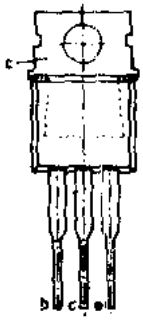
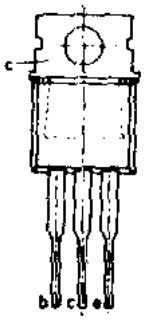
MULLARD DATA BOOK 1973-74

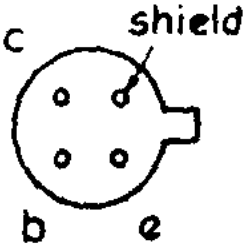
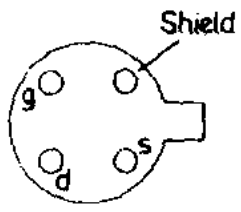
ERRATA

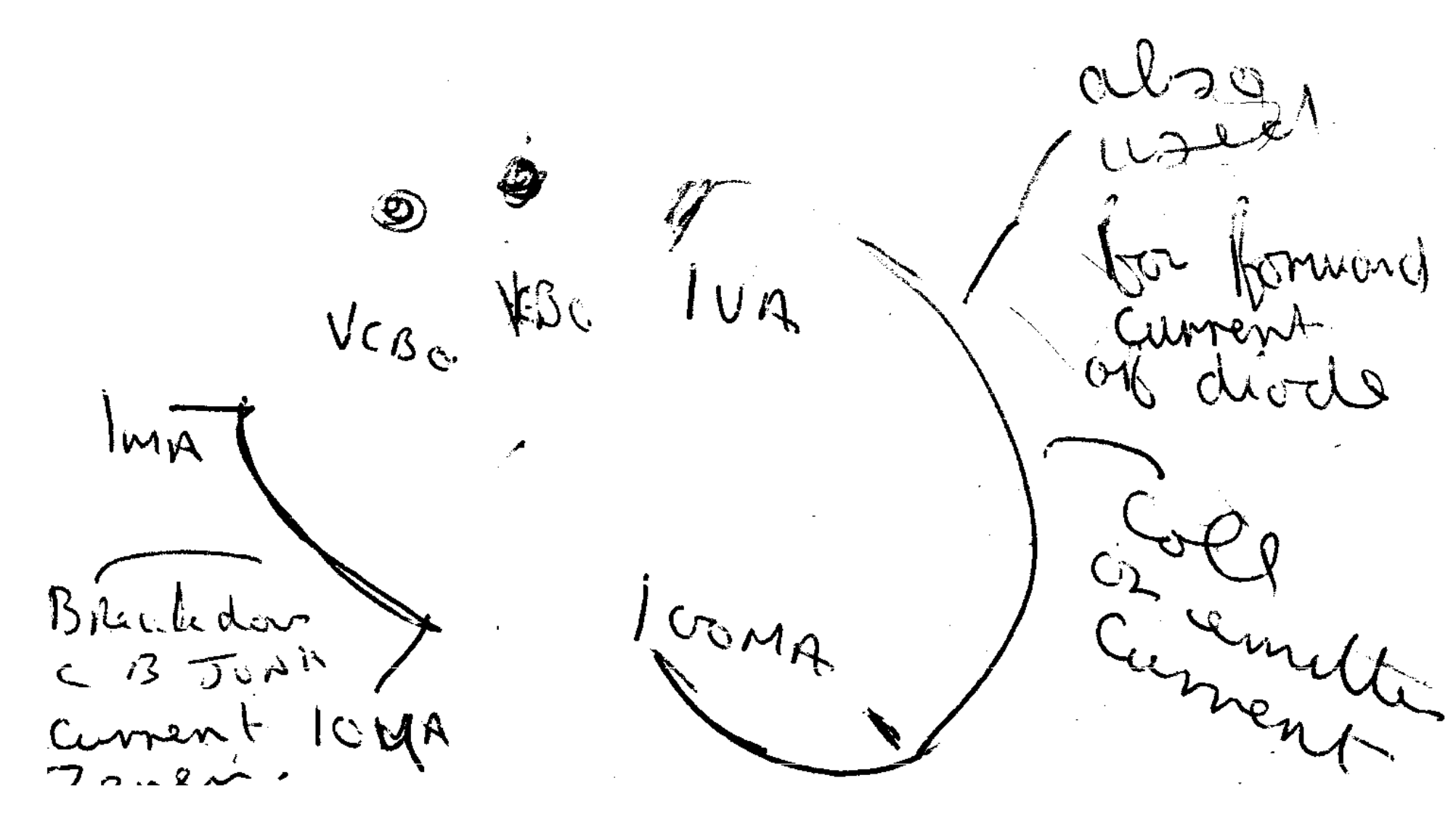
AUGUST 1973

Mullard Limited
Renewal Sales Department
Mullard House
Torrington Place
London WC1E 7HD

Type No.	Page No.	Correction
AC187	13	Delete minus signs to read: *IC = 300mA; VCE = 1·0V. †IC = 10mA; VCE = 2·0V.
BC157 BC158 BC159	24 25 25	Add minus sign to all voltages and currents.
BC186 BC187	25 26	Add minus sign to all voltages and currents.
BD201 BD202 BD203	31 32 32	Replace existing outline of device with new plastic encapsulation. 
BD204	32	Amend n-p-n to read p-n-p: "Silicon p-n-p.....equipment" Replace existing outline of device with new plastic encapsulation. 

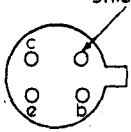
TOR SECTION

Type No.	Page No.	Correction
BD234	33	Amend n-p-n to read p-n-p: "Silicon p-n-p.....drivers"
BD236	34	Amend n-p-n to read p-n-p: "Silicon p-n-p.....drivers"
BD238	35	Amend n-p-n to read p-n-p: "Silicon p-n-p.....drivers"
BF200	41	Replace existing pinning diagram with: 
BF263	42	Delete 'n' and replace with 'm' to read: "ICM max. 20mA"
BFW10	43	Replace existing pinning diagram with: 


VCBO
ICOMA
IMA
Breakdown
current ICMA

AF125

Germanium p-n-p alloy-diffused transistor. For use as a mixer oscillator in a.m./f.m. and shortwave receivers.



Construction: TO–72		
VCB max. (IE=0)	−20	V
ICM max.	10	mA
Ptot max. (Tamb=30°C)	60	mW
fT (VCB=−6 V; IE=1 mA) Typ.	75	MHz
*Cobs (VCB=−6 V; IE=1 mA) Typ.	2·5	pF

At frequencies below 10·7 MHz the feedback capacitance in common emitter (Coes) is approx. 3·5 pF at IE=1 mA; VCE=−6 V.
*f=100 MHz.

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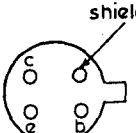
*AF126

Germanium p-n-p alloy-diffused transistor. For use as an i.f. amplifier in f.m. receivers.



Construction: TO–72		
VCB max. (IE=0)	−20	V
ICM max.	10	mA
Ptot max. (Tamb=30°C)	60	mW
fT (VCB=−6 V; IE=1 mA) Typ.	75	MHz
*Cobs (VCB=−6 V; IE=1 mA) Typ.	2·5	pF

At frequencies below 10·7 MHz the feedback capacitance in common emitter (Coes) is approx. 3·5 pF at IE=1 mA; VCE=−6 V.
*f=100 MHz.

AF127

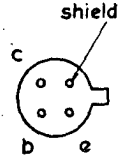
Germanium p-n-p alloy-diffused transistor. For use as a mixer/oscillator and i.f. amplifier in m.w. and l.w. a.m. receivers.

Construction: TO–72		
VCB max. (IE=0)	−20	V
ICM max.	10	mA
Ptot max. (Tamb=30°C)	60	mW
fT (VCB=−6 V; IE=1 MA) Typ.	75	MHz
*Cobs (VCB=−6 V; IE=1 mA) Typ.	2·5	pF

At frequencies below 10·7 MHz the feedback capacitance in common emitter (Coes) is approx. 3·5 pF at IE=1 mA; VCE=−6 V.
*f=100 MHz.

AF139

Germanium p-n-p mesa transistor. For use as a mixer/oscillator at frequencies up to 860 MHz.



Construction: TO–72		
VCBO max.	−20	V
VCEO max.	−15	V
ICM max.	10	mA
Ptot max. (Tamb ≤45°C)	60	mW
fT (VCE=−12 V; IC=1·5 mA) Typ.	550	MHz
*Max. unilateralised power gain, Typ.	11·5	dB
*Noise figure (Rs=60 Ω), Typ.	7	dB

*VCB=−12 V; IE=1·5 mA; f=800 MHz.

AF178

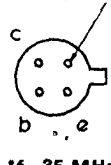
Germanium p-n-p alloy-diffused transistor. For use as a mixer/oscillator at frequencies up to 260 MHz.

Construction: TO–12		
VCB max. (IE=0)	−25	V
ICM max.	10	mA
Ptot max. (Tamb ≤45°C)	75	mW
fT (VCB=−12 V; IE=1 mA) Typ.	180	MHz
*Cobs (VCB=−12 V; IE=1 mA) Typ.	1·8	pF
hfe	>20	
†Noise figure, Typ.	6	dB

*f=200 MHz.
†IC=1 mA; VCE=−12 V; f=200 MHz; RS=30 Ω.

AF179

Germanium p-n-p alloy-diffused transistor. For use as a large signal i.f. amplifier in television receivers.

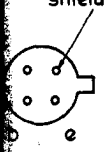


Construction: TO–12		
VCB max.	−25	V
ICM max.	15	mA
Ptot max. (Tamb=25°C)	140	mW
ICBO (VCB=−10 V; IE=0 mA) Max.	8	μA
*Coes (VCE=−14 V; IE=6·5 mA)	1·8	pF

*f=35 MHz.

F180

Germanium p-n-p alloy-diffused transistor. For use as an r.f. amplifier in television tuners, with forward gain control for frequencies up to 220 MHz.



Construction: TO–12		
VCB max. (IE=0)	−25	V
ICM max.	25	mA
Ptot max. (Tamb=25°C)	156	mW
*Noise factor, Typ.	3·5	dB
ICBO (VCB=−10 V; IE=0) max.	10	μA
†Max. unilateralised gain, Typ.	25	dB

=200 MHz; GhS=40 mmho; BS=0.
E=3 mA; VCB=−10 V; f=200 MHz.

F181

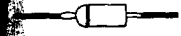
Germanium p-n-p alloy-diffused transistor. For use as a television video i.f. amplifier with forward a.g.c.

Construction: TO–12		
VCB max. (IE=0)	−30	V
ICM max.	20	mA
Ptot max. (Tamb=25°C)	156	mW
hFE (Ic=3 mA; VCE=−10 V) min.	20	
ICBO (VCB=−10 V; IE=0) Typ.	1·4	μA
*fT (VCB=−10 V; IE=3 mA) Typ.	170	MHz
†Max. unilateralised gain, Typ.	35	dB

=35 MHz.
CE=−10 V; IE=3 mA; f=35 MHz.

A102

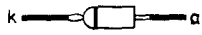
Silicon variable capacitance diode.



Construction: DO–7		
VR max.	20	V
IR max.	100	μA
Capacitance Ratio: Cd (VR=10 V) / Cd (VR=4 V) max.	0·7	
Tamb max.	90	°C

BA145

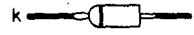
A high speed double diffused silicon diod intended for use in clamping circuits, lin phase detectors and burst phase detector of colour television receivers.



Plastic construction: DO–14	
VRWM max.	300
IF (AV) max.	10 m
IFRM max.	100 m
Max. VF at IF of (at Tj=75°C):	
100 mA	1·0
Tj max.	125 °

BA148

A fast general purpose diode.

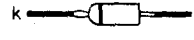


Plastic construction: DO–14	
VRRM max.	350
VRWM max.	300
IF (AV) max. Averaged over any 20 ms period	0·3
IFRM	2
VF max. at IF of 2 A	1·5
*IR max. at VR of 300 V	200
Tj max.	125

*Tj=125°C.

BA154

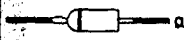
Silicon whiskerless diode for use in tel vision circuits and general purpose applic tions; all-glass construction.



VR max.	50
IF max.	30 m
IFRM max.	50 m
Max. VF at IF of (at Tj=25°C):	
1·0 mA	0·9
30 mA	1·5
Tj max.	175

BA155

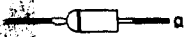
Silicon whiskerless diode for use as video noise limiter and in general purpose applications; all-glass construction.



VR max.	150	V
IF max.	100	mA
IFRM max.	150	mA
Max. VF at IF of (at Tj=25°C):		
10 mA	1·2	V
50 mA	1·5	V
Tj max.	175	°C

BA156

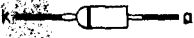
Silicon whiskerless diode intended for use as bias stabiliser in class B output stages; all-glass construction.



IF max.	30	mA
VF (Tj=25°C) at:		
IF=0·2 mA	500 to 590	mV
IF=3·0 mA	585 to 800	mV
Tj max.	175	°C
θj-amb (in free air)	0·6	deg C/mW

BA182

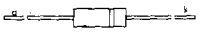
Silicon planar diode for use as a switching element in v.h.f. tuners.



VR max.	35	V
IF max.	100	mA
Cd (VR=20V; f=1·0MHz) typ.	0·8	pF
max.	1·0	pF
rd (IF=5·0mA; f=200MHz) typ.	0·5	Ω
max.	0·7	Ω

BAX13

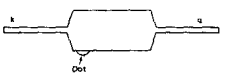
Whiskerless diffused diode for high-sp
application.



VR max.	50
IF max.	75
trr max. Rise time	4·0
Qs max. Storage charge	45

BB105

Variable capacitance silicon diode for u.
tuners.



VR max.	20
IR max.	100
Capacitance Ratio:	
Cd (VR = 3 V) (f=1·0 MHz)	min. 4
Cd (VR=25 V)	max. 5
Tj max.	60

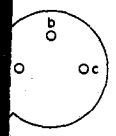
BC107

Silicon n-p-n planar epitaxial transistor.
use in audio driver stages and televi
signal processing circuits.

Construction: TO–18	
VCBO max.	50
VCEO max.	45
IC max.	100
Ptot max. (Tamb ≤25°C)	300
hfe (VCE=5V; IC=2 mA)	125 to 500
fT (VCE=5 V; IC=10 mA)	300

BC108

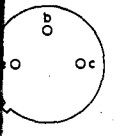
Silicon n-p-n planar epitaxial transistor. Intended for applications as audio pre-amplifiers, driver stages in amplifiers, radio and television receivers.



Construction: TO–18		
VCBO max.	30	V
VCEO max.	20	V
IC max.	100	mA
Ptot max. (Tamb ≤25°C)	300	mW
hfe (VCE=5 V; IC=2 mA)	125 to 500	
fT (VCE=5 V; IC=10 mA)	300	MHz

C109

Silicon n-p-n planar epitaxial transistor. For use in low noise input stages in high quality amplifiers and tape recorders.

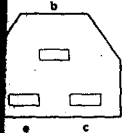


Construction: TO–18		
VCBO max.	30	V
VCEO max.	20	V
IC max.	100	mA
Ptot max. (Tamb ≤25°C)	300	mW
hfe (VCE=5 V; IC=2 mA)	240 to 900	
fT (VCE=5 V; IC=10 mA)	300	MHz
*Noise figure (Typ.)	2·0	dB

*=0·2 mA; VCE=5 V; RS=2·0 kΩ; f=30 Hz to 15 KHz.

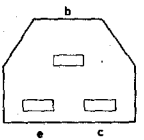
C147

Silicon n-p-n planar epitaxial transistors in plastic encapsulation with three rigid self-locking strips suitable for insertion into printed circuit boards using standard grids. for use in audio driver stages and television signal processing circuits.



VCBO max.	5[illegible]	V
VCEO max.	45	V
IC max.	100	mA
Ptot max. (Tamb ≤25°C)	220	mW
hfe (VCE=5·0 V; IC=2·0 mA)	125 to 500	
fT Typ. (VCE=5·0 V; IC=10 mA)	300	MHz

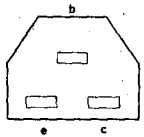
BC148



Silicon n-p-n planar epitaxial transistor in plastic encapsulation with three rigid self-locking strips suitable for insertion into printed circuit boards using standard grids. For use in audio preamplifiers, and driver stages in amplifiers, radio and television receivers.

VCBO max.	30	V
VCEO max.	20	V
IC max.	100	mA
Ptot max. (Tamb ≤25°C)	220	mW
hfe (VCE=5 V; IC=2 mA)	125 to 500	
fT Typ. (VCE=5 V; IC=10 mA)	300	MHz

BC149

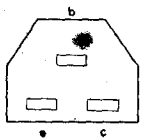


Silicon n-p-n planar epitaxial transistor in plastic encapsulation with three rigid self-locking strips suitable for insertion into printed circuit boards using standard grids. For use in low noise input stages in high quality amplifiers and tape recorders.

VCBO max.	30	V
VCEO max.	20	V
IC max.	100	mA
Ptot max. (Tamb ≤25°C)	220	mW
hfe (VCE=5 V; IC=2 mA)	240 to 900	
fT Typ. (VCE=5 V; IC=10 mA)	300	MHz
*Noise figure (Typ.)	2·0	dB

*IC=0·2 mA; VCE=5 V; RS=2·0 kΩ; f=30 Hz to 15 kHz.

BC157

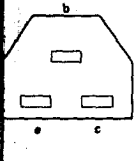


Silicon p-n-p planar epitaxial transistor in plastic encapsulation with three rigid self-locking strips suitable for insertion into printed circuit boards using standard grids. For use in audio driver stages and television signal processing circuits.

VCBO max.	50	V
VCEO max.	45	V
IC max.	100	mA
Ptot max. (Tamb ≤25°C)	220	mW
hfe (VCE=−5 V; IC=−2 mA)	75 to 260	
fT Typ. (VCE=−5 V; IC=−10 mA)	130	MHz

BC158

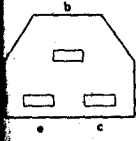
Silicon p-n-p planar epitaxial transistor in plastic encapsulation with three rigid self-locking strips suitable for insertion into printed circuit boards using standard grids. For use in audio preamplifiers, and driver stages in amplifiers, radio and television receivers.



VCBO max.	30	V
VCEO max.	25	V
IC max.	100	mA
Ptot max. (Tamb ≤25°C)	220	mW
hfe (VCE=−5 V; IC=−2 mA)	75 to 260	
fT Typ. (VCE=−5 V; IC=−10 mA)	130	MHz

BC159

Silicon p-n-p planar epitaxial transistor in plastic encapsulation with three rigid self-locking strips suitable for insertion into printed circuit boards using standard grids. For use in low noise input stages in high quality amplifiers and tape recorders.

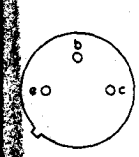


VCBO max.	25	V
VCEO max.	20	V
IC max.	100	mA
Ptot max. (Tamb ≤25°C)	220	mW
hfe (VCE=−5 V; IC=−2 mA)	125 to 500	
fT Typ. (VCE=−5 V; IC=−10 mA)	130	MHz
*Noise figure (Typ.)	2·0	dB

*IC=−0·2 mA; VCE=−5 V; RS=2·0 kΩ; f=30 Hz to 15 kHz.

C186

Silicon p-n-p planar epitaxial transistor. For use in television applications and driver stages of audio amplifiers.

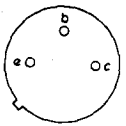


Construction: TO–18

VCBO max.	40	V
VCEO max.	25	V
ICM max.	200	mA
Ptot max. (Tamb ≤25°C)	300	mW
fT Typ. (VCE=−5 V; IC=−50 mA)	168	*MHz
hFE (VCE=−5 V; IC=−50 mA)	35 to 175	

BC187

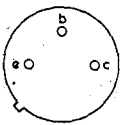
Silicon p-n-p planar epitaxial transistor. For use in television applications and driver stages of audio amplifiers.



Construction: TO–18		
VCBO max.	30	V
VCEO max.	25	V
ICM max.	200	mA
Ptot max. (Tamb = 25 °C)	300	mW
fT Typ. (VCE = −5 V; IC = 50 mA)	191	MHz
hFE (VCE = −5 V; IC = −50 mA)	65 to 325	

BD115

Silicon n-p-n planar transistor. For use in class 'A' output stages of audio amplifiers operating from a supply voltage of 100 volts.

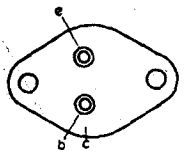


Construction: TO–39		
VCBO max.	220	V
VCEO max.	180	V
ICM max.	150	mA
*Ptot max. (Tamb ⩽ 50 °C, mounted on a heatsink)	6·0	W
hFE Typ. (VCE = 100 V; IC = 50 mA)	60	
fT Typ. (VCE = 100 V; IC = 30 mA)	145	MHz

*Mounted on a 1·5 mm blackened aluminium heatsink, area ⩾ 30 cm²

BD124

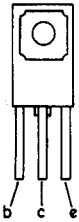
Silicon n-p-n planar epitaxial power transistor intended for television frame time base output stages and general purpos medium power applications.



Construction: SO–55/SB2–5		
VCBO (IC ⩽ 1 mA)	70	V
ICM max.	4	A
Ptot max. (Tmb ⩽ 60 °C)	15	W
hFE min. (IC = 0·5 A)	35	
fT min. (IC = 250 mA)	60	MH
Tj max.	175	°
θj-mb	7·5	deg C/W

BD131

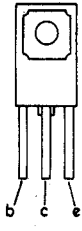
Silicon n-p-n planar epitaxial transistor for general purpose and medium power applications.



Construction: TO–126		
VCBO max.	70	V
VCEO max.	45	V
ICM max.	6·0	A
Ptot max. (Tmb ⩽60°C)	11	W
hFE min. (VCE=12 V; IC=0·5 A)	40	
fT min. (VCE=5 V; IC=0·25 A)	60	MHz
Tj max	125	°C
θj-mb	6·0	deg C/W

BD131 BD132

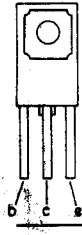
Silicon n-p-n planar epitaxial transistor (BD131) and p-n-p (BD132) output transistors.
Complementary matched pair for push-pull stages.



Construction: TO–126	BD131	BD132	
VCBO max.	45	−45	V
VCEO max.	45	−45	V
ICM max.	6·0		A
Ptot max. (Tmb ⩽60°C)	11		W
hFE (VCE=±12 V; ICF=0·5 A)	78 to 250		
fT min. (VCE=±5 V; IC=0·25 A)	60		MHz
Tj max.	125		°C
θj-mb	6·0		deg C/W

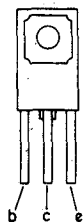
BD133

Silicon n-p-n planar epitaxial output transistor for high voltage medium power applications.



Construction: TO–126		
VCBO max.	90	V
VCEO max.	60	V
ICM max.	6·0	A
Ptot max.	11	W
hFE (VCE=12V; IC=0·5A)	>40	
fT (f=35MHz; IC=0·25A; VCE=5V)	>60	MHz

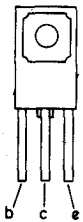
BD135



Silicon n-p-n planar epitaxial transistor in plastic encapsulation. Suitable for use in high dissipation single-ended driver circuits, or in complementary driver pairs with type BD136 in high quality audio amplifiers.

Construction: TO–126		
VCBO max.	45	V
VCEO max.	45	V
ICM max.	1·5	A
Ptot max. (Tmb ⩽60°C)	6·5	W
hFE (VCE=2 V; IC=150 mA)	40 to 250	
fT Typ. (VCE=5 V; IC=50 mA)	250	MHz
Tj max.	125	°C
θj-mb	10	deg C/W

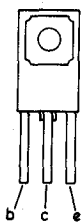
BD136



Silicon p-n-p planar epitaxial transistor in plastic encapsulation. Suitable for use in high dissipation single-ended driver circuits, or in complementary driver pairs with type BD135 in high quality audio amplifiers.

Construction: TO–126		
VCBO max.	−45	V
VCEO max.	−45	V
ICM max.	1·5	A
Ptot max. (Tmb ⩽60°C)	6·5	W
hFE (VCE=−2 V; IC=150 mA)	40 to 250	
fT Typ. (VCE=−5 V; IC=50 mA)	75	MHz
Tj max	125	°C
θj-mb	10	deg C/W

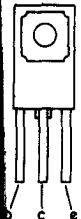
BD137



Silicon n-p-n planar epitaxial transistor in plastic encapsulation. Suitable for use in high dissipation single-ended driver circuits, or in complementary driver pairs with type BD138 in high quality audio amplifiers.

Construction: TO–126		
VCBO max.	60	V
VCEO max.	60	V
ICM max.	1·5	A
Ptot max. (Tmb⩽60°C)	6·5	W
hFE (VCE=2 V; IC=150 mA)	40 to 160	
fT Typ. (VCE=5 V; IC=50 mA)	250	MHz
Tj max.	125	°C
θj-mb	10	deg C/W

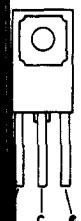
BD138



Silicon p-n-p planar epitaxial transistor in plastic encapsulation. Suitable for use in high dissipation single-ended driver circuits, or in complementary driver pairs with type BD137 in high-quality audio amplifiers.

Construction: TO–126		
VCBO max.	−60	V
VCEO max.	−60	V
ICM max.	1·5	A
Ptot max. (Tmb≤60°C)	6·5	W
hFE (VCE=−2 V; IC=150 mA)	40 to 160	
fT Typ. (VCE=−5 V; IC=50 mA)	75	MHz
Tj max.	125	°C
θj-mb	10	deg C/W

BD139



Silicon n-p-n planar epitaxial transistor in plastic encapsulation. Suitable for use in high dissipation single-ended driver circuits, or in complementary driver pairs with type BD140 in high quality audio amplifiers.

Construction: TO–126		
VCER max.	100	V
VCEO max.	80	V
ICM max.	1·5	A
Ptot max. (Tmb≤60°C)	6·5	W
hFE (VCE=2 V; IC=150 mA)	40 to 160	
fT Typ. (VCE=5 V; IC=50 mA)	250	MHz
Tj max.	125	°C
θj-mb	10	deg C/W

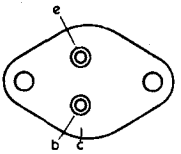
D140

Silicon p-n-p planar epitaxial transistor in plastic encapsulation. Suitable for use in high dissipation single-ended driver circuits, or in complementary driver pairs with type BD139 in high quality audio amplifiers.

Construction: TO–126		
VCER max.	−100	V
VCEO max.	−80	V
ICM max.	1·5	A
Ptot max. (Tmb≤60°C)	6·5	W
hFE (VCE=−2 V; IC=150 mA)	40 to 160	
fT Typ. (VCE=−5 V; IC=50 mA)	75	MHz
Tj max.	125	°C
θj-mb	10	deg C/W

BD144

Television line driver n-p-n transistor.

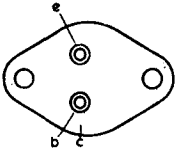


Construction: TO-3

VCBO	800	V
VCER	800	V
ICM	0·25	A
hFE	>20	
fT	12	MHz

BD181

Silicon n-p-n diffused power transistors for use in high-power hi-fi audio equipment.

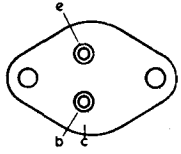


Construction: TO-3

VCEO	45	V
VCER	55	V
ICM	15	A
Ptot (Tmb = 83°C)	70	W
hFE (IC = 3A; VCE = 4V)	20–70	

BD182

Silicon n-p-n diffused power transistor for use in high-power hi-fi audio equipment.

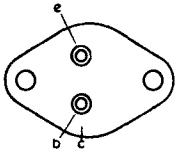


Construction: TO-3

VCEO	60	V
VCER	70	V
ICM	15	A
Ptot (Tmb = 25°C)	117	W
hFE (IC = 4A; VCE = 4V)	20–70	

BD183

Silicon n-p-n diffused power transistor for use in high-power hi-fi audio equipment.

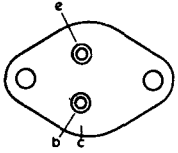


Construction: TO–3

VCEO		80	V
VCER		85	V
ICM		15	A
Ptot (Tmb = 25°C)		117	W
hFE (IC = 4A; VCE	4V)	20–70	

BD184

Silicon n-p-n diffused power transistor for use in high-power hi-fi audio equipment.

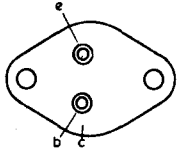


Construction: TO–3

VCEO		95	V
VCER		90	V
ICM		15	A
Ptot (Tmb = 25°C)		117	W
hFE (IC = 4A; VCE	4V)	20–70	

BD201

Silicon n-p-n transistor for use in hi-fi audio equipment.
Complementary to BD202.

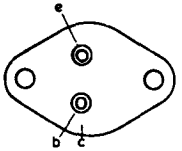


Construction: TO–3.

VCBO	60	V
VCEO	45	V
ICM	8	A
Ptot (Tmb = 25°C)	55	W
hFE	30	

BD202

Silicon p-n-p transistor for use in hi-fi audio equipment.
Complementary to BD201.

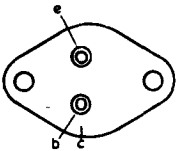


Construction: TO–3

VCBO	−60	V
VCEO	−45	V
ICM	8	A
Ptot (Tmb = 25°C)	55	W
hFE	>30	

BD203

Silicon n-p-n transistor for use in hi-fi audio equipment
Complementary to BD204.

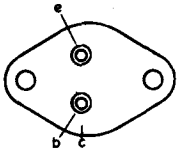


Construction: TO–3

VCBO	60	V
VCEO	60	V
ICM	8	A
Ptot (Tmb = 25°C)	55	W
hFE	>30	

BD204

Silicon n-p-n transistor for use in hi-fi audio equipment.
Complementary to BD203.

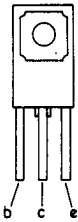


Construction: TO–3

VCBO	−60	V
VCEO	−60	V
ICM	8	A
Ptot (Tmb = 25°C)	55	W
hFE	>30	

BD232

Silicon n-p-n transistor for use as a line driver in television receivers.

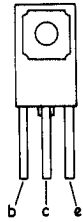


Construction: TO–126

VCBO max.	500	V
VCEO max.	250	V
ICM max.	500	mA
Ptot max. (Tmb = 25°C)	7	W
hFE	25–175	
fT typ.	15	MHz

BD233

Silicon n-p-n transistor for use as audio hi-fi drivers.

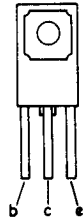


Construction: TO–126

VCBO max.	45	V
VCEO max.	45	V
ICM max.	6·0	A
Ptot max. (Tamb = 25°C)	25	W
hFE	>25	
fT min.	3·0	MHz

BD234

Silicon n-p-n transistor for use as audio hi-fi drivers.

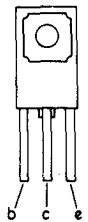


Construction: TO–126

VCBO max.	−45	V
VCEO max.	−45	V
ICM max.	6·0	A
Ptot max. (Tamb = 25°C)	25	W
hFE	>25	
fT min.	3·0	MHz

BD235

Silicon n-p-n transistor for use as audio hi-fi drivers.

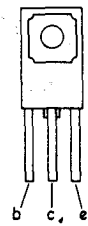


Construction: TO–126

VCBO max.	60	V
VCEO max.	60	V
ICM max.	6·0	A
Ptot max. (Tamb = 25°C)	25	W
hFE	25	
fT min.	3·0	MHz

BD236

Silicon n-p-n transistor for use as audio hi-fi drivers.

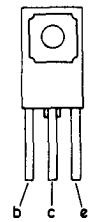


Construction: TO–126

VCBO max.	−60	V
VCEO max.	−60	V
ICM max.	6·0	A
Ptot max. (Tmb = 25°C)	25	W
hFE	>25	
fT min.	3·0	MHz

BD237

Silicon n-p-n transistor for use as audio hi-fi drivers.

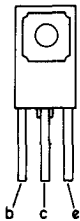


Construction: TO–126

VCBO max.	100	V
VCEO max.	80	V
ICM max.	6·0	A
Ptot max. (Tamb = 25°C)	25	W
hFE	>25	
fT min.	3·0	MHz

BD238

Silicon n-p-n transistor for use as audio hi-fi drivers.



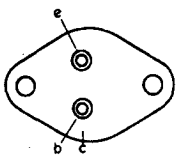
Construction: TO–126

VCBO max.	−100	V
VCEO max.	−80	V
ICM max.	6·0	A
Ptot max. (Tmb 25°C)	25	W
hFE	>25	
fT min.	3·0	MHz

BDY20

Silicon n-p-n diffused power transistor. For use in high-quality amplifiers and power supplies.

2–BDY20 Matched Pair.

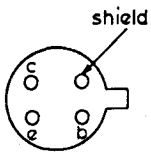


Construction: TO–3

VCBO max.	100	V
VCEO max.	60	V
ICM max.	15	A
Ptot max. (Tmb ≤25°C)	115	W
hFE (VCE=4 V; IC=4A)	20 to 70	
fT Typ. (VCE=4 V; IC=1A)	1·0	MHz
Tj max.	200	°C
θj-mb	1·5	deg °C/W

BF115

Silicon n-p-n planar epitaxial transistor intended for a.m. and f.m. applications.



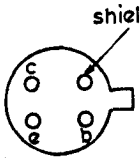
Construction: TO–72

VCBO max.	50	V
ICM max.	30	mA
Ptot max. (Tamb ≤45°C)	145	mW
Tj max.	175	°C
fT Typ.	230	MHz
*Noise figure	4·0	dB

*f=100 MHz; gs=10 mmho.

BF167

Silicon n-p-n planar transistor. For use in the control stage of television video i.f. amplifiers with forward gain control.



Construction: TO–72		
VCB max.	+40	V
VCE max.	+30	V
IC max.	25	mA
Ptot max. (Tamb ≤45°C)	130	mW
fT (VCE=+10 V; IC=4 mA) Typ.	350	MHz
Max. unilateralised gain, Typ.	42	dB
*Noise figure, Typ.	3	dB

*VCE=+10 V; IC=4 mA; gs=10 mmho; f=35 MHz.

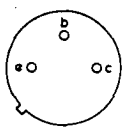
BF173

Silicon n-p-n planar epitaxial transistor. For use in the output stages of television video i.f. amplifiers.

Construction: TO–72		
VCB max.	+40	V
VCE max.	+25	V
IC max.	25	mA
Ptot max. (Tamb ≤45°C)	200	mW
fT (VCE=+10 V; IC=5 mA)	550	MHz
Max. unilateralised gain, Typ.	42	dB

BF177

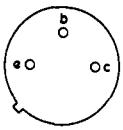
Silicon n-p-n planar transistor. For use in the video output stages of portable television receivers.



Construction: TO–5		
VCBO max.	85	V
VCEO max.	60	V
IC max.	50	mA
Ptot max. (Tamb ≤65°C)	600	mW
hFE min. (IC=15 mA; VCE=10 V)	20	
fT Typ. (IC=10 mA; VCE=10 V)	120	MHz

BF178

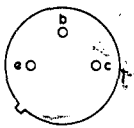
Silicon n-p-n transistor for use in video output stages.



Construction: TO–5 Collector to case		
VCBO max.	145	V
ICM max.	50	mA
Ptot max. (Tamb ≤55°C)	0·6	W
Tj max.	200	°C
fT Typ. (VCE=10 V; IC=10 mA)	120	MHz
hFE min. (VCE=20 V; IC=30 mA)	20	

BF179

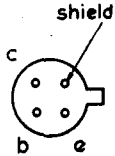
Silicon n-p-n planar transistor. For use in the video output stages of monochrome television receivers.



Construction: TO–5		
VCBO max.	225	V
VCEO max.	115	V
IC max.	50	mA
Ptot max. (Tamb ≤65°C)	600	mW
hFE min. (IC=20 mA; VCE=15 V)	20	
fT Typ. (IC=10 mA; VCE=10 V)	120	MHz

BF180

Silicon n-p-n planar transistor with forward gain control characteristics. For use in r.f. amplifier stage of television integrated tuners.

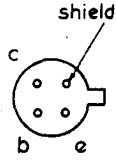


Construction: TO–72		
VCBO max.	30	V
IC max.	20	mA
Ptot max. (Tamb ≤25°C)	150	mW
*Max. unilateralised power gain	24	dB
fT (IC=2 mA; VCE=10 V) Typ.	675	MHz

*At 200 MHz.

BF181

Silicon n-p-n planar transistor with forward gain control characteristics. For use as a self-oscillating mixer or mixer in television integrated tuners.

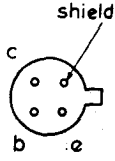


Construction: TO–72		
VCBO max.	30	V
IC max.	20	mA
Ptot max. (Tamb ≤25°C)	150	mW
*Max. unilateralised power gain	11	dB
fT Typ. (IC=2 mA; VCE=10 V)	600	MHz

*At f=900 MHz.

BF182

Silicon n-p-n planar transistor. For use as a separate mixer in television integrated tuners.

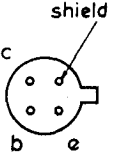


Construction: TO–72		
VCBO max.	25	V
VCEO max.	20	V
IC max.	15	mA
Ptot max. (Tamb=25°C)	150	mW
fT Typ. (IC=2 mA; VCE=10 V)	650	MHz
Noise figure (VCB=10 V; IE=2 mA; f=800 MHz) Typ.	7·4	dB
*Max. unilateralised gain Typ.	11	dB

*IE=−2 mA; VCB=10 V; f=900 MHz.

BF183

Silicon n-p-n planar transistor. For use as a local oscillator in television integrated tuners.

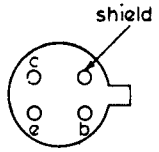


Construction: TO–72		
VCBO max.	25	V
VCEO max.	20	V
IC max.	15	mA
Ptot max. (Tamb=25°C)	150	mW
fT Typ. (IC=3 mA; VCE=10 V)	800	MHz
*Max. unilateralised gain Typ.	12·5	dB

*IE=−3 mA;VCB=10 V; f=900 MHz.

BF184

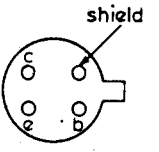
Silicon n-p-n planar epitaxial transistor recommended for use in i.f. amplifiers.



Construction: TO–72		
VCBO max.	30	V
IC max.	30	mA
Ptot max. (Tamb ≤45°C)	145	mW
Tj max.	175	°C
hFE (IC=1 mA; VCE=10 V)	75 to 750	
fT Typ. (IC=1 mA; VCE=10 V)	300	MHz

BF185

Silicon n-p-n planar epitaxial low noise transistor. Intended for use as input and mixer/oscillator stages.

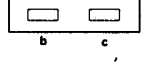


Construction: TO–72		
VCBO max.	30	V
IC max.	30	mA
Ptot max. (Tamb ≤45°C)	145	mW
Tj max.	175	°C
hFE (IC=1 mA; VCE=10 V)	34 to 140	
fT Typ. (IC=1 mA; VCE=10 V)	220	MHz
*Noise figure Typ.	3·6	dB

*IC=1 mA; VCE=10 V; RS=100 Ω; f=100 MHz.

BF194

Silicon n-p-n epitaxial planar transistor in epoxy resin encapulation with three rigid self-locking connections. For use in a.m./f.m. receiver i.f. stages and sound i.f. stages of television receivers.

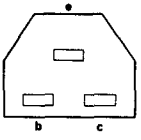


VCB max. (IE=0)	+30	V
IC max.	30	mA
Ptot max. (Tamb ≤45°C)	220	mW
hFE (VCE=10 V; IC=1 mA) Typ.	115	
fT Typ.	260	MHz
*Noise figure Typ.	4·0	dB

*IC=1 mA; VCE=10 V; f=100 MHz; gs=10 mmho.

BF195

Silicon n-p-n epitaxial planar transistor. For use in the input and mixer stages of a.m./f.m. receivers.

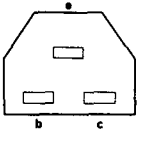


VCB max. (IE=0)	+30	V
IC max.	30	mA
Ptot max. (Tamb ⩽45°C)	220	mW
hFE (VCE=10 V; IC=1 mA) Typ.	67	
fT Typ.	200	MHz
*Noise figure Typ.	3·5	dB

*IC=1 mA; VCE=10 V; f=1 MHz; gs=20 mmho.

BF196

Silicon n-p-n planar transistor in plastic encapsulation with three rigid self-locking strips suitable for insertion into printed circuit boards using standard grids. For use in the control stage of television video i.f. amplifiers with forward gain control.

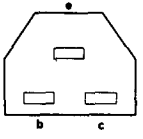


VCBO max.	40	V
VCEO max.	30	V
IC max.	25	mA
Ptot max. (Tamb=25°C)	250	mW
fT Typ. (IC=4 mA; VCE=10 V)	400	MHz
*Noise figure Typ.	3·0	dB

*IC=4 mA; VCE=10 V; gs=10 mmho; f=35 MHz.

BF197

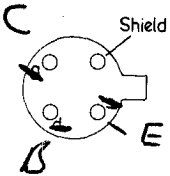
Silicon n-p-n planar epitaxial transistor in plastic encapsulation with three rigid self-locking strips suitable for insertion into printed circuit boards using standard grids. For use in the output stage of television video i.f. amplifiers.



VCBO max.	40	V
VCEO max.	25	V
IC max.	25	mA
Ptot max. (Tamb=25°C)	250	mW
fT Typ. (IC=5 mA; VCE=10 V)	550	MHz

BF200

Silicon n-p-n planar transistor with forward gain control characteristics. For use in the r.f. amplifier stage of television v.h.f. tuners.

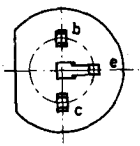


Construction: TO–72		
VCBO max.	30	V
VCEO max.	20	V
IC max.	20	mA
Ptot max. (Tamb = 25°C)	150	mW
fT Typ. (IC = 3 mA; VCE = 10 V)	550	MHz
*Noise figure Typ.	3·0	dB

*IE = −3 mA; VCB = 10 V; gs = 10 mmho; f = 200 MHz.

BF241

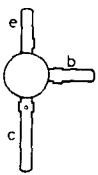
Silicon n-p-n transistor for use as a.m. mixer/i.f. amplifier.



Construction: TO–92.			
VCBO max.		40	V
VCEO max.		40	V
ICM max.		25	mA
Ptot max. (Tamb	45°C)	225	mW
Tj max.		150	°C
fT min.		400	MHz

BF262

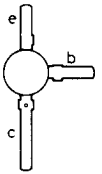
Silicon n-p-n h.f. transistor for use in u.h.f. television tuners.



VCBO max.	30	V
VCEO max.	20	V
ICM max.	20	mA
hFE (IC 3·0mA)	20	
fT min.	800	MHz

BF263

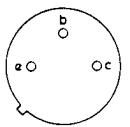
Silicon n-p-n h.f. transistor for use in u.h.f. television tuners.



VCBO max.	30	V
VCEO max.	20	V
ICM max.	20	nA
hFE (IC 3·0mA)	20	
fT min.	600	MHz

BF336

Silicon n-p-n medium power transistors for use as television video amplifiers.

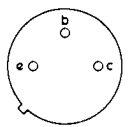


Construction: TO–5. Collector to case

VCBO max	185	V
VCEO max.	180	V
ICM max.	100	mA
Ptot max. (Tmb 25°C)	3·0	W
hFE (Ic = 30mA)	20	
fT min.	80	MHz

BF337

Silicon n-p-n medium power transistors for use as television video amplifiers.



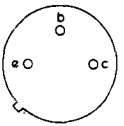
Construction: TO–5. Collector to case.

VCBO max.	250	V
VCEO max.	200	V
ICM max.	100	mA
Ptot max. (Tmb 25°C)	3·0	W
hFE (Ic 30mA)	20	
fT min.	80	MHz

BF338

Silicon n-p-n medium power transistors for use as colour television video amplifiers.

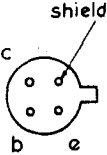
Construction: TO-5. Collector to case.



VCBO max.	300	V
VCEO max.	225	V
ICM max.	100	mA
Ptot max. (Tmb 25°C)	3·0	W
hFE (Ic 30mA)	20	
fT min.	80	MHz

BFW10

N-channel silicon field-effect transistor, low noise, suitable for use in wide-band amplifiers.



g—gate
d—drain
s—source

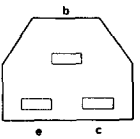
Construction: TO-72. Shield to case

VDSS max.	**±30**	**V**
VGSO max.	**−30**	**V**
ID max.	**20**	**mA**
IG max.	**10**	**mA**
Ptot max. (Tamb ≤25°C)	**300**	**mW**
***N max.**	**2·5**	**dB**

***f=100 MHz; RG=800 Ω; VDS=15 V; VGS=0.**

BFW60

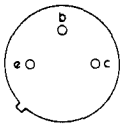
Silicon n-p-n planar epitaxial transistors in plastic encapsulation with three rigid self-locking strips suitable for insertion into printed circuit boards using standard grids. For general purpose applications.



VCBO max.	40	V
VCEO max.	35	V
IC max.	1·0	A
Ptot max. (Tamb ≤25°C)	300	mW
hFE (IC = 100mA)	>50	
fT typ.	80	MHz

BFX29

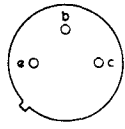
Silicon p-n-p planar epitaxial transistor for general amplifying and switching purposes.



Construction: TO–5. Collector to case		
VCBO max.	−60	V
VCEO max.	−60	V
ICM max.	600	mA
Ptot max. (Tamb ≤25°C)	600	mW
hFE Typ. (VCE=−10V; IC=10 mA)	125	
fT min. (VCE=−10 V; IC=50 mA)	100	MHz

BFX84

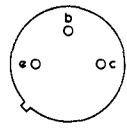
Silicon n-p-n planar epitaxial transistor.



Construction: TO–5. Collector to case		
VCBO max.	100	V
VCEO max.	60	V
ICM max.	1	A
Ptot max. (Tamb. ≤25°C)	800	mW
hFE Typ. (VCE=10 V; IC=150 mA)	112	
fT min. (VCE=10 V; IC=50 mA)	50	MHz

BFX88

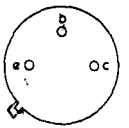
Silicon p-n-p planar epitaxial transistor for general amplifying and switching purposes.



Construction: TO–5. Collector to case		
VCBO max.	−40	V
VCEO max.	−40	V
ICM max.	600	mA
Ptot max. (Tamb ≤25°C)	600	mW
hFE Typ. (VCE=−10 V; IC=10 mA)	125	
fT min. (VCE=−10 V; IC=50 mA)	100	MHz

BFY50

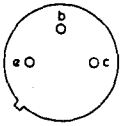
Silicon n-p-n planar epitaxial transistor for general purpose applications.



Construction: TO–5. Collector to case		
VCBO max.	80	V
VCEO max.	35	V
ICM max.	1·0	A
Ptot max. (Tamb ≤ 25 °C)	800	mW
hFE Typ. (VCE = 10 V; IC = 150 mA)	112	
fT min (VCE = 10 V; IC = 50 mA)	50	MHz

BFY51

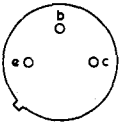
Silicon n-p-n planar epitaxial transistor for general purpose applications.



Construction: TO–5. Collector to case		
VCBO max.	60	V
VCEO max.	30	V
ICM max.	1·0	A
Ptot max. (Tamb ≤ 25 °C)	800	mW
hFE Typ. (VCE = 10 V; IC = 150 mA)	123	
fT min. (VCE = 10 V; IC = 50 mA)	50	MHz

BFY52

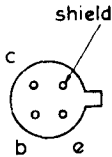
Silicon n-p-n planar epitaxial transistor for general purpose applications.



Construction: TO–5. Collector to case		
VCBO max.	40	V
VCEO max.	20	V
ICM max.	1·0	A
Ptot max. (Tamb ≤ 25 °C)	800	mW
hFE Typ. (VCE = 10 V; IC = 150 mA)	142	
fT min. (VCE = 10 V; IC = 50 mA)	50	MHz

BFY90

Silicon n-p-n transistor for use as a u.h.f. amplifier.



Construction: TO-72.

VCBO max.	30	V
VCEO max.	15	V
ICM max.	50	mA
Ptot max.	200	mW
hFE (IC = 2·0mA)	25–150	
fT min.	1	GHz

BR100

Silicon bi-directional trigger device for use in triac and thyristor trigger circuits.

Construction: DO–14

VBO	32 ± 4·0	V
ITRM max. ($t \leqslant 20\ \mu s$)	2·0	A
Pav (Tamb ≤ 70°C)	150	mW

BR101

Silicon planar p-n-p-n controlled switch for television time base and other applications.

Construction: TO-72

P-N-P Transistor-VEBO (max.)	50	V
N-P-N Transistor VCBO (nom.)	50	V
—IERM (max.)	2·5	A
Ptot max. (Tamb = 25%)	275	mW
VAK (Forward on slate)	<1·4	V
IH (Holding current)	<1·0	mA

BRY39

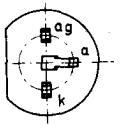
Silicon p-n-p-n controlled switch for use as a programmable unijunction transistor.

Construction: TO-72

VGak max.	70	V
VgaA max.	70	V
IA max.	250	mA
Tj max.	150	°C
IARM (max).	2·5	A

BRY56

Silicon p-n-p-n controlled switch for use as a programmable unijunction transistor.

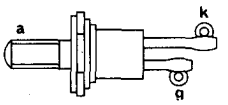


Construction: TO-92 (plastic)

VGK max.	70	V
VGA max.	70	V
IA max.	250	mA
Tj max.	150	°C
IARM max.	2·5	A

BT101–300R
BT101–500R

P-gate silicon reverse blocking thyristors. For use in general domestic applications.

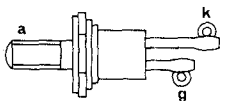


Construction: TO–64

	BT101–300R	–500R	
VRWM max.	200	400	V
VRRM max.	300	500	V
IT(AV) max.	6·5		A
IFSM max. (t=10 ms)	55		A
IGT (Tj=25°C)	>10		mA
VGT (Tj=25°C)	>2·0		V
Tj max.	125		°C

BT102–300R
BT102–500R

P-gate silicon reverse blocking thyristors. For use in general domestic applications.

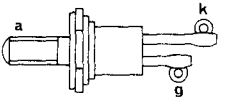


Construction: TO–64

	BT102–300R	–500R	
VRWM max.	200	400	V
VRRM max.	300	500	V
IT(AV) max.	6·5		A
IFSM max. (t=10 ms)	55		A
IGT (Tj=25°C)	>50		mA
VGT (Tj=25°C)	>2·5		V
Tj max.	125		°C

BT106

P-gate silicon reverse blocking thyristor. For use in transformerless power supplies, in particular for television applications.

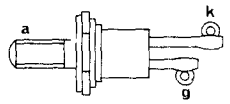


Construction: Similar to TO–64
(Ratings apply to frequencies of 0 to 400 Hz)

VRWM max.	650	V
VRRM max.	700	V
VBO min. (Tj=100°C)	500	V
IT (RMS) max.	10	A
IT (AV) max. (Tmb=90°C)	1·0	A
VGT (Tj=25°C)	>3·5	V
IGT (Tj=25°C)	>50	mA
Tj max.	100	°C

BT107

P-gate silicon reverse blocking thyristor for use in domestic and light industrial equipment.

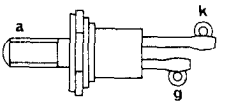


Construction: Similar to TO–64
(Ratings apply to frequencies 0 to 400 Hz)

VRWM max.	400	V
VRRM max.	500	V
VBO min. (Tj=100°C)	500	V
IT (RMS) max.	15	A
IT (AV) max. (Tmb≤60°C)	6·5	A
VGT (Tj=25°C)	>2·0	V
IGT (Tj=25°C)	>10	mA
Tj max.	100	°C

BT108

P-gate silicon reverse blocking thyristor for use in domestic and light industrial equipment.

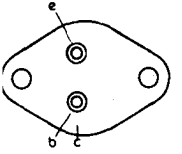


Construction: Similar to TO–64

(Ratings apply to frequencies 0 to 400 Hz)		
VRWM max.	400	V
VRRM max.	500	V
VBO min (Tj=100°C)	500	V
IT (RMS) max.	15	A
IT (AV) max. (Tmb≤60°C)	6·5	A
VGT (Tj=25°C)	>3·5	V
IGT (Tj=25°C)	>50	mA
Tj max.	100	°C

BU105

Silicon n-p-n high voltage power transistor in metal envelope, intended for use in line deflection circuits of television receivers.

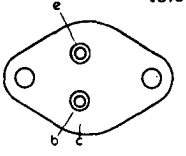


Construction: TO–3

VCBO max. (total peak value)	1500	V
VCER max. (total peak value, RBE≤100 Ω)	1500	V
ICM max.	2·5	A
Ptot max. (Tmb ≤90°C)	10	W
VCE (sat) max. (IC=2·5 A, IB=1·5 A)	5·0	V
Tj max.	115	°C
θj-mb	2·5	deg C/W

BU126

High voltage silicon n-p-n power transistor for use in switch mode power supply units for television.

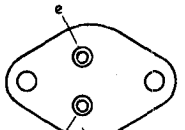


Construction: TO 3

VCESM	750	V
ICM	6	A
Ptot max. (Tmb 50 C)	30	W
tf typ.	0·15	μs

BU204

High voltage silicon n-p-n power transistor for use in line deflection circuits for television.

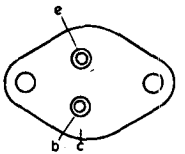


Construction: TO-3

VCESM	1300	V
IC (dc)	2·5	A
Ptot (Tmb = 90°C)	10	W
hFE (IC = 2A)	>2	
tf typ. (IC = 2A; IB = IA)	0·75	µs

BU205

High voltage silicon n-p-n power transistor for use in line deflection circuits for television.

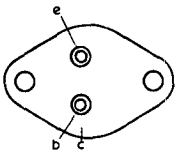


Construction: TO-3

VCESM	1500	V
IC (dc)	2·5	A
Ptot (Tmb = 90°C)	10	W
hFE (IC = 2A)	>2	
tf typ. (IC = 2A; IB = 1A)	0·75	µs

BU208

High voltage silicon n-p-n power transistor for use in line deflection circuits for colour television.

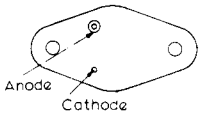


Construction: TO-3

VCESM	1500	V
IC (dc)	5	A
Ptot (Tmb = 90°C)	12·5	W
hFE (IC = 4·5A)	>2·25	
tf typ. (IC = 45A; IB = 1·8A)	0·70	µs

BY118

Silicon rectifier diode, for line deflection circuits.

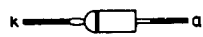


BY118

Construction: SO55/SB2–5		
VRRM max.	300	V
IF (AV) max.	5	A
VF max. (Tj=25°C; IF=14 A)	1·2	V
IR max. (Tj=25°C; VRM=300 V)	100	μA
Tj max.	150	°C
θj-amb max.	5	deg C/W

BY126

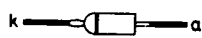
Silicon double-diffused junction rectifier diode.



Plastic construction		
VRRM	650	V
VRWM	450	V
IF (AV) for R and L load:		
at VRWM=max.	1·0	A
at VRWM=60 V	1·2	A
IFSM (t=10 ms)	40	A
Tj max.	150	°C

BY127

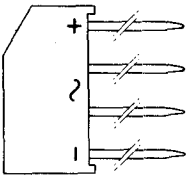
Silicon double-diffused junction rectifier diode.



Plastic construction		
VRRM	1250	V
VRWM	800	V
IF (AV) for L and R loads:		
at VRWM=max.	1·0	A
at VRWM=60 V	1·2	A
IFSM (t=10 ms)	40	A
Tj max.	150	°C

BY164

Silicon bridge rectifier consisting of four silicon double diffused junction diodes in a plastic encapsulation. For use in mains powered domestic equipment.

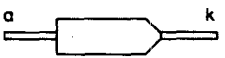


Vin (RMS) max.	42	V
VIRM	120	V
*Vout max.	60	V
†Vout max.	38	V
†Iout max. (Tamb ≤40°C)	1·4	A
IORM	5·0	A

*Capacitive load.
†Resistive/Inductive load.

BY176

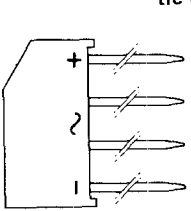
Silicon plastic encapsulated E.H.T. rectifier diode. For television applications, particularly in small-screen receivers.



VRRM max.	15	kV
VRWM max.	15	kV
IF (AV) max.	2·5	mA
IFRM max.	250	mA
Tj max.	95	°C

BY179

Silicon bridge rectifier consisting of four silicon double diffused junction diodes in a plastic encapsulation. For use in mains powered domestic equipment.



Vin (RMS) max.	280	V
VIRM	800	V
*Vout max.	400	V
†Vout max.	255	V
†Iout max. (Tamb ≤40°C)	1·0	A
IORM	5·0	A

*Capacitive load.
†Resistive/Inductive load.

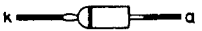
BY182

Silicon E.H.T. rectifier diode for use in trebler circuits of colour television receivers.

VRRM max.	12	kV
VRWM max.	12	kV
IF (AV) max.	2·5	mA
IFRM max.	250	mA
Tj max.	95	°C

BY184

Silicon high voltage, high speed rectifier diode for use in television circuits.

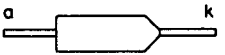


Construction: DO - 14

VRRM max.	1800	V
VRWM max.	1500	V
IF (AV) max.	2·0	mA
IFRM max.	100	mA
Tj max.	75	°C

BY187

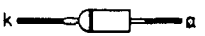
Silicon E.H.T. rectifier diode for use in trebler circuits of colour television receivers.



VRRM max.	12·5	kV
VRWM max.	11·5	kV
IF (AV) max.	2·5	mA
IFRM max.	200	mA
Tj max.	85	°C

BYX10

Silicon double diffused rectifier diode in plastic encapsulation, intended for use in low current rectifier applications.



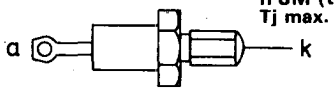
VRRM max.	1600	V
VRWM max.	800	V
IF (AV) max. (R and L load):		
at VRWM max.	0·36	A
at VRWM = 60 V	0·5	A
IFRM max.	3·0	A
IFSM max. (t = 10 ms)	15	A
Tj max.	150	°C
θj-amb max.	200	deg C/W

BYX38–300

Silicon diffused junction rectifier diode for power applications.

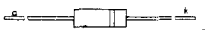
Construction: DO–4

VRRM	300	V
VRWM	200	V
IF (AV) max. (Tamb ≤125°C)	2·5	A
IFSM (t = 10 ms)	38	A
Tj max.	150	°C



BZX61

Voltage regulator diodes. Dissipation 1·3W (Tamb = 25°C). Voltage tolerance ±5%.



Construction: DO–7

Type No.	Vz (nom) (V)	Type No.	Vz (nom) (V)
– C7V5	7·5	– C27	27
– C8V2	8·2	– C30	30
– C9V1	9·1	– C33	33
– C10	10	– C36	36
– C11	11	– C39	39
– C12	12	– C43	43
– C13	13	– C47	47
– C15	15	– C51	51
– C16	16	– C56	56
– C18	18	– C62	62
– C20	20	– C68	68
– C22	22	– C75	75
– C24	24		

BZX70

Voltage regulator diodes. Dissipation 2·5W (Tamb = 25 C). Voltage tolerance ±5%.

Construction: SO–15

Type No.	Vz (nom) (V)	Type No.	Vz (nom) (V)	Type No.	Vz (nom) (V)
– C7V5	7·5	– C18	18	– C43	43
– C8V2	8·2	– C20	20	– C47	47
– C9V1	9·1	– C22	22	– C51	51
– C10	10	– C24	24	– C56	56
– C11	11	– C27	27	– C62	62
– C12	12	– C30	30	– C68	68
– C13	13	– C33	33	– C75	75
– C15	15	– C36	36		
– C16	16	– C39	39		

BZY88

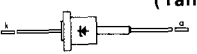
Voltage regulator diodes. Dissipation 400 mW (Tamb=50°C). Voltage tolerance ±5%.

Construction:DO–7

Type No.	Vz (nom) (V)	Type No.	Vz (nom) (V)	Type No.	Vz (nom) (V)
– C1V3	1.3	– C6V8	6·8	– C16	16
– C3V3	3·3	– C7V5	7·5	– C18	18
– C3V6	3·6	– C8V2	8·2	– C20	20
– C3V9	3·9	– C9V1	9·1	– C22	22
– C4V3	4·3	– C10	10	– C24	24
– C4V7	4·7	– C11	11	– C27	27
– C5V1	5·1	– C12	12	– C30	30
– C5V6	5·6	– C13	13	– C33	33
– C6V2	6·2	– C15	15	– C36	36

BZY95

Voltage regulator diodes. Dissipation 1·5W (Tamb = 25 C). Voltage tolerance ±5%.

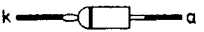


Construction: DO – 1

Type No.	Vz (nom) (V)	Type No.	Vz (nom) (V)	Type No.	Vz (nom) (V)
– C10	10	– C22	22	– C47	47
– C11	11	– C24	24	– C51	51
– C12	12	– C27	27	– C56	56
– C13	13	– C30	30	– C62	62
– C15	15	– C33	33	– C68	68
– C16	16	– C36	36	– C75	75
– C18	18	– C39	39		
– C20	20	– C43	43		

OA90

Germanium point-contact diode. For use as a detector or f.m. demodulator in a.m. and f.m. receivers.



Construction: DO–7		
Max. Reverse voltage peak		
VRM	30	V
*average VR (AV)	20	V
Max. Forward current peak		
IFM	45	mA
*average IF (AV)	10	mA
surge (1 sec. max.)	200	mA
Tamb	75	°C

*Averaged over any 50ms period or d.c. component.

OA91

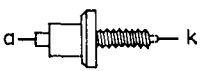
Germanium point-contact diode. For use as a detector in a.m. receivers, and as a general purpose diode.

Construction: DO–7		
Max. Reverse voltage peak		
VRM	115	V
average VR (AV)	90	V
Max. Forward current peak		
IFM	150	mA
*average IF (AV)	50	mA
Tamb	25	°C

*With zero reverse voltage. Averaged over any 50ms period or d.c. component.

OA210

Silicon junction rectifier diode.



At Tamb = 70°C		
Max. P.I.V.	400	V
Max. forward current peak		
(at P.I.V. max.)	5·0	A
*average	500	mA
Tamb max.	70	°C

*Averaged over any 50ms period or d.c. component.

INTEGRATED CIRCUITS

Full Data Sheets also available on request

TAA300

Monolithic integrated circuit comprising a complete a.f. amplifier; the voltage range of 4·5 to 9 V and low current drain make the circuit specially suitable for battery operation.

Construction: TO–74		
Supply voltage (nom)	9·0	V
Pout (typ.)	1·0	W
with input signal	8·5	mV
and load Impedance	8·0	Ω
Total quiescent current (typ.)	8·0	mA
Operating ambient temperature range	−55 to +150	°C

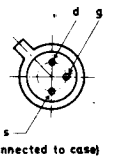
TAA310A

Monolithic integrated circuit comprising a complete low noise audio pre-amplifier. Suitable for use as a record and playback amplifier for tape.

Construction: TO–74		
Supply voltage (nom.)	7·0	V
Voltage gain (typ.)	100	dB
Noise figure (max.)	4·0	dB
Operating ambient temperature range	−20 to +75	°C

TAA320

Integrated M.O.S. pre-amplifier circuit for use with high-impedance pickups for gramophone applications.



Construction: TO–18

−VDS (max.)	20	V
−ID (max.)	25	mA
−VGS (typ.)	11	V
rgs min.	100	GΩ

TAA350A

Monolithic integrated circuit for amplification of f.m. i.f. signals. The high gain circuit, employing long-tailed pairs with constant current drive to the emitters, forms a wide band differential limiting amplifier with excellent a.m. rejection.

Construction: TO–74

Supply voltage (nom.)	6·0	V
Matched power gain at 6 MHz (typ.)	80	dB
A.M. rejection with slope detector	50	dB
Total current drain (typ.)	20	mA
Operating ambient temperature range	−25 to +125	°C

TAA435

Integrated pre-amplifier circuit for use with discrete output transistor for 4W amplifier.

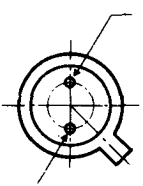
Construction TO–74

Overall performance when used with AD161/162 complementary transistors

Supply voltage (nom)	14	V
Overall voltage gain	80	dB
Output power	4	W
Noise figure (f = 60Hz to 10KHz)	6·0	dB

TAA550

Integrated voltage stabiliser circuit for use with varicap tuners in television sets.



Construction: TO–18

Vstab— 31·32V red dot
32-34V yellow dot
34-35V green dot

Istab—	5·0	mA
Diff. resistance	10	Ω

The TAA550 is available in three voltage groups as indicated.

TAA570

Monolithic integrated circuit comprising a four-stage limiter amplifier with symmetrical phase f.m. detector and remote d.c. volume control. Excellent a.m. rejection is obtained by a differential amplifier incorporating long-tailed pairs.

Construction: TO–74		
Supply voltage (nom.)	12·0	V
Frequency	6·0	MHz
A.M. rejection at Vin=10 mV (typ.)	45	dB
Detected audio output (typ.)		
at 15 kHz frequency deviation	0·3	V
at 50 kHz frequency deviation	1·0	V
Total current drain (typ.)	19	mA
Operating ambient temperature range	−25 to +75	°C

TAA700

Monolithic integrated circuit for signal processing in TV receivers; designed for receivers using valves or transistors in the deflection and video output stages, and n-p-n transistors in the tuner and i.f. amplifier stages.

The circuit functions comprise video preamplifier, line gated a.g.c. detector, noise protection circuit, sync pulse separator, line flywheel phase detector, field sync pulse separator, and blanking facility for the video amplifier.

Construction: 16-lead quad-in-line package		
Supply voltage (nom.)	12	V
Supply current		
nom., no. a.g.c.	22	mA
max. demand	43	mA
Total power dissipation (Tamb 55°C)	400	mW
Operating ambient temperature range	−25 to +125	°C

TAA840

Integrated A.M. radio circuit comprising r.f. amplifier, mixer/osc. i.f. amplifier, a.g.c., detector, audio, driver stages.

Construction: 14-lead dual-in-line		
Supply voltage (nom)	6	V
Total supply current (typ.) (Quiescent)	17	mA
Sensitivity for S/N ratio of 26dB	20	μV
A.G.C. range (typ.)	64	dB

TAD100

The TAD100 is a silicon integrated circuit primarily intended for a.m. receivers. The circuit incorporates the mixer, oscillator, i.f. amplifier, a.g.c. and audio preamplifier stages. The audio output transistors are not included so that different output power stages may be added to suit individual receiver requirements. The frequency response of the circuit is such that the front half of the circuit may be used as an i.f. amplifier at 10·7 MHz for f.m. receivers.

Construction: TO–116 (14-lead dual-in-line package)			
Supply voltage (nom)	6	9	V
Performance in a typical receiver:			
Output power (AC187/AC188 output pair) Typ.	0·7	1·5	W
Total receiver quiescent current (no signal) Typ.	15	21	mA
Sensitivity (R.F. at pin 1 to obtain 10 mV from detector) Typ.	4	4	μV
Operating ambient temperature range	−10 to +55		°C

TBA120S

Integrated i.f. amplifier circuit for television sound.

Supply voltage (nom)	12	V
Gain at 6m/Hz	68	dB
Sensitivity for limiting	30	μV
Output voltage	1·1	V
A.M. rejection	55	dB

Construction: 14-lead dual-in-line package

TBA480

Integrated i.f. amplifier circuit for television sound.

Supply voltage (nom)	12	V
Input limiting voltage (6MHz)	40	μV
Output voltage	300	mV
Control range	60	dB
A.M. rejection	50	dB

Construction: 16-lead dual-in-line package.

TBA500/Q
510/Q
520/Q
530/Q
540/Q

Integrated colour processing circuits for colour television.

TBA500—Luminance combination
TBA510—Chrominance combination
TBA520—Colour demodulation
TBA530—R.G.B. Matrix pre-amp
TBA540—Reference combination
Vsupp—(nom) 12V
Devices can be supplied in 16-lead dual-in-line packages or with suffix Q. Zig-Zag Quad-in-line packages.

TBA550

Monolithic integrated circuit for signal processing in TV receivers; designed for receivers using valves or transistors in the deflection and video output stages, and n-p-n transistors in the tuner and i.f. amplifier stages.
The circuit functions comprise video preamplifier, line gated a.g.c. detector, noise protection circuit, sync pulse separator, line flywheel phase detector, field sync pulse separator, and blanking facility for the video amplifier.

Construction: 16-lead zig-zag quad-in-line package		
Supply voltage (nom.)	12	V
Supply current		
nom., no a.g.c.	22	mA
max. demand	43	mA
Total power dissipation (Tamb 55°C)	400	mW
Operating ambient temperature range	−25 to −125	°C

TBA560

Integrated Luminance and Chromance control combination for colour television receivers.

TBA560Q

Comprises the functions of TBA500 and TBA510

Supply voltage (nom.)	12	V

Construction: 16-lead dual-in-line or 16-lead zig-zag quad-in-line suffix Q.

TBA570

Integrated a.m./f.m. radio receiver circuit.

Construction: 16-lead dual-in-line or 16-lead zig-zag quad-in-line suffix Q.

Supply voltage (nom.)	6	V
Itot (quiescent)	10·5	mA
R.F. input voltage for S/N ratio = 26dB	18	μV

TBA690

Integrated a.m./f.m. radio receiver circuit with 0·6W output circuit.

Supply voltage	2·7 to 11·4	V
Output	0·6	W
A.G.C. range	60	dB
Sensitivity	4·0	μV

Construction: 16-lead dual-in-line package

TBA700

Integrated a.m./f.m. radio receiver circuit with 1W output circuit.

Supply voltage (nom.)	9	V
Output	1·0	W
A.G.C. range	60	dB
Sensitivity	15	μV

Construction: 16-lead dual-in-line package

TBA750

TBA750Q

Integrated limiter amplifier circuit with f.m. detector d.c. volume control and a.f. pre-amplifier, for use as television sound i.f. circuits

Supply voltage (nom.)	12	V
Total drain current	23	mA
Limited voltage (Typ.)	100	μV

Construction: 16-lead dual-in-line or 16-lead zig-zag quad-in-line suffix Q.

TBA920

Integrated line oscillator combination for television receiver applications.

Supply voltage (nom.)	12	V
Supply current (nom.)	36	mA
Video input signal (positive sync)	3	V

Construction: 16-lead dual-in-line package.

TBA990
990Q

Integrated circuit colour demodulator for colour television applications.

Supply voltage (nom.)	12	V
Supply current (nom.)	17	mA
Ptot (Tamb = 60°C) Typ.	200	mW

Construction: 16-lead dual-in-line package or 16-lead zig-zag quad-in-line suffix Q.

TCA160

TCA160Q

Integrated audio-amplifier circuit for application in battery and mains fed equipment.

Supply voltage range	5 to 16	V
Total quiescent current	5–15	mA
Output power up to (with Heatsink)	2·2	W

Construction: 16-lead dual-in-line or 16-lead zig-zag quad-in-line suffix Q.

TCA270
270Q

Integrated synchronous-demodulator circuit and processing circuit for television applications.

Supply voltage (nom.)	12	V
Total current drain	47	mA
Peak video output	3	V

Construction: 16-lead dual-in-line or 16-lead zig-zag quad-in-line suffix Q.

SEMICONDUCTOR COMPARABLES

INTRODUCTION

The comparables section consists of a list of suitable Mullard replacements for semiconductor devices made by other manufacturers. It has been compiled by comparing the published data for individual types. In general, Mullard types are given only if their important electrical characteristics are as good as, or better than, the type to be replaced.

For example, a Mullard AC127 is given as a replacement for a 2SD96. A comparison of the electrical ratings and characteristics which are important for replacement purposes is as follows:

	Ptot max.	VCB max.	VCER max.	IC max.	fT
2SD96	300mW	25V	18V	250mA	2·0MHz
AC127	340mW	32V	32V	500mA	2·5MHz

Thus considering the design tolerance in domestic equipment, the use of the AC127 as a replacement is justified. However, once the Mullard type has been selected from this list, its encapsulation details should be studied to determine whether the Mullard device will fit into the space available.

Semiconductor devices made by different manufacturers seldom have exactly the same nominal characteristics, and, unlike valves, it is not therefore possible to give a list of direct replacements – those types which may confidently be interchanged because all ratings, characteristics and encapsulation details are the same or very similar. The characteristics of some devices made by other manufacturers may be quoted at different d.c. conditions to those used by Mullard, and the measurement methods may also vary; circuit configurations used in various radios, etc. can also differ considerably. On rare occasions even breakdown may result when the Mullard replace-

ment is fitted. In general, however, good results can be obtained by using the following hints.

Replacement hints

The following points are intended as a guide to some of the problems which may be encountered in radio and audio equipment.

1. Polarity

It is essential that the correct polarity transistor (n-p-n or p-n-p) is used. The collector terminal of p-n-p transistors will be negative with respect to the emitter, and the collector terminal of n-p-n transistors will be positive with respect to the emitter.

2. Lead lengths

The leads of all replacement components should be the same length as those of the original devices. If there is a screen lead on the Mullard replacement it should be connected to chassis if possible.

3. Audio-frequency stages in portables

Arrangements with either output and driver transformers, or a driver transformer only, normally use p-n-p transistors, but if one n-p-n is present every transistor in the arrangement is probably n-p-n. Complementary push-pull arrangements (recognised by the absence of any transformers) usually have at least one n-p-n transistor and frequently more. These can be difficult to service, and it is usually necessary to trace out the circuit if no diagram is available.

4. A.F. driver transistor

The replacement should be selected with care in circuits where the battery voltage is greater than 12V. The

collector voltage rating should be twice the battery voltage, when a driver transformer is used.

5. A.F. output transistors

If an output transistor has failed, and the cause appears to be over-heating, the Mullard replacement may also be in danger of failing. If there is room, cooling clips should be fitted to the output transistors, or the area of the heat-sink should be enlarged if one already exists. Otherwise the value of the emitter resistor can be increased, or thermistors can be fitted across the base bias resistors.

6. Car radio output stages

Arrangements with no driver transformer may use a number of circuit configurations, and the pre-amplifier and driver transistors can be p-n-p or n-p-n. A Mullard AD149 should be used as a p-n-p output transistor replacement in all car radio circuits.

7. A.M. I.F. stages

When transistors in i.f. stages are replaced, a type should be chosen which has a similar value of feedback capacitance. Unfortunately these figures for other manufacturers' types have not always been available. If there is instability after the replacement has been fitted satisfactory operation may be obtained by making some circuit modifications. For example, if there are neutralising components the value of the neutralising capacitor should be altered. If there is no neutralisation, and if the transformer is single-tuned and of the correct phasing, instability may be removed by inserting a neutralising capacitor (value 1 to 10pF). Another method of making the stage stable is to insert a damping resistor across the primary of the i.f. transformer in the collector circuit.

8. A.M. oscillator and mixer stages

An AF117 is a suitable p-n-p replacement. If the circuit does not oscillate after the replacement has been fitted, the emitter current should be increased (but not over 3mA). If there is squegging the value of the emitter decoupling capacitor should be reduced, and if this is unsuccessful a damping resistor should be connected across the oscillator tuned circuit.

9. F.M. I.F. stages

A Mullard AF116 (p-n-p) should be used. If instability occurs the value of the neutralising capacitor should be altered if one is present. Otherwise the emitter current should be reduced (but not to less than half its value) by increasing the value of the upper base bias resistor. A damping resistor connected across the i.f. coil in the collector circuit may cure instability if other methods have failed.

10. F.M. oscillators and mixers

Mullard AF114, AF178 (both p-n-p) should be used. It is important to ensure that the lead lengths of the replacements are the same as those of the original devices. Instability can sometimes be cured by adjusting the value of the emitter current (by altering the value of the upper base bias resistor). It may be necessary to alter the value of the emitter feedback capacitor in oscillators.

11. F.M. R.F. amplifiers

A Mullard AF114 or AF178 (both p-n-p) should be used as a replacement. If there is instability the emitter current should be reduced by increasing the value of the upper base bias resistor across the coil in the collector tuned circuit.

SEMICONDUCTOR COMPARABLES

Type No.	Mullard Comparable	Type No.	Mullard Comparable
A2E5	BY126	AC156	AC128
A2E9	BY126	AC157	AC127
A2K4	BY127	AC160	AC127
A2K5	BY127	AC162	AC126
A2K9	BY127	AC163	AC126
A7D	BY126	AC166	AC128
A344	BC108, BC109	AC167	AC128
A345	BC108, BC109	AC168	AC127
A346	BC108, BC109	AC169	AC128
AA112	OA90	AC170	AC126
AA116	OA90	AC171	AC126
AA118	OA91	AC172	AC127
AA119	AA119	AC175	AC127
AA120	AA129	AC176	AC176
AA129	AA129	AC177	AC128
AA130	OA90	AC181	AC127
AA131	AA119	AC185	AC127
AA132	OA91	AC187	AC187
AC106	AC128	AC188	AC188
AC110	AC126	AD139	AD149
AC114	AC128	AD149	AD149
AC117	AC128	AD150	AD149
AC120	AC128	AD152	AD149
AC121	AC128	AD155	AD162
AC122	AC126	AD156	AD162
AC123	AC126	AD157	AD162
AC124	AC126	AD161	AD161
AC125	AC126	AD162	AD162
AC126	AC126	AF102	AF121
AC127	AC127	AF105	AF116
AC127Z	AC127Z	AF109	AF178
AC128	AC128	AF110	AF181
AC131	AC128	AF113	AF178
AC132	AC128	AF114	AF114
AC134	AC126	AF115	AF115
AC138	AC128	AF116	AF116
AC139	AD149	AF117	AF117
AC141	AC176	AF118	AF118
AC150	AC128	AF121	AF121
AC151	AC126	AF124	AF124
AC152	AC128	AF125	AF125
AC153	AC128	AF126	AF126
AC153K	AC128	AF127	AF127
AC154	AC128	AF129	AF178
AC155	AC128	AF130	AF178

Type No.	Mullard Comparable
AF134	AF178
AF139	AF139
AF142	AF181
AF143	AF181
AF144	AF181
AF164	AF181
AF165	AF181
AF166	AF181
AF178	AF178
AF179	AF121
AF180	AF180
AF181	AF181
AF182	AF180
AF186	AF139
AF200	AF181
AF201	AF181
AFY12	AF178
AFY19	BFX88
AFZ11	AF178, AF180
AFZ12	AF178, AF180
AG150	BA155
B2E5	BY126
B2E9	BY126
B2K5	BY127
B2K9	BY127
B1022	AC128
BA100	BA148
BA102	BA102
BA114	BA156
BA115	BA155
BA116	BA130
BA144	BA145
BA145	BA145
BA148	BA148
BA154	BA154
BA155	BA155
BA156	BA156
BA182	BA182
BAX13	BAX13
BB105	BB105
BC107	BC107
BC108	BC108
BC109	BC109
BC113	BC108
BC114	BC109
BC115	BC107
BC118	BC107
BC119	BFY51
BC125	BC107
BC134	BC107
BC142	BFX84
BC145	BF178
BC147	BC147
BC148	BC148
BC149	BC149
BC150	BC109
BC151	BC107
BC157	BC157
BC158	BC158
BC159	BC159
BC167	BC107
BC168	BC109
BC169	BC109
BC170	BC109
BC170A	BC108
BC170B	BC108
BC170C	BC108
BC171	BC107
BC172	BC109
BC186	BC186
BC187	BC187
BCY42	BC107
BCY59	BC107
BD115	BD115
BD116	BDY20
BD121	BDY20
BD123	BDY20
BD124	BD124
BD131	BD131
BD132	BD132
BD133	BD133
BD135	BD135
BD136	BD136
BD137	BD137
BD138	BD138
BD139	BD139
BD140	BD140
BD144	BD144
BD181	BD181
BD182	BD182

Type No.	Mullard Comparable
BD183	BD183
BD184	BD184
BD201	BD201
BD202	BD202
BD203	BD203
BD204	BD204
BD232	BD232
BD233	BD233
BD234	BD234
BD235	BD235
BD236	BD236
BD237	BD237
BD238	BD238
BDY20	BDY20
BF109	BF178
BF115	BF115
BF154	BC108
BF167	BF167
BF173	BF173
BF177	BF177
BF178	BF178
BF179	BF179
BF180	BF180
BF181	BF181
BF182	BF182
BF183	BF183
BF184	BF184
BF185	BF185
BF194	BF194
BF195	BF195
BF196	BF196
BF197	BF197
BF200	BF200
BF216	BF115
BF241	BF241
BF262	BF262
BF263	BF263
BF336	BF336
BF337	BF337
BF338	BF338
BFW10	BFW10
BFW60	BFW60
BFX29	BFX29
BFX84	BFX84
BFX88	BXF88

Type No.	Mullard Comparable
BFY18	BC107
BFY19	BC107
BFY39	BC107
BFY50	BFY50
BFY51	BFY51
BFY52	BFY52
BFY90	BFY90
BR100	BR100
BR101	BR101
BRY39	BRY39
BRY56	BRY56
BSY20	BC108, BC109
BSY26	BC108, BC109
BSY27	BC10B, BC109
BSY72	BC107, BF184
BSY95A	BC108, BC109
BT101	BT101
BT102	BT102
BT106	BT106
BT107	BT107
BT10B	BT108
BU105	BU105
BU126	BU126
BU204	BU204
BU205	BU205
BU208	BU208
BY100	BY127
BY100S	BY127
BY101	BY126
BY105	BY127
BY114	BY126
BY118	BY118
BY122	BY164
BY124	BY126
BY125	BY126
8Y126	BY126
BY127	BY127
BY130	BY126
BY140	BY182
BY164	BY164
BY176	BY176
BY179	BY179
BY182	BY182
BY1B4	BY184
BY187	BY187

Type No.	Mullard Comparable
BYX10	BYX10
BYX38–300	BYX38–300
BYY34	BY126
BYZ13	BYX38–300
BZX61	BZX61
BZX70	BZX70
BZX88	BZY88
BZY95	BZY95
CA2DO2	AD149
CER72	BY127
CER72D	BY127
CER700C	BY126
CER720	BY127
CG60H	OA90
CG61H	OA90
CG62H	OA90
CG63H	OA90
CG64H	OA90
CK721	AC126
CK722	AC126
CK724	AC126
CK725	AC126
CK727	AC126
CK751	AC128
CK870	AC126
CK871	AC126
CK872	AC128
CK878	AC128
CK882	AC128
CK888	AC128
COD1538	BY127
COD1618	BY127
CSD2310	BA155
CSD2317	BA155
CST1773	AO149
CST1773A	AD149
CTP1004	AD149
CTP1005	AD149
CTP1032	AC126
CTP1033	AC126
CTP1034	AC126
CTP1035	AC126
CTP1036	AC126
CTP1104	AD149
CTP1108	AD149
CTP1109	AD149
CTP1320	AC126
CTP1330	AC126
CTP1340	AC126
CTP1350	AC126
CTP1360	AC126
CTP1514	AD149
D45C	BY126
D58C	BY127
D105C	BY127
D148S	BY127
D158S	BY127
D165	BY127
DD006	BY126
DD056	BY126
DD058	BY127
DD268	BY127
DR365	AA119
DR400	BY126
DR800	BY127
DS26	AC128
DS34	AF178
DS41	AF178
DS44	AC127
DS46	AC126
DS501	AD149
EA080	BY127
ED3	AA119
ED1800	AA119
ED1892	OA90
ED1903	OA91
ED2102	OA90
ED2848	BY127
ED2911	BY127
ED2919	BY126
ED2923	BY127
ER41	BY126
ER81	BY127
ER308	BY127
ERD800	BY127
F8	BY127
FD212	BA155
FD213	BA155
FD227	BA155
FD260	BA155

Type No.	Mullard Comparable
FSP270–1	BF167
FST1/4	BY127
FST2/8	BY127
G5/5	AA119
G5/103	AA119
G5/104	AA119
G5/105	AA119
G1050	BY127
GA52829	AC126
GD1E	AA119
GO2E	OA91
GO3	OA90
GD4	OA90
GO4E	AA119
GD4S	AA119
GD5	AA119
GD5E	AA119
GD6E	AA119
GO11	OA90
GD12	OA90
GD13E	AA119
GO71E	AA119
GO72E/3	AA119
GD72E/4	AA119
GD73E/3	AA119
GD73E/4	AA119
GD73E/5	AA119
GET3	AC126
GET4	AC126
GET102	AC126
GET103	AC128
GET104	AC128
GET106	AC126, AC128
GET113	AC128
GET114	AC128
GET116	AC128
GET119	AC128
GEX12	OA90
GEX23	OA91
GEX34	AA119
GEX36	OA90
GEX37	OA90
GEX39	OA90
GEX45	OA91
GEX54	OA91

Type No.	Mullard Comparable
GFT20	AC126
GFT21	AC126
GFT25	AC126
GFT32	AC126
GFT41	AF178
GFT42A	AF178
GFT2006/30	AD149
GFT3008/20	AD149
GFT3008/40	AD149
GFT3408/20	AD149
GFT3408/40	AD149
GFT4012/30	AO149
GFT8024	AD149
GSD5/4	AA119
GT3	AC126
GT4A	AC128
GT14	AC128
GT20	AC128
GT31	AC126
GT32	AC128
GT33	AC128
GT34	AC126
GT38	AC126
GT74	AC126
GT81	AC126, AC128
GT81HS	AC126
GT81R	AC128
GT83	AC126
GT87	AC126
GT109	AC128
GT109R	AC128
GT122	AC126
GT222	AC126
GT310	AC128
GT2766	AC127
GT2906	AC127
H2	AD149
H3	AO149
H4	AD149
HA1	AC126
HA2	AC126
HA3	AC126
HC1	AC126
HD197	AC128
HJ15	AC126

Type No.	Mullard Comparable
HJ17	AC128
HJ17D	AC128
HJ34	AC128
HJ34A	AC128
HJ50	AC126
HJ51	AC128
HJ74	AF117
HT400	BC108, BC109
HT401	BC108, BC109
IWP	BY127
JCN4	BY126
JP1	AC128
K5/2	OA90
KGS1000	AC128
M8HZ	BY127
M82	BY127
M720B	BY127
MA215	BY126
ME1001	BC107
ME1002	BC107
ME2001	BC107
ME2002	BC107
ME4101	BC107
ME4102	BC107
MM4	BY126
MT84	BY127
MT101	AC176
NKT72	AF124/5/6/7
NKT128	AC128
NKT131	AF180
NKT132	AF180
NKT133	AF180
NKT141	AF180
NKT142	AF180
NKT143	AF180
NKT144	AF180
NKT202	AC126
NKT203	AC128
NKT204	AC126
NKT205	AC126
NKT206	AC126
NKT208	AC128
NKT211	AC128
NKT212	AC128
NKT213	AC128

Type No.	Mullard Comparable
NKT214	AC128
NKT215	AC128
NKT216	AC128
NKT218	AC128
NKT222	AC128
NKT223	AC128
NKT224	AC128
NKT225	AC128
NKT231	AC128
NKT232	AC128
NKT251	AC128
NKT251A	AC128
NKT252	AC128
NKT253	AC128
NKT261	AC128
NKT262	AC128
NKT263	AC128
NKT264	AC128
NKT270	AC128
NKT271	AC128
NKT272	AC128
NKT273	AC128
NKT274	AC128
NKT275	AC128
NKT275A	AC128
NKT275E	AC128
NKT275J	AC128
NKT278	AC128
NKT304	AD149
NKT415	AD149
NKT451	AD149
NKT452	AD149
NKT453	AD149
NKT676	AF178
NKT713	AC127
NKT773	AC176
OA59	OA90
OA60	OA90
OA70	OA90
OA72	AA119
OA73	OA90
OA79	AA119
OA81	OA91
OA90	OA90
OA91	OA91

Type No.	Mullard Comparable	Type No.	Mullard Comparable
OA150	OA91	PA380	BY127
OA160	OA90	PADT24	AF178
OA179	AA119	PADT25	AF178
OA210	OA210	PSO25	8Y126
OA211	BY127	PS140	8Y126
OA214	BY127	PS724	BA155
OA257	OA90	PS2247	BY126
OA258	OA90	Q6	AC128
OC13	AC126	Q7	AC128
OC16	AD149	Q8	AC128
OC25	AD149	RL31	AA119
OC30	AD162	RL32	AA119
OC34	AC126	RL52	AA119
OC38	AC126	RL246	AA119
OC71N	AC126	RL252	AA119
OC79	AC128	S16	BY126
OC80	AC128	S16A	BY126
OC81	AC128	S16B	BY126
OC81D	AC128	S235	BY126
OC81DM	AC128	S243	BY126
OC81M	AC128	SD38	OA91
OC82	AC128	SD92	BY126
OC85	AC128	SD94	BY126
OC169	AF126, AF127	SEO5A	BY126
OC302	AC126	SFD107	OA90
OC601	AC126	SFD108	OA91
OC602	AC126	SFD112	AA119
OC604	AC126	SFT124	AC128
OC615	AF178	SFT125	AC128
OC615V	AF178	SFT125P	AC128
OC702B	AC127	SFT130	AC128
OC810	AC126	SFT162	AF118
OC811	AC126	SFT316	AF180, AF181
OC6015	AF178	SFT317	AF180
OD603	AD149	SFT319	AF180
OD603/50	AD149	SFT320	AF180
OD604	AD149	SFT325	AC128
OD605	AD149	SFT354	AF180, AF181
OS33	BA100	SFT357	AF180, AF181
OX3003	AC126	SFT357P	AF181
OX3004	AC128	SFT358	AF180
OY100	BY127	SG217	BA155
OY101	BY127	SH1	BY126
P6RP8	BY127	SLA604	BY126
PA340A	BY126	SLA604A	BY126

Type No.	Mullard Comparable
SM105SS	BY126
SR500	BY126
SR500B	BY126
SWO5A	BY126
SX633	BY127
SX635	BY127
SX644	BY126
UT227	BY126
V10/15	AC126
V10/30	AC126
V10/50	AC126
V30/20P	AD149
V30/30P	AD149
V208	AD149
V308	AD149
VD11	OA90
VO12	OA90
VD13	OA90
WR400	BY126
XA131	AF178
XA141	AF178
XA142	AF178
XA143	AF178
XA161	AF178
XB102	AC126
X8104	AC126
XB112	AC126
XB113	AC126
XC101	AC128
XC131	AC128
XC171	AC128
XU604	BY127
Y363	AC126
Y633	AC128
ZOT	BC108, BC109
ZJ13	AC128
ZR12	BY118
ZS12	AC128
ZS15	AC128
ZS34	AC128
ZS38	AC128
ZS56	AC128
ZS91	AC128
ZT40	BC108, BC109
ZT41	BC108, BC109

Type No.	Mullard Comparable
ZT80	AC127
Numerical	
1G91	OA90
1G92	OA90
1G95	AA119
1HY100	BY127
1L5TI	AC128
1N28A	OA91
1N34	OA90
1N34A	OA90
1N36	AA119
1N38	OA90
1N38A	OA91
1N38B	OA91
1N39A	OA90
1N42	OA91
1N48	OA91
1N52	OA91
1N56A	OA90
1N57A	OA90
1N60	AA119
1N60A	AA119
1N64	OA90, AA119
1N64A	AA119
1N70	OA91
1N70A	OA91
1N74	OA91
1N81	AA119
1N87	OA90
1N87A	OA90
1N88	OA91
1N90	OA91
1N96	OA90
1N97	OA91
1N97A	OA91
1N98	OA91
1N99	OA91
1N99A	OA91
1N100	OA91
1N105	AA119
1N127A	OA91
1N128	AA119

Type No.	Mullard Comparable
1N128A	AA119
1N142	OA91
1N254	BY126
1N255	BY126
1N256	BY127
1N267	AA119
1N290	AA119
1N295A	OA90
1N310	OA91
1N313	OA91
1N332	8Y126
1N338	8Y127
1N341	BY126
1N342	8Y126
1N343	BY126
1N344	8Y126
1N345	BY126
1N346	BY126
1N348	8Y126
1N349	BY126
1N441	BY126
1N442	BY126
1N443	BY126
1N444	BY127
1N445	BY127
1N448	OA91
1N462	BA155
1N476	OA91
1N478	OA91
1N479	OA91
1N486A/B	8Y126
1N487	BY126
1N488A/B	BY126
1N538	BY126
1N540	BY126
1N541	AA119
1N542	2–AA119
1N547	BY127
1N560	BY127
1N562	8Y127
1N599A	BY126
1N600A	BY126
1N602/A	BY126
1N603/A	BY126
1N604/A	BY126
1N605/A	BY126
1N606/A	8Y126
1N616	OA90
1N617	OA91
1N618	OA91
1N646	BY126
1N673	BY126
1N781	AA119
1N781A	AA119
1N801	BA155
1N801M	BA155
1N802	BA155
1N802M	BA155
1N854	BY127
1N1095	BY127
1N1096	BY127
1N1103	BY127
1N1169	BY127
1N1255	BY126
1N1255A	BY126
1N1259	BY127
1N1486	BY127
1N1492	BY127
1N1693	BY126
1N1695	BY126
1N2071/A	BY127
1N2505	BY127
1N2611	BY126
1N2613	BY127
1N2615	BY127
1N2616	BY127
1N2773	BY127
1N3182	BA102
1N3193	BY127
1N3194	BY127
1N3195	BY127
1N3196	BY127
1N3221	BY127
1N3242	BY127
1N3547	BY126
1N3625	8A155
1N3769	OA91
1N4005	BY127
1N4250	BY127
1NU40	AC126

Type No.	Mullard Comparable
1NU70	AC126
1P541	AA119
1P542	AA119
1S038	BY127
1S054	BY127
1S058	BY127
1S32	OA90
1S33	OA90
1S34	OA90
1S47	BY127
1S83	BY126
1S84	BY126
1S90	BY126
1S91	BY126
1S92	BY126
1S93	BY126
1S94	BY127
1S95	BY127
1S96	BY127
1S97	BY127
1S107	BY127
1S117	BY127
1S119	BY127
1S124	BY126
1S127	OA90
1S149	8Y126
1S206	BY126
1S209	BY126
1S426	DA90
1S557	BY127
1S686	BY126
1S1692	BY127
1S1693	BY127
1S1694	BY127
1S1695	BY127
1T23	OA90
1T508	BY127
2G101	AF180, AF181
2G102	AF117
2G108	AC126
2G109	AC126
2G201	AC128
2G202	AC128
2G270	AC128
2G271	AC128
2G319	AC126
2G320	AC128
2G381	AC128
2G382	AC128
2G401	AF117
2G402	AF117
2G416	AF117
2G417	AF117
2N34	AC128
2N34A	AC126, AC128
2N35	AC127
2N36	AC126, AC128
2N37	AC126, AC128
2N38	AC126, AC128
2N38A	AC126, AC128
2N44	AC128
2N48	AC126
2N54	AC126, AC128
2N59A	AC128
2N59B/C	AC128
2N60	AC128
2N61	AC128
2N62	AC128
2N87	AC128
2N102	AD161
2N108	AC128
2N109	AC128
2N117	AC176
2N118	AC176
2N119	AC176
2N138A	AC128
2N138B	AC128
2N156	AD149
2N170	AC127
2N175	AC107
2N180	AC128
2N181	AC128
2N185	AC128
2N186	AC128
2N186A	AC128
2N187	AC128
2N187A	AC128
2N188	AC128
2N188A	AC128
2N191	AC128

Type No.	Mullard Comparable	Type No.	Mullard Comparable
2N192	AC128	2N308	AF117
2N195	AC128	2N309	AF117
2N196	AC128	2N310	AF117
2N199	AC128	2N322	AC128
2N213	AC176	2N323	AC128
2N214	AC127	2N324	AC128
2N217	AC128	2N325	AD149
2N218	AF117	2N331	AC128
2N219	AF117	2N350	AD149
2N220	AC107	2N350A	AD149
2N224	AC128	2N351	AD149
2N225	AC128	2N351A	AD149
2N226	AC128	2N352	AD149
2N227	AC128	2N353	AD149
2N228	AC127	2N358	AC127
2N229	AC127	2N358A	AC127
2N230	AD149	2N362	AC128
2N234	AD149	2N364	AC127
2N234A	AD149	2N365	AC127
2N235	AD149	2N366	AC127
2N236	AD149	2N376	AD149
2N238	AC128	2N385	AC127
2N241	AC128	2N388	AC127
2N241A	AC128	2N399	AD149
2N249	AC128	2N407	AC128
2N252	AF117	2N408	AC128
2N257	AD149	2N409	AF117
2N257A	AD149	2N410	AF117
2N257G	AD149	2N419	AD149
26257W	AD149	2N431	AC176
2N265	AC128	2N432	AC176
2N266	AC128	2N433	AC176
2N270	AC128	2N439A	AC127
2N272	AC128	2N447	AC127
2N285A	AD149	2N447A	AC127
2N285B	AD149	2N460	AC128
2N290	AF178	2N461	AC128
2N291	AC128	2N464	AC128
2N300	AF178	2N465	AC128
2N301	AD149	2N466	AC128
2N301A	AD149	2N467	AC128
2N302	AC128	2N484	AF180
2N303	AC128	2N486	AF180
2N306	AC127	2N507	AC127
2N306A	AC127	2N519	AC128

Type No.	Mullard Comparable
2N563	AC128
2N564	AC128
2N565	AC128
2N566	AC128
2N567	AC128
2N568	AC128
2N569	AC128
2N570	AC128
2N571	AC128
2N572	AC128
2N576	AC127
2N609	AC128
2N610	AC128
2N611	AC128
2N612	AC128
2N613	AC128
2N624	AF181
2N631	AC128
2N632	AC128
2N633	AC128
2N634	AC127
2N634A	AC127
2N647	AC127
2N649	AC127
2N655	AC128
2N702	BC107
2N703	8C107
2N728	BC107
2N990	AF178
2N991	AF124/5/6/7
2N992	AF126
2N993	AF127
2N1008	AC128
2N1010	AC127
2N1038	AD149
2N1059	AC127
2N1097	AC128
2N1098	AC128
2N1101	AC127
2N1102	AC127
2N1128	AC128
2N1141	AF178
2N1142	AC126
2N1143	AF117
2N1144	AC128
2N1145	AC128
2N1173	AC127
2N1176	AC128
2N1177	AF181
2N1178	AF181
2N1179	AF181
2N1195	AF118
2N1251	AC127
2N1264	AF117
2N1274	AC128
2N1287	AC128
2N1287A	AC128
2N1353	AC128
2N1370	AC128
2N1372	AC128
2N1386	BC108, 8C109
2N1406	AF178
2N1407	AF178
2N1431	AC127
2N1515	AF180
2N1516	AF180
2N1517	AF180
2N1524	AF180
2N1525	AF180
2N1586	AC176
2N1587	AC176
2N1589	AC176
2N1590	AC176
2N1592	AC176
2N1593	AC176
2N1624	AC127
2N1631	AF181
2N1632	AF181
2N1636	AF181
2N1637	AF181
2N1638	AF181
2N1639	AF181
2N2061	AD149
2N2061A	AD149
2N2062	AD149
2N2063	AD149
2N2064	AD149
2N2067	AD149
2N2067B	AD149

Type No.	Mullard Comparable
2N2067G	AD149
2N2067–0	AD149
2N2067W	AD149
2N2089	AF114, AF181
2N2090	AF115
2N2091	AF116
2N2092	AF117
2N2207	AF118
2N2256	BC108, BC109
2N2257	BC108, BC109
2N2271	AC128
2N2429	AC126
2N2430	AC127
2N2431	AC128
2N2495	AF178
2N2496	AF180
2N2512	AF118
2N2626	BC107
2N2654	AF121
2N2671	AF181
2N2672	AF181
2N2672A	AF181
2N2706	AC128
2N2712	BC107
2N2715	BF173
2N2716	BF173
2N2835	AD149
2N2836	AD149
2N2921	BC107
2N2922	BC107
2N2923	BC107
2N2924	BC107
2N2925	BC107
2N2926	BC107
2N2953	AC128
2N3074	AF180
2N3075	AF181
2N3153	AC126
2N3287	BC107
2N3288	BC107
2N3289	BC107
2N3290	BC107
2N3291	BC107
2N3292	BC107
2N3293	BC107
2N3294	BC107
2N3391	BC107
2N3391A	BC107
2N3392	BC107
2N3393	BC107
2N3394	BC107
2N3443	AC126
2N3493	BF173
2N3565	BC107
2N3588	AF181
2N3662	BF173
2N3663	BF173
2N3691	BC107
2N3692	BC107
2N3693	BC107
2N3694	BC107
2N3707	BC107
2N3708	BC107
2N3709	BC107
2N3710	BC107
2N3825	BC107
2N4026	BD138
2N4077	AD161
2N4078	AD162
2N4079	AD161/AD162
2N4286	BC107
2N4433	BF115
2N4434	BF184
2N4435	BF185
2S37	AC128
2S38	AC128
2S39	AC128
2S40	AC128
2S41	AD149
2S41A	AD149
2S43	AC128
2S44	AC128
2S54	AC128
2S56	AC128
2S144	AF117
2S163	AC128
2S179	AC128
2S433	AF124/5/6/7
2SA24	AF178
2SA25	AF178

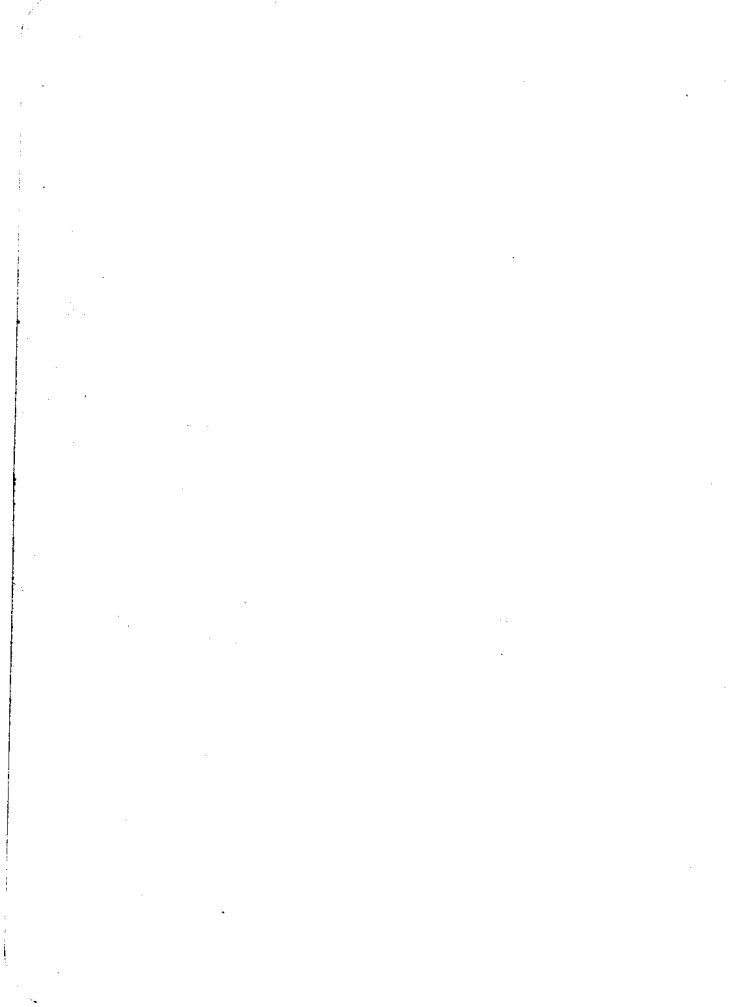
Type No.	Mullard Comparable	Type No.	Mullard Comparable
2SA37	AF117	2SA229	AF178
2SA38	AF117	2SA230	AF178
2SA39	AF117	2SA234	AF178
2SA41	AF117	2SA235	AF178
2SA42	AF117	2SA236	AF114/5/6
2SA51	AF117	2SA237	AF114/5/6
2SA58	AF124/5/6/7	2SA240	AF178
2SA59	AF117	2SA242	AF178
2SA60	AF124/5/6/7	2SA250	AF118
2SA69	AF180	2SA255	AF114/5/6
2SA70	AF180	2SA256	AF124/5/6/7
2SA71	AF180	2SA257	AF124/5/6/7
2SA72	AF114/5/6/7	2SA258	AF124/5/6/7
2SA73	AF114/5/6/7	2SA259	AF124/5/6/7
2SA75	AF180	2SA285	AF114/5/6
2SA76	AF114/5/6/7	2SA286	AF114/5/6
2SA77	AF178	2SA287	AF114/5/6
2SA82	AF124, AF125	2SA288	AF178
2SA92	AF124/5/6/7	2SA289	AF178
2SA93	AF124/5/6/7	2SA290	AF178
2SA103	AF117	2SA313	AF114/5/6
2SA105	AF178	2SA314	AF114/5/6
2SA116	AF178	2SA315	AF124/5/6/7
2SA117	AF178	2SA316	AF124/5/6/7
2SA118	AF178	2SA323	AF114/5/6
2SA124	AF178	2SA324	AF114/5/6
2SA125	AF178	2SA340	AF124/5/6/7
2SA130	AF181	2SA341	AF124/5/6/7
2SA131	AF181	2SA342	AF124/5/6/7
2SA134	AF178	2SA343	AF178
2SA135	AF178	2SA345	AF178
2SA144	OC170, OC171	2SA346	AF178
2SA148	AF115	2SA347	AF178
2SA153	AF178	2SA348	AF178
2SA155	AF117	2SA349	AF178
2SA159	AF178	2SA359	AC126, AF118
2SA161	AF178	2SA361	AF178
2SA175	AF114/5/6	2SA377	AF121
2SA213	AF178	2SA403	AF178
2SA216	AF178	2SA427	AF180
2SA220	AF114/5/6	2SA428	AF180
2SA221	AF114/5/6	2SA432	AF178
2SA222	AF114/5/6	2SA433	AF114/5/6
2SA223	AF114/5/6	2SB19	AD162
2SA227	AF178	2SB20	AD162

Type No.	Mullard Comparable	Type No.	Mullard Comparable
2SB26	AD149	2SB95	AC12B
2SB27	AD149	2SB96	AC128
2SB28	AD149	2SB98	AC128
2SB29	AD149	2SB99	AC128
2SB30	AD149	2SB100	AC126
2SB31	AD149	2SB101	AC128
2SB32	AC126	2SB102	AC128
2SB33	AC128	2SB103	AC128
2SB34	AC128	2SB104	AC128
2SB37	AC128	2SB105	AD149
2SB38	AC128	2SB106	AD149
2SB44	AC128	2S8107	AD149
2SB46	AC126	2SB108	AD149
2S848	AC126	2SB109	AD149
2SB49	AC126	2SB110	AC126
2SB50	AC126	2SB111	AC126
2SB51	AC128	2SB112	AC126
2SB52	AC128	2SB113	AC126
2SB53	AC128	2SB114	AC128
2SB54	AC128	2SB115	AC128
2SB55	AC128	2SB116	AC128
2SB56	AC128	2SB117	AC128
2SB57	AC128	2SB118	AD149
2SB58	AC128	2SB119	AD149
2SB59	AC126	2SB120	AD149
2SB60	AC126	2SB126	AD149
2SB60A	AC126	2SB127	AD149
2SB61	AC126	2SB131	AD149
2SB63	AD162	2SB134	AC126
2SB66	AC126	2SB135	AC126, AC128
2SB70	AC126	2SB136	AC128
2SB71	AC126	2SB137	AD149
2SB74	AC126	2SB140	AD149
2SB75	AC126	2SB142	AD149
2SB76	AC126	2SB143	AD149
2SB77	AC128	2SB144	AD149
2S878	AC128	2SB145	AD149
2SB79	AC128	2SB146	AD149
2SB80	AD149	2SB154	AC128
2SB83	AD149	2SB155	AC128
2SB89	AC128	2SB156	AC128
2SB90	AC126	2SB157	AC128
2SB91	AC128	2SB158	AC128
2SB92	AC128	2SB159	AC128
2SB94	AC128	2SB160	AC126

Type No.	Mullard Comparable	Type No.	Mullard Comparable
2SB161	AC128	2SB255	AC128
2SB162	AC128	2SB261	AC128
2SB163	AC128	2SB262	AC128
2SB164	AC128	2SB263	AC128
2SB165	AC128	2SB264	AC126
2SB166	AC128	2SB293	AC128
2SB167	AC128	2SB294	AC128
2SB168	AC126	2SB345	AC126
2SB169	AC128	2SB346	AC126
2SB170	AC128	S2B347	AC126
2SB171	AC128	2SB348	AC126
2SB172	AC128	2SB415	AC128
2SB173	AC126	2SB448	AD149
2SB174	AC128	2SB475	AC128
2SB175	AC128	2SC37	BC107
2S8176	AC128	2SC39A	BC107
2SB177	AC128	2SC80	BC107
2SB17B	AC128	2SC91	AC127
2SB179	AC128	2SC98	BC108, BC109
2SB180	AD149	2SC99	BC108, BC109
2SB183	AC126	2SC103A	BC107
2SB184	AC128	2SC121	BF173
2SB185	AC126	2SC122	BF173
2SB186	AC126	2SC123	BF173
2SB187	AC126	2SC124	BF173
2SB188	AC128	2SC127	BC108, BC109
2SB189	AC128	2SC155	BF167
2SB190	AC128	2SC156	BF167
2SB192	AC128	2SC171	BC107
2SB193	AC128	2SC174	BC107
2SB194	AC128	2SC183	BF115
2SB195	AC128	2SC184	BF115
2SB196	AC128	2SC185	BF115
2SB197	AC128	2SC186	BF167
2SB198	AC128	2SC187	BF167
2SB199	AC128	2SC206	BC107
2SB200	AC128	2SC271	BF173
2SB201	AC128	2SC281	BC107
2SB202	AC128	2SC286	BF173
2SB219	AC128	2SC287	BF173
2SB220	AC128	2SC288	BF173
2SB221	AC128	2SC316	BC107
2SB222	AC128	2SC360	BC107
2SB223	AC128	2SC368	BC107
2SB254	AC128	2SC372	BC107

Type No.	Mullard Comparable
2SC379	BC107
2SC429	BF167
2SC430	BF167, BF173
2SD30	AC127
2SD34	AC127
2SD37	AC127
2SD38	AC127
2SD61	AC127
2SD62	AC127
2SD63	AC127
2SD64	AC127
2SD65	AC127
2SD66	AC127
2SD75	AC127
2SD77	AC127
2SD96	AC127
2SD127	AC127
2SD142	BD124
2SD178	AC127
2SD186	AC127
2SD187	AC127
2SD193	AC127
2T11	AC128
2T13	AC128
2T14	AC128
2T15	AC128
2T16	AC128
2T20	AC128
2T21	AC128
2T22	AC12B
2T23	AC128
2T24	AC128
2T25	AC128
2T26	AC128
2T51	AC127

Type No.	Mullard Comparable
3N34	BF167
3N35	BF167
3N35A	BF167
3N56	AC176
3N57	AC176
3N71	BF167
3N72	BF167
3N73	BF167
3NB7	BC107
3N88	BC107
4D24	BF167
4D25	BF167
4D26	BF167
33DP1	OA91
40AS	BY126
50D5	BY126
50E4	BY126
147T1	AD149
154T1	AF178
155T1	AF178
156T1	AF178
157T1	AF178
520T1	AC128
521T1	AC12B
40022	AD149
40254	AD149



TELEVISION PICTURE TUBE TYPE NOMENCLATURE SYSTEM

All new Mullard picture tubes are registered internationally with Pro-Electron and have type numbers according to the following code, based on the Pro-Electron type nomenclature system for cathode ray tubes.

The type number consists of a single letter followed by two sets of figures ending with a letter.

The first letter, A, indicates that the tube is a television display tube for domestic applications.

The first group of figures indicates the approximate diagonal of the screen in cm

Thus 47 represents a 47cm (19in) screen
59 represents a 59cm (23in) screen

The second group of figures is a two or three figure serial number indicating a particular design or development.

The final letter indicates the properties of the phosphor screen

Thus W indicates a white fluorescence
X indicates a tri-colour screen

Examples

A47–26W Domestic television picture tube with 47cm (19in) 'black-and-white' screen

A63–120X Domestic television picture tube with 63cm (25in) 'colour' screen

OLD SYSTEM

Earlier picture tubes have numbers consisting of two letters followed by two sets of figures.

The first letter indicates the method of deflection and focusing

A Electrostatic focusing, magnetic deflection
M Magnetic focusing and deflection

The second letter, W, indicates the white phosphor for 'black-and-white' picture tubes.

The first group of figures immediately following the letters, indicates the approximate diagonal of the screen in cm.

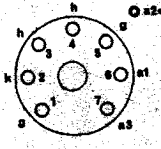
The second group of figures is a serial number indicating a particular design or development.

Examples:

AW53-88	Cathode ray tube with 53cm (21in) 'black-and-white' screen and employing magnetic deflection and electrostatic focusing
MW53-80	Cathode ray tube with 53cm (21in) 'black-and-white screen and employing magnetic deflection and focusing.

A28–14W

28cm (11in) Television tube. Electrostatic focusing, 90° magnetic deflection angle. Metal-backed screen and reinforced envelope. A separate safety screen is not required.



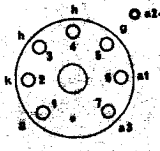
Special 7-pin

Vh	11	V
Ih	75	mA
Va2+a4	11	kV
Va3 (focus electrode)	0 to 350	V
Va1	250	V
Vg for cut-off	−35 to −69	V

Final anode cavity connector type CT8.

A31–120W

31cm (12in) Television tube. Electrostatic focusing. 110° magnetic deflection angle. Metal-backed screen and reinforced envelope. A separate safety screen is not required.



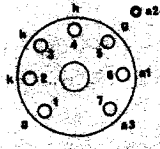
Special 7-pin

Vh	11	V
Ih	75	mA
Va2+a4	11	kV
Va3 (focus electrode)	0 to 350	V
Va1	250	V
Vg for cut-off	−35 to −69	V

Final anode cavity connector type CT8.

A31–410W

31cm (12in) Television tube. Electrostatic focusing. 110° magnetic deflection angle. Metal-backed screen and reinforced envelope. A separate safety screen is not required. Short warm-up time.



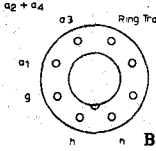
Special 7-pin

Vh	11	V
Ih	140	mA
Va2+a4	12	kV
Va3 (focus electrode)	0 to 350	V
Va1	250	V
Vg for cut-off	−35 to −69	V

Final anode cavity connector type CT8.

A44–120W/R

44cm (17in) Television tube. Electrostatic focusing. 110° magnetic deflection angle. Metal-backed screen and reinforced envelope. A separate safety screen is not required. This tube is fitted with a ring trap base.



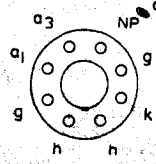
B8H

Vh	6·3	V
Ih	300	mA
Va2+a4	18	kV
Va3 (focus electrode)	0 to 400	V
Va1	400	V
Vg for cut-off	−40 to −77	V

Final anode cavity connector type CT8.

A47–14W

47cm (19in) Television tube. Electrostatic focusing. 110° magnetic deflection. Metal-backed screen.

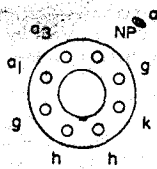


Vh	6·3	V
Ih	300	mA
Va2+a4	20	kV
Va3 (focus electrode)	0 to 400	V
Va1	400	V
Vg for cut-off	−40 to −77	V

Final anode cavity connector type CT8.

A47–26W
A47–26W/R

47cm (19in) Television tube. Electrostatic focusing. 110° magnetic deflection angle. Metal-backed screen and reinforced envelope. A separate safety screen is not required.



B8H

Vh	6·3	V
Ih	300	mA
Va2+a4	20	kV
Va3 (focus electrode)	0 to 400	V
Va1	400	V
Vg for cut-off	−40 to −77	V

Final anode cavity connector type CT8.

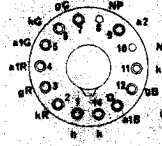
The A47–26W/R is fitted with a ring trap connected to pin 5.

A47–26W
including kit

Picture tube together with conversion kit for replacement of the 19-in twin panel tube A47–11W.

A49–120X

49cm (19in) shadow-mask colour Television tube. Electrostatic focusing, 90° magnetic deflection angle. Metal-backed 3-colour phosphor-dot screen. Reinforced envelope. A separate safety screen is not required. Suitable for receivers with push-through presentation.



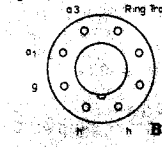
Vh	6·3	V
Ih	900	mA
Va3+a4	25	kV
Va2 (focus electrode)	4·2 to 5	kV
*Va1 (at Vg = −100 V)	210 to 496	V
*Vg (at Va2 = 300 V)	−65 to −135	V

Final anode cavity connector type CT8.

*For visual extinction of focused raster.

A50–120W/R

50cm (20in) Television tube. Electrostatic focusing, 110° magnetic deflection angle. Metal-backed screen and reinforced envelope. A separate safety screen is not required. This tube is fitted with a Ring Trap.



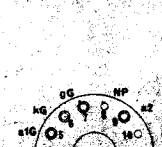
B8H

Vh	6·3	V
Ih	300	mA
Va2+a4	20	kV
Va3 (focus electrode)	0 to 400	V
Va1	400	V
Vg for cut-off	−40 to −77	V

Final anode cavity connector type CT8.

A56–120X

56cm (22in) shadow-mask colour Television tube. Electrostatic focusing, 92° magnetic deflection angle. Metal-backed 3-colour phosphor-dot screen. Reinforced envelope. A separate safety screen is not required.



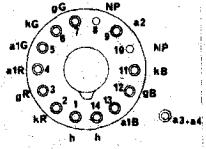
Vh	6·3	V
Ih	900	mA
Va3+a4	25	kV
Va2 (focus electrode)	4·5 to 5	kV
*Va1 (at Vg = −100 V)	210 to 496	V
*Vg (at Va1 = 300V)	−65 to −135	V

Final anode cavity connector type CT8.

*For visual extinction of raster.

A56–140X

56cm (22in) shadow mask colour Television tube. Electrostatic focusing. 110° magnetic deflection angle. Metal-backed 3-colour phosphor-dot screen. Reinforced envelope. A separate safety screen is not required.



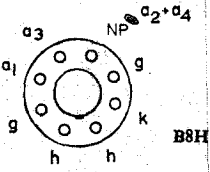
Vh	6·3	V
Ih	900	mA
Va3+a4	25	kV
Va2 (focus electrode)	4·5 to 5	kV
*Va1 (at Vg = −100V)	210 to 495	V
*Vg (at Va1 = 300V)	−65 to −135	V

Final anode cavity connector type CT8.

*For visual extinction of raster.

A59–15W

58cm (23in) Television tube. Electrostatic focusing, 110° magnetic deflection. Metal-backed screen.



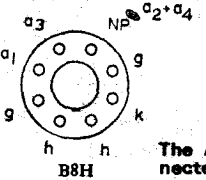
B8H

Vh	6·3	V
Ih	300	mA
Va2+a4	20	kV
Va3 (focus electrode)	0 to 400	V
Va1	400	V
Vg for cut-off	−40 to −77	V

Final anode cavity connector type CT8.

A59–23W
A59–23W/R

59cm (23in) Television tube. Electrostatic focusing, 110° magnetic deflection angle. Metal-backed screen and reinforced envelope. A separate safety screen is not required.



B8H

Vh	6·3	V
Ih	300	mA
Va2+a4	20	kV
Va3 (focus electrode)	0 to 400	V
Va1	400	V
Vg for cut-off	−40 to −77	V

Final anode cavity connector type CT8.

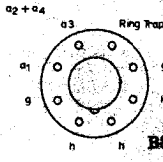
The A59–23W/R is fitted with a ring trap connected to pin 5.

A59–23W
including kit

Picture tube together with conversion kit for replacement of the 23-in twin panel tube A59–16W.

A61–120W/R

61cm (24in) Television tube. Electrostatic focusing, 110° magnetic deflection angle. Metal-backed screen and reinforced envelope. A separate safety screen is not required. Suitable for use in receivers with push-through presentation. This tube is fitted with a ring trap base.



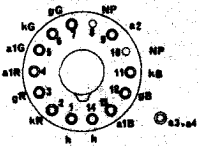
B8H

Vh	6·3	V
Ih	300	mA
Va2 + a4	20	kV
Va3 (focus electrode)	0 to 400	V
Va1	400	V
Vg for cut-off	−40 to −77	V

Final anode cavity connector type CT8.

A63–120X

63cm (25in) shadow-mask colour Television tube. Electrostatic focusing. 90° magnetic deflection angle. Metal-backed 3-colour phosphor-dot screen. Reinforced envelope. A separate safety screen is not required. Suitable for receivers with push-through presentation.

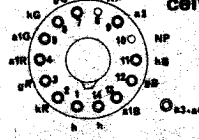


Vh	6·3	V
Ih	900	mA
Va3 + a4	25	kV
Va2 (focus electrode)	4·2 to 5	kV
*Va1 (at Vg = −100 V)	210 to 495	V
*Vg (at Va1 = 300 V)	−65 to −135	V

*For visual extinction of focused raster.

A66–120X

66cm (26in) shadow-mask colour Television tube.
Electrostatic focusing, 92° magnetic deflection angle. Metal-backed 3-colour phosphor-dot screen. Reinforced envelope. A separate safety screen is not required. Suitable for receivers with push-through presentation.



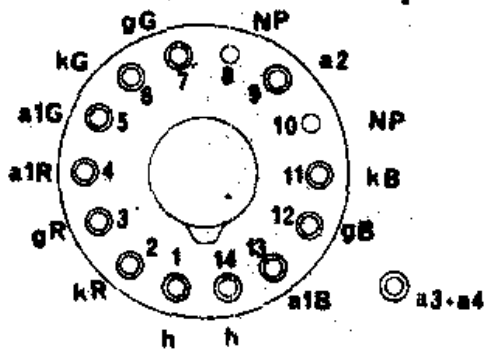
Vh	6·3	V
Ih	900	mA
Va3 + a4	25	kV
Va2 (focus electrode)	4·2 to 5	kV
*Va1 (at Vg = −100 V)	210 to 495	V
*Vg (at Va1 = 300 V)	−65 to −135	V

Final anode cavity connector type CT8.

*For visual extinction of focused raster.

A66-140X

66cm (26in) shadow-mask colour Television tube. Electrostatic focusing. 110° magnetic deflection angle. Metal-backed 3-colour phosphor-dot screen. Reinforced envelope. A separate safety screen is not required. Suitable for receivers with push-through presentation.



Vh	6·3	V
Ih	900	mA
Va3 + a4	25	kV
Va2 (focus electrode)	4·2 to 5	kV
*Va1 (at Vg = −100V)	210 to 495	V
*Vg (at Va1 = 300V)	−65 to −135	V

Final anode cavity connector type CT8.

*For visual extinction of focused raster.

TELEVISION PICTURE TUBE REPLACEMENTS

The information supplied in the replacement list is based on similarities of published electrical, mechanical and dimensional specifications. In undertaking any picture tube replacements, please observe all relevant instructions and specifications of the tube maker and/or set manufacturer, in particular, insulation, alignment, mounting and handling of the picture tube.

In case of replacement by a similar type make sure that base pin arrangements are electrically and dimensionally identical. Careful attention must be paid to possible differences in specifications.

If the above mentioned precautions are taken, a Mullard picture tube used as a replacement is covered by its normal guarantee.

Full technical information on Mullard Picture Tubes used in new receiver designs is published in the Mullard Technical Handbook Book 2 Part 1, May 1973.

Replacement information

1. "Inckit" types include kit which enables the majority of twin panel tubes to be replaced by modern equivalents.
2. Original has 12·6V heater. Connect 21Ω, 2W resistor in series with the heater.
3. Original has light screen tint (75%).
4. Replacement is 1 inch shorter.

TELEVISION PICTURE TUBE REPLACEMENTS

Type to be Replaced	Mullard Type	Notes
A28–14W	A28–14W	
A31–120W	A31–120W	
A31–410W	A31–410W	
A44–120W/R	A44–120W/R	
A47–11W	A47–26W	
A47–13W	A47–26W/inckit	1
A47–14W	A47–14W	
A47–15W	A47–14W	
A47–17W	A47–26W	
A47–18W	A47–26W	3
A47–25W	A47–26W	
A47–26W	A47–26W	
A47–26W/ inckit	A47–25W/inckit	1
A47–26W/R	A47–26W/R	
A47–27W	A47–26W	
A47–28W	A47–26W	
A47–28W/R	A47–26W/R	
A49–11X	A49–120X	
A49–15X	A49–120X	
A49–19X	A49–120X	
A49–191X	A49–120X	
A49–120X	A49–120X	
A49–200X	A49–120X	
A50–120W/R	A50–120W/R	
A56–120X	A56–120X	
A56–140X	A56–140X	
A59–11W	A59–23W	
A59–12W	A59–23W	
A59–13W	A59–23W/inckit	1
A59–14W	A59–23W/inckit	1
A59–15W	A59–15W	
A59–16W	A59–23W /inckit	1
A59–23W	A59–23W	
A59–23W/R	A59–23W/R	
A59–25W	A59–23W	
A61–120W/R	A61–120W/R	
A63–11X	A63–120X	
A63–120X	A63–120X	
A63–200X	A63–120X	
A56–120X	A65–120X	
A66–140X	A66–140X	
AW47–90	A47–14W	3, 4
AW47–91	A47–14W	3
AW47–97	A47–14W	2, 3, 4
AW59–90	A59–15W	3, 4
AW59–91	A59–15W	3
AW59–95	A59–15W	2, 3, 4
C19/7A	A47–14W	3, 4
C19/10A	A47–14W	3
C19/10AP	A27–26W/inckit	1
C19AK	A47–14W	3, 4
C23/7A	A59–15W	3, 4
C23/10A	A59–15W	3
C23/10AP	A59–23W/inckit	1
C23AK	A59–15W	3, 4
C23AKT	A59–23W/inckit	1
CME1713R	A44–120W/R	
CME1901	A47-14W	2, 3, 4
CME1902	A47–14W	3, 4
CME1903	A47–14W	3
CME1905	A47–25W	
CME1906	A47–26W/inckit	1
CME1907	A47–26W	
CME1908	A47–14W	
CME1913	A47–26W	
CME1913R	A47–26W/R	
CME1913S	A47–26W	
CME2013R	A50–120W/R	
CME2301	A59–15W	2, 3, 4
CME2302	A59–15W	3, 4
CME2303	A59–15W	3
CME2305	A59–23W	
CME2306	A59–23W/inckit	1
CME2308	A59–15W	
CME2312	A59–23W	
CME2313R	A59–23W/R	
CME2313S	A59–23W	
CME2413R	A51–120W/R	
23DGP4	A59–23W/inckit	1
23DHP4	A59–23W/inckit	1
23SP4	A59–23W/inckit	1
25UP22	A63–120X	
7601A	A47–14W	2, 3, 4
7701A	A59–15W	2, 3, 4

RECEIVING VALVE TYPE NOMENCLATURE SYSTEM

All new Mullard valves are registered internationally with Pro-Electron and have type numbers according to the following code, based on the Pro-Electron type nomenclature system for receiving and amplifying valves.

The type number consists of two or more letters followed by a group of three figures (two figures in earlier types).

The first letter indicates the heater or filament voltage or current:

D	0·5 to 1·5V filament
E	6·3V heater
G	5·0V heater
P	300mA heater
U	100mA heater

Letters A (4·0V), C (200mA) and K (2·0V) have also been used.

The second and subsequent letters indicate the general class of valve:

A	single diode
B	double diode
C	triode
D	power output triode
E	tetrode
F	pentode
L	power output tetrode or pentode
H	hexode or heptode (hexode type)
K	octode or heptode (octode type)
M	tuning indicator
Y	half-wave rectifier
Z	full-wave rectifier

Two or three of these letters may be combined together, e.g. BC – double-diode triode.

The first figure of the serial number indicates the type of base:

2	B10B (10-pin) base (previously used for B8G base)
3	Octal base
4	B8A base
5	B9D (magnoval) base (previously used for miscellaneous bases)
8	B9A (noval) base
9	B7G base

The remaining figure or figures make up the serial number indicating a particular design or development.

Examples

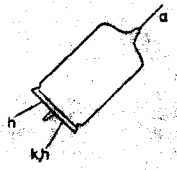
PCF806	Triode pentode with B9A base for use in 300mA series heater chain
EC90	Triode with B7G base and 6·3V heater.

LIST OF EARLIER TYPES AND TYPES NOT IN COMMON USE

EC86	EL81	PL81A	UBF80
EC88	EL86	PL82	UBF89
ECC88	ELL80	U25/KY50	UCC85
ECF82	EY88	U301/CY30	UL41
EF83	PCF82	UABC80	30C15/ PCF800
EF91	PCF84	UBC81	

DY51

HIGH VOLTAGE HALF-WAVE RECTIFIER

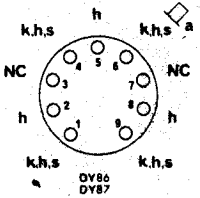


Wired-in

Vh	1·4	V
Ih	550	mA
Pulsed input		
P.I.V. max.	15	kV
Iout	350	μA
ik(pk) max.	40	mA
C max.	2000	pF

DY86/87

E.H.T. HALF-WAVE RECTIFIER



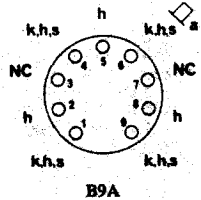
B9A

Vh	1·4	V
Ih	550	mA
Pulsed input		
P.I.V. max.	22	kV
ia(pk) max.	40	mA
Iout max.	500	μA
C max.	2000	pF

Pins 3 and 7 may only be connected to points in the heater circuit and must not be earthed.

DY802

E.H.T. HALF-WAVE RECTIFIER

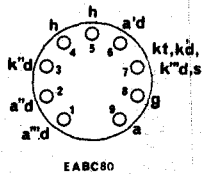


B9A

Vh	1·4	V
Ih	550	mA
Pulsed input		
P.I.V. max.	25	kV
ia(pk) max.	50	mA
Iout max.	500	μA
C max.	2000	pF

Pins 3 and 7 may only be connected to points in the heater circuit and must not be earthed.

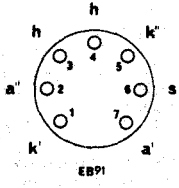
EABC80 — TRIPLE DIODE TRIODE



B9A

Vh	6·3		V
Ih	450		mA
Va	100	250	V
Vg	−1·0	−3·0	V
Ia	0·8	1·0	mA
gm	1·45	1·4	mA/V
μ	70	70	

EB91 — DOUBLE DIODE (separate cathodes)

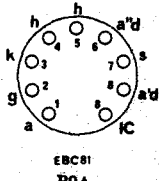


B7G

Vh	6·3	V
Ih	300	mA
*P.I.V. max.	420	V
*Ia max.	9·0	mA
*ia(pk) max.	54	mA
*vh–k(pk) max.	330	V

*Each section

EBC81 — DOUBLE DIODE TRIODE

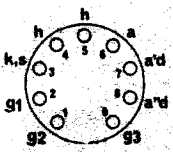


B9A

Vh	6·3	V
Ih	230	mA
Va	250	V
Vg	−3·0	V
Ia	1·0	mA
gm	1·2	mA/V
μ	70	

EBF80

DOUBLE DIODE PENTODE

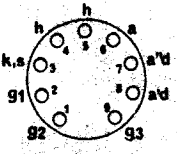


B9A

Vh	6·3	V
Ih	300	mA
Va = Vb	250	V
Rg2	95	kΩ
Vg2	85	V
Vg3	0	V
Rk	300	Ω
Ia	5·0	mA
Ig2	1·75	mA
gm	2·2	mA/V
μg1–g2	18	

EBF83

DOUBLE DIODE PENTODE FOR USE IN HYBRID CAR RADIOS

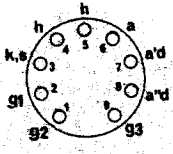


B9A

Vh	6·3			V
Ih	300			mA
Va	6·3	12·6	25	V
Vg3	0	0	0	V
Vg2	6·3	12·6	25	V
Rg1	2·2	2·2	2·2	MΩ
Ia	0·12	0·45	1·7	mA
Ig2	0·04	0·14	0·6	mA
gm	0·45	1·0	2·1	mA/V
ra	0·85	1·0	0·2	MΩ

EBF89

DOUBLE DIODE VARIABLE-MU R.F. PENTODE

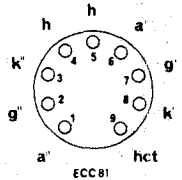


B9A

Vh	6·3		V
Ih	300		mA
Va	250	250	V
Vg3	0	0	V
Vg2	80	100	V
Vg1	−1·0	−2·0	V
Ia	9·0	9·0	mA
Ig2	2·7	2·7	mA
gm	4·6	3·8	mA/V
ra	0·9	1·0	MΩ
μg1–g2	20	20	

ECC81

R.F. DOUBLE TRIODE (separate cathodes)

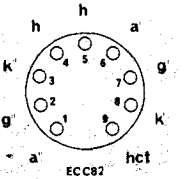


B9A

	Series	Parallel	
Vh	12·6	6·3	V
Ih	150	300	mA
Characteristics (each section)			
Va	200	250	V
Vg	−1·0	−2·0	V
Ia	11·5	10	mA
gm	6·7	5·5	mA/V
μ	70	60	

ECC82

DOUBLE TRIODE (separate cathodes)

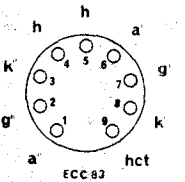


B9A

	Series	Parallel	
Vh	12·6	6·3	V
Ih	150	300	mA
Characteristics (each section)			
Va	100	250	V
Vg	0	−8·5	V
Ia	11·8	10·5	mA
gm	3·1	2·2	mA/V
μ	19·5	17	

ECC83

DOUBLE TRIODE (separate cathodes)

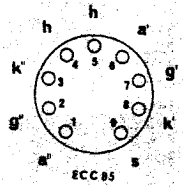


B9A

	Series	Parallel	
Vh	12·6	6·3	V
Ih	150	300	mA
Characteristics (each section)			
Va	100	250	V
Vg	−1·0	−2·0	V
Ia	0·5	1·2	mA
gm	1·25	1·6	mA/V
μ	100	100	

ECC85

R.F. DOUBLE TRIODE (separate cathodes)

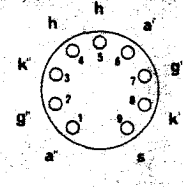


B9A

Vh	6·3	V
Ih	435	mA
Characteristics (each section)		
Va	250	V
Vg	−2·3	V
Ia	10	mA
gm	5·9	mA/V
μ	57	

ECC189

V.H.F. VARIABLE-MU FRAME-GRID CASCODE DOUBLE TRIODE

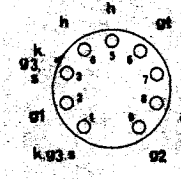


B9A

Vh	6·3	V
Ih	365	mA
Characteristics (each section)		
Va	90	V
Vg	−1·4	V
Ia	15	mA
gm	12·5	mA/V
ra	2·5	kΩ
μ	34	
Vg (for 20:1 reduction in gm)	−5·0	V
Vg (for 100:1 reduction in gm)	−9·0	V

ECF86

TRIODE FRAME-GRID PENTODE

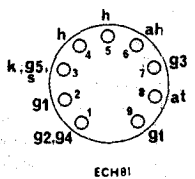


B9A

	Triode	Pentode	
Vh	6·3		V
Ih	390		mA
Va	100	170	V
Vg2	—	150	V
Vg1	−3	−1·2	V
Ia	14	10	mA
Ig2	—	3·3	mA
gm	5·7	12	mA/V
ra	3·0	>350	kΩ

ECH81

TRIODE HEPTODE FREQUENCY CHANGER

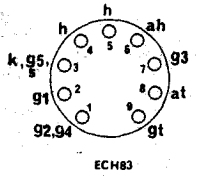


B9A

Vh	6·3	V
Ih	300	mA
Vah = Vb	250	V
Rg2+g4	22	kΩ
Rg3+gt	47	kΩ
Rk	140	Ω
Iah	3·25	mA
Ig2+g4	6·7	mA
Ig3+gt	200	μA
gc	775	μA/V
Vat	100	V
Iat	4·5	mA

ECH83

TRIODE HEPTODE FOR USE IN HYBRID CAR RADIOS

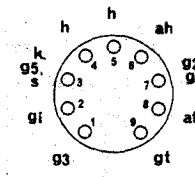


B9A

Vh	6·3	V
Ih	300	mA
Vah = Vb	12·6	V
Vg2+g4	12·6	V
Vg1	0	V
Iah	100	μA
Ig2+g4	350	μA
Ig3+gt	32	μA
Vosc(r.m.s.)	1·2	V
gc	160	μA/V
ra	3·8	MΩ
Vat = Vb	12·6	V
Iat	750	μA

ECH84

TRIODE HEPTODE FOR NOISE CANCELLED SYNC. SEPARATOR

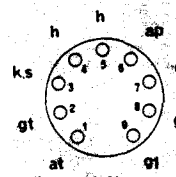


B9A

Vh	6·3		V
Ih	300		mA
	Triode	Heptode	
Va	50	135	V
Vg3	—	0	V
Vg2+g4	—	14	V
Vg1	0	0	V
Ia	3·0	1·7	mA
Ig2+g4	—	900	μA
gm	3·7	2·2	mA/V
μ	50	—	
Vg3(Ia = 20μA)	—	−2·0	V
Vg1(Ia = 20μA)	—	−1·9	V
Ia(Va = 200V, Vg = −11V)	<100	—	μA

ECL80

TRIODE OUTPUT PENTODE
(pa max. = 3·5W)

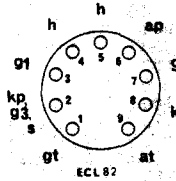


B9A

Vh	6·3		V
Ih	300		mA
	Triode	Pentode	
Va	100	200	V
Vg2	—	200	V
Vg3	—	0	V
Vg1	−2·3	−8·0	V
Ia	4·0	17·5	mA
Ig2	—	3·3	mA
gm	1·4	3·3	mA/V
μ	17·5	—	
Ra	—	11	kΩ
Pout	—	1·4	W

ECL82

TRIODE OUTPUT PENTODE
(pa max. = 5·4W)

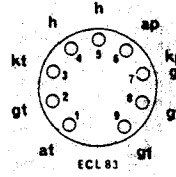


B9A

Vh	6·3		V
Ih	780		mA
	Triode	Pentode	
Va	100	250	V
Vg2	—	250	V
Ia	3·5	28	mA
Ig2	—	5·7	mA
Vg1	0	−22·5	V
gm	2·5	5·0	mA/V
Ra	—	9·0	kΩ
Pout	—	3·4	W

ECL83

TRIODE OUTPUT PENTODE
(pa max. = 5·4W)

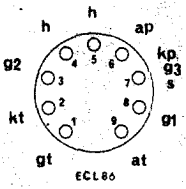


B9A

Vh	6·3		V
Ih	600		mA
	Triode	Pentode	
Va	200	200	V
Vg2	—	200	V
Ia	2·4	27	mA
Ig2	—	4·4	mA
Vg1	−1·5	−13	V
gm	2·5	5·0	mA/V
ra	34	65	kΩ
Ra	—	7·5	kΩ
Pout	—	2·5	W

ECL86

TRIODE OUTPUT PENTODE
(pa max.=9W)

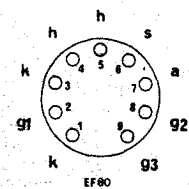


B9A

Vh	6·3		V
Ih	700		mA
	Triode	Pentode	
Va	250	250	V
Vg2	—	250	V
Ia	1·2	36	mA
Ig2	—	6·0	mA
Vg1	−1·9	−7·0	V
gm	1·6	10	mA/V
ra	62	48	kΩ
Ra	—	7·0	kΩ
Pout	—	4·0	W

EF80

HIGH SLOPE R.F. PENTODE

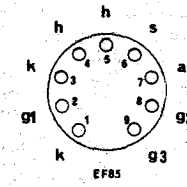


B9A

Vh	6·3	V
Ih	300	mA
Va	170	V
Vg2	170	V
Vg3	0	V
Rk	160	Ω
Ia	10	mA
Ig2	2·5	mA
gm	7·4	mA/V
μg1–g2	50	

EF85

VARIABLE-MU R.F. PENTODE

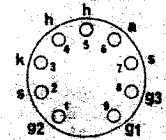


B9A

Vh	6·3	V
Ih	300	mA
Vb=Va	250	V
Rg2	60	kΩ
Vg2	100	V
Rk	160	Ω
Ia	10	mA
Ig2	2·5	mA
gm	6·0	mA/V

EF86

LOW NOISE A.F. VOLTAGE AMPLIFYING PENTODE



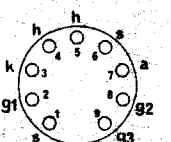
EF86

B9A

Vh	6·3	V
Ih	200	mA
Va	250	V
Vg3	0	V
Vg2	140	V
Vg1	−2·0	V
Ia	3·0	mA
Ig2	600	μA
gm	2·0	mA/V
μg1–g2	38	

EF89

VARIABLE-MU R.F. PENTODE



EF89

B9A

Vh	6·3	V
Ih	200	mA
Va	250	V
Vg3	0	V
Vg2	100	V
Rk	180	Ω
Ia	9·0	mA
Ig2	3·0	mA
gm	3·6	mA/V

EF183

FRAME-GRID VARIABLE-MU R.F. PENTODE

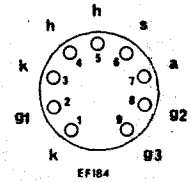
EF183

B9A

Vh	6·3	V
Ih	300	mA
Va	200	V
Vg2	90	V
Vg3	0	V
Ia	12	mA
Ig2	4·5	mA
Vg1	−2·0	V
gm	12·5	mA/V
ra	500	kΩ

EF184

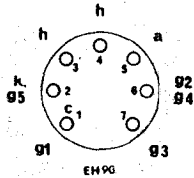
FRAME-GRID R.F. PENTODE



Vh	6·3		V
Ih	300		mA
Va	170	200	V
Vg3	0	0	V
Vg2	170	200	V
Vg1	−2·0	−2·5	V
Ia	10	10	mA
Ig2	4·1	4·1	mA
gm	15·6	15	mA/V
ra	330	380	kΩ
μg1–g2	60	60	

EH90

DUAL CONTROL HEPTODE

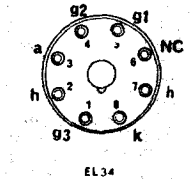


B7G

Vh	6·3	V
Ih	300	mA
Va	100	V
Vg2+g4	30	V
Vg1	−1·0	V
Vg3	0	V
Ia	0·75	mA
Ig2+g4	1·1	mA
gm(g1–a)	1·2	mA/V
ra	900	kΩ

EL34

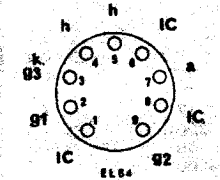
OUTPUT PENTODE (pa max.=25W)



Octal

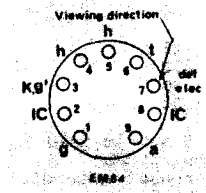
Vh	6·3	V
Ih	1·5	A
Va	250	V
Vg2	250	V
Vg3	0	V
Rk	106	Ω
Ia	100	mA
Ig2	15	mA
gm	11	mA/V
Ra	2·0	kΩ
Pout	11	W

EL84 — OUTPUT PENTODE (pa max.=12W)



Vh	6·3	V
Ih	760	mA
Va	250	V
Vg2	250	V
Rk	135	Ω
Ia	48	mA
Ig2	5·5	mA
gm	11·3	mA/V
Ra	4·5	kΩ
Pout	5·7	W

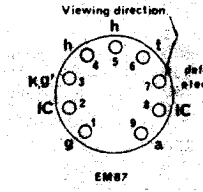
EM84 — VOLTAGE INDICATOR



Vh	6·3		V
Ih	210		mA
Vb	250		V
Vt	250		V
Ra	470		kΩ
Rg–k	3		MΩ
Vg	0	−22	V
Ia	450	60	μA
It	1·0	1·8	mA
*L	21	0	mm

Deflection electrode connected to anode.
*Length of column

EM87 — VOLTAGE INDICATOR

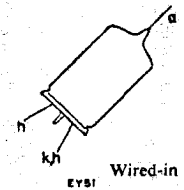


Vh	6·3			V
Ih	300			mA
Vb	250			V
Vt	250			V
Ra	100			kΩ
Rg–k	3·0			MΩ
Vg	0	−10	−15	V
Ia	2·0	0·5	0·2	mA
It	1·0	1·8	2·0	mA
*L	21	0	−1·5	mm

Deflection electrode connected to anode
*Length of column. A negative value of L indicates overlapping

EY51

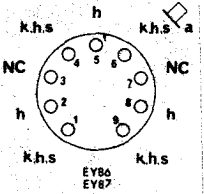
HIGH VOLTAGE HALF-WAVE RECTIFIER



Vh	6·3	V
Ih	90	mA
Pulsed input		
P.I.V. max.	17	kV
Iout	350	μA
ik(pk) max.	80	mA
C max.	5000	pF

EY86/87

HIGH VOLTAGE HALF-WAVE RECTIFIER

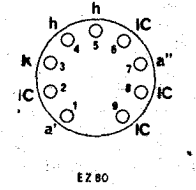


Vh	6·3	V
Ih	90	mA
Pulsed input		
P.I.V. max.	22	kV
Iout	800	μA
ia(pk) max.	40	mA
C max.	2000	pF

†Pins 1, 4, 6 and 9 may be used for fitting an anti-corona shield
*Pins 3 and 7 may only be connected to points in the heater circuit and must not be earthed

EZ80

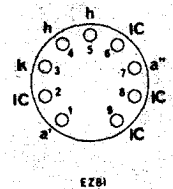
FULL-WAVE RECTIFIER



Vh	6·3	V
Ih	600	mA
Vin (r.m.s.)	2×350	V
Iout max.	90	mA
C max.	50	μF
Rlim min. (per anode)	300	Ω

EZ81

FULL-WAVE RECTIFIER



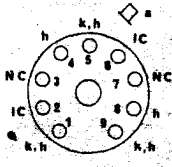
EZ81

B9A

Vh	6·3	V
Ih	1·0	A
Vin (r.m.s.)	2×350	V
Iout max.	160	mA
C max.	50	μF
Rlim min. (per anode)	230	Ω

GY501

E.H.T. HALF-WAVE RECTIFIER FOR COLOUR TV



B9D

Vh	3·15	V
Ih	400	mA
P.I.V. max.	31	kV
Vout	25	kV
Iout	1·5	mA

Pins 3 and 7 may only be connected to points with the same potential as the heater, and must not be earthed

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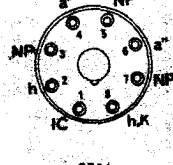
GZ34

FULL-WAVE RECTIFIER



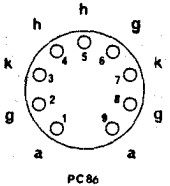
GZ34

Octal

Vh	5·0	V
Ih	1·9	A
Vin(r.m.s.)	2×450	V
Iout max.	250	mA
C max.	60	μF
Rlim min. (per anode)	150	Ω

PC86

U.H.F. FRAME-GRID MIXER/ OSCILLATOR TRIODE

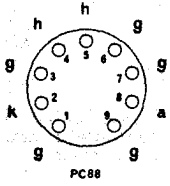


B9A

Ih	300	mA
Vh	3·8	V
Va	175	V
Vg	−1·5	V
Ia	12	mA
gm	14	mA/V
ra	4·85	kΩ
μ	68	

PC88

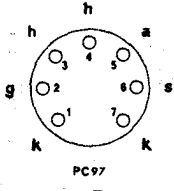
U.H.F. FRAME-GRID GROUNDED GRID AMPLIFIER TRIODE



Ih	300	mA
Vh	3·8	V
Va	160	V
Vg1	−1·25	V
Ia	12·5	mA
gm	13·5	mA/V
ra	4·8	kΩ
μ	65	

PC97

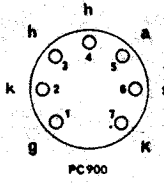
R.F. TRIODE



B9D

Ih	300	mA
Vh	4·5	V
Va	135	V
Vg	−1·0	V
Ia	11	mA
gm	13	mA/V
μ	65	
ra	5·0	kΩ

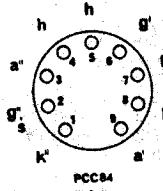
PC900 — R.F. TRIODE



B7G

Ih	300	mA
Vh	4·0	V
Va	135	V
Vg	−1·0	V
Ia	11·5	mA
gm	14·5	mA/V
μ	72	
ra	5·0	kΩ

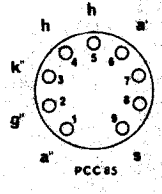
PCC84 — DOUBLE TRIODE (separate cathodes)



B9A

Ih	300	mA
Vh	7·0	V
Characteristics (each section)		
Va	90	V
Vg	−1·5	V
Ia	12	mA
gm	6·0	mA/V
μ	24	

PCC85 — DOUBLE TRIODE (separate cathodes)

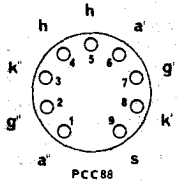


B9A

Ih	300		mA
Vh	9·0		V
Characteristics (each section)			
Va	170	200	V
Vg	−1·5	−2·1	V
Ia	10	10	mA
gm	6·2	5·8	mA/V
μ	50	48	

PCC88

FRAME-GRID DOUBLE TRIODE

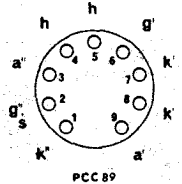


B9A

Ih	300	mA
Vh	7·0	V
Characteristics (each section)		
Va	90	V
Vg	−1·3	V
Ia	15	mA
gm	12·5	mA/V
μ	33	

PCC89

VARIABLE-MU FRAME-GRID DOUBLE TRIODE

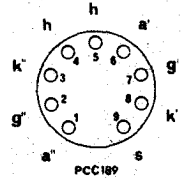


B9A

Ih	300	mA
Vh	7·5	V
Characteristics (each section)		
Va	90	V
Ia	15	mA
Vg	−1·2	V
gm	12·3	mA/V
μ	36	

PCC189

V.H.F. VARIABLE-MU FRAME-GRID CASCODE DOUBLE TRIODE

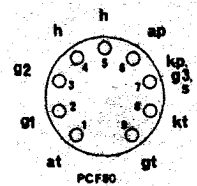


B9A

Ih	300	mA
Vh	7·6	V
Characteristics (each section)		
Va	90	V
Vg	−1·4	V
Ia	15	mA
gm	12·5	mA/V
ra	2·5	kΩ
μ	34	
Vg (for 20:1 reduction in gm)	−5·0	V
Vg (for 100:1 reduction in gm)	−9·0	V

PCF80

TRIODE PENTODE (separate cathodes)

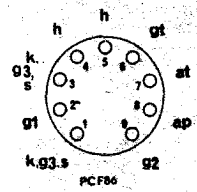


B9A

Ih	300		mA
Vh	9·0		V
	Triode	Pentode	
Va	100	170	V
Vg2	—	170	V
Vg1	−2·0	−2·0	V
Ia	14	10	mA
Ig2	—	2·8	mA
gm	5·0	6·2	mA/V
μ	20	—	

PCF86

TRIODE FRAME-GRID PENTODE

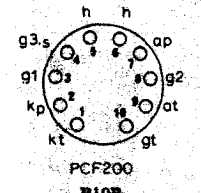


B9A

Ih	300		mA
Vh	8·0		V
	Triode	Pentode	
Va	100	170	V
Vg2	—	150	V
Vg1	−3	−1·2	V
Ia	14	10	mA
Ig2	—	3·3	mA
gm	5·7	12	mA/V
ra	3·0	>350	kΩ

PCF200

TRIODE PENTODE

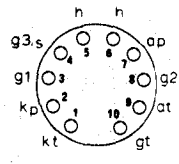


B10B

Ih	300		mA
Vh	8·0		V
	Triode	Pentode	
Va	170	160	V
Vg2	—	135	V
Vg1	−1·0	−1·7	V
Ia	8·5	13	mA
Ig2	—	5·3	mA
gm	5·2	14	mA/V
μ	57	—	

PCF201

TRIODE PENTODE



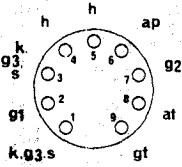
PCF201

B10B

Ih	300		mA
Vh	8·0		V
	Triode	Pentode	
Va	100	160	V
Vg2	—	110	V
Vg1	−2	−1·4	V
Ia	14	13	mA
Ig2	—	5·3	mA
gm	4·8	12·6	mA/V
μ	17·5	—	

PCF801

TRIODE FRAME-GRID VARIABLE-MU PENTODE



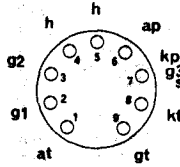
PCF801

B9A

Ih	300		mA
Vh	8·5		V
	Triode	Pentode	
Va	100	170	V
Vg2	—	120	V
Vg1	−3·0	−1·4	V
Ia	15	10	mA
Ig2	—	3·0	mA
gm	9·0	11	mA/V
μ	20	—	
ra	2·2	⩾350	kΩ

PCF802

TRIODE PENTODE

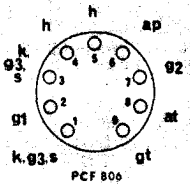


PCF802

B9A

Ih	300		mA
Vh	9·0		V
	Triode	Pentode	
Va	200	100	V
Vg2	—	100	V
Vg1	−2·0	−1·0	V
Ia	3·5	6·0	mA
Ig2	—	1·7	mA
gm	3·5	5·5	mA/V
μ	70	—	
ra	20	400	kΩ

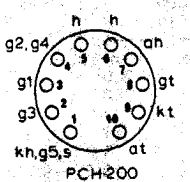
PCF806 — TRIODE FRAME-GRID PENTODE



B9A

Ih	300		mA
Vh	8·0		V
	Triode	Pentode	
Va	100	170	V
Vg2	—	150	V
Vg1	−3·0	−1·2	V
Ia	14	10	mA
Ig2	—	3·3	mA
gm	5·5	12	mA/V
μ	17	—	

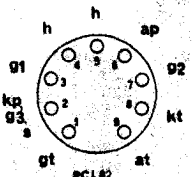
PCH200 — TRIODE HEPTODE FOR NOISE CANCELLED SYNC SEPARATOR



B10B

Ih	300		mA
Vh	8·5		V
	Triode	Heptode	
Va	100	14	V
Vg2+g4	—	14	V
Vg3	—	0	V
Vg1	−1·0	0	V
Ia	9	1·5	mA
Ig2+g4	—	1·2	mA
Ig3	—	1·0	μA
gm	8·8	—	mA/V
μ	50	—	

PCL82 — TRIODE OUTPUT PENTODE (pa max. = 7W)

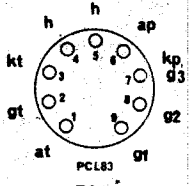


B9A

Ih	300		mA
Vh	16		V
	Triode	Pentode	
Va	100	170	V
Vg2	—	170	V
Vg1	0	−11·5	V
Ia	3·5	41	mA
Ig2	—	9·0	mA
gm	2·2	7·5	mA/V
μ	70	—	
Ra	—	3·9	kΩ
Pout	—	3·3	W

PCL83

TRIODE OUTPUT PENTODE
(pa max. = 5·4W)

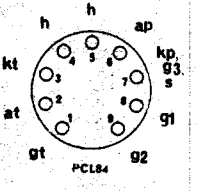


B9A

Ih	300		mA
Vh	12·6		V
	Triode	Pentode	
Va	250	170	V
Vg2	—	170	V
Vg1	−8·5	−9·5	V
Ia	10·5	30	mA
Ig2	—	5·0	mA
gm	2·2	5·5	mA/V
μ	17	—	
Ra	—	5·5	kΩ
Pout	—	2·2	W

PCL84

TRIODE OUTPUT PENTODE
(pa max. = 4W)

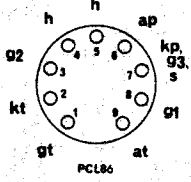


B9A

Ih	300		mA
Vh	15		V
	Triode	Pentode	
Va	200	200	V
Vg2	—	200	V
Vg1	−1·7	−2·9	V
Ia	3·0	18	mA
Ig2	—	3·0	mA
gm	4·0	10·4	mA/V
ra	16·2	130	kΩ
μg1–g2	—	38	

PCL86

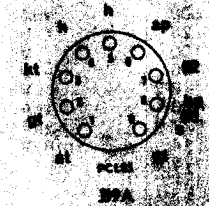
TRIODE OUTPUT PENTODE
(pa max. (pentode) = 9W)



B9A

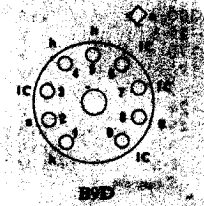
Ih	300		mA
Vh	13·3		V
	Triode	Pentode	
Va	230	230	V
Vg2	—	230	V
Vg1	−1·7	−5·7	V
Ia	1·2	39	mA
Ig2	—	6·5	mA
gm	1·6	10·5	mA/V
ra	—	45	kΩ
μg1–g2	—	21	

PCL805/85 [illegible] BEAM CURRENT PENTODE



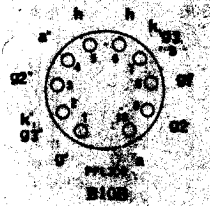
Ih	300		mA
Vh	18		V
	Triode	Pentode	
Va	100	170	V
Vg2	—	170	V
Vg1	0	−15	V
Ia	10	41	mA
Ig2	—	2·7	mA
gm	5·5	7·25	mA/V
ra	9	25	kΩ
μg1-g2	—	7·0	

PD500 [illegible] SHUNT STABILISER TRIODE FOR COLOUR TV



Ih	300	mA
Vh	7·5	V
Va	25	kV
Ve	0	V
Vg at Ia=1·5 mA	−71 to −30	V
Vg max. at Ia =0·1 mA	−40	V

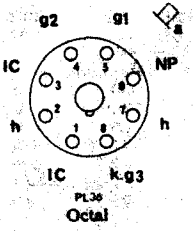
PFL200 [illegible] DOUBLE PENTODE (for mains output section)—5W)



Ih	300		mA
Vh	16·5		V
	Amplifier section	Output section	
Va	180	170	V
Vg2	180	170	V
Vg1	−2·3	−8·0	V
Ia	10	32	mA
Ig2	3·0	6·5	mA
gm	6·6	21	mA/V
μg1-g2	35	33	
ra	180	80	kΩ

PL36

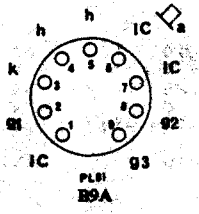
LINE TIMEBASE OUTPUT PENTODE (pa max.=12W)



Ih	300	mA
Vh	25	V
Va	100	V
Vg2	100	V
Vg1	−8·2	V
Ia	100	mA
Ig2	7·0	mA
gm	14	mA/V
μg1–g2	5·6	

PL81

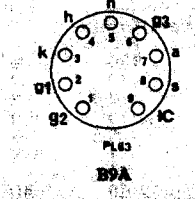
LINE TIMEBASE OUTPUT PENTODE (pa max.=8W)



Ih	300	mA
Vh	21·5	V
Va	170	V
Vg2	170	V
Vg3	0	V
Vg1	−24	V
Ia	45	mA
Ig2	3·0	mA
gm	6·5	mA/V
μg1–g2	5·5	

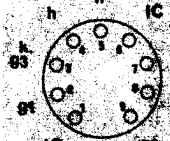
PL83

VIDEO OUTPUT PENTODE (pa max.=8W)



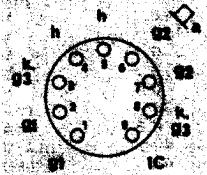
Ih	300		mA
Vh	15		V
Va	170	200	V
Vg2	170	200	V
Vg3	0	0	V
Vg1	−2·3	−3·5	V
Ia	36	36	mA
Ig2	5·0	5·0	mA
gm	10	10	mA/V
μg1–g2	24	24	

PL84 OUTPUT PENTODE (pa max.=12W)



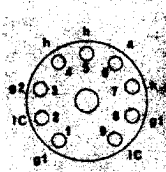
Ih	300		mA
Vh	15		V
Va	170	200	V
Vg2	170	200	V
Vg1	−12·5	−17·3	V
Ia	70	80	mA
Ig2	3·5	3·0	mA
gm	11	9·5	mA/V
ra	28	28	kΩ
μg1–g2	8·0	8·0	

PL504 LINE OUTPUT PENTODE (pa max.=12W) Replaces PL500



Ih	300	mA
Vh	27	V
Dynamic characteristics		
Va	75	V
Vg2	200	V
Vg1	−10	V
Ia	440	mA
Ig2	30	mA

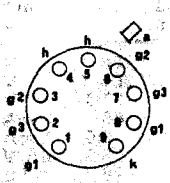
PL508 FIELD OUTPUT PENTODE FOR COLOUR TV



Ih	300	mA
Vh	17	V
Va	150	V
Vg2	150	V
Ia	80	mA
Ig2	4·6	mA
Vg1	−17	V
gm	9·0	mA/V
μg1–g2	7·0	
ra	10	kΩ

PL509

LINE OUTPUT PENTODE FOR COLOUR TV (pa max.=30W)

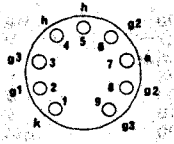


B9D

Ih	300	mA
Vh	40	V
Va	160	V
Vg3	0	V
Vg2	160	V
Vg1	0	V
Ia	1·4	A
Ig2	45	mA

PL802

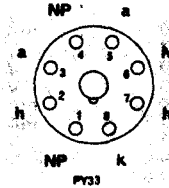
VIDEO OUTPUT PENTODE FOR COLOUR TV



Ih	300	mA
Vh	16	V
Va	170	V
Vg3	0	V
Vg2	170	V
Vg1	−0·9	V
Ia	30	mA
Ig2	6·5	mA
gm	40	mA/V
ra	45	kΩ
μg1–g2	70	

PY33

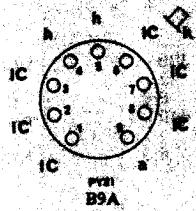
HALF-WAVE RECTIFIER



PY33
Octal

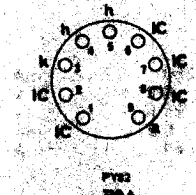
Ih	300	mA
Vh	29	V
P.I.V. max.	700	V
Vin(r.m.s.)	200	V
Iout max.	325	mA
C max.	200	μF
Rlim min.	15	Ω

PY81/800 BOOSTER DIODE



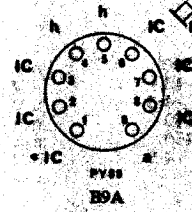
Ih	300	mA
Vh	19	V
P.I.V. max.	8·75	kV
Ia(av) max.	175	mA
Vh-k(pk) max. (cathode positive)	6·0	kV

PY82 HALF-WAVE RECTIFIER



Ih	300	mA
Vh	19	V
P.I.V.	700	V
Vin(r.m.s.) max.	250	V
Iout max.	100	mA
C max.	50	µF
Rlim min.	40	Ω

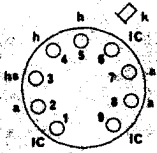
PY88 BOOSTER DIODE



Ih	300	mA
Vh	30	V
P.I.V. max.	6·6	kV
Ia(av) max.	220	mA
Vh-k(pk) max. (cathode positive)	6·6	kV

PY500A

BOOSTER DIODE FOR COLOUR TV

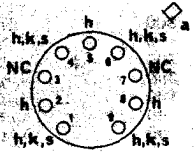


B9D

Ih	300	mA
Vh	12	V
P.I.V. max.	5·6	kV
Ia(av) max.	440	mA
vh–k(pk) max. (cathode positive)	6·3	kV

U26/KY80

E.H.T. RECTIFIER

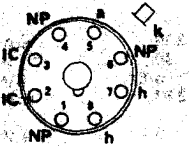


B9A

Ih	350	mA
Vh	2·0	V
P.I.V. max.	23·5	kV
Ia max.	0·2	mA
ia(pk) max.	60	mA

U191/PY301

BOOSTER DIODE

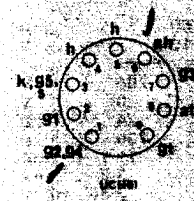


Octal

Ih	300	mA
Vh	19	V
P.I.V. max.	4·5	kV
Ia(av) max.	150	mA
Ia(pk) max.	450	mA
vh–k(pk) max.	4·5	kV

UCH81

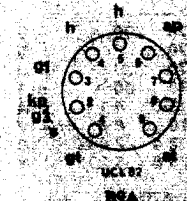
TRIODE-PENTODE FREQUENCY CHANGER



Ih	100		mA
Vh	19		V
Vah = Vb	170	200	V
Rg + g4	10	10	kΩ
Rg3 + g5	47	47	kΩ
Rk	150	180	Ω
Vg2 + g4	102	113	V
Iah	3·2	3·7	mA
Ig2 + g4	8·6	8·1	mA
Ig3 + g1	200	230	μA
gc	750	775	μA/V
Vat	102	102	V
Ist	4·6	5·4	mA

UCL82

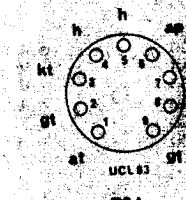
TRIODE OUTPUT PENTODE (pa max. = 7W)



Ih	100		mA
Vh	50		V
	Triode	Pentode	
Va	100	200	V
Vg2	—	200	V
Ia	3·6	36	mA
Ig2	—	7·0	mA
Vg1	0	−16	V
gm	2·5	5·4	mA/V
Ra	—	5·5	kΩ
Pout	—	3·5	W

UCL83

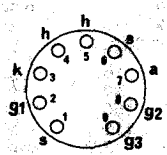
TRIODE OUTPUT PENTODE (pa max. = 5·4W)



Ih	100		mA
Vh	38		V
	Triode	Pentode	
Va	170	170	V
Vg2	—	170	V
Vg1	−1·5	−8·5	V
Ia	1·6	30	mA
Ig2	—	5·0	mA
gm	2·1	5·5	mA/V
μ	82	—	
Ra	—	5·5	kΩ
Pout	—	2·2	W

UF89

VARIABLE-MU R.F. PENTODE



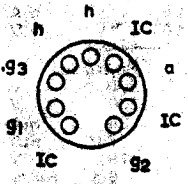
UF89

B9A

Ih	100		mA
Vh	12·6		V
Va	170	200	V
Vg3	0	0	V
Rg2	15	24	kΩ
Rk	130	130	Ω
Ia	11	11·1	mA
Ig2	3·9	3·8	mA
gm	3·8	3·85	mA/V

UL84

OUTPUT PENTODE (pa max.=12W)



UL84

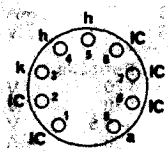
B9A

Ih	100			mA
Vh	45			V
Va	100	170	200	V
Vg2	100	170	*	V
Rk	150	170	270	Ω
Ia	43	70	60	mA
Ig2	3·0	5·0	4·1	mA
gm	9·0	10	8·8	mA/V
Ra	2·4	2·4	2·4	kΩ
Pout	1·9	5·6	5·2	W

*Vg2(b)=200V, Rg2=470Ω

UY85

HALF-WAVE RECTIFIER

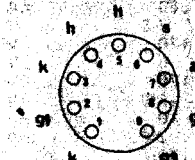


UY85

B9A

Ih	100	mA
Vh	38	V
Vin(r.m.s.)	250	V
Iout max.	110	mA
C max.	100	μF
Rlim min.	100	Ω

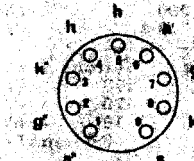
6F23/EF812 — HIGH MUTA R.F. PENTODE



B9A

Vh	6·3	V
Ih	300	mA
Va	170	V
Vg2	170	V
Rk	150	Ω
Ia	10	mA
Ig2	2·6	mA
gm	9·2	mA/V
μg1–g2	60	

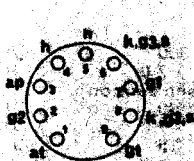
6/30L2/ECC804 — DOUBLE TRIODE (separate cathodes)



B9A

Vh	6·3	V
Ih	300	mA
Characteristics (each section)		
Va	200	V
Vg	−7·7	V
Ia	10	mA
gm	3·4	mA/V
μ	18	

30C18/PCF806 — V.H.F. TRIODE PENTODE

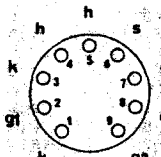


B9A

(Shield completely surrounds pentode)

Ih	300		mA
Vh	7·4		V
Va	100	125	V
Vg2	—	125	V
Vg1	−3·0	−1·5	V
Ia	14	10	mA
Ig2	—	3·1	mA
gm	5·5	11	mA/V
μ	17	—	
μg1–g2	—	50	

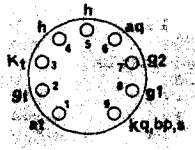
30F5/PF818 H.F. SCREENED PENTODE (pa max.=3W)



B9A

Ih	300	mA
Vh	7·3	V
Va	170	V
Vg3	0	V
Vg2	170	V
Vg1	−1·9	V
Ia	10	mA
Ig2	2·6	mA
Rk	150	Ω
gm	8·8	mA/V

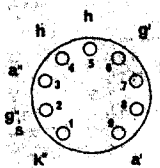
30FL1/PCE800 TRIODE BEAM TETRODE



B9A

Ih	300		mA
Vh	9·4		V
	Triode	Tetrode	
Va	200	170	V
Vg2	—	170	V
Ia	10	10	mA
gm	3·4	8·0	mA/V
μ	18	—	

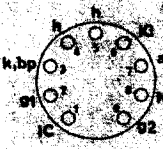
30L15/PCC805 R.F. CASCODE DOUBLE TRIODE



B9A

Ih	300 mA
Vh	7·0 V
Characteristics (each section)	
Va	90 V
Vg	−1·2 V
Ia	15 mA
gm	9·0 mA/V
μ	27

30P12/PL801 BEAM TETRODE (A.F. or field output, pa max. = 6W)



B9A

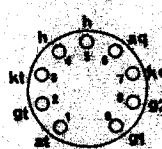
Ih	300	mA
Vh	12·6	V
Va	170	V
Vg2	180	V
Vg1	−19·3	V
Ia	31	MA
Ig2	2·5	mA
Ra	5·0	kΩ
Pout	2·25	W

30P19/PL802 LINE OUTPUT BEAM TETRODE (pa max. = 10W)

Octal

Ih	300	mA
Vh	25	V
Va max.	400	V
Va(pk) max.	7·0	kV
Vg2 max.	250	V
Vg2(pk) max.	2·0	kV
Ik max.	200	mA
Rg1–k max.	1·0	MΩ
Vh–k(r.m.s.) max.	200	V

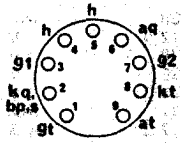
30PL1/PCL801 TRIODE BEAM TETRODE (A.F. or field output)



B9A

Ih	300		mA
Vh	13		V
	Triode	Tetrode	
Va	200	170	V
Vg2	—	160	V
Ia	10	32	mA
gm	3·4	1·2	mA/V
μ	18	—	

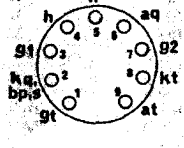
30PL13/PCL800 TRIODE OUTPUT BEAM TETRODE



B9A

Ih	300		mA
Vh	16		V
	Triode	Tetrode	
Va	100	170	V
Vg2	—	170	V
Ia	10	45	mA
Ig2	—	8·7	mA
gm	4·3	7·5	mA/V
μ	18	—	

30PL14/PCL88 TRIODE OUTPUT BEAM TETRODE



B9A

Ih	300		mA
Vh	16		V
	Triode	Tetrode	
Va	100	170	V
Vg2	—	170	V
Ia	10	50	mA
gm	4·3	7·3	mA/V
μ	18	—	

VALVE EQUIVALENTS

† Valves having a different heater current, and therefore not direct replacement in a.c./d.c. receivers.

Type	Mullard Equivalent
AZ31	AZ31
B109	UCC85
B309	ECC81
B319	PCC84
B329	ECC82
B339	ECC83
B349	12AT7/PCC85
B719	ECC85
B729	6/30L2/ECC804
CY30	U301/CY30
D77	DAF96
DAF96	DAF96
DF96	DF96
DH108	UAF42
DH118	UBC41
DH119	UBC41
DH142	UBC41
DH150	EBC41
DH710	EBC41
DH719	6AB8/ECC80
DK96	DK96
DL96	DL96
DW70	DW70
DW71	DW77
DY51	DY51
DY86	DY86/87
DY87	DY86/87
DY802	DY802
EABC80	EABC80
EAF42	EAF42
EB91	EB91
EBC41	EBC41
EBC81	EBC81
EBF80	EBF80
EBF83	EBF83
EBF89	EBF89
EC86	EC86
EC88	EC88
ECC32	ECC32
ECC33	ECC33
ECC81	ECC81
ECC82	ECC82
ECC83	ECC83
ECC84	ECC84
ECC85	ECC85
ECC88	ECC88
ECC189	ECC189
ECC804	6/30L2/ECC804
ECF80	ECF80
ECF82	ECF82
ECF86	ECF86
ECH42	ECH42
ECH81	ECH81
ECH83	ECH83
ECH84	ECH84
ECL80	ECL80
ECL82	ECL82
ECL83	ECL83
ECL86	ECL86
EF36	EF37A
EF37	EF37A
EF37A	EF37A
EF40	EF40
EF41	EF41
EF80	EF80
EF83	EF83
EF85	EF85
EF86	EF86
EF89	EF89
EF91	EF91
EF92	EF92
EF95	EF95
EF183	EF183
EF184	EF184
EF812	6F32/EF812
EH90	EH90
EL34	EL34
EL36	EL36
EL41	EL41
EL42	EL42
EL81	EL83
EL84	EL84
EL85	EL85
EL86	EL86
EL91	EL91
EL95	EL95
EL821	EL821
EL180	EL180
EM34	EM34
EM81	EM81
EM84	EM84

Type	Mullard Equivalent	Type	Mullard Equivalent
EM87	EM87	PCC89	PCC89
EM840	EM841	PCC189	PCC189
EY51	EY51	PCC805	3L15/PCC805
EY86	EY86/87	PCE800	30FL1/PCE800
EY87	EY86/87	PCF80	PCF80
EY88	EY88	PCF82	PCF82
EZ35	EZ35	PCF84	PCF84
EZ40	EZ40	PCF86	PCF86
EZ41	EZ41	PCF200	PCF200
EZ80	EZ80	PCF201	PCF201
EZ81	EZ81	PCF800	30C15/PCF800
GY501	GY501	PCF801	PCF801
GZ32	GZ32	PCF802	PCF802
GZ34	GZ34	PCF805	30C18/PCF805
KY50	U25/KY50	PCF806	PCF806
KY80	U26/KY80	PCH200	PCH200
LN119	UCL82	PCL82	PCL82
LN152	ECL80	PCL83	PCL83
LN319	30PL1/PCL801	PCL84	PCL84
LZ319	PCF80	PCL85	PCL805/85
LZ329	PCF80	PCL86	PCL86
LZ339	30C15/PCF800	PCL88	30PL14/PCL88
N25	DL96	PCL800	30PL13/PCL800
N77	EL91	PCL801	30PL1/PCL801
N119	UL84	PCL805	PCL805/85
N142	UL41	PD500	PD500
N144	EL91	PF818	30F5/PF818
N150	EL41	PFL200	PFL200
N151	EL42	PL36	PL36
N152	PL81	PL81	PL81
N155	EL85	PL81A	PL81A
N309	PL83	PL82	PL82
N329	PL82	PL83	PL83
N369	30P12/PL801	PL84	PL84
N379	PL84	PL302	30P19/PL302
N389	30P19/PL302	PL500	PL504
N709	EL84	PL504	PL504
PABC80	PABC80	PL505	PL509
PC86	PC86	PL508	PL508
PC88	PC88	PL509	PL509
PC97	PC97	PL801	30P12/PL801
PC900	PC900	PL802	PL802
PCC84	PCC84	PL820	PL820
PCC85	PCC85	PY33	PY33
PCC88	PCC88	PY81	PY81/800

Type	Mullard Equivalent
PY82	PY82
PY88	PY88
PY301	U191/PY301
PY500	PY500A
PY500A	PY500A
PY800	PY81/800
R12	EY51
R20	U26/KY80
U25	U26/KY80
U26	U26/KY80
U43	EY51
U47	U26/KY80
U48	U26/KY80
U70	EZ80
U119	UY85
U142	UY41
U143	EZ81
U147	EZ35
U150	EZ40
U151	EY51
U153	PY81
U191	U191/PY301
U192	PY82
U301	U301/CY30
U319	PY82
U339	U191/PY301
U381	UY85
U709	EZ81
UABC80	UABC80
UAF42	UAF42
UBC41	UBC41
UBC81	UBC81
UBF80	UBF80
UBF89	UBF89
UCC85	UCC85
UCH42	UCH42
UCH81	UCH81
UCL82	UCL82
UCL83	UCL83
UF41	UF41
UF89	UF89
UL41	UL41
UL84	UL84
UU12	EZ81
UY41	UY41
UY42	UY41

Type	Mullard Equivalent
UY85	UY85
W25	DF96
W77	EF92
W142	UF41
W150	EF41
W719	6F36
WD119	DF96
WD142	UAF42
WD709	EBF80
X25	DK96
X119	UCH81
X142	UCH42
X150	ECH42
X719	ECH81
Y25	DM71
Z77	EF91
Z329	30F5/PF510
Z719	EF80
Z729	EF86
Z749	6F23/EF812
ZD25	DAF96
1C3	DK96
1FD1	DAF96
1M1	DM70
1P1	DL96
6AK5	EF96
6AL5	EB91
6AM5	EL91
6AM6	EF91
6C10	ECH42
6C12	ECH81
6CB6	6CB6
6CH6	EL821
6CW5	EL86
6D2	EB91
6F12	EF91
6F13	EF86
6F23	6F23/EF812
6F28	EF86
6F29	EF183
6F30	EF184
6FD12	EBF89
6L12	ECC85
6L13	ECC83
6LD3	EBC41
6LD12	EABC80

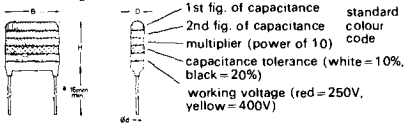
Type	Mullard Equivalent
6LD13	EBC81
6P15	EL84
6X5GT	EZ35
6/30L2	6/30L2/ECC804
8D3	EF91
9D6	EF92
10C14	UCH81
10FD12	UBF89
10L14	UCC85
10LD3	UBC41
10LD12	UABC80
10LD13	UBC81
10P18	UL84
10PL12	UCL82
12AT7	ECC81

Type	Mullard Equivalent
12AU7	ECC82
12AX7	ECC83
30C1	PCF80
30C15	30C15/PCF800
30C18	30C18/PCF805
30F5	30F5/PF818
30FL1	30FL1/PCE800
30L1	PCC84
30L15	30L15/PCC805
30P12	30P12/PL801
30P18	PL82
30P18	PL84
30P19	30P19/PL302
30PL1	30PL1/PCL801
30PL13	30PL13/PCL800
30PL14	30PL14/PCL88

CAPACITORS & RESISTORS

METALLISED FILM CAPACITORS
C280 Series (polyester)

Dimensions and method of marking:-



CAPACITANCE TOLERANCE for $C \leq 0{\cdot}22\mu F \pm 20\%$
for $C \geq 0{\cdot}33\mu F \pm 10\%$
LOSSES (at 1kHz) $\tan\delta < 75 \times 10^{-4}$
INSULATION RESISTANCE for $C \leq 0{\cdot}33\mu F$, $R > 30\,000M\Omega$
(at 20°C) for $C \geq 0{\cdot}47\mu F$, $RC > 10\,000M\Omega\mu F$
TEMPERATURE RANGE −40 to +85°C

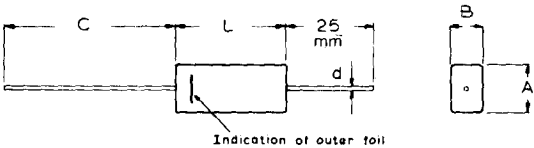
250V d.c. working

Capacitance (μF)	Type No.	Max. body dimensions (mm)			
		B	D	H	d
0·01	C280AE/P10K	12·5	4	9	0·6
0·015	C280AE/P15K	12·5	4	9	0·6
0·022	C280AE/P22K	12·5	4	9	0·6
0·033	C280AE/P33K	12·5	4	9	0·6
0·047	C280AE/P47K	12·5	4	9	0·6
0·068	C280AE/P68K	12·5	4	9	0·6
0·1	C280AE/P100K	12·5	5	9	0·6
0·15	C280AE/P150K	17·5	5	10	0·8
0·22	C280AE/P220K	17·5	6	11	0·8
0·33	C280AE/A330K	22·5	6	11	0·8
0·47	C280AE/A470K	22·5	7	12	0·8
0·68	C280AE/A680K	22·5	8·5	13·5	0·8
1	C280AE/A1M	30	8·5	13·5	0·8
1·5	C280AE/A1M5	30	9	17	0·8
2·2	C280AE/A2M2	30	11	19	0·8

400V d.c. working

0·01	C280CF/P10K	12·5	4	9	0·6
0·015	C280CF/P15K	12·5	4	9	0·6
0·022	C280CF/P22K	12·5	4	9	0·6
0·033	C280CF/P33K	12·5	5	10	0·6
0·047	C280CF/P47K	12·5	6	11	0·6
0·068	C280CF/P68K	17·5	6	11	0·8
0·1	C280CF/P100K	17·5	7	12	0·8
0·15	C280CF/P150K	22·5	6·5	11·5	0·8
0·22	C280CF/P220K	22·5	7·5	12·5	0·8
0·33	C280CF/A330K	22·5	9·5	14·5	0·8
0·47	C280CF/A470K	30	9·5	14·5	0·8
0·68	C280CF/A680K	30	10	18	0·8
1	C280CF/A1M	30	12	20	0·8

METALLISED FILM CAPACITORS
C281 Series (polyester)



CAPACITANCE TOLERANCE ±10%

LOSSES (at 1kHz) $\tan\delta$ for C281AB $< 75 \times 10^{-4}$
for C281CD $< 30 \times 10^{-4}$

INSULATION RESISTANCE (at 20°C) for $C \leq 0{\cdot}33\mu F$ $R > 30\,000M\Omega$
for $C \geq 0{\cdot}47\mu F$ $RC > 10\,000M\Omega\mu F$

TEMPERATURE RANGE −40 to +85°C

250V d.c. working

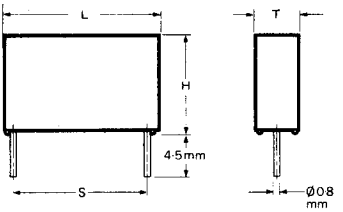
Capacitance (μF)	Type No.	Dimensions (mm)				
		L	B	A	d	C
0·01	C281AB/A10K	14·6	4·8	8·8	0·8	40
0·015	C281AB/A15K	14·6	4·8	8·8	0·8	40
0·022	C281AB/A22K	14·6	4·8	8·8	0·8	40
0·033	C281AB/A33K	14·6	4·8	8·8	0·8	40
0·047	C281AB/A47K	14·6	4·8	8·8	0·8	40
0·068	C281AB/A68K	14·6	5·6	9·5	0·8	40
0·1	C281AB/A100K	14·6	6·6	10·5	0·8	40
0·15	C281AB/A150K	18·1	6·6	10·5	0·8	40
0·22	C281AB/A220K	18·1	7·7	11·6	0·8	40
0·33	C281AB/A330K	23·6	7·5	11·6	0·8	40
0·47	C281AB/A470K	23·6	8·8	12·9	0·8	40
0·68	C281AB/A680K	23·6	10·5	14·5	0·8	40
1	C281AB/A1M	31·1	10·5	14·7	1	49
1·5	C281AB/A1M5	31·1	12·5	19·6	1	49
2·2	C281AB/A2M2	31·1	15·1	22·1	1	49

400V d.c. working

0·01	C281CD/A10K	14·6	4·8	8·8	0·8	40
0·015	C281CD/A15K	14·6	4·8	8·8	0·8	40
0·022	C281CD/A22K	14·6	4·8	8·8	0·8	40
0·033	C281CD/A33K	14·6	5·6	9·5	0·8	40
0·047	C281CD/A47K	14·6	6·6	10·5	0·8	40
0·068	C281CD/A68K	18·1	6·6	10·5	0·8	40
0·1	C281CD/A100K	18·1	7·7	11·6	0·8	40
0·15	C281CD/A150K	23·6	7·5	11·6	0·8	40
0·22	C281CD/A220K	23·6	8·8	12·9	0·8	40
0·33	C281CD/A330K	23·6	10·5	14·5	0·8	40
0·47	C281CD/A470K	31·1	10·5	14·7	1	49

METALLISED FILM CAPACITORS

344 Series (polyester)



CAPACITANCE TOLERANCE	±10%
LOSSES (at 1kHz)	$\tan\delta < 75\times10^{-4}$
INSULATION RESISTANCE	for C ≤ 0·33μF, R > 30 000MΩ
(at 20°C)	for C ≥ 0·47μF, RC > 10 000MΩμF
TEMPERATURE RANGE	−55 to +85°C

344 2 Series 100V d.c. working

Capacitance (μF)	Type No.	Dimensions (mm)			
		S	L	T	H
0·047	344 21473	10	13	4·5	10
0·068	344 21683	10	13	4·5	10
0·1	344 21104	10	13	4·5	10
0·15	344 21154	10	13	4·5	10
0·22	344 21224	10	13	5	11
0·33	344 21334	15	17·5	5	11
0·47	344 21474	15	17·5	6	11·5
0·68	344 21684	15	17·5	7	13
1	344 21105	15	17·5	8·5	14·5
1·5	344 21155	22·5	26	7·5	16·5
2·2	344 21225	22·5	26	8·5	18
3·3	344 21335	22·5	26	9·5	19
4·7	344 21475	27·5	30	11	20
6·8	344 21685	27·5	30	13·5	22·5

344 4 Series 250V d.c. working

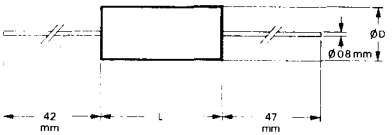
Capacitance (μF)	Type No.	Dimensions (mm)			
		S	L	T	H
0·1	344 41103	10	13	4·5	10
0·015	344 41153	10	13	4·5	10
0·022	344 41223	10	13	4·5	10
0·033	344 41333	10	13	4·5	10
0·047	344 41473	10	13	4·5	10
0·068	344 41683	10	13	5	11
0·1	344 41104	15	17·5	5	11
0·15	344 41154	15	17·5	6	11·5
0·22	344 41224	15	17·5	7	13
0·33	344 41334	15	17·5	8·5	14·5
0·47	344 41474	22·5	26	6·5	15·5
0·68	344 41684	22·5	26	7·5	16·5
1	344 41105	22·5	26	9·5	19
1·5	344 41155	27·5	30	11	20
2·2	344 41225	27·5	30	13·5	22·5

344 5 Series 400V d.c. working

Capacitance (μF)	Type No.	Dimensions (mm)			
		S	L	T	H
0·01	344 51103	10	13	4·5	10
0·015	344 51153	10	13	4·5	10
0·022	344 51223	10	13	4·5	10
0·033	344 51333	10	13	5	11
0·047	344 51473	15	17·5	5	11
0·068	344 51683	15	17·5	6	11·5
0·1	344 51104	15	17·5	7	13
0·15	344 51154	15	17·5	8·5	14·5
0·22	344 51224	22·5	26	6·5	15·5
0·33	344 51334	22·5	26	7·5	16·5
0·47	344 51474	22·5	26	9·5	19
0·68	344 51684	27·5	30	11	20
1	344 51105	27·5	30	13·5	22·5

FILM/FOIL CAPACITORS

278 Series (polypropylene and paper)



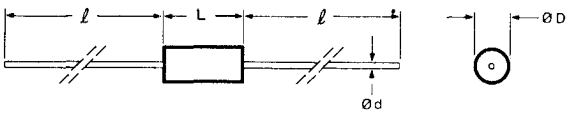
CAPACITANCE TOLERANCE ±5%
LOSSES (at 1kHz) $\tan\delta < 30\times10^{-4}$
(at 10kHz) $\tan\delta < 60\times10^{-4}$
(at 100kHz) $\tan\delta < 150\times10^{-4}$
INSULATION RESISTANCE (at 20°C) $> 10^5 M\Omega$
TEMPERATURE RANGE −25 to +70°C

1·5kV peak to peak

Capacitance (nF)	Type No.	Dimensions (mm)	
		D	L
1·5	278 72152	13·5	32·5
1·8	278 72182	13·5	32·5
2	278 72202	13·5	32·5
2·2	278 72222	13·5	32·5
2·7	278 72272	13·5	32·5
3·6	278 72362	13·5	32·5
4·7	278 72472	13·5	32·5
5·1	278 72512	16·5	37·5
5·2	278 72522	16·5	37·5
8·2	278 72822	16·5	37·5
10	278 72103	16·5	37·5

FILM/FOIL CAPACITORS

C295 Series (polystyrene)



CAPACITANCE TOLERANCE ±1%
LOSSES (at 1kHz) $\tan\delta < 2\times10^{-4}$
(at 1MHz) $\tan\delta < 10\times10^{-4}$
INSULATION RESISTANCE (at 20°C) $> 10^{6}M\Omega$
TEMPERATURE RANGE
C295AA and AC −40 to +85°C
C295AH −40 to +70°C

For capacitors of body length L = 15mm ℓ = 35mm and d = 0·7mm
L = 25mm ℓ = 45mm and d = 0·8mm

63V d.c. working

Capacitance (μF)	Type No.	Dimensions (mm)	
		D	L
0·018	C295AH/D18K	10	15
0·02	C295AH/D20K	10	15
0·022	C295AH/D22K	10	15
0·024	C295AH/D24K	10	15
0·027	C295AH/D27K	12·5	15
0·03	C295AH/D30K	12·5	15
0·033	C295AH/D33K	12·5	15
0·036	C295AH/D36K	12·5	15
0·039	C295AH/D39K	12·5	15
0·091	C295AH/D91K	12·5	25
0·1	C295AH/D100K	15	25
0·11	C295AH/D110K	15	25
0·12	C295AH/D120K	15	25
0·13	C295AH/D130K	15	25
0·15	C295AH/D150K	15	25
0·16	C295AH/D160K	15	25

125V d.c. working

0·0043	C295AA/D4K3	7·5	15
0·0047	C295AA/D4K7	9	15
0·0051	C295AA/D5K1	9	15
0·0056	C295AA/D5K6	9	15

125V d.c. working

Capacitance (μF)	Type No.	Dimensions (mm)	
		D	L
0·0062	C295AA/D6K2	9	15
0·0068	C295AA/D6K8	9	15
0·0075	C295AA/D7K5	9	15
0·0082	C295AA/D8K2	10	15
0·0091	C295AA/D9K1	10	15
0·01	C295AA/D10K	10	15
0·011	C295AA/D11K	12·5	15
0·012	C295AA/D12K	12·5	15
0·013	C295AA/D13K	12·5	15
0·015	C295AA/D15K	12·5	15
0·016	C295AA/D16K	12·5	15
0·027	C295AA/D27K	12·5	25
0·03	C295AA/D30K	12·5	25
0·033	C295AA/D33K	12·5	25
0·036	C295AA/D36K	12·5	25
0·039	C295AA/D39K	12·5	25
0·043	C295AA/D43K	12·5	25
0·047	C295AA/D47K	12·5	25
0·051	C295AA/D51K	12·5	25
0·056	C295AA/D56K	15	25
0·062	C295AA/D62K	15	25
0·068	C295AA/D68K	15	25
0·075	C295AA/D75K	15	25
0·082	C295AA/D82K	15	25

500V d.c. working

0·0013	C295AC/D1K3	9	15
0·0015	C295AC/D1K5	9	15
0·0016	C295AC/D1K6	9	15
0·0018	C295AC/D1K8	9	15
0·002	C295AC/D2K	9	15
0·0022	C295AC/D2K2	9	15
0·0024	C295AC/D2K4	10	15
0·0027	C295AC/D2K7	10	15
0·003	C295AC/D3K	10	15
0·0033	C295AC/D3K3	10	15
0·0036	C295AC/D3K6	12·5	15
0·0039	C295AC/D3K9	12·5	15
0·018	C295AC/D18K	15	25
0·02	C295AC/D20K	15	25
0·022	C295AC/D22K	15	25
0·024	C295AC/D24K	15	25

FILM/FOIL CAPACITORS
C296 Series (polyester)

CAPACITANCE TOLERANCE	±10%
LOSSES (at 1kHz)	$\tan\delta < 60 \times 10^{-4}$
INSULATION RESISTANCE (at 20°C)	for $C \leqslant 0{\cdot}22\mu F$ $R > 50\,000M\Omega$ for $C \geqslant 0{\cdot}33\mu F$ $RC > 16\,500M\Omega\mu F$
TEMPERATURE RANGE	−40 to +85°C

160V d.c. working

Capacitance (μF)	Type No.	Dimensions (mm)	
		Max. diameter	Max. body length
0·01	C296AA/A10K	7·5	21
0·015	C296AA/A15K	7·5	21
0·022	C296AA/A22K	7·5	21
0·033	C296AA/A33K	7·5	21
0·047	C296AA/A47K	8	21
0·068	C296AA/A68K	9	21
0·1	C296AA/A100K	10·5	21
0·15	C296AA/A150K	12	21
0·22	C296AA/A220K	10	35
0·33	C296AA/A330K	12	35
0·47	C296AA/A470K	14	35
0·68	C296AA/A680K	16	35
1	C296AA/A1M	18·5	35

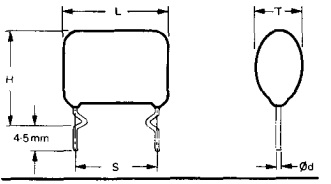
400V d.c. working

0·001	C296AC/A1K	7·5	21
0·0015	C296AC/A1K5	7·5	21
0·0022	C296AC/A2K2	7·5	21
0·0033	C296AC/A3K3	7·5	21
0·0047	C296AC/A4K7	7·5	21
0·0068	C296AC/A6K8	7·5	21
0·01	C296AC/A10K	7·5	21
0·015	C296AC/A15K	7·5	21
0·022	C296AC/A22K	8·5	21
0·033	C296AC/A33K	10	21
0·047	C296AC/A47K	11·5	21
0·068	C296AC/A68K	9·5	35
0·1	C296AC/A100K	11	35
0·15	C296AC/A150K	12·5	35
0·22	C296AC/A220K	14·5	35
0·33	C296AC/A330K	17	35
0·47	C296AC/A470K	19·5	35

Note: Connecting wire diameter 0·8mm (21s.w.g. approx.)

FILM/FOIL CAPACITORS

347 Series (polyester)



CAPACITANCE TOLERANCE ±10%

LOSSES (at 10kHz) $\tan\delta$ for $C \leqslant 100nF < 120\times10^{-4}$

(at 1kHz) for $C > 100nF < 60\times10^{-4}$

INSULATION RESISTANCE (at 20°C) for $C \leqslant 100nF$ $R > 50\,000M\Omega$

for $C > 100nF$ $RC > 10\,000s$

TEMPERATURE RANGE −40 to +85°C

347 2 Series 100V d.c. working

Capacitance (nF)	Type No.	Dimensions (mm)				
		S	L	T	H	d
100	347 21104	15·2	19	7·5	16·5	0·8
150	347 21154	15·2	19	8·5	17·5	0·8

347 4 Series 250V d.c. working

10	347 41103	10·2	13·5	5	13	0·6
15	347 41153	10·2	13·5	6	14	0·6
22	347 41223	10·2	13·5	6·5	14	0·6
33	347 41333	15·2	19	6	15	0·8
47	347 41473	15·2	19	7	16	0·8
68	347 41683	15·2	19	8	17	0·8
100	347 41104	22·9	27	7	19	0·8
150	347 41154	22·9	27	8·5	19·5	0·8
220	347 41224	22·9	27	10	22	0·8
330	347 41334	27·9	32	10·5	20·5	0·8
470	347 41474	27·9	32	12·5	22·5	0·8
680	347 41684	27·9	32	15·5	24·5	0·8

347 5 Series 400V d.c. working

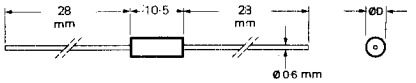
4·7	347 51472	10·2	13·5	4·5	12·5	0·6
6·8	347 51682	10·2	13·5	5·5	13·5	0·6

347 6 Series 630V d.c. working

2·2	347 61222	10·2	13·5	4·5	12·5	0·6
3·3	347 61332	10·2	13·5	4·5	13·5	0·6

FILM/FOIL CAPACITORS

424, 425, 427 Series (polystyrene)



CAPACITANCE TOLERANCE		±1% or ±5%
LOSSES (at 1kHz)		$\tan\delta < 2\times10^{-4}$
(at 1MHz)		$\tan\delta < 5\times10^{-4}$
INSULATION RESISTANCE (at 20°C)		$> 10^5 M\Omega$
TEMPERATURE RANGE	424	−40 to +70°C
	425	−40 to +85°C
	427	−40 to +85°C

424 Series 63V d.c. working

C	Type No.		D	C	Type No.		D
(pF)	±1%	±5%	(mm)	(pF)	±1%	±5%	(mm)
4300	424 44302	424 24302	4·5	5600	424 45602	424 25602	5
4700	424 44702	424 24702	4·5	6200	424 46202	424 26202	5
5100	424 45102	424 25102	5	6800	424 46802	424 26802	5·5

425 Series 125V d.c. working

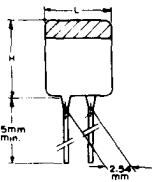
560	425 45601	425 25601	3·5	1600	425 41602	425 21602	4·5
620	425 46201	425 26201	3·5	1800	425 41802	425 21802	4·5
680	425 46801	425 26801	3·5	2000	425 42002	425 22002	4·5
750	425 47501	425 27501	3·5	2200	425 42202	425 22202	5
820	425 48201	425 28201	3·5	2400	425 42402	425 22402	5
910	425 49101	425 29101	3·5	2700	425 42702	425 22702	5
1000	425 41002	425 21002	3·5	3000	425 43002	425 23002	5·5
1100	425 41102	425 21102	4	3300	425 43302	425 23302	5·5
1200	425 41202	425 21202	4	3600	425 43602	425 23602	6
1300	425 41302	425 21302	4	3900	425 43902	425 23902	6
1500	425 41502	425 21502	4				

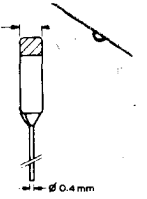
427 Series 500V d.c. working

100	427 41001	427 21001	3·5	240	427 42401	427 22401	3·5
110	427 41101	427 21101	3·5	270	427 42701	427 22701	3·5
120	427 41201	427 21201	5·5	300	427 43001	427 23001	3·5
130	427 41301	427 21301	3·5	330	427 43301	427 23301	4
150	427 41501	427 21501	3·5	360	427 43601	427 23601	4
160	427 41601	427 21601	3·5	390	427 43901	427 23901	4·5
180	427 41801	427 21801	3·5	430	427 44301	427 24301	4·5
200	427 42001	427 22001	3·5	470	427 44701	427 24701	4·5
220	427 42201	427 22201	3·5	510	427 45101	427 25101	5

CERAMIC CAPACITORS
C333 Series

Size	Dimensions (mm)	
	L	H
1	3·5	4·5
2	4·5	5·5
3	5·5	6·5
4	6·5	7·5
5	6·5	10·5





CAPACITANCE TOLERANCE 1·8 to 10pF ±0·25pF
12 to 330pF ±2%

INSULATION RESISTANCE (at 20°C) > 1000MΩ

TEMPERATURE RANGE −55 to +85°C

TEMPERATURE COEFFICIENT 1·8 to 18pF = NP0
22 to 150pF = N150
180 to 330pF = N750

63V d.c. working. (LOW-K)

Capacitance (pF)	Type No.	Capacitance code marking	Size
1·8	C333CB/N1E8	W or 1p8	1
2·2	C333CB/N2E2	X or 2p2	1
2·7	C333CB/N2E7	Y or 2p7	1
3·3	C333CB/N3E3	Z or 3p3	1
3·9	C333CB/N3E9	A or 3p9	1
4·7	C333CB/N4E7	B or 4p7	1
5·6	C333CB/N5E6	C or 5p6	1
6·8	C333CB/N6E8	D or 6p8	1
8·2	C333CB/N8E2	E or 8p2	1
10	C333CB/N10E	F or 10p	1
12	C333CB/C12E	G or 12p	1
15	C333CB/C15E	H or 15p	1
18	C333CB/C18E	J or 18p	1
22	C333CC/C22E	K or 22p	1
27	C333CC/C27E	L or 27p	2
33	C333CC/C33E	M or 33p	2
39	C333CC/C39E	39 or 39p	2
47	C333CC/C47E	47 or 47p	2
56	C333CC/C56E	56 or 56p	3
68	C333CC/C68E	68 or 68p	3
82	C333CC/C82E	82 or 82p	4
100	C333CC/C100E	100 or n10	4
120	C333CC/C120E	120 or n12	5
150	C333CC/C150E	150 or n15	5
180	C333CH/C180E	180 or n18	4
220	C333CH/C220E	220 or n22	4
270	C333CH/C270E	270 or n27	5
330	C333CH/C330E	330 or n33	5

CERAMIC CAPACITORS

629 Series

CAPACITANCE TOLERANCE −20 to +100%
INSULATION RESISTANCE at 20°C > 1000MΩ
TEMPERATURE RANGE −10 to +55°C

40V d.c. working (long leads HIGH-K)		40V d.c. working (cropped leads HIGH-K)	
Capacitance (nF)	**Type No.**	**Capacitance (nF)**	**Type No.**
1	629 02102	1	629 06102
2·2	629 02222	2·2	629 06222
4·7	629 02472	4·7	629 06472
10	629 02103	10	629 06103
22	629 02223	22	629 06223

CERAMIC CAPACITORS

630 Series

CAPACITANCE TOLERANCE ±10%
INSULATION RESISTANCE at 20°C > 1000MΩ
TEMPERATURE RANGE −55 to +85°C

100V d.c. working (MEDIUM-K)			
Capacitance (pF)	**Type No.**	**Capacitance (pF)**	**Type No.**
390	630 02391	1500	630 02152
470	630 02471	1800	630 02182
560	630 02561	2200	630 02222
680	630 02681	2700	630 02272
820	630 02821	3300	630 02332
1000	630 02102	3900	630 02392
1200	630 02122	4700	630 02472

ELECTROLYTIC CAPACITORS

015, 016, 017 Series (Axial version)

CAPACITANCE TOLERANCE −10 to +50%
TEMPERATURE RANGE 015 Series −25 to +85°C
016 and 017 Series −40 to +85°C

Working d.c. voltage (V)	Capacitance (μF)	Type No.
4	47	015 12479
4	100	015 12101
4	220	016 12221
4	330	016 12331
4	1000	017 12102
4	4700	017 12472
6·3	33	015 13339
6·3	68	015 13689
6·3	150	016 13151
6·3	470	016 13471
6·3	680	017 13681
6·3	1500	017 13152
6·3	2200	017 13222
6·3	3300	017 13332
10	22	015 14229
10	47	015 14479
10	100	016 14101
10	220	016 14221
10	330	016 14331
10	470	017 14471
10	1000	017 14102
10	1500	017 14152
10	2200	017 14222
16	15	015 15159
16	33	015 15339
16	68	016 15689
16	150	016 15151
16	220	016 15221
16	330	017 15331
16	680	017 15681
16	1000	017 15102
16	1500	017 15152
25	10	015 16109
25	22	015 16229
25	47	016 16479
25	100	016 16101
25	150	016 16151
25	220	017 16221
25	470	017 16471
25	680	017 16681
25	1000	017 16102
40	6·8	015 17688
40	15	015 17159
40	33	016 17339
40	47	016 17479
40	100	016 17101
40	150	017 17151
40	220	017 17221
40	470	017 17471
40	680	017 17681
63	1	015 18108
63	1·5	015 90001
63	2·2	015 18228
63	3·3	015 18338
63	4·7	015 90003
63	6·8	015 18688
63	10	016 18109
63	15	016 18159
63	22	016 18229
63	47	016 18479
63	68	017 18689
63	100	017 18101
63	150	017 18151
63	220	017 18221
63	330	017 18331

ELECTROLYTIC CAPACITORS

015, 016, 017 Series (Printed wiring versions)

CAPACITANCE TOLERANCE −10 to +50%
TEMPERATURE RANGE −40 to +85°C

Working d.c. voltage (V)	Capacitance (μF)	Type No.
4	220	016 42221
4	330	016 42331
4	1000	017 52102
4	4700	017 52472
6·3	150	016 43151
6·3	470	016 43471
6·3	680	017 53681
6·3	1500	017 53152
6·3	2200	017 53222
6·3	3300	017 53332
10	100	016 44101
10	220	016 44221
10	330	016 44331
10	470	017 54471
10	1000	017 54102
10	1500	017 54152
10	2200	017 54222
16	68	016 45689
16	150	016 45151
16	220	016 45221
16	330	017 55331
16	680	017 55681
16	1000	017 55102
16	1500	017 55152
25	47	016 46479
25	100	016 46101
25	150	016 46151
25	220	017 56221
25	470	017 56471
25	680	017 56681
25	1000	017 56102
40	33	016 47339
40	47	016 47479
40	100	016 47101
40	150	017 57151
40	220	017 57221
40	470	017 57471
40	680	017 57681
63	10	016 48109
63	15	016 48159
63	22	016 48229
63	47	016 48479
63	68	017 58689
63	100	017 58101
63	150	017 58151
63	220	017 58221
63	330	017 58331

ELECTROLYTIC CAPACITORS

071, 072 Series

CAPACITANCE TOLERANCE −10 to +50%
TEMPERATURE RANGE −40 to +85°C

Working d.c. voltage (V)	Capacitance (μF)	Type No.
10	4700	071 14472
10	6800	071 14682
10	10 000	071 14103
10	15 000	071 14153
10	11 000+11 000	072 14113
10	16 500+16 500	072 14173
16	3300	071 15332
16	4700	071 15472
16	6800	071 15682
16	10 000	071 15103
16	7500+7500	072 15752
16	11 000+11 000	072 15113
25	2200	071 16222
25	3300	071 16332
25	4700	071 16472
25	6800	071 16682
25	5000+5000	072 16502
25	7500+7500	072 16752
40	1000	071 17102
40	2200	071 17222
40	3300	071 17332
40	4700	071 17472
40	3400+3400	072 17342
40	5000+5000	072 17502
63	680	071 18681
63	1000	071 18102
63	1500	071 18152
63	2200	071 18222
63	1650+1650	072 18172
63	2350+2350	072 18242

ELECTROLYTIC CAPACITORS

121 Series

CAPACITANCE TOLERANCE ±20%
TEMPERATURE RANGE −50 to +85°C
(up to +125°C with voltage derating)

Working d.c. voltage (V)	Capacitance (μF)	Type No.
6·3	22	121 13229
6·3	47	121 13479
6.3	68	121 13689
6·3	150	121 13151
6·3	220	121 13221
6·3	330	121 13331
10	15	121 14159
10	33	121 14339
10	47	121 14479
10	100	121 14101
10	150	121 14151
10	220	121 14221
16	10	121 15109
16	15	121 15159
16	33	121 15339
16	47	121 15479
16	68	121 15689
16	100	121 15101
25	4·7	121 16478
25	10	121 16109
25	22	121 16229
25	33	121 16339
25	47	121 16479
25	68	121 16689
40	2·2	121 17228
40	4·7	121 17478
40	10	121 17109
40	22	121 17229
40	33	121 17339
40	47	121 17479

ELECTROLYTIC CAPACITORS

C431 Series

CAPACITANCE TOLERANCE −10 to +50%
TEMPERATURE RANGE −40 to +70°C

Working d.c. Voltage (V)	Capacitance (μF)	Type No.
10	2000	C431BR/D2000
10	3200	C431BR/D3200
10	5000	C431BR/D5000
10	10 000	C431BR/D10000
10	16 000	C431BR/D16000
16	1250	C431BR/E1250
16	2000	C431BR/E2000
16	3200	C431BR/E3200
16	6400	C431BR/E6400
16	10 000	C431BR/E10000
25	800	C431BR/F800
25	1250	C431BR/F1250
25	2000	C431BR/F2000
25	4000	C431BR/F4000
25	6400	C431BR/F6400
40	500	C431BR/G500
40	800	C431BR/G800
40	1250	C431BR/G1250
40	2500	C431BR/G2500
40	4000	C431BR/G4000
64	320	C431BR/H320
64	500	C431BR/H500
64	800	C431BR/H800
64	1600	C431BR/H1600
64	2500	C431BR/H2500

VARIABLE CAPACITORS

808 Series

WORKING D.C. VOLTAGE 100V
TEMPERATURE RANGE −40 to +70°C

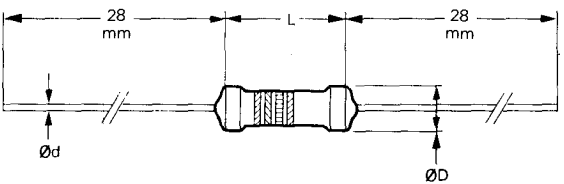
Film dielectric trimmers

Capacitance swing (pF)	Minimum capacitance (pF)	Type No.
4·1	1·4	808 00004
8	2	808 00005
20	2	808 00006
59·5	5·5	808 01001

LINEAR RESISTORS

CR16, CR25, CR37 (carbon film)

Resistance range (Ω)	Resistance tolerance (%)	Max. power dissipation at 70°C (W)	Preferred value series	Max. voltage d.c. or rms (V)	Style
10 to 220k	± 5	0·2	E12	150	CR16
270k to 1M	±10	0·2	E12	150	CR16
1 to 1M	± 5	0·33	E24	250	CR25
1·2M to 10M	±10	0·33	E12	250	CR25
1 to 1M	± 5	0·5	E24	350	CR37
1·2M to 10M	±10	0·5	E12	350	CR37



Style	Dimensions (mm)		
	D	L	d
CR16	1·6	4·5	0·4
CR25	2·5	7·5	0·6
CR37	3·7	10	0·7

Negative temperature coefficient (n.t.c.) thermistors—
ROD TYPES

Resistance at 25°C (Ω)	B value (K)	Colour Code	Type No.
4·7k	3250	Orange	VA1066S
15 k	3550	Green	VA1055S
47 k	3925	Blue	VA1056S
150 k	4075	White	VA1067S

Maximum power dissipation at 25°C 0·6W

Negative temperature coefficient (n.t.c.) thermistors—
DISC AND PLATE TYPES

Resistance at 25°C (Ω)	Resistance tolerance (%)	B value (K)	Max. power dissipation at 25°C (W)	Type No.
1·1	±20	2650	1	VA1037
2·2	±20	2650	1	VA1086
4	±20	2800	1	VA1033
6	±20	2800	1	VA1074
8	±20	2900	1	VA1053
10	±20	2950	1	VA1110
15	±20	3000	1	VA1100
15	min.	3300	*	VA1104
32	−20+30	4200	1	VA1077
50	±20	3300	1	VA1034
130	±20	4600	1	VA1040
150	±20	3275	0·6	VA1096
470	±20	3425	0·6	VA1097
500	±20	5200	1	VA1039
1·3k	±20	5450	1	VA1038
1·5k	±20	3700	0·6	VA1098
2·2k	±20	3750	0·6	VA1106
4·7k	±10	4225	0·6	VA1109
15k	±20	4250	0·6	VA1108
22k	±10	4300	0·6	VA1112
33k	±10	4325	0·6	VA1111

*VA1104: maximum rms current 2·2A.

Positive temperature coefficient (p.t.c.) thermistors

Resistance at 25°C(Ω)	Switch temp., (°C)	Dissipation factor (mW per deg C)	Type No.
50 ± 15Ω	25	6	E220ZZ/01
30 ± 15Ω	45	8·5	E220ZZ/02
50 ± 15Ω	80	8·5	E220ZZ/03
40 ± 15Ω	110	8·5	E220ZZ/04
80 ± 20%	75	21	VA8650

Peak idle current after			Peak current through coil	Switch temperature (°C)	Type number
5s	30s	3min.			
70mA	5mA	2mA	5A at 220V rms	75	2322 662 98003

VOLTAGE DEPENDENT RESISTORS

Asymmetric Types

Type No.	C (approx)	β value	Reference current (mA)	Reference voltage (V)
E295ZZ/01	1·6	0·05 to 0·08	1	1
E295ZZ/02	2·4	0·06 to 0·09	1	1·35

Dimensions: Diameter 9mm; thickness 4·6mm

Rod Types

Type No.	C (approx)	β value	Reference current (mA)	Reference voltage (V)
E298ED/A258	1550	0·2 to 0·25	10	470
E298CD/A258*	1550	0·2 to 0·25	10	470
E298ED/A260	1800	0·18 to 0·23	10	560
E298ED/A262	2200	0·18 to 0·23	10	680
E298ED/A265	2400	0·18 to 0·23	10	910
E298ED/P268	3000	0·17 to 0·22	10	1200
E298ZZ/05*	3020	0·16 to 0·21	2	950
E298ZZ/06	3020	0·16 to 0·21	2	950

*Tag ended; the remainder have axial leads

Plain Rods

Type No.	Maximum current (μA)	β value	Dissipation factor (mW per °C)
E298ZZ/103	175	0·17 to 0·25	22
E298ZZ/104	150	0·17 to 0·25	110

The resistors are unlacquered, uninsulated and supplied with tinned ends.

Disc Types

Type No.	C (approx)	β value	Reference current (mA)	Reference voltage (V)
E299DD/P116	14	0·25 to 0·4	100	8
E299DD/P118	18	0·25 to 0·4	100	10
E299DD/P120	21	0·25 to 0·4	100	12
E299DD/P216	25	0·25 to 0·4	10	8
E299DD/P218	32	0·25 to 0·4	10	10
E299DD/P220	40	0·25 to 0·4	10	12
E299DD/P222	48	0·25 to 0·4	10	15
E299DD/P224	57	0·21 to 0·35	10	18
E299DD/P226	60	0·21 to 0·35	10	22
E299DD/P228	70	0·21 to 0·35	10	27
E299DD/P230	85	0·18 to 0·25	10	33
E299DD/P232	100	0·18 to 0·25	10	39
E299DD/P234	130	0·18 to 0·25	10	47
E299DD/P236	150	0·18 to 0·25	10	56
E299DD/P238	180	0·18 to 0·25	10	68
E299DD/P336	190	0·14 to 0·23	1	56
E299DD/P338	230	0·14 to 0·23	1	68
E299DD/P340	300	0·14 to 0·21	1	82
E299DD/P342	350	0·14 to 0·21	1	100
E299DD/P344	400	0·14 to 0·21	1	120
E299DD/P346	500	0·14 to 0·21	1	150
E299DD/P348	600	0·14 to 0·21	1	180
E299DD/P350	750	0·14 to 0·21	1	220
E299DD/P352	900	0·14 to 0·21	1	270
E299DD/P354	1100	0·14 to 0·21	1	330
2322 554 02221	47	0·25 to 0·4	10	15
E299DH/P230	84	0·18 to 0·25	10	33

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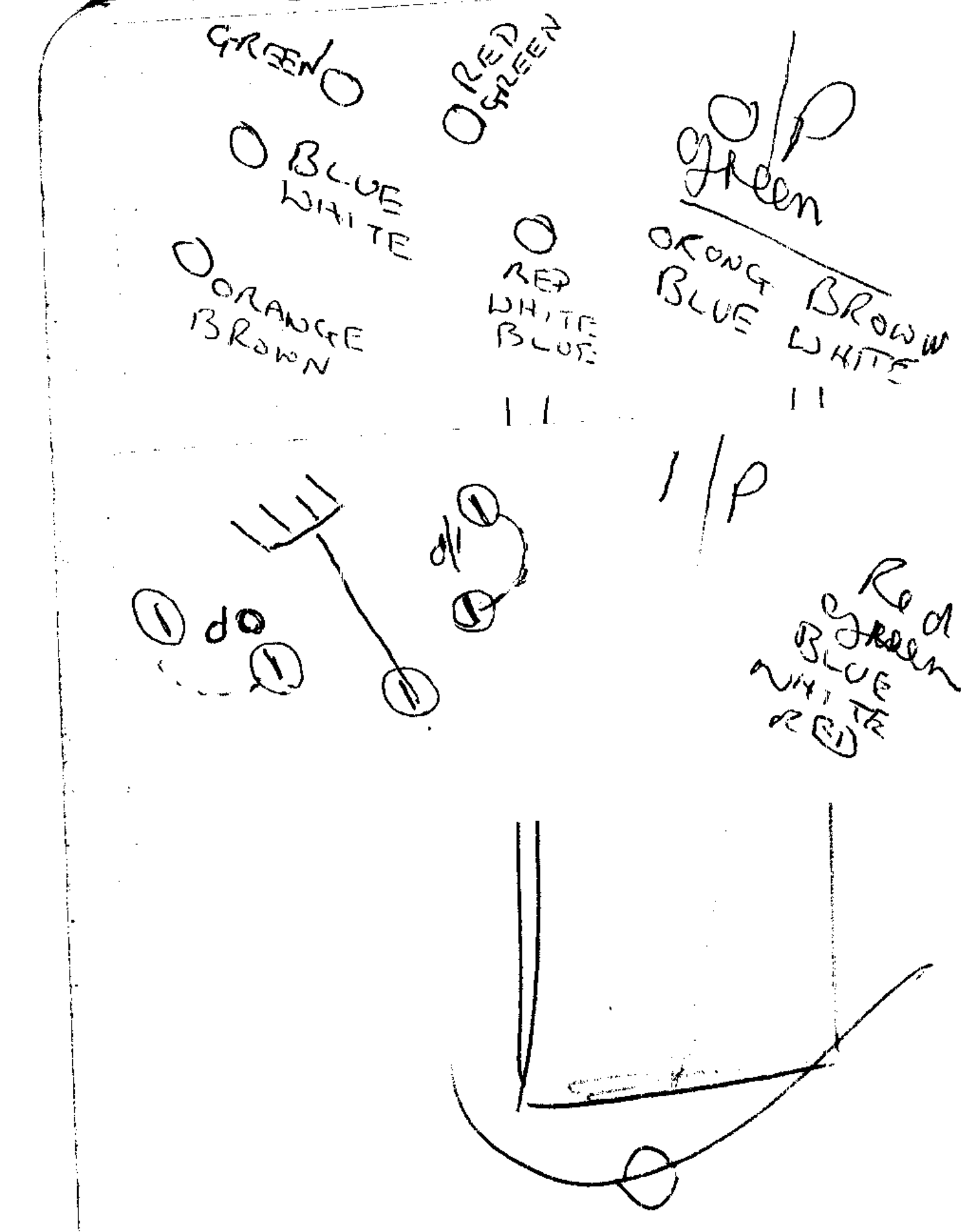
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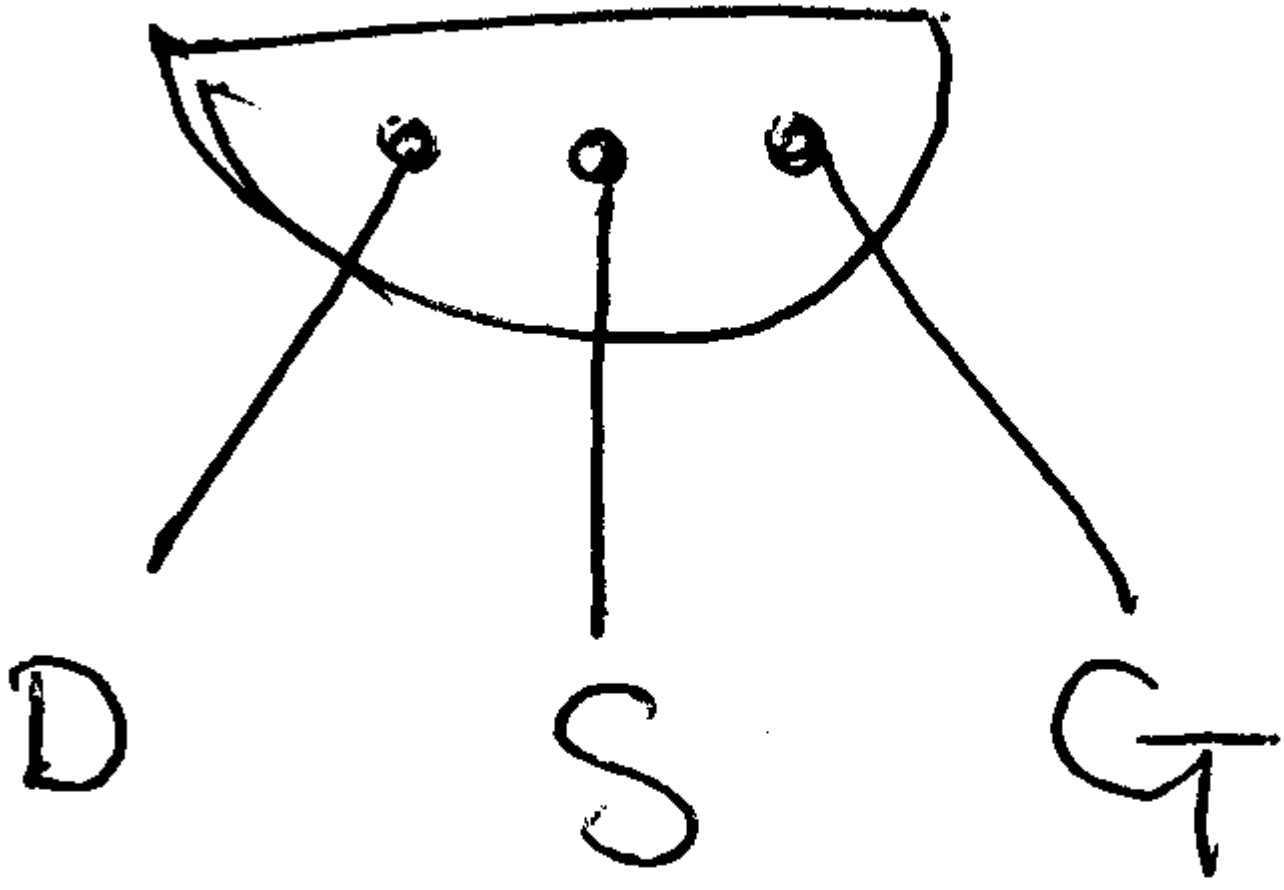

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