

MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

T-33-07
MRF485

The RF Line

NPN SILICON RF POWER TRANSISTOR

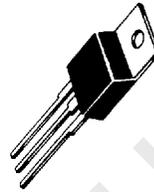
... designed primarily for use in single sideband linear amplifier output applications and other communications equipment operating to 30 MHz.

- Characterized for Single Sideband and Large-Signal Amplifier Applications Utilizing Low-Level Modulation
- Specified 28 V, 30 MHz Characteristics —
Output Power = 15 W (PEP)
Minimum Efficiency = 40% (SSB)
Minimum Power Gain = 10 dB (PEP & CW)
- Common-Collector Configuration

15 W (PEP) – 15 W (CW) – 30 MHz

RF POWER TRANSISTOR

NPN SILICON



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MAXIMUM RATINGS

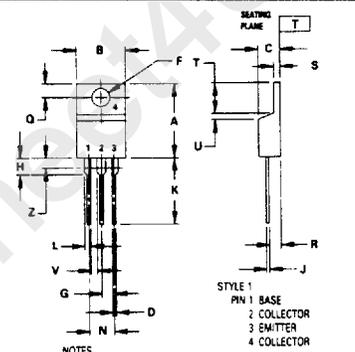
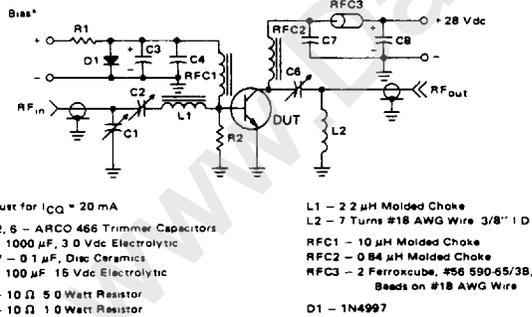
Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	35	Vdc
Collector-Base Voltage	V _{CBO}	65	Vdc
Emitter-Base Voltage	V _{EBO}	4.0	Vdc
Collector Current – Continuous	I _C	1.0	Adc
Total Device Dissipation @ T _C = 50°C (1)	P _D	30	Watts
Derate above 50°C		0.3	W/°C
Storage Temperature Range	T _{stg}	-65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R _{θJC}	3.33	°C/W

(1) This device is designed for RF operation. The total device dissipation rating applies only when the device is operated as an RF amplifier.

FIGURE 1 – COMMON EMITTER TEST CIRCUIT



- NOTES
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M 1982
 2. CONTROLLING DIMENSION INCH
 3. DIM Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	14.48	15.75	0.570	0.620
B	9.66	10.28	0.380	0.405
C	4.07	4.82	0.160	0.190
D	0.64	0.98	0.025	0.035
F	3.61	3.73	0.142	0.147
G	2.42	2.66	0.095	0.105
H	2.80	3.03	0.110	0.155
J	0.36	0.56	0.014	0.022
K	12.70	14.27	0.500	0.562
L	1.15	1.39	0.045	0.055
N	4.83	5.33	0.190	0.210
Q	2.54	3.04	0.100	0.120
R	2.04	2.75	0.080	0.110
S	1.15	1.39	0.045	0.055
T	5.97	6.47	0.235	0.255
U	0.00	1.27	0.000	0.050
V	1.15	—	0.045	—
Z	—	2.04	—	0.080

CASE 221A-04
TO-220AB

MRF485

MOTOROLA SC (XSTRS/R F)

46E D 6367254 0094701 1 MOT6

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ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I _C = 20 mA, I _B = 0)	V _{(BR)CEO}	35	—	—	V _{dc}
Collector-Emitter Breakdown Voltage (I _C = 50 mA, V _{BE} = 0)	V _{(BR)CES}	60	—	—	V _{dc}
Emitter-Base Breakdown Voltage (I _E = 5.0 mA, I _C = 0)	V _{(BR)EBO}	40	—	—	V _{dc}
Collector Cutoff Current (V _{CB} = 25 V _{dc} , I _E = 0)	I _{CB0}	—	—	1.0	mA _{dc}
Collector Cutoff Current (V _{CE} = 28 V _{dc} , V _{BE} = 0)	I _{CES}	—	—	5.0	mA _{dc}
ON CHARACTERISTICS					
DC Current Gain (I _C = 500 mA, V _{CE} = 5.0 V _{dc})	h _{FE}	10	30	—	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V _{CB} = 28 V _{dc} , I _E = 0, f = 1.0 MHz)	C _{ob}	—	85	100	pF
FUNCTIONAL TESTS (SSB)					
Common Emitter Amplifier Power Gain (V _{CC} = 28 V _{dc} , P _{out} = 15 W (PEP), f ₁ = 30 MHz, f ₂ = 30.001 MHz, I _{CO} = 20 mA)	G _{PE}	10	13	—	dB
Collector Efficiency (V _{CC} = 28 V _{dc} , P _{out} = 15 W (PEP), f ₁ = 30 MHz, f ₂ = 30.001 MHz, I _{CO} = 20 mA)	η	40	—	—	%
Intermodulation Distortion (1) (V _{CC} = 28 V _{dc} , P _{out} = 15 W (PEP), f ₁ = 30 MHz, f ₂ = 30.001 MHz, I _{CO} = 20 mA)	IMD(d3)	—	-35	-30	dB
Load Mismatch (V _{CC} = 28 V _{dc} , P _{out} = 15 W (PEP), f ₁ = 30 MHz, f ₂ = 30.001 MHz, VSWR = 30:1 All Angles)	ψ	No Degradation in Output Power			

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(1) To MIL-STD-1311 Version A, Test Method 2204B, Two Tone, Reference Each Tone

FIGURE 2 — OUTPUT POWER versus INPUT POWER

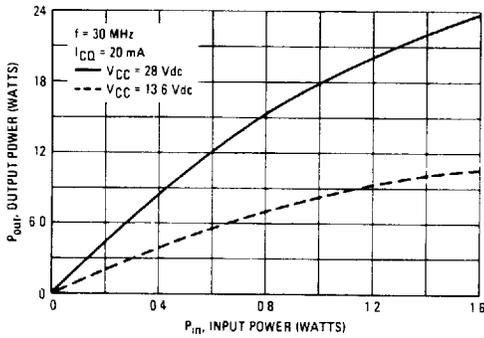
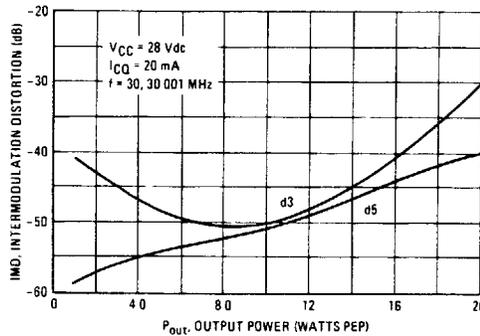


FIGURE 3 — INTERMODULATION DISTORTION versus OUTPUT POWER



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FIGURE 4 – OUTPUT POWER versus SUPPLY VOLTAGE

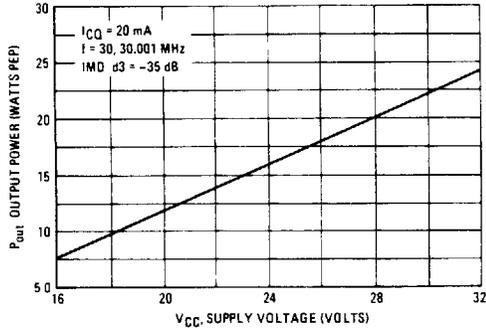
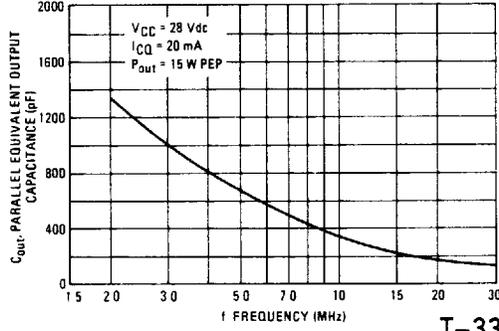


FIGURE 5 – OUTPUT CAPACITANCE versus FREQUENCY



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FIGURE 6 – OUTPUT RESISTANCE versus FREQUENCY

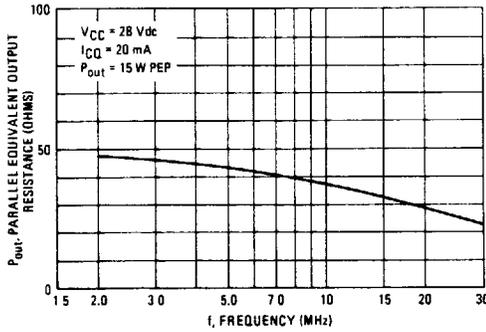


FIGURE 7 – POWER GAIN versus FREQUENCY

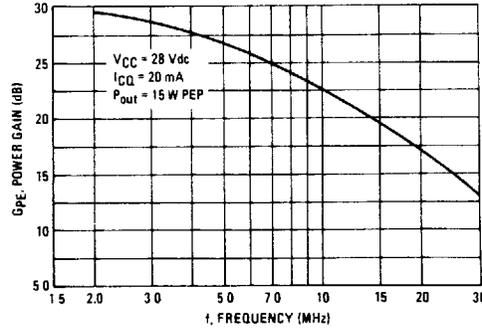
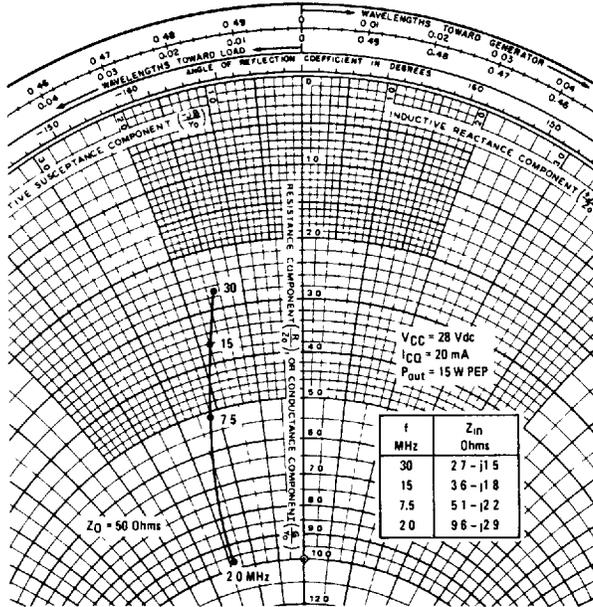


FIGURE 8 – SERIES EQUIVALENT INPUT IMPEDANCE



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