



GERMANIUM PRODUCTS

GERMANIUM TRANSISTORS

Type G11
Type G11A

General Electric Germanium Transistors are power amplifiers which have been designed to perform many of the various functions of vacuum tubes. Their outstanding characteristics are small size, instantaneous operation (no heater power), low input impedance, high output impedance and long life.

PRINCIPAL APPLICATIONS

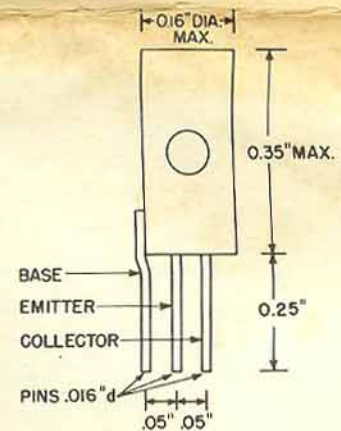
Type G11: Amplifier and oscillator
Type G11A: Counter

PHYSICAL SPECIFICATIONS



Approx. three times actual size.

- Case: Brass
- Pins: Gold plated phosphor bronze
- Impregnation: Filled with moisture resistant wax
- Suggested Means of Connection: Plug into 5- or 7-pin subminiature tube socket
- Mounting: Any position
- Pin Connections:
 - Base: Soldered to case
 - Emitter: Center pin
 - Collector: Opposite base pin



ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings:

Collector dissipation	100 mw
Collector voltage, V_c	30 volts
Collector current, I_c	7 ma
Emitter current, I_e	3 ma
Emitter peak-inverse voltage	50 volts
Ambient temperature	40°C

ELECTRICAL CHARACTERISTICS cont.

Typical Operating Characteristics—Grounded Base Operation:

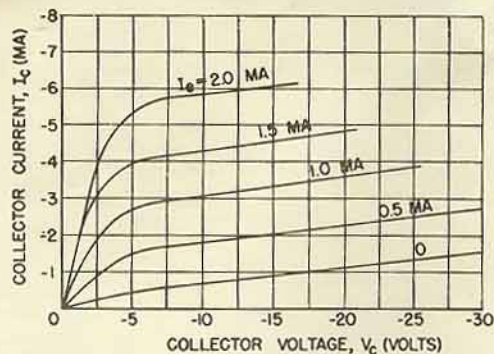
For $V_c = 25$ volts, $I_e = 0.5$ ma, $T = 25^\circ\text{C}$:

	G11	G11A
Base resistance, R_b	200 ohms	400 ohms
Collector resistance, R_c	20 K ohms	20 K ohms
Input resistance, $R_e + R_b$	475 ohms	800 ohms
Current amplification factor, alpha	2.2	2.2
Power gain*	17 db	—
Cut-off frequency, F_c^{**}	2 mc	2 mc
I_{co} max.***	—	1.5 ma
Noise figure	57 db	—
Minimum d-c resistance in emitter circuit	500 ohms	—

NOTES:

1. Impedances are open circuit measurements.
2. Any germanium transistor may be damaged by excessive voltage surges. In experimental work, it is generally best to connect the transistor in its circuit and raise the voltages gradually until the desired operating condition is reached.
- *3. Power gain measured with a 500 ohm external input resistance and a load resistance of 20,000 ohms.
- **4. Frequency at which alpha is 3 db down from its 1000 cycle value.
- ***5. $I_e = 0$ ma, $V_c = -25$ volts.

TYPICAL COLLECTOR CHARACTERISTICS FOR G11 AND G11A



SCOPE OF SPECIFICATIONS

In the construction of the equipment described, the full intent of the specifications will be met. The General Electric Company, however, reserves the right to make any departure from the specification for reasons of improved design.

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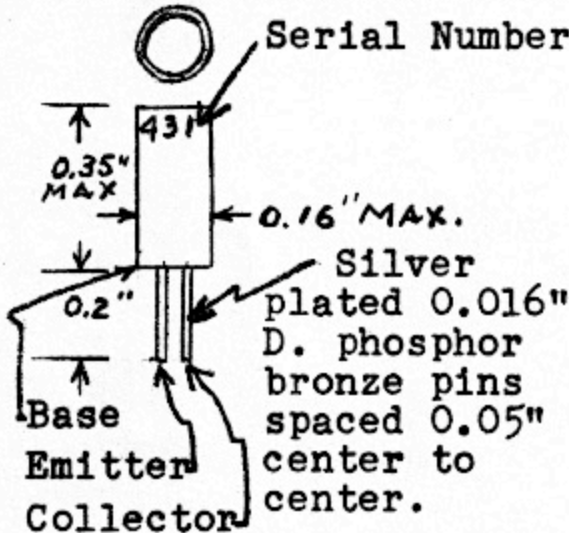
Germanium Triode

Metal Case - Plug In

General Information

Type ~~SX-4A~~ G-11

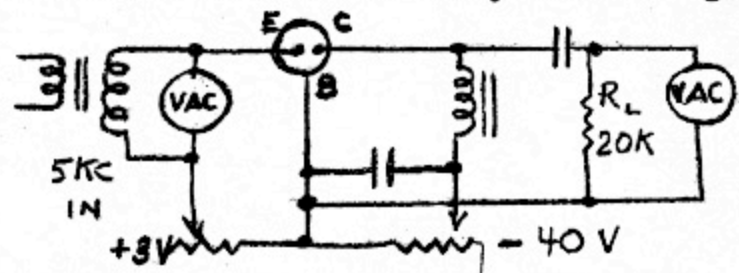
The Germanium Triode (transistor) described below uses a metal case with two silver plated phosphor bronze pins projecting from one end. These pins are designed to plug into two adjacent holes of a standard five or seven pin subminiature rectangular socket. The case is wax filled to obtain maximum freedom from humidity and vibration.



Electrical Characteristics in general follow the attached curves. Each unit is checked for power gain of between 13 and 20 db, 0.1 V input at 5 K.C. in the circuit shown below. Individual triodes may show higher gain with other values of R_L .

Maximum Ratings:-

- Emitter DC current 1 ma
- Collector dc current 2 ma
- Emitter RMS signal 0.3 volts



Do not subject the triode circuit to excessive voltage surges such as caused by switches, induction furnaces, motor starters, etc. It is generally best to connect the triode in circuit and raise the voltage gradually until the desired current is reached.

Mounting in any position does not effect the operation.

A convenient connection arrangement consists of wiring together 1 and 4 of the 5 pin subminiature socket and using this as the base connection. Then connect socket terminal 2 to the emitter circuit and socket terminal 3 to the collector circuit. To reverse the emitter and collector merely unplug the triode, rotate it 180 degrees and plug it in again. Contact case with two wires in socket holes 1 and 4 or replace the #1 and #4 socket contact springs with a 0.010 x 0.050" phosphor bronze strip and bend to contact the shell of the case as shown.



MADE BY *Fred Jungel* Feb 50

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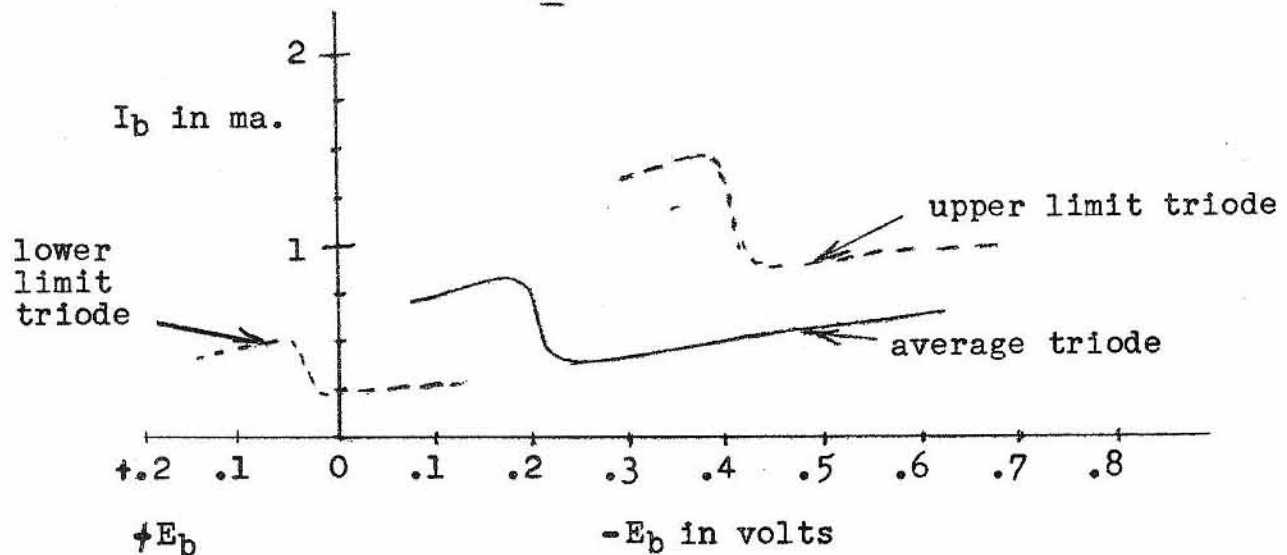
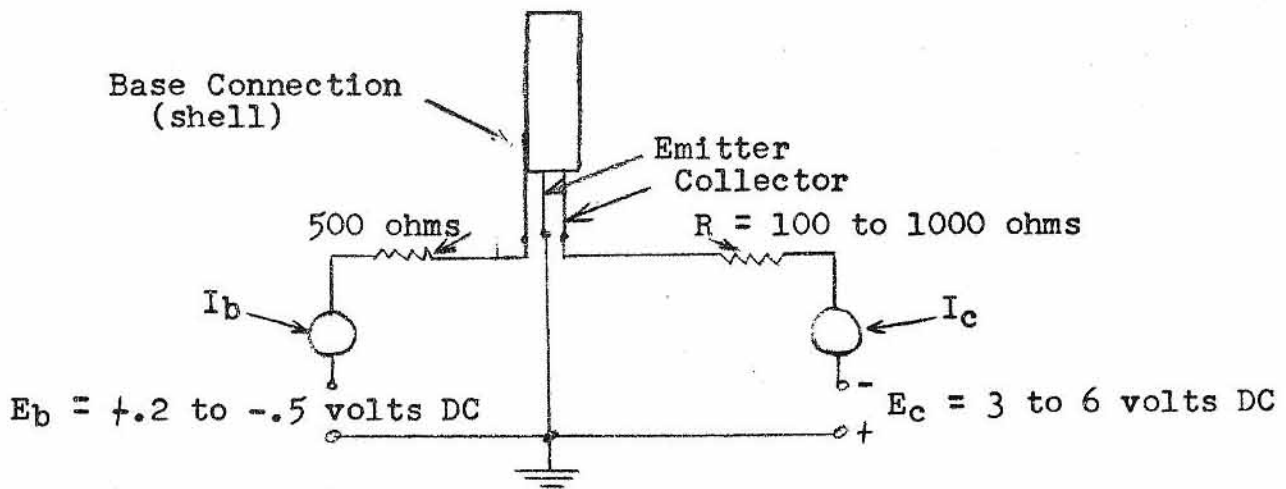
General Electric
GERMANIUM TRIODE (Transistor)

Type G11A (was Z2) for Trigger Circuits

The type G11A Germanium Triode has the same mechanical and electrical characteristics as the Type G11 except that a check for trigger performance has been added.

Each triode is tested for negative resistance (trigger action) in the circuit described below. The base current on an average unit changes approximately 0.5 ma for a 0.05 volt change in base voltage. The collector current changes between 0.5 and 1.0 milliamperes at the same time.

The values of R , E_c and E_b must be adjusted to obtain optimum performance from each triode.



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