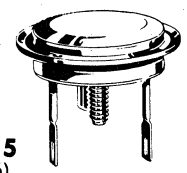
2N1412 (GERMANIUM)
2N1412A



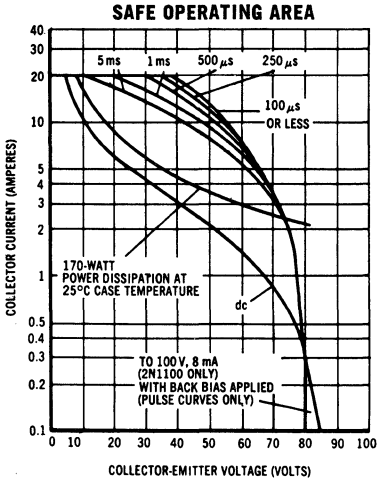
CASE 5
(TO-36)

PNP germanium power transistors for high-voltage power amplifier and switching applications in military and industrial equipment.

MAXIMUM RATINGS

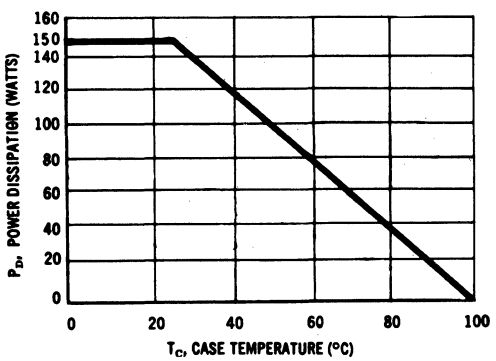
Rating	Symbol	Value	Unit
Collector-Base Voltage	V_{CB}	100	Vdc
Collector-Emitter Voltage	V_{CES}	80	Vdc
Collector-Emitter Voltage	V_{CEO}	60	Vdc
Emitter-Base Voltage	V_{EB}	60	Vdc
Emitter Current (Continuous)	I_E	15	Amp
Base Current (Continuous)	I_B	4.0	Amp
Junction & Storage Temperature	T_{stg}	-65 to +100	^oC
Thermal Resistance	θ_{JC}	0.5	$^oC/W$

SAFE OPERATING AREA



The Safe Operating Area Curves indicate I_C — V_{CE} limits below which the device will not go into secondary breakdown. Collector load lines for specific circuits must fall within the applicable Safe Area to avoid causing a collector-emitter short. (Duty cycle of the excursions make no significant change in these safe areas.) To insure operation below the maximum T_J, the power-temperature derating curve must be observed for both steady state and pulse power conditions.

POWER-TEMPERATURE DERATING CURVE



The maximum continuous power is related to maximum junction temperature by the thermal resistance factor.

This curve has a value of 150 Watts at case temperatures of 25°C and is 0 Watts at 100°C with a linear relation between the two temperatures such that:

$$\text{allowable } P_D = \frac{100° - T_C}{0.5}$$

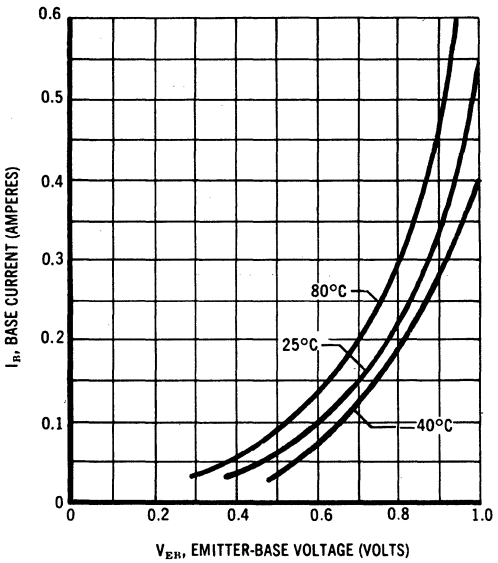
2N1412 (continued)

ELECTRICAL CHARACTERISTICS

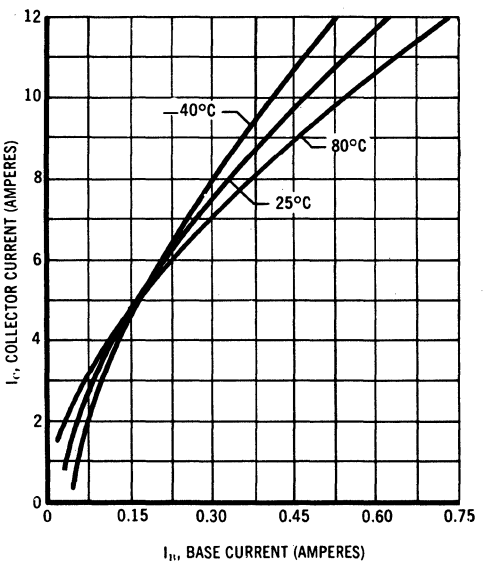
Characteristic	Symbol	Minimum	Maximum	Unit
Emitter Cutoff Current V_{EB} = −2.0 Vdc I_C = 0	I_{EBO}	—	200	μAdc
Emitter Cutoff Current V_{EB} = −60 Vdc I_C = 0	I_{EBO}	—	10	mAdc
Collector Cutoff Current V_{CB} = −2.0 Vdc I_E = 0	I_{CBO}	—	200	μAdc
Collector Cutoff Current V_{CB} = −100 Vdc I_E = 0	I_{CBO}	—	10	mAdc
Emitter-Base Voltage V_{CE} = −2.0 Vdc I_C = −1.2 Adc	V_{EB}		0.5	Vdc
Emitter-Base Voltage V_{CE} = −2.0 Vdc I_C = −5.0 Adc	V_{EB}		0.9	Vdc
Floating Potential V_{CB} = −100 Vdc I_E = 0 (Voltmeter input resistance = 10 Megohm min)	V_{fl}		1.0	Vdc
Collector-Emitter Saturation Voltage I_C = −12 Adc I_B = −2.0 Adc	$V_{CE(SAT)}$		0.7	Vdc
Forward Current Transfer Ratio* V_{CE} = −2.0 Vdc I_C = −15 Adc	h_{FE}	10	—	—
Forward Current Transfer Ratio V_{CE} = −2.0 Vdc I_C = −5.0 Adc	h_{FE}	25	50	—
Collector-Emitter Breakdown Voltage* I_C = −1 Adc I_B = 0	BV_{CEO}	60	—	Vdc
Collector-Emitter Breakdown Voltage* V_{EB} = 0 I_C = 300 mA	BV_{CES}	80	—	Vdc
Small-Signal Short-Circuit Forward-Current Transfer Ratio Cutoff Frequency V_{CE} = −12 Vdc I_C = −5.0 Adc	$f_{\alpha e}$	5.0	—	kHz
High-Temperature Operation Emitter Cutoff Current T_C = +71°C min V_{EB} = −30 Vdc	I_{EBO}	—	6.0	mAdc
Collector Cutoff Current V_{CB} = −30 Vdc I_E = 0	I_{CBO}	—	6.0	mAdc

*Test by sweep method with a short duty cycle (about 1%) to avoid excessive heating.

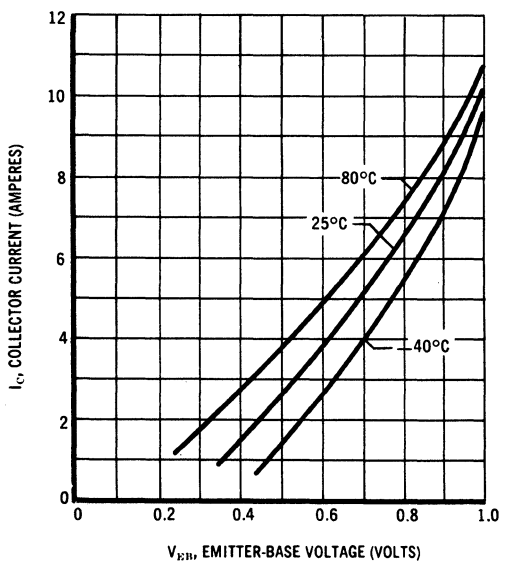
INPUT CHARACTERISTICS



CURRENT TRANSFER CHARACTERISTICS



TRANSCONDUCTANCE CHARACTERISTICS



OUTPUT CHARACTERISTICS