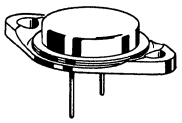
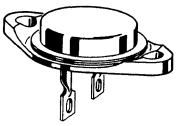
2N1162 thru 2N1167 (GERMANIUM)
2N1162A thru 2N1167A

PNP germanium power transistors for switching and amplifier applications in high reliability equipment.



CASE 11A
(TO-3 modified)

2N1162, A
2N1164, A
2N1166, A



CASE 4-04
(TO-41)

2N1163, A
2N1165, A
2N1167, A

MAXIMUM RATINGS

Apply also to standard, non-A series

Rating	Symbol	2N1162A 2N1163A	2N1164A 2N1165A	2N1166A 2N1167A	Units
Collector-Base Voltage	V_{CB}	50	80	100	Vdc
Collector-Emitter Voltage	V_{CES}	35	60	75	Vdc
Emitter-Base Voltage	V_{EB}	25	40	50	Vdc
Total Device Dissipation @ 25°C Derate above 25°C	P_D	106 1.25			Watts W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +110			°C

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

Characteristic	Symbol	Min	Typ	Max	Unit
Collector Cutoff Current ($V_{CB} = V_{CB}$(max), $I_E = 0$)	I_{CBO1}	—	3.0	15	mA
Collector Cutoff Current (V_{CB} = 2 V, I_E = 0)	I_{CBO}	—	125	225	μA
(V_{CB} = 15 V, I_E = 0, T_C = 90°C) 2N1162A-3A*		—	10	20	mA
(V_{CB} = 30 V, I_E = 0, T_C = 90°C) 2N1164A-7A*		—	10	20	mA
Collector-Emitter Breakdown Voltage** (I_C = 500 mA, V_{EB} = 0) 2N1162A-3A*	BV_{CES}**	35	—	—	Vdc
2N1164A-5A*		60	—	—	
2N1166A-7A*		75	—	—	
Emitter Cutoff Current (V_{EB} = 12 V, I_C = 0)	I_{EBO}	—	0.5	1.2	mA
DC Forward Current Gain (V_{CE} = 1 V, I_C = 25 A)	h_{FE1}	15	25	—	—
(V_{CE} = 2 V, I_C = 5 A)	h_{FE}	—	65	125	
Collector-Emitter Saturation Voltage (I_C = 25 A, I_B = 1.6 A)	$V_{CE(sat)}$	—	0.3	0.8	volts
Base-Emitter Saturation Voltage (I_C = 25 A, I_B = 1.6 A)	$V_{BE(sat)}$	—	0.7	1.7	volts
Common Emitter-Cutoff Frequency (V_{CE} = 2 V, I_C = 2 A)	$f_{\alpha e}$	—	4.0	—	kHz

*Characteristics apply also to corresponding, non-A type numbers
**Sweep Method: 1/2 cycle sine wave, 60 Hz

SWITCHING CHARACTERISTICS (Typical)

Saturated Collector Current	Pulsed Drive Base Current		Response times in μs		
	On	Off	$t_d + t_r$	t_s	t_f
5 amp	330 mA	100 mA	11	5.0	17
10 amp	660 mA	200 mA	15	4.0	20
25 amp	1650 mA	500 mA	19	3.0	18

FIGURE 1 — POWER TEMPERATURE DERATING CURVE

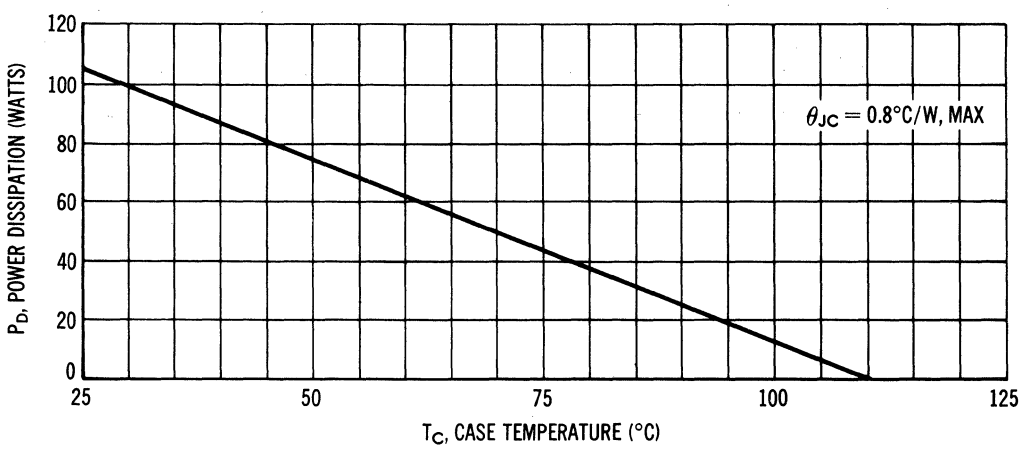
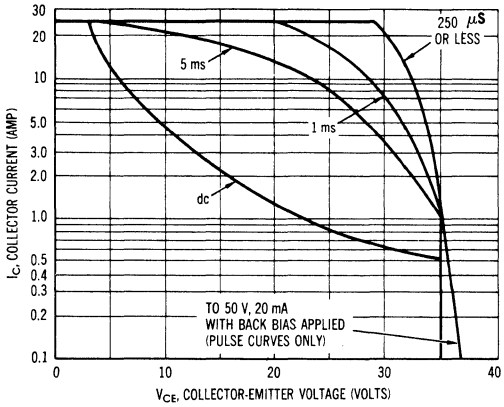
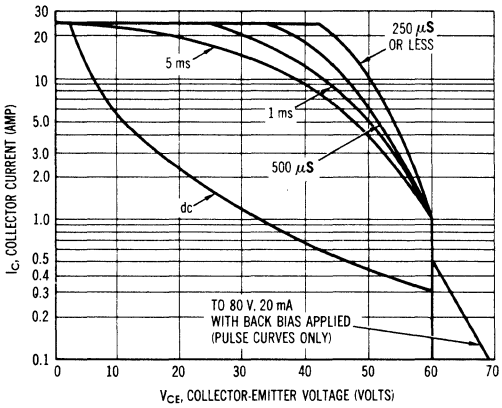
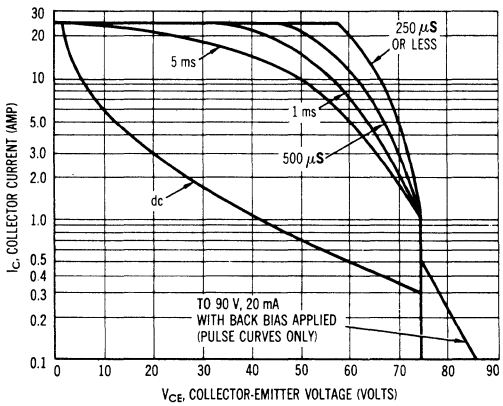


FIGURE 2 — ACTIVE REGION SAFE OPERATING AREAS

The active region safe operating area curves indicate I_C-V_{CE} limits to be observed in order to avoid secondary breakdown. (Secondary breakdown is independent of temperature and duty cycle.) These curves do not define operation in the avalanche region. To insure operation below the maximum junction temperature, power derating must be observed for both steady state and pulse conditions.







LARGE SIGNAL CHARACTERISTICS

FIGURE 3 — TRANSCONDUCTANCE

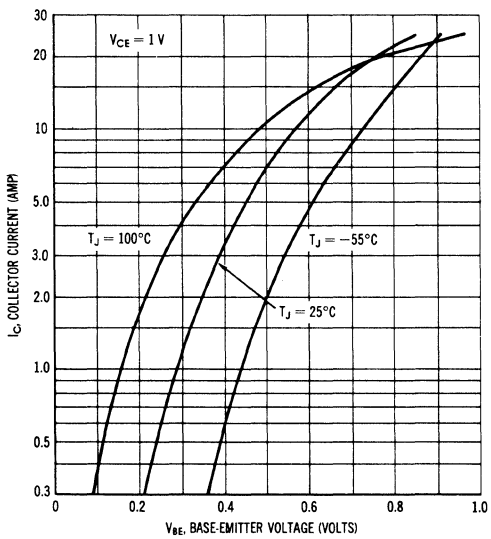


FIGURE 4 — INPUT ADMITTANCE

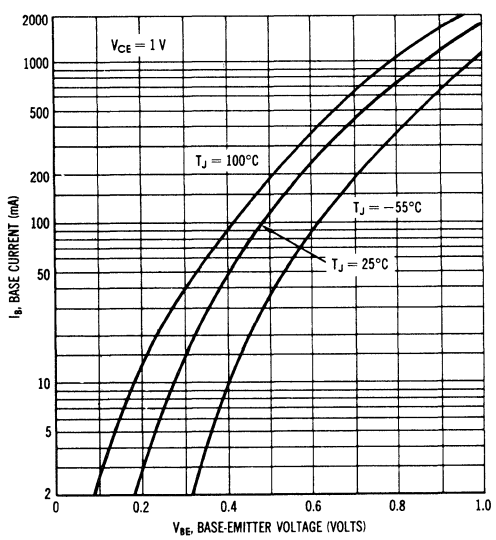


FIGURE 5 — CURRENT GAIN

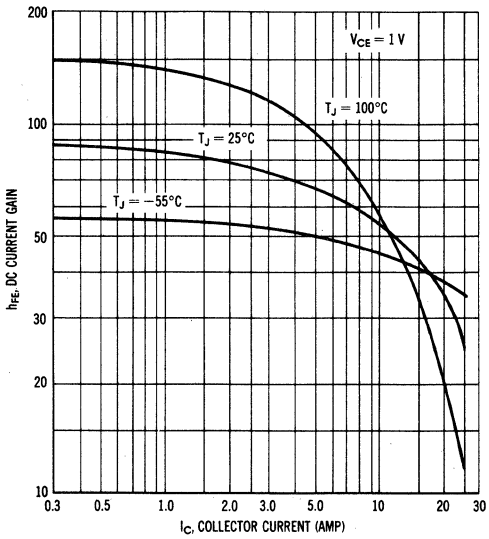


FIGURE 6 — SATURATION REGION