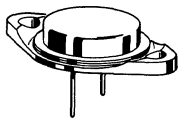
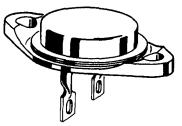
2N2137 thru 2N2146 (GERMANIUM)
2N2137A thru 2N2146A

PNP germanium industrial power transistors for driver applications in high reliability equipment.



CASE 11
(TO-3)



CASE 4-04
(TO-41)

For units with solder lugs attached, specify devices MP2137,A etc. (TO-41 package)

MAXIMUM RATINGS

Apply also to standard, non-A series

Rating	Symbol	2N2137A 2N2142A	2N2138A 2N2143A	2N2139A 2N2144A	2N2140A 2N2145A	2N2141A 2N2146A	Unit
Collector-Base Voltage	V_{CB}	30	45	60	75	90	Vdc
Collector-Emitter Voltage	V_{CES}	30	45	60	75	90	Vdc
Collector-Emitter Voltage	V_{CEO}	20	30	45	60	65	Vdc
Emitter-Base Voltage	V_{EB}	15	25	30	40	45	Vdc
Total Device Dissipation @ T_C = 25°C	P_D	70					Watts
Derate above 25°C		0.833					W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +110					°C

ELECTRICAL CHARACTERISTICS

*Characteristics apply also to corresponding, non-A type numbers.

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage** (I_C = 500 mAdc, I_B = 0)	2N2137A, 2N2142A*	BV_{CEO}**	20	-	-	Vdc
	2N2138A, 2N2143A*		30	-	-	
	2N2139A, 2N2144A*		45	-	-	
	2N2140A, 2N2145A*		60	-	-	
	2N2141A, 2N2146A*		65			
Collector-Emitter Breakdown Voltage** (I_C = 300 mAdc, V_{BE} = 0)	2N2137A, 2N2142A*	BV_{CES}**	30	-	-	Vdc
	2N2138A, 2N2143A*		45	-	-	
	2N2139A, 2N2144A*		60	-	-	
	2N2140A, 2N2145A*		75	-	-	
	2N2141A, 2N2146A*		90	-	-	
Floating Potential		V_{EBF}				Vdc
(V_{CB} = 30 Vdc, I_E = 0)	2N2137A, 2N2142A*		-	-	1.0	
(V_{CB} = 45 Vdc, I_E = 0)	2N2138A, 2N2143A*		-	-	1.0	
(V_{CB} = 60 Vdc, I_E = 0)	2N2139A, 2N2144A*		-	-	1.0	
(V_{CB} = 75 Vdc, I_E = 0)	2N2140A, 2N2145A*		-	-	1.0	
(V_{CB} = 90 Vdc, I_E = 0)	2N2141A, 2N2146A*		-	-	1.0	
Collector-Base Cutoff Current		I_{CBO}				mAdc
(V_{CB} = 2.0 Vdc, I_E = 0)			-	0.018	0.05	
(V_{CB} = $V_{CB(max)}$, I_C = 0, T_C = +71°C)			-	0.75	5.0	
Collector-Base Cutoff Current† (V_{CB} = $V_{CB(max)}$, I_E = 0)		I_{CBO1}	-	0.1	2.0	mAdc
Emitter-Base Cutoff Current		I_{EBO}				mAdc
(V_{BE} = $V_{BE(max)}$, I_C = 0)			-	0.08	2.0	
(V_{BE} = $V_{BE(max)}$, I_C = 0, T_C = +71°C)			-	0.5	5.0	
ON CHARACTERISTICS						
DC Current Gain						-
(I_C = 0.5 Adc, V_{CE} = 2.0 Vdc)†	2N2137A-2N2141A*	h_{FE1}	30	45	60	
	2N2142A-2N2146A*		50	70	100	
(I_C = 2.0 Adc, V_{CE} = 2.0 Vdc)	2N2137A-2N2141A*	h_{FE}	15	22	-	
	2N2142A-2N2146A*		25	33	-	
Collector-Emitter Saturation Voltage (I_C = 2.0 Adc, I_B = 200 mAdc)		$V_{CE(sat)}$	-	0.12	0.5	Vdc
Base-Emitter Saturation Voltage (I_C = 2.0 Adc, I_B = 200 mAdc)		$V_{BE(sat)}$	-	0.75	1.2	Vdc
DYNAMIC CHARACTERISTICS						
Common Emitter Cutoff Frequency (I_C = 2.0 Adc, V_{CE} = 6.0 Vdc)		$f_{\alpha e}$	12	20	-	kHz

**Sweep method: 1/2 cycle sine wave, 60 Hz .

FIGURE 1 — POWER TEMPERATURE DERATING CURVE

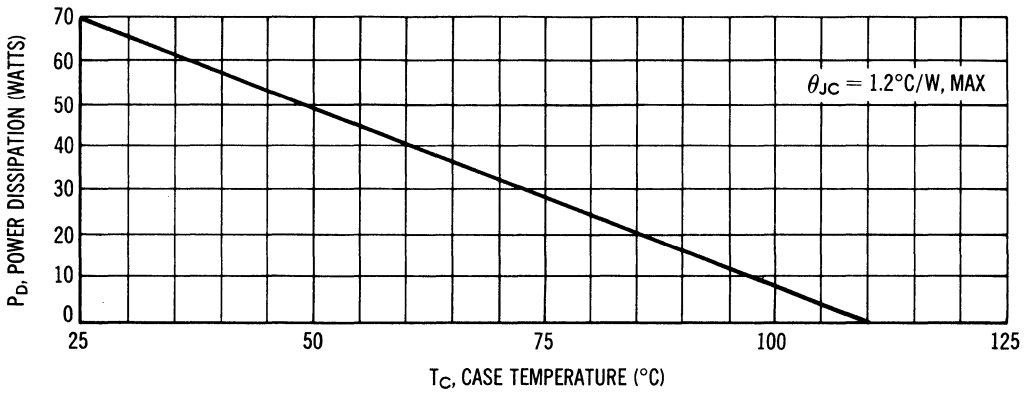
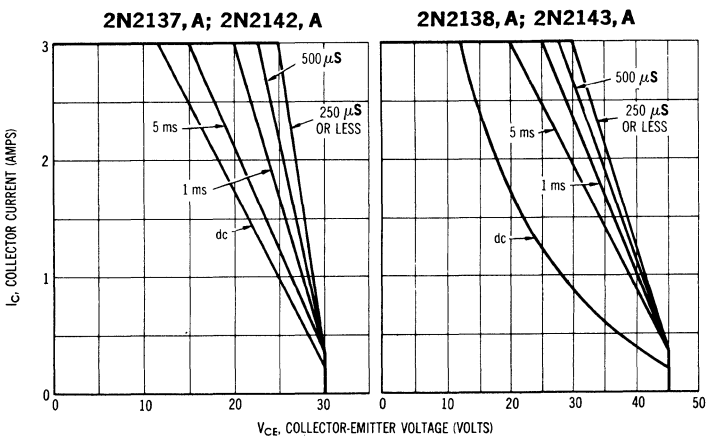
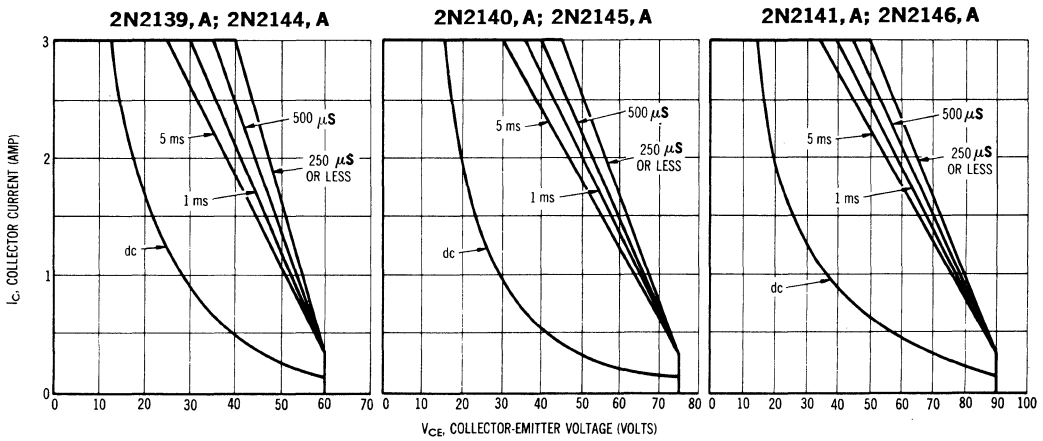


FIGURE 2 — ACTIVE REGION SAFE OPERATING AREAS

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 (ALL TYPES)

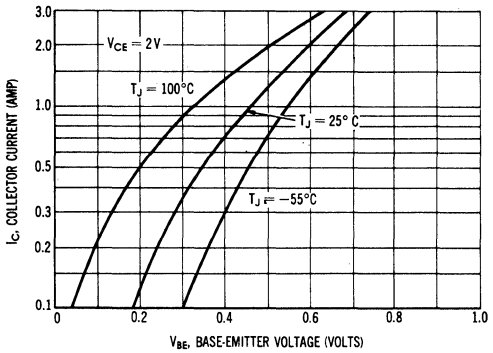


FIGURE 4 — INPUT ADMITTANCE (2N2137A-2N2141A, 2N2137-2N2141)

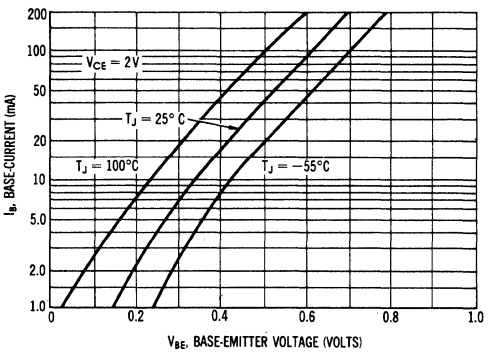


FIGURE 5 — INPUT ADMITTANCE (2N2142A-2N2146A, 2N2142-2N2146)

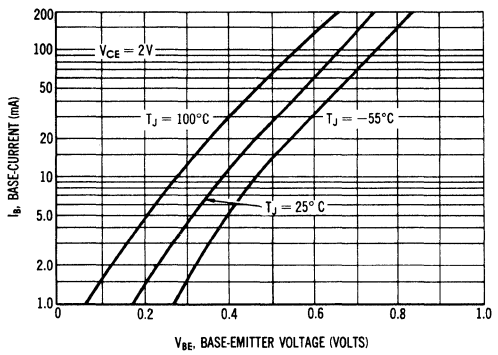


FIGURE 6 — NORMALIZED DC CURRENT GAIN (ALL TYPES)

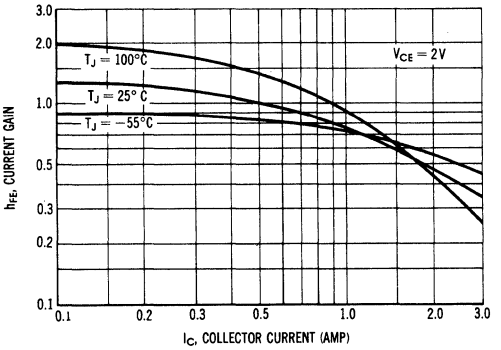


FIGURE 7 — SATURATION REGION (2N2137A-2N2141A, 2N2137-2N2141)

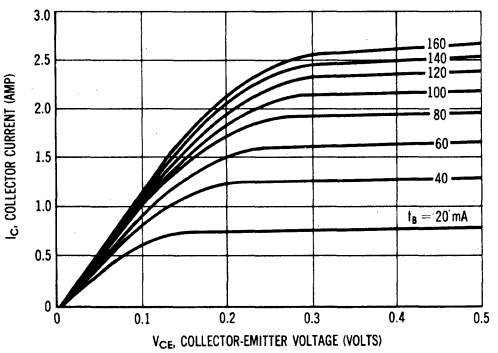
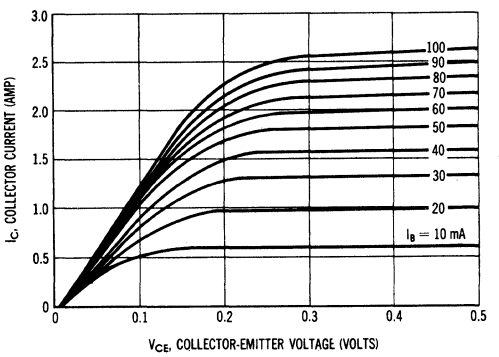
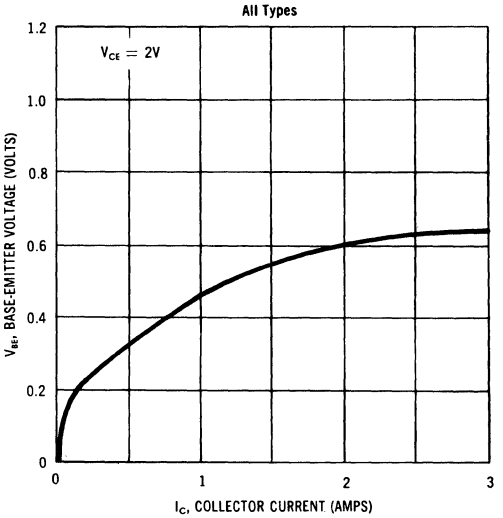


FIGURE 8 — SATURATION REGION (2N2142A-2N2146A, 2N2142-2N2146)

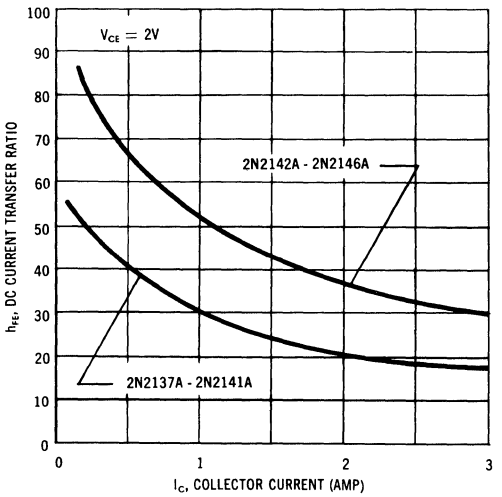


INPUT & TRANSFER CHARACTERISTICS

BASE-EMITTER VOLTAGE versus COLLECTOR CURRENT
All Types



DC CURRENT TRANSFER RATIO versus COLLECTOR CURRENT



2N2152 thru 2N2154 (GERMANIUM)
2N2156 thru 2N2158

CASE 5
(TO-36)

PNP germanium power transistors for high-power, high-gain applications in high-reliability industrial equipment.

MAXIMUM RATINGS

Rating	Symbol	2N2152 2N2156	2N2153 2N2157	2N2154 2N2158	Unit
Collector-Emitter Voltage	V_{CEO}	30	45	60	Vdc
Collector-Emitter Voltage	V_{CES}	45	60	75	Vdc
Collector-Base Voltage	V_{CB}	45	60	75	Vdc
Emitter-Base Voltage	V_{EB}	25	30	40	Vdc
Collector Current	I_C	30			Adc
Total Device Dissipation @ $T_C = 25^oC$	P_D	170			Watts
Derate above 25^oC		0.5			$W/^oC$
Operating Junction Temperature Range	T_J	-65 to +110			^oC

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	θ_{JC}	0.5	$^oC/W$