2N1189 2N1190 (GERMANIUM)

CASE 31(1)
(TO-5)
All leads isolated

PNP germanium transistors for high-gain audio amplifier and switching applications.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Base Voltage	V_{CB}	45	Vdc
Collector-Emitter Voltage	V_{CER}	30	Vdc
Emitter-Base Voltage	V_{EB}	15	Vdc
Collector Current (Continuous)	I_C	500*	mAdc
Junction, Storage Temperature	T_J, T_{stg}	-65 to +100	°C
Collector Dissipation, Ambient (Derate 2.67 mW/°C above 25°C)	P_D	200	mW
Thermal Resistance (Junction to Ambient)	θ_{JA}	0.375	°C/mW
Thermal Resistance (Junction to Case)	θ_{JC}	0.250	°C/mW

*Limited by power dissipation.

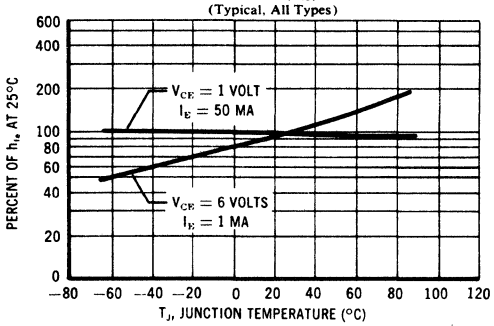
ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Collector-Base Cutoff Current	I_{CBO}				μAdc
(V_{CB} = 30 Vdc, I_E = 0)		—	3.0	10	
(V_{CB} = 45 Vdc, I_E = 0)		—	—	50	
(V_{CB} = 10 Vdc, I_E = 0, T_A = + 71°C)		—	55	100	
Emitter-Base Cutoff Current	I_{EBO}				μAdc
(V_{EB} = 15 Vdc, I_C = 0)		—	3.0	10	
Collector-Emitter Leakage Current	I_{CER}				μAdc
(V_{CE} = 30 Vdc, R_{BE} = 10K)		—	—	600	
Collector-Emitter Punch-Thru Voltage	V_{pt}				Vdc
(V_{EB} = 1 Vdc, VTVM Impedance ≥ 1 M ohm		45	—	—	
Output Capacitance	C_{ob}				pF
(V_{CB} = 6 Vdc, I_E = 0, f = 1 MHz)		—	12.0	25	
Noise Figure	NF				dB
(V_{CE} = 4.5 V_{dc}, I_E = 0.5 mAdc		—	5.0	15	
R_g = 1 K, f = 1 kHz Δf = 1 Hz)					
Small-Signal Current-Gain Cutoff Frequency	$f_{\alpha b}$				MHz
(V_{CB} = 6 Vdc, I_E = 1 mAdc)					
2N1189		1.75	3.5	—	
2N1190		2.25	4.5	—	

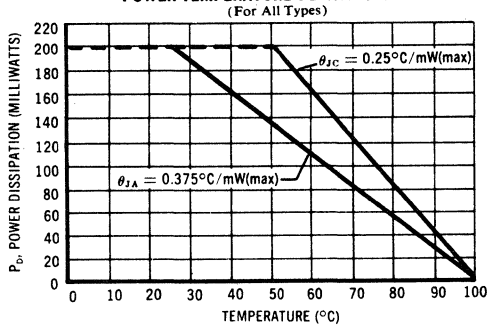
ELECTRICAL CHARACTERISTICS (continued)

Characteristic		Symbol	Min	Typ	Max	Unit
Input Impedance (V_{CB} = 6 Vdc, I_E = 1 mAdc, f = 1 kHz)		h_{ib}	27	31	37	Ohms
Output Admittance (V_{CB} = 6 Vdc, I_E = 1 mAdc, f = 1 kHz)		h_{ob}	0.1	—	0.9	μmho
Small Signal Current Gain (V_{CE} = 6 Vdc, I_E = 1 mAdc, f = 1 kHz)		h_{fe}				—
	2N1189		75	120	175	
	2N1190		125	190	300	
DC Current Transfer Ratio (V_{CE} = 1.0 Vdc, I_E = 10 mAdc)		h_{FE}				—
	2N1189		60	115	—	
	2N1190		100	170	—	
Base-Emitter Drive Voltage (V_{CE} = 1.0 Vdc, I_E = 10 mAdc)		V_{BE}				Vdc
	2N1189		—	0.24	0.26	
	2N1190		—	0.22	0.25	
Collector-Emitter Saturation Voltage		V_{CE} (sat)				Vdc
(I_C = 50 mAdc, I_B = 1.5 mA)	2N1189		—	0.14	0.22	
(I_C = 50 mAdc, I_B = 1.0 mA)	2N1190		—	0.15	0.22	
(I_C = 100 mAdc, I_B = 3.0 mA)	2N1189		—	0.17	0.3	
(I_C = 100 mAdc, I_B = 2.0 mA)	2N1190		—	0.19	0.3	

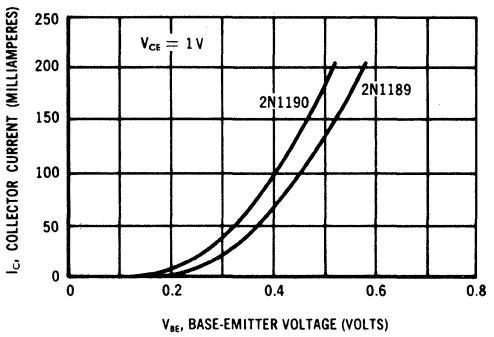
SMALL SIGNAL CURRENT GAIN(h_{fe}) versus TEMPERATURE
(Typical, All Types)



POWER-TEMPERATURE DERATING CURVE
(For All Types)



OUTPUT CURRENT versus BASE DRIVE VOLTAGE



DC CURRENT TRANSFER RATIO versus COLLECTOR CURRENT