2N2288, 2N2289 (GERMANIUM)
2N2290

PNP GERMANIUM POWER SWITCHING TRANSISTORS

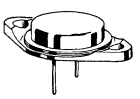
. . . designed for fast-switching applications requiring low saturation voltage and excellent collector-emitter sustaining voltage capability.

- Alloy-Diffused Epitaxial Construction
- Low Saturation Voltages –
  $V_{CE(sat)}$ = 0.5 Vdc (Max) @ I_C = 5.0 Adc
  $V_{BE(sat)}$ = 1.0 Vdc (Max) @ I_C = 5.0 Adc

10 AMPERE

PNP ADE GERMANIUM POWER TRANSISTORS

40-120 VOLTS
70 WATTS



MAXIMUM RATINGS

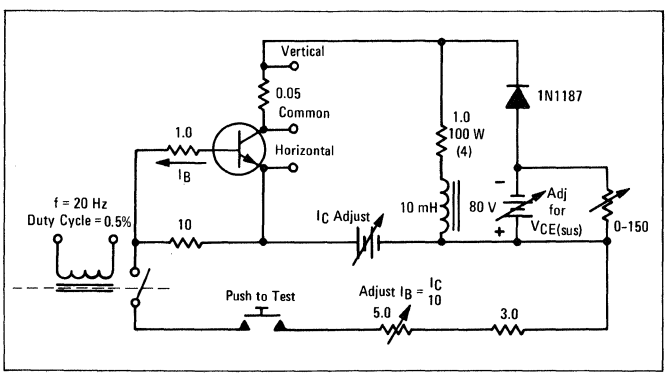
Rating	Symbol	2N2288	2N2289	2N2290	Unit
*Collector-Emitter Voltage (R_{BE} = 100 Ohms)	V_{CER}	40	80	120	Vdc
*Collector-Base Voltage	V_{CB}	40	80	120	Vdc
*Emitter-Base Voltage	V_{EB}	← 0.75 →			Vdc
*Collector Current - Continuous	I_C	← 10 →			Adc
Base Current - Continuous	I_B	← 3.0 →			Adc
Total Device Dissipation @ T_C = 25°C *Derate above 25°C	P_D	← 70 0.833 →			Watts W/°C
*Operating and Storage Junction Temperature Range	T_J, T_{stg}	← -65 to +110 →			°C

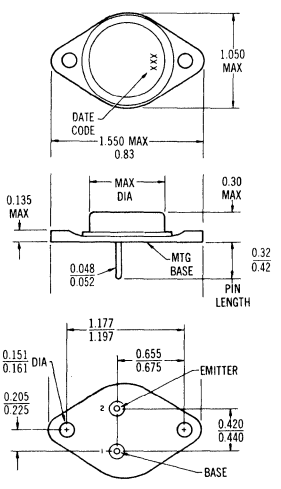
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	θ_{JC}	1.2	°C/W

*Indicates JEDEC Registered Data.

FIGURE 1 – SUSTAINING VOLTAGE TEST CIRCUIT





Collector Connected to Case

CASE 11A
(TO-3)

Except Pin Diameter

2N2288, 2N2289, 2N2290 (continued)

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 100 mAdc, I_B = 0)	2N2288	BV_{CEO}	30	-	Vdc
	2N2289		50	-	
	2N2290		70	-	
Collector-Emitter Sustaining Voltage (See Figure 1) (I_C = 5.0 Adc)	2N2288	$V_{CE(sus)}$	30	-	Vdc
	2N2289		50	-	
	2N2290		70	-	
*Collector-Emitter Breakdown Voltage (I_C = 50 mAdc, R_{BE} = 100 Ohms)	2N2288	BV_{CER}	40	-	Vdc
	2N2289		80	-	
	2N2290		120	-	
*Collector Cutoff Current (V_{CE} = 15 Vdc, I_B = 0)	2N2288	I_{CEO}	-	50	mAdc
(V_{CE} = 25 Vdc, I_B = 0)	2N2289		-	50	
(V_{CE} = 35 Vdc, I_B = 0)	2N2290		-	50	
*Collector Cutoff Current (V_{CE} = 40 Vdc, $V_{BE(off)}$ = 0.1 Vdc, T_C = 100°C, +0, -3.0°C)	2N2288	I_{CEX}	-	35	mAdc
(V_{CE} = 80 Vdc, $V_{BE(off)}$ = 0.1 Vdc, T_C = 100°C, +0, -3.0°C)	2N2289		-	35	
(V_{CE} = 120 Vdc, $V_{BE(off)}$ = 0.1 Vdc, T_C = 100°C, +0, -3.0°C)	2N2290		-	35	
Collector Cutoff Current (V_{CB} = 2.0 Vdc, I_E = 0)	All Types	I_{CBO}	-	200	μAdc
*(V_{CB} = 40 Vdc, I_E = 0)	2N2288		-	5.0	mAdc
*(V_{CB} = 80 Vdc, I_E = 0)	2N2289		-	5.0	
*(V_{CB} = 120 Vdc, I_E = 0)	2N2290		-	5.0	
Emitter Cutoff Current (V_{EB} = 0.75 Vdc, I_C = 0)		I_{EBO}	-	25	mAdc
ON CHARACTERISTICS					
*DC Current Gain (I_C = 2.0 Adc, V_{CE} = 5.0 Vdc)		h_{FE}	20	-	-
(I_C = 5.0 Adc, V_{CE} = 2.0 Vdc)			20	60	
Collector-Emitter Saturation Voltage (I_C = 5.0 Adc, I_B = 0.5 Adc)		$V_{CE(sat)}$	-	0.5	Vdc
*Base-Emitter Saturation Voltage (I_C = 5.0 Adc, I_B = 0.5 Adc)		$V_{BE(sat)}$	-	1.0	Vdc
SMALL-SIGNAL CHARACTERISTICS					
*Small-Signal Current Gain (I_C = 0.5 Adc, V_{CE} = 14 Vdc, f = 1.0 kHz)		h_{fe}	25	100	-
(I_C = 0.5 Adc, V_{CE} = 6.0 Vdc, f = 30 kHz)			15	-	
SWITCHING CHARACTERISTICS					
Rise Time	I_C = 5.0 Adc, I_{B1} = I_{B2} = 1.0 Adc) (See Figure 2)	t_r	-	5.0	μs
Storage Time		t_s	-	7.0	μs
Fall Time		t_f	-	8.0	μs

*Indicates JEDEC Registered Data.

FIGURE 2 – SWITCHING TIME TEST CIRCUIT