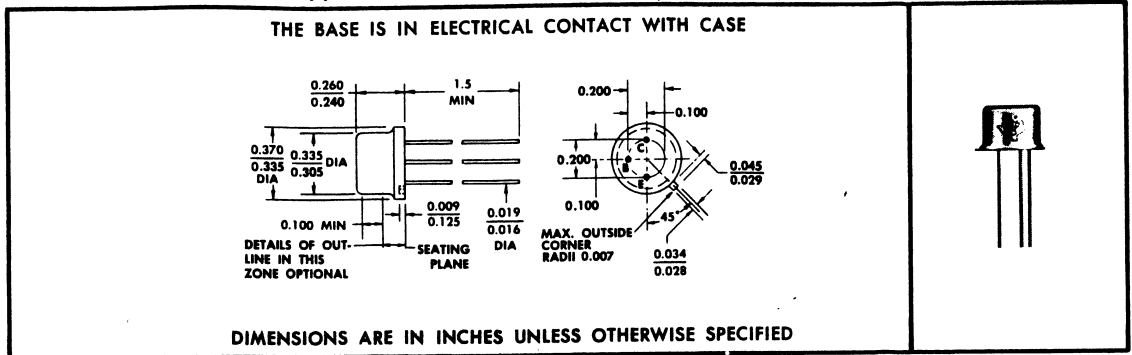


P-N-P ALLOY-JUNCTION GERMANIUM TRANSISTOR

The transistors are in a JEDEC TO-5 hermetically sealed welded package with glass to metal seal between case and leads. Approximate weight is one gram.



\*absolute maximum ratings at 25°C free-air temperature (unless otherwise noted)

Collector-Base Voltage	← 30 v →
Emitter-Base Voltage	← 25 v →
Collector Current	← 300 ma →
total Device Dissipation at (or below) 25°C Free-Air Temperature (See Note 1)	← 150 mw →
Operating Collector Junction Temperature	← 85°C →
Storage Temperature Range	← -65°C to 100°C →

electrical characteristics at 25°C free-air temperature

PARAMETER	TEST CONDITIONS	2N1309			UNIT
		MIN	TYP	MAX	
$V_{CB0}$ Collector-Base Breakdown Voltage	$I_C = -100 \mu a, I_E = 0$	-30	—	—	v
$V_{EBO}$ Emitter-Base Breakdown Voltage	$I_E = -100 \mu a, I_C = 0$	-25	—	—	v
$V_{pt}$ Punch Through Voltage†	$V_{EBf} = -1 v$	-15	—	—	v
$I_{C0}$ Collector Cutoff Current	$V_{CB} = -25 v, I_E = 0$	—	-2	-6	$\mu a$
$I_{E0}$ Emitter Cutoff Current	$V_{EB} = -25 v, I_C = 0$	—	-1.5	-6	$\mu a$
$h_{FE}$ Static Forward Current Transfer Ratio	$V_{CE} = -1 v, I_C = -10 ma$	80	160	—	—
	$V_{CE} = -0.35 v, I_C = -200 ma$	20	75	—	—
$V_{BE}$ Base-Emitter Voltage	$I_B = -0.5 ma, I_C = -10 ma$	-0.15	-0.25	-0.35	v
	$I_B = -0.5 ma, I_C = -10 ma$	—	—	—	v
	$I_B = -0.25 ma, I_C = -10 ma$	—	—	—	v
	$I_B = -0.17 ma, I_C = -10 ma$	—	—	—	v
	$I_B = -0.13 ma, I_C = -10 ma$	—	-0.08	-0.20	v
$V_{CE(sat)}$ Collector-Emitter Saturation Voltage	$I_B = -0.5 ma, I_C = -10 ma$	—	—	—	v
	$I_B = -0.25 ma, I_C = -10 ma$	—	—	—	v
	$I_B = -0.17 ma, I_C = -10 ma$	—	—	—	v
	$I_B = -0.13 ma, I_C = -10 ma$	—	—	—	v
$h_{ib}$ Small-Signal Common-Base Input Impedance	$V_{CB} = -5 v, I_E = 1 ma, f = 1 kc$	—	29	—	ohm
$h_{rb}$ Small-Signal Common-Base Reverse Voltage Transfer Ratio	$V_{CB} = -5 v, I_E = 1 ma, f = 1 kc$	—	$7 \times 10^{-4}$	—	—
$h_{ob}$ Small-Signal Common-Base Output Admittance	$V_{CB} = -5 v, I_E = 1 ma, f = 1 kc$	—	0.40	—	$\mu mho$
$h_{fe}$ Small-Signal Common-Emitter Forward Current Transfer Ratio	$V_{CE} = -5 v, I_C = -1 ma, f = 1 kc$	—	190	—	—
$f_{hfb}$ Common-Base Alpha-Cutoff Frequency	$V_{CB} = -5 v, I_E = 1 ma$	15	20	—	mc
$C_{ob}$ Common-Base Open-Circuit Output Capacitance	$V_{CB} = -5 v, I_E = 0, f = 1 mc$	—	10	20	pf
$C_{ib}$ Common-Base Open-Circuit Input Capacitance	$V_{EB} = -5 v, I_C = 0, f = 1 mc$	—	9	—	pf

switching characteristics at 25°C free-air temperature

PARAMETER	TEST CONDITIONS††	2N1309		
		MIN	TYP	MAX
$t_d$ Delay Time	$I_C = -10 ma, I_{B(1)} = -1.3 ma, I_{B(2)} = 0.7 ma, V_{BE(off)} = 0.8 v, R_L = 1 k \Omega$ (See Fig. 1)	—	0.05	—
$t_r$ Rise Time		—	0.14	—
$t_s$ Storage Time		—	0.76	—
$t_f$ Fall Time		—	0.30	—
$Q_{sb}$ Stored Base Charge	$I_{B(1)} = -1 ma, I_C = -10 ma$ (See Fig. 2)	—	800	—

††Voltage and current values shown are nominal, exact values vary slightly with device

operating characteristics at 25°C free-air temperature

PARAMETER	TEST CONDITIONS	2N1309		
		MIN	TYP	MAX
NF Spot Noise Figure	$V_{CB} = -5 v, I_E = 1 ma, f = 1 kc, R_G = 1 k \Omega$	—	3	—

†††Indicates JEDEC registered data (typical values excluded).

† $V_{PT}$  is determined by measuring the emitter-base floating potential  $V_{EBf}$ . The collector-base voltage,  $V_{CB}$ , is increased until  $V_{EBf} = -1 v$ ; this value of  $V_{CB} = (V_{PT} - 1 v)$ .