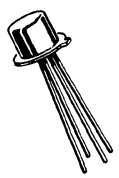
2N3127 (GERMANIUM)

2N3127 JAN AVAILABLE



CASE 20
(TO-72)

PNP germanium mesa transistor designed for industrial and commercial VHF/UHF amplifier applications.

Active Elements Isolated From Case

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	20	Vdc
Collector-Emitter Voltage	V_{CES}	25	Vdc
Collector-Base Voltage	V_{CB}	25	Vdc
Emitter-Base Voltage	V_{EB}	0.75	Vdc
Collector Current	I_C	50	mAdc
Total Device Dissipation @ $T_A = 25^oC$ Derate above 25^oC	P_D	100 1.33	mW $mW/^oC$
Operating & Storage Junction Temperature	T_J, T_{stg}	-65 to +100	^oC

TABLE I – GROUP A INSPECTION (T_A = 25°C unless otherwise noted) (LTPD applies to JAN 2N3127 only)

Examination or Test	MIL-STD-750 Method	Symbol	Limits Min	Limits Max	Unit	LTPD
SUBGROUP 1						
Visual and Mechanical Examination	2071	—	—	—	—	10
SUBGROUP 2						
Collector-Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)	3001 Condition D	BV_{CBO}	25	—	Vdc	5
Collector-Emitter Breakdown Voltage (I_C = 2 mAdc, I_B = 0)	3011 Condition D	BV_{CEO}	20	—	Vdc	
Collector-Emitter Breakdown Voltage (I_C = 100 μAdc, V_{BE} = 0)	3011 Condition C	BV_{CES}	25	—	Vdc	
Collector-Base Cutoff Current (V_{CB} = 10 Vdc, I_E = 0)	3036 Condition D	I_{CBO}	—	3.0	μAdc	
Emitter-Base Cutoff Current (V_{BE} = 0.75 Vdc, I_C = 0)	3061 Condition D	I_{EBO}	—	100	μAdc	
DC Current Gain (I_C = 3 mAdc, V_{CE} = 10 Vdc)	3076	h_{FE}	20	100	—	
Base-Emitter Saturation Voltage (I_C = 5 mAdc, I_B = 1 mAdc)	3066 Condition A	$V_{BE(sat)}$	—	0.6	Vdc	
Collector-Emitter Saturation Voltage (I_C = 5 mAdc, I_B = 1 mAdc)	3071	$V_{CE(sat)}$	—	0.3	Vdc	
SUBGROUP 3						
Small-Signal Current Gain (I_C = 3 mAdc, V_{CE} = 10 Vdc, f = 1 kHz)	3206	h_{fe}	20	125	—	10
Current-Gain — Bandwidth Product (I_C = 2 mAdc, V_{CE} = 6 Vdc, f = 100 MHz)	3261	f_T	400	—	MHz	
Collector - Base Capacitance* (V_{CB} = 10 Vdc, I_E = 0, f ≥ 0.1 ≤ 1.0 MHz)	3236	C_{cb}*	—	1.2	pF	
SUBGROUP 4						
Collector-Base Cutoff Current (V_{CB} = 10 Vdc, I_E = 0, T_A = 85°C)	3036 Condition D	I_{CBO}	—	50	μAdc	10
DC Current Gain ‡ (I_C = 3 mAdc, V_{CE} = 10 Vdc, T_A = -55^{+0}_{-3} °C)	3076	h_{FE}‡	7.0	—	—	
SUBGROUP 5						
Power Gain (Figure 1) (I_C = 3 mAdc, V_{CE} = 10 Vdc, R_S = 50 ohms, f = 200 MHz)	3256	G_{pe}	17	25	dB	15
Noise Figure (Figure 1) (I_C = 3 mAdc, V_{CE} = 10 Vdc, R_S = 50 ohms, f = 200 MHz)	3246	NF	—	5.0	dB	

STANDARD UNIT ONLY

Collector-Base Time Constant (Figure 2) (I_C = 3 mAdc, V_{CB} = 10 Vdc, f = 31.8 MHz)	r'_bC_c	1.0	12	ps	—

* Measured in a guarded circuit, such that the can capacitance is not included.

‡ Applies to JAN unit only.

TABLE II – GROUP B INSPECTION – JAN 2N3127 only (T_A = 25°C unless otherwise noted)

Examination or Test	MIL-STD-750 Method	Symbol	Limits		Unit	LTPD
			Min	Max		
SUBGROUP 1						
Physical Dimensions	2066	—	—	—	—	20
SUBGROUP 2						
Solderability (Omit aging)	2026	—	—	—	—	15
Temperature Cycling (T_{high} = 100 $^{+3}_{-0}$ °C)	1051 Condition B	—	—	—	—	
Thermal Shock (Glass Strain)	1056 Condition A	—	—	—	—	
Seal (Leak Rate)**	** Condition C, Procedure IIIa, Condition B for Gross Leaks	—	—	10^{-7}	atm cc/s	
Moisture Resistance	1021	—	—	—	—	
End-Point Tests: (Subgroups 2, 3)						
Collector-Base Cutoff Current (V_{CB} = 10 Vdc)	3036 Condition D	I_{CBO}	—	3.0	μAdc	
DC Current Gain (I_C = 3 mAdc, V_{CE} = 10 Vdc)	3076	h_{FE}	20	100	—	
SUBGROUP 3						
Shock (Non-operating; 1500 G; 5 blows of 0.5 ms each in Orientations X_1, Y_1, Y_2, and Z_1) (total = 20 blows)	2016	—	—	—	—	15
Vibration Fatigue (Non-operating; 20G)	2046	—	—	—	—	
Vibration, Variable Frequency	2056	—	—	—	—	
Constant Acceleration (Centrifugal) (20,000G, Orientations X_1, Y_1, Y_2, and Z_1)	2006	—	—	—	—	
End-Point Tests: Same as Subgroup 2						
SUBGROUP 4						
Lead Fatigue	2036 Condition E	—	—	—	—	15
SUBGROUP 5						
High-Temperature Life (Non-operating) (T_{stg} = 100°C)	1031	—	—	—	—	λ = 15
End-Point Tests: (Subgroups 5, 6)						
Collector-Base Cutoff Current (V_{CB} = 10 Vdc, I_E = 0)	3036 Condition D	I_{CBO}	—	6.0	μAdc	
DC Current Gain (I_C = 3 mAdc, V_{CE} = 10 Vdc)	3076	h_{FE}	17	125	—	
SUBGROUP 6						
Steady State Operation Life (I_C = 10 mAdc, V_{CB} = 10 Vdc)	1026	—	—	—	—	λ = 15
End-Point Tests: Same as Subgroup 5						

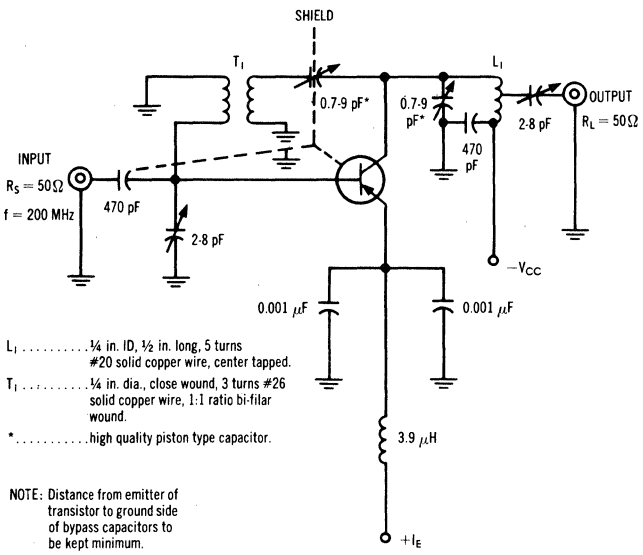
**Per Method 112 of MIL-STD-202

TABLE III – GROUP C INSPECTION‡ – JAN 2N3127 only (T_A = 25°C unless otherwise noted)

Examination or Test	MIL-STD-750 Method	Symbol	Limits Min	Limits Max	Unit	LTPD
SUBGROUP 1						
Collector-Base Time Constant (Figure 2) (I_C = 3 mAdc, V_{CB} = 10 Vdc, f = 31.8 MHz)		r'_bC_c	—	12	ps	20
Salt Atmosphere (Corrosion)	1041	—	—	—	—	
End-Point Tests:						
Collector-Base Cutoff Current (V_{CB} = 10 Vdc, I_E = 0)	3036 Condition D	I_{CBO}	-	3.0	μAdc	
DC Current Gain (I_C = 3 mAdc, V_{CE} = 10 Vdc)	3076	h_{FE}	20	100	—	
SUBGROUP 2						
Output Conductance (I_C = 2 mAdc, V_{CE} = 6 Vdc, f = 30 MHz)	3216	$Re(h_{oe})$	1.0	3.5	mmhos	10
Input Conductance (I_C = 2 mAdc, V_{CE} = 6 Vdc, f = 30 MHz)	3221	$Re(y_{ie})$	1.25	5.0	mmhos	

‡ Group C tests shall be performed on the initial lot and every six months thereafter.

FIGURE 1 – TEST CIRCUIT FOR POWER GAIN AND NOISE FIGURE



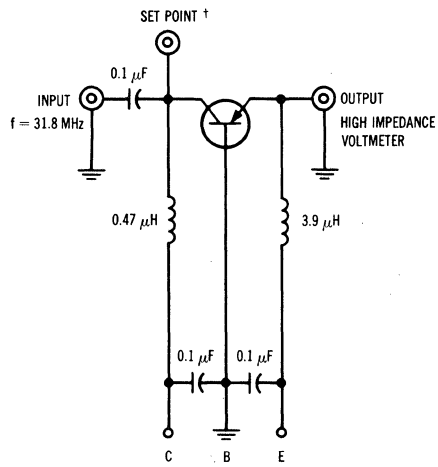
L_1 .....¼ in. ID, ½ in. long, 5 turns #20 solid copper wire, center tapped.

T_1 .....¼ in. dia., close wound, 3 turns #26 solid copper wire, 1:1 ratio bi-filar wound.

*.....high quality piston type capacitor.

NOTE: Distance from emitter of transistor to ground side of bypass capacitors to be kept minimum.

FIGURE 2 – TEST CIRCUIT FOR COLLECTOR-BASE TIME CONSTANT



† NOTE: E_{in} = 0.5 V measured at set point.
$r_b'C_c = E_{out}$ (in mV) × 10