

LOW POWER PNP SILICON TRANSISTOR

Qualified per MIL-PRF-19500/177

DEVICES

2N1131	2N1132
2N1131L	2N1132L

LEVELS

JAN
JANTX
JANTXV

ABSOLUTE MAXIMUM RATINGS ($T_C = +25^\circ\text{C}$ unless otherwise noted)

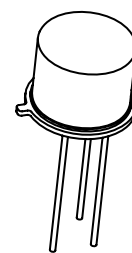
Parameters / Test Conditions	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	40	Vdc
Collector-Base Voltage	V_{CBO}	50	Vdc
Emitter-Base Voltage	V_{EBO}	5.0	Vdc
Collector Current	I_C	600	mA dc
Total Power Dissipation @ $T_A = +25^\circ\text{C}$ ⁽¹⁾ @ $T_C = +25^\circ\text{C}$ ⁽²⁾	P_T	0.6 2.0	W
Operating & Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200	$^\circ\text{C}$

NOTES:

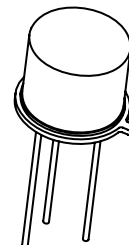
- 1/ Derate linearly 3.43mW/ $^\circ\text{C}$ for $T_A > +25^\circ\text{C}$
2/ Derate linearly 11.4mW/ $^\circ\text{C}$ for $T_C > +25^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$, unless otherwise noted)

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage $I_C = 10\text{mA dc}$	$V_{(BR)CEO}$	40		Vdc
Collector-Base Breakdown Voltage $I_C = 10\mu\text{A dc}$	$V_{(BR)CBO}$	50		Vdc
Emitter-Base Cutoff Current $V_{EB} = 5.0\text{Vdc}$	I_{EBO}		100	$\mu\text{A dc}$
Collector-Emitter Cutoff Current $V_{CE} = 50\text{Vdc}$, $R_{BE} \leq 10\text{ ohms}$	I_{CER}		10	mA dc
Collector-Base Cutoff Current $V_{CB} = 50\text{Vdc}$ $V_{CB} = 30\text{Vdc}$	I_{CBO}		10 1.0	$\mu\text{A dc}$



TO-39
2N1131, 2N1132



TO-5
2N1131L, 2N1132L

ELECTRICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$, unless otherwise noted) (CONT.)

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
ON CHARACTERISTICS ⁽³⁾				
Forward-Current Transfer Ratio $I_C = 150\text{mA}$, $V_{CE} = 10\text{Vdc}$ 2N1131, L 2N1132, L $I_C = 5.0\text{mA}$, $V_{CE} = 10\text{Vdc}$ 2N1131, L 2N1132, L	h_{FE}	20 30 15 25	45 90	
Collector-Emitter Saturation Voltage $I_C = 150\text{mA}$, $I_B = 15\text{mA}$	$V_{CE(sat)}$		1.3	Vdc
Base-Emitter Saturation Voltage $I_C = 150\text{mA}$, $I_B = 15\text{mA}$	$V_{BE(sat)}$		1.5	Vdc

DYNAMIC CHARACTERISTICS

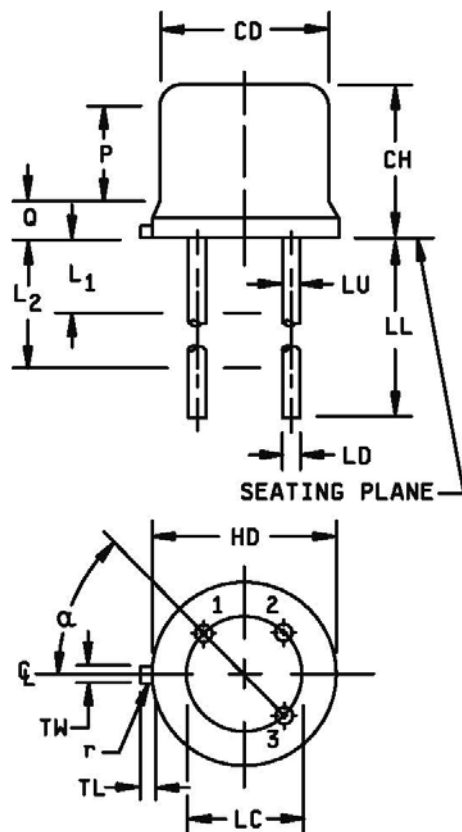
Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Small-Signal Short-Circuit Forward-Current Transfer Ratio $I_C = 1.0\text{mA}$, $V_{CE} = 5.0\text{Vdc}$, $f = 1.0\text{kHz}$ 2N1131, L 2N1132, L $I_C = 5.0\text{mA}$, $V_{CE} = 10\text{Vdc}$, $f = 1.0\text{kHz}$ 2N1131, L 2N1132, L	h_{fe}	15 30 20 30	50 90	
Small-Signal Open-Circuit Output Admittance $I_C = 1.0\text{mA}$, $V_{CE} = 5.0\text{Vdc}$, $f = 1.0\text{kHz}$ $I_C = 5.0\text{mA}$, $V_{CE} = 10\text{Vdc}$, $f = 1.0\text{kHz}$	h_{ob}		1.0 5.0	μmho
Small-Signal Short-Circuit Input Impedance $I_C = 1.0\text{mA}$, $V_{CE} = 5.0\text{Vdc}$, $f = 1.0\text{kHz}$ $I_C = 5.0\text{mA}$, $V_{CE} = 10\text{Vdc}$, $f = 1.0\text{kHz}$	h_{ib}	25	35 10	Ω
Magnitude of Common Emitter Small-Signal Short Circuit Forward-Current Transfer Ratio $I_C = 50\text{mA}$, $V_{CE} = 10\text{Vdc}$, $f = 20\text{MHz}$ 2N1131, L 2N1132, L	$ h_{fe} $	2.5 3.0	20 20	
Output Capacitance $V_{CB} = 10\text{Vdc}$, $I_E = 0$, $100\text{kHz} \leq f \leq 1.0\text{MHz}$	C_{obo}		4.5	pF
Input Capacitance $V_{EB} = 0.5\text{Vdc}$, $I_C = 0$, $100\text{kHz} \leq f \leq 1.0\text{MHz}$	C_{ibo}		80	pF

SWITCHING CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Turn-On Time + Turn-Off Time (See figure 2 of MIL-PRF-177)	$t_{on} + t_{off}$		50	ns

(3) Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$

PACKAGE DIMENSIONS



Symbol	Dimensions				Note
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.305	.335	7.75	8.51	
CH	.240	.260	6.10	6.60	
HD	.335	.370	8.51	9.40	
LC	.200 TP		5.08 TP		6
LD	.016	.021	0.41	0.53	7, 8
LL	.500	.750	12.70	19.05	7, 8, 12
LU	.016	.019	0.41	0.48	7, 8
L ₁		.050		1.27	7, 8
L ₂	.250		6.35		7, 8
P	.100		2.54		
Q		.050		1.27	5
TL	.029	.045	0.74	1.14	4
TW	.028	.034	0.71	0.86	3
r		.010		0.25	10
α	45° TP		45° TP		6

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Beyond r (radius) maximum, TW shall be held for a minimum length of .011 inch (0.28 mm).
4. Dimension TL measured from maximum HD.
5. Body contour optional within zone defined by HD, CD, and Q.
6. CD shall not vary more than .010 inch (0.25 mm) in zone P. This zone is controlled for automatic handling.
7. Leads at gauge plane .054 +.001, -.000 inch (1.37 +0.03, -0.00 mm) below seating plane shall be within .007 inch (0.18 mm) radius of true position (TP) at maximum material condition (MMC) relative to tab at MMC. The device may be measured by direct methods or by gauging procedure.
8. Dimension LU applies between L₁ and L₂. Dimension LD applies between L₂ and LL minimum. Diameter is uncontrolled in and beyond LL minimum.
9. All three leads.
10. The collector shall be internally connected to the case.
11. Dimension r (radius) applies to both inside corners of tab.
12. In accordance with ASME Y14.5M, diameters are equivalent to ϕ x symbology.
13. Lead 1 = emitter, lead 2 = base, lead 3 = collector.
14. * For L-suffix or non-S-suffix devices (TO-5), dimension LL = 1.5 inches (38.10 mm) min. and 1.75 inches (44.45 mm) max. For non-L suffix types (TO-39), dimension LL = .5 inch (12.70 mm) min. and .750 inch (19.05 mm) max..

* **FIGURE 1.** Physical dimensions 2N1131 and 2N1132 (TO-39), 2N1131L and 2N1132L (TO-5).