

NPN POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/510

DEVICES

2N6249	2N6250	2N6251
2N6249T1	2N6250T1	2N6251T1

LEVELS

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

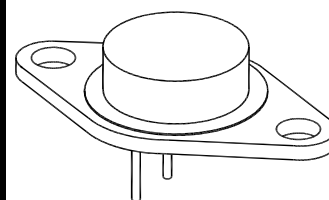
Parameters / Test Conditions	Symbol	2N6249 2N6249T1	2N6250 2N6250T1	2N6251 2N6251T1	Unit
Collector-Emitter Voltage	V_{CEO}	200	275	350	Vdc
Collector-Base Voltage	V_{CBO}	300	375	450	Vdc
Emitter-Base Voltage	V_{EBO}	6.0			Vdc
Collector Current	I_C	10			Adc
Base Current	I_B	5.0			
Total Power Dissipation @ $T_A = +25^\circ\text{C}$ ⁽¹⁾ @ $T_C = +25^\circ\text{C}$ ⁽²⁾	P_T	6.0 175			W
Operating & Storage Junction Temperature	T_{op}, T_{stg}	-65 to +200			$^\circ\text{C}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.0			$^\circ\text{C/W}$

NOTES:

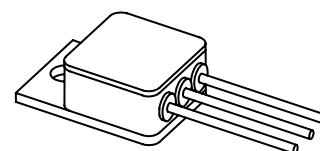
- (1) Derate linearly at 34.2 mW/ $^\circ\text{C}$ for $T_A > +25^\circ\text{C}$
- (2) Derate linearly at 1.0 mW/ $^\circ\text{C}$ for $T_C > +25^\circ\text{C}$

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

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage $I_C = 20\text{mA}$; $L = 42\text{mH}$; $f = 30 - 60\text{Hz}$ (See Figure 10 of MIL-PRF-19500/510)	$V_{(BR)CEO}$	200 275 350		Vdc
Collector-Emitter Breakdown Voltage $I_C = 200\text{mA}$; $L = 14\text{mH}$; $f = 30 - 60\text{Hz}$; $R_{BE} = 50\Omega$ (See Figure 10 of MIL-PRF-19500/510)	$V_{(BR)CER}$	225 300 375		Vdc
Emitter-Base Cutoff Current $V_{EB} = 6.0\text{Vdc}$	I_{EBO}		100	μAdc



TO-3 (TO-204AA)



TO-254

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

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS				
Collector-Emitter Cutoff Current $V_{CE} = 150\text{Vdc}$ 2N6249, T1 $V_{CE} = 225\text{Vdc}$ 2N6250, T1 $V_{CE} = 300\text{Vdc}$ 2N6251, T1	I_{CEO}		1.0	mAdc
Collector- Emitter Cutoff Current $V_{CE} = 225\text{Vdc}$, $V_{BE} = -1.5\text{Vdc}$ 2N6249, T1 $V_{CE} = 300\text{Vdc}$, $V_{BE} = -1.5\text{Vdc}$ 2N6250, T1 $V_{CE} = 375\text{Vdc}$, $V_{BE} = -1.5\text{Vdc}$ 2N6251, T1	I_{CEX}		100	μAdc
Collector-Base Cutoff Current $V_{CB} = 300\text{Vdc}$ 2N6249, T1 $V_{CB} = 375\text{Vdc}$ 2N6250, T1 $V_{CB} = 450\text{Vdc}$ 2N6251, T1	I_{CBO}		0.5	mAdc
ON CHARACTERISTICS ⁽³⁾				
Forward-Current Transfer Ratio $I_C = 10\text{Adc}$, $V_{CE} = 3\text{Vdc}$ 2N6249, T1 2N6250, T1 2N6251, T1	h_{FE}	10 8 6	50 50 50	
Collector-Emitter Saturation Voltage $I_C = 10\text{Adc}$, $I_B = 1.0\text{Adc}$ 2N6249, T1 $I_C = 10\text{Adc}$, $I_B = 1.25\text{Adc}$ 2N6250, T1 $I_C = 10\text{Adc}$, $I_B = 1.67\text{Adc}$ 2N6251, T1	$V_{CE(sat)}$		1.5	Vdc
Base-Emitter Saturation Voltage $I_C = 10\text{Adc}$, $I_B = 1.0\text{Adc}$ 2N6249, T1 $I_C = 10\text{Adc}$, $I_B = 1.25\text{Adc}$ 2N6250, T1 $I_C = 10\text{Adc}$, $I_B = 1.67\text{Adc}$ 2N6251, T1	$V_{BE(sat)}$		2.25	Vdc

DYNAMIC CHARACTERISTICS

Magnitude of Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 1.0\text{Adc}$, $V_{CE} = 10\text{Vdc}$, $f = 1\text{MHz}$	$ h_{fe} $	2.5	15	
Output Capacitance $V_{CB} = 10\text{Vdc}$, $I_C = 0$, $100\text{kHz} \leq f \leq 1.0\text{MHz}$	C_{obo}		500	pF

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

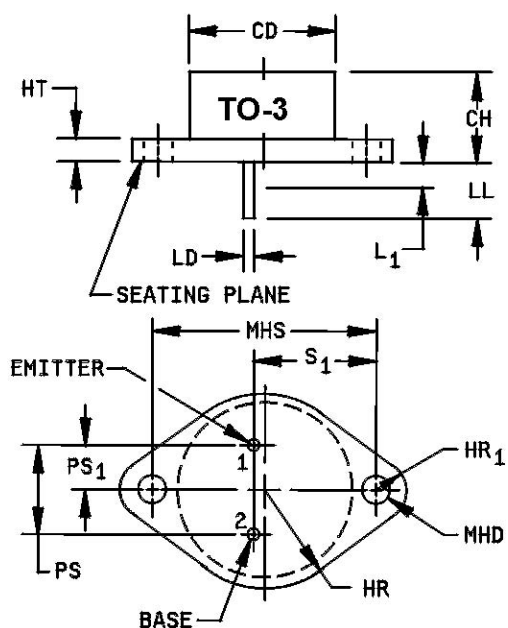
SWITCHING CHARACTERISTICS

Turn-On Time $V_{CC} = 200V_{dc}; I_C = 10A_{dc}$ $I_B = 1.0A$ 2N6249, T1 $I_B = 1.25A$ 2N6250, T1 $I_B = 1.67A$ 2N6251, T1	t_{on}		2.0	μs
Turn-Off Time $V_{CC} = 200V_{dc}; I_C = 10A_{dc}$ $I_B = 1.0A$ 2N6249, T1 $I_B = 1.25A$ 2N6250, T1 $I_B = 1.67A$ 2N6251, T1	t_{off}		4.5	μs

SAFE OPERATING AREA

DC Tests $T_C = +25^\circ C$, 1 Cycle, $t = 1s$ (See Figure 12 of MIL-PRF-19500/510) Test 1 $V_{CE} = 17.5V_{dc}$, $I_C = 10A_{dc}$ Test 2 $V_{CE} = 30V_{dc}$, $I_C = 5.8A_{dc}$ Test 3 $V_{CE} = 100V_{dc}$, $I_C = 0.3A_{dc}$ Test 4 $V_{CE} = 200V_{dc}$, $I_C = 0.13A_{dc}$ (For 2N6249, 2N6249T1 only) Test 5 $V_{CE} = 275V_{dc}$, $I_C = 0.09A_{dc}$ (For 2N6250, 2N6250T1 only) Test 6 $V_{CE} = 350V_{dc}$, $I_C = 0.065A_{dc}$ (For 2N6251, 2N6251T1 only)				
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PACKAGE DIMENSIONS

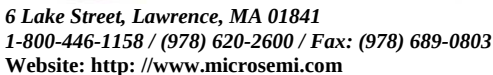


Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD		.875		22.23	
CH	.250	.450	6.35	11.43	
HR	.495	.525	12.57	13.34	
HR ₁	.131	.188	3.33	4.78	
HT	.050	.135	1.27	3.43	
LD	.038	.053	0.97	1.35	3, 5
LL	.312	.500	7.92	12.70	3
L ₁		.050		1.27	5
MHD	.151	.161	3.84	4.09	
MHS	1.177	1.197	29.90	30.40	
PS	.420	.440	10.67	11.18	2
PS ₁	.205	.25	5.21	6.35	2, 3
S ₁	.665	.675	16.89	17.15	2

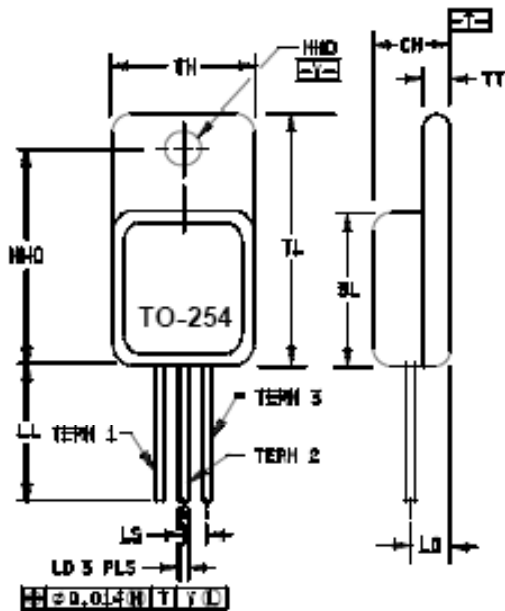
NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. These dimensions shall be measured at points .050 inch (1.27 mm) and .055 inch (1.40 mm) below seating plane. When gauge is not used, measurement will be made at the seating plane.
3. Two leads.
4. Collector shall be electrically connected to the case.
5. LD applies between L₁ and LL maximum. Lead diameter shall not exceed twice LD within L₁.
6. In accordance with ASME Y14.5M, diameters are equivalent to ϕ x symbology.

FIGURE 1. Physical dimensions (similar to TO-3).



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Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
BL	.535	.545	13.59	13.84
CH	.249	.260	6.32	6.60
LD	.035	.045	0.89	1.14
LL	.530	.550	13.46	13.97
LO	.150 BSC		3.81 BSC	
LS	.150 BSC		3.80 BSC	
MHD	.139	.149	3.53	3.78
MHO	.665	.685	16.89	17.40
TL	.790	.800	20.07	20.32
TT	.040	.050	1.02	1.27
TW	.535	.545	13.59	13.84
TERM 1	BASE			
TERM 2	COLLECTOR			
TERM 3	EMITTER			

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Methods used for electrical isolation of terminals feedthroughs shall employ materials that contain a minimum of 90 percent AL2O3 (ceramic).
4. In accordance with ASME Y14.5M, diameters are equivalent to ϕ x symbology.

FIGURE 2. Dimensions and configuration 2N6249T1, 2N6250T1, and 2N6251T1 (TO-254AA)