

# 2N6249, 2N6250, & 2N6251



## NPN Darlington Power Silicon Transistor

Rev. V4

### Features

- Available in JAN, JANTX, JANTXV per MIL-PRF-19500/510
- TO-3 (TO-204AA) Package
- Suitable for High Voltage, High Current, High Speed Switching Applications



### Electrical Characteristics ( $T_A = +25^\circ\text{C}$ unless otherwise noted)

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Collector - Emitter Breakdown Voltage	$I_C = 200 \text{ mA dc}$ , $L = 42 \text{ mH}$ , $f = 30 - 60 \text{ GHz}$ 2N6249 2N6250 2N6251	$V_{(BR)CEO}$	V dc	—	200 275 350
Collector - Emitter Breakdown Voltage	$I_C = 200 \text{ mA dc}$ , $L = 42 \text{ mH}$ , $f = 30 - 60 \text{ GHz}$ $R_{BE} = 50 \Omega$ 2N6249 2N6250 2N6251	$V_{(BR)CER}$	V dc	—	225 300 375
Emitter - Base Cutoff Current	$V_{EB} = 6 \text{ Vdc}$	$I_{EBO}$	$\mu\text{A dc}$	—	100
Collector - Emitter Cutoff Current	$V_{CE} = 150 \text{ V dc}$ , 2N6249 $V_{CE} = 225 \text{ V dc}$ , 2N6250 $V_{CE} = 300 \text{ V dc}$ , 2N6251	$I_{CEO}$	$\text{mA dc}$	—	1.0
Collector - Emitter Cutoff Current	$V_{CE} = 225 \text{ V dc}$ , $V_{BE} = -1.5 \text{ V dc}$ , 2N6249 $V_{CE} = 300 \text{ V dc}$ , $V_{BE} = -1.5 \text{ V dc}$ , 2N6250 $V_{CE} = 375 \text{ V dc}$ , $V_{BE} = -1.5 \text{ V dc}$ , 2N6251	$I_{CEX1}$	$\mu\text{A dc}$	—	10
Collector - Base Cutoff Current	$V_{CE} = 300 \text{ V dc}$ , 2N6249 $V_{CE} = 375 \text{ V dc}$ , 2N6250 $V_{CE} = 450 \text{ V dc}$ , 2N6251	$I_{CBO}$	$\text{mA dc}$	—	0.5
Forward Current Transfer Ratio	$I_C = 10 \text{ A dc}$ , $V_{CE} = 3 \text{ Vdc}$ 2N6249 2N6250 2N6251	$h_{FE1}$	-	10 8 6	50 50 50
Collector - Emitter Sustaining Voltage	$I_C = 10 \text{ A dc}$ , $I_B = 1.0 \text{ A dc}$ , 2N6249 $I_C = 10 \text{ A dc}$ , $I_B = 1.25 \text{ A dc}$ , 2N6250 $I_C = 10 \text{ A dc}$ , $I_B = 1.67 \text{ A dc}$ , 2N6251	$V_{CE(SAT)}$	V dc	—	1.5
Base - Emitter Saturation Voltage	$I_C = 10 \text{ A dc}$ , $I_B = 1.0 \text{ A dc}$ , 2N6249 $I_C = 10 \text{ A dc}$ , $I_B = 1.25 \text{ A dc}$ , 2N6250 $I_C = 10 \text{ A dc}$ , $I_B = 1.67 \text{ A dc}$ , 2N6251	$V_{BE(SAT)}$	V dc	—	2.25

# 2N6249, 2N6250, & 2N6251



## NPN Darlington Power Silicon Transistor

Rev. V4

### Electrical Characteristics ( $T_A = +25^\circ\text{C}$ unless otherwise noted)

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Collector - Emitter Cutoff Current	$T_A = +125^\circ\text{C}$ $V_{CE} = 225\text{ V dc}, V_{BE} = -1.5\text{ V dc}, 2\text{N}6249$ $V_{CE} = 300\text{ V dc}, V_{BE} = -1.5\text{ V dc}, 2\text{N}6250$ $V_{CE} = 375\text{ V dc}, V_{BE} = -1.5\text{ V dc}, 2\text{N}6251$	$I_{CEX2}$	$\mu\text{A dc}$	—	90
Forward - Current Transfer Ratio	$T_A = -55^\circ\text{C}$ $V_{CE} = 3\text{ V dc}, I_C = 10\text{ A dc}$ 2N6249 2N6250 2N6251	$h_{FE2}$	-	5 4 3	
<b>Dynamic Characteristics</b>					
Small-Signal Short-Circuit Forward Current Transfer Ratio	$I_C = 1\text{ A dc}, V_{CE} = 10\text{ Vdc}, f = 1\text{ MHz}$	$ h_{FE} $	-	2.5	15.0
Open Capacitance Open Circuit	$V_{CE} = 10\text{ Vdc}, I_C = 0, 100\text{ kHz} \leq f \leq 1\text{ MHz}$	$C_{obo}$	$\text{pF}$	—	500
<b>Switching Characteristics</b>					
Turn-On Time	$V_{CC} = 200\text{ Vdc}; I_C = 10\text{ A dc};$ $I_B = 1.0\text{ A dc}, 2\text{N}6249$ $I_B = 1.25\text{ A dc}, 2\text{N}6250$ $I_B = 1.67\text{ A dc}, 2\text{N}6251$	$t_{on}$	$\mu\text{s}$	—	2.0
Turn-Off Time	$V_{CC} = 200\text{ Vdc}; I_C = 10\text{ A dc};$ $I_B = 1.0\text{ A dc}, 2\text{N}6249$ $I_B = 1.25\text{ A dc}, 2\text{N}6250$ $I_B = 1.67\text{ A dc}, 2\text{N}6251$	$t_{off}$	$\mu\text{s}$	—	4.5
<b>Safe Operating Area</b>					
DC Tests:	$T_C = +25^\circ\text{C}, 1\text{ Cycle}, t = 1.0\text{ s}$ (see figure 12 of MIL-PRF-19500/371)				
Test 1:	$V_{CE} = 17.5\text{ Vdc}, I_C = 10\text{ A dc}$				
Test 2:	$V_{CE} = 30\text{ Vdc}, I_C = 5.8\text{ A dc}$				
Test 3:	$V_{CE} = 100\text{ Vdc}, I_C = 0.3\text{ A dc}$				
Test 4:	$V_{CE} = 200\text{ Vdc}, I_C = 0.13\text{ A dc}$ , (for 2N6249 only)				
Test 5:	$V_{CE} = 275\text{ Vdc}, I_C = 0.09\text{ A dc}$ , (for 2N6250 only)				
Test 6:	$V_{CE} = 350\text{ Vdc}, I_C = 0.065\text{ A dc}$ , (for 2N6251 only)				

# 2N6249, 2N6250, & 2N6251



## NPN Darlington Power Silicon Transistor

Rev. V4

### Absolute Maximum Ratings

Ratings	Symbol	2N6249	2N6250	2N6251	Units
Collector - Emitter Voltage	$V_{CEO}$	200	275	350	V dc
Collector - Base Voltage	$V_{CBO}$	300	375	450	V dc
Emitter - Base Voltage	$V_{EBO}$	6			V dc
Collector Current	$I_C$	10			A dc
Base Current	$I_B$	5			A dc
Total Power Dissipation @ $T_A = +25^\circ\text{C}$ @ $T_C = +25^\circ\text{C}^1$	$P_T$	6 175			W
Operating & Storage Temperature Range	$T_J, T_{STG}$	-65 to +200			$^\circ\text{C}$

### Thermal Characteristics

Characteristics	Symbol	Max. Value
Thermal Resistance, Junction to Case <sup>2</sup>	$R_{\theta JC}$	1.0 $^\circ\text{C/W}$

- (1) For temperature-power derating curves, see figures 5 and 6 of MIL-PRF-19500/510  
(2) For thermal impedance curves, see figures 7, 8 and 9 of MIL-PRF-19500/510

# 2N6249, 2N6250, & 2N6251

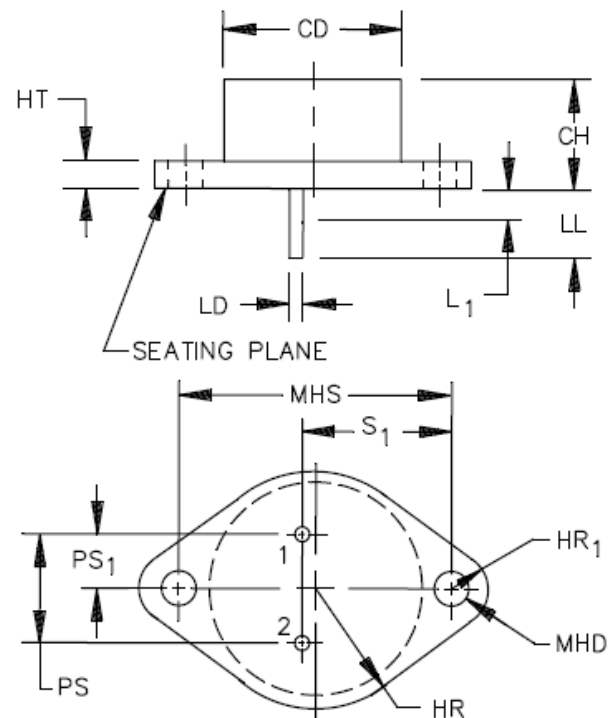


## NPN Darlington Power Silicon Transistor

Rev. V4

### Outline Drawing (TO-3)

Ltr	Dimensions				Note
	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 <sub>1</sub>	.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 <sub>1</sub>		.050		1.27	5
MHD	.151	.161	3.84	4.09	
MHS	1.17 7	1.197	29.90	30.40	
PS	.420	.440	10.67	11.18	2
PS <sub>1</sub>	.205	.25	5.21	6.35	2, 3
S <sub>1</sub>	.665	.675	16.89	17.15	2



#### NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. These dimensions should be measured at points .050 (1.27 mm) to .055 (1.40 mm) below seating plane. When gage is not used, measurement will be made at seating plane.
3. Two leads.
4. Collector shall be electrically connected to the case.
5. LD applies between L<sub>1</sub> and LL maximum. Lead diameter shall not exceed twice LD within L<sub>1</sub>.
6. In accordance with ASME Y14.5M, diameters are equivalent to  $\phi$  symbology.
7. Terminal 1 is emitter; terminal 2 is base; case is collector.

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

# 2N6249, 2N6250, & 2N6251



## NPN Darlington Power Silicon Transistor

Rev. V4

### VPT COMPONENTS. ALL RIGHTS RESERVED.

Information in this document is provided in connection with VPT Components products. These materials are provided by VPT Components as a service to its customers and may be used for informational purposes only. Except as provided in VPT Components Terms and Conditions of Sale for such products or in any separate agreement related to this document, VPT Components assumes no liability whatsoever. VPT Components assumes no responsibility for errors or omissions in these materials. VPT Components may make changes to specifications and product descriptions at any time, without notice. VPT Components makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppels or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF VPT COMPONENTS PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. VPT COMPONENTS FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. VPT COMPONENTS SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE USE OF THESE MATERIALS.

VPT Components products are not intended for use in medical, lifesaving or life sustaining applications. VPT Components customers using or selling VPT Components products for use in such applications do so at their own risk and agree to fully indemnify VPT Components for any damages resulting from such improper use or sale.