

# 2N6249, 2N6250, & 2N6251



## NPN Darlington Power Silicon Transistor

Rev. V1

### Features

- Available in JAN, JANTX, JANTXV per MIL-PRF-19500/371
- TO-3 (TO-204AA) Package



### Electrical Characteristics

Parameter	Test Conditions	Symbol	Units	Min.	Max.
<b>Off Characteristics</b>					
Collector - Emitter Breakdown Voltage	$I_C = 20 \text{ mAdc}$ , $L = 42 \text{ mH}$ , 30 - 60 GHz (see figure 10 of MIL-PRF-19500/510) 2N6249 2N6250 2N6251	$V_{(BR)CEO}$	Vdc	—	200 275 350
Collector - Emitter Breakdown Voltage	$I_C = 20 \text{ mAdc}$ , $L = 42 \text{ mH}$ , 30 - 60 GHz (see figure 10 of MIL-PRF-19500/510) 2N6249 2N6250 2N6251	$V_{(BR)CER}$	Vdc	—	225 300 375
Emitter - Base Cutoff Current	$V_{EB} = 6 \text{ Vdc}$	$I_{EBO}$	$\mu\text{Adc}$	—	100
Collector - Emitter Cutoff Current	$V_{CE} = 150 \text{ Vdc}$ , 2N6249 $V_{CE} = 225 \text{ Vdc}$ , 2N6250 $V_{CE} = 225 \text{ Vdc}$ , 2N6251	$I_{CEO}$	mAdc	—	1.0
Collector - Emitter Cutoff Current	$V_{CE} = 225 \text{ Vdc}$ , $V_{BE} = -1.5 \text{ Vdc}$ , 2N6249 $V_{CE} = 300 \text{ Vdc}$ , $V_{BE} = -1.5 \text{ Vdc}$ , 2N6250 $V_{CE} = 375 \text{ Vdc}$ , $V_{BE} = -1.5 \text{ Vdc}$ , 2N6251	$I_{CEX}$	$\mu\text{Adc}$	—	100
Collector - Base Cutoff Current	$V_{CE} = 300 \text{ Vdc}$ , 2N6249 $V_{CE} = 325 \text{ Vdc}$ , 2N6250 $V_{CE} = 450 \text{ Vdc}$ , 2N6251	$I_{EBO}$	mAdc	—	1.0
<b>On Characteristics<sup>1</sup></b>					
Forward Current Transfer Ratio	$I_C = 10 \text{ Adc}$ , $V_{CE} = 3 \text{ Vdc}$ 2N6249 2N6250 2N6251	$H_{FE}$	-	10 8 6	50 50 50
Collector - Emitter Sustaining Voltage	$I_C = 10 \text{ Adc}$ , $I_B = 1.0 \text{ Adc}$ , 2N6249 $I_C = 10 \text{ Adc}$ , $I_B = 1.25 \text{ Adc}$ , 2N6250 $I_C = 10 \text{ Adc}$ , $I_B = 1.67 \text{ Adc}$ , 2N6251	$V_{CE(SAT)}$	Vdc	—	1.5
Base - Emitter Saturation Voltage	$I_C = 10 \text{ Adc}$ , $I_B = 1.0 \text{ Adc}$ , 2N6249 $I_C = 10 \text{ Adc}$ , $I_B = 1.25 \text{ Adc}$ , 2N6250 $I_C = 10 \text{ Adc}$ , $I_B = 1.67 \text{ Adc}$ , 2N6251	$V_{BE(SAT)}$	Vdc	—	2.25

1. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

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Parameter	Test Conditions	Symbol	Units	Min.	Max.
<b>Dynamic Characteristics</b>					
Small-Signal Short-Circuit Forward Current Transfer Ratio	$I_C = 1 \text{ Adc}$ , $V_{CE} = 10 \text{ Vdc}$ , $f = 1 \text{ kHz}$	$ H_{FE} $	-	2.5	15.0
Output Capacitance	$V_{CB} = 10 \text{ Vdc}$ , $I_E = 0$ , $100 \text{ kHz} \leq f \leq 1 \text{ MHz}$	$C_{OBO}$	pF	—	500
<b>Switching Characteristics</b>					
Turn-On Time	$V_{CC} = 200 \text{ Vdc}$ ; $I_C = 1 \text{ Adc}$ ; $I_{B1} = 1.0 \text{ Adc}$ , 2N6249 $I_{B1} = 1.25 \text{ Adc}$ , 2N6250 $I_{B1} = 1.67 \text{ Adc}$ , 2N6251	$T_{ON}$	$\mu\text{s}$	—	2.0
Turn-Off Time	$V_{CC} = 200 \text{ Vdc}$ ; $I_C = 1 \text{ Adc}$ ; $I_{B1} = 1.0 \text{ Adc}$ , 2N6249 $I_{B1} = 1.25 \text{ Adc}$ , 2N6250 $I_{B1} = 1.67 \text{ Adc}$ , 2N6251	$T_{OFF}$	$\mu\text{s}$	—	4.5
<b>Safe Operating Area</b>					
DC Tests:	$T_C = +25^\circ\text{C}$ , 1 Cycle, $t = 1.0 \text{ s}$ (see figure 12 of MIL-PRF-19500/371)				
Test 1:	$V_{CE} = 17.5 \text{ Vdc}$ , $I_C = 10 \text{ Adc}$				
Test 2:	$V_{CE} = 30 \text{ Vdc}$ , $I_C = 5.8 \text{ Adc}$				
Test 3:	$V_{CE} = 100 \text{ Vdc}$ , $I_C = 0.3 \text{ Adc}$				
Test 4:	$V_{CE} = 200 \text{ Vdc}$ , $I_C = 0.13 \text{ Adc}$ , (for 2N6249 only)				
Test 5:	$V_{CE} = 275 \text{ Vdc}$ , $I_C = 0.09 \text{ Adc}$ , (for 2N6250 only)				
Test 3:	$V_{CE} = 350 \text{ Vdc}$ , $I_C = 0.09 \text{ Adc}$ , (for 2N6251 only)				

### Absolute Maximum Ratings

Ratings	Symbol	2N6249	2N6250	2N6251	Units
Collector - Emitter Voltage	$V_{CEO}$	200	275	350	Vdc
Collector - Base Voltage	$V_{CBO}$	300	375	450	Vdc
Emitter - Base Voltage	$V_{EBO}$	6			Vdc
Collector Current	$I_C$	10			Adc
Base Current	$I_B$	5			Adc
Total Power Dissipation @ $T_A = +25^\circ\text{C}^2$ @ $T_A = +25^\circ\text{C}^3$	$P_T$	6 175			W
Operating & Storage Temperature Range	$T_{OP}$ , $T_{STG}$	-65 to +200			$^\circ\text{C}$

2. Derate linearly @  $34.2 \text{ mW} / ^\circ\text{C}$  for  $T_A > 25^\circ\text{C}$ .
3. Derate linearly @  $1.0 \text{ mW} / ^\circ\text{C}$  for  $T_C > 27^\circ\text{C}$ .

### Thermal Characteristics

Characteristics	Symbol	Max. Value
Thermal Resistance, Junction to Case	$R_{\theta JC}$	$1.25^\circ\text{C/W}$

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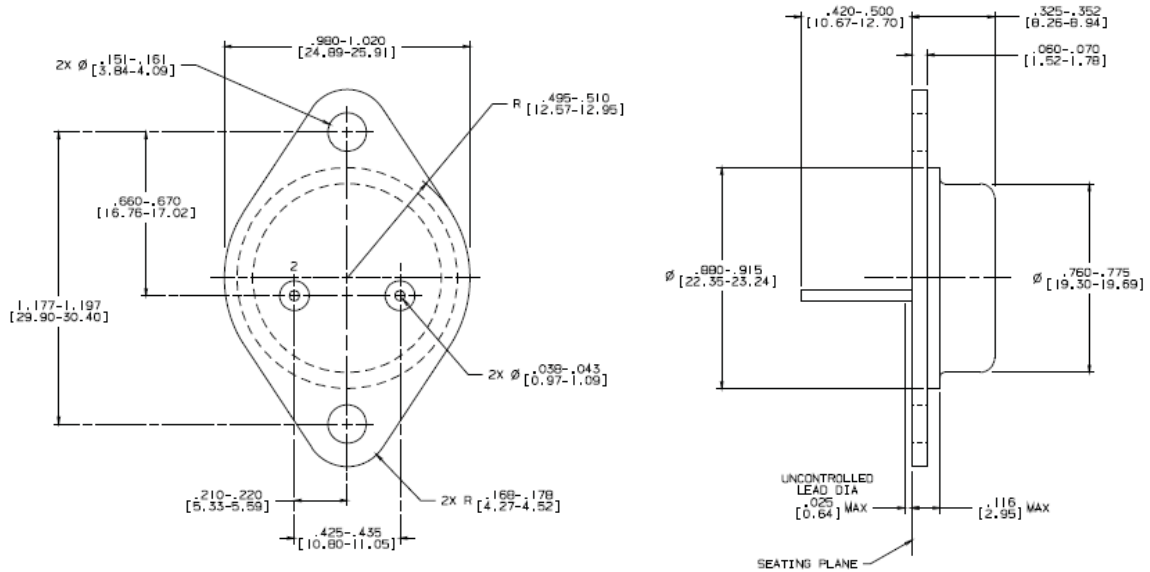
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### Outline Drawing



#### NOTES:

1. STANDARD HEADER TYPE SOLID BASE.
2. STANDARD LEAD FINISH PER MIL-M-39510 TYPE X OR EQUIVALENT.
3. LEAD NOT BENT GREATER THAN 15°.
4. DIMENSIONS BASED ON JEDEC STANDARD TO-3 PUBLICATION 95, PA

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