



# NPN Darlington Power Silicon Transistor

## 2N6300 & 2N6301



### Features

- Available in JAN, JANTX, and JANTXV per MIL-PRF-19500/539
- TO-66 (TO-213AA) Package



### Maximum Ratings

Ratings	Symbol	2N6300	2N6301	Units
Collector - Emitter Voltage	$V_{CEO}$	60	80	Vdc
Collector - Base Voltage	$V_{CBO}$	60	80	Vdc
Emitter - Base Voltage	$V_{EBO}$	5.0		Vdc
Base Current	$I_B$	120		mAdc
Collector Current	$I_C$	8.0		Adc
Total Power Dissipation @ $T_C = +0\text{ }^\circ\text{C}$ @ $T_C = +100\text{ }^\circ\text{C}$	$P_T$	75 37		W W
Operating & Storage Temperature Range	$T_{op}, T_{stg}$	-55 to +200		$^\circ\text{C}$

### Thermal Characteristics

Characteristics	Symbol	Maximum	Units
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.66	$^\circ\text{C/W}$

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

OFF Characteristics	Symbol	Minimum	Maximum	Units
Collector - Emitter Breakdown Voltage $I_C = 100\text{ mAdc}$ 2N6300 2N6301	$V_{(BR)CEO}$	60 80	---	Vdc
Collector - Emitter Cutoff Current $V_{CE} = 30\text{ Vdc}$ $V_{CE} = 40\text{ Vdc}$ 2N6300 2N6301	$I_{CEO}$	---	0.5 0.5	mAdc
Collector - Emitter Cutoff Current $V_{CE} = 60\text{ Vdc}, V_{BE} = -1.5\text{ Vdc}$ $V_{CE} = 80\text{ Vdc}, V_{BE} = -1.5\text{ Vdc}$ 2N6300 2N6301	$I_{CEX}$	---	10 10	$\mu\text{Adc}$
Emitter - Base Cutoff Current $V_{EB} = 5.0\text{ Vdc}$	$I_{EBO}$	---	5.0	mAdc

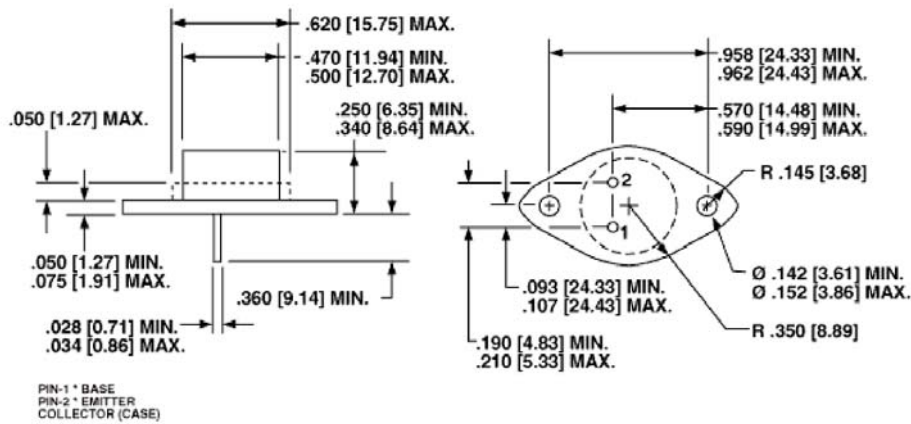


**Electrical Characteristics -con't**

<b>ON Characteristics (2)</b>				
	Symbol	Minimum	Maximum	Unit
Forward Current Transfer Ratio $I_C = 1.0 \text{ Adc}, V_{CE} = 3.0 \text{ Vdc}$ $I_C = 4.0 \text{ Adc}, V_{CE} = 3.0 \text{ Vdc}$ $I_C = 8.0 \text{ Adc}, V_{CE} = 3.0 \text{ Vdc}$	$H_{FE}$	500 750 100	18,000	
Collector - Emitter Saturation Voltage $I_C = 4.0 \text{ Adc}, I_B = 16 \text{ mAdc}$ $I_C = 8.0 \text{ Adc}, I_B = 80 \text{ mAdc}$	$V_{CE(sat)}$	--- ---	2.0 3.0	Vdc
Base - Emitter Saturation Voltage $I_C = 8.0 \text{ Adc}, I_B = 80 \text{ mVdc}$	$V_{BE(sat)}$	---	4.0	Vdc
Base-Emitter Voltage $I_C = 4.0 \text{ Adc}, V_{CE} = 3.0 \text{ Vdc}$	$V_{BE(on)}$	---	2.8	Vdc
<b>DYNAMIC Characteristics</b>				
Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 3.0 \text{ Adc}, V_{CE} = 3.0 \text{ Vdc}, f = 1.0 \text{ MHz}$	$ h_{fe} $	25	350	
Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 3.0 \text{ Adc}, V_{CE} = 3.0 \text{ Vdc}, f = 1.0 \text{ kHz}$	$h_{fe}$	300	---	
Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$	$C_{obo}$	---	200	pF
<b>Switching Characteristics</b>				
Turn-on Time $V_{CC} = 30 \text{ Vdc}, I_C = 4.0 \text{ Adc}, I_{B1} = 16 \text{ mAdc}$	$\tau_{on}$	---	2.0	$\mu\text{s}$
Turn-Off Time $V_{CC} = 30 \text{ Vdc}, I_C = 4.0 \text{ Adc}, I_{B1} = 16 \text{ mAdc}$	$\tau_{off}$	---	8.0	$\mu\text{s}$
<b>SAFE OPERATING AREA</b>				
<b>DC Tests:</b>	$T_C = +25 \text{ }^\circ\text{C}, 1 \text{ Cycle}, t = 1.0 \text{ s}$			
<b>Test 1:</b>	$V_{CE} = 8.0 \text{ Vdc}, I_C = 8.0 \text{ Adc}$			
<b>Test 2:</b>	$V_{CE} = 20 \text{ Vdc}, I_C = 2.0 \text{ Adc}$			
<b>Test 3:</b>	$V_{CE} = 60 \text{ Vdc}, I_C = 100 \text{ mAdc}$	2N6300		
	$V_{CE} = 80 \text{ Vdc}, I_C = 100 \text{ mAdc}$	2N6301		

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

Outline Drawing



NOTE: Dimensions in Inches [mm]

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