

## NPN DARLINGTON POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/539

### DEVICES

**2N6300**

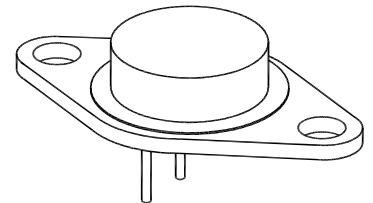
**2N6301**

### LEVELS

**JAN  
 JANTX  
 JANTXV**

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

Parameters / Test Conditions	Symbol	2N6300	2N6301	Unit
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	$P_T$	@ $T_C = +0^\circ\text{C}$ <sup>(1)</sup>	75	W
		@ $T_C = +100^\circ\text{C}$	32	
Operating & Storage Junction Temperature Range	$T_j, T_{stg}$	-55 to +200		$^\circ\text{C}$



**TO-66 (TO-213AA)**

### Note:

- Derate linearly 0.428W/ $^\circ\text{C}$  above  $T_C > 0^\circ\text{C}$

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

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
<b>OFF CHARACTERISTICS</b>				
Collector-Emitter Voltage $I_C = 100\text{mAdc}$	$V_{(BR)CEO}$	60		Vdc
2N6301		80		
Collector-Emitter Cutoff Current $V_{CE} = 30\text{Vdc}$ $V_{CB} = 40\text{Vdc}$	$I_{CEO}$		0.5	mAdc
2N6301			0.5	
Collector-Emitter Cutoff Current $V_{CE} = 60\text{Vdc}, V_{BE} = -1.5\text{Vdc}$ $V_{CE} = 80\text{Vdc}, V_{BE} = -1.5\text{Vdc}$	$I_{CEX}$		0.5	mAdc
2N6301			0.5	
Emitter-Base Cutoff Current $V_{EB} = 5.0\text{Vdc}$	$I_{EBO}$		2.0	mAdc

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

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
<b>ON CHARACTERISTICS <sup>(3)</sup></b>				
Forward-Current Transfer Ratio $I_C = 1.0\text{A dc}$ , $V_{CE} = 3.0\text{V dc}$ $I_C = 4.0\text{A dc}$ , $V_{CE} = 3.0\text{V dc}$ $I_C = 8.0\text{A dc}$ , $V_{CE} = 3.0\text{V dc}$	$h_{FE}$	500 750 100	18,000	
Collector-Emitter Saturation Voltage $I_C = 4.0\text{A dc}$ , $I_B = 16\text{mA dc}$ $I_C = 8.0\text{A dc}$ , $I_B = 80\text{mA dc}$	$V_{CE(sat)}$		2.0 3.0	Vdc
Base-Emitter Saturation Voltage $I_C = 8.0\text{A dc}$ , $I_B = 80\text{mA dc}$	$V_{BE(sat)}$		4.0	Vdc
Base-Emitter Voltage $I_C = 4.0\text{A dc}$ , $V_{CE} = 3.0\text{V dc}$	$V_{BE(on)}$		2.8	Vdc

## DYNAMIC CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 3.0\text{A dc}$ , $V_{CE} = 3.0\text{V dc}$ , $f = 1.0\text{MHz}$	$ h_{fe} $	25	350	
Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 3.0\text{A dc}$ , $V_{CE} = 3.0\text{V dc}$ , $f = 1.0\text{KHz}$	$h_{fe}$	300		
Output Capacitance $V_{CB} = 10\text{V dc}$ , $I_E = 0$ , $100\text{kHz} \leq f \leq 1.0\text{MHz}$	$C_{obo}$		200	pF

## SWITCHING CHARACTERISTICS

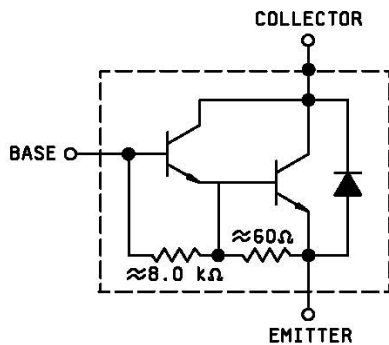
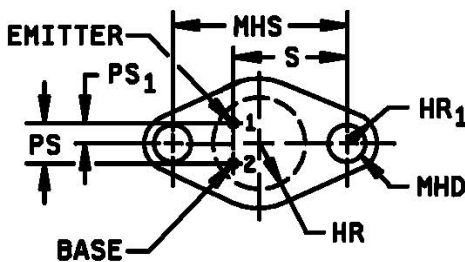
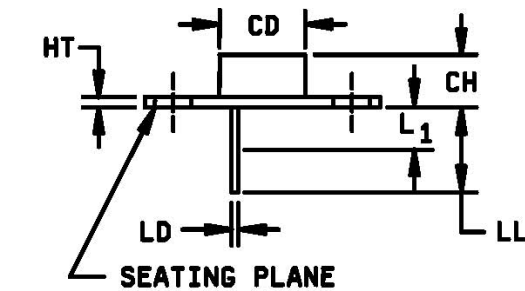
Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Turn-On Time $V_{CC} = 30\text{V dc}$ ; $I_C = 4.0\text{A dc}$ ; $I_{B1} = 16\text{mA dc}$	$t_{on}$		2.0	$\mu\text{s}$
Turn-Off Time $V_{CC} = 30\text{V dc}$ ; $I_C = 4.0\text{A dc}$ ; $I_{B1} = I_{B2} = 16\text{mA dc}$	$t_{off}$		8.0	$\mu\text{s}$

## SAFE OPERATING AREA

<b>DC Test</b> $T_C = 25^\circ\text{C}$ , 1 cycle, $t = 1.0\text{s}$	
<b>Test 1</b> $V_{CE} = 8.0\text{V dc}$ , $I_C = 8.0\text{A dc}$	
<b>Test 2</b> $V_{CE} = 20\text{V dc}$ , $I_C = 2.0\text{A dc}$	
<b>Test 3</b> $V_{CE} = 60\text{V dc}$ , $I_C = 100\text{mA dc}$	2N6300
$V_{CE} = 80\text{V dc}$ , $I_C = 100\text{mA dc}$	2N6301

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

## PACKAGE DIMENSIONS



**SCHEMATIC CIRCUIT**

Symbol	Dimensions		Notes		
	Inches	Millimeters			
	Min	Max			
CD		.620	15.75	3	
CH	.250	.340	6.35	8.64	
HT	.050	.075	1.27	1.91	3
HR		.350		8.89	
HR <sub>1</sub>	.115	.145	2.92	3.68	6
LD	.028	.034	0.71	0.86	5, 9
LL	.360	.500	9.14	12.70	5
L <sub>1</sub>		.050		1.27	5, 9
MHD	.142	.152	3.61	3.86	7
MHS	.958	.962	24.33	24.43	
PS	.190	.210	4.83	5.33	4
PS <sub>1</sub>	.095	.105	2.41	2.66	4
S	.570	.590	14.48	14.99	4

### NOTES:

- Dimensions are in inches.
- Millimeters are given for general information only.
- Body contour is optional within zone defined by CD.
- These dimensions should be measured at points .050 inch (1.27 mm) to .055 inch (1.40 mm) below seating plane. When gauge is not used, measurement will be made at seating plane.
- Both terminals.
- At both ends.
- Two holes.
- The collector shall be electrically connected to the case.
- LD applies between L<sub>1</sub> and LL. Lead diameter shall not exceed twice LD within L<sub>1</sub>.
- In accordance with ASME Y14.5M, diameters are equivalent to  $\phi$ x symbology.

**FIGURE 1. Physical dimensions (TO-66).**