

FEATURES

- Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding "-PBF" suffix.

MAXIMUM RATINGS

Ratings	Symbol	2N6300	2N6301	Unit
Collector-base voltage	V_{CBO}	60	80	V
Collector-emitter voltage	V_{CEO}	60	80	V
Emitter-base voltage	V_{EBO}		5	V
Continuous collector current	I_C	8		A
Base current	I_B	120		mA
Total device dissipation @ $T_C = 0^\circ\text{C}$ ⁽¹⁾	P_T	75		W
Total device dissipation @ $T_C = 100^\circ\text{C}$		37		
Operating and storage temperature range	T_J, T_{stg}	-55 to +200		$^\circ\text{C}$
Thermal resistance, junction to case	$R_{\theta JC}$	2.66		$^\circ\text{C}/\text{W}$

Note 1: Derate linearly at 0.428W/ $^\circ\text{C}$ above $T_C > 0^\circ\text{C}$.

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

Characteristics	Symbol	Min	Max	Unit
ON CHARACTERISTICS				
Collector-emitter breakdown voltage $I_C = 100\text{mA}$	2N6300 2N6301 $V_{CEO(sus)}$	60 80	- -	V
Collector emitter cutoff current $V_{CE} = 60\text{V}, V_{BE} = 1.5\text{V}$ $V_{CE} = 80\text{V}, V_{BE} = 1.5\text{V}$	2N6300 2N6301 I_{CEX}	- -	10 10	μA
Collector emitter cutoff current, base open $V_{CE} = 30\text{V}$ $V_{CE} = 40\text{V}$	2N6300 2N6301 I_{CEO}	- -	0.5 0.5	mA
Emitter base cutoff current $V_{EB} = 5.0\text{V}$	I_{EBO}	-	2.0	mA
Forward current transfer ration $I_C = 1\text{A}, V_{CE} = 3\text{V}$ $I_C = 4\text{A}, V_{CE} = 3\text{V}$ $I_C = 8\text{A}, V_{CE} = 3\text{V}$	h_{FE}	500 750 100	- 18000 -	-
Collector emitter saturation voltage $I_C = 4.0\text{A}, I_B = 16\text{mA}$ $I_C = 8.0\text{A}, I_B = 80\text{mA}$	$V_{CE(sat)}$	- -	2.0 3.0	V
Base emitter saturation voltage $V_{CE} = 3.0\text{V}, I_C = 4\text{A}$ $I_C = 8.0\text{A}, I_B = 80\text{mA}$	$V_{BE(sat)}$	- -	2.8 4.0	V
DYNAMIC CHARACTERISTICS				
Magnitude of common emitter small signal short circuit forward current transfer ratio $V_{CE} = 3.0\text{V}, I_C = 3.0\text{A}, f = 1\text{MHz}$	$ h_{fe} $	25	350	-

2N6300-2N6301

NPN SILICON DARLINGTON POWER TRANSISTORS

Characteristics	Symbol	Min	Max	Unit
Common emitter small signal short circuit forward current transfer ratio $V_{CE} = 3.0V, I_C = 3.0A, f = 1kHz$	h_{fe}	300	-	-
Common base output $V_{CB} = 10V, I_E = 0, 100kHz \leq f \leq 1MHz$	C_{obo}	-	200	pF
SWITCHING CHARACTERISTICS				
Turn-on time $V_{CC} = 30V, I_C = 4A, I_{B1} = 16mA$	t_{on}	-	2.0	μs
Turn-off time $V_{CC} = 30V, I_C = 4A, I_{B1} = -I_{B2} = 16mA$	t_{off}	-	8.0	μs

SAFE OPERATING AREA

DC Tests

$T_C = 25^\circ C, t = 1 \text{ second, duty cycle} \leq 10\%$

Test 1

$V_{CE} = 8V, I_C = 8A$

Test 2

$V_{CE} = 20V, I_C = 2.0A$

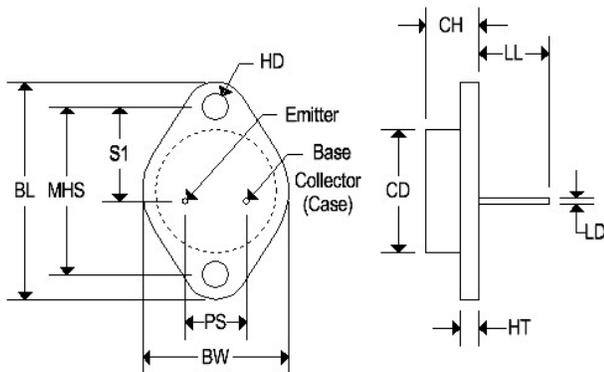
Test 3

$V_{CC} = 60V, I_C = 100mA (2N6300)$

$V_{CE} = 80V, I_C = 100mA (2N6301)$

MECHANICAL CHARACTERISTICS

Case	TO-66
Marking	Alpha-numeric
Polarity	See below



Dim	TO-66			
	Inches		Millimeters	
	Min	Max	Min	Max
BL	1.205	1.280	30.60	32.50
CD	0.445	0.545	11.303	13.843
CH	0.257	0.284	6.540	7.220
LL	0.374	0.413	9.500	10.50
BW	0.680	0.727	17.26	18.46
LD	0.030	0.036	0.760	0.920
HT	0.054	0.065	1.380	1.650
MHS	0.951	0.976	24.16	24.78
S1	0.545	0.614	13.84	15.60
HD	0.131	0.154	3.320	3.920
PS	0.191	0.210	4.860	5.340

2N6300-2N6301

NPN SILICON DARLINGTON POWER TRANSISTORS

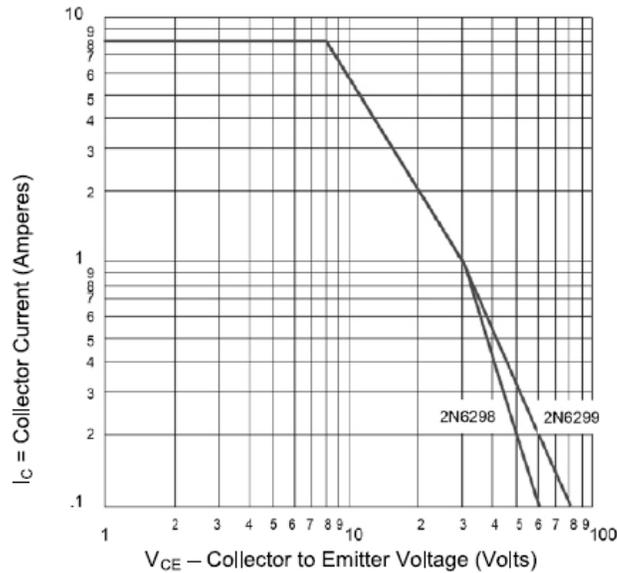


FIGURE 1 – Maximum Safe Operating Area (dc)

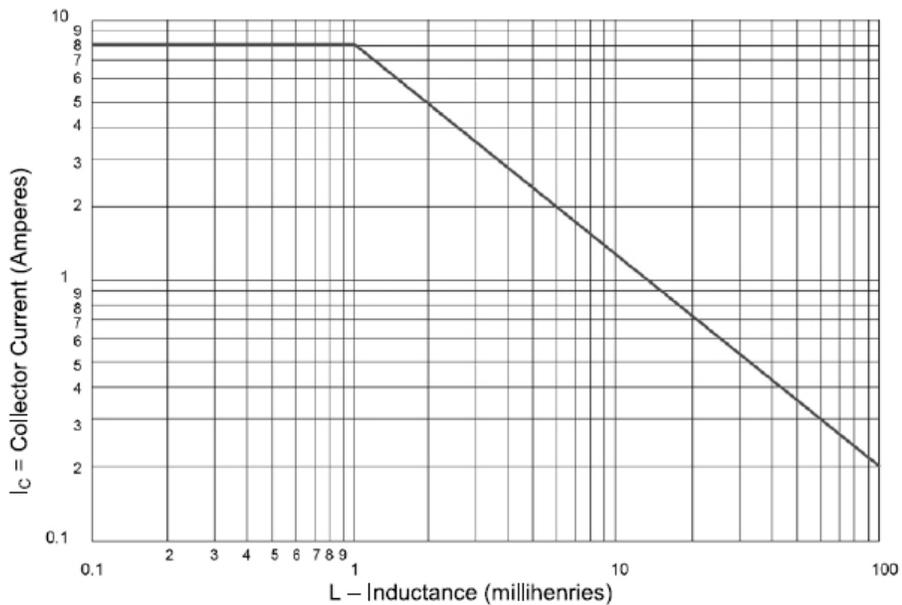


FIGURE 2 – Safe Operating Area for switching between saturation and cutoff (unclamped inductive load)