

# 2N6383, 2N6384, & 2N6385



## NPN High Power Silicon Transistors

Rev. V1

### Features

- Available in JAN, JANTX, JANTXV per MIL-PRF-19500/523
- 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) 2N6383 2N6384 2N6385	$V_{(BR)CEO}$	Vdc	40 60 80	—
Collector - Emitter Breakdown Voltage	$I_C = 200 \text{ mAdc}$ , $L = 14 \text{ mH}$ , 30 - 60 GHz (see figure 10 of MIL-PRF-19500/510) 2N6383 2N6384 2N6385	$V_{(BR)CER}$	Vdc	40 60 80	—
Collector - Base Cutoff Current	$V_{CE} = 40 \text{ Vdc}$ , 2N6383 $V_{CE} = 60 \text{ Vdc}$ , 2N6384 $V_{CE} = 80 \text{ Vdc}$ , 2N6385	$I_{EBO}$	mAdc	—	1
Emitter - Base Cutoff Current	$V_{EB} = 6 \text{ Vdc}$	$I_{EBO}$	mAdc	—	5
Collector - Emitter Cutoff Current	$V_{CE} = 40 \text{ Vdc}$ , 2N6383 $V_{CE} = 60 \text{ Vdc}$ , 2N6384 $V_{CE} = 80 \text{ Vdc}$ , 2N6385	$I_{CEO}$	mAdc	—	1
Collector - Emitter Cutoff Current	$V_{CE} = 40 \text{ Vdc}$ , $V_{BE} = -1.5 \text{ Vdc}$ , 2N6383 $V_{CE} = 60 \text{ Vdc}$ , $V_{BE} = -1.5 \text{ Vdc}$ , 2N6384 $V_{CE} = 80 \text{ Vdc}$ , $V_{BE} = -1.5 \text{ Vdc}$ , 2N6385	$I_{EBO}$	mAdc	—	0.3
<b>On Characteristics<sup>1</sup></b>					
Forward Current Transfer Ratio	$I_C = 5 \text{ Adc}$ , $V_{CE} = 3 \text{ Vdc}$ $I_C = 10 \text{ Adc}$ , $V_{CE} = 3 \text{ Vdc}$	$H_{FE}$	-	1000 100	20000
Collector - Emitter Sustaining Voltage	$I_C = 5 \text{ Adc}$ , $I_B = 10 \text{ mAdc}$ $I_C = 10 \text{ Adc}$ , $I_B = 0.1 \text{ mAdc}$	$V_{CE(SAT)}$	Vdc	—	2 3
Base - Emitter Saturation Voltage	$I_C = 5 \text{ Adc}$ , $I_B = 3 \text{ Adc}$ $I_C = 10 \text{ Adc}$ , $I_B = 3 \text{ Adc}$	$V_{BE(SAT)}$	Vdc	—	2.8 4.5

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

### Electrical Characteristics

Parameter	Test Conditions	Symbol	Units	Min.	Max.
<b>Dynamic Characteristics</b>					
Small-Signal Short-Circuit Forward Current Transfer Ratio	$I_C = 1 \text{ Adc}, V_{CE} = 5 \text{ Vdc}, f = 1 \text{ MHz}$	$ h_{FE} $	-	20	300
Output Capacitance	$V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1 \text{ MHz}$	$C_{OBO}$	pF	—	200
<b>Switching Characteristics</b>					
Turn-On Time	$V_{CC} = 200 \text{ Vdc}; I_C = 1 \text{ Adc}, I_{B1} = 20 \text{ mAdc}$	$T_{ON}$	$\mu\text{s}$	—	2.5
Turn-Off Time	$V_{CC} = 200 \text{ Vdc}; I_C = 1 \text{ Adc}, I_{B1} = I_{B1} = 20 \text{ mAdc}$	$T_{OFF}$	$\mu\text{s}$	—	10
<b>Safe Operating Area</b>					
DC Tests:	$T_C = +25^\circ\text{C}, 1 \text{ Cycle}, t = 1.0 \text{ s}$				
Test 1:	$V_{CE} = 10 \text{ Vdc}, I_C = 10 \text{ Adc}, \text{ All Types}$				
Test 2:	$V_{CE} = 30 \text{ Vdc}, I_C = 3.33 \text{ Adc}, \text{ All Types}$				
Test 3:	$V_{CE} = 40 \text{ Vdc}, I_C = 1.5 \text{ Adc}, 2\text{N}6383$				
	$V_{CE} = 60 \text{ Vdc}, I_C = 0.4 \text{ Adc}, 2\text{N}6384$				
	$V_{CE} = 80 \text{ Vdc}, I_C = 0.16 \text{ Adc}, 2\text{N}6385$				

### Absolute Maximum Ratings

Ratings	Symbol	2N6383	2N6384	2N6385	Units
Collector - Emitter Voltage	$V_{CEO}$	40	60	80	Vdc
Collector - Base Voltage	$V_{CBO}$	40	60	80	Vdc
Emitter - Base Voltage	$V_{EBO}$	5			Vdc
Collector Current	$I_C$	10			Adc
Base Current	$I_B$	0.25			Adc
Total Power Dissipation @ $T_A = +25^\circ\text{C}^2$ @ $T_C = +25^\circ\text{C}^3$	$P_T$	6 100			W
Operating & Storage Temperature Range	$T_{OP}, T_{STG}$	-55 to +175			$^\circ\text{C}$

- Derate linearly @ 34.2 mW /  $^\circ\text{C}$  for  $T_A > 25^\circ\text{C}$ .
- Derate linearly @ 571 mW /  $^\circ\text{C}$  for  $T_C > 75^\circ\text{C}$ .

### Thermal Characteristics

Characteristics	Symbol	Max. Value
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.75 $^\circ\text{C}/\text{W}$

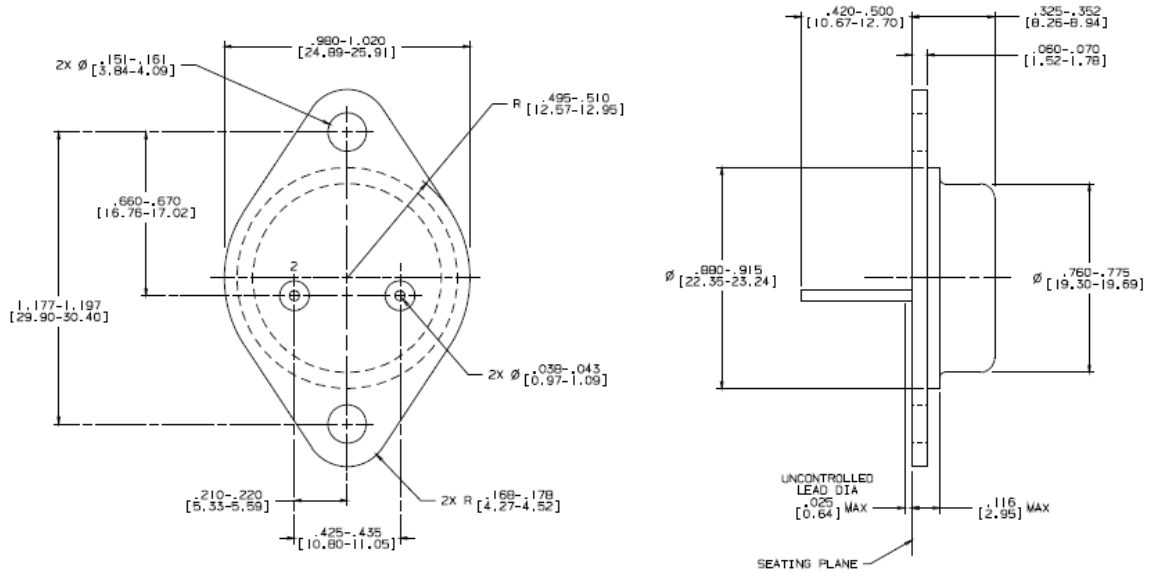
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### Outline Drawing



#### 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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