

## NPN POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/466

### Devices

2N5683

2N5684

### Qualified Level

JAN  
JANTX  
JANTXV

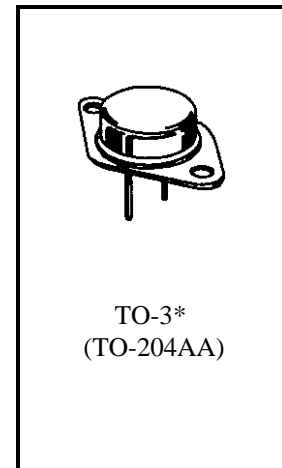
### MAXIMUM RATINGS

Ratings	Symbol	2N5683	2N5684	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	$I_B$	15		Adc
Collector Current	$I_C$	50		Adc
Total Power Dissipation <sup>(1)</sup>	@ $T_C = 25^{\circ}C$	300		W
	@ $T_C = 100^{\circ}C$	171		W
Operating & Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +200		$^{\circ}C$

### THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.584	$^{\circ}C/W$

1) Derate linearly 1.715 W/ $^{\circ}C$  between  $T_C = +25^{\circ}C$  and  $T_C = +200^{\circ}C$



\*See appendix A for package outline

### ELECTRICAL CHARACTERISTICS ( $T_C = 25^{\circ}C$ unless otherwise noted)

Characteristics	Symbol	Min.	Max.	Unit
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### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage $I_C = 200$ mAdc	2N5683 2N5684	$V_{(BR)CEO}$	60 80	Vdc
Collector-Emitter Cutoff Current $V_{CE} = 30$ Vdc $V_{CE} = 40$ Vdc	2N5683 2N5684	$I_{CEO}$	5.0 5.0	$\mu$ Adc
Collector-Emitter Cutoff Current $V_{CE} = 60$ Vdc, $V_{BE} = 1.5$ Vdc $V_{CE} = 80$ Vdc, $V_{BE} = 1.5$ Vdc	2N5683 2N5684	$I_{CEX}$	5.0 5.0	$\mu$ Adc
Collector-Base Cutoff Current $V_{CB} = 60$ Vdc $V_{CB} = 80$ Vdc	2N5683 2N5684	$I_{CBO}$	5.0 5.0	$\mu$ Adc
Emitter-Base Cutoff Current $V_{EB} = 5.0$ Vdc		$I_{EBO}$	5.0	$\mu$ Adc

**ELECTRICAL CHARACTERISTICS (con't)**

Characteristics	Symbol	Min.	Max.	Unit
<b>ON CHARACTERISTICS</b> <sup>(2)</sup>				
Forward-Current Transfer Ratio $I_C = 5.0 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc}$ $I_C = 25 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc}$ $I_C = 50 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$	$h_{FE}$	30 15 5.0	60	
Collector-Emitter Saturation Voltage $I_C = 25 \text{ Adc}, I_B = 2.5 \text{ Adc}$ $I_C = 50 \text{ Adc}, I_B = 10 \text{ Adc}$	$V_{CE(sat)}$		1.0 5.0	Vdc
Base-Emitter Saturation Voltage $I_C = 25 \text{ Adc}, I_B = 2.5 \text{ Adc}$	$V_{BE(sat)}$		2.0	Vdc
Base-Emitter Voltage $I_C = 25 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc}$	$V_{BE(on)}$		2.0	Vdc

**DYNAMIC CHARACTERISTICS**

Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 5.0 \text{ Adc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ MHz}$	$ h_{fe} $	2.0	20	
Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 10 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}, f = 1.0 \text{ kHz}$	$h_{fe}$	15		
Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, 0.1 \text{ MHz} \leq f \leq 1.0 \text{ MHz}$	$C_{obo}$		2,000	pF

**SWITCHING CHARACTERISTICS**

Turn-On Time $V_{CC} = 30 \text{ Vdc}; I_C = 25 \text{ Adc}; I_B = 2.5 \text{ Adc}$	$t_{on}$		1.5	$\mu\text{s}$
Turn-Off Time $V_{CC} = 30 \text{ Vdc}; I_C = 25 \text{ Adc}; I_{B1} = I_{B2} = 2.5 \text{ Adc}$	$t_{off}$		3.0	$\mu\text{s}$

**SAFE OPERATING AREA**

<b>DC Tests</b> $T_C = +25^{\circ}\text{C}, 1 \text{ Cycle}, t = 1.0 \text{ s}$	
<b>Test 1</b> $V_{CE} = 6.0 \text{ Vdc}, I_C = 50 \text{ Adc}$	All Types
<b>Test 2</b> $V_{CE} = 30 \text{ Vdc}, I_C = 10 \text{ Adc}$	All Types
<b>Test 3</b> $V_{CE} = 50 \text{ Vdc}, I_C = 560 \text{ mAdc}$	2N5683
$V_{CE} = 60 \text{ Vdc}, I_C = 640 \text{ mAdc}$	2N5684

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

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