

NPN POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/466

Devices

2N5683

2N5684

Qualified Level

JAN
JANTX
JANTXV

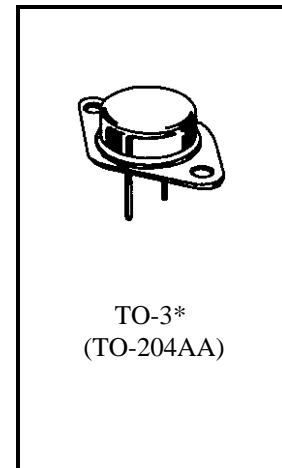
MAXIMUM RATINGS

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 ⁽¹⁾	@ $T_C = 25^{\circ}\text{C}$	300		W
	@ $T_C = 100^{\circ}\text{C}$	171		W
Operating & Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		$^{\circ}\text{C}$

THERMAL CHARACTERISTICS

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

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



*See appendix A for package outline

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

Characteristics	Symbol	Min.	Max.	Unit
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OFF CHARACTERISTICS

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

ELECTRICAL CHARACTERISTICS (con't)

Characteristics	Symbol	Min.	Max.	Unit
ON CHARACTERISTICS ⁽²⁾				
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	μs
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	μs

SAFE OPERATING AREA

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

(2) Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$.