

PNP POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/535

Devices

2N5003

2N5005

Qualified Level

JAN
JANTX
JANTXV

MAXIMUM RATINGS

Ratings	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	80	Vdc
Collector-Base Voltage	V_{CBO}	100	Vdc
Emitter-Base Voltage	V_{EBO}	5.5	Vdc
Collector Current	I_C $I_C^{(3)}$	5.0 10	Adc
Total Power Dissipation @ $T_A = +25^{\circ}\text{C}$ ⁽¹⁾ @ $T_C = +25^{\circ}\text{C}$ ⁽²⁾	P_T	2.0 58	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	$R_{\theta JC}$	3.0	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	88	$^{\circ}\text{C/W}$

1) Derate linearly 11.4 mW/ $^{\circ}\text{C}$ for $T_A > +25^{\circ}\text{C}$

2) Derate linearly 331 mW/ $^{\circ}\text{C}$ for $T_C > +25^{\circ}\text{C}$

3) This value applies for $P_W \leq 8.3$ ms, duty cycle $\leq 1\%$



TO-59

*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 $I_C = 100$ mAdc,	$V_{(BR)CEO}$	80		Vdc
Collector-Emitter Cutoff Current $V_{CE} = 40$ Vdc, $I_B = 0$	I_{CEO}		50	μAdc
Collector-Emitter Cutoff Current $V_{CE} = 60$ Vdc, $V_{BE} = 0$ $V_{CE} = 100$ Vdc, $V_{BE} = 0$	I_{CES}		1.0 1.0	μAdc mAdc
Emitter-Base Cutoff Current $V_{BE} = 4.0$ Vdc, $I_C = 0$ $V_{BE} = 5.5$ Vdc, $I_C = 0$	I_{EBO}		1.0 1.0	MAdc MAdc

2N5003, 2N5005 JAN SERIES

ELECTRICAL CHARACTERISTICS (Con't)

Characteristics	Symbol	Min.	Max.	Unit
ON CHARACTERISTICS				
Forward-Current Transfer Ratio $I_C = 50 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$ $I_C = 2.5 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$ $I_C = 5.0 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$ $I_C = 50 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$ $I_C = 2.5 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$ $I_C = 5.0 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$	2N5003 2N5005	 50 70 40	90 200	
Base-Emitter Voltage Non-saturated $V_{CE} = 5.0 \text{ Adc}, I_C = 2.5 \text{ Adc}$	V_{BE}		1.45	Vdc
Collector-Emitter Saturation Voltage $I_C = 2.5 \text{ Adc}, I_B = 250 \text{ mAdc}$ $I_C = 5.0 \text{ Adc}, I_B = 500 \text{ mAdc}$	$V_{CE(sat)}$		0.75 1.5	Vdc
Base-Emitter Saturation Voltage $I_C = 2.5 \text{ Adc}, I_B = 250 \text{ mAdc}$ $I_C = 5.0 \text{ Adc}, I_B = 500 \text{ mAdc}$	$V_{BE(sat)}$		1.45 2.2	Vdc

DYNAMIC CHARACTERISTICS

Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio 2N5003 $I_C = 100 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}, f = 10 \text{ MHz}$ 2N5005	h_{fe}	2.0 50		
Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio 2N5003 $I_C = 500 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}, f = 10 \text{ MHz}$ 2N5005	h_{fe}	6.0 7.0		
Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, f = 1 \text{ MHz}$	C_{obo}		250	PF

SWITCHING CHARACTERISTICS

Turn-On Time $I_C = 5 \text{ Adc}; I_{B1} = 500 \text{ mAdc}$	t_{on}		0.5	μs
Storage Time $I_{B2} = -500 \text{ mAdc}$	t_s		1.4	μs
Fall Time $V_{BE(OFF)} = 3.7 \text{ Vdc}$	t_f		0.5	μs
Turn-Off Time $R_L = 6 \Omega$	t_{off}		1.5	μs

SAFE OPERATING AREA

DC Tests $T_C = +25^\circ C, V_{CE} = 0, t_p = 1 \text{ second 1 Cycle}$ Test 1 $V_{CE} = 12 \text{ Vdc}, I_C = 5 \text{ Adc}$ Test 2 $V_{CE} = 32 \text{ Vdc}, I_C = 1.7 \text{ Adc}$ Test 3 $V_{CE} = 80 \text{ Vdc}, I_C = 100 \text{ mAdc}$				
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