

PNP POWER SILICON TRANSISTOR

Devices

2N5003

2N5005

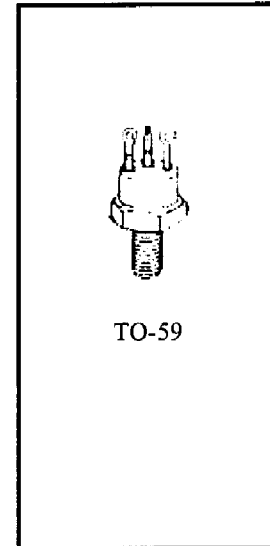
MAXIMUM RATINGS

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	A _{dc}
Total Power Dissipation	P_T	2.0 58	W
		@ $T_A = +25^\circ\text{C}^{(1)}$ @ $T_C = +25^\circ\text{C}^{(2)}$	
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	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	88	$^\circ\text{C}/\text{W}$

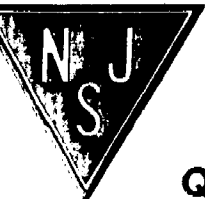
- 1) Derate linearly 11.4 mW/ $^\circ\text{C}$ for $T_A > +25^\circ\text{C}$
- 2) Derate linearly 331 mW/ $^\circ\text{C}$ for $T_C > +25^\circ\text{C}$
- 3) This value applies for $P_w \leq 8.3$ ms, duty cycle $\leq 1\%$



*See appendix A for package outline

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

Characteristics	Symbol	Min.	Max.	Unit
Collector-Emitter Breakdown Voltage $I_C = 100$ mA _{dc} ,	$V_{(BR)CEO}$	80		Vdc
Collector-Emitter Cutoff Current $V_{CE} = 40$ Vdc, $I_B = 0$	I_{CEO}		50	μA_{dc}
Collector-Emitter Cutoff Current $V_{CE} = 60$ Vdc, $V_{BE} = 0$ $V_{CE} = 100$ Vdc, $V_{BE} = 0$	I_{CES}		1.0 1.0	μA_{dc} mA _{dc}
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	MA _{dc} MA _{dc}



NJ Semi-Conductors reserves the right to change test conditions, parameters limits and package dimensions without notice information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

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ELECTRICAL CHARACTERISTICS (Con't)

Characteristics	Symbol	Min.	Max.	Unit
ON CHARACTERISTICS				
Forward-Current Transfer Ratio I _C = 50 mA _{dc} , V _{CE} = 5.0 V _{dc} I _C = 2.5 A _{dc} , V _{CE} = 5.0 V _{dc} I _C = 5.0 A _{dc} , V _{CE} = 5.0 V _{dc} I _C = 50 mA _{dc} , V _{CE} = 5.0 V _{dc} I _C = 2.5 A _{dc} , V _{CE} = 5.0 V _{dc} I _C = 5.0 A _{dc} , V _{CE} = 5.0 V _{dc}	2N5003 2N5005	 50 70 40	 90 200	
Base-Emitter Voltage Non-saturated V _{CE} = 5.0 A _{dc} , I _C = 2.5 A _{dc}	V _{BE}		1.45	V _{dc}
Collector-Emitter Saturation Voltage I _C = 2.5 A _{dc} , I _B = 250 mA _{dc} I _C = 5.0 A _{dc} , I _B = 500 mA _{dc}	V _{CE(sat)}		0.75 1.5	V _{dc}
Base-Emitter Saturation Voltage I _C = 2.5 A _{dc} , I _B = 250 mA _{dc} I _C = 5.0 A _{dc} , I _B = 500 mA _{dc}	V _{BE(sat)}		1.45 2.2	V _{dc}

DYNAMIC CHARACTERISTICS

Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio 2N5003 I _C = 100 mA _{dc} , V _{CE} = 5.0 V _{dc} , f = 10 MHz	2N5005	h _{fc}	2.0 50	
Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio 2N5003 I _C = 500 mA _{dc} , V _{CE} = 5.0 V _{dc} , f = 10 MHz	2N5005	h _{fe}	6.0 7.0	
Output Capacitance V _{CB} = 10 V _{dc} , I _E = 0, f = 1 MHz		C _{obo}		250 PF

SWITCHING CHARACTERISTICS

Turn-On Time I _C = 5 A _{dc} ; I _{B1} = 500 mA _{dc}		t _{on}		0.5 μs
Storage Time I _{B2} = -500 mA _{dc}		t _s		1.4 μs
Fall Time V _{BE(OFF)} = 3.7 V _{dc}		t _f		0.5 μs
Turn-Off Time R _L = 6 Ω		t _{off}		1.5 μs

SAFE OPERATING AREA

DC Tests T _C = +25°C, V _{CE} = 0, t _p = 1 second 1 Cycle
Test 1 V _{CE} = 12 V _{dc} , I _C = 5 A _{dc}
Test 2 V _{CE} = 32 V _{dc} , I _C = 1.7 A _{dc}
Test 3 V _{CE} = 80 V _{dc} , I _C = 100 mA _{dc}