

## PNP SILICON SWITCHING TRANSISTOR

Qualified per MIL-PRF-19500/512

### Devices

2N4029

2N4033

### Qualified Level

JAN  
JANTX  
JANTXV

### MAXIMUM RATINGS

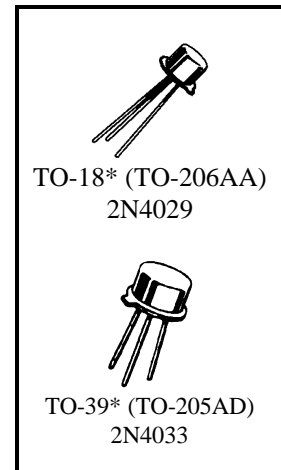
Ratings	Symbol	VALUE		Unit
Collector-Emitter Voltage	$V_{CEO}$	80		Vdc
Collector-Base Voltage	$V_{CBO}$	80		Vdc
Emitter-Base Voltage	$V_{EBO}$	5.0		Vdc
Collector Current	$I_C$	1.0		Adc
		2N4029 <sup>1</sup>	2N4033 <sup>2</sup>	
Total Power Dissipation @ $T_A = +25^{\circ}\text{C}$	$P_T$	0.5	0.8	W
Operating & Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +200		$^{\circ}\text{C}$

### THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	25.0	$^{\circ}\text{C}/\text{W}$

1) Derate linearly 2.86 mW/ $^{\circ}\text{C}$  for  $T_A > +25^{\circ}\text{C}$

2) Derate linearly 4.56 mW/ $^{\circ}\text{C}$  for  $T_A > +25^{\circ}\text{C}$



\*See appendix A for package outline

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

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

Collector-Base Cutoff Current $V_{CB} = 80 \text{ Vdc}$ $V_{CB} = 60 \text{ Vdc}$	$I_{CBO}$		10 10	$\mu\text{Adc}$ $\eta\text{Adc}$
Emitter-Base Cutoff Current $V_{BE} = 5.0 \text{ Vdc}$ $V_{BE} = 3.0 \text{ Vdc}$	$I_{EBO}$		25 10	$\mu\text{Adc}$ $\eta\text{Adc}$
Collector-Emitter Cutoff Voltage $V_{BE} = 40 \text{ Vdc}; V_{CE} = 60 \text{ Vdc}$	$I_{CEX}$		25	$\eta\text{Adc}$

**ELECTRICAL CHARACTERISTICS (con't)**

Characteristics	Symbol	Min.	Max.	Unit
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**DC CHARACTERISTICS**<sup>(3)</sup>

Forward-Current Transfer Ratio I <sub>C</sub> = 100 μAdc, V <sub>CE</sub> = 5.0 Vdc I <sub>C</sub> = 100 mAdc, V <sub>CE</sub> = 5.0 Vdc I <sub>C</sub> = 500 mAdc, V <sub>CE</sub> = 5.0 Vdc I <sub>C</sub> = 1.0 Adc, V <sub>CE</sub> = 5.0 Vdc	h <sub>FE</sub>	50 100 70 25	300	
Collector-Emitter Saturation Voltage I <sub>C</sub> = 150 mAdc, I <sub>B</sub> = 15 mAdc I <sub>C</sub> = 500 mAdc, I <sub>B</sub> = 50 mAdc I <sub>C</sub> = 1.0 Adc, I <sub>B</sub> = 100 mAdc	V <sub>CE(sat)</sub>		0.15 0.50 1.0	Vdc
Base-Emitter Voltage I <sub>C</sub> = 150 mAdc, I <sub>B</sub> = 15 mAdc I <sub>C</sub> = 500 mAdc, I <sub>B</sub> = 50 mAdc	V <sub>BE(sat)</sub>		0.9 1.2	Vdc

**DYNAMIC CHARACTERISTICS**

Magnitude of Common Emitter Small-Signal Short-Circuit Forward-Current Transfer Ratio I <sub>C</sub> = 50 mAdc, V <sub>CE</sub> = 10 Vdc, f = 100 MHz	h <sub>fe</sub>	1.5	6.0	
Output Capacitance V <sub>CB</sub> = 10 Vdc, I <sub>E</sub> = 0, 100 kHz ≤ f ≤ 1.0 MHz	C <sub>obo</sub>		20	pF
Input Capacitance V <sub>EB</sub> = 0.5 Vdc, I <sub>C</sub> = 0, 100 kHz ≤ f ≤ 1.0 MHz	C <sub>ibo</sub>		80	pF

**SWITCHING CHARACTERISTICS**

On-Time V <sub>CC</sub> = 31.9 Vdc; I <sub>C</sub> = 500 mAdc; I <sub>B1</sub> = 50 mAdc	t <sub>d</sub>		15	ηs
Rise Time V <sub>CC</sub> = 31.9 Vdc; I <sub>C</sub> = 500 mAdc; I <sub>B1</sub> = 50 mAdc	t <sub>r</sub>		25	ηs

(3) Pulse Test: Pulse Width = 300μs, Duty Cycle ≤ 2.0%.