

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 ¹	2N4033 ²	
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	$^{\circ}\text{C/W}$

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 $T_A > +25^{\circ}\text{C}$



TO-18* (TO-206AA)
2N4029



TO-39* (TO-205AD)
2N4033

*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	μAdc ηAdc
Emitter-Base Cutoff Current $V_{BE} = 5.0 \text{ Vdc}$ $V_{BE} = 3.0 \text{ Vdc}$	I_{EBO}		25 10	μAdc ηAdc
Collector-Emitter Cutoff Voltage $V_{BE} = 40 \text{ Vdc}; V_{CE} = 60 \text{ Vdc}$	I_{CEX}		25	ηAdc

ELECTRICAL CHARACTERISTICS (con't)

Characteristics	Symbol	Min.	Max.	Unit
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ON CHARACTERISTICS ⁽³⁾

Forward-Current Transfer Ratio $I_C = 100 \mu\text{Adc}, V_{CE} = 5.0 \text{ Vdc}$ $I_C = 100 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$ $I_C = 500 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$ $I_C = 1.0 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$	h_{FE}	50 100 70 25	300	
Collector-Emitter Saturation Voltage $I_C = 150 \text{ mAdc}, I_B = 15 \text{ mAdc}$ $I_C = 500 \text{ mAdc}, I_B = 50 \text{ mAdc}$ $I_C = 1.0 \text{ Adc}, I_B = 100 \text{ mAdc}$	$V_{CE(sat)}$		0.15 0.50 1.0	Vdc
Base-Emitter Voltage $I_C = 150 \text{ mAdc}, I_B = 15 \text{ mAdc}$ $I_C = 500 \text{ mAdc}, I_B = 50 \text{ mAdc}$	$V_{BE(sat)}$		0.9 1.2	Vdc

DYNAMIC CHARACTERISTICS

Magnitude of Common Emitter Small-Signal Short-Circuit Forward-Current Transfer Ratio $I_C = 50 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 100 \text{ MHz}$	$ h_{fe} $	1.5	6.0	
Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$	C_{obo}		20	pF
Input Capacitance $V_{EB} = 0.5 \text{ Vdc}, I_C = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$	C_{ibo}		80	pF

SWITCHING CHARACTERISTICS

On-Time $V_{CC} = 31.9 \text{ Vdc}; I_C = 500 \text{ mAdc}; I_{B1} = 50 \text{ mAdc}$	t_d		15	ns
Rise Time $V_{CC} = 31.9 \text{ Vdc}; I_C = 500 \text{ mAdc}; I_{B1} = 50 \text{ mAdc}$	t_r		25	ns

(3) Pulse Test: Pulse Width = 300 μ s, Duty Cycle $\leq$ 2.0%.