

## PNP SILICON SWITCHING TRANSISTOR

Qualified per MIL-PRF-19500/323

### Devices

2N3250A

2N3251A

### Qualified Level

JAN  
JANTX  
JANTXV

### MAXIMUM RATINGS

Ratings	Symbol	Value	Units
Collector-Emitter Voltage	$V_{CEO}$	60	Vdc
Collector-Base Voltage	$V_{CBO}$	60	Vdc
Emitter-Base Voltage	$V_{EBO}$	5.0	Vdc
Collector Current	$I_C$	200	mAdc
Total Power Dissipation @ $T_A = +25^{\circ}\text{C}$ <sup>(1)</sup> @ $T_C = +25^{\circ}\text{C}$ <sup>(2)</sup>	$P_T$	0.36	W
		1.2	W
Operating & Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +175	$^{\circ}\text{C}$

### THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$ <sup>(1)(2)</sup>	417	$^{\circ}\text{C}/\text{W}$

1) Derate linearly 2.4 W/ $^{\circ}\text{C}$  for  $T_A > +25^{\circ}\text{C}$

2) Derate linearly 8.0 W/ $^{\circ}\text{C}$  for  $T_C > +25^{\circ}\text{C}$



TO-39\*  
(TO-205AD)

\*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-Emitter Breakdown Voltage $I_C = 10 \text{ mAdc}$	$V_{(BR)CEO}$	60		Vdc
Collector-Emitter Cutoff Voltage $V_{BE} = 3.0 \text{ Vdc}, V_{CE} = 40 \text{ Vdc}$	$I_{CEX}$		20	$\eta\text{Adc}$
Collector-Base Cutoff Current $V_{CB} = 60 \text{ Vdc}$ $V_{CB} = 40 \text{ Vdc}$	$I_{CBO}$		10	$\mu\text{Adc}$
			20	$\eta\text{Adc}$
Emitter-Base Cutoff Current $V_{EB} = 5.0 \text{ Vdc}$	$I_{EBO}$		10	$\mu\text{Adc}$
Collector-Emitter Cutoff Voltage $V_{BE} = 3.0 \text{ Vdc}, V_{CE} = 40 \text{ Vdc}$	$I_{CEX}$		50	$\eta\text{Adc}$

2N3250A, 2N3251A JAN SERIES

**ELECTRICAL CHARACTERISTICS (con't)**

Characteristics		Symbol	Min.	Max.	Unit
<b>DC CHARACTERISTICS <sup>(3)</sup></b>					
Forward-Current Transfer Ratio $I_C = 0.1 \text{ mA dc}, V_{CE} = 1.0 \text{ V dc}$	2N3250A 2N3251A	$h_{FE}$	40 80		
$I_C = 1.0 \text{ mA dc}, V_{CE} = 1.0 \text{ V dc}$	2N3250A 2N3251A		45 90		
$I_C = 10 \text{ mA dc}, V_{CE} = 1.0 \text{ V dc}$	2N3250A 2N3251A		50 100	150 300	
$I_C = 50 \text{ mA dc}, V_{CE} = 1.0 \text{ V dc}$	2N3250A 2N3251A		15 30		
Collector-Emitter Saturation Voltage $I_C = 10 \text{ mA dc}, I_B = 1.0 \text{ mA dc}$ $I_C = 50 \text{ mA dc}, I_B = 5.0 \text{ mA dc}$			$V_{CE(sat)}$		0.25 0.50
Base-Emitter Voltage $I_C = 10 \text{ mA dc}, I_B = 1.0 \text{ mA dc}$ $I_C = 50 \text{ mA dc}, I_B = 5.0 \text{ mA dc}$		$V_{BE(sat)}$	0.60	0.90 1.20	Vdc

**DYNAMIC CHARACTERISTICS**

Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 1.0 \text{ mA dc}, V_{CE} = 10 \text{ V dc}, f = 1.0 \text{ kHz}$	2N3250A 2N3251A	$h_{fe}$	50 100	200 400	
Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 10 \text{ mA dc}, V_{CE} = 20 \text{ V dc}, f = 100 \text{ MHz}$	2N3250A 2N3251A	$ h_{fe} $	2.5 3.0	9.0 9.0	
Output Capacitance $V_{CB} = 10 \text{ V dc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$		$C_{obo}$		6.0	pF
Input Capacitance $V_{EB} = 1.0 \text{ V dc}, I_C = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$		$C_{ibo}$		8.0	pF

**SWITCHING CHARACTERISTICS**

Turn-On Time $V_{CC} = 3.0 \text{ V dc}; I_C = 10 \text{ mA dc}; I_{B1} = 1.0 \text{ mA dc}$		$t_{on}$		70	ns
Turn-Off Time $V_{CC} = 3.0 \text{ V dc}; I_C = 10 \text{ mA dc}; I_{B1} = I_{B2} = 1.0 \text{ mA dc}$	2N3250A 2N3251A	$t_{off}$		250 300	ns

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