

## NPN MEDIUM POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/581

### Devices

2N4237                      2N4238                      2N4239

### Qualified Level

JANTX  
JANTXV

### MAXIMUM RATINGS ( $T_A = 25^{\circ}\text{C}$ Unless Otherwise noted)

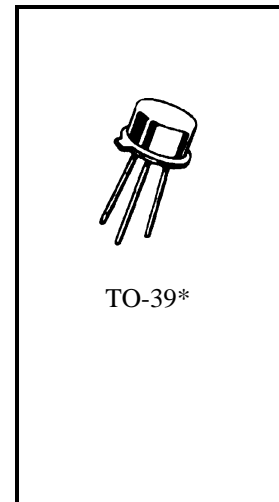
Ratings	Symbol	2N4237	2N4238	2N4239	Units
Collector-Emitter Voltage	$V_{CEO}$	40	60	80	Vdc
Collector-Base Voltage	$V_{CBO}$	50	80	100	Vdc
Emitter-Base Voltage	$V_{EBO}$	6.0			Vdc
Collector Current	$I_C$	1.0			Adc
Base Current	$I_B$	0.5			Adc
Total Power Dissipation	$P_T$	@ $T_A = +25^{\circ}\text{C}^{(1)}$	1.0		W
		@ $T_C = +25^{\circ}\text{C}^{(2)}$	6.0		W
Operating & Storage Temperature Range	$T_{op}, T_{stg}$	-65 to +200			$^{\circ}\text{C}$

### THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	29	$^{\circ}\text{C}/\text{W}$

1) Derate linearly 5.7 mW/ $^{\circ}\text{C}$  for  $T_A > +25^{\circ}\text{C}$

2) Derate linearly 34 mW/ $^{\circ}\text{C}$  for  $T_C > +25^{\circ}\text{C}$



\*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-Emitter Breakdown Voltage $I_C = 100 \text{ mAdc}$	2N4237 2N4238 2N4239	$V_{(BR)CEO}$	50 80 100	Vdc	
Emitter-Base Cutoff Current $V_{EB} = 6.0 \text{ Vdc}$			0.5		mAdc
Collector-Emitter Cutoff Current $V_{CE} = 90 \text{ Vdc}, V_{BE} = 1.5 \text{ Vdc}$					
$V_{CE} = 50 \text{ Vdc}$	2N4237	$I_{CEX}$	100	nAdc	
$V_{CE} = 80 \text{ Vdc}$	2N4238		100		
$V_{CE} = 10 \text{ Vdc}$	2N4239		100		
Collector-Base Cutoff Current $V_{CE} = 50 \text{ Vdc}$	2N4237	$I_{CBO}$	100	nAdc	
$V_{CE} = 80 \text{ Vdc}$	2N4238		100		
$V_{CE} = 10 \text{ Vdc}$	2N4239		100		

**ELECTRICAL CHARACTERISTICS (con't)**

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

Forward Current Transfer Ratio I <sub>C</sub> = 250 mA <sub>dc</sub> , V <sub>CE</sub> = 1.0 V <sub>dc</sub> I <sub>C</sub> = 500 mA <sub>dc</sub> , V <sub>CE</sub> = 1.0 V <sub>dc</sub>	h <sub>FE</sub>	30 30	150	
Collector-Emitter Saturation Voltage I <sub>C</sub> = 500 A <sub>dc</sub> , I <sub>B</sub> = 50 A <sub>dc</sub> I <sub>C</sub> = 1.0 A <sub>dc</sub> , I <sub>B</sub> = 0.1 A <sub>dc</sub>	V <sub>CE(sat)</sub>		0.3 0.6	V <sub>dc</sub>
Base-Emitter Saturation Voltage I <sub>C</sub> = 500 A <sub>dc</sub> , I <sub>B</sub> = 50 A <sub>dc</sub> I <sub>C</sub> = 1.0 A <sub>dc</sub> , I <sub>B</sub> = 0.1 A <sub>dc</sub>	V <sub>BE(sat)</sub>		1.0 1.5	V <sub>dc</sub>

**DYNAMIC CHARACTERISTICS**

Magnitude of Common Emitter Small-Signal Short Circuit Forward-Current Transfer Ratio I <sub>C</sub> = 100 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> , f = 10 MHz	h <sub>fe</sub>	3.0		
Output Capacitance V <sub>CB</sub> = 10 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 100 kHz	C <sub>obo</sub>		100	pF

**SAFE OPERATING AREA**

<p><b>DC Tests</b> T<sub>C</sub> = +25<sup>0</sup>C, 1 Cycle, t ≥ 0.5 s</p> <p><b>Test 1</b> V<sub>CE</sub> = 6.0 V<sub>dc</sub>, I<sub>C</sub> = 1.0 A<sub>dc</sub></p> <p><b>Test 2</b> V<sub>CE</sub> = 12 V<sub>dc</sub>, I<sub>C</sub> = 500 mA<sub>dc</sub></p> <p><b>Test 3</b> V<sub>CE</sub> = 30 V<sub>dc</sub>, I<sub>C</sub> = 166 mA<sub>dc</sub> 2N4237 V<sub>CE</sub> = 50 V<sub>dc</sub>, I<sub>C</sub> = 100 mA<sub>dc</sub> 2N4238 V<sub>CE</sub> = 70 V<sub>dc</sub>, I<sub>C</sub> = 71 mA<sub>dc</sub> 2N4239</p>
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