

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 @ $T_A = +25^\circ\text{C}^{(1)}$ @ $T_C = +25^\circ\text{C}^{(2)}$	P_T	1.0			W
		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	$^\circ\text{C/W}$

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



TO-39*

*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 $I_C = 100 \text{ mAdc}$	$V_{(BR)CEO}$		50	Vdc
2N4237			80	
2N4239			100	
Emitter-Base Cutoff Current $V_{EB} = 6.0 \text{ Vdc}$	I_{EBO}		0.5	mAdc
Collector-Emitter Cutoff Current $V_{CE} = 90 \text{ Vdc}, V_{BE} = 1.5 \text{ Vdc}$	I_{CEX}		100	nAdc
$V_{CE} = 50 \text{ Vdc}$ 2N4237				
$V_{CE} = 80 \text{ Vdc}$ 2N4238				
$V_{CE} = 10 \text{ Vdc}$ 2N4239				
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 ⁽³⁾

Forward Current Transfer Ratio $I_C = 250 \text{ mAdc}, V_{CE} = 1.0 \text{ Vdc}$ $I_C = 500 \text{ mAdc}, V_{CE} = 1.0 \text{ Vdc}$	h_{FE}	30 30	150	
Collector-Emitter Saturation Voltage $I_C = 500 \text{ Adc}, I_B = 50 \text{ Adc}$ $I_C = 1.0 \text{ Adc}, I_B = 0.1 \text{ Adc}$	$V_{CE(sat)}$		0.3 0.6	Vdc
Base-Emitter Saturation Voltage $I_C = 500 \text{ Adc}, I_B = 50 \text{ Adc}$ $I_C = 1.0 \text{ Adc}, I_B = 0.1 \text{ Adc}$	$V_{BE(sat)}$		1.0 1.5	Vdc

DYNAMIC CHARACTERISTICS

Magnitude of Common Emitter Small-Signal Short Circuit Forward-Current Transfer Ratio $I_C = 100 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 10 \text{ MHz}$	$ h_{fe} $	3.0		
Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, f = 100 \text{ kHz}$	C_{obo}		100	pF

SAFE OPERATING AREA**DC Tests** $T_C = +25^{\circ}\text{C}$, 1 Cycle, $t \geq 0.5 \text{ s}$ **Test 1** $V_{CE} = 6.0 \text{ Vdc}, I_C = 1.0 \text{ Adc}$ **Test 2** $V_{CE} = 12 \text{ Vdc}, I_C = 500 \text{ mAdc}$ **Test 3** $V_{CE} = 30 \text{ Vdc}, I_C = 166 \text{ mAdc}$ 2N4237 $V_{CE} = 50 \text{ Vdc}, I_C = 100 \text{ mAdc}$ 2N4238 $V_{CE} = 70 \text{ Vdc}, I_C = 71 \text{ mAdc}$ 2N4239