

NPN LOW POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/368

Devices

2N3439 **2N3440**
2N3439L **2N3440L**

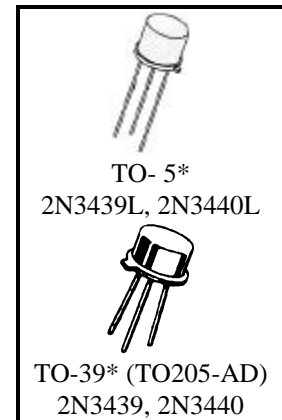
Qualified Level

JANTX
JANTXV

MAXIMUM RATINGS

Ratings	Symbol	2N3439	2N3440	Units
Collector-Emitter Voltage	V_{CEO}	350	250	Vdc
Collector-Base Voltage	V_{CBO}	450	300	Vdc
Emitter-Base Voltage	V_{EBO}	7.0		Vdc
Collector Current	I_C	1.0		Adc
Total Power Dissipation	P_T	@ $T_A = 25^{\circ}C^{(1)}$	0.8	W
		@ $T_C = 25^{\circ}C^{(2)}$	5.0	W/ $^{\circ}C$
Operating & Storage Temperature Range	T_{op}, T_{stg}	-55 to +200		$^{\circ}C$

- 1) Derate linearly 4.57 mW/ $^{\circ}C$ for $T_A > +25^{\circ}C$
- 2) Derate linearly 28.5 mW/ $^{\circ}C$ for $T_C > +25^{\circ}C$



*See Appendix A for Package Outline

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

Characteristics	Symbol	Min.	Max.	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage $I_C = 50$ mAdc	2N3439 2N3440	$V_{(BR)CEO}$	350 250	Vdc
Collector-Emitter Cutoff Current $V_{CE} = 300$ Vdc $V_{CE} = 200$ Vdc	2N3439 2N3440	I_{CEO}	2.0 2.0	μ Adc μ Adc
Emitter-Base Cutoff Current $V_{EB} = 7.0$ Vdc		I_{EBO}	10	μ Adc

ELECTRICAL CHARACTERISTICS (con't)

Characteristics	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS (con't)				
Collector-Emitter Cutoff Current $V_{CE} = 450 \text{ Vdc}, V_{BE} = -1.5 \text{ Vdc}$ $V_{CE} = 300 \text{ Vdc}, V_{BE} = -1.5 \text{ Vdc}$	I_{CEX}		5.0	$\mu\text{A dc}$
2N3439			5.0	$\mu\text{A dc}$
Collector-Base Cutoff Current $V_{CB} = 360 \text{ Vdc}$ $V_{CB} = 250 \text{ Vdc}$ $V_{CB} = 450 \text{ Vdc}$ $V_{CB} = 300 \text{ Vdc}$	I_{CBO}		2.0	$\mu\text{A dc}$
2N3439			2.0	
2N3440			5.0	
2N3440			5.0	

ON CHARACTERISTICS ⁽³⁾

Forward-Current Transfer Ratio $I_C = 20 \text{ mA dc}, V_{CE} = 10 \text{ Vdc}$ $I_C = 2.0 \text{ mA dc}, V_{CE} = 10 \text{ Vdc}$ $I_C = 0.2 \text{ mA dc}, V_{CE} = 10 \text{ Vdc}$	h_{FE}	40	160	
		30		
		10		
Collector-Emitter Saturation Voltage $I_C = 50 \text{ mA dc}, I_B = 4.0 \text{ mA dc}$		$V_{CE(sat)}$		0.5
Base-Emitter Saturation Voltage $I_C = 50 \text{ mA dc}, I_B = 4.0 \text{ mA dc}$	$V_{BE(sat)}$		1.3	Vdc

DYNAMIC CHARACTERISTICS

Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 10 \text{ mA dc}, V_{CE} = 10 \text{ Vdc}, f = 5.0 \text{ MHz}$	$ h_{fe} $	3.0	15	
Forward Current Transfer Ratio $I_C = 5.0 \text{ mA dc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz}$		h_{fe}	25	
Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$	C_{obo}		10	pF
Input Capacitance $V_{EB} = 5.0 \text{ Vdc}, I_C = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$	C_{ibo}		75	pF

SWITCHING CHARACTERISTICS

Turn-On Time $V_{CC} = 200 \text{ Vdc}; I_C = 20 \text{ mA dc}, I_{B1} = 2.0 \text{ mA dc}$	t_{on}		1.0	μs
Turn-Off Time $V_{CC} = 200 \text{ Vdc}; I_C = 20 \text{ mA dc}, I_{B1} = -I_{B2} = 2.0 \text{ mA dc}$	t_{off}		10	μs

SAFE OPERATING AREA

DC Tests $T_C = 25^\circ\text{C}, 1 \text{ cycle}, t = 1.0 \text{ s}$				
Test 1 $V_{CE} = 5.0 \text{ Vdc}, I_C = 1.0 \text{ A dc}$ Both Types				
Test 2 $V_{CE} = 350 \text{ Vdc}, I_C = 14 \text{ mA dc}$ 2N3439				
Test 3 $V_{CE} = 250 \text{ Vdc}, I_C = 20 \text{ mA dc}$ 2N3440				

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