

## NPN LOW POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/368

### Devices

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

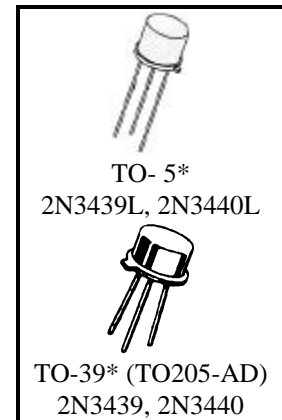
### Qualified Level

**JANTX**  
**JANTXV**

### MAXIMUM RATINGS

Ratings	Symbol	2N3439	2N3440	Units
Collector-Emitter Voltage	$V_{CE0}$	350	250	Vdc
Collector-Base Voltage	$V_{CB0}$	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	$\mu$ Adc $\mu$ Adc
Emitter-Base Cutoff Current $V_{EB} = 7.0$ Vdc		$I_{EBO}$	10	$\mu$ Adc

**ELECTRICAL CHARACTERISTICS (con't)**

Characteristics	Symbol	Min.	Max.	Unit
<b>OFF CHARACTERISTICS (con't)</b>				
Collector-Emitter Cutoff Current V <sub>CE</sub> = 450 Vdc, V <sub>BE</sub> = -1.5 Vdc V <sub>CE</sub> = 300 Vdc, V <sub>BE</sub> = -1.5 Vdc	I <sub>CEX</sub>		5.0 5.0	μA dc μA dc
Collector-Base Cutoff Current V <sub>CB</sub> = 360 Vdc V <sub>CB</sub> = 250 Vdc V <sub>CB</sub> = 450 Vdc V <sub>CB</sub> = 300 Vdc	I <sub>CBO</sub>		2.0 2.0 5.0 5.0	μA dc

**ON CHARACTERISTICS <sup>(3)</sup>**

Forward-Current Transfer Ratio I <sub>C</sub> = 20 mA dc, V <sub>CE</sub> = 10 Vdc I <sub>C</sub> = 2.0 mA dc, V <sub>CE</sub> = 10 Vdc I <sub>C</sub> = 0.2 mA dc, V <sub>CE</sub> = 10 Vdc	h <sub>FE</sub>	40 30 10	160	
Collector-Emitter Saturation Voltage I <sub>C</sub> = 50 mA dc, I <sub>B</sub> = 4.0 mA dc	V <sub>CE(sat)</sub>		0.5	V dc
Base-Emitter Saturation Voltage I <sub>C</sub> = 50 mA dc, I <sub>B</sub> = 4.0 mA dc	V <sub>BE(sat)</sub>		1.3	V dc

**DYNAMIC CHARACTERISTICS**

Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio I <sub>C</sub> = 10 mA dc, V <sub>CE</sub> = 10 Vdc, f = 5.0 MHz	h <sub>fe</sub>	3.0	15	
Forward Current Transfer Ratio I <sub>C</sub> = 5.0 mA dc, V <sub>CE</sub> = 10 Vdc, f = 1.0 kHz	h <sub>fe</sub>	25		
Output Capacitance V <sub>CB</sub> = 10 Vdc, I <sub>E</sub> = 0, 100 kHz ≤ f ≤ 1.0 MHz	C <sub>obo</sub>		10	pF
Input Capacitance V <sub>EB</sub> = 5.0 Vdc, I <sub>C</sub> = 0, 100 kHz ≤ f ≤ 1.0 MHz	C <sub>ibo</sub>		75	pF

**SWITCHING CHARACTERISTICS**

Turn-On Time V <sub>CC</sub> = 200 Vdc; I <sub>C</sub> = 20 mA dc, I <sub>B1</sub> = 2.0 mA dc	t <sub>on</sub>		1.0	μs
Turn-Off Time V <sub>CC</sub> = 200 Vdc; I <sub>C</sub> = 20 mA dc, I <sub>B1</sub> = -I <sub>B2</sub> = 2.0 mA dc	t <sub>off</sub>		10	μs

**SAFE OPERATING AREA**

<b>DC Tests</b> T <sub>C</sub> = 25 <sup>0</sup> C, 1 cycle, t = 1.0 s				
<b>Test 1</b> V <sub>CE</sub> = 5.0 Vdc, I <sub>C</sub> = 1.0 A dc      Both Types				
<b>Test 2</b> V <sub>CE</sub> = 350 Vdc, I <sub>C</sub> = 14 mA dc      2N3439				
<b>Test 3</b> V <sub>CE</sub> = 250 Vdc, I <sub>C</sub> = 20 mA dc      2N3440				

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

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Datasheets for electronics components.