

NPN LOW POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/368

Devices

2N3439
2N3439L

2N3440
2N3440L

Qualified Level

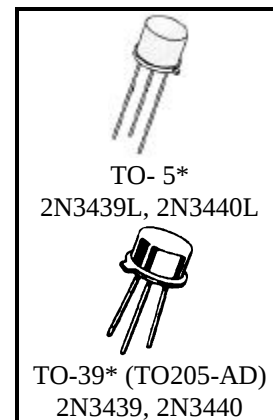
JANTX
JANTXV

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	@ $T_A = 25^\circ\text{C}^{(1)}$ @ $T_C = 25^\circ\text{C}^{(2)}$		W
		0.8 5.0		$\text{W}/^\circ\text{C}$
Operating & Storage Temperature Range	T_{op}, T_{stg}	-55 to +200		$^\circ\text{C}$

1) Derate linearly 4.57 mW/ $^\circ\text{C}$ for $T_A > +25^\circ\text{C}$

2) Derate linearly 28.5 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 $I_C = 50 \text{ mAdc}$	2N3439 2N3440	$V_{(BR)CEO}$	350 250	Vdc
Collector-Emitter Cutoff Current $V_{CE} = 300 \text{ Vdc}$ $V_{CE} = 200 \text{ Vdc}$	2N3439 2N3440	I_{CEO}	2.0 2.0	μAdc μAdc
Emitter-Base Cutoff Current $V_{EB} = 7.0 \text{ Vdc}$		I_{EBO}	10	μAdc

ELECTRICAL CHARACTERISTICS (con't)

Characteristics	Symbol	Min.	Max.	Unit
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OFF CHARACTERISTICS (con't)

Collector-Emitter Cutoff Current $V_{CE} = 450 \text{ Vdc}$, $V_{BE} = -1.5 \text{ Vdc}$ 2N3439 $V_{CE} = 300 \text{ Vdc}$, $V_{BE} = -1.5 \text{ Vdc}$ 2N3440	I_{CEX}		5.0 5.0	μAdc μAdc
Collector-Base Cutoff Current $V_{CB} = 360 \text{ Vdc}$ 2N3439 $V_{CB} = 250 \text{ Vdc}$ 2N3440 $V_{CB} = 450 \text{ Vdc}$ 2N3439 $V_{CB} = 300 \text{ Vdc}$ 2N3440	I_{CBO}		2.0 2.0 5.0 5.0	μAdc

ON CHARACTERISTICS ⁽³⁾

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

DYNAMIC CHARACTERISTICS

Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 10 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$, $f = 5.0 \text{ MHz}$	$ h_{fe} $	3.0	15	
Forward Current Transfer Ratio $I_C = 5.0 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$, $f = 1.0 \text{ kHz}$	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 $V_{CC} = 200 \text{ Vdc}$; $I_C = 20 \text{ mAdc}$, $I_{B1} = 2.0 \text{ mAdc}$	t_{on}		1.0	μs
Turn-Off Time $V_{CC} = 200 \text{ Vdc}$; $I_C = 20 \text{ mAdc}$, $I_{B1} = -I_{B2} = 2.0 \text{ mAdc}$	t_{off}		10	μs

SAFE OPERATING AREA**DC Tests** $T_C = 25^\circ\text{C}$, 1 cycle, $t = 1.0 \text{ s}$ **Test 1** $V_{CE} = 5.0 \text{ Vdc}$, $I_C = 1.0 \text{ Adc}$ Both Types**Test 2** $V_{CE} = 350 \text{ Vdc}$, $I_C = 14 \text{ mAdc}$ 2N3439**Test 3** $V_{CE} = 250 \text{ Vdc}$, $I_C = 20 \text{ mAdc}$ 2N3440(3) Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$.