

NPN LOW POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/368

Devices

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

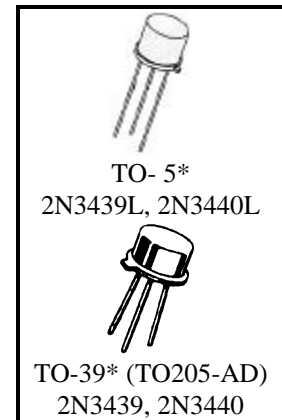
Qualified Level

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	@ $T_A = 25^{\circ}C^{(1)}$	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		$^{\circ}C$

- Derate linearly 4.57 mW/ $^{\circ}C$ for $T_A > +25^{\circ}C$
- 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 Vdc, V _{BE} = -1.5 Vdc V _{CE} = 300 Vdc, V _{BE} = -1.5 Vdc	I _{CEX}		5.0 5.0	μA _{dc} μA _{dc}
Collector-Base Cutoff Current V _{CB} = 360 Vdc V _{CB} = 250 Vdc V _{CB} = 450 Vdc V _{CB} = 300 Vdc	I _{CBO}		2.0 2.0 5.0 5.0	μA _{dc}

ON CHARACTERISTICS ⁽³⁾

Forward-Current Transfer Ratio I _C = 20 mA _{dc} , V _{CE} = 10 Vdc I _C = 2.0 mA _{dc} , V _{CE} = 10 Vdc I _C = 0.2 mA _{dc} , V _{CE} = 10 Vdc	h _{FE}	40 30 10	160	
Collector-Emitter Saturation Voltage I _C = 50 mA _{dc} , I _B = 4.0 mA _{dc}	V _{CE(sat)}		0.5	Vdc
Base-Emitter Saturation Voltage I _C = 50 mA _{dc} , I _B = 4.0 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 mA _{dc} , V _{CE} = 10 Vdc, f = 5.0 MHz	h _{fe}	3.0	15	
Forward Current Transfer Ratio I _C = 5.0 mA _{dc} , V _{CE} = 10 Vdc, f = 1.0 kHz	h _{fe}	25		
Output Capacitance V _{CB} = 10 Vdc, I _E = 0, 100 kHz ≤ f ≤ 1.0 MHz	C _{obo}		10	pF
Input Capacitance V _{EB} = 5.0 Vdc, I _C = 0, 100 kHz ≤ f ≤ 1.0 MHz	C _{ibo}		75	pF

SWITCHING CHARACTERISTICS

Turn-On Time V _{CC} = 200 Vdc; I _C = 20 mA _{dc} , I _{B1} = 2.0 mA _{dc}	t _{on}		1.0	μs
Turn-Off Time V _{CC} = 200 Vdc; I _C = 20 mA _{dc} , I _{B1} = -I _{B2} = 2.0 mA _{dc}	t _{off}		10	μs

SAFE OPERATING AREA

DC Tests T _C = 25 ⁰ C, 1 cycle, t = 1.0 s	
Test 1 V _{CE} = 5.0 Vdc, I _C = 1.0 A _{dc} Both Types	
Test 2 V _{CE} = 350 Vdc, I _C = 14 mA _{dc} 2N3439	
Test 3 V _{CE} = 250 Vdc, I _C = 20 mA _{dc} 2N3440	

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