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2N3439 & 2N3440 Silicon NPN Transistor Power Amplifier & High Speed Switch TO-39 Type Package

Absolute Maximum Ratings: ($T_C = +25^\circ\text{C}$ unless otherwise specified)

Collector-Emitter Voltage, V_{CE0}		
2N3439	350V	
2N3440	250V	
Collector-Base Voltage, V_{CBO}		
2N3439	450V	
2N3440	300V	
Emitter-Base Voltage, V_{EBO}	7V	
Continuous Collector Current, I_C	1A	
Total Device Dissipation ($T_A = +25^\circ\text{C}$), P_D	800mW	
Derate Above 25°C	4.75mW/ $^\circ\text{C}$	
Total Device Dissipation ($T_C = +25^\circ\text{C}$), P_D	5W	
Derate Above 25°C	28.5mW/ $^\circ\text{C}$	
Operating Junction Temperature Range, T_J	-65° to $+200^\circ\text{C}$	
Storage Temperature Range, T_{stg}	-65° to $+200^\circ\text{C}$	

Electrical Characteristics: ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Collector-Emitter Breakdown Voltage 2N3439	$V_{(BR)CEO}$	$I_C = 10\text{mA}$, $R_{BB1} = 470\Omega$, $V_{BB1} = 6\text{V}$, $L = 25\text{mH}$ (min), $f = 30$ to 60Hz	350	-	-	V
2N3440			250	-	-	V
Collector Cutoff Current 2N3439	I_{CEO}	$V_{CE} = 300\text{V}$	-	-	2.0	μA
2N3440		$V_{CE} = 200\text{V}$	-	-	2.0	μA
2N3439	I_{CEX}	$V_{CE} = 450\text{V}$, $V_{BE} = 1.5\text{V}$	-	-	5.0	μA
2N3440		$V_{CE} = 300\text{V}$, $V_{BE} = 1.5\text{V}$	-	-	5.0	μA
2N3439	I_{CBO}	$V_{CB} = 360\text{V}$	-	-	2.0	μA
		$V_{CB} = 450\text{V}$	-	-	5.0	μA
2N3440		$V_{CB} = 250\text{V}$	-	-	2.0	μA
		$V_{CB} = 300\text{V}$	-	-	5.0	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 7\text{V}$	-	-	10	μA

Electrical Characteristics (Cont'd): ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
ON Characteristics (Note 1)						
DC Current Gain	h_{FE}	$I_C = 20\text{mA}, V_{CE} = 10\text{V}$	40	-	160	
		$I_C = 2.0\text{mA}, V_{CE} = 10\text{V}$	30	-	-	
		$I_C = 0.2\text{mA}, V_{CE} = 10\text{V}$	10	-	-	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 50\text{mA}, I_B = 4\text{mA}$	-	-	0.5	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 50\text{mA}, I_B = 4\text{mA}$	-	-	1.3	V
Dynamic Characteristics						
Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio	$ h_{fe} $	$I_C = 10\text{mA}, V_{CE} = 10\text{V}, f = 5\text{MHz}$	3.0	-	15	
Forward Current Transfer Ratio	h_{fe}	$I_C = 5\text{mA}, V_{CE} = 10\text{V}, f = 1\text{kHz}$	25	-	-	
Output Capacitance	C_{obo}	$V_{CB} = 10\text{V}, I_E = 0, 100\text{kHz} \leq f \leq 1\text{MHz}$	-	-	10	pF
Input Capacitance	C_{ibo}	$V_{CB} = 5\text{V}, I_C = 0, 100\text{kHz} \leq f \leq 1\text{MHz}$	-	-	75	pF

Note 1. Pulse Test; Pulse Width = $300\mu\text{s}$, Duty Cycle $\leq 2\%$.

