

## 2N3439 (SILICON)

### NPN SILICON HIGH VOLTAGE POWER TRANSISTORS

... designed for use in consumer and industrial line-operated applications. These devices are particularly suited for audio, video and differential amplifiers as well as high-voltage, low-current inverters, switching and series pass regulators.

- High DC Current Gain –  
 $h_{FE} = 40 - 160 @ I_C = 20 \text{ mAdc}$
- Current-Gain-Bandwidth Product –  
 $f_T = 15 \text{ MHz (Min) @ } I_C = 10 \text{ mAdc}$
- Low Output Capacitance –  
 $C_{ob} = 10 \text{ pF (Max) @ } f = 1.0 \text{ MHz}$

1 AMPERE  
POWER TRANSISTORS  
NPN SILICON

350 VOLTS  
10 WATTS



#### \* MAXIMUM RATINGS

Rating	Symbol	2N3439	Units
Collector-Emitter Voltage	$V_{CE0}$	350	Vdc
Collector-Base Voltage	$V_{CB}$	450	Vdc
Emitter-Base Voltage	$V_{EB}$	7.0	Vdc
Collector Current - Continuous	$I_C$	1.0	Adc
Base Current	$I_B$	0.5	Adc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.0	Watts
		5.7	mW/°C
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.0	Watts
		0.057	W/°C
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +200	°C

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Units
Thermal Resistance, Junction to Case	$\theta_{JC}$	17.5	°C/W
Thermal Resistance, Junction to Ambient	$\theta_{JA}$	175	°C/W

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

Characteristic	Symbol	Min	Max	Units
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#### OFF CHARACTERISTICS

Characteristic	Symbol	Min	Max	Units
Collector-Emitter Sustaining Voltage (1) ( $I_C = 50 \text{ mAdc}, I_B = 0$ )	$V_{CE0}(\text{sat})$	350	-	Vdc
Collector Cutoff Current ( $V_{CE} = 300 \text{ Vdc}, I_B = 0$ )	$I_{CEO}$	-	20	$\mu\text{Adc}$
Collector Cutoff Current ( $V_{CE} = 450 \text{ Vdc}, V_{BE}(\text{off}) = 1.5 \text{ Vdc}$ )	$I_{CEX}$	-	500	$\mu\text{Adc}$
Collector Cutoff Current ( $V_{CB} = 360 \text{ Vdc}, I_E = 0$ )	$I_{CBO}$	-	20	$\mu\text{Adc}$
Emitter Cutoff Current ( $V_{BE} = 6.0 \text{ Vdc}, I_C = 0$ )	$I_{EBO}$	-	20	$\mu\text{Adc}$

#### ON CHARACTERISTICS (1)

Characteristic	Symbol	Min	Max	Units
DC Current Gain ( $I_C = 20 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$ ) ( $I_C = 20 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$ )	$h_{FE}$	30 40	- 160	-
Collector-Emitter Saturation Voltage ( $I_C = 50 \text{ mAdc}, I_B = 4.0 \text{ mAdc}$ )	$V_{CE}(\text{sat})$	-	0.5	Vdc
Base-Emitter Saturation Voltage ( $I_C = 50 \text{ mAdc}, I_B = 4.0 \text{ mAdc}$ )	$V_{BE}(\text{sat})$	-	1.3	Vdc

#### DYNAMIC CHARACTERISTICS

Characteristic	Symbol	Min	Max	Units
Current Gain - Bandwidth Product ( $I_C = 10 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$ )	$f_T$	15	-	MHz
Output Capacitance ( $V_{CB} = 10 \text{ Vdc}, I_E = 0, f = 1.0 \text{ MHz}$ )	$C_{ob}$	-	10	pF
Input Capacitance ( $V_{EB} = 5.0 \text{ Vdc}, I_C = 0, f = 1.0 \text{ MHz}$ )	$C_{ib}$	-	75	pF
Small signal Current Gain ( $I_C = 5.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz}$ )	$h_{fe}$	25	-	-
Real Part of Common Emitter Small-Signal Short-Circuit Input Impedance ( $V_{CE} = 10 \text{ Vdc}, I_C = 5.0 \text{ mAdc}, f = 1.0 \text{ MHz}$ )	$\text{Re}(Z_{in})$	-	300	Ohms

\* Indicates JEDEC Registered Data.  
(1) Pulse Test - Pulse Width of 300  $\mu\text{s}$ , Duty Cycle of 2.0%.

