

# 2N2959

CASE 79, STYLE 1  
TO-39 (TO-205AD)

SWITCHING TRANSISTORS

NPN SILICON

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	20	Vdc
Collector-Base Voltage	$V_{CBO}$	60	Vdc
Emitter-Base Voltage	$V_{EBO}$	5.0	Vdc
Collector Current — Continuous	$I_C$	600	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	0.6 20	Watt mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	3.0 4.00	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +200	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector-Emitter Breakdown Voltage ( $I_C = 10$ mAdc, pulsed, $I_B = 0$ )	$V_{(BR)CEO}$	20	—	Vdc
Collector-Base Breakdown Voltage ( $I_C = 10$ $\mu$ Adc, $I_E = 0$ )	$V_{(BR)CBO}$	60	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 10$ $\mu$ Adc, $I_C = 0$ )	$V_{(BR)EBO}$	5.0	—	Vdc
Collector Cutoff Current ( $V_{CE} = 30$ Vdc, $V_{BE} = 0.5$ Vdc)	$I_{CEX}$	—	.050	$\mu$ Adc
Collector Cutoff Current ( $V_{CB} = 50$ Vdc, $I_E = 0$ ) ( $V_{CB} = 50$ Vdc, $I_E = 0$ , $T_A = 150^\circ\text{C}$ )	$I_{CBO}$	— —	0.025 15	$\mu$ Adc
Base Cutoff Current ( $V_{CE} = 30$ Vdc, $V_{BE} = 0.5$ Vdc)	$I_{BL}$	—	.050	$\mu$ Adc

## ON CHARACTERISTICS

DC Current Gain ( $I_C = 150$ mAdc, $V_{CE} = 10$ Vdc)	$h_{FE}$	100	300	—
Collector-Emitter Saturation Voltage(1) ( $I_C = 150$ mAdc, $I_B = 15$ mAdc)	$V_{CE(sat)}$	—	0.5	Vdc
Base-Emitter Saturation Voltage(1) ( $I_C = 150$ mAdc, $I_B = 15$ mAdc)	$V_{BE(sat)}$	—	1.3	Vdc

## SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product ( $I_C = 20$ mA, $V_{CE} = 20$ V, $f = 100$ MHz)	$f_T$	250	—	MHz
Output Capacitance ( $V_{CB} = 10$ V, $I_E = 0$ , $f = 100$ kHz)	$C_{obo}$	—	8.0	pF

## SWITCHING CHARACTERISTICS

Delay Time ( $V_{CC} = 30$ V, $I_{CS} = 150$ mA, $I_{B1} = 15$ mA)	$t_d$	—	20	ns
Rise Time ( $V_{CC} = 30$ V, $I_{CS} = 150$ mA, $I_{B1} = 15$ mA)	$t_r$	—	75	ns
Storage Time ( $V_{CC} = 6.0$ V, $I_{CS} = 150$ mA, $I_{B1} = 15$ mA, $I_{B2} = 15$ mA)	$t_s$	—	300	ns
Fall Time ( $V_{CC} = 6.0$ V, $I_{CS} = 150$ mA, $I_{B1} = 15$ mA, $I_{B2} = 15$ mA)	$t_f$	—	200	ns

(1) Pulse Test: Pulse Width  $\leq 300$   $\mu$ s, Duty Cycle  $\leq 2.0\%$ .