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**2N4928 thru 2N4931 (SILICON)**



High-voltage PNP silicon annular transistors for use in general-purpose high-voltage applications.

(TO-39)

Collector connected to case

**MAXIMUM RATINGS**

Rating	Symbol	2N4928	2N4929	2N4930	2N4931	Unit
Collector-Emitter Voltage	$V_{CEO}$	100	150	200	250	Vdc
Collector-Base Voltage	$V_{CB}$	100	150	200	250	Vdc
Emitter-Base Voltage	$V_{EB}$	4.0	4.0	4.0	4.0	Vdc
Collector Current – Continuous	$I_C$	100	500	500	500	mA dc
Total Device Dissipation @ $T_A = 25^\circ C$ Derate above $25^\circ C$	$P_D$	0.6 3.4	1.0 5.71	1.0 5.71	1.0 5.71	Watt mW/ $^\circ C$
Total Device Dissipation @ $T_C = 25^\circ C$ Derate above $25^\circ C$	$P_D$	3.0 17.2	5.0 28.6	5.0 28.6	5.0 28.6	Watt mW/ $^\circ C$
Operating & Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +200				$^\circ C$



Quality Semi-Conductors

**2N4928 thru 2N4931 (continued)**

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$ )

Characteristic	Symbol	Min	Max	Unit
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**OFF CHARACTERISTICS**

Collector-Emitter Breakdown Voltage <sup>(1)</sup> ( $I_C = 10 \text{ mAdc}$ , $I_B = 0$ )	2N4928 2N4929 2N4930 2N4931	$BV_{CEO}$	100 150 200 250	- - - -	Vdc
Collector-Base Breakdown Voltage ( $I_E = 0$ , $I_C = 100 \mu\text{Adc}$ )	2N4928 2N4929 2N4930 2N4931	$BV_{CBO}$	100 150 200 250	- - - -	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 100 \mu\text{Adc}$ , $I_C = 0$ )		$BV_{EBO}$	4.0	-	Vdc
Collector Cutoff Current ( $V_{CB} = 50 \text{ Vdc}$ , $I_E = 0$ )	2N4928	$I_{CBO}$	-	0.5	$\mu\text{Adc}$
( $V_{CB} = 75 \text{ Vdc}$ , $I_E = 0$ )	2N4929		-	0.5	
( $V_{CB} = 150 \text{ Vdc}$ , $I_E = 0$ )	2N4930, 2N4931		-	1.0	
Emitter Cutoff Current ( $V_{BE} = 3.0 \text{ Vdc}$ , $I_C = 0$ )	2N4928, 2N4929	$I_{EBO}$	-	0.5	$\mu\text{Adc}$
( $V_{BE} = 3.0 \text{ Vdc}$ , $I_C = 0$ )	2N4930, 2N4931		-	1.0	

**ON CHARACTERISTICS**

DC Current Gain ( $I_C = 1.0 \text{ mAdc}$ , $V_{CE} = 10 \text{ Vdc}$ )	All Types	$h_{FE}$	20	-	-
( $I_C = 10 \text{ mAdc}$ , $V_{CE} = 10 \text{ Vdc}$ ) <sup>(1)</sup>	2N4928, 2N4929		25	200	
( $I_C = 10 \text{ mAdc}$ , $V_{CE} = 10 \text{ Vdc}$ ) <sup>(1)</sup>	2N4930, 2N4931		20	200	
( $I_C = 50 \text{ mAdc}$ , $V_{CE} = 10 \text{ Vdc}$ ) <sup>(1)</sup>	2N4928, 2N4929		20	-	
( $I_C = 30 \text{ mAdc}$ , $V_{CE} = 10 \text{ Vdc}$ ) <sup>(1)</sup>	2N4930, 2N4931		20	-	
Collector-Emitter Saturation Voltage <sup>(1)</sup> ( $I_C = 10 \text{ mAdc}$ , $I_B = 1.0 \text{ mAdc}$ )	2N4928, 2N4929 2N4930, 2N4931	$V_{CE(sat)}$	- -	0.5 5.0	Vdc
Base-Emitter On Voltage ( $I_C = 10 \text{ mAdc}$ , $V_{CE} = 10 \text{ Vdc}$ )		$V_{BE(on)}$	-	1.0	Vdc

**DYNAMIC CHARACTERISTICS**

Current-Gain-Bandwidth Product ( $I_C = 20 \text{ mAdc}$ , $V_{CE} = 20 \text{ Vdc}$ , $f = 100 \text{ MHz}$ )	2N4928, 2N4929	$f_T$	100	1,000	MHz
( $I_C = 20 \text{ mAdc}$ , $V_{CE} = 20 \text{ Vdc}$ , $f = 20 \text{ MHz}$ )	2N4930, 2N4931		20	200	
Collector-Base Capacitance ( $V_{CB} = 20 \text{ Vdc}$ , $I_E = 0$ , $f = 140 \text{ kHz}$ )	2N4928	$C_{cb}$	-	6.0	pF
( $V_{CB} = 20 \text{ Vdc}$ , $I_E = 0$ , $f = 140 \text{ kHz}$ )	2N4929		-	10	
( $V_{CB} = 20 \text{ Vdc}$ , $I_E = 0$ , $f = 140 \text{ kHz}$ )	2N4930, 2N4931		-	20	
Emitter-Base Capacitance ( $V_{BE} = 2.0 \text{ Vdc}$ , $I_C = 0$ , $f = 140 \text{ kHz}$ )	2N4928	$C_{eb}$	-	40	pF
( $V_{BE} = 1.0 \text{ Vdc}$ , $I_C = 0$ , $f = 140 \text{ kHz}$ )	2N4929		-	80	
( $V_{BE} = 0.5 \text{ Vdc}$ , $I_C = 0$ , $f = 140 \text{ kHz}$ )	2N4930, 2N4931		-	400	

