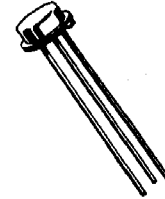


**2N5229          PNP SILICON  
 2N5230          CHOPPER  
 2N5231          TRANSISTORS**

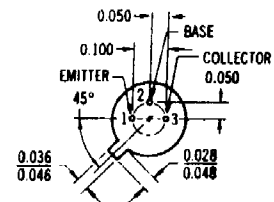
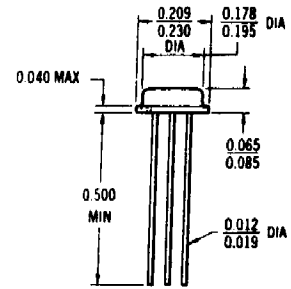


- Low Offset Voltage –  $V_{EC(off)} = 0.5 \text{ mVdc (Max) @ } I_B = 100 \mu\text{Adc}$
- Low Dynamic "ON" Series Resistance –  
 $r_{ec(ON)} = 6.0 \text{ Ohms (Max) @ } I_B = 1.0 \text{ mAdc}$
- Space Saving TO-46 Package

**MAXIMUM RATINGS**

Rating	Symbol	2N5229	2N5230	2N5231	Unit
*Collector-Emitter Voltage	$V_{CEO}$	10	20	30	Vdc
*Collector-Base Voltage	$V_{CB}$	15	30	50	Vdc
*Emitter-Base Voltage	$V_{EB}$	15	30	50	Vdc
*Collector Current	$I_C$	← 50 →			mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	← 0.5 →			Watt
		← 2.86 →			mW/ $^\circ\text{C}$
*Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	← 2.0 →			Watts
		← 12 →			mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	← -65 to +200 →			$^\circ\text{C}$

\*Indicates JEDEC Registered Data.



TO-46 PACKAGE



# 2N5229, 2N5230, 2N5231 (continued)

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

Characteristic	Symbol	Min	Max	Unit	
<b>OFF CHARACTERISTICS</b>					
Emitter-Collector Breakdown Voltage ( $I_E = 10 \mu\text{A}$ , $I_B = 0$ )	2N5229 2N5230 2N5231	BV <sub>ECO</sub>	10 20 30	— — —	V <sub>dc</sub>
Collector-Base Breakdown Voltage ( $I_C = 10 \mu\text{A}$ , $I_E = 0$ )	2N5229 2N5230 2N5231	BV <sub>CBO</sub>	15 30 50	— — —	V <sub>dc</sub>
Emitter-Base Breakdown Voltage ( $I_E = 10 \mu\text{A}$ , $I_C = 0$ )	2N5229 2N5230 2N5231	BV <sub>EBO</sub>	15 30 50	— — —	V <sub>dc</sub>
Collector Cutoff Current ( $V_{CB} = 12 \text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = 25 \text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = 40 \text{ Vdc}$ , $I_E = 0$ )	2N5229 2N5230 2N5231	I <sub>CBO</sub>	— — —	1.0 1.0 1.0	nA <sub>dc</sub>
Emitter Cutoff Current ( $V_{EB} = 12 \text{ Vdc}$ , $I_C = 0$ ) ( $V_{EB} = 25 \text{ Vdc}$ , $I_C = 0$ ) ( $V_{EB} = 40 \text{ Vdc}$ , $I_C = 0$ )	2N5229 2N5230 2N5231	I <sub>EBO</sub>	— — —	1.0 1.0 1.0	nA <sub>dc</sub>
<b>ON CHARACTERISTICS</b>					
DC Current Gain ( $I_C = 100 \mu\text{A}$ , $V_{CE} = 1.0 \text{ Vdc}$ ) ( $I_C = 200 \mu\text{A}$ , $V_{CE} = 0.5 \text{ Vdc}$ ) (Inverted Connection)		h <sub>FE</sub>	50 15	— —	—
Offset Voltage ( $I_B = 100 \mu\text{A}$ , $I_E = 0$ ) ( $I_B = 1.0 \text{ mA}$ , $I_E = 0$ )	2N5229, 2N5230 2N5231 2N5229 2N5230, 2N5231	V <sub>EC(off)</sub>	— — — —	0.5 0.8 0.8 1.0	mV <sub>dc</sub>
<b>DYNAMIC CHARACTERISTICS</b>					
Collector-Base Capacitance ( $V_{CB} = 10 \text{ Vdc}$ , $I_E = 0$ , $f = 140 \text{ kHz}$ )		C <sub>cb</sub>	—	5.0	pF
Emitter-Base Capacitance ( $V_{EB} = 10 \text{ Vdc}$ , $I_C = 0$ , $f = 140 \text{ kHz}$ )		C <sub>eb</sub>	—	4.0	pF
Small-Signal Current Gain ( $I_C = 1.0 \text{ mA}$ , $V_{CE} = 5.0 \text{ Vdc}$ , $f = 4.0 \text{ MHz}$ )		h <sub>fe</sub>	2.0	—	—
"ON" Series Resistance ( $I_B = 1.0 \text{ mA}$ , $I_E = 0$ , $I_C = 100 \mu\text{A}$ , $f = 1.0 \text{ kHz}$ )	2N5229 2N5230 2N5231	r <sub>ec (ON)</sub>	1.0 2.0 2.0	6.0 8.0 10	Ohms

\*Indicates JEDEC Registered Data.