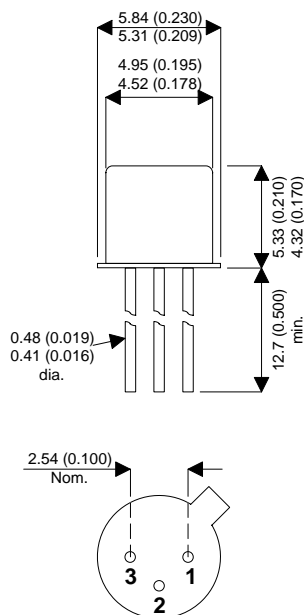


**MECHANICAL DATA**

Dimensions in mm (inches)



**TO18 (TO-206AA) PACKAGE**

**Underside View**

Pin 1 = Emitter    Pin 2 = Base    Pin 3 = Collector

**BIPOLAR NPN SILICON  
AMPLIFIER TRANSISTORS**

**FEATURES**

- SILICON PLANAR EPITAXIAL NPN TRANSISTOR
- HERMETICALLY SEALED METAL PACKAGE
- CECC SCREENING OPTIONS AVAILABLE
- SPACE QUALITY LEVELS AVAILABLE

**APPLICATIONS:**

The 2N930A is designed for small general purpose and amplifier applications

**ABSOLUTE MAXIMUM RATINGS** ( $T_A = 25^\circ\text{C}$  unless otherwise stated)

$V_{CBO}$	Collector – Base Voltage	60V
$V_{CEO}$	Collector – Emitter Voltage	45V
$V_{EBO}$	Emitter – Base Voltage	6V
$I_C$	Collector Current	30mA
$P_D$	Total Device Dissipation @ $T_A = 25^\circ\text{C}$	0.5W
	Derate above $25^\circ\text{C}$	$350^\circ\text{C} / \text{W}$
$P_D$	Total Device Dissipation @ $T_C = 25^\circ\text{C}$	1.2W
	Derate above $25^\circ\text{C}$	$146^\circ\text{C} / \text{W}$
$T_{STG}, T_J$	Operating and Storage Temperature Range	$-65$ to $+200^\circ\text{C}$

Semelab Plc reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by Semelab is believed to be both accurate and reliable at the time of going to press. However Semelab assumes no responsibility for any errors or omissions discovered in its use. Semelab encourages customers to verify that datasheets are current before placing orders.

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Issue 1

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

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
<b>OFF CHARACTERISTICS</b>					
$V_{(BR)CEO}^*$	Collector – Emitter Breakdown Voltage	$I_C = 10\text{mA}$	$I_B = 0$	45	
$V_{(BR)CBO}$	Collector – Base Breakdown Voltage	$I_C = 10\mu\text{A}$	$I_E = 0$	60	V
$V_{(BR)EBO}$	Emitter – Base Breakdown Voltage	$I_E = 10\mu\text{A}$	$I_C = 0$	6	
$I_{CEO}$	Collector Cut-off Current	$V_{CE} = 5\text{V}$	$I_B = 0$		2
$I_{CBO}$	Collector – Cut-off Current	$V_{CB} = 45\text{V}$	$I_E = 0$		2
$I_{CES}$	Collector – Cut-off Current	$V_{CE} = 45\text{V}$	$V_{BE} = 0$ $T_A = 170^\circ\text{C}$		2
$I_{EBO}$	Emitter – Cut-off Current	$V_{EB} = 5\text{V}$	$I_C = 0$		2
<b>ON CHARACTERISTICS</b>					
$V_{CE(sat)}^*$	Collector – Emitter Saturation Voltage	$I_C = 10\text{mA}$	$I_B = 0.5\text{mA}$		0.5
$V_{BE(sat)}^*$	Base – Emitter Saturation Voltage	$I_C = 10\text{mA}$	$I_B = 0.5\text{mA}$	0.7	0.9
$h_{FE}^*$	DC Current Gain	$I_C = 1.0\mu\text{A}$	$V_{CE} = 5\text{V}$	60	
		$I_C = 10\mu\text{A}$	$V_{CE} = 5\text{V}$	100	300
		$I_C = 10\text{mA}$	$V_{CE} = 5\text{V}$	30	
		$T_A = -55^\circ\text{C}$			
		$I_C = 10\text{mA}$	$V_{CE} = 5\text{V}$		600
<b>SMALL SIGNAL CHARACTERISTICS</b>					
$f_T$	Current Gain Bandwidth Product	$I_C = 500\mu\text{A}$ $f = 30\text{MHz}$	$V_{CE} = 5\text{V}$	30	
$C_{ob}$	Output Capacitance	$I_E = 0$ $f = 1\text{MHz}$	$V_{CB} = 5\text{V}$		6
$h_{ib}$	Input Impedance			25	32
$h_{rb}$	Voltage Feedback Ratio	$I_E = 1\text{mA}$	$V_{CB} = 5\text{V}$		600
$h_{ob}$	Output Admittance	$f = 1\text{kHz}$			1
$h_{fe}$	Small Signal Current Gain			150	600
NF	Noise Figure	$V_{CE} = 5\text{V}$ $R_S = 10\text{k}\Omega$ $f = 1.0\text{kHz}$	$I_C = 10\mu\text{A}$		3

\* Pulse Test:  $t_p \leq 300\mu\text{s}$ ,  $\delta \leq 2\%$