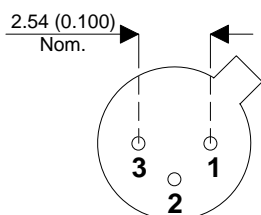
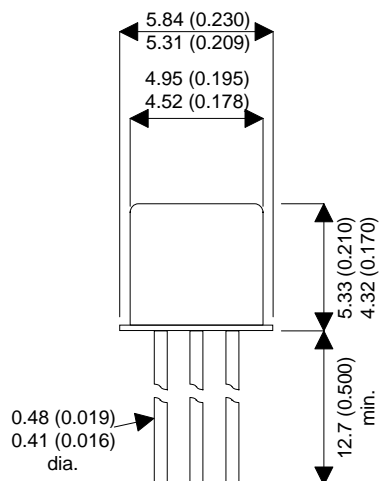


**MECHANICAL DATA**

Dimensions in mm (inches)



**TO-18 METAL PACKAGE**

**Underside View**

PIN 1 – Emitter    PIN 2 – Base    PIN 3 – Collector

**PNP, LOW NOISE  
AMPLIFIER  
TRANSISTOR**

**FEATURES**

- SILICON PLANAR EPITAXIAL PNP TRANSISTOR
- CECC SCREENING OPTIONS
- LOW NOISE AMPLIFIER

**APPLICATIONS:**

- Low Level Amplifier
- Instrumentation Amplifiers
- General Purpose

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

$V_{CBO}$	Collector – Base Voltage	-60V
$V_{CEO}$	Collector – Emitter Voltage ( $I_B = 0$ )	-50V
$V_{EBO}$	Emitter – Base Voltage ( $I_B = 0$ )	-5V
$I_C$	Collector Current	-50mA
$P_D$	Total Device Dissipation @ $T_A = 25^{\circ}C$	360mW
	Derate above $25^{\circ}C$	2.06mW / $^{\circ}C$
$P_D$	Total Device Dissipation @ $T_C = 25^{\circ}C$	1.2W
	Derate above $25^{\circ}C$	6.86mW / $^{\circ}C$
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-65 to +200 $^{\circ}C$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	0.49 $^{\circ}C/mW$
$R_{\theta JC}$	Thermal Resistance Junction to Case	0.15 $^{\circ}C/mW$

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

Parameter		Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)CEO}$	Collector – Emitter Breakdown Voltage	$I_C = -10\text{mA}$	$I_B = 0$	-60			V
$V_{(BR)CBO}$	Collector – Base Breakdown Voltage	$I_C = -10\mu\text{A}$	$I_E = 0$	-50			
$V_{(BR)EBO}$	Emitter – Base Breakdown Voltage	$I_E = -10\mu\text{A}$	$I_C = 0$	-5			
$I_{CBO}$	Collector Cut-off Current	$V_{CB} = -50\text{V}$ $I_E = 0$	$T_A = 150^\circ\text{C}$			-0.01 -10	$\mu\text{A}$
$I_{EBO}$	Emitter Cut-off Current	$V_{EB} = -4\text{V}$	$I_C = 0$			-20	nA
$V_{CE(sat)}$	Collector – Emitter Saturation Voltage	$I_C = -100\mu\text{A}$ $I_C = -1\text{mA}$	$I_B = -10\mu\text{A}$ $I_B = -100\mu\text{A}$			-0.2 -0.25	V
$V_{BE(sat)}$	Base – Emitter Saturation Voltage	$I_C = -100\mu\text{A}$ $I_C = -1\text{mA}$	$I_B = -10\mu\text{A}$ $I_B = -100\mu\text{A}$			-0.7 -0.8	V
$V_{BE(on)}$	Base – Emitter On Voltage	$I_C = -100\mu\text{A}$	$V_{CE} = -5\text{V}$			-0.7	V
$h_{FE}$	DC Current Gain	$(V_{CE} = -5\text{V})$	$I_C = -1\mu\text{A}$			75	—
			$I_C = -10\mu\text{A}$			225	
			$I_C = -100\mu\text{A}$			300	
			$I_C = -100\mu\text{A}$	$T_A = -55^\circ\text{C}$		150	
			$I_C = -500\mu\text{A}$			300	
			$I_C = -1\text{mA}$			300	
			$I_C = -10\text{mA}^*$			250	

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

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

Parameter		Test Conditions			Min.	Typ.	Max.	Unit
$f_t$	Current Gain Bandwidth Product <sup>1</sup>	$V_{CE} = -5\text{V}$	$I_C = -500\mu\text{A}$	$f = 20\text{MHz}$	30			MHz
		$V_{CE} = -5\text{V}$	$I_C = -1\text{mA}$	$f = 100\text{MHz}$	100		500	
$C_{ob}$	Output Capacitance	$V_{CB} = -5\text{V}$	$I_E = 0$	$f = 1\text{MHz}$			4	$\mu\text{F}$
$C_{ib}$	Input Capacitance	$V_{EB} = -0.5\text{V}$	$I_C = 0$	$f = 1\text{MHz}$			8	
$h_{ie}$	Input Impedance	$V_{CE} = -10\text{V}$ $I_C = -1\text{mA}$ $f = 1\text{kHz}$			10		40	$\text{k}\Omega$
$h_{oe}$	Output Admittance				5		60	$\mu\text{hos}$
$h_{re}$	Voltage Feedback Ratio						25	$\times 10^{-4}$
$h_{fe}$	Small Signal Current Gain				300		900	—
$N_F$	Noise Figure	$V_{CE} = -10\text{V}$ $I_C = -100\mu\text{A}$ $R_G = 3\text{k}\Omega$	$f = 100\text{Hz}$	B.W. = 20Hz		2.5	4	dB
			<b>Spot:</b>	$f = 1\text{kHz}$ B.W. = 200Hz		0.8	1.5	
			<b>Noise:</b>	$f = 10\text{kHz}$ B.W. = 2kHz		1.8	1.5	
				$f = 1\text{kHz}$		1.5	2.5	

1)  $f_t$  is defined as the frequency at which  $|h_{fe}|$  extrapolates to unity.