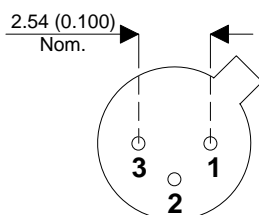
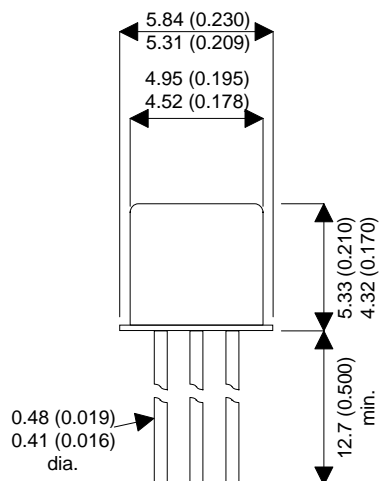


MECHANICAL DATA

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 ($I_B = 0$)	-60V
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	$I_C = -10\mu\text{A}$	$I_E = 0$	-60			
$V_{(BR)EBO}$	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	μA
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 ¹	$V_{CE} = -5\text{V}$	$I_C = -500\mu\text{A}$	$f = 20\text{MHz}$	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	pF	
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	k Ω	
h_{oe}	Output Admittance				5		60	μhmos	
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	
			Spot:	$f = 1\text{kHz}$	B.W. = 200Hz		0.8		1.5
				$f = 10\text{kHz}$	B.W. = 2kHz		1.8		1.5
			Noise:	$f = 1\text{kHz}$			1.5		2.5

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