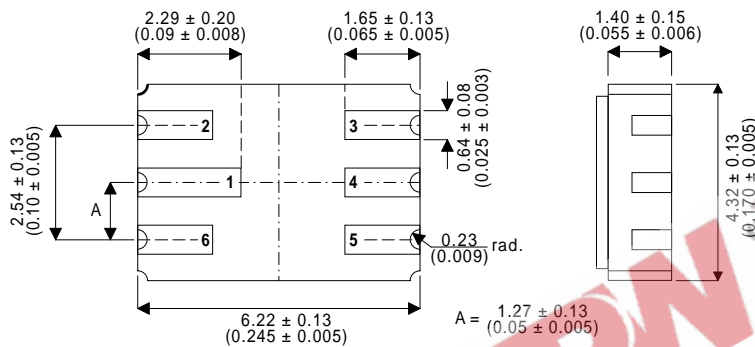


**MECHANICAL DATA**

Dimensions in mm (inches)

**DUAL HIGH GAIN  
PNP TRANSISTORS IN A  
HERMETICALLY SEALED  
CERAMIC SURFACE MOUNT PACKAGE  
FOR HIGH RELIABILITY APPLICATIONS**



**FEATURES**

- HERMETIC CERAMIC SURFACE MOUNT PACKAGE
- CECC SCREENING OPTIONS
- SPACE QUALITY LEVELS OPTIONS

**LCC2 PACKAGE  
Underside View**

- PAD 1 – Collector 1
- PAD 2 – Base 1
- PAD 3 – Base 2
- PAD 4 – Collector 2
- PAD 5 – Emitter 2
- PAD 6 – Emitter 1

**APPLICATIONS:**

Suitable for use in high gain, low noise differential amplifier applications.

**ABSOLUTE MAXIMUM RATINGS**

(T<sub>amb</sub> = 25°C unless otherwise stated)

		EACH SIDE	TOTAL DEVICE
V <sub>CBO</sub>	Collector – Base Voltage	–60V	
V <sub>CEO</sub>	Collector – Emitter Voltage <sup>1</sup>	–60V	
V <sub>EBO</sub>	Emitter – Base Voltage	–5V	
I <sub>C</sub>	Collector Current	–50mA	
P <sub>D</sub>	Total Device Dissipation	500mW	600mW
	Derate above 25°C	2.9mW / °C	3.4mW / °C
T <sub>STG</sub>	Storage Temperature Range	–65 to 200°C	

**NOTES**

1. Base – Emitter Diode Open Circuited.

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

Parameter	Test Conditions <sup>1</sup>	Min.	Typ.	Max.	Unit	
<b>INDIVIDUAL TRANSISTOR CHARACTERISTICS</b>						
$V_{(BR)CBO}$	Collector – Base Breakdown Voltage	$I_C = -10\mu\text{A}$ $I_E = 0$	-60		V	
$V_{(BR)CEO}^*$	Collector – Emitter Breakdown Voltage	$I_C = -10\text{mA}$ $I_B = 0$	-60			
$V_{(BR)EBO}$	Emitter – Base Breakdown Voltage	$I_E = -10\mu\text{A}$ $I_C = 0$	-5			
$I_{CBO}$	Collector Cut-off Current	$V_{CB} = -50\text{V}$ $I_E = 0$		-10	nA	
		$T_A = 150^{\circ}\text{C}$		-10	$\mu\text{A}$	
$I_{EBO}$	Emitter Cut-off Current	$V_{EB} = -4\text{V}$ $I_C = 0$		-20	nA	
$h_{FE}$	DC Current Gain	$I_C = -10\mu\text{A}$ $V_{CE} = -5\text{V}$	100		—	
		$I_C = -100\mu\text{A}$ $V_{CE} = -5\text{V}$	150	450		
		$T_A = -55^{\circ}\text{C}$	75			
		$I_C = -500\mu\text{A}$ $V_{CE} = -5\text{V}$	150	450		
		$I_C = -1\text{mA}$ $V_{CE} = -5\text{V}$	150	450		
		$I_C = -10\text{mA}$ $V_{CE} = -5\text{V}^*$	125			
$V_{BE}$	Base – Emitter Voltage	$I_C = -100\mu\text{A}$ $V_{CE} = -5\text{V}$		-0.7	V	
		$I_B = -10\mu\text{A}$ $I_C = -100\mu\text{A}$		-0.7		
		$I_B = -100\mu\text{A}$ $I_C = -1\text{mA}$		-0.8		
$V_{CE(sat)}$	Collector – Emitter Saturation Voltage	$I_B = -10\mu\text{A}$ $I_C = -100\mu\text{A}$		-0.2	V	
		$I_B = -100\mu\text{A}$ $I_C = -1\text{mA}$		-0.25		
$h_{ie}$	Small Signal Common – Emitter Input Impedance	$V_{CE} = -10\text{V}$	3	30	k $\Omega$	
$h_{fe}$	Small Signal Common – Emitter Current Gain		150	600	—	
$h_{re}$	Small Signal Common – Emitter Reverse Voltage Gain		$I_C = -1\text{mA}$		$25 \times 10^{-4}$	
$h_{oe}$	Small Signal Common – Emitter Output Admittance		$f = 1\text{kHz}$	5	60	$\mu\text{mho}$
$ h_{fe} $	Small Signal Common – Emitter Current Gain	$V_{CE} = -5\text{V}$ $I_C = -500\mu\text{A}$	1		—	
		$V_{CE} = -5\text{V}$ $I_C = -1\text{mA}$	1	5		
$C_{obo}$	Common – Base Open Circuit Output Capacitance	$V_{CB} = -5\text{V}$ $I_E = 0$		4	pF	
$C_{ibo}$	Common – Base Open Circuit Input Capacitance	$V_{EB} = -0.5\text{V}$ $I_C = 0$		8		

**NOTES**

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

1) Terminals not under test are open circuited under all test conditions.

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

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
<b>TRANSISTOR MATCHING CHARACTERISTICS</b>					
$h_{FE1}$	Static Forward Current Gain	$V_{CE} = -5\text{V}$			
$h_{FE2}$	Balance Ratio	$I_C = -100\mu\text{A}$	0.9	1	—
		See Note 2.			
$ V_{BE1} - V_{BE2} $	Base – Emitter Voltage Differential	$V_{CE} = -5\text{V}$		5	mV
		$I_C = -10\mu\text{A}$ to $-10\text{mA}$			
		$V_{CE} = -5\text{V}$		3	
		$I_C = -100\mu\text{A}$			
$ \Delta(V_{BE1} - V_{BE2})\Delta T_A $	Base – Emitter Voltage Differential	$V_{CE} = -5\text{V}$		0.8	mV
		$T_{A1} = 25^{\circ}\text{C}$			
		$T_{A2} = -55^{\circ}\text{C}$			
		$V_{CE} = -5\text{V}$		1	
		$I_C = -100\mu\text{A}$			
		$T_{A1} = 25^{\circ}\text{C}$			
		$T_{A2} = 125^{\circ}\text{C}$			

**OPERATING CHARACTERISTICS** ( $T_{amb} = 25^{\circ}\text{C}$  unless otherwise stated)

Parameter	Test Conditions <sup>1</sup>	Min.	Typ.	Max.	Unit
<b>INDIVIDUAL TRANSISTOR CHARACTERISTICS</b>					
F	Spot Noise Figure	$V_{CE} = -10\text{V}$			dB
		$I_C = -100\mu\text{A}$		7	
		$R_G = 3\text{k}\Omega$	$f = 100\text{Hz}$		
		Noise Bandwidth = 20Hz			
		$V_{CE} = -10\text{V}$			dB
		$I_C = -100\mu\text{A}$		3	
		$R_G = 3\text{k}\Omega$	$f = 1\text{kHz}$		
		Noise Bandwidth = 200Hz			
		$V_{CE} = -10\text{V}$			dB
		$I_C = -100\mu\text{A}$		2.5	
		$R_G = 3\text{k}\Omega$	$f = 10\text{kHz}$		
		Noise Bandwidth = 2kHz			
$\bar{F}$	Average Noise Figure	$V_{CE} = -10\text{V}$			dB
		$I_C = -100\mu\text{A}$		3.5	
		$R_G = 3\text{k}\Omega$	Noise Bandwidth = 15.7kHz		
		See Note 3.			

**NOTES**

- 1) Terminals not under test are open circuited under all test conditions.
- 2) The lower of the two readings is taken as  $h_{FE1}$ .
- 3) Average noise figure is measured in an amplifier with response down 3dB at 10Hz and 10 kHz and a high frequency rolloff of 6dB / octave.

**THERMAL INFORMATION**

