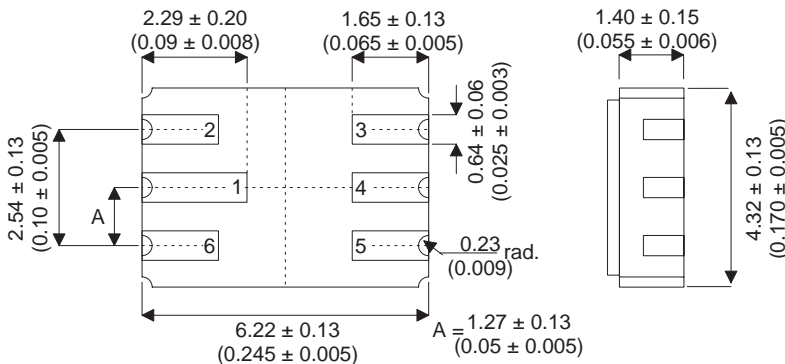


DUAL HIGH GAIN PNP TRANSISTORS IN A HERMETICALLY SEALED CERAMIC SURFACE MOUNT PACKAGE FOR HIGH RELIABILITY APPLICATIONS

MECHANICAL DATA
Dimensions in mm (inches)



FEATURES

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

LCC2 PACKAGE
Underside View

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

APPLICATIONS:

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

ABSOLUTE MAXIMUM RATINGS

		($T_{amb} = 25^{\circ}C$ unless otherwise stated)	
		EACH SIDE	TOTAL DEVICE
V_{CBO}	Collector – Base Voltage	–60V	
V_{CEO}	Collector – Emitter Voltage	–60V	
V_{EBO}	Emitter – Base Voltage	–5V	
I_C	Collector Current	–50mA	
P_D	Total Device Dissipation	500mW	600mW
	Derate above 25°C	2.9mW / °C	3.4mW / °C
T_{STG}	Storage Temperature Range	–65 to 200°C	

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

Parameter	Test Conditions	Min.	Typ.	Max.	Unit	
INDIVIDUAL TRANSISTOR CHARACTERISTICS						
$V_{(BR)CBO}$	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	μA
I_{EBO}	Emitter Cut-off Current	$V_{EB} = -4\text{V}$ $I_C = 0$		-20	nA	
h_{FE}	DC Current Gain	$I_C = -10\mu\text{A}$ $V_{CE} = -5\text{V}$		225	—	
			$I_C = -100\mu\text{A}$ $V_{CE} = -5\text{V}$	300		900
			$T_A = -55^{\circ}\text{C}$	150		
			$I_C = -500\mu\text{A}$ $V_{CE} = -5\text{V}$	300		900
			$I_C = -1\text{mA}$ $V_{CE} = -5\text{V}$	300		900
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	$V_{CE} = -10\text{V}$ $I_C = -1\text{mA}$ $f = 1\text{kHz}$	10	40	k Ω	
h_{fe}	Small Signal Common – Emitter Current Gain		300	900	—	
h_{re}	Small Signal Common – Emitter Reverse Voltage Gain		25×10^{-4}			
h_{oe}	Small Signal Common – Emitter Output Admittance		5	60	μmho	
$ h_{fe} $	Small Signal Common – Emitter Current Gain	$V_{CE} = -5\text{V}$ $f = 30\text{MHz}$	$I_C = -500\mu\text{A}$	1	—	
			$I_C = -1\text{mA}$	1		5
C_{obo}	Common – Base Open Circuit Output Capacitance	$V_{CB} = -5\text{V}$ $f = 100\text{kHz}$		4	pF	
C_{ibo}	Common – Base Open Circuit Input Capacitance	$V_{EB} = -0.5\text{V}$ $f = 100\text{kHz}$		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.

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

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

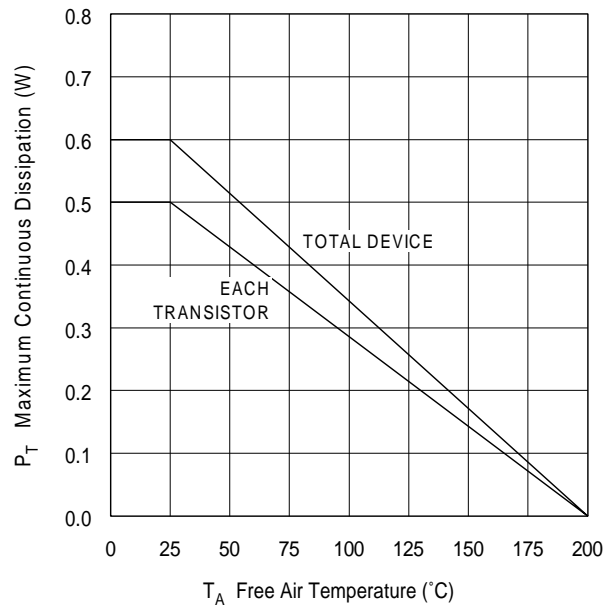
OPERATING CHARACTERISTICS ($T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
INDIVIDUAL TRANSISTOR CHARACTERISTICS					
F	Spot Noise Figure	$V_{CE} = -10V$		4	dB
		$I_C = -100\mu A$			
		$R_G = 3k\Omega$	$f = 100\text{Hz}$		
		Noise Bandwidth = 20Hz			
		$V_{CE} = -10V$		1.5	
		$I_C = -100\mu A$			
		$R_G = 3k\Omega$	$f = 1\text{kHz}$		
		Noise Bandwidth = 200Hz			
		$V_{CE} = -10V$		1.5	
		$I_C = -100\mu A$			
		$R_G = 3k\Omega$	$f = 10\text{kHz}$		
		Noise Bandwidth = 2kHz			
\bar{F}	Average Noise Figure	$V_{CE} = -10V$		2.5	dB
		$I_C = -100\mu A$			
		$R_G = 3k\Omega$			
		Noise Bandwidth = 15.7kHz			
		See Note 2.			

NOTES

- 1) The lower of the two readings is taken as h_{FE1}
- 2) 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



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