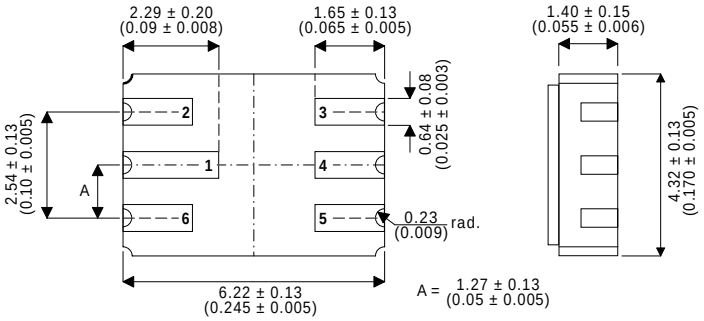
2N2920DCSM

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

MECHANICAL DATA
Dimensions in mm (inches)



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

FEATURES

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

APPLICATIONS:

Suitable for use in general purpose differential amplifier applications.

ABSOLUTE MAXIMUM RATINGS

	(T_{amb} = 25°C unless otherwise stated)	EACH SIDE	TOTAL DEVICE
V_{CBO}	Collector – Base Voltage	60V	
V_{CEO}	Collector – Emitter Voltage [1]	60V	
V_{EBO}	Emitter – Base Voltage	5V	
I_C	Collector Current	50mA	
P_D	Total Device Dissipation	300mW	500mW
	Derate above 25°C	1.72mW / °C	2.86mW / °C
T_{STG}	Storage Temperature Range	–65 to 200°C	

NOTES
1. Base – Emitter Diode Open Circuited.

SEME LAB

2N2920DCSM

ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C unless otherwise stated)

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

NOTES

* Pulse Test: t_p = 300µs, $\delta \leq 2\%$.

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

ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C unless otherwise stated)

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

OPERATING CHARACTERISTICS (T_{amb} = 25°C unless otherwise stated)

Parameter		Test Conditions [1]	Min.	Typ.	Max.	Unit
INDIVIDUAL TRANSISTOR CHARACTERISTICS						
F	Spot Noise Figure	V_{CE} = –10V I_C = –100µA R_G = 3kΩ f = 100Hz Noise Bandwidth = 20Hz			7	dB
		V_{CE} = –10V I_C = –100µA R_G = 3kΩ f = 1kHz Noise Bandwidth = 200Hz			3	
		V_{CE} = –10V I_C = –100µA R_G = 3kΩ f = 10kHz Noise Bandwidth = 2kHz			2.5	
$\overline{F}$	Average Noise Figure	V_{CE} = –10V I_C = –100µA R_G = 3kΩ Noise Bandwidth = 15.7kHz See Note 3.			3.5	dB

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