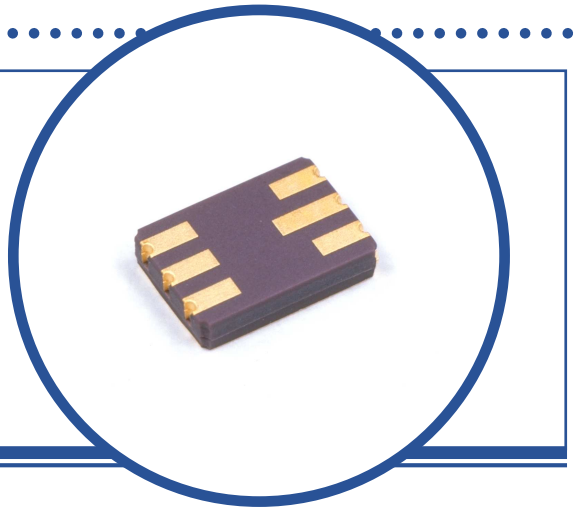
SILICON EPITAXIAL DUAL NPN TRANSISTORS

TT electronics
Semelab Limited

2N3904DCSM

- Dual Silicon Planar NPN Transistors.
- Hermetic Ceramic Surface Mount Package.
- Designed For General Purpose and Switching Applications.
- Screening Options Available.



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise stated)

			Each Side	Total Device
V_{CBO}	Collector – Base Voltage		60V	
V_{CEO}	Collector – Emitter Voltage		40V	
V_{EBO}	Emitter – Base Voltage		6V	
I_C	Continuous Collector Current		200mA	
P_D	Total Power Dissipation at	T_A = 25°C	500mW	600mW(1)
		Derate Above 25°C	2.86mW/°C	3.43mW/°C
T_J	Junction Temperature Range		-55 to +200°C	
T_{stg}	Storage Temperature Range		-55 to +200°C	

THERMAL PROPERTIES (Each Side)

Symbols	Parameters	Min.	Typ.	Max.	Units
$R_{\theta JA}$	Thermal Resistance, Junction To Ambient			350	°C/W

Notes
(1) Total device power dissipation limited by package.

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ELECTRICAL CHARACTERISTICS (Each Side, T_A = 25°C unless otherwise stated)

Symbols	Parameters	Test Conditions		Min.	Typ	Max.	Units
I_{CBO}	Collector-Cut-Off Current	V_{CB} = 30V	I_E = 0			30	nA
I_{EBO}	Emitter Cut-Off Current	V_{EB} = 3V	I_C = 0			30	
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = 10µA		60			V
$V_{(BR)CEO}$ (2)	Collector-Emitter Breakdown Voltage	I_C = 1.0mA		40			
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 10µA		6			
h_{FE} (2)	Forward-current transfer ratio	I_C = 0.1mA	V_{CE} = 1.0V	40			
		I_C = 1.0mA		70			
		I_C = 10mA		100		300	
		I_C = 50mA		60			
		I_C = 100mA		30			
$V_{BE(sat)}$ (2)	Base-Emitter Saturation Voltage	I_C = 10mA	I_B = 1.0mA	0.65		0.85	V
		I_C = 50mA	I_B = 5mA			0.95	
$V_{CE(sat)}$ (2)	Collector-Emitter Saturation Voltage	I_C = 10mA	I_B = 1.0mA			0.2	
		I_C = 50mA	I_B = 5mA			0.3	
$V_{BE(f)}$ (2)	Forward Base-Emitter Voltage	I_B = 500mA				1.45	
		I_B = 200mA	T_A = 100°C			2	

DYNAMIC CHARACTERISTICS

f_T	Transition Frequency	I_C = 10mA f = 100MHz	V_{CE} = 20V	300			MHz
h_{fe}	Small-Signal Current Gain	I_C = 1.0mA f = 1.0KHz	V_{CE} = 10V	100		400	
C_{obo}	Output Capacitance	V_{CB} = 5V f = 1.0MHz	I_E = 0			4	pF
C_{ibo}	Input Capacitance	V_{EB} = 0.5V f = 1.0MHz	I_C = 0			8	
NF (3)	Noise Figure	I_C = 100 µA R_S = 1.0KΩ f = 10Hz To 15.7KHz	V_{CE} = 5V			5	dB
t_d	Delay Time	V_{CC} = 3V	V_{BE} = 0.5V			35	ns
t_r	Rise Time	I_C = 10mA	I_{B1} = 1.0mA			35	
t_s	Storage Time	V_{CC} = 3V	I_C = 10mA			200	
t_f	Fall Time	$I_{B1} = I_{B2}$ = 1.0mA				50	

Notes
(2) Pulse Width ≤ 300us, δ ≤ 2%
(3) By design only, not a production test.

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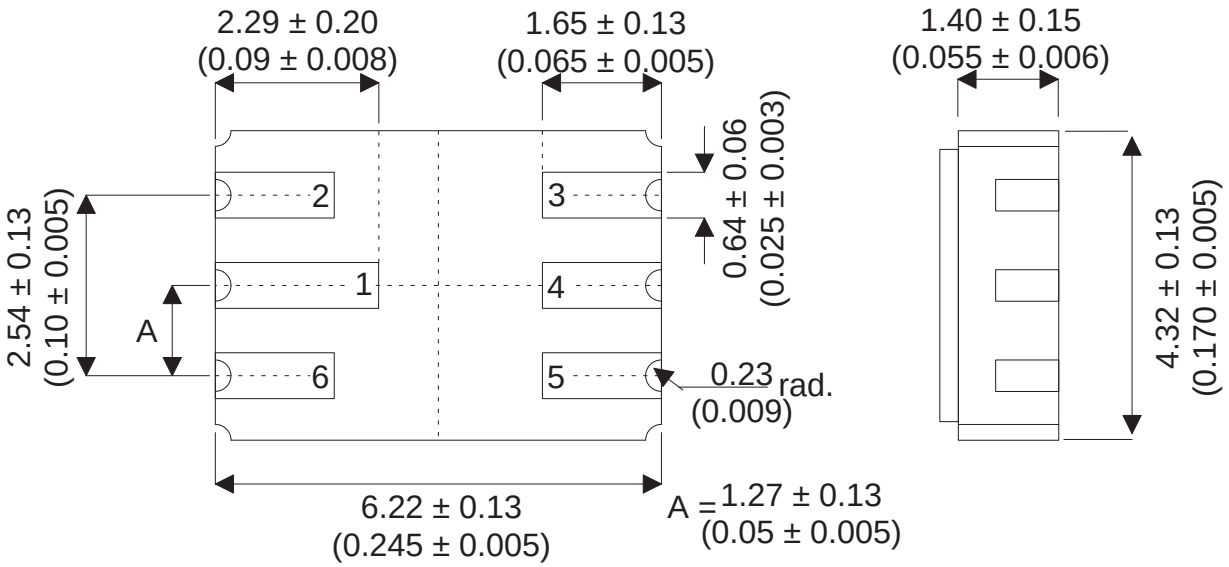
MECHANICAL DATA

Dimensions in mm (inches)



LCC2 (MO-041BB)

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