



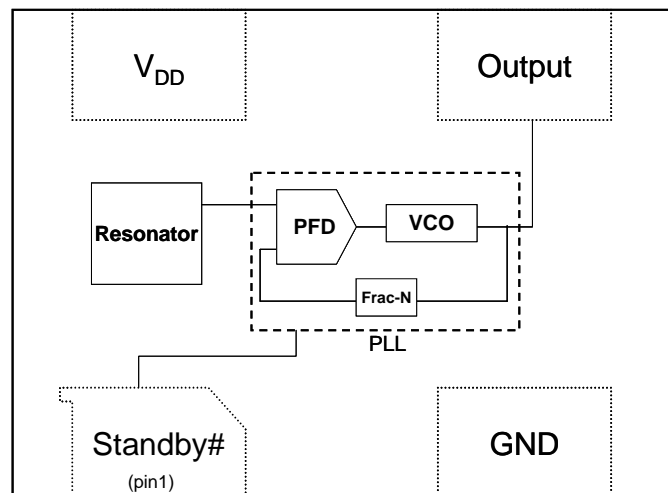
General Description

The DSC1001 is a silicon MEMS based CMOS oscillator offering excellent jitter and stability performance over a wide range of supply voltages and temperatures. The device operates from 1 to 150MHz in increments of 100Hz (up to four decimal point resolution) with supply voltages between 1.8 to 3.3 Volts and extended temperatures from -40°C to 105°C.

The DSC1001 incorporates an all silicon resonator that is extremely robust and nearly immune to stress related fractures, common to crystal based oscillators. Without sacrificing the performance and stability required of today's systems, a crystal-less design allows for a higher level of reliability, making the DSC1001 ideal for rugged, industrial, and portable applications where stress, shock, and vibration can damage quartz crystal based systems.

Available in industry standard packages, the DSC1001 can be "dropped-in" to the same PCB footprint as standard crystal oscillators.

Block Diagram



Features

- Frequency Range: 1 to 150MHz
- Exceptional Stability over Temperature
 - ± 20 PPM, ± 25 PPM, ± 50 PPM
- Operating voltage
 - 1.65 to 3.60V
- Operating Temperature Range
 - Ext. Industrial -40°C to 105°C
 - Industrial -40°C to 85°C
 - Ext. Commercial -20°C to 70°C
 - Commercial 0°C to 70°C
- Low Operating and Standby Current
 - 6mA Operating (40MHz)
 - 15uA Standby
- Ultra Miniature Footprint
 - 2.5 x 2.0 x 0.85 mm
 - 3.2 x 2.5 x 0.85 mm
 - 5.0 x 3.2 x 0.85 mm
 - 7.0 x 5.0 x 0.85 mm
- Excellent shock and Vibration Resistance
- Lead Free, RoHS & Reach SVHC Compliant

Benefits

- Pin for pin "drop in" replacement for industry standard oscillators
- Semiconductor level reliability, significantly higher than quartz
- Frequency Resolution to 4 decimals
- Short mass production lead-times
- Longer Battery Life / Reduced Power
- Compact Plastic package
- Cost Effective

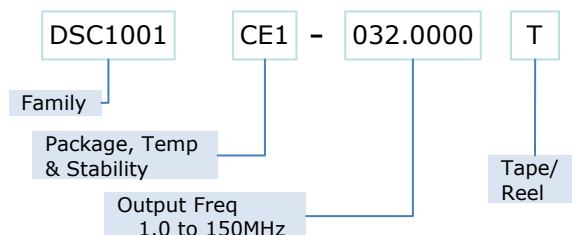
Applications

- Mobile Applications
- Consumer Electronics
- Portable Electronics
- CCD Clock for VTR Cameras
- Low Profile Applications
- Industrial

Absolute Maximum Ratings¹

Item	Min.	Max	Unit	Condition
Supply Voltage	-0.3	+4.0	V	
Input Voltage	-0.3	VDD+0.3	V	
Junction Temp	-	+150	°C	
Storage Temp	-55	+150	°C	
Soldering Temp	-	+260	°C	40 sec max.
ESD	-		V	
HBM		2000		
MM		200		
CDM		500		

Ordering Code



* See Ordering Information for details

Recommended Operating Conditions

Parameter	Symbol	Range
Supply Voltage	V _{DD}	1.65 – 3.60V
Output Load	Z _L	R>10KΩ, C≤15pF
Operating Temperature	T	-40 to +105 °C
Option 1		-40 to +85 °C
Option 2		-20 to +70 °C
Option 3		0 to +70 °C
Option 4		

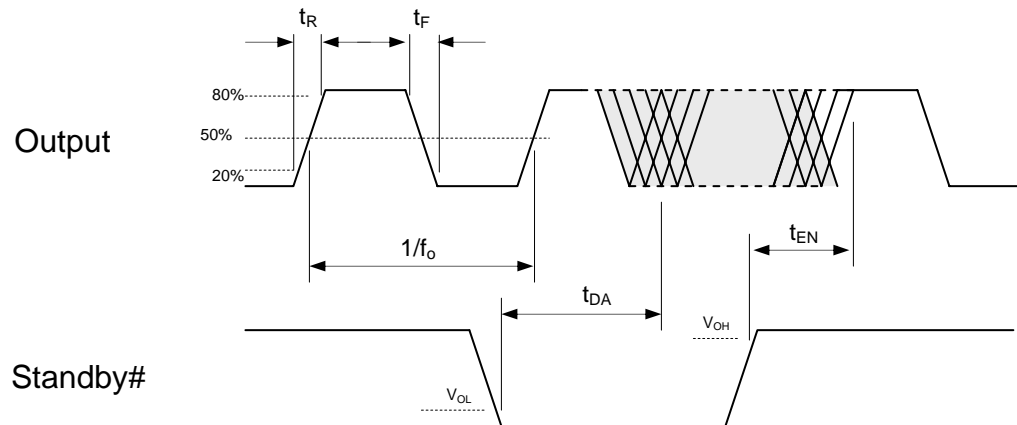
Specifications

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Frequency	f ₀	Single Frequency	1		150	MHz
Frequency Tolerance	Δf				±20, ±25, ±50	ppm
Supply Current, no load	I _{DD}	C _L =0p R _L =∞ T=25°C 1 to 40MHz 40 to 80MHz 80 to 125MHz 125 to 150MHz		6 7 8 10	15	mA
Supply Current, standby	I _{DD}	T=25°C			15	uA
Output Logic Levels	V _{OH} V _{OL}	-6mA 6mA	0.9*V _{DD} -		- 0.1*V _{DD}	Volts
Output logic high						
Output logic low						
Output Transition time	t _R t _F	C _L =15pF; T=25°C 20%/80%*V _{DD}		1.3 1.3	2 2	ns
Rise Time						
Fall Time						
Output Startup Time ²	t _{SU}	T=25°C		3	10	ms
Output Disable Time	t _{DA}			20	100	ns
Output Duty Cycle	SYM		45		55	%
Input Logic Levels	V _{IH} V _{IL}		0.75*V _{DD} -		- 0.25* V _{DD}	Volts
Input logic high						
Input logic low						
Jitter, Cycle to Cycle	J _{CC}	F = 100MHz ³		80		ps

Notes:

1. Absolute maximum ratings are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated beyond these limits.
2. Output frequency to within 100ppm of final stable output frequency.
3. See typical cycle to cycle jitter graph for frequency dependence.

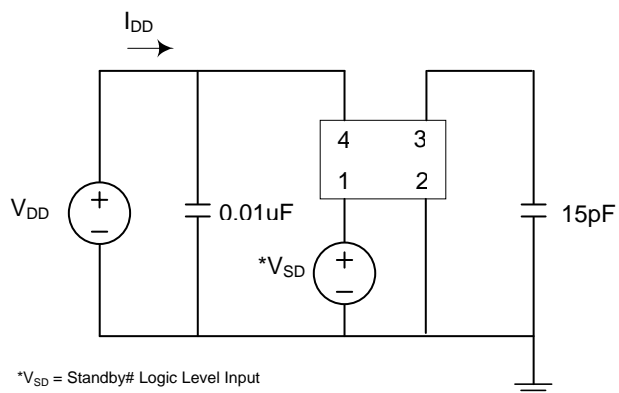
Output Waveform



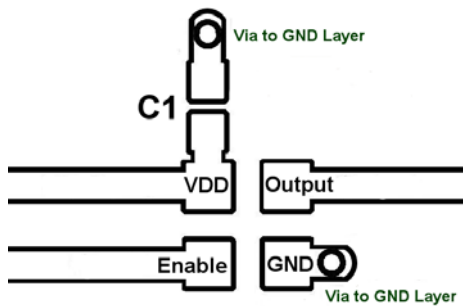
Standby Function

Standby# (pin 1)	Output (pin 3)
Hi Level	Output ON
Open (no connect)	Output ON
Low Level	High Impedance

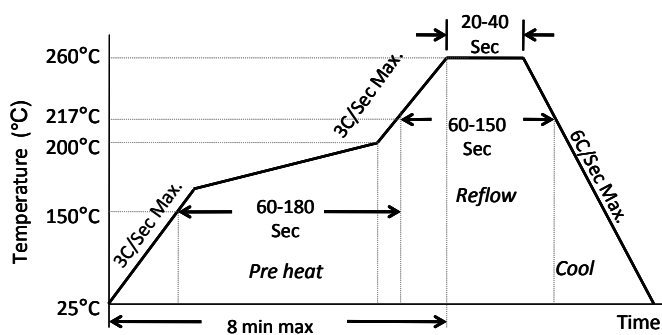
Test Circuit



Board Layout (recommended)



Solder Reflow Profile

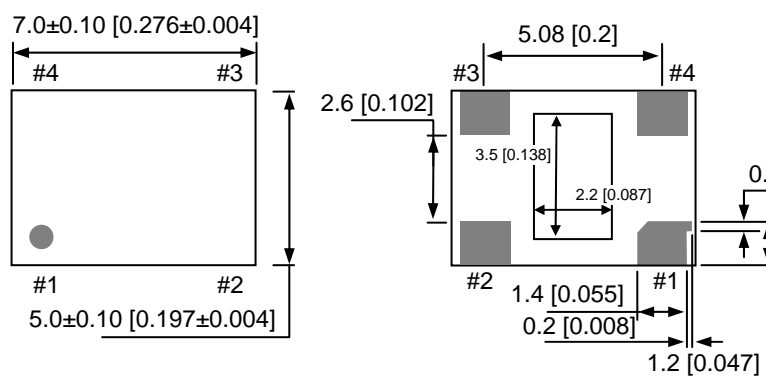


MSL 1 @ 260°C refer to JSTD-020C	
Ramp-Up Rate (200°C to Peak Temp)	3°C/Sec Max.
Preheat Time 150°C to 200°C	60-180 Sec
Time maintained above 217°C	60-150 Sec
Peak Temperature	255-260°C
Time within 5°C of actual Peak	20-40 Sec
Ramp-Down Rate	6°C/Sec Max.
Time 25°C to Peak Temperature	8 min Max.

Package Dimensions

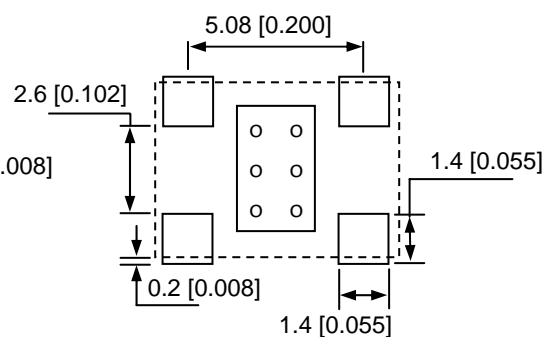
7.0 x 5.0 mm Plastic Package

External Dimensions



No.	Pin Terminal
1	Standby#
2	GND
3	Output
4	VDD

Recommended Land Pattern*

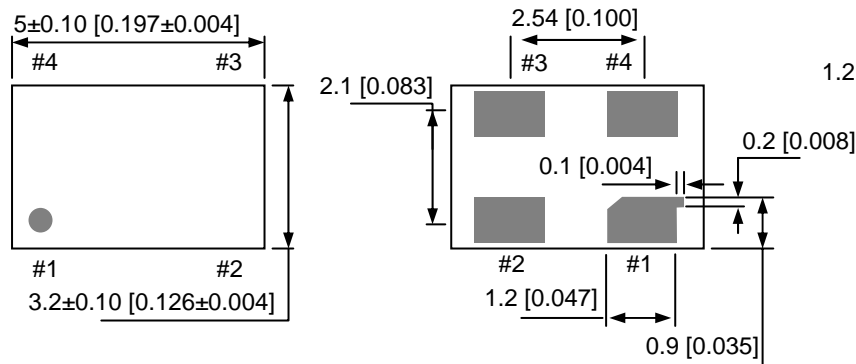


*Note: The center pad is not connected internally and should be left unconnected or tied to GND.

units: mm [inch]

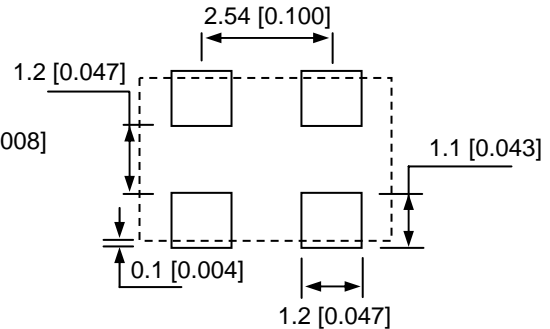
5.0 x 3.2 mm Plastic Package

External Dimensions



No.	Pin Terminal
1	Standby#
2	GND
3	Output
4	VDD

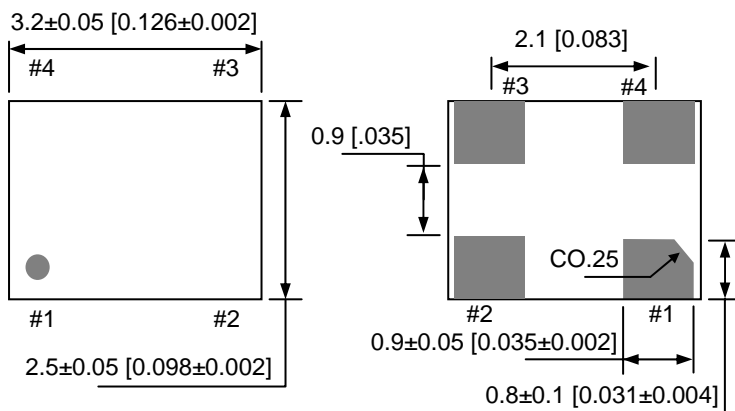
Recommended Land Pattern



units: mm [inch]

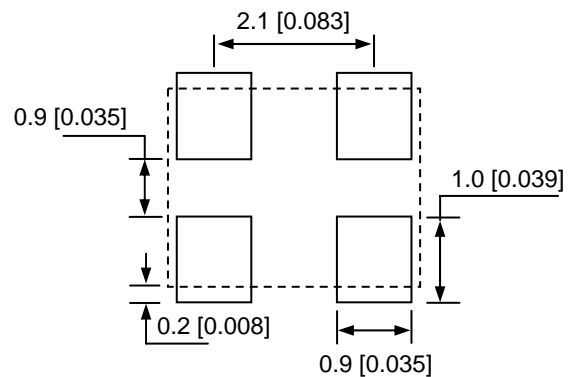
3.2 x 2.5 mm Plastic Package

External Dimensions



No.	Pin Terminal
1	Standby#
2	GND
3	Output
4	VDD

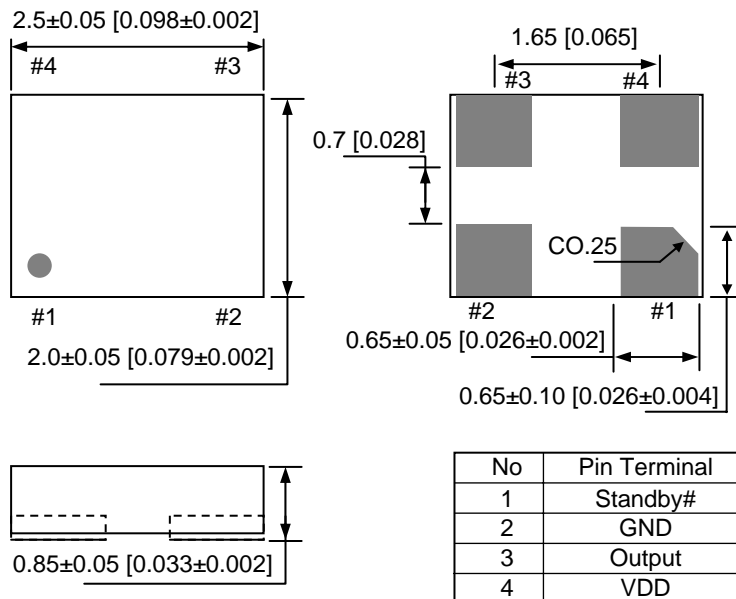
Recommended Land Pattern



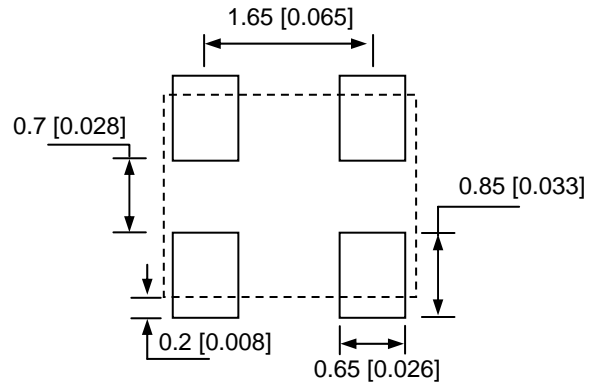
units: mm [inch]

2.5 x 2.0 mm Plastic Package

External Dimensions



Recommended Land Pattern



units: mm [inch]

Ordering Information

DSC1001 PTS – xxx.xxxx T

PART NUMBERING GUIDE

Package (Plastic QFN)	Temperature	Stability	Frequency	Packing Option
P=A: 7.0x5.0mm P=B: 5.0x3.2mm P=C: 3.2x2.5mm P=D: 2.5x2.0mm	T=C: 0° ~ +70° C T=E: -20° ~ +70° C T=I: -40° ~ +85° C T=L: -40° ~ +105° C	S=1: ±50ppm S=2: ±25ppm S=3: ±20ppm	XXX.XXXX (4 decimal places)	Blank: Tubes T: Tape & Reel

Example: DSC1001CE1-123.0000T

The example part number above is a 123.0000MHz oscillator in Plastic 3.2x2.5mm package, with ±50ppm stability over an operating temperature of -20 to +70°C, shipped in Tape and Reel.