



1.8~3.3V

Programmable PureSilicon™ Oscillator
Datasheet

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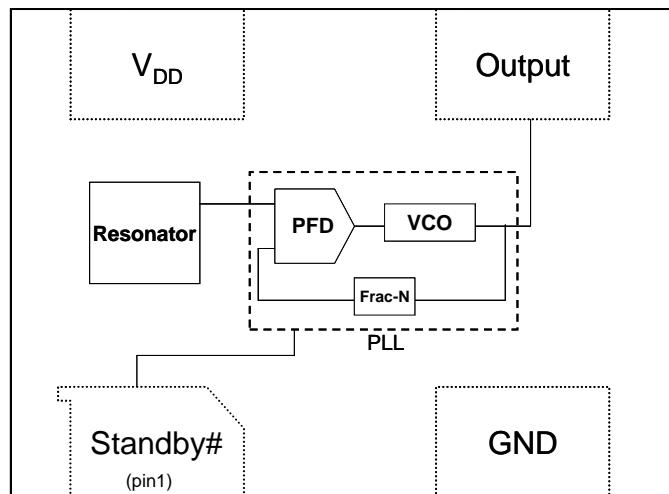
General Description

The DSC8001 is a programmable 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 DSC8001 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 DSC8001 ideal for rugged, industrial, and portable applications where stress, shock, and vibration can damage quartz crystal based systems.

Available in industry standard packages, the DSC8001 can be "dropped-in" to the same PCB footprint as standard crystal oscillators.

Block Diagram



Features

- Frequency Range: Programmable from 1 to 150MHz
- Exceptional Stability over Temperature
 - ±10 PPM, ±25 PPM, ±50 PPM
- Operating voltage
 - 1.7 to 3.6V
- 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°
- Low Operating and Standby Current
 - 5mA 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

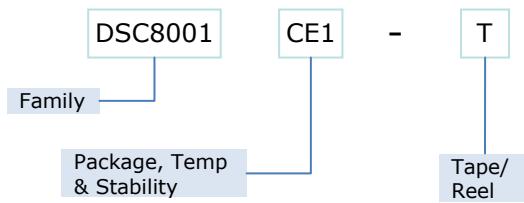
Applications

- Mobile Applications
- Consumer Electronics
- Portable Electronics
- DVR, CCTV, Surveillance 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		4000		
MM		200		
CDM		1500		

Ordering Code



* See Ordering Information for details

Recommended Operating Conditions

Parameter	Symbol	Range
Supply Voltage	V _{DD}	1.7 – 3.6V
Output Load	Z _L	R>10KΩ, C≤15pF
Operating Temperature		
Option 1	T	-40 to +105 °C
Option 2		-40 to +85 °C
Option 3		-20 to +70 °C
Option 4		0 to +70 °C

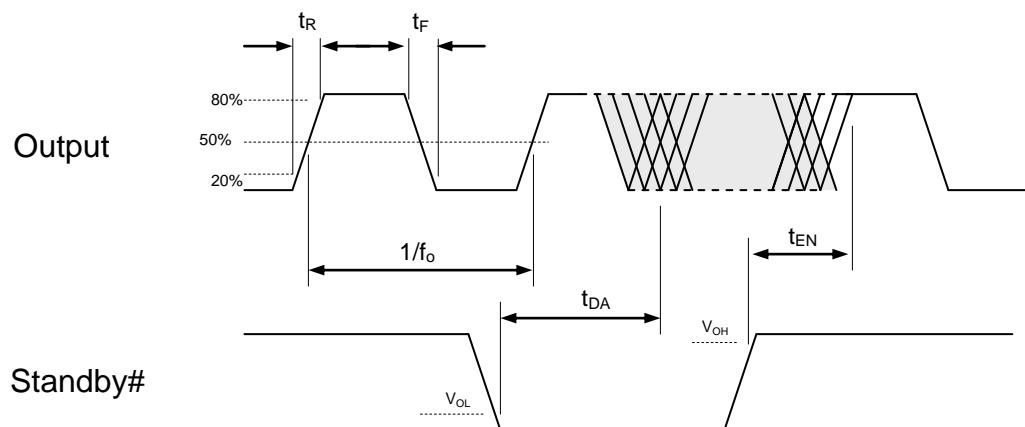
Specifications

Parameter	Symbol	Condition	Min.	Ty p.	Max.	Unit
Frequency	f ₀	Single Frequency	1		150	MHz
Frequency Tolerance Ext. Industrial Industrial Extended Commercial Commercial	Δf	Includes frequency variations due to initial tolerance, temperature and power supply voltage			±25, ±50 ±10, ±25, ±50 ±10, ±25, ±50 ±10, ±25, ±50	ppm
Aging	Δf	1 year @25°C			±5	ppm
Supply Current, no load	I _{DD}	C _L =0p R _L =∞ T=25°C V=1.8V	1 to 40MHz 40 to 80MHz 80 to 125MHz 125 to 150MHz	5 6 7 8	12	mA
Supply Current, standby	I _{DD}	T=25°C			15	uA
Output Logic Levels Output logic high Output logic low	V _{OH} V _{OL}		-4mA 4mA	0.8*V _{DD} -	- 0.2*V _{DD}	Volts
Output Transition time Rise Time Fall Time	t _R t _F	C _L =15pF; T=25°C 20%/80%*V _{DD}		1.0 1.0	3 3	ns
Output Startup Time²	t _{SU}	T=25°C		3	8	ms
Output Disable Time	t _{DA}			20	100	ns
Output Duty Cycle	SYM		45		55	%
Input Logic Levels Input logic high Input logic low	V _{IH} V _{IL}		0.75*V _{DD} -	- 0.25* V _{DD}		Volts
Jitter, Cycle to Cycle	J _{CC}	F = 100MHz		50		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...

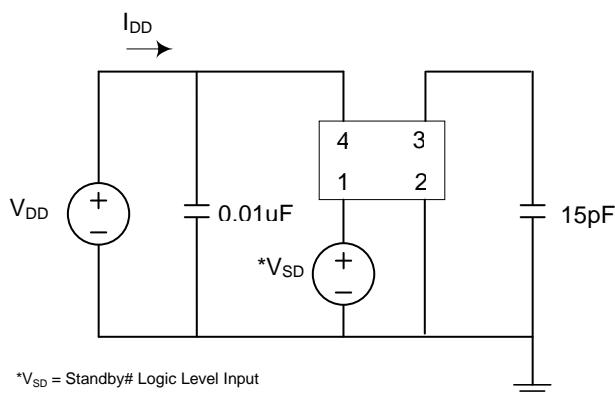
Output Waveform



Standby Function

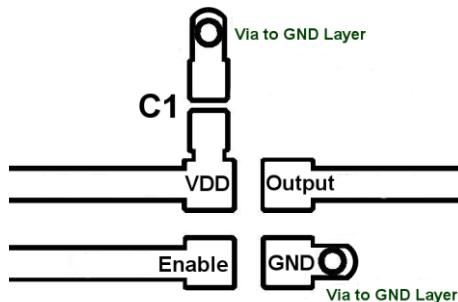
Standby# (pin 1)	Output (pin 3)
Hi Level	Output ON
Open (no connect)	Output ON
Low Level	High Impedance

Test Circuit

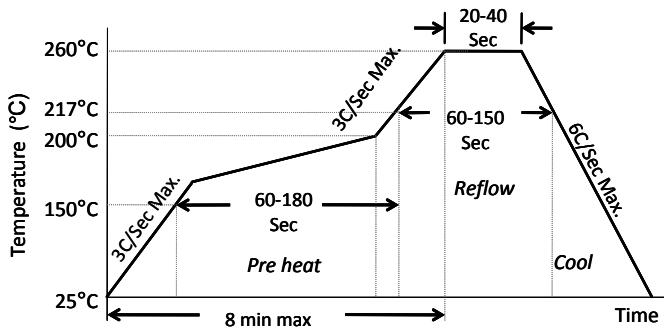


* V_{SD} = Standby# Logic Level Input

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

Recommended Land Pattern*

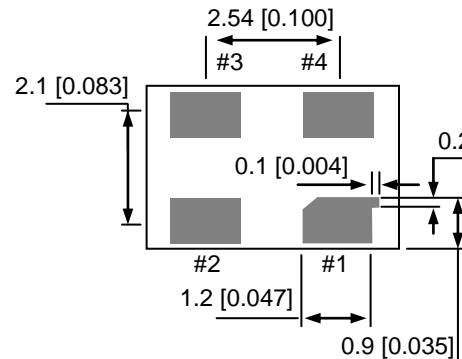
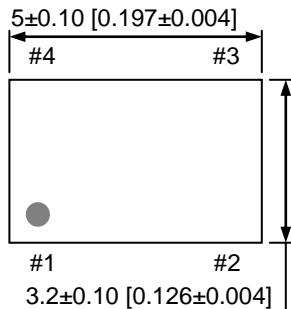
*Note: The center pad is not connected internally and should be left unconnected or tied to GND.

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

units: mm [inch]

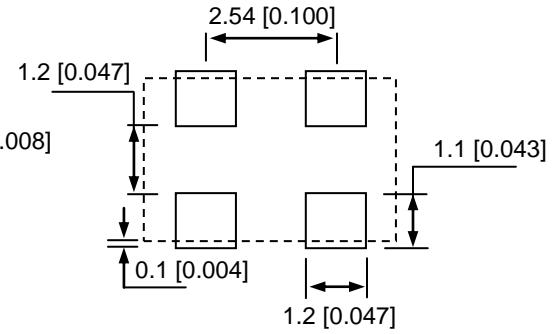
5.0 x 3.2 mm Plastic Package

External Dimensions



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

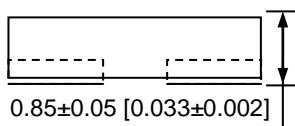
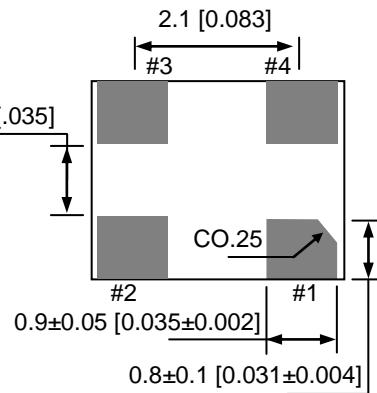
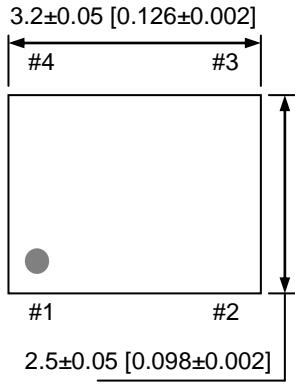
Recommended Land Pattern



units: mm [inch]

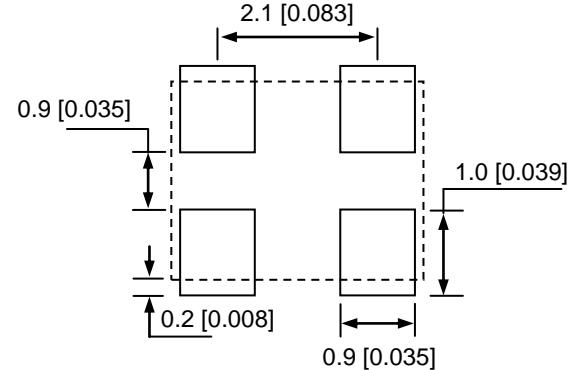
3.2 x 2.5 mm Plastic Package

External Dimensions



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

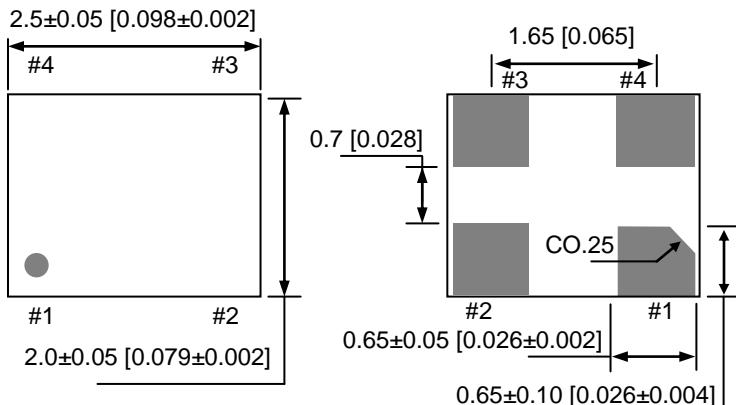
Recommended Land Pattern



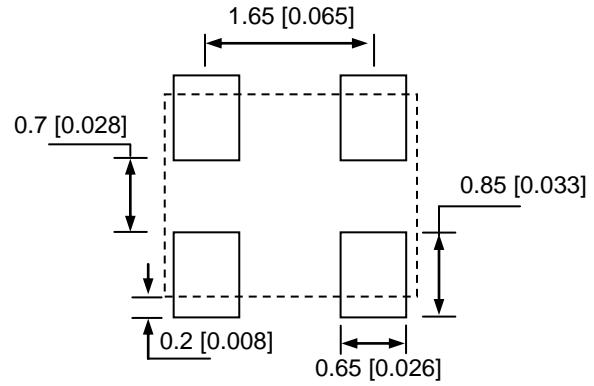
units: mm [inch]

2.5 x 2.0 mm Plastic Package

External Dimensions



Recommended Land Pattern



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

units: mm [inch]

Ordering Information

DSC8001 PTS - T

PART NUMBERING GUIDE			
Package (Plastic QFN)	Temperature	Stability	Packing Option
P=A: 7.0x5.0mm	T=C: 0° ~ +70° C	S=1: ±50ppm	Blank: Tubes
P=B: 5.0x3.2mm	T=E: -20° ~ +70° C	S=2: ±25ppm	T: Tape & Reel
P=C: 3.2x2.5mm	T=I: -40° ~ +85° C	S=5: ±10ppm	
P=D: 2.5x2.0mm	T=L: -40° ~ +105° C		

Example: DSC8001CE1-T

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