

**1.6 x 1.2 mm**

Low-Power Ultra-Miniature Oscillator

General Description

The DSC3001 is an ultra-miniature, low-profile complete timing solution in a 1.6 x 1.2 mm footprint. The device is available in frequencies from 1 to 150 MHz with frequency stability as high as 10 PPM across temperature ranges up to -40 to +105°C. The device delivers the jitter and stability performance required by high definition video and audio, media and applications processors, and solid state drives with a low power ultra-miniature configuration.

The DSC3001 incorporates an all silicon MEMS resonator that delivers 20x higher MTBF than crystal resonators, and is rated for shock resistance to over 30,000 G. Its miniature packaging is built to support multiple pad footprints and deliver a cost effective solution for mobile and portable applications.

World's Smallest Production Oscillator



Features

- Ultra-Miniature, Low Profile Footprint
 - 1.6 x 1.2 mm
- Frequency Range:
 - 1 to 150MHz
- Frequency 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
- Low Operating and Standby Current
 - 3.0-6.0 mA Operating
 - 0.015 mA Standby
- MIL-STD 883 Shock and Vibration Resistant to over 30,000 G
- RoHS, Pb Free, Reach SVHC Compliant
- AEC-Q100 Automobile Qualified

Benefits

- Ultra-miniature footprint with no external components
- High frequency and temp stability
- 20x higher MTBF than Xtal-based XO
- Shock and vibration resistant to 30,000G for mobile and portable applications

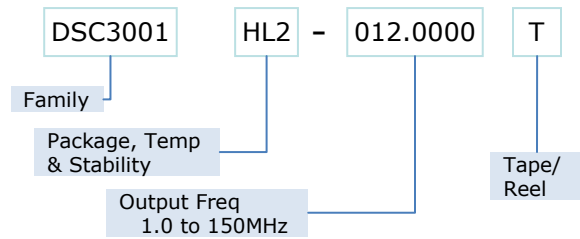
Applications

- Imaging, Video, and Audio Modules
- Portable Consumer Electronics and Media Devices
- Tablets and Mobile Internet Devices
- Low Profile Embedded Designs
- Pico and Femto Networking

Absolute Maximum Ratings

Item	Min	Max	Unit	Condition
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

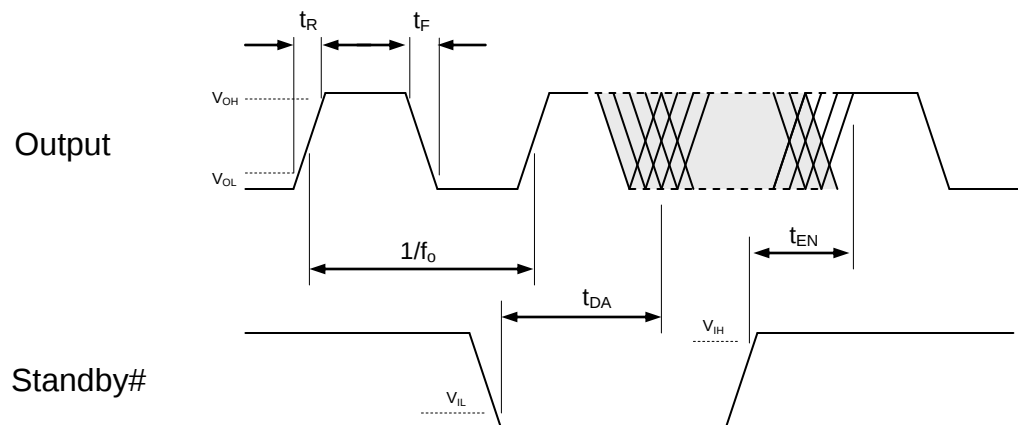
Recommended Operating Conditions

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

Specifications (VDD = 1.7 – 3.6 V) T_A=85°C unless otherwise specified

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Frequency	f ₀	Single Frequency	1		150	MHz
Frequency Tolerance	Δf	Includes frequency variations due to initial tolerance, temperature and power supply voltage			±10, ±25, ±50	ppm
Aging	Δf	1 year @25°C			±5	ppm
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}	V
Output Startup Time	t _{SU}	T=25°C		1.0	1.3	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}	V
Supply Current	I _{DD}	C _L =0p, R _L =∞ T=25°C, V=1.8v F=12MHz		6.0 ¹	6.5	mA
Output Transition time Rise Time Fall Time	t _R t _F	C _L =15pF; T=25°C 20%/80%*V _{DD}		1.8 1.0	3 3	ns
Jitter, Period	J _{rms}	F=12MHz		7 ¹		ps

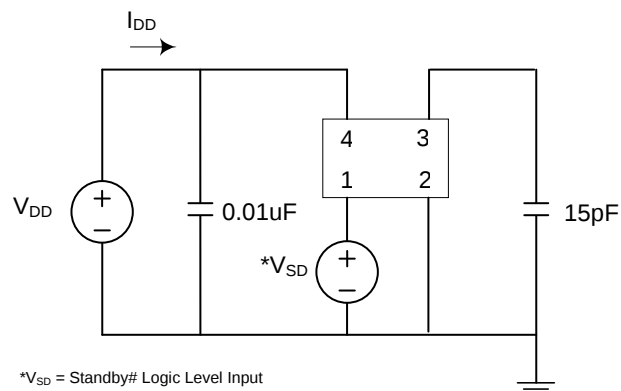
Output Waveform



Standby Function

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

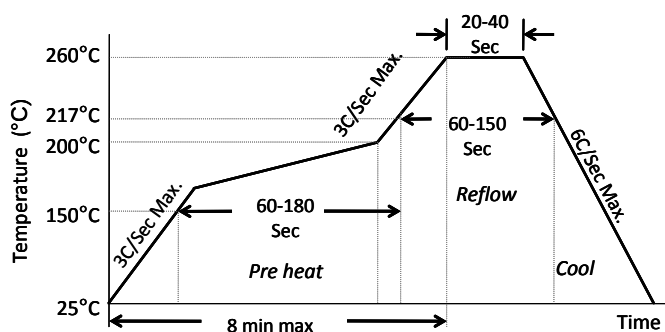
Test Circuit



Notes:

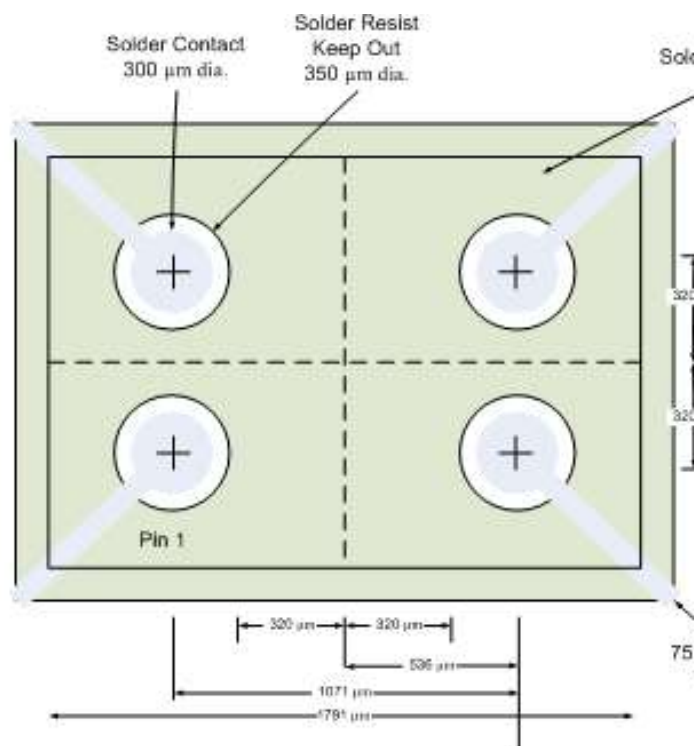
1. Contact factory for lower power, lower jitter, and higher output drive options.

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.

Board Layout (recommended)

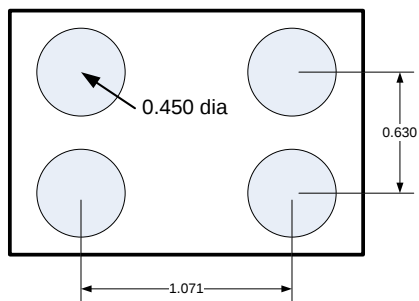
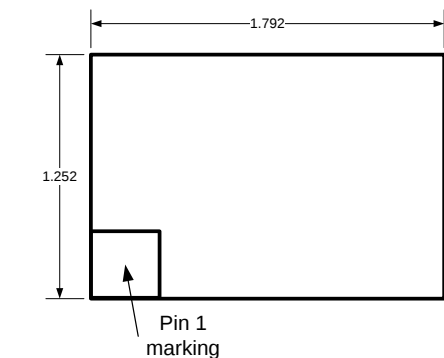


Package Dimensions

1.6 x 1.2 mm Component Footprint

(Top View)

(Bottom View)



All dimensions in mm



Component height after reflow is 0.53-0.60mm. Contact factory for product height under 0.50mm

Ordering Information

DSC3001 PTS – xxx.xxxx T

PART NUMBERING GUIDE				
Package	Temperature	Stability	Frequency	Packing Option
P=H: 1.6x1.2mm	T=E: -20° ~ +70° C T=I: -40° ~ +85° C T=L: -40° ~ +105° C	S=1: ±50ppm S=2: ±25ppm S=5: ±10ppm	xxx.xxxx	T: Tape & Reel

Example: DSC3001HL2-012.0000T

The example part number above is a 12.0000MHz oscillator with ±25ppm stability over an operating temperature of -40 to +105°C, shipped in Tape and Reel.

Disclaimer:

Micrel makes no representations or warranties with respect to the accuracy or completeness of the information furnished in this data sheet. This information is not intended as a warranty and Micrel does not assume responsibility for its use. Micrel reserves the right to change circuitry, specifications and descriptions at any time without notice. No license, whether express, implied, arising by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Micrel's terms and conditions of sale for such products, Micrel assumes no liability whatsoever, and Micrel disclaims any express or implied warranty relating to the sale and/or use of Micrel products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright or other intellectual property right.

Micrel Products are not designed or authorized for use as components in life support appliances, devices or systems where malfunction of a product can reasonably be expected to result in personal injury. Life support devices or systems are devices or systems that (a) are intended for surgical implant into the body or (b) support or sustain life, and whose failure to perform can be reasonably expected to result in a significant injury to the user. A Purchaser's use or sale of Micrel Products for use in life support appliances, devices or systems is a Purchaser's own risk and Purchaser agrees to fully indemnify Micrel for any damages resulting from such use or sale.