DSC1101 | DSC1121



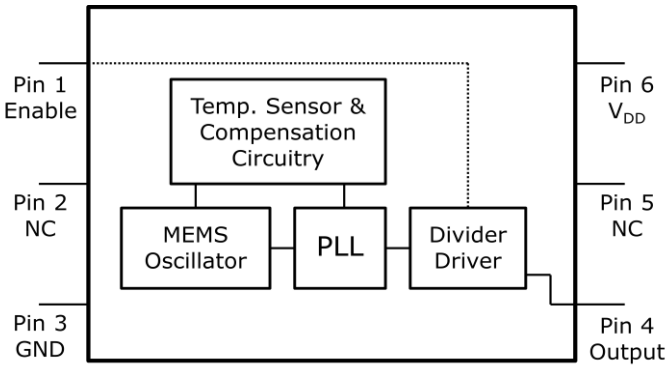
Low-Jitter Precision CMOS Oscillator

General Description

The DSC1101 & DSC1121 series of high performance oscillators utilizes a proven silicon MEMS technology to provide excellent jitter and stability over a wide range of supply voltages and temperatures. By eliminating the need for quartz or SAW technology, MEMS oscillators significantly enhance reliability and accelerate product development, while meeting stringent clock performance criteria for a variety of communications, storage, and networking applications.

DSC1101 has a standby feature allowing it to completely power-down when EN pin is pulled low; whereas for DSC1121, only the outputs are disabled when EN is low. Both oscillators are available in industry standard packages, including the small 3.2x2.5 mm^2, and are "drop-in" replacements for standard 4-pin CMOS quartz crystal oscillators.

Block Diagram



Output Enable Modes

EN Pin	DSC1101	DSC1121
High	Output Active	Output Active
NC	Output Active	Output Active
Low	Standby	Output Disabled

Features

- **Low RMS Phase Jitter: <1 ps (typ)**
- **High Stability: ±10, ±25, ±50 ppm**
- **Wide Temperature Range**
  - Automotive: -55° to 125° C
  - Ext. Industrial: -40° to 105° C
  - Industrial: -40° to 85° C
  - Ext. commercial: -20° to 70° C
- **High Supply Noise Rejection: -50 dBc**
- **Short Lead Time: 2 Weeks**
- **Wide Freq. Range: 2.3 to 170 MHz**
- **Small Industry Standard Footprints**
  - 2.5x2.0, 3.2x2.5, 5.0x3.2, & 7.0x5.0 mm
- **Excellent Shock & Vibration Immunity**
  - Qualified to MIL-STD-883
- **High Reliability**
  - 20x better MTF than quartz oscillators
- **Low Current Consumption**
- **Supply Range of 2.25 to 3.6 V**
- **Standby & Output Enable Function**
- **Lead Free & RoHS Compliant**

Applications

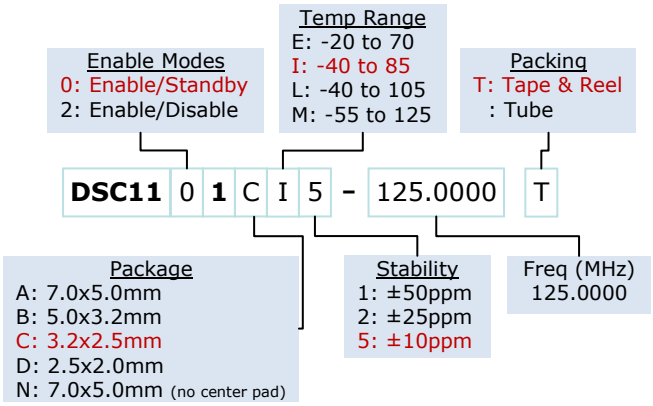
- **Storage Area Networks**
  - SATA, SAS, Fibre Channel
- **Passive Optical Networks**
  - EPON, 10G-EPON, GPON, 10G-PON
- **Ethernet**
  - 1G, 10GBASE-T/KR/LR/SR, and FCoE
- **HD/SD/SDI Video & Surveillance**
- **PCI Express**
- **DisplayPort**

Absolute Maximum Ratings

Item	Min	Max	Unit	Condition
Supply Voltage	-0.3	+4.0	V	
Input Voltage	-0.3	V_{DD}+0.3	V	
Junction Temp	-	+150	°C	
Storage Temp	-55	+150	°C	
Soldering Temp	-	+260	°C	40sec max.
ESD HBM MM CDM	-	 4000 400 1500	V	

Note: 1000+ years of data retention on internal memory

Ordering Code

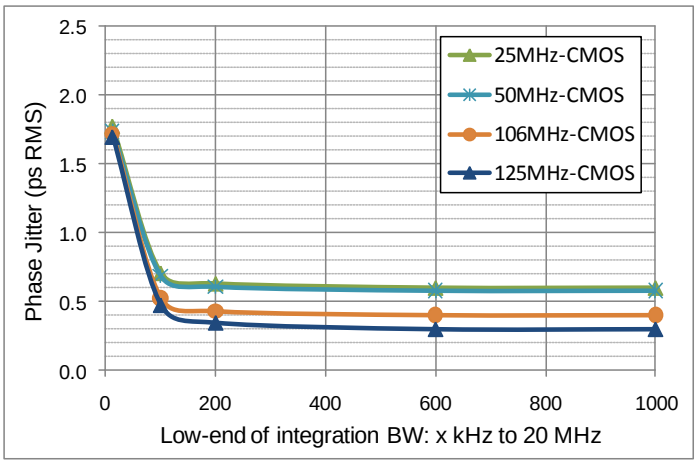


Specifications

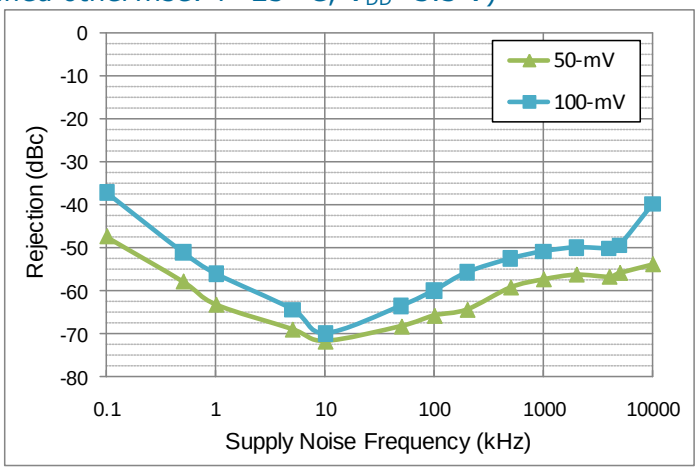
Parameter		Condition	Min.	Typ.	Max.	Unit
Supply Voltage[1]	V_{DD}		2.25		3.6	V
Supply Current	I_{DD}	EN pin low – output is disabled DSC1101 DSC1121		 20	 0.095 22	mA
Frequency Stability Ext Comm. & Ind. only All temp ranges All temp ranges	Δf	Includes frequency variations due to initial tolerance, temp. and power supply voltage			 ±10 ±25 ±50	ppm
Aging	Δf	1 year @25°C			±5	ppm
Startup Time[2]	t_{SU}	T=25°C			5	ms
Input Logic Levels Input logic high Input logic low	 V_{IH} V_{IL}		 0.75xV_{DD} -		 - 0.25xV_{DD}	V
Output Disable Time[3]	t_{DA}				5	ns
Output Enable Time	t_{EN}	DSC1101 DSC1121			5 20	ms ns
Enable Pull-Up Resistor[4]		Pull-up resistor exist		40		kΩ
CMOS Output						
Supply Current[4]	I_{DD}	output is enabled C_L=15pF, F_0=125 MHz		31	35	mA
Output Logic Levels Output logic high Output logic low	 V_{OH} V_{OL}	I=±6mA	 0.9xV_{DD} -		 - 0.1xV_{DD}	V
Output Transition time[3] Rise Time Fall Time	 t_R t_F	20% to 80% C_L=15pF		 1.1 1.3	 2 2	ns
Frequency	f_0	All temp range except Auto Auto temp range	2.3		170 100	MHz
Output Duty Cycle	SYM		45		55	%
Period Jitter	J_{PER}	Fout=125MHz		3		ps_{RMS}
Integrated Phase Noise	J_{PH}	200kHz to 20MHz @ 125MHz 100kHz to 20MHz @ 125MHz 12kHz to 20MHz @ 125MHz		0.3 0.38 1.7	 2	ps_{RMS}

1. Pin 6 V_{DD} should be filtered with 0.1uf capacitor.
2. t_{su} is time to 100PPM of output frequency after V_{DD} is applied and outputs are enabled.
3. Output Waveform and Test Circuit figures below define the parameters.
4. Output is enabled if pad is floated or not connected.

Nominal Performance Parameters (Unless specified otherwise: T=25° C, V_{DD}=3.3 V)

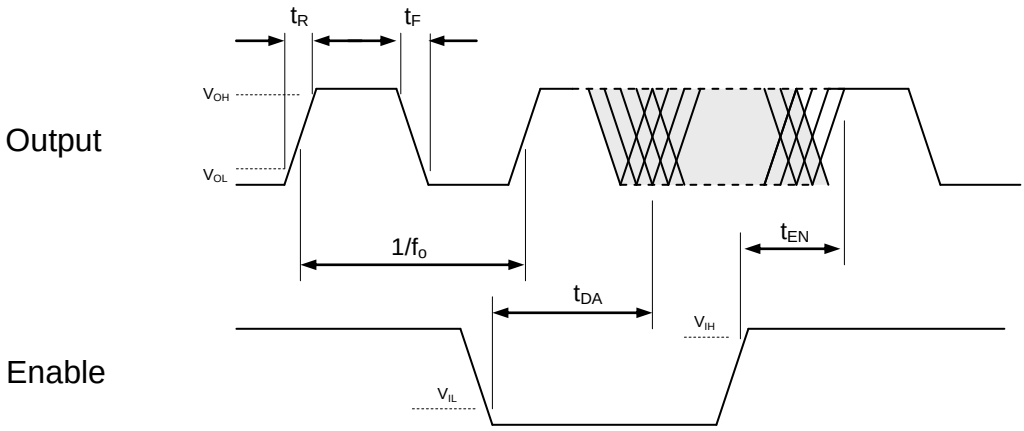


Phase jitter (integrated phase noise)

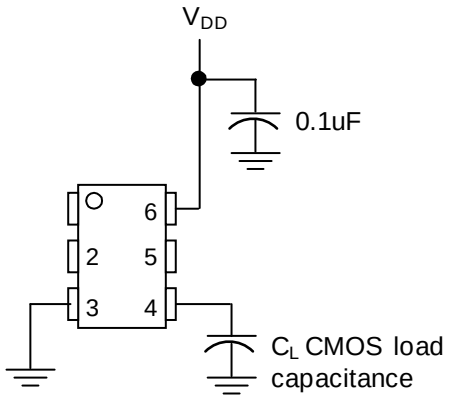


Power supply rejection ratio

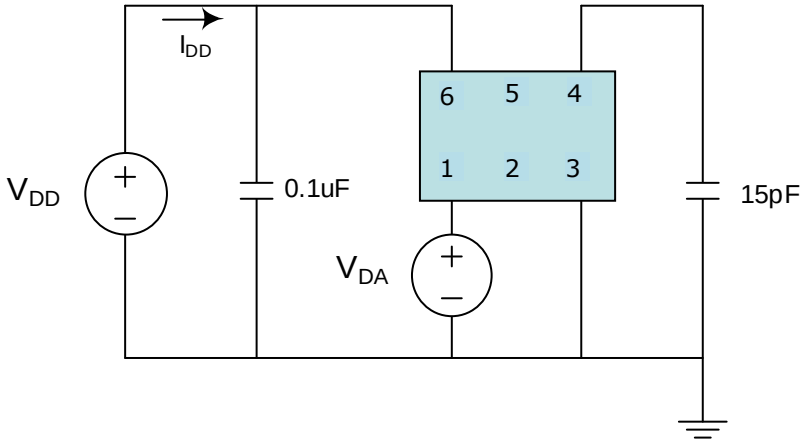
Output Waveform



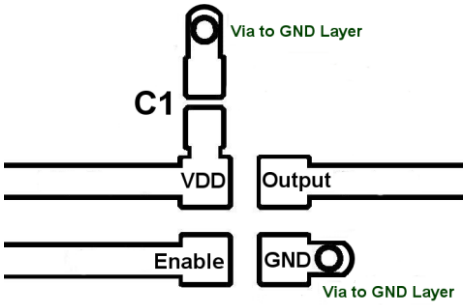
Typical Termination Scheme



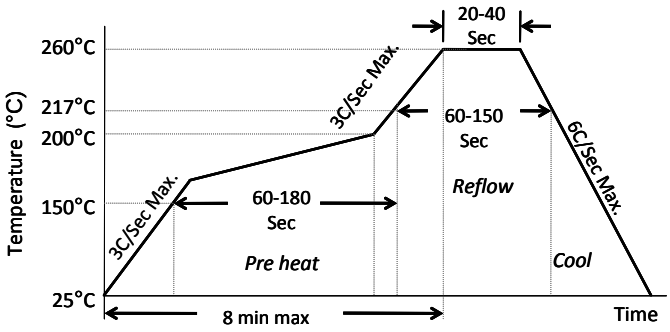
Test Circuit



Board Layout (recommended)



Solder Reflow Profile

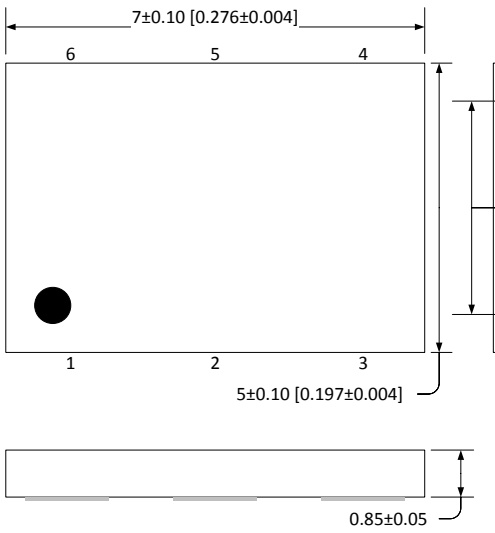


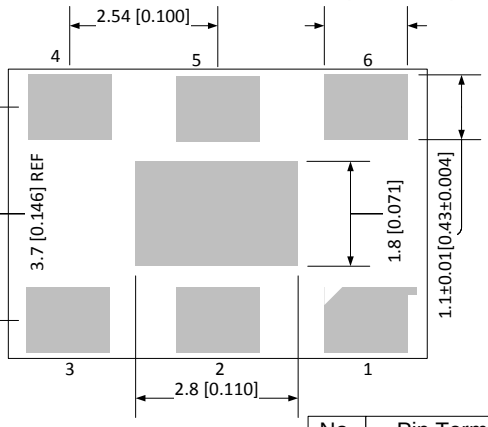
MSL 1 @ 260°C refer to JSTD-020C	
Ramp-Up Rate (200°C to Peak Temp)	3°C/Sec Max.
Preheat Time 150°C to 200°C	60-180 Sec
Time maintained above 217°C	60-150 Sec
Peak Temperature	255-260°C
Time within 5°C of actual Peak	20-40 Sec
Ramp-Down Rate	6°C/Sec Max.
Time 25°C to Peak Temperature	8 min Max.

Package Dimensions

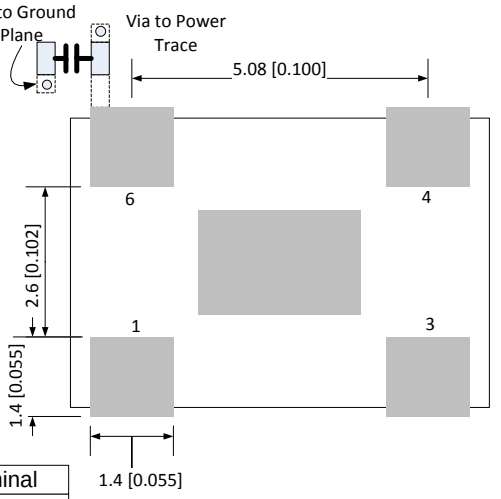
7.0 x 5.0 mm Plastic Package

EXTERNAL DIMENSIONS
Units: mm [inches]





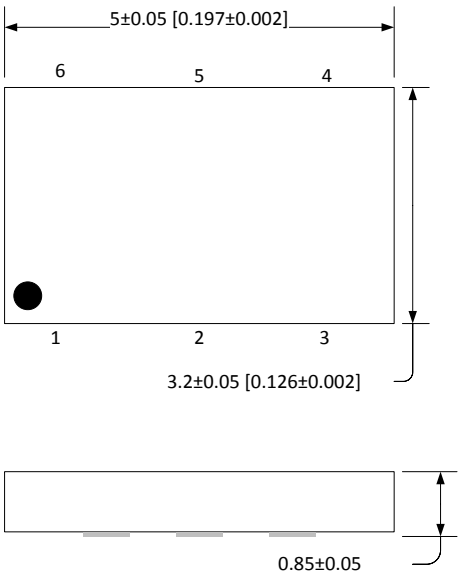
RECOMMENDED SOLDER PAD LAYOUT
Units: mm [inches]

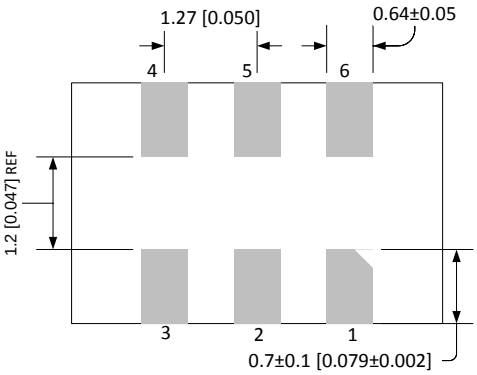


No.	Pin Terminal
1	Enable
2	N/C
3	Ground
4	OUT
5	N/C
6	VDD
PAD	TIE TO GND

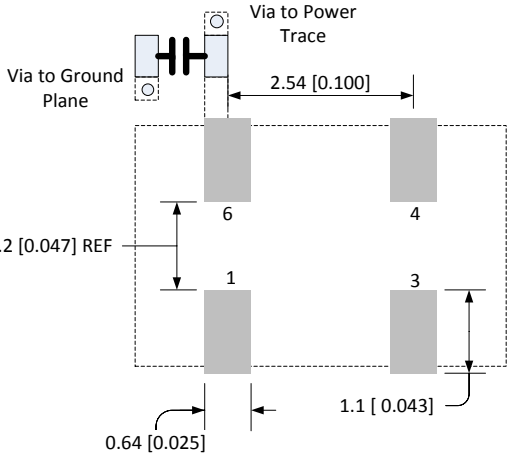
5.0 x 3.2 mm Plastic Package

EXTERNAL DIMENSIONS
Units: mm [inches]





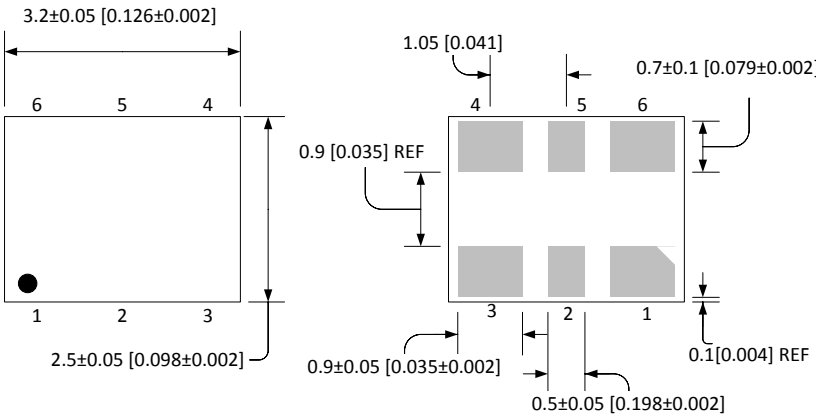
RECOMMENDED SOLDER PAD LAYOUT
Units: mm [inches]

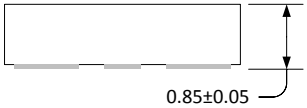


No.	Pin Terminal
1	Enable
2	N/C
3	Ground
4	OUT
5	N/C
6	VDD

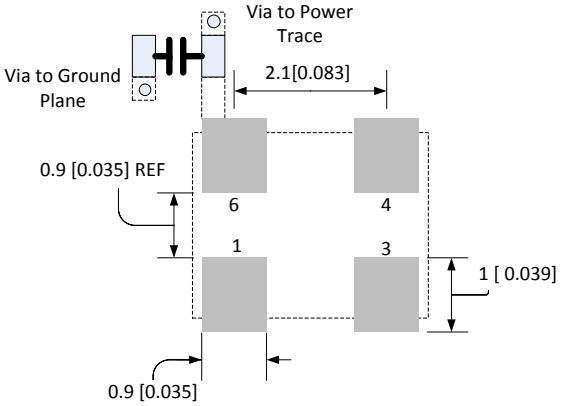
3.2 x 2.5 mm Plastic Package

EXTERNAL DIMENSIONS
Units: mm [inches]





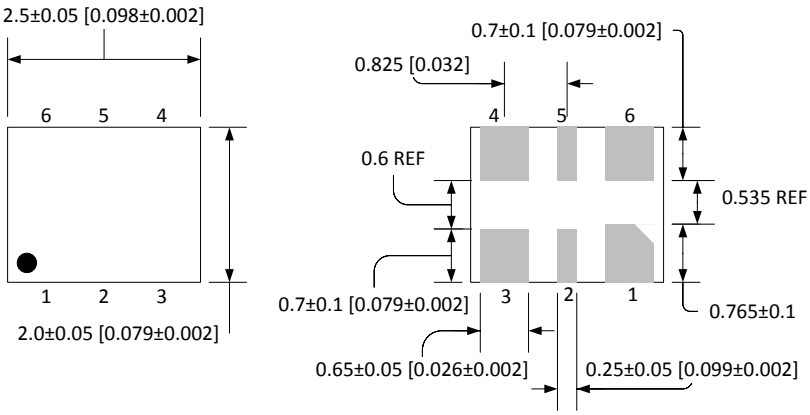
RECOMMENDED SOLDER PAD LAYOUT
Units: mm [inches]

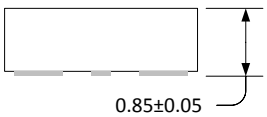


No.	Pin Terminal
1	Enable
2	N/C
3	Ground
4	OUT
5	N/C
6	VDD

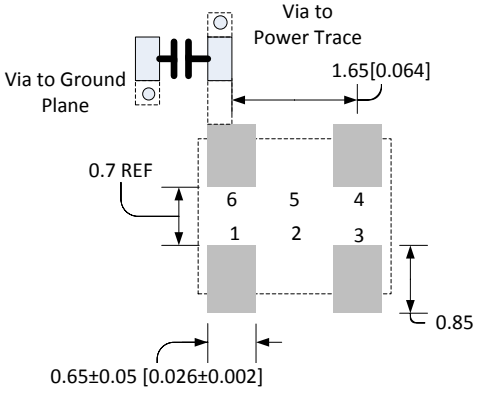
2.5 x 2.0 mm Plastic Package

EXTERNAL DIMENSIONS
Units: mm [inches]





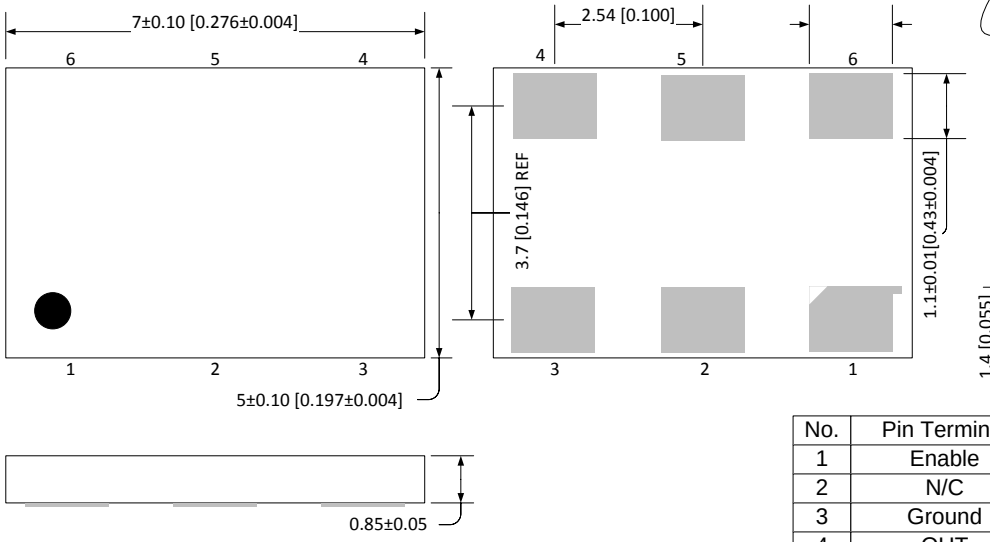
RECOMMENDED SOLDER PAD LAYOUT
Units: mm [inches]



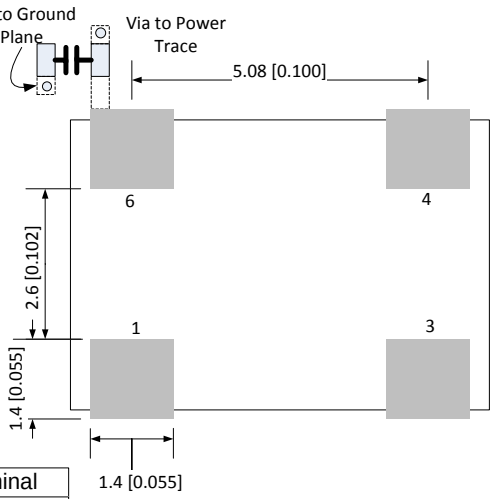
No.	Pin Terminal
1	Enable
2	N/C
3	Ground
4	OUT
5	N/C
6	VDD

7.0 x 5.0 mm Plastic Package (no center pad)

EXTERNAL DIMENSIONS
Units: mm [inches]



RECOMMENDED SOLDER PAD LAYOUT
Units: mm [inches]



No.	Pin Terminal
1	Enable
2	N/C
3	Ground
4	OUT
5	N/C
6	VDD

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