

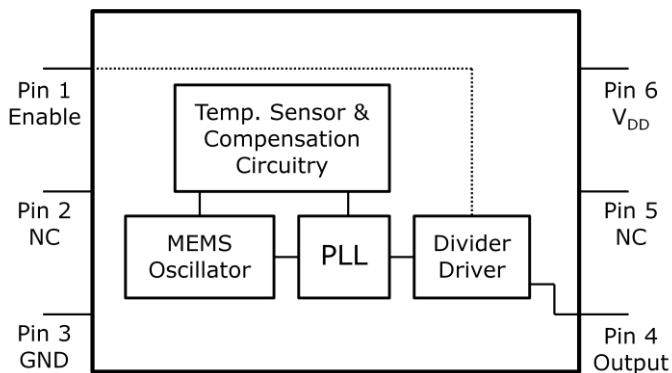


General Description

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 mm², and are "drop-in" replacement for standard 4-pin CMOS quartz 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 Times: <3 Weeks**
- **Wide Freq. Range: 10 to 170 MHz**
- **Small Industry Standard Footprints**
 - 3.2x2.5, 5.0x3.2, and 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**

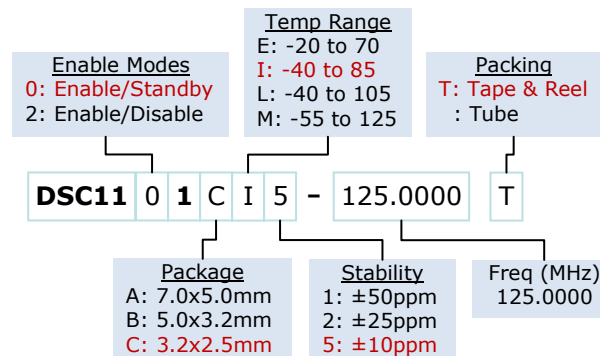
Applications

- **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	-		V	
HBM		4000		
MM		400		
CDM		1500		

Ordering Code



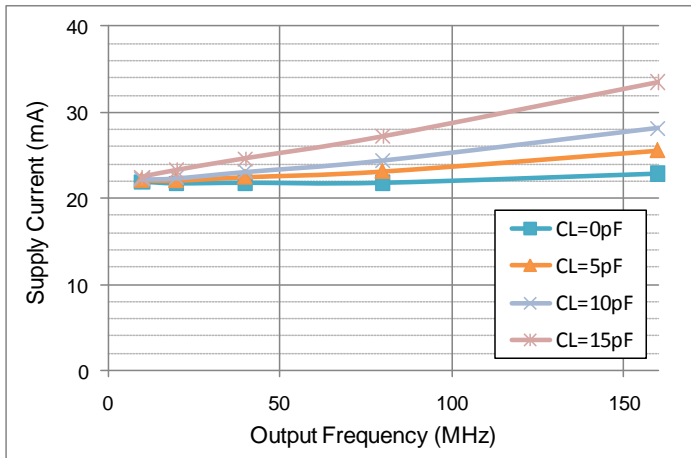
Specifications

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	0.1 26	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			10	ms
Input Logic Levels Input logic high Input logic low	V_{IH} V_{IL}		0.75x V_{DD} -		- 0.25x V_{DD}	V
Output Disable Time ³	t_{DA}				100	ns
Output Enable Time	t_{EN}	DSC1101 DSC1121			10 0.005	ms
Enable Pull-Up Resistor ⁴		Pull-up resistor exist		33		k Ω
CMOS Output						
Supply Current ⁴	I_{DD}	output is enabled $C_L=15\text{pF}$, $F_0=125\text{ MHz}$		31	35	mA
Output Logic Levels Output logic high Output logic low	V_{OH} V_{OL}	$I=\pm 6\text{mA}$	0.9x V_{DD} -		- 0.1x V_{DD}	V
Output Transition time ³ Rise Time Fall Time	t_R t_F	20% to 80% $C_L=15\text{pF}$		1.1 1.3	2 2	ns
Frequency	f_0	All temp range except Auto Auto temp range	10		170 100	MHz
Output Duty Cycle	SYM		45		55	%
Period Jitter	J_{PER}	$C_L=2\text{pF}$ $C_L=15\text{pF}$		4.3 6		ps _{RMS}
Integrated Phase Noise	J_{PH}	200kHz to 20MHz @ 125MHz 100kHz to 20MHz @ 125MHz 12kHz to 20MHz @ 125MHz		0.35 0.5 1.8		ps _{RMS}
Spurious Frequencies					-50	dBc

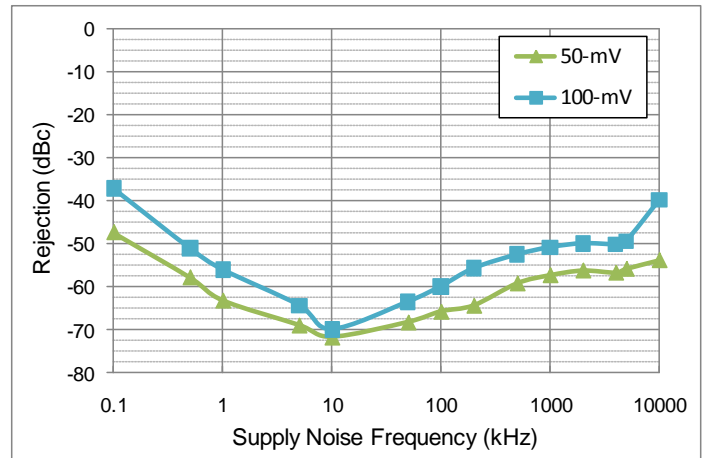
Notes:

- Pin 4 V_{DD} should be filtered with 0.1 μF capacitor.
- Output frequency will be within 100ppm of final stable output frequency.
- Output Waveform and Test Circuit figures below define the parameters.
- Output is enabled if pad is floated or not connected.

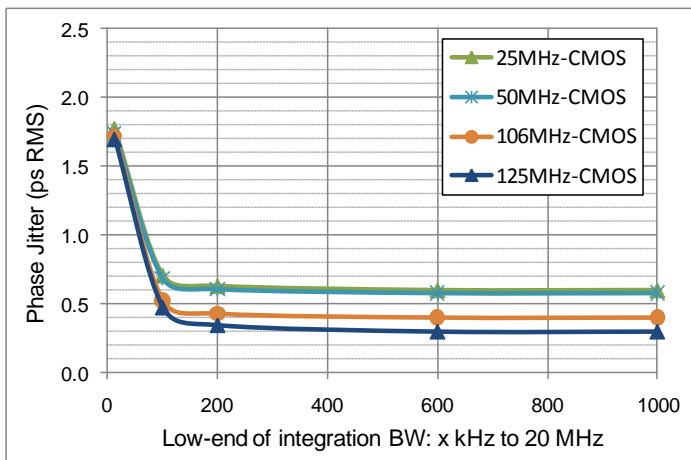
Nominal Performance Parameters (Unless specified otherwise: $T=25^{\circ}C$, $V_{DD}=3.3V$)



Supply current over freq

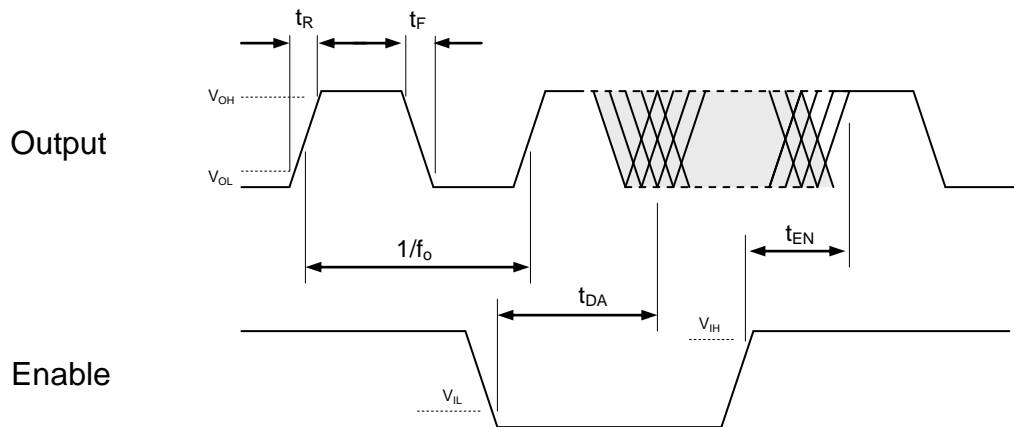


Power supply rejection ratio

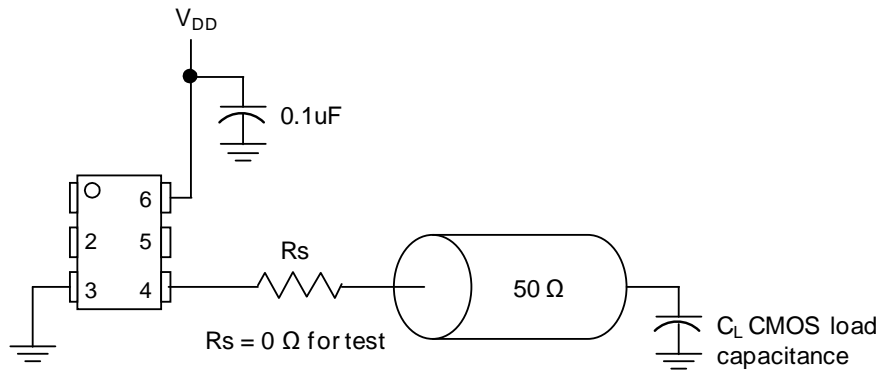


Phase jitter (integrated phase noise)

Output Waveform

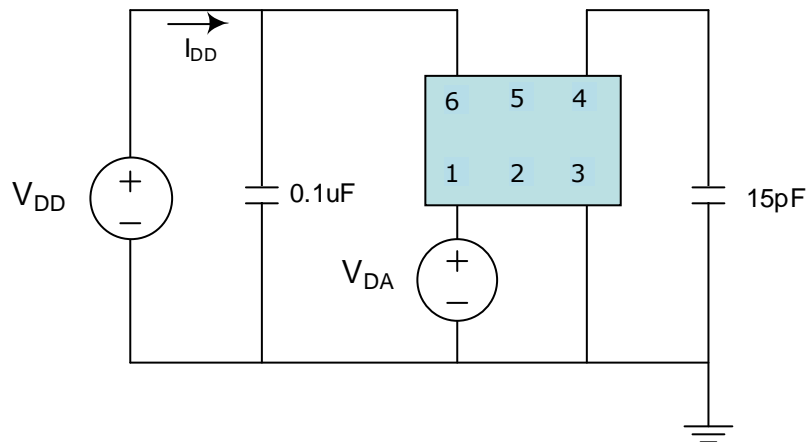


Typical Termination Scheme

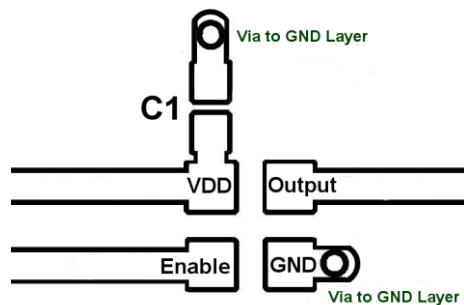


R_s serves to match the trace impedances. Depending on board layout, the value may range from 0 to 30 ohms.

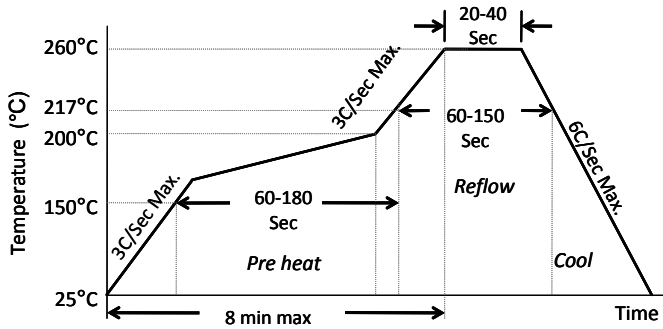
Test Circuit



Board Layout (recommended)



Solder Reflow Profile

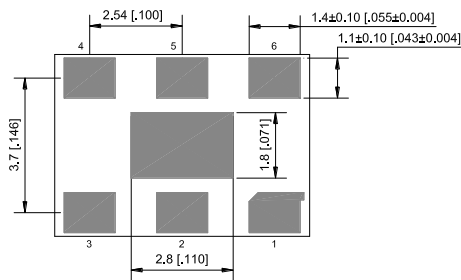
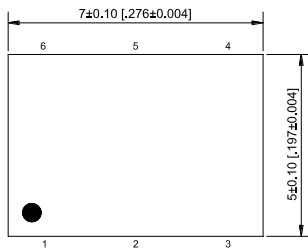


MSL 1 @ 260°C refer to JSTD-020C	
Ramp-Up Rate (200°C to Peak Temp)	3°C/Sec Max.
Preheat Time 150°C to 200°C	60-180 Sec
Time maintained above 217°C	60-150 Sec
Peak Temperature	255-260°C
Time within 5°C of actual Peak	20-40 Sec
Ramp-Down Rate	6°C/Sec Max.
Time 25°C to Peak Temperature	8 min Max.

Package Dimensions

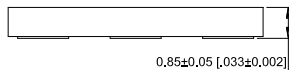
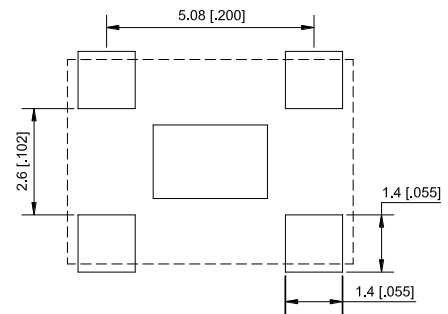
7.0 x 5.0 mm Plastic Package

External Dimensions
units: mm[inch]



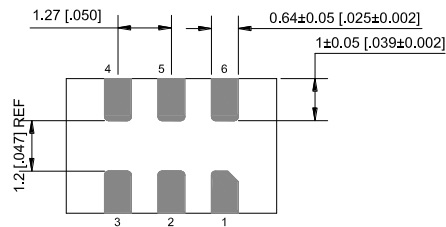
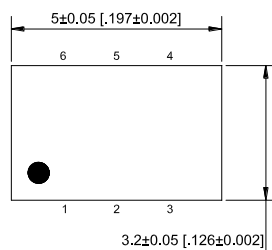
No.	Pin terminal
1	Enable
2	nc
3	GND
4	Output
5	nc
6	VDD

Recommended Solder Pad Layout
units: mm[inch]



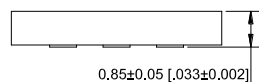
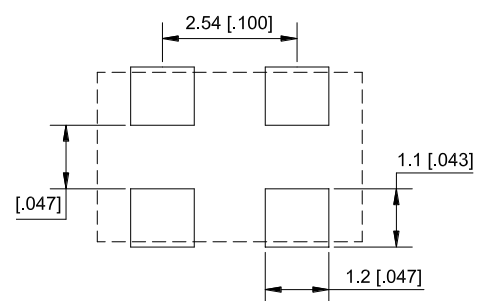
5.0 x 3.2 mm Plastic Package

External Dimensions
units: mm[inch]



No.	Pin terminal
1	Enable
2	nc
3	GND
4	Output
5	nc
6	VDD

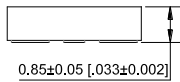
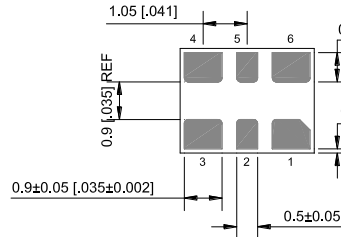
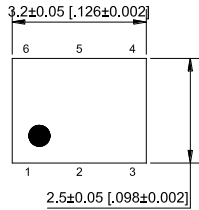
Recommended Solder Pad Layout
units: mm[inch]



3.2 x 2.5 mm Plastic Package

External Dimensions

units: mm[inch]



No.	Pin te
1	Enable
2	nc
3	GND
4	Output
5	nc
6	VDD

Recommended Solder Pad Layout

units: mm[inch]

