DSC8101 | DSC8121

discera

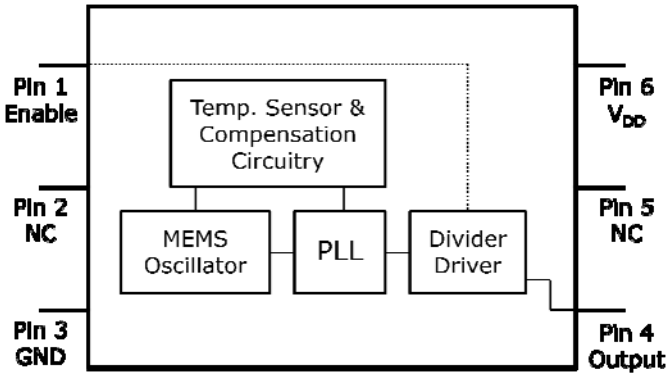
Programmable Low-Jitter Precision CMOS Oscillator

General Description

The DSC8101 & DSC8121 series of high performance field-programmable oscillators utilizes a proven silicon MEMS technology to provide excellent jitter and stability over a wide range of supply voltages and temperatures. Using the TIMEFLASH programmer, the end user can easily program the oscillators' frequency in the field for immediate testing or use in advance prototype development or production.

DSC8101 has a standby feature allowing it to completely power-down when EN pin is pulled low; whereas for DSC8121, 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" replacement for standard 4-pin CMOS quartz oscillators.

Block Diagram



Output Enable Modes

EN Pin	DSC8101	DSC8121
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**
  - o Automotive: -55° to 125° C
  - o Ext. Industrial: -40° to 105° C
  - o Industrial: -40° to 85° C
  - o Ext. commercial: -20° to 70° C
- **High Supply Noise Rejection: -50 dBc**
- **Short Lead Time: 2 Weeks**
- **Wide Freq. Range: 10 to 170 MHz**
- **Small Industry Standard Footprints**
  - o 3.2x2.5, 5.0x3.2, and 7.0x5.0 mm
- **Excellent Shock & Vibration Immunity**
  - o Qualified to MIL-STD-883
- **High Reliability**
  - o 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**
  - o SATA, SAS, Fibre Channel
- **Passive Optical Networks**
  - o EPON, 10G-EPON, GPON, 10G-PON
- **Ethernet**
  - o 1G, 10GBASE-T/KR/LR/SR, and FCoE
- **HD/SD/SDI Video & Surveillance**
- **PCI Express**
- **DisplayPort**

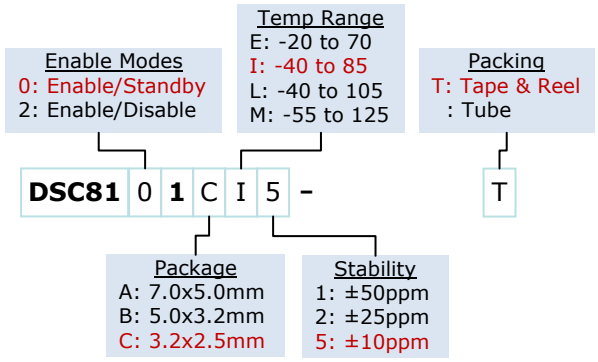
MK-Q-B-P-D-110410-01-2

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

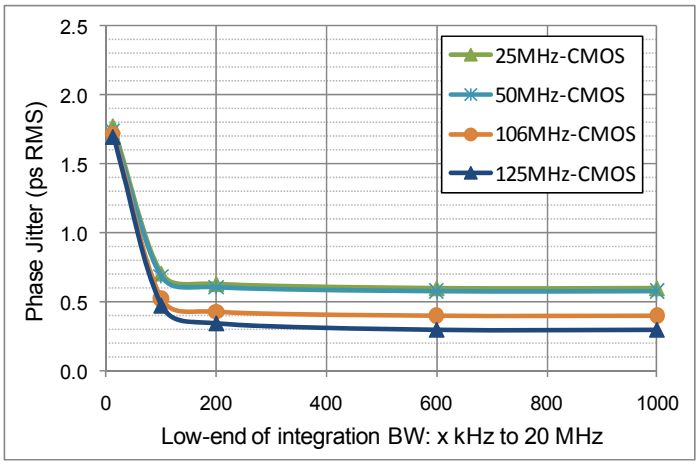


Specifications

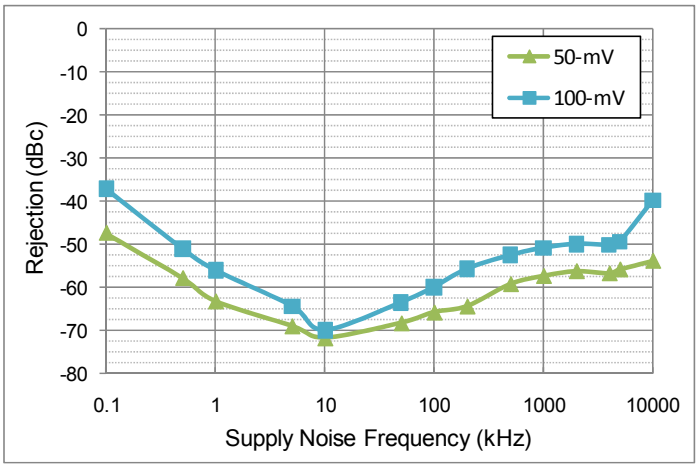
Parameter		Condition	Min.	Typ.	Max.	Unit
Supply Voltage[1]	V_{DD}		2.25		3.6	V
Supply Current	I_{DD}	EN pin low – output is disabled DSC8101 DSC8121		 20	 0.095 22	mA
Frequency Stability Ext Comm. & Ind. only All temp ranges All temp ranges	Δf	Includes frequency variations due to initial tolerance, temp. 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}	DSC8101 DSC8121			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	10		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)

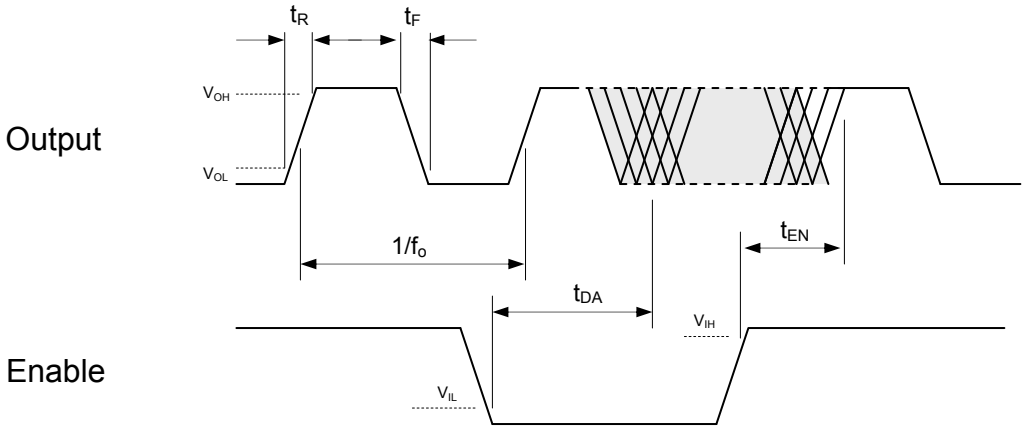


Phase jitter (integrated phase noise)

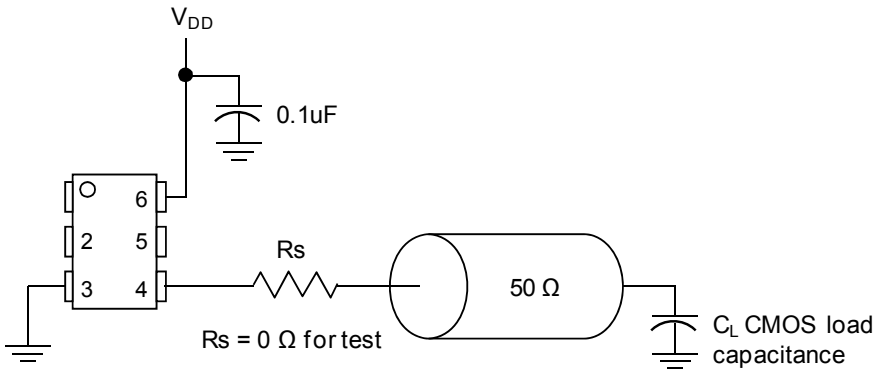


Power supply rejection ratio

Output Waveform

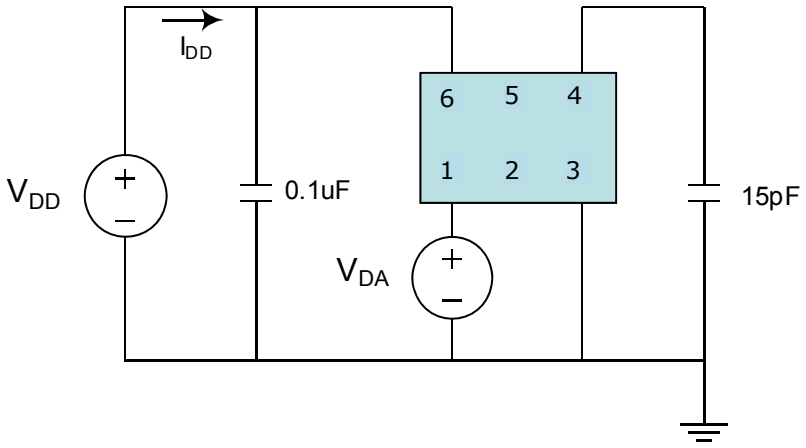


Typical Termination Scheme

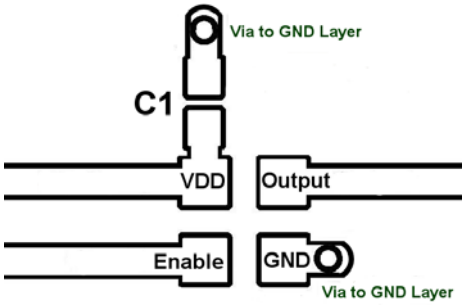


Rs serves to match the trace impedances. Depending on board layout, the value may range from 0 to 30 ohms.

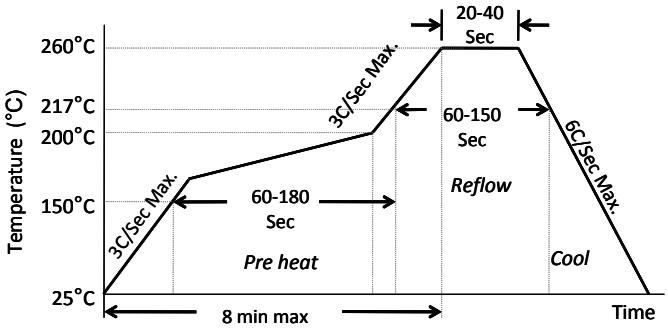
Test Circuit



Board Layout (recommended)



Solder Reflow Profile

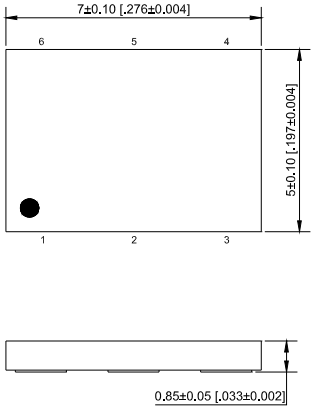


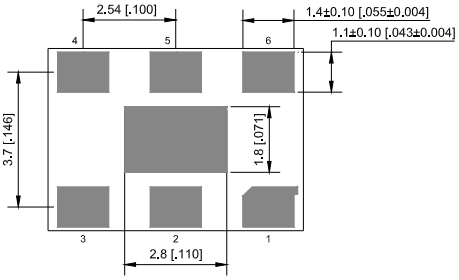
MSL 1 @ 260°C refer to JSTD-020C	
Ramp-Up Rate (200°C to Peak Temp)	3°C/Sec Max.
Preheat Time 150°C to 200°C	60-180 Sec
Time maintained above 217°C	60-150 Sec
Peak Temperature	255-260°C
Time within 5°C of actual Peak	20-40 Sec
Ramp-Down Rate	6°C/Sec Max.
Time 25°C to Peak Temperature	8 min Max.

Package Dimensions

7.0 x 5.0 mm Plastic Package

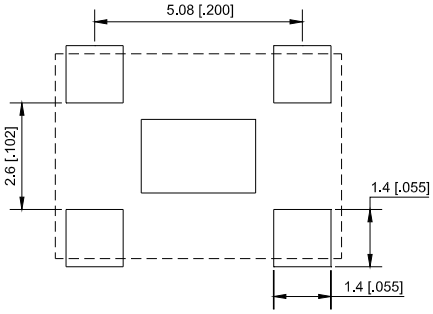
External Dimensions
units: mm[inch]





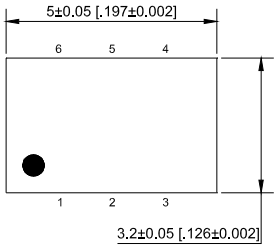
No.	Pin terminal
1	Enable
2	nc
3	GND
4	Output
5	nc
6	VDD

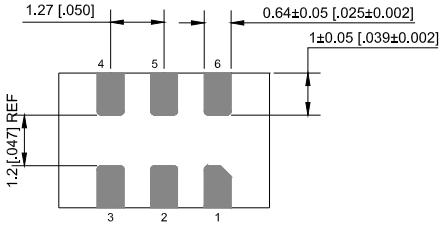
Recommended
Solder Pad Layout
units: mm[inch]

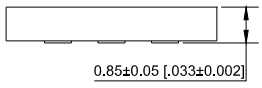


5.0 x 3.2 mm Plastic Package

External Dimensions
units: mm[inch]

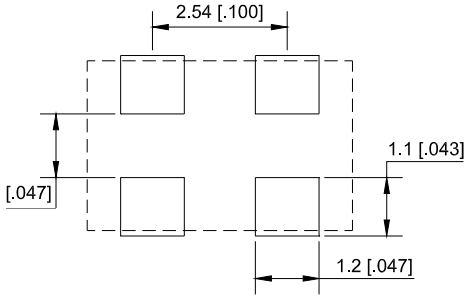






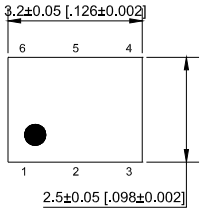
No.	Pin terminal
1	Enable
2	nc
3	GND
4	Output
5	nc
6	VDD

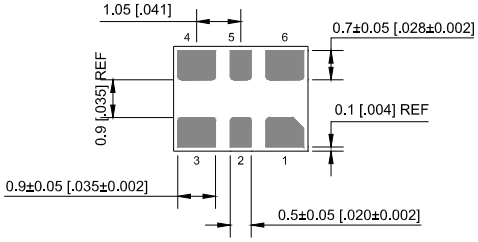
Recommended
Solder Pad Layout
units: mm[inch]

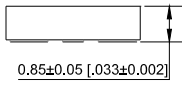


3.2 x 2.5 mm Plastic Package

External Dimensions
units: mm[inch]

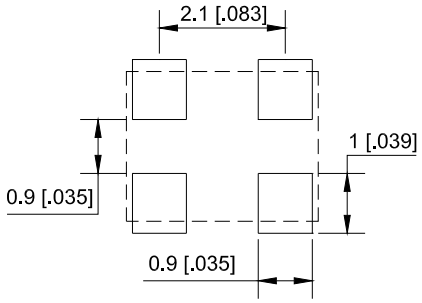






No.	Pin terminal
1	Enable
2	nc
3	GND
4	Output
5	nc
6	VDD

Recommended
Solder Pad Layout
units: mm[inch]



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