DSC2311

discera

Crystal-less™ Configurable Two Output Clock Generator

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General Description

The DSC2311 is a crystal-less clock generator that is factory configurable to simultaneously output two separate frequencies from 2.3 to 170 MHz. The clock generator uses proven silicon MEMS technology to provide low jitter and high frequency stability across a wide range of supply voltages and temperatures. By eliminating the external quartz crystal, crystal-less clock generators significantly enhance reliability and accelerate product development, while meeting stringent clock performance criteria for a variety of consumer electronics, communications, and storage applications.

DSC2311 has an Output Enable / Disable feature allowing it to disable the outputs when OE is low. The device is available in a space saving 6 pin 2.5 x 2.0 mm crystal-less TDFN package that uses only a single external bypass capacitor. This requires a PCB footprint equivalent to that of a 1.0 x 1.0 mm crystal-based clock generator.

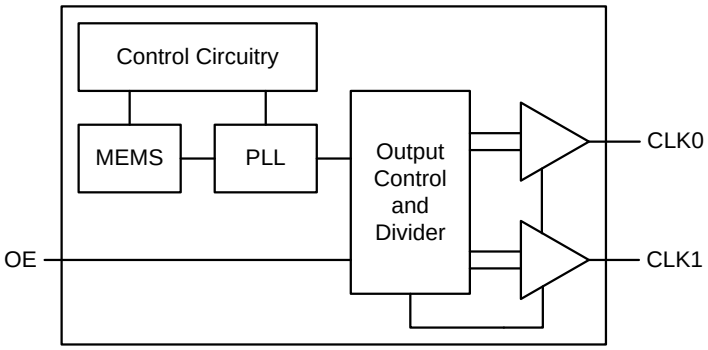
Features

- **Two Simultaneous CMOS Outputs:**
  - Output 1 Range: 2.3 to 170 MHz
  - Output 2 Range: 2.3 to 170 MHz
- **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**
- **High Shock & Vibration Immunity**
  - Qualified to MIL-STD-883
- **High Reliability**
  - 20x higher MTBF than crystal-based clock generator designs
- **Supply Range of 2.25 to 3.6 V**
- **Short Lead Times: 2 Weeks**
- **Lead Free & RoHS Compliant**

Applications

- **Consumer Electronics**
- **Camera and Imaging Modules**
- **Home Automation**
- **Industrial and Power Conversion**
- **Mobile Communications, Internet, and Sensor Devices**
- **Solid State, Hard Drive, and Flash Drive Storage**

Block Diagram



Specifications (Unless specified otherwise: T=25° C, VDD =3.3V)

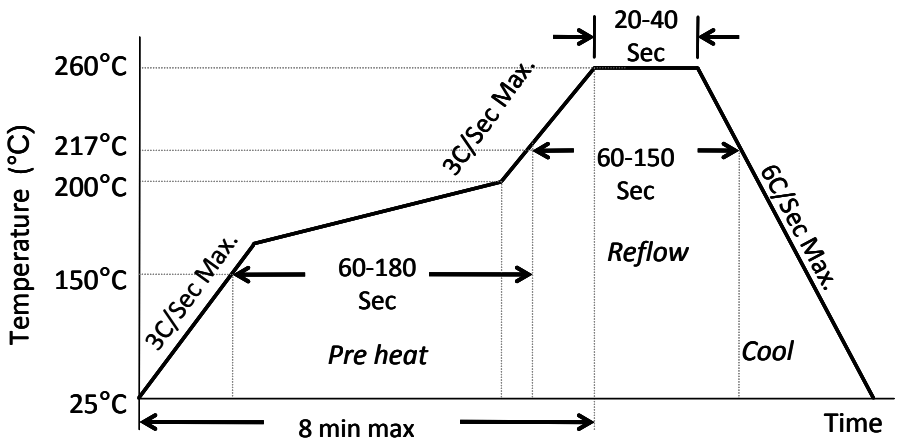
Parameter		Condition	Min.	Typ.	Max.	Unit
Supply Voltage[1]	V_{DD}		2.25		3.6	V
Supply Current[2]	I_{DD}	EN pin high – outputs are enabled C_L=15pF, F_{O1}=F_{O2}=25 MHz		25	28	mA
Frequency Stability	Δf	Includes frequency variations due to initial tolerance, temp. and power supply voltage			±10 ±25 ±50	ppm
Aging	Δf	1 year @25°C			±5	ppm
Startup Time[3]	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[4]	t_{DA}				5	ns
Output Enable Time	t_{EN}				20	ns
Pull-Up Resistor[2]		Pull-up exists on all digital IO		40		kΩ
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[4] Rise Time Fall Time	 t_R t_F	20% to 80% C_L=15pf		 1.1 1.4	 2 2	ns
Frequency	f_0	Commercial/Industrial temp range Automotive temp range	2.3		170 100	MHz
Output Duty Cycle	SYM		45		55	%
Period Jitter[5]	J_{PER}	F_{O1}=F_{O2}=25 MHz		3		ps_{RMS}
Integrated Phase Noise	J_{CC}	200kHz to 20MHz @ 25 MHz 100kHz to 20MHz @ 25 MHz 12kHz to 20MHz @ 25 MHz		0.3 0.38 1.7	 2	ps_{RMS}

Notes:
1. Pin 4 V_{DD} should be filtered with 0.01uf capacitor.
2. Output is enabled if Enable pad is floated or not connected.
3. t_{su} is time to 100PPM stable output frequency after V_{DD} is applied and outputs are enabled.
4. Output Waveform and Test Circuit figures below define the parameters.
5. Period Jitter includes crosstalk from adjacent output.

Absolute Maximum Ratings

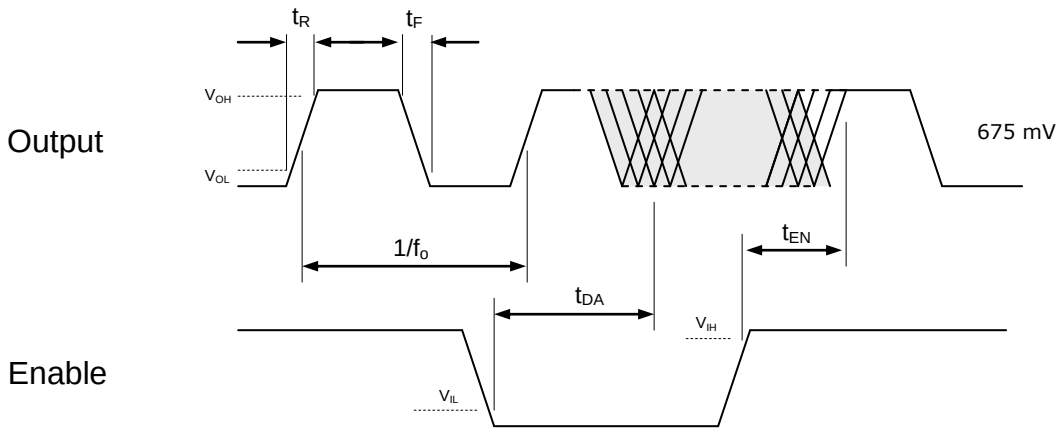
Item	Min	Max	Unit	Condition
Supply Voltage	-0.3	+4.0	V	
Input Voltage	-0.3	V_{DD}+0.3	V	
Junction Temp	-	+150	°C	
Storage Temp	-55	+150	°C	
Soldering Temp	-	+260	°C	40sec max.
ESD HBM MM CDM	-	 4000 400 1500	V	

Solder Reflow Profile



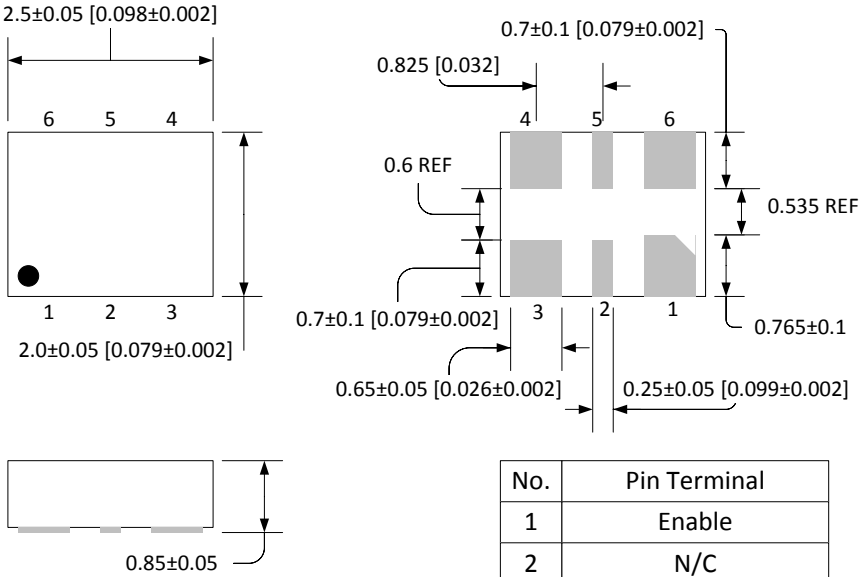
6 QFN MSL 1 @ 260°C refer to JSTD-020C	
Ramp-Up Rate (200°C to Peak Temp)	3°C/Sec Max.
Preheat Time 150°C to 200°C	60-180 Sec
Time maintained above 217°C	60-150 Sec
Peak Temperature	255-260°C
Time within 5°C of actual Peak	20-40 Sec
Ramp-Down Rate	6°C/Sec Max.
Time 25°C to Peak Temperature	8 min Max.

OE Function and Output Waveform: LVCMOS



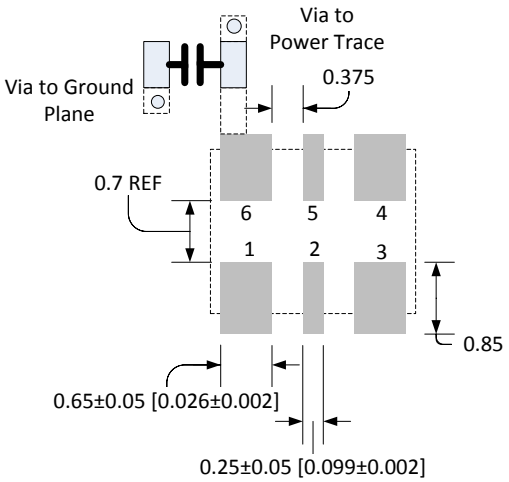
Package Dimensions

EXTERNAL DIMENSIONS
Units: mm [inches]



No.	Pin Terminal
1	Enable
2	N/C
3	Ground
4	CLK0
5	CLK1
6	VDD

RECOMMENDED SOLDER PAD LAYOUT
Units: mm [inches]



Ordering Information

DSC2311 K I 2 - R0001 T

Package
K: 2520 6pin Dual Output

Temp Range
E: -20 to 70
I: -40 to 85
L: -40 to 105
M: -55 to 125

Stability
1: ±50ppm
2: ±25ppm
5: ±10ppm

Packing
T: Tape & Reel
: Tube

Frequency Code
Rxxxx: Custom

Output Clock Frequencies

Output frequencies are factory configured to individual customer and product requirements, subject to output control and divider limitations. Contact sales with your custom frequency needs.

Frequency Code	Freq out 1 MHz	Freq Out 2 MHz
R0001	127	127
R0002	25	125

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