



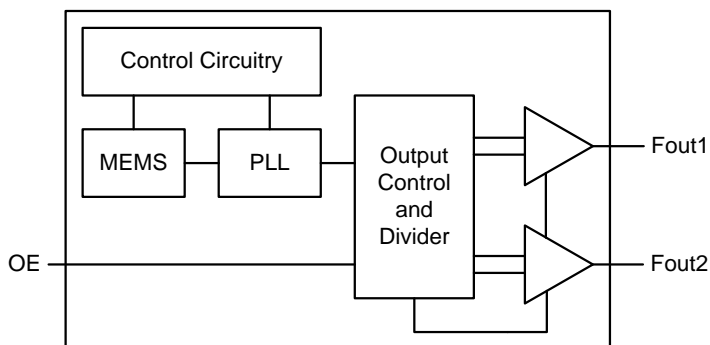
Crystal-less™ Configurable Two Output Clock Generator

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.

Block Diagram



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: ±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**

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

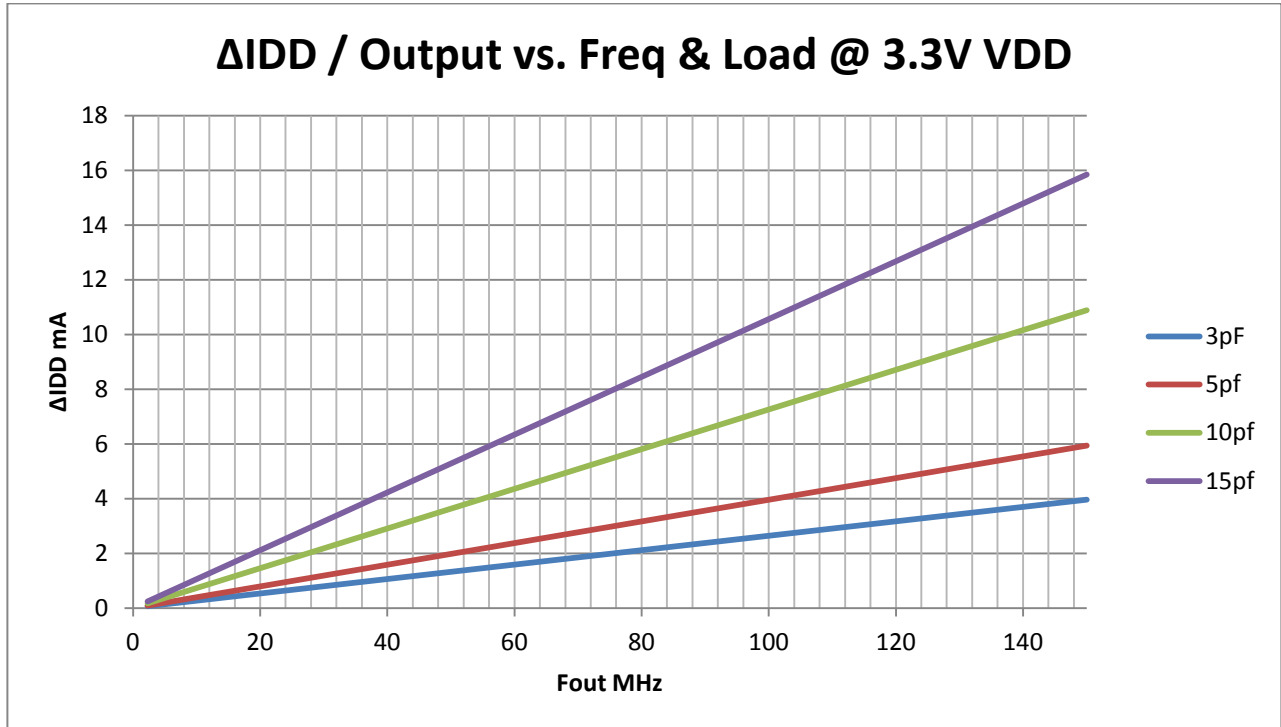
Parameter		Condition	Min.	Typ.	Max.	Unit
Supply Voltage ¹	V _{DD}		2.25		3.6	V
Supply Current ²	I _{DD}	EN pin low – outputs are disabled		21	23	mA
Frequency Stability ⁶	Δf	Includes frequency variations due to initial tolerance, temp. and power supply voltage			±25 ±50	ppm
Aging	Δf	1 year @25°C			±5	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		ps _{RMS}

- Notes:
- Pin 4 V_{DD} should be filtered with 0.01uf capacitor.
 - Output is enabled if Enable pad is floated or not connected. Operating current = Disabled Current + ΔIDD from Fout1 + ΔIDD from Fout2. See Current Consumption graph on next page.
 - t_{SU} is time to 100PPM stable output frequency after V_{DD} is applied and outputs are enabled.
 - Output Waveform and Test Circuit figures below define the parameters.
 - Period Jitter includes crosstalk from adjacent output.
 - For other ppm stabilities, contact the factory at sales@discera.com

Absolute Maximum Ratings

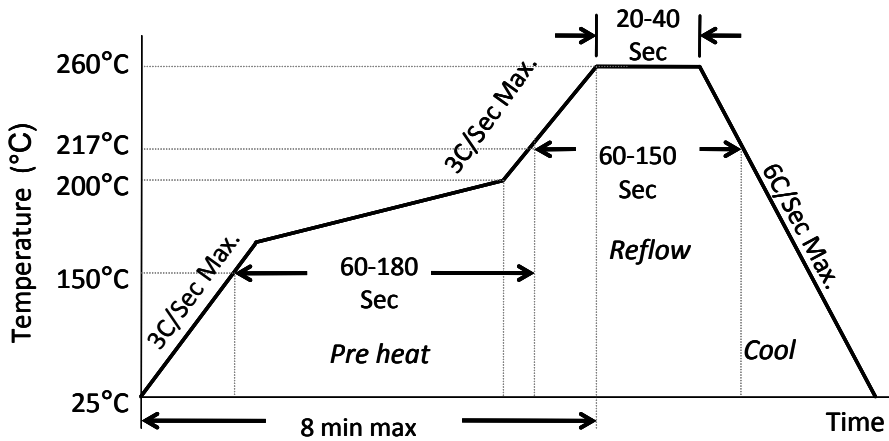
Item	Min	Max	Unit	Condition
Supply Voltage	-0.3	+4.0	V	
Input Voltage	-0.3	V _{DD} +0.3	V	
Junction Temp	-	+150	°C	
Storage Temp	-55	+150	°C	
Soldering Temp	-	+260	°C	40sec max.
ESD	-		V	
HBM		4000		
MM		400		
CDM		1500		

Current Consumption



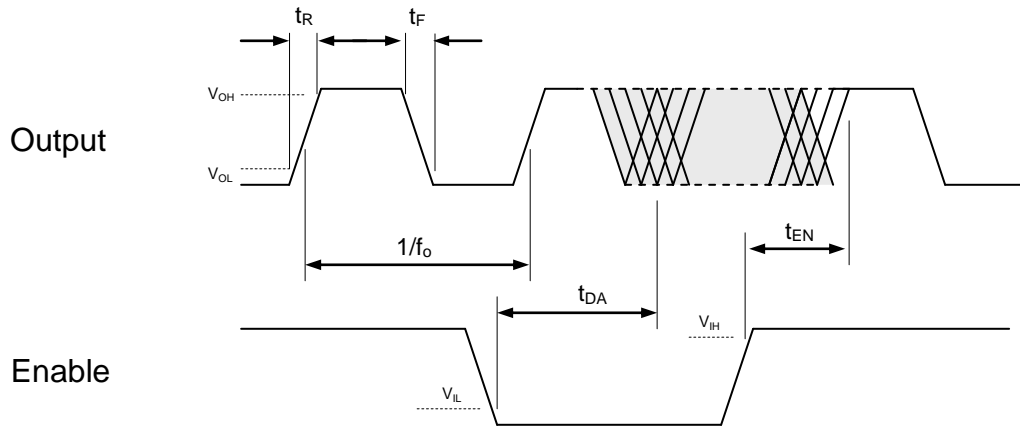
Total Current = Disabled Current + Δ IDD Fout1 + Δ IDD Fout2

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



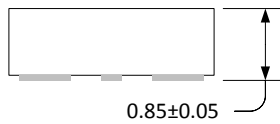
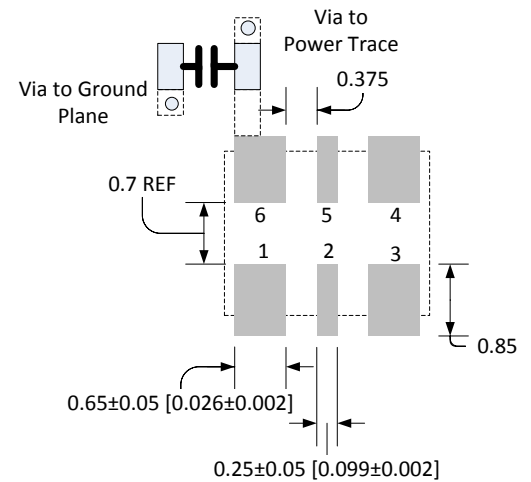
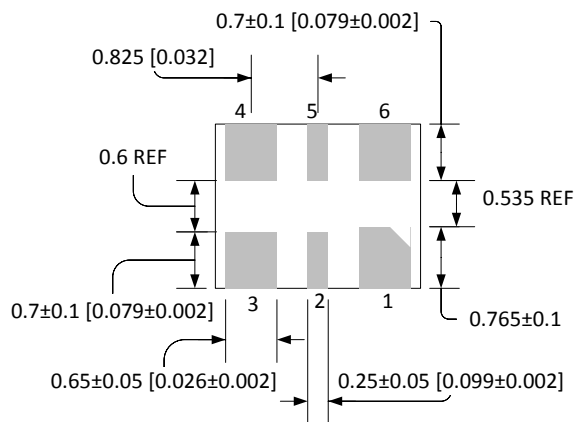
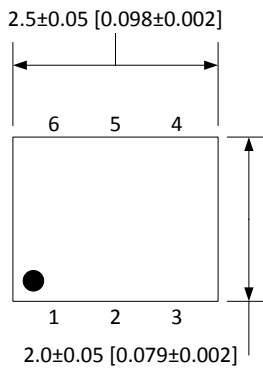
Package Dimensions

EXTERNAL DIMENSIONS

Units: mm [inches]

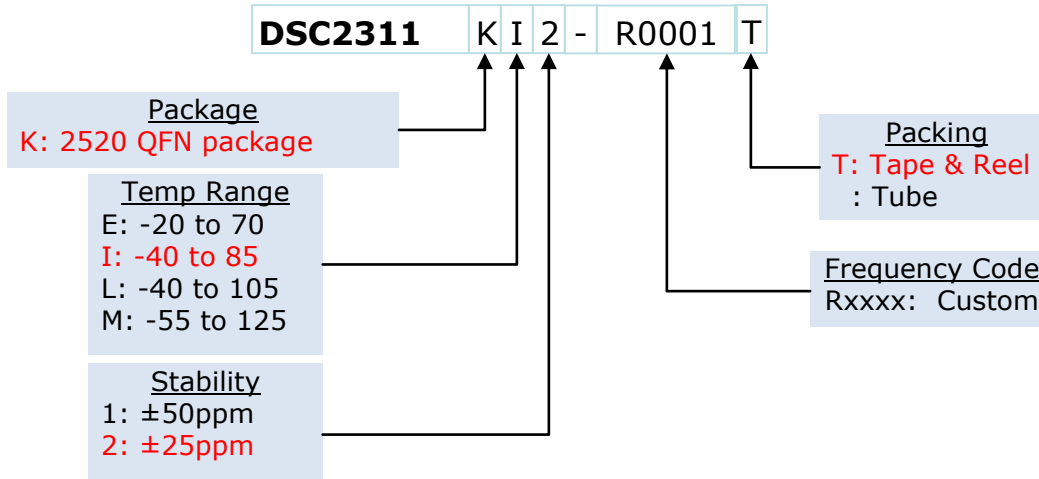
RECOMMENDED SOLDER PAD LAYOUT

Units: mm [inches]



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

Ordering Information



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	Fout1 MHz	Fout2 MHz
R0001	127	127
R0002	25	125

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.