DSC510-05

Crystal-less™ Four Output LAN Clock Generator

General Description

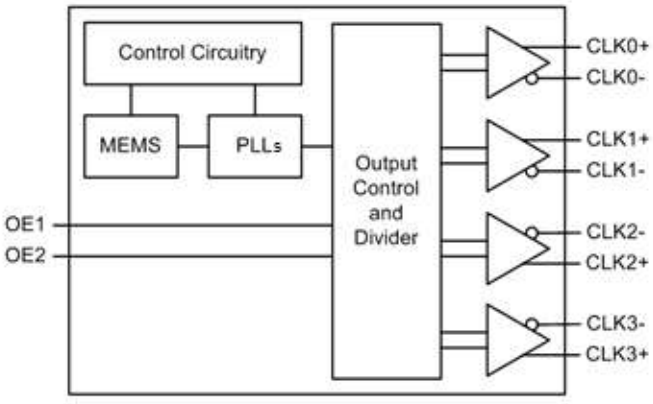
The DSC510-05 is a Crystal-less™, four output clock generator that implements Discera's proven PureSilicon™ MEMS technology. The devices implements proven silicon MEMS technology to provide excellent jitter and stability over a wide range of supply voltages and temperatures. By eliminating the external quartz crystal, MEMS clock generators significantly enhance reliability and accelerate product development, while meeting stringent clock performance criteria for a variety of communications, storage, and networking applications.

DSC510-05 has an Output Enable / Disable feature allowing it to disable all outputs when OE1 and OE2 are low. Each output enable pin controls one of the two banks of synchronous clocks. See the OE function table 1 for more detail. The device is available in a 20 pin QFN. Additional output formats are in any combination of LVPECL, LVDS, LVCMOS and HCSL.

Features

- **Four 25MHz LVPECL Clocks**
- **Available Output Formats:**
  - HCSL, LVPECL, LVCMOS, or LVDS
  - Mixed Outputs: LVPECL/HCSL/LVDS/CMOS
- **Wide Temperature Range**
  - Ext. Industrial: -40° to 105° C
  - Industrial: -40° to 85° C
  - Ext. commercial: -20° to 70° C
- **Supply Range of 2.25 to 3.6 V**
- **Low Power Consumption**
  - 30% lower than competing devices
- **Excellent Shock & Vibration Immunity**
  - Qualified to MIL-STD-883
- **Available Footprints:**
  - 20 QFN
- **Lead Free & RoHS Compliant**
- **Short Lead Time: 2 Weeks**
- **AEC-Q100 Automotive Qualified**

Block Diagram



Applications

- **Communications/Networking**
  - **Ethernet/ LAN PHY**
  - **1G, 10GBASE-T/KR/LR/SR, and FcoE**
  - **Routers and Switches**
  - **Gateways, VoIP, Wireless AP's**
  - **Passive Optical Networks**

* Clk0+/-, Clk1+/-, Clk2 +/- and Clk3 +/- are 25MHz clocks for LAN applications. For other frequencies, please contact the factory.

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	I_{DD}	EN pin low – outputs are disabled		42	46	mA
Supply Current[2] (Four HCSL Outputs)	I_{DD}	EN pin high – outputs are enabled R_L=50 Ω, All Outputs Running		120		mA
Frequency Stability	Δf	Includes frequency variations due to initial tolerance, temp. and power supply voltage			±100 ±50	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 on OE pin		40		kΩ

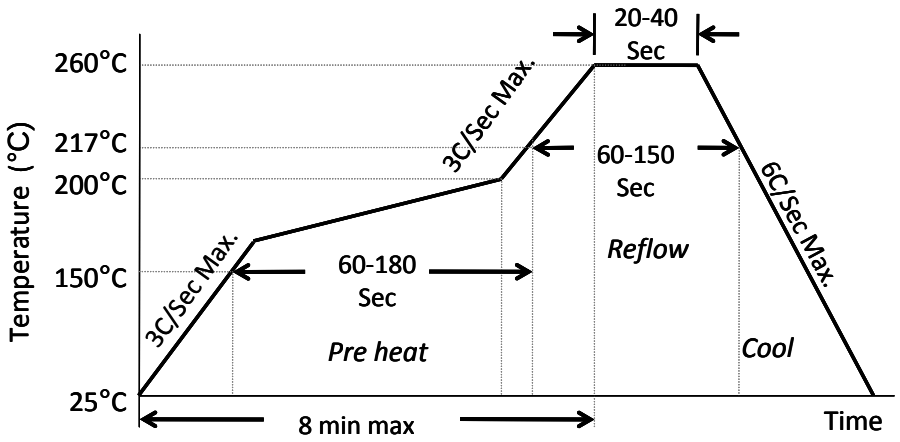
LVPECL Outputs						
Output Logic Levels Output logic high Output logic low	 V_{OH} V_{OL}	R_L=50Ω	 V_{DD}-1.08 -		 - V_{DD}-1.55	V
Pk to Pk Output Swing		Single-Ended		800		mV
Output Transition time[3] Rise Time Fall Time	 t_R t_F	20% to 80% R_L=50Ω, C_L= 0pF		250		ps
Frequency	f_0	Single Frequency	2.3		460	MHz
Output Duty Cycle	SYM	Differential	48		52	%
Period Jitter	J_{PER}			2.5		ps_{RMS}
Integrated Phase Noise	J_{PH}	200kHz to 20MHz @25MHz 100kHz to 20MHz @25MHz 12kHz to 20MHz @25MHz		0.25 0.38 1.7	 2	ps_{RMS}

Notes:
1. Each V_{DD} pin should be filtered with 0.01uf capacitor.
2. Output is enabled if OE pin 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 Connection Diagram define the parameters.
5. Period Jitter includes crosstalk from adjacent output.
6. Contact Sales@Discera.com for alternate output options (LVPECL, LVDS, LVCMOS).
7. Contact Sales@Discera.com for alternative frequency options
8. Jitter limits established by Gen 1.1, Gen 2.1, and Gen 3.0 PCIe standards.

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

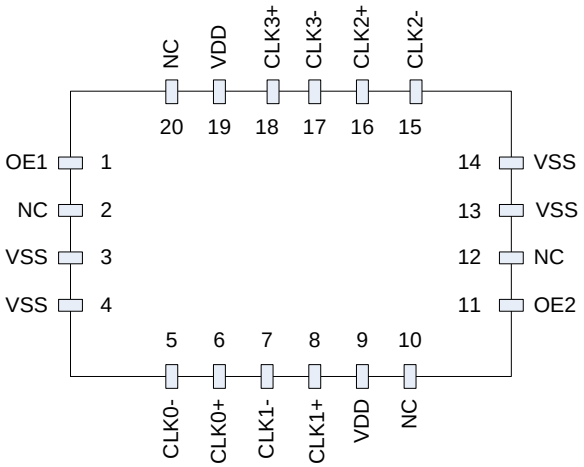


20 QFN MSL 1 @ 260°C refer to JSTD-020C	
Ramp-Up Rate (200°C to Peak Temp)	3°C/Sec Max.
Preheat Time 150°C to 200°C	60-180 Sec
Time maintained above 217°C	60-150 Sec
Peak Temperature	255-260°C
Time within 5°C of actual Peak	20-40 Sec
Ramp-Down Rate	6°C/Sec Max.
Time 25°C to Peak Temperature	8 min Max.

Pin Description (20 QFN)

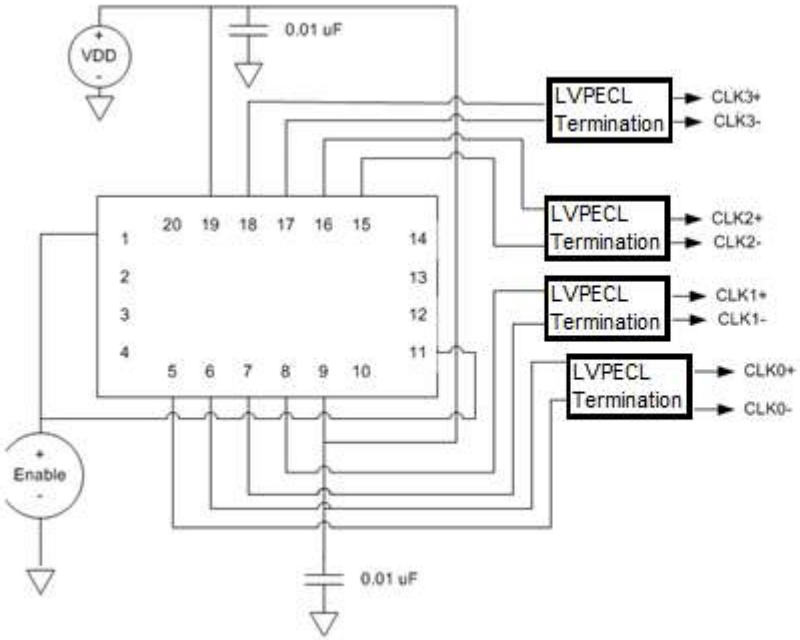
Pin No.	Pin Name	Pin Type	Description
1	OE1	I	Output Enable; active high – See Table 1
2	NC	NA	Leave unconnected or grounded
3	VSS	Power	Ground
4	VSS	Power	Ground
5	CLK0-	O	Complement output of differential pair
6	CLK0+	O	True output of differential pair
7	CLK1-	O	Complement output of differential pair
8	CLK1+	O	True output of differential pair
9	VDD	Power	Power Supply
10	NC	NA	Leave unconnected or grounded
11	OE2	I	Output Enable; active high – See Table 1
12	NC	NA	Leave unconnected or grounded
13	VSS	Power	Ground
14	VSS	Power	Ground
15	CLK2-	O	Complement output of differential pair
16	CLK2+	O	True output of differential pair
17	CLK3-	O	Complement output of differential pair
18	CLK3+	O	True output of differential pair
19	VDD	Power	Power Supply
20	NC	NA	Leave unconnected or grounded

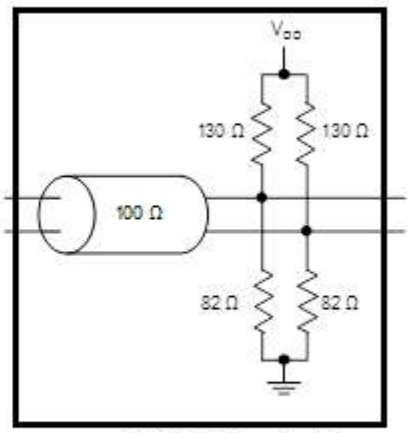
Pin Diagram (20 QFN)



20 QFN 5.0 x 3.2mm

Connection Diagram (20 QFN Four LVPECL Outputs)





LVPECL termination circuit for 100 Ohms

OE Function and Output Waveform: LVPECL

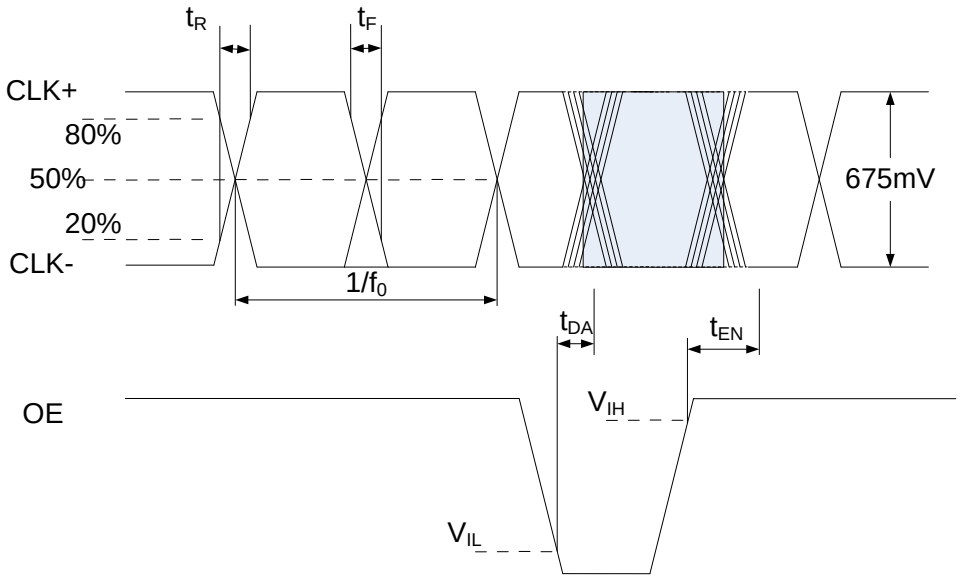


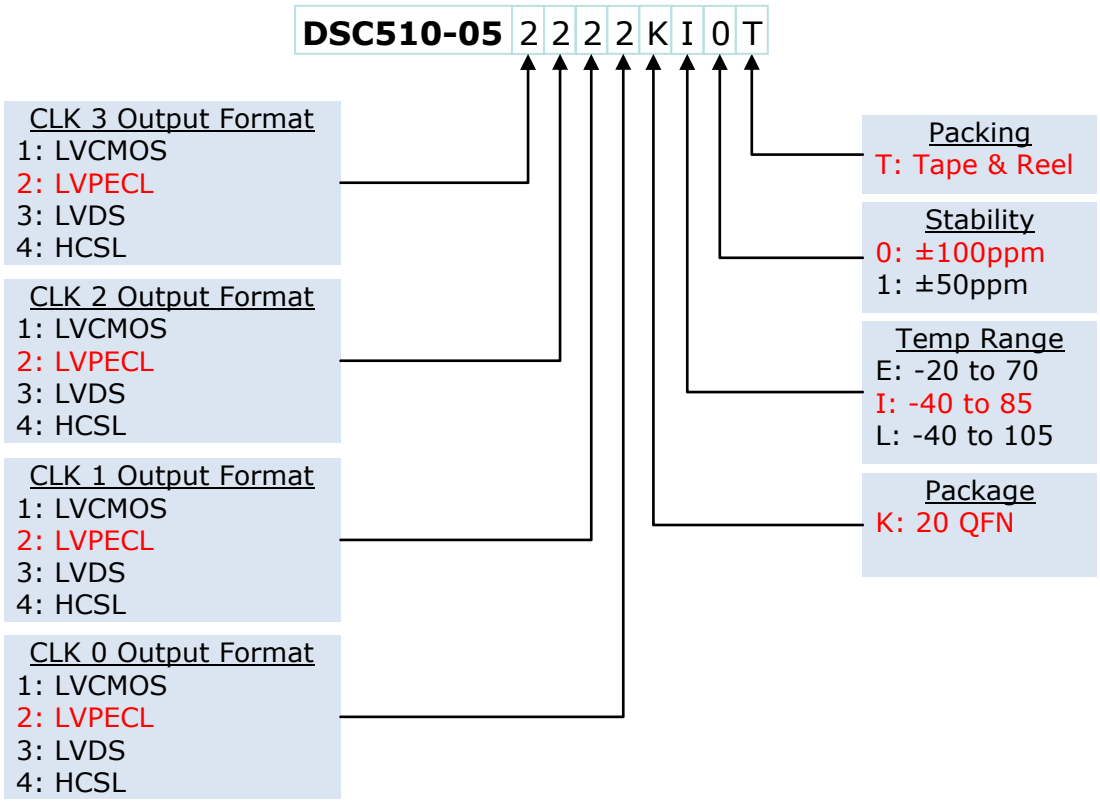
Table 1: output enable select table

CLK1/CLK2 are synchronous

OE1	OE2	CLK0	CLK1	CLK2	CLK3
0	0	Hi-Z	Hi-Z	Hi-Z	Hi-Z
0	1	Hi-Z	EN	EN	Hi-Z
1	0	EN	Hi-Z	Hi-Z	EN
1	1	EN	EN	EN	EN

CLK0/CLK3 are synchronous

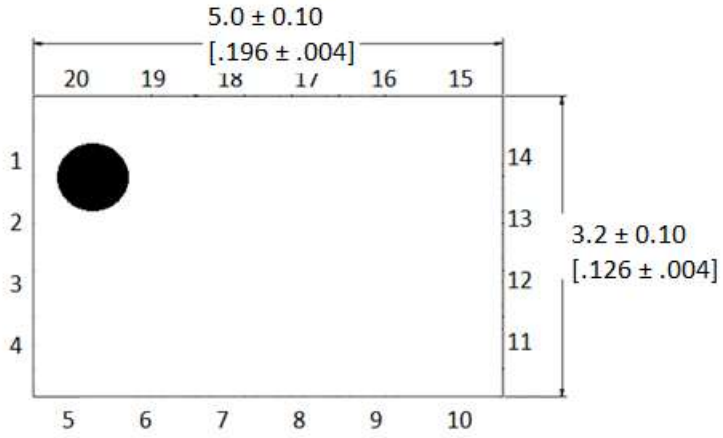
Ordering Information



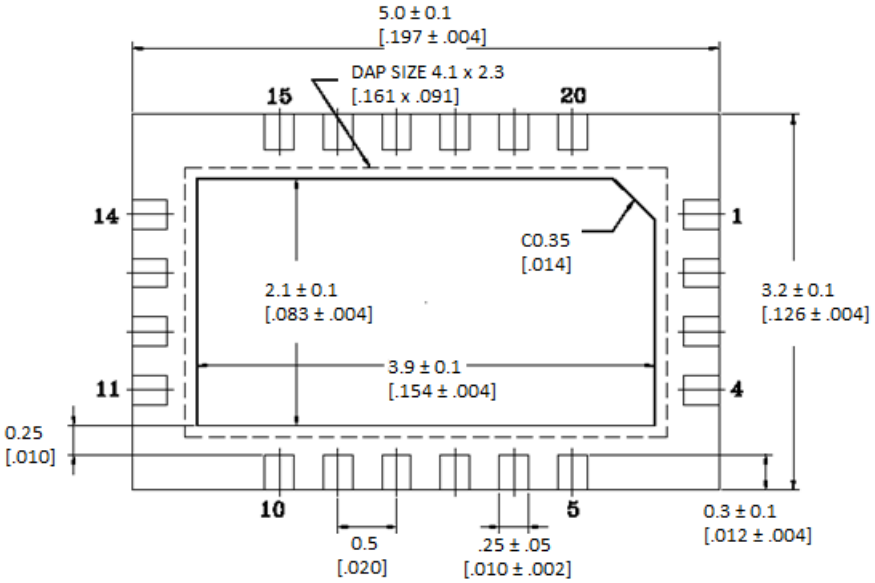
Package Dimensions

20 QFN, 5.0 x 3.2 mm

Top View
units: mm[inches]



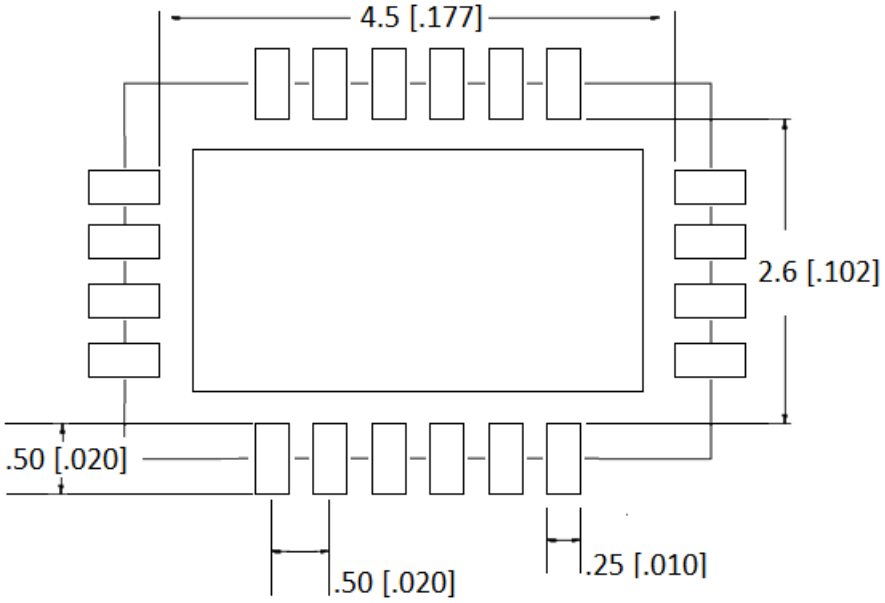
Bottom View
units: mm[inches]±



Side View
units: mm[inches]

Recommended Solder Pad Layout

units: mm[inches]



*Connect the center pad to VSS for best thermal performance

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