DSC400

Configurable Four Output, Low Jitter Crystal-less™ Clock Generator

Features

- Low RMS Phase Jitter: <1 ps (typ.)
- High Stability: ±25 ppm, ±50 ppm
- Wide Temperature Range:
  - Industrial –40°C to +85°C
  - Ext. Commercial –20°C to +70°C
- High Supply Noise Rejection: –50 dBc
- Four Format-Configurable Outputs:
  - LVPECL, LVDS, HCSL, LVCMOS
- Available Pin-Selectable Frequency Table
  - 1 Pin per Bank for 2 Frequency Sets
- Wide Frequency Range:
  - 2.3 MHz – 460 MHz
- 20-Pin QFN Footprint (5.0 mm x 3.2 mm)
- Excellent Shock and Vibration Immunity
- High Reliability
  - 20x better MTF than quartz-based devices
- Wide Supply Range of 2.25V to 3.6V
- Lead Free and RoHS-Compliant
- AEC-Q100 Automotive Qualified

Applications

- Communications and Networks
- Ethernet
  - 1G, 10GBASE-T/KR/LR/SR, and FCoE
- Storage Area Networks
  - SATA, SAS, Fibre Channel
- Passive Optical Networks
  - EPON, 10G-EPON, GPON, 10G-PON
- HD/SD/SDI Video and Surveillance
- Automotive
- Media and Video
- Embedded and Industrial

General Description

The DSC400 is a four output crystal-less™ clock generator. It utilizes proven PureSilicon™ MEMS technology to provide excellent jitter and stability while incorporating additional device functionality.

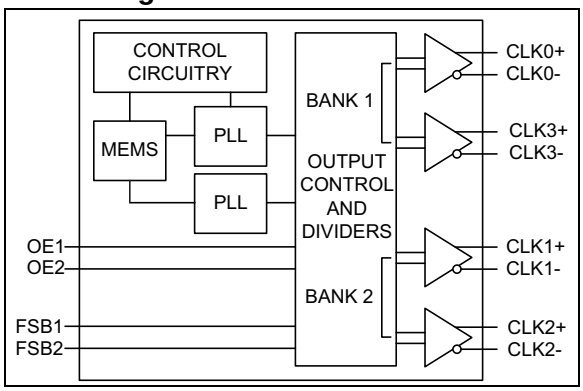
The nominal frequencies of the outputs can be identical or independently derived from common PLLs.

Each output may be configured independently to support a single-ended LVCMOS interface or a differential interface. Differential options include LVPECL, LVDS, or HCSL.

The DSC400 provides two independent select lines for choosing between two sets of pre-configured frequencies per bank. It also has two OE pins to allow for enabling and disabling outputs.

The DSC400 is packaged in a 20-pin QFN (5 mm x 3.2 mm) and is available in extended commercial and industrial temperature grades.

Block Diagram



© 2016 Microchip Technology Inc.

1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings †

Supply Voltage ..... –0.3V to +4.0V
Input Voltage ..... –0.3V to V_{DD}+0.3V
ESD Protection (HBM) ..... 4 kV
ESD Protection (MM) 400V
ESD Protection (CDM) ..... 1.5 kV

† **Notice:** Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational sections of this specification is not intended. Exposure to maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

Specifications: V_{DD} = 3.3V; T_A = +25°C unless otherwise specified.

Parameters	Sym.	Min.	Typ.	Max.	Units	Conditions
Supply Voltage (Note 1)	V_{DD}	2.25	—	3.6	V	—
Core Supply Current (Note 2)	I_{DDCORE}	—	40	44	mA	OE(1:2) = 0. All outputs disabled.
Frequency Stability	Δf	—	—	±25	ppm	All temperature and V_{DD} ranges.
		—	—	±50		
Aging - First Year	Δf_{Y1}	—	—	±5	ppm	One year at +25°C
Aging - After First Year	Δf_{Y2}+	—	—	<±1	ppm/yr	Year two and beyond at +25°C
Start-up Time (Note 3)	t_{SU}	—	—	5	ms	T = +25°C
Input Logic Levels	V_{IH}	0.75 x V_{DD}	—	—	V	Input logic high
	V_{IL}	—	—	0.25 x V_{DD}		Input logic low
Output Disable Time (Note 4)	t_{DA}	—	—	5	ns	OE(1:2) transition from 1 to 0
Output Enable Time (Note 4)	t_{EN}	—	—	20	ns	OE(1:2) transition from 0 to 1
Pull-Up Resistor	R_{PU}	—	40	—	kΩ	All input pins have an internal pull-up

Note 1: V_{DD} pins should be filtered with a 0.1 µF capacitor connected between V_{DD} and V_{SS}.
2: The addition of I_{DDCORE} and I_{DDIO} provides the total current consumption of the device.
3: t_{SU} is time to 100 ppm stable output frequency after V_{DD} is applied and outputs are enabled.
4: See the Output Waveform section for more information.

© 2016 Microchip Technology Inc.

TEMPERATURE SPECIFICATIONS (Note 1)

Parameters	Sym.	Min.	Typ.	Max.	Units	Conditions
Temperature Ranges						
Operating Temperature Range (T)	T_A	–20	—	+70	°C	Ordering Option E
	T_A	–40	—	+85	°C	Ordering Option I
Junction Temperature	T_J	—	—	+150	°C	—
Storage Temperature Range	T_S	–40	—	+150	°C	—
Soldering Temperature	—	—	—	+260	°C	40 sec. max.

Note 1: The maximum allowable power dissipation is a function of ambient temperature, the maximum allowable junction temperature, and the thermal resistance from junction to air (i.e., T_A, T_J, θ_{JA}). Exceeding the maximum allowable power dissipation will cause the device operating junction temperature to exceed the maximum +125°C rating. Sustained junction temperatures above +125°C can impact the device reliability.

2.0 PIN DESCRIPTIONS

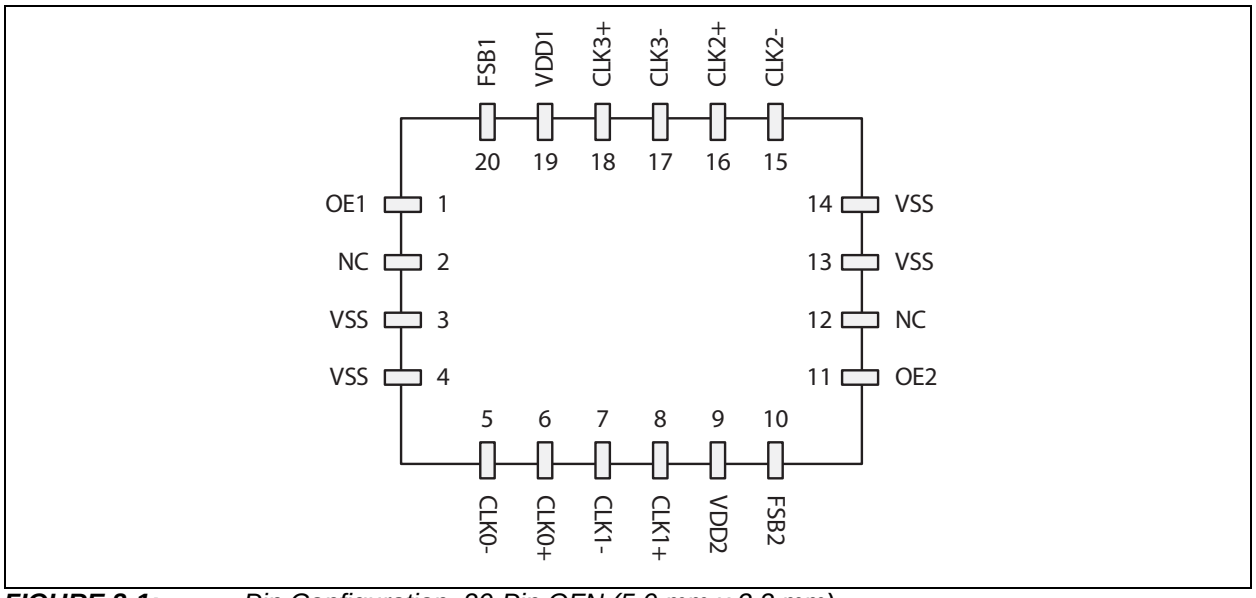


FIGURE 2-1: *Pin Configuration, 20-Pin QFN (5.0 mm x 3.2 mm)*

The descriptions of the pins are listed in Table 2-1.

TABLE 2-1: PIN FUNCTION TABLE

Pin Number	Pin Name	Pin Type	Description
1	OE1	I	Output Enable for Bank1 (CLK0 and CLK3); Active-High. See Table 3-1.
2	NC	N/A	Leave unconnected or connect to ground.
3	V_{SS}	PWR	Ground.
4	V_{SS}	PWR	Ground.
5	CLK0–	O	Complement output of differential pair 0 (off when in LVCMOS format).
6	CLK0+	O	True output of differential pair 0 or LVCMOS output 0.
7	CLK1–	O	Complement output of differential pair 1 (off when in LVCMOS format).
8	CLK1+	O	True output of differential pair 1 or LVCMOS output 1.
9	V_{DD2}	PWR	Power Supply for Bank2 (CLK1 and CLK2).
10	FSB2	I	Input for selecting pre-configured frequencies on Bank2 (CLK1 and CLK2).
11	OE2	I	Output Enable for Bank2 (CLK1 and CLK2); Active-High. See Table 3-1.
12	NC	N/A	Leave unconnected or connect to ground.
13	V_{SS}	PWR	Ground.
14	V_{SS}	PWR	Ground.
15	CLK2–	O	Complement output of differential pair 2 (off when in LVCMOS format).
16	CLK2+	O	True output of differential pair 2 or LVCMOS output 2.
17	CLK3–	O	Complement output of differential pair 3 (off when in LVCMOS format).
18	CLK3+	O	True output of differential pair 3 or LVCMOS output 3.
19	V_{DD1}	PWR	Power Supply for Bank1 (CLK0 and CLK3).
20	FSB1	I	Input for selecting pre-configured frequencies on Bank1 (CLK0 and CLK3).

© 2016 Microchip Technology Inc.

3.0 OPERATIONAL DESCRIPTION

The DSC400 is a crystal-less™ clock generator. Unlike older clock generators in the industry, it does not require an external crystal to operate; it relies on the integrated MEMS resonator that interfaces with internal PLLs. This technology enhances performance and reliability by allowing tighter frequency stability over a far wider temperature range. In addition, the higher resistance to shock and vibration decreases the aging rate to allow for much improved product life in the system.

3.1 Inputs

There are four input signals in the device. Each has an internal (40 kΩ) pull-up to default the selection to a high (1). Inputs can be controlled through hardware strapping method with a resistor to ground to assert the input low (0). Inputs may also be controlled by other components' GPIOs

In case more than one frequency set is desired, FSB1 and FSB2 are used to independently select one of two sets per bank. FSB1 selects the pre-configured set on Bank1 (CLK0 and CLK3) and FSB2 selects the pre-configured set on Bank2 (CLK1 and CLK2), as shown in Table 1-1 in the Product Identification System section.

If there is a requirement to disable outputs, the inputs OE1 and OE2 are used in conjunction to disable the banks of outputs. Outputs are disabled in tri-state (Hi-Z) mode. See Table 3-1 for more information.

TABLE 3-1: OUTPUT ENABLE SELECTION TABLE

OE1	OE2	Bank 1 (CLK0 & CLK3)	Bank 2 (CLK1 & CLK2)
0	0	Hi-Z	Hi-Z
0	1	Hi-Z	Running
1	0	Running	Hi-Z
1	1	Running	Running

3.2 Outputs

The four outputs are grouped into two banks. Each bank is supplied by an independent V_{DD} to allow for optimized noise isolation between the two banks. Each bank provides two synchronous outputs generated by a common PLL:

- Bank1 is composed of outputs CLK0 and CLK3.
- Bank2 is composed of outputs CLK1 and CLK2.

Each output may be pre-configured independently to be one of the following formats: LVCMOS, LVDS, LVPECL or HCSL. In case the output is configured to be single-ended LVCMOS, the frequency is generated on the true output (CLKx+) and the complement output (CLKx–) is shut off in a low state. Frequencies can be chosen from 2.3 MHz to 460 MHz for differential outputs and from 2.3 MHz to 170 MHz on LVCMOS outputs.

3.3 Power

V_{DD1} and V_{DD2} supply the power to banks 1 and 2 respectively. Each V_{DD} may each have a different supply voltage from the other as long as it is within the 2.25V to 3.6V range. Each V_{DD} pin should have a 0.1 µF capacitor to filter high-frequency noise. V_{SS} is common to the entire device.

4.0 TERMINATION SCHEMES

4.1 LVPECL

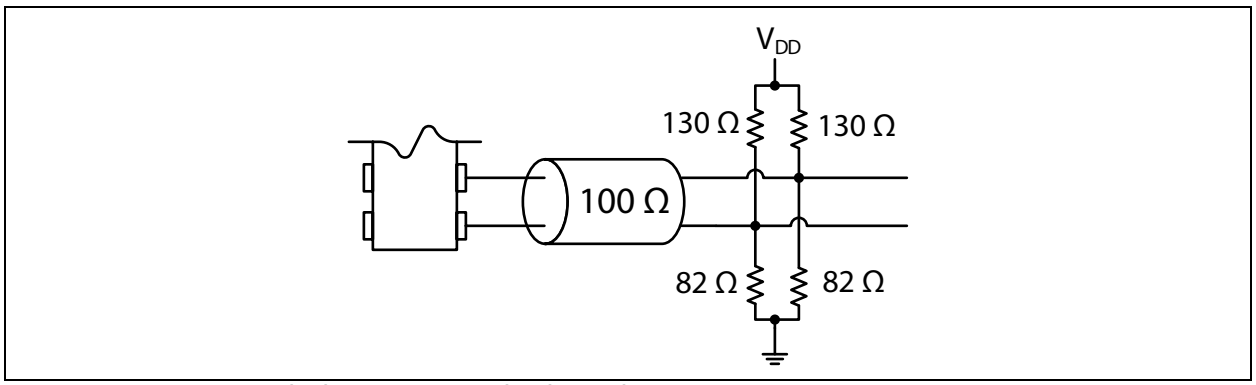


FIGURE 4-1: *Typical LVPECL Termination Scheme.*

TABLE 4-1: LVPECL OUTPUTS (Note 1)

Parameter	Symbol	Min.	Typ.	Max.	Units	Condition
Output Logic Levels	V_{OH}	V_{DD} – 1.08	—	—	V	Output Logic High, R_L = 50Ω to V_{DD}–2V
	V_{OL}	—	—	V_{DD} – 1.55		Output Logic Low, R_L = 50Ω to V_{DD}–2V
Peak-to-Peak Output Swing	—	—	800	—	mV	Single-Ended
Output Transition Time (Note 2)	t_R	—	250	—	ps	Rise Time. 20% to 80%; R_L = 50Ω to V_{DD}–2V
	t_F	—	250	—		Fall Time. 20% to 80%; R_L = 50Ω to V_{DD}–2V
Frequency	f_0	2.3	—	460	MHz	Single Frequency
Output Duty Cycle	SYM	48	—	52	%	Differential
IO Supply Current (Note 3)	I_{DDIO}	—	35	38	mA	Per Output at 125 MHz
Period Jitter (Note 4)	J_{PER}	—	2.5	—	ps_{RMS}	CLK(0:3) = 156.25 MHz
Integrated Phase Noise	J_{PH}	—	0.25	—	ps_{RMS}	200 kHz to 20 MHz @ 156.25 MHz
		—	0.38	—		100 kHz to 20 MHz @ 156.25 MHz
		—	1.7	2		12 kHz to 20 MHz @ 156.25 MHz

Note 1: LVPECL applicable to extended commercial temperature only.

2: See the Output Waveform section for more information.

3: The addition of I_{DDCORE} and I_{DDIO} provides the total current consumption of the device.

4: Period jitter includes crosstalk from adjacent output.

© 2016 Microchip Technology Inc.

4.2 LVDS

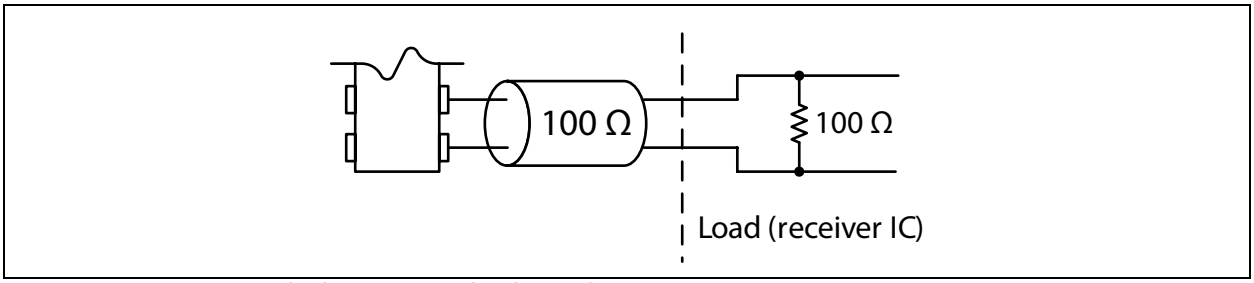


FIGURE 4-2: *Typical LVDS Termination Scheme.*

If the 100Ω clamping resistor does not exist inside the receiving device, it should be added externally on the PCB and placed as close as possible to the receiver.

TABLE 4-2: LVDS OUTPUTS

Parameter	Symbol	Min.	Typ.	Max.	Units	Condition
Output Offset Voltage	V_{OS}	1.125	—	1.4	V	R = 100Ω Differential
Delta Offset Voltage	ΔV_{OS}	—	—	50	mV	—
Peak-to-Peak Output Swing	V_{PP}	—	350	—	mV	Single-Ended
Output Transition Time (Note 1)	t_R	—	200	—	ps	Rise Time, 20% to 80%, R_L= 50Ω, C_L= 2 pF
	t_F	—	200	—		Fall Time, 20% to 80%, R_L= 50Ω, C_L= 2 pF
Frequency	f_0	2.3	—	460	MHz	Single Frequency
Output Duty Cycle	SYM	48	—	52	%	Differential
IO Supply Current (Note 2)	I_{DDIO}	—	9	12	mA	Per Output at 125 MHz.
Period Jitter	J_{PER}	—	2.5	—	ps_{RMS}	—
Integrated Phase Noise	J_{PH}	—	0.28	—	ps_{RMS}	200 kHz to 20 MHz @ 156.25 MHz
		—	0.4	—		100 kHz to 20 MHz @ 156.25 MHz
		—	1.7	2.0		12 kHz to 20 MHz @156.25 MHz

Note 1: See the Output Waveform section for more information.

2: The addition of I_{DDCORE} and I_{DDIO} provides the total current consumption of the device.

4.3 HCSL

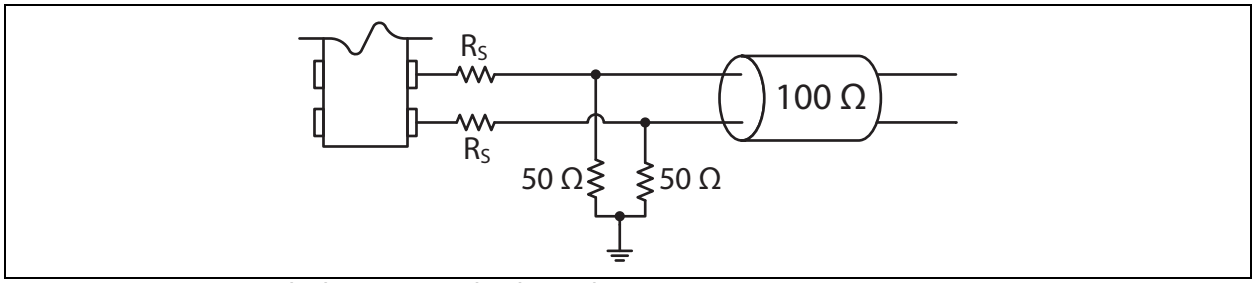


FIGURE 4-3: *Typical HCSL Termination Scheme.*

R_S is a series resistor implemented to match the trace impedance. Depending on the board layout, the value may range from 0Ω to 30Ω.

TABLE 4-3: HCSL OUTPUTS

Parameter	Symbol	Min.	Typ.	Max.	Units	Condition
Output Logic Levels	V_{OH}	0.725	—	—	V	Output Logic High, R_L = 50Ω
	V_{OL}	—	—	0.1		Output Logic Low, R_L = 50Ω
Peak-to-Peak Output Swing	—	—	750	—	mV	Single-Ended
Output Transition Time (Note 1)	t_R	200	—	400	ps	Rise Time, 20% to 80%, R_L= 50Ω, C_L= 2 pF
	t_F	200	—	400		Fall Time, 20% to 80%, R_L= 50Ω, C_L= 2 pF
Frequency	f_0	2.3	—	460	MHz	Single Frequency
Output Duty Cycle	SYM	48	—	52	%	Differential
IO Supply Current (Note 2)	I_{DDIO}	—	20	22	mA	Per Output at 125 MHz.
Period Jitter	J_{PER}	—	2.5	—	ps_{RMS}	—
Integrated Phase Noise	J_{PH}	—	0.25	—	ps_{RMS}	200 kHz to 20 MHz @ 156.25 MHz
		—	0.37	—		100 kHz to 20 MHz @ 156.25 MHz
		—	1.7	2.0		12 kHz to 20 MHz @156.25 MHz

Note 1: See the Output Waveform section for more information.

2: The addition of I_{DDCORE} and I_{DDIO} provides the total current consumption of the device.

© 2016 Microchip Technology Inc.

4.4 LVCMOS

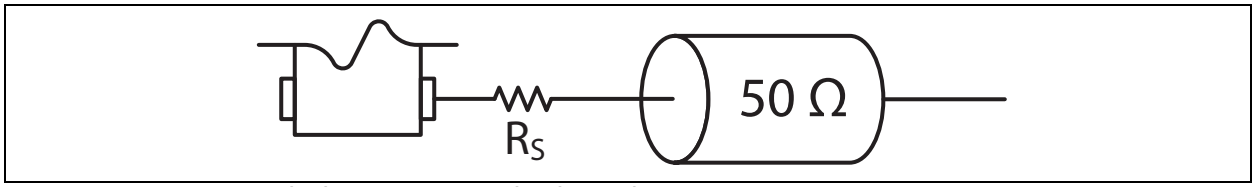


FIGURE 4-4: *Typical LVCMOS Termination Scheme.*

R_S is a series resistor implemented to match the trace impedance to that of the clock output. Depending on the board layout, the value may range from 0Ω to 27Ω.

TABLE 4-4: LVCMOS OUTPUTS

Parameter	Symbol	Min.	Typ.	Max.	Units	Condition
Output Logic Levels	V_{OH}	0.9 x V_{DD}	—	—	V	Output Logic High, I = ±6 mA
	V_{OL}	—	—	0.1 x V_{DD}		Output Logic Low, I = ±6 mA
Output Transition Time (Note 1)	t_R	—	1.1	2.0	ns	Rise Time, 20% to 80%, C_L= 15 pF
	t_F	—	1.3	2.0		Fall Time, 20% to 80%, C_L= 15 pF
Frequency	f_0	2.3	—	170	MHz	All Temperature Ranges, Except Automotive
		—	—	100		Automotive Temperature Range
Output Duty Cycle	SYM	44	—	55	%	—
IO Supply Current (Note 2)	I_{DDIO}	—	11	14	mA	Per Output at 125 MHz, C_L = 15 pF
Period Jitter	J_{PER}	—	3	—	ps_{RMS}	CLK(0:3) = 125 MHz
Integrated Phase Noise	J_{PH}	—	0.3	—	ps_{RMS}	200 kHz to 20 MHz @ 125 MHz
		—	0.38	—		100 kHz to 20 MHz @ 125 MHz
		—	1.7	2.0		12 kHz to 20 MHz @125 MHz

Note 1: See the Output Waveform section for more information.

2: The addition of I_{DDCORE} and I_{DDIO} provides the total current consumption of the device.

5.0 OUTPUT WAVEFORM

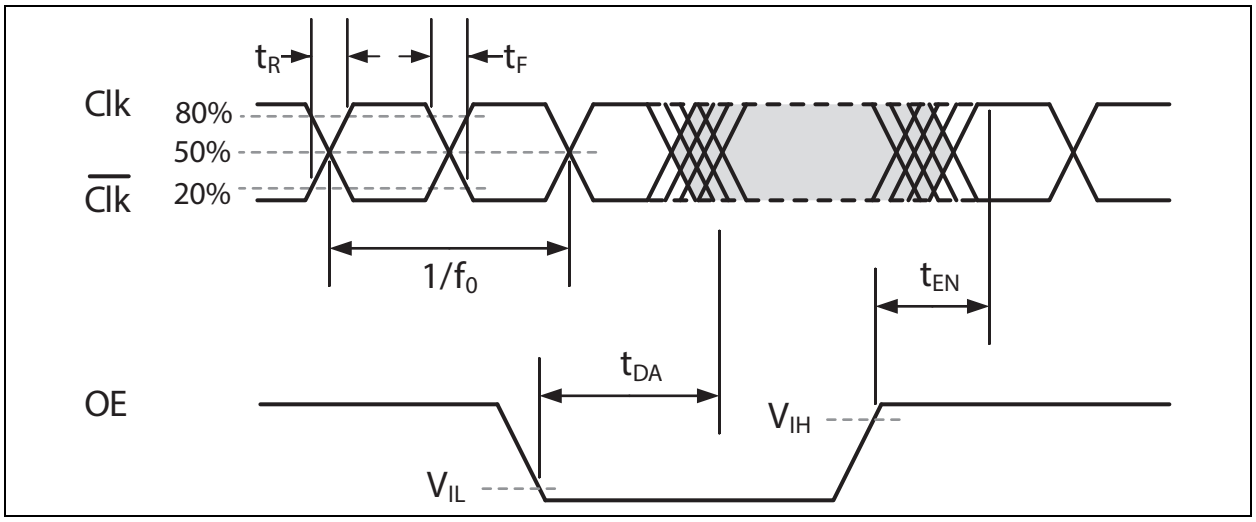


FIGURE 5-1: *Differential Output (LVDS, LVPECL, HCSL).*

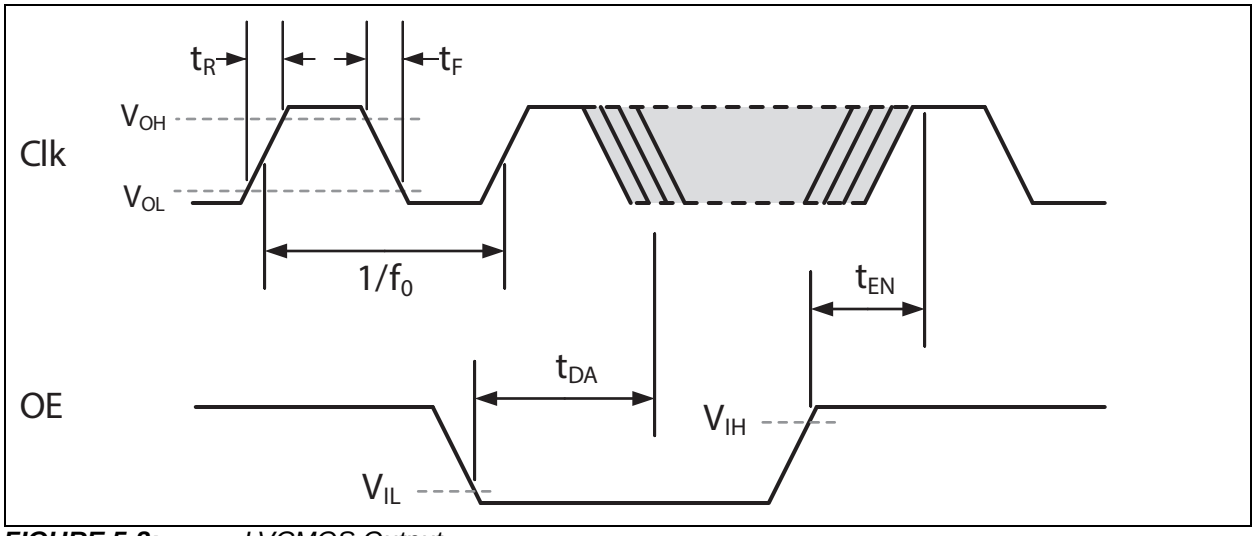


FIGURE 5-2: *LVCMOS Output.*

© 2016 Microchip Technology Inc.

6.0 CONNECTION DIAGRAM

The connection diagram below includes recommended capacitors to be placed on each V_{DD} for noise filtering.

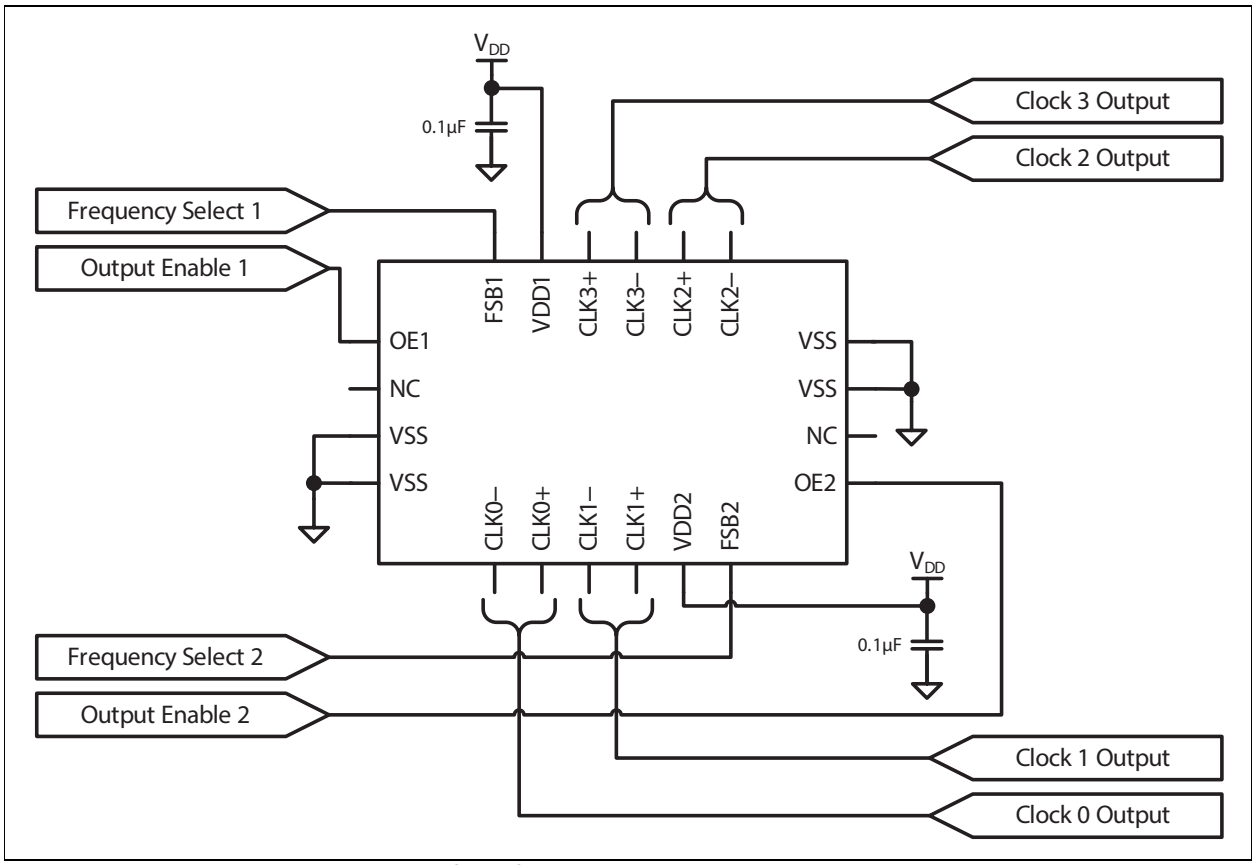
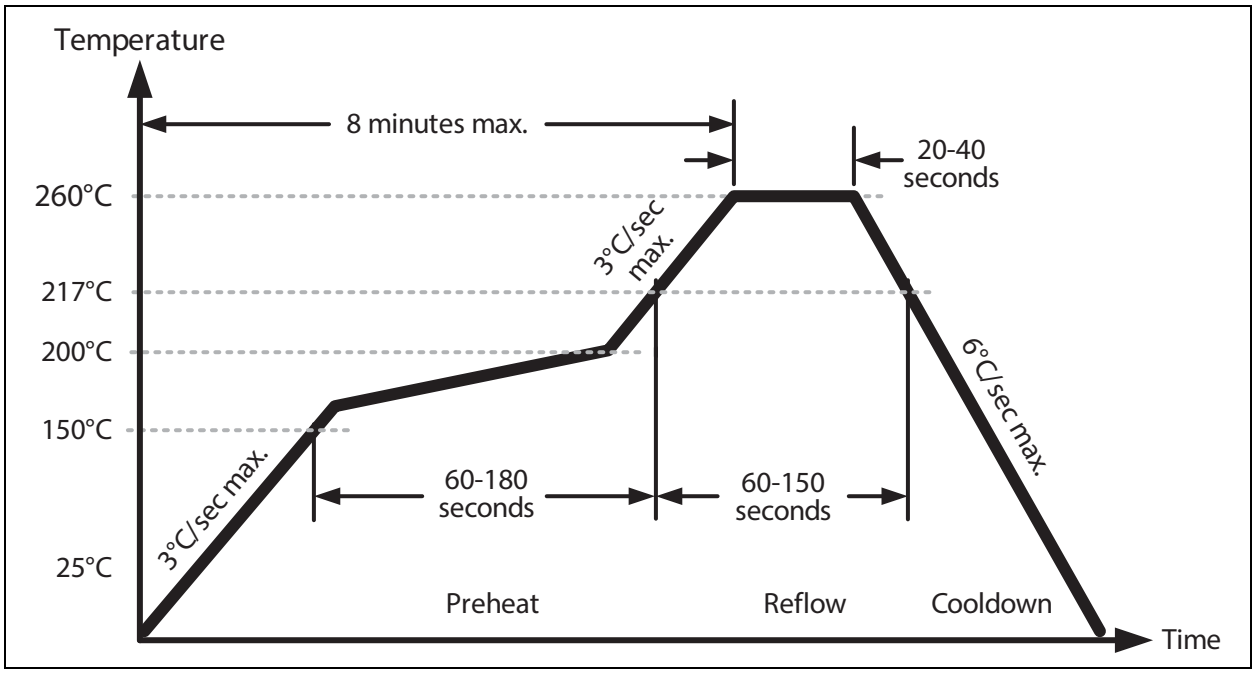


FIGURE 6-1: *DSC400 Connection Diagram.*

7.0 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°C to 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 minutes max.

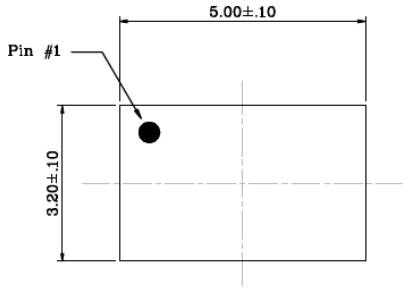
© 2016 Microchip Technology Inc.

8.0 PACKAGE MARKING INFORMATION

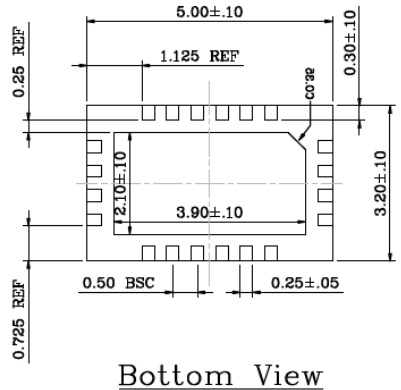
20-Lead QFN 5.0 mm x 3.2 mm Package Outline and Recommended Land Pattern

TITLE
20 LEAD QFN 5.0x3.2mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

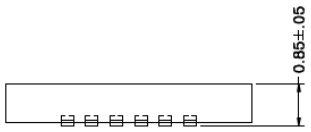
DRAWING #	QFN5032-20LD-PL-1	UNIT	MM



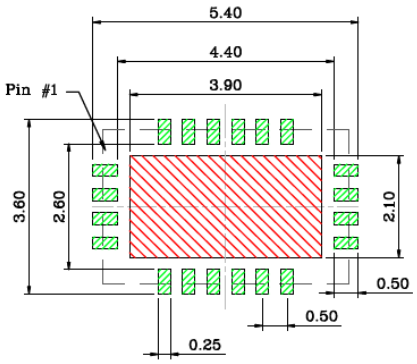
Top View



Bottom View



Side View



Recommended Land Pattern

NOTE:
1. Green shaded rectangles in Recommended Land Pattern are solder stencil opening.
2. Red shaded rectangle in Recommended Land Pattern is keep-out area.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

NOTES:

© 2016 Microchip Technology Inc.

APPENDIX A: REVISION HISTORY

Revision A (September 2016)

- Converted Micrel data sheet DSC400 to Microchip DS20005612A.
- Minor text changes throughout.

NOTES:

© 2016 Microchip Technology Inc.

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, contact your local Microchip representative or sales office.

PART NO.	— X	X	X	X	Qxxxx	X	X	X	X
Device	CLK3 Output Format	CLK2 Output Format	CLK1 Output Format	CLK0 Output Format	Freq. Code	Package	Temp. Range	Stability	Packing

Device:	DSC400:		Configurable Four Output, Low Jitter Crystal-less Clock Generator
CLK3 Output Format:	0 1 2 3 4	= = = = =	OFF LVCMOS LVPECL LVDS HCSL
CLK2 Output Format:	1 2 3 4	= = = =	LVCMOS LVPECL LVDS HCSL
CLK1 Output Format:	0 1 2 3 4	= = = = =	OFF LVCMOS LVPECL LVDS HCSL
CLK0 Output Format:	1 2 3 4	= = = =	LVCMOS LVPECL LVDS HCSL
Frequency Code:	Qxxxx	=	This code is assigned by the factory. See the table in this section for more information.
Package:	K	=	20-Pin QFN
Temperature Range:	E I	= =	–20°C to +70°C –40°C to +85°C
Stability:	1 2	= =	±50 ppm ±25 ppm
Packing:	T	=	Tape & Reel

Examples:

a) DSC400-2143QxxxxKE1T:
Configurable Four Output, Low Jitter Crystal-less Clock Generator; LVPECL CLK3; LVCMOS CLK2; HCSL CLK1; LVDS CLK0; Frequency Code; 20-Pin QFN; –20°C to +70°C Temp. Range; ±50 ppm Stability; Tape & Reel

b) DSC400-4132QxxxxKI2T:
Configurable Four Output, Low Jitter Crystal-less Clock Generator; HCSL CLK3; LVCMOS CLK2; LVDS CLK1; LVPECL CLK0; Frequency Code; 20-Pin QFN; –40°C to +85°C Temp. Range; ±25 ppm Stability; Tape & Reel

c) DSC400-0202QxxxxKE2T:
Configurable Four Output, Low Jitter Crystal-less Clock Generator; OFF CLK3; LVPECL CLK2; OFF CLK1; LVPECL CLK0; Frequency Code; 20-Pin QFN; –20°C to +70°C Temp. Range; ±25 ppm Stability; Tape & Reel

d) DSC400-1111QxxxxKI1T:
Configurable Four Output, Low Jitter Crystal-less Clock Generator; LVCMOS CLK3 through CLK0; Frequency Code; 20-Pin QFN; –40°C to +85°C Temp. Range; ±50 ppm Stability; Tape & Reel

1.0 FACTORY CONFIGURATION CODE ASSIGNMENT OF QXXXX

The DSC400 is meant for customers to define their own frequency requirements at the four available outputs. The Qxxxx number identifies these specific customer requirements and is assigned by the factory.

TABLE 1-1: EXAMPLE OF HOW FSB1 & FSB2 ARE APPLIED & THE QXXXX ASSIGNMENT

		FSB1		Qxxxx Number
Bank1	**Outputs**	1 (default)	0	Q0001
	CLK0	125 MHz	150 MHz	
	CLK3	50 MHz	25 MHz	
Bank2	**Outputs**	**FSB2**		
		1 (default)	0	
	CLK1	156.25 MHz	100 MHz	
	CLK2	156.25 MHz	100 MHz	

NOTES:

© 2016 Microchip Technology Inc.

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as "unbreakable."

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE**.** Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights unless otherwise stated.

Microchip received ISO/TS-16949:2009 certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona; Gresham, Oregon and design centers in California and India. The Company's quality system processes and procedures are for its PIC® MCUs and dsPIC® DSCs, KEELOQ® code hopping devices, Serial EEPROMs, microperipherals, nonvolatile memory and analog products. In addition, Microchip's quality system for the design and manufacture of development systems is ISO 9001:2000 certified.

QUALITY MANAGEMENT SYSTEM
CERTIFIED BY DNV
═ ISO/TS 16949 ═

Trademarks

The Microchip name and logo, the Microchip logo, AnyRate, dsPIC, FlashFlex, flexPWR, Heldo, JukeBlox, KeeLoq, KeeLoq logo, Kleer, LANCheck, LINK MD, MediaLB, MOST, MOST logo, MPLAB, OptoLyzer, PIC, PICSTART, PIC32 logo, RightTouch, SpyNIC, SST, SST Logo, SuperFlash and UNI/O are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

ClockWorks, The Embedded Control Solutions Company, ETHERSYNCH, Hyper Speed Control, HyperLight Load, IntelliMOS, mTouch, Precision Edge, and QUIET-WIRE are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Analog-for-the-Digital Age, Any Capacitor, AnyIn, AnyOut, BodyCom, chipKIT, chipKIT logo, CodeGuard, dsPICDEM, dsPICDEM.net, Dynamic Average Matching, DAM, ECAN, EtherGREEN, In-Circuit Serial Programming, ICSP, Inter-Chip Connectivity, JitterBlocker, KleerNet, KleerNet logo, MiWi, motorBench, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, MultiTRAK, NetDetach, Omniscient Code Generation, PICDEM, PICDEM.net, PICkit, PICtail, PureSilicon, RightTouch logo, REAL ICE, Ripple Blocker, Serial Quad I/O, SQI, SuperSwitcher, SuperSwitcher II, Total Endurance, TSHARC, USBCheck, VariSense, ViewSpan, WiperLock, Wireless DNA, and ZENA are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

Silicon Storage Technology is a registered trademark of Microchip Technology Inc. in other countries.

GestIC is a registered trademarks of Microchip Technology Germany II GmbH & Co. KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

© 2016, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

ISBN: 978-1-5224-0985-4

Worldwide Sales and Service

AMERICAS

Corporate Office
2355 West Chandler Blvd.
Chandler, AZ 85224-6199
Tel: 480-792-7200
Fax: 480-792-7277
Technical Support:
http://www.microchip.com/support
Web Address:
www.microchip.com

Atlanta
Duluth, GA
Tel: 678-957-9614
Fax: 678-957-1455

Austin, TX
Tel: 512-257-3370

Boston
Westborough, MA
Tel: 774-760-0087
Fax: 774-760-0088

Chicago
Itasca, IL
Tel: 630-285-0071
Fax: 630-285-0075

Cleveland
Independence, OH
Tel: 216-447-0464
Fax: 216-447-0643

Dallas
Addison, TX
Tel: 972-818-7423
Fax: 972-818-2924

Detroit
Novi, MI
Tel: 248-848-4000

Houston, TX
Tel: 281-894-5983

Indianapolis
Noblesville, IN
Tel: 317-773-8323
Fax: 317-773-5453

Los Angeles
Mission Viejo, CA
Tel: 949-462-9523
Fax: 949-462-9608

New York, NY
Tel: 631-435-6000

San Jose, CA
Tel: 408-735-9110

Canada - Toronto
Tel: 905-695-1980
Fax: 905-695-2078

ASIA/PACIFIC

Asia Pacific Office
Suites 3707-14, 37th Floor
Tower 6, The Gateway
Harbour City, Kowloon

Hong Kong
Tel: 852-2943-5100
Fax: 852-2401-3431

Australia - Sydney
Tel: 61-2-9868-6733
Fax: 61-2-9868-6755

China - Beijing
Tel: 86-10-8569-7000
Fax: 86-10-8528-2104

China - Chengdu
Tel: 86-28-8665-5511
Fax: 86-28-8665-7889

China - Chongqing
Tel: 86-23-8980-9588
Fax: 86-23-8980-9500

China - Dongguan
Tel: 86-769-8702-9880

China - Guangzhou
Tel: 86-20-8755-8029

China - Hangzhou
Tel: 86-571-8792-8115
Fax: 86-571-8792-8116

China - Hong Kong SAR
Tel: 852-2943-5100
Fax: 852-2401-3431

China - Nanjing
Tel: 86-25-8473-2460
Fax: 86-25-8473-2470

China - Qingdao
Tel: 86-532-8502-7355
Fax: 86-532-8502-7205

China - Shanghai
Tel: 86-21-5407-5533
Fax: 86-21-5407-5066

China - Shenyang
Tel: 86-24-2334-2829
Fax: 86-24-2334-2393

China - Shenzhen
Tel: 86-755-8864-2200
Fax: 86-755-8203-1760

China - Wuhan
Tel: 86-27-5980-5300
Fax: 86-27-5980-5118

China - Xian
Tel: 86-29-8833-7252
Fax: 86-29-8833-7256

ASIA/PACIFIC

China - Xiamen
Tel: 86-592-2388138
Fax: 86-592-2388130

China - Zhuhai
Tel: 86-756-3210040
Fax: 86-756-3210049

India - Bangalore
Tel: 91-80-3090-4444
Fax: 91-80-3090-4123

India - New Delhi
Tel: 91-11-4160-8631
Fax: 91-11-4160-8632

India - Pune
Tel: 91-20-3019-1500

Japan - Osaka
Tel: 81-6-6152-7160
Fax: 81-6-6152-9310

Japan - Tokyo
Tel: 81-3-6880- 3770
Fax: 81-3-6880-3771

Korea - Daegu
Tel: 82-53-744-4301
Fax: 82-53-744-4302

Korea - Seoul
Tel: 82-2-554-7200
Fax: 82-2-558-5932 or
82-2-558-5934

Malaysia - Kuala Lumpur
Tel: 60-3-6201-9857
Fax: 60-3-6201-9859

Malaysia - Penang
Tel: 60-4-227-8870
Fax: 60-4-227-4068

Philippines - Manila
Tel: 63-2-634-9065
Fax: 63-2-634-9069

Singapore
Tel: 65-6334-8870
Fax: 65-6334-8850

Taiwan - Hsin Chu
Tel: 886-3-5778-366
Fax: 886-3-5770-955

Taiwan - Kaohsiung
Tel: 886-7-213-7828

Taiwan - Taipei
Tel: 886-2-2508-8600
Fax: 886-2-2508-0102

Thailand - Bangkok
Tel: 66-2-694-1351
Fax: 66-2-694-1350

EUROPE

Austria - Wels
Tel: 43-7242-2244-39
Fax: 43-7242-2244-393

Denmark - Copenhagen
Tel: 45-4450-2828
Fax: 45-4485-2829

France - Paris
Tel: 33-1-69-53-63-20
Fax: 33-1-69-30-90-79

Germany - Dusseldorf
Tel: 49-2129-3766400

Germany - Karlsruhe
Tel: 49-721-625370

Germany - Munich
Tel: 49-89-627-144-0
Fax: 49-89-627-144-44

Italy - Milan
Tel: 39-0331-742611
Fax: 39-0331-466781

Italy - Venice
Tel: 39-049-7625286

Netherlands - Drunen
Tel: 31-416-690399
Fax: 31-416-690340

Poland - Warsaw
Tel: 48-22-3325737

Spain - Madrid
Tel: 34-91-708-08-90
Fax: 34-91-708-08-91

Sweden - Stockholm
Tel: 46-8-5090-4654

UK - Wokingham
Tel: 44-118-921-5800
Fax: 44-118-921-5820

06/23/16

© 2016 Microchip Technology Inc.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Microchip:

DSC400-0414Q0033KE1 DSC400-4444Q0015KE1 DSC400-4444Q0038KI1 DSC400-4134Q0028KE1 DSC400-4444Q0022KE1 DSC400-4134Q0050KE1 DSC400-1111Q0019KI2 DSC400-1111Q0034KI1 DSC400-1444Q0052KE1

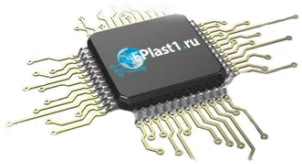
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)
Факс: 8 (812) 320-02-42
Электронная почта: org@eplast1.ru
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.