



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



# High Performance CMOS Oscillator with Frequency Margining – Pin Control

## Features

- Crystal oscillator with CMOS output
- Output frequency from 8 MHz to 200 MHz
- Two frequency margining control pins (FS0, FS1)
- Output enable or power-down function
- Factory configured or field programmable
- Integrated phase-locked loop (PLL)
- Supply voltage: 3.3 V or 2.5 V
- Pb-free package: 5.0 × 3.2 mm LCC
- Commercial and industrial temperature ranges

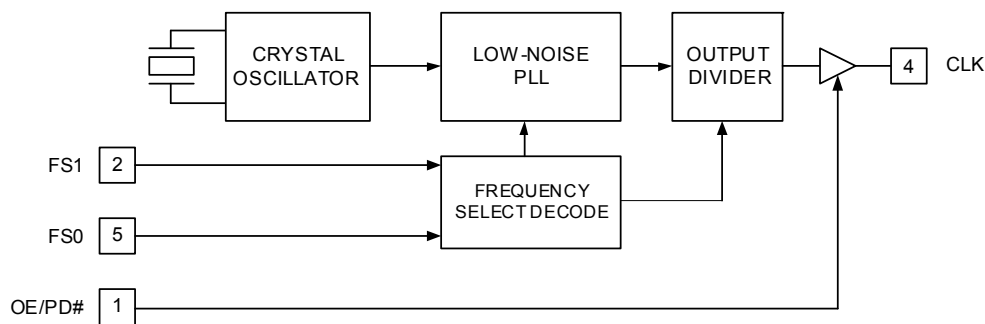
## Functional Description

The CY2XF32 is a high performance and high frequency crystal oscillator (XO). It uses a Cypress proprietary low noise PLL to synthesize the frequency from an integrated crystal. The output frequency can be changed via two select pins, allowing easy frequency margin testing in applications.

The CY2XF32 is available as a factory configured device or as a field programmable device.

For a complete list of related documentation, [click here](#).

## Logic Block Diagram

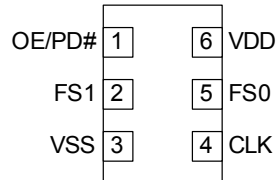


**Contents**

<b>Pinouts</b> .....	<b>3</b>	<b>Switching Waveforms</b> .....	<b>8</b>
<b>Pin Definitions</b> .....	<b>3</b>	<b>Ordering Information</b> .....	<b>9</b>
<b>Functional Overview</b> .....	<b>3</b>	Possible Configurations .....	9
<b>Programming Description</b> .....	<b>4</b>	Ordering Code Definitions .....	9
Field Programmable CY2XF32F .....	4	<b>Package Diagram</b> .....	<b>10</b>
Factory Configured CY2XF32 .....	4	<b>Acronyms</b> .....	<b>11</b>
<b>Programming Variables</b> .....	<b>4</b>	<b>Document Conventions</b> .....	<b>11</b>
Output Frequencies .....	4	Units of Measure .....	11
Pin 1: Output Enable or Power-down (OE/PD#) .....	4	<b>Document History Page</b> .....	<b>12</b>
Supply Voltage .....	4	<b>Sales, Solutions, and Legal Information</b> .....	<b>13</b>
Industrial versus Commercial Device Performance .....	4	Worldwide Sales and Design Support .....	13
<b>Absolute Maximum Conditions</b> .....	<b>5</b>	Products .....	13
<b>Operating Conditions</b> .....	<b>5</b>	PSoC® Solutions .....	13
<b>DC Electrical Characteristics</b> .....	<b>6</b>	Cypress Developer Community .....	13
<b>AC Electrical Characteristics</b> .....	<b>7</b>	Technical Support .....	13

## Pinouts

Figure 1. 6-pin Ceramic LCC pinout



## Pin Definitions

6-pin Ceramic LCC

Pin No.	Pin Name	I/O Type	Description
1	OE/PD#	CMOS Input	Output Enable or Power-down: Functionality is a programming option; see <a href="#">Table 2</a> and <a href="#">Table 3</a> for details.
2, 5	FS1, FS0	CMOS Input	Frequency Select.
4	CLK	CMOS Output	Clock Output.
6	VDD	Power	Supply Voltage: 2.5 V or 3.3 V.
3	VSS	Power	Ground.

## Functional Overview

The FS0 and FS1 pins select between four different output frequencies, as shown in [Table 1](#). Frequency margining is a common application for this feature. One frequency is used for the standard operating mode of the device, while the other frequencies are available for margin testing, either during product development or in system manufacturing test.

Table 1. Frequency Select

FS1	FS0	Output Frequency
0	0	Frequency 0
0	1	Frequency 1
1	0	Frequency 2
1	1	Frequency 3

When changing the output frequency, the frequency transition is not guaranteed to be smooth. There can be frequency excursions beyond the start frequency and the new frequency. Glitches and runt pulses are possible, and time must be allowed for the PLL to relock.

Pin 1 is programmed to function as either OE (output enable) or PD# (power-down, active low). The OE function is used to enable or disable the CLK output very quickly, but it does not reduce core power consumption. The PD# function puts the device into a low power state, but the wake up takes longer because the PLL must reacquire lock. Details are shown in [Table 2](#) and [Table 3](#).

Table 2. Output Enable Operation

OE	PLL & Xtal Oscillator	Output Buffer
0	Active	Off
1	Active	On

Table 3. Power-down Operation

PD#	PLL & Xtal Oscillator	Output Buffer
0	Off	Off
1	Active	On

## Programming Description

The CY2XF32 is a programmable device. Before being used in an application, it must be programmed with the output frequencies and other variables described in a later section. Two different device types are available, each with its own programming flow. They are described below.

### Field Programmable CY2XF32F

Field programmable devices are shipped unprogrammed and must be programmed before being installed on a printed circuit board (PCB). Customers use CyberClocks™ Online Software to specify the device configuration and generate a JEDEC (extension .jed) programming file. Programming of samples and prototype quantities is available using a Cypress programmer. Third party vendors manufacture programmers for small to large volume applications. Cypress’s value added distribution partners also provide programming services. Field programmable devices are designated with an “F” in the part number. They are intended for quick prototyping and inventory reduction. The CY2XF32 is one time programmable (OTP).

The software is located at [www.cyberclocksonline.com](http://www.cyberclocksonline.com).

### Factory Configured CY2XF32

For ready-to-use devices, the CY2XF32 is available with no field programming required. All requests are submitted to the local Cypress Field Application Engineer (FAE) or sales representative. After the request is processed, the user receives a new part number, samples, and data sheet with the programmed values. This part number is used for additional sample requests and production orders.

## Programming Variables

### Output Frequencies

The CY2XF32 is programmed with up to four independent output frequencies, which are then selected using the FS0 and FS1 pins. The device can synthesize frequencies to a resolution of one part per million (ppm), but the actual accuracy of the output frequency is limited by the accuracy of the integrated reference crystal.

### Pin 1: Output Enable or Power-down (OE/PD#)

Pin 1 is programmed as either Output Enable (OE) or Power-down (PD#).

### Supply Voltage

A programming option optimizes the CY2XF32 for either 2.5 V or 3.3 V supply voltage. A device programmed for a particular supply voltage is not guaranteed to meet specifications when operated at the other voltage.

### Industrial versus Commercial Device Performance

Industrial and commercial devices have different internal crystals. This has a potentially significant impact on performance levels for applications requiring the lowest possible phase noise. CyberClocks Online Software displays expected performance for both options.

**Table 4. Device Programming Variables**

Variable
Output Frequency 0 (Power on default)
Output Frequency 1
Output Frequency 2
Output Frequency 3
Pin 1 Functionality (OE or PD#)
Supply Voltage (2.5 V or 3.3 V)
Temperature Range (Commercial or Industrial)

## Absolute Maximum Conditions

Parameter	Description	Condition	Min	Max	Unit
V <sub>DD</sub>	Supply Voltage		-0.5	4.4	V
V <sub>IN</sub> <sup>[1]</sup>	Input Voltage, DC	Relative to V <sub>SS</sub>	-0.5	V <sub>DD</sub> + 0.5	V
T <sub>S</sub>	Temperature, Storage	Non operating	-55	135	°C
T <sub>J</sub>	Temperature, Junction		-40	135	°C
ESD <sub>HBM</sub>	ESD Protection (Human Body Model)	JEDEC STD 22-A114-B	2000	-	V
Θ <sub>JA</sub> <sup>[2]</sup>	Thermal Resistance, Junction to Ambient	0 m/s airflow	64		°C/W

## Operating Conditions

Parameter	Description	Min	Typ	Max	Unit
V <sub>DD</sub>	3.3 V Supply Voltage Range	3.135	3.3	3.465	V
	2.5 V Supply Voltage Range	2.375	2.5	2.625	V
T <sub>PU</sub>	Power-up Time for V <sub>DD</sub> to Reach Minimum Specified Voltage (Power Ramp is Monotonic)	0.05	-	500	ms
T <sub>A</sub>	Ambient Temperature, Commercial	0	-	70	°C
	Ambient Temperature, Industrial	-40	-	85	°C
C <sub>LOAD</sub>	Load Capacitance at CLK (>100 MHz)	-	-	10	pF
	Load Capacitance at CLK (≤100 MHz)	-	-	15	pF

### Notes

1. The voltage on any input or I/O pin cannot exceed the power pin during power-up.
2. Simulated. The board is derived from the JEDEC multilayer standard. It measures 76 x 114 x 1.6 mm and has four layers of copper (2/1/1/2 oz.). The internal layers are 100% copper planes, while the top and bottom layers have 50% metalization. No vias are included in the model.

## DC Electrical Characteristics

Parameter	Description	Condition	Min	Typ	Max	Unit
$I_{DD}$	Operating Supply Current	$V_{DD} = 3.465\text{ V}$ , OE/PD# = $V_{DD}$ , output unloaded	–	–	110	mA
$I_{SB}$	Standby Supply Current	PD# = $V_{SS}$	–	–	200	$\mu\text{A}$
$V_{OH}$	Output High Voltage	$V_{DD} = \text{min}$ , $I_{OH} = -4\text{ mA}$	$0.9 \times V_{DD}$	–	–	V
$V_{OL}$	Output Low Voltage	$V_{DD} = \text{max}$ , $I_{OL} = 4\text{ mA}$	–	–	$0.1 \times V_{DD}$	V
$I_{OZ}$	Output Leakage Current	OE/PD# = $V_{SS}$	–35	–	35	$\mu\text{A}$
$V_{IH}$	Input High Voltage		$0.7 \times V_{DD}$	–	–	V
$V_{IL}$	Input Low Voltage		–	–	$0.3 \times V_{DD}$	V
$I_{IH0}$	Input High Current, OE/PD# Pin	Input = $V_{DD}$	–	–	115	$\mu\text{A}$
$I_{IH1}$	Input High Current, FS0 & FS1 Pins	Input = $V_{DD}$	–	–	10	$\mu\text{A}$
$I_{IL0}$	Input Low Current, OE/PD# Pin	Input = $V_{SS}$	–50	–	–	$\mu\text{A}$
$I_{IL1}$	Input Low Current, FS0 & FS1 Pin	Input = $V_{SS}$	–20	–	–	$\mu\text{A}$
$C_{IN0}^{[3]}$	Input Capacitance, OE/PD# Pin		–	15	–	pF
$C_{IN1}^{[3]}$	Input Capacitance, FS0 & FS1 Pin		–	4	–	pF

**Note**

3. Not 100% tested, guaranteed by design and characterization.

## AC Electrical Characteristics

Parameter <sup>[4]</sup>	Description	Condition	Min	Typ	Max	Unit
F <sub>OUT</sub>	Output Frequency <sup>[5]</sup>		8	–	200	MHz
FSC	Frequency Stability, Commercial Devices <sup>[6]</sup>	T <sub>A</sub> = 0 °C to 70 °C	–	–	±35	ppm
FSI	Frequency Stability, Industrial Devices <sup>[6]</sup>	T <sub>A</sub> = –40 °C to 85 °C	–	–	±55	ppm
AG	Aging, 10 Years		–	–	±15	ppm
T <sub>DC</sub>	Output Duty Cycle	Measured at V <sub>DD</sub> /2; see <a href="#">Figure 2</a>	45	50	55	%
T <sub>R</sub>	Output Rise Time	20% to 80% of V <sub>DD</sub> , C <sub>LOAD</sub> = 15 pF	–	0.7	1.5	ns
T <sub>F</sub>	Output Fall Time	80% to 20% of V <sub>DD</sub> , C <sub>LOAD</sub> = 15 pF	–	0.8	1.5	ns
T <sub>OHZ</sub>	Output Disable Time	Time from falling edge on OE to stopped outputs (Asynchronous)	–	–	100	ns
T <sub>OE</sub>	Output Enable Time	Time from rising edge on OE to outputs at a valid frequency (Asynchronous)	–	–	100	ns
T <sub>LOCK</sub>	Startup Time	Time for CLK to reach valid frequency measured from the time V <sub>DD</sub> = V <sub>DD</sub> (min.) or from PD# rising edge	–	–	5	ms
T <sub>LFS</sub>	Relock Time	Time for CLK to reach valid frequency from FS0 or FS1 pin change	–	–	1	ms

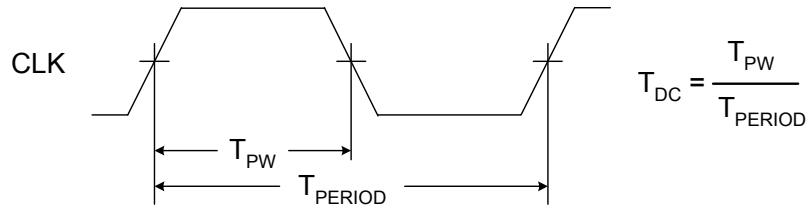
### Notes

4. Not 100% tested, guaranteed by design and characterization.
5. This parameter is specified in CyberClocks Online software.
6. Frequency stability is the maximum variation in frequency from F<sub>0</sub>. It includes initial accuracy, plus variation from temperature and supply voltage.

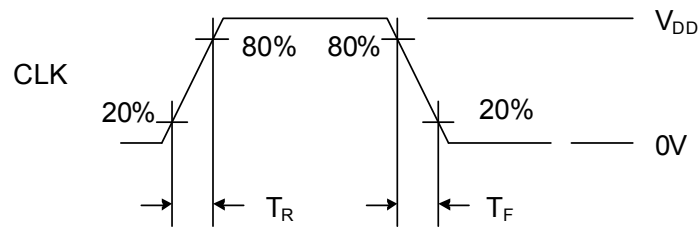


## Switching Waveforms

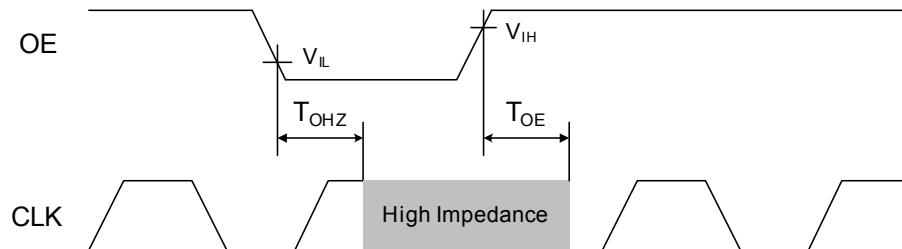
**Figure 2. Duty Cycle Timing**



**Figure 3. Output Rise and Fall Time**



**Figure 4. Output Enable and Disable Timing**



## Ordering Information

The following table contains only the parts that are currently available. If you do not see what you are looking for, contact your local sales representative. For more information, visit the Cypress website at [www.cypress.com](http://www.cypress.com) and refer to the product summary page at <http://www.cypress.com/products>.

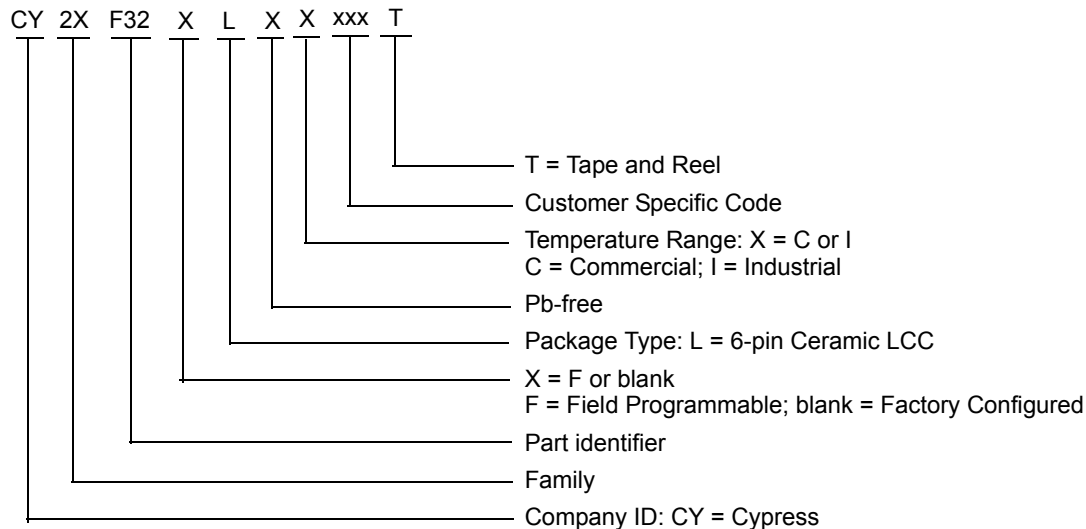
Part Number <sup>[7]</sup>	Configuration	Package Description	Product Flow
<b>Pb-free</b>			
CY2XF32FLXIT	Field Programmable	6-pin Ceramic LCC – Tape and Reel	Industrial, –40 °C to 85 °C

Some product offerings are factory programmed customer specific devices with customized part numbers. The Possible Configurations table shows the available device types, but not complete part numbers. Contact your local Cypress FAE or Sales Representative for more information.

## Possible Configurations

Part Number <sup>[7]</sup>	Configuration	Package Description	Product Flow
<b>Pb-free</b>			
CY2XF32LXCxxxT	Factory Configured	6-pin Ceramic LCC – Tape and Reel	Commercial, 0 °C to 70 °C
CY2XF32LXIxxxT	Factory Configured	6-pin Ceramic LCC – Tape and Reel	Industrial, –40 °C to 85 °C

## Ordering Code Definitions

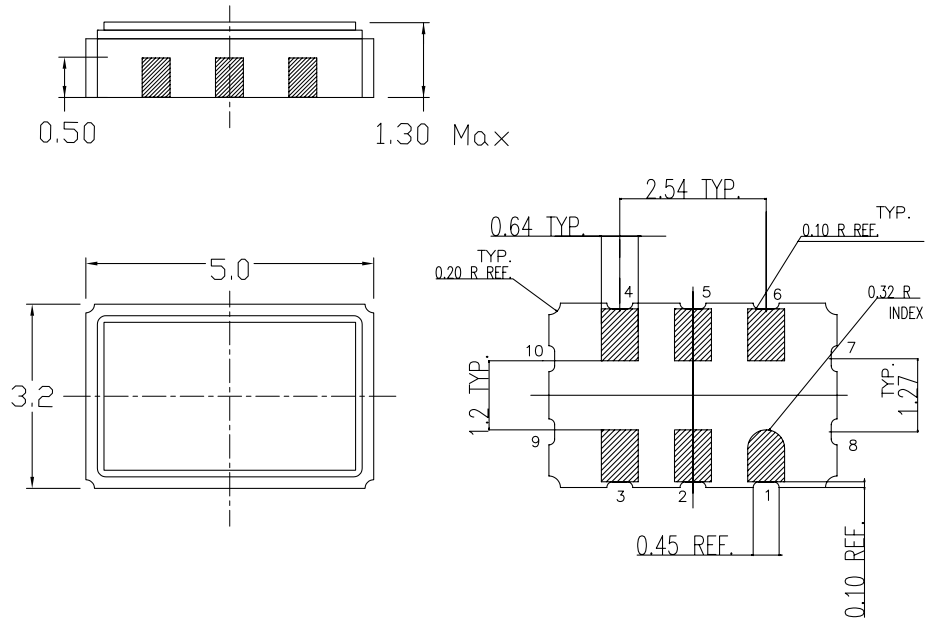


### Note

7. "xxx" is a factory assigned code that identifies the programming option.

Package Diagram

Figure 5. 6-pin Ceramic LCC (5.0 × 3.2 × 1.3 mm) LZ06A Package Outline, 001-10044



Dimensions in mm  
 Kyocera dwg ref KD-VA6432-A  
 Package Weight ~ 0.12 grams

001-10044 \*C

## Acronyms

Acronym	Description
CLKOUT	Clock Output
CMOS	Complementary Metal Oxide Semiconductor
DPM	Die Pick Map
EPROM	Erasable Programmable Read Only Memory
LVDS	Low-Voltage Differential Signaling
NTSC	National Television System Committee
OE	Output Enable
PAL	Phase Alternate Line
PD	Power-Down
PLL	Phase Locked Loop
TTL	Transistor-Transistor Logic

## Document Conventions

### Units of Measure

Symbol	Unit of Measure
°C	degree Celsius
kHz	kilohertz
kΩ	kilohm
MHz	megahertz
MΩ	megaohm
μA	microampere
μs	microsecond
μV	microvolt
μVrms	microvolts root-mean-square
mA	milliampere
mm	millimeter
ms	millisecond
mV	millivolt
nA	nanoampere
ns	nanosecond
nV	nanovolt
Ω	ohm
ppm	parts per million
W	watt

**Document History Page**

Document Title: CY2XF32, High Performance CMOS Oscillator with Frequency Margining – Pin Control Document Number: 001-53147				
Revision	ECN	Submission Date	Orig. of Change	Description of Change
**	2705753	05/13/09	KVM / PYRS	New data sheet.
*A	2734005	07/09/2009	WWZ	Post to external web.
*B	2764787	09/19/2009	KVM	Change I <sub>SB</sub> max from 250 μA to 200 μA Add max limit for T <sub>R</sub> , T <sub>F</sub> : 1.5 ns Change T <sub>LOCK</sub> max from 10 ms to 5 ms Change T <sub>LFS</sub> max from 10 ms to 1 ms
*C	2958629	06/22/10	KVM	Updated <a href="#">Ordering Information</a> . Updated <a href="#">Package Diagram</a> .
*D	3169028	05/06/10	BASH	Changed status from Preliminary to Final. Added <a href="#">Ordering Code Definitions</a> . Added <a href="#">Acronyms</a> and <a href="#">Units of Measure</a> . Updated template as per current Cypress standards.
*E	4398514	06/04/2014	AJU	Updated <a href="#">Package Diagram</a> : spec 001-10044 – Changed revision from *A to *B. Updated in new template. Completing Sunset Review.
*F	4570063	11/14/2014	AJU	Added related documentation hyperlink in page 1. Removed the prune part number CY2XF32FLXCT in <a href="#">Ordering Information</a> . Updated <a href="#">Figure 5</a> in <a href="#">Package Diagram</a> (spec 001-10044 *B to *C).

## Sales, Solutions, and Legal Information

### Worldwide Sales and Design Support

Cypress maintains a worldwide network of offices, solution centers, manufacturer's representatives, and distributors. To find the office closest to you, visit us at [Cypress Locations](#).

#### Products

<a href="#">Automotive</a>	<a href="#">cypress.com/go/automotive</a>
<a href="#">Clocks &amp; Buffers</a>	<a href="#">cypress.com/go/clocks</a>
<a href="#">Interface</a>	<a href="#">cypress.com/go/interface</a>
<a href="#">Lighting &amp; Power Control</a>	<a href="#">cypress.com/go/powerpsoc</a> <a href="#">cypress.com/go/plc</a>
<a href="#">Memory</a>	<a href="#">cypress.com/go/memory</a>
<a href="#">PSoC</a>	<a href="#">cypress.com/go/psoc</a>
<a href="#">Touch Sensing</a>	<a href="#">cypress.com/go/touch</a>
<a href="#">USB Controllers</a>	<a href="#">cypress.com/go/USB</a>
<a href="#">Wireless/RF</a>	<a href="#">cypress.com/go/wireless</a>

#### PSoC<sup>®</sup> Solutions

[psoc.cypress.com/solutions](#)  
[PSoC 1](#) | [PSoC 3](#) | [PSoC 4](#) | [PSoC 5LP](#)

#### Cypress Developer Community

[Community](#) | [Forums](#) | [Blogs](#) | [Video](#) | [Training](#)

#### Technical Support

[cypress.com/go/support](#)

---

© Cypress Semiconductor Corporation, 2009-2014. The information contained herein is subject to change without notice. Cypress Semiconductor Corporation assumes no responsibility for the use of any circuitry other than circuitry embodied in a Cypress product. Nor does it convey or imply any license under patent or other rights. Cypress products are not warranted nor intended to be used for medical, life support, life saving, critical control or safety applications, unless pursuant to an express written agreement with Cypress. Furthermore, Cypress does not authorize its products for use as critical components in life-support systems where a malfunction or failure may reasonably be expected to result in significant injury to the user. The inclusion of Cypress products in life-support systems application implies that the manufacturer assumes all risk of such use and in doing so indemnifies Cypress against all charges.

Any Source Code (software and/or firmware) is owned by Cypress Semiconductor Corporation (Cypress) and is protected by and subject to worldwide patent protection (United States and foreign), United States copyright laws and international treaty provisions. Cypress hereby grants to licensee a personal, non-exclusive, non-transferable license to copy, use, modify, create derivative works of, and compile the Cypress Source Code and derivative works for the sole purpose of creating custom software and or firmware in support of licensee product to be used only in conjunction with a Cypress integrated circuit as specified in the applicable agreement. Any reproduction, modification, translation, compilation, or representation of this Source Code except as specified above is prohibited without the express written permission of Cypress.

Disclaimer: CYPRESS MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Cypress reserves the right to make changes without further notice to the materials described herein. Cypress does not assume any liability arising out of the application or use of any product or circuit described herein. Cypress does not authorize its products for use as critical components in life-support systems where a malfunction or failure may reasonably be expected to result in significant injury to the user. The inclusion of Cypress' product in a life-support systems application implies that the manufacturer assumes all risk of such use and in doing so indemnifies Cypress against all charges.

Use may be limited by and subject to the applicable Cypress software license agreement.