

# Cypress PSoC® 6 Microcontrollers

*Purpose-Built for the Internet of Things*

[WWW.CYPRESS.COM/PSOC6](http://WWW.CYPRESS.COM/PSOC6)



## INCREASING DEMANDS FOR THE INTERNET OF THINGS

The IoT is exploding, with more than 30 billion devices projected to be in service by 2020. At the heart of every IoT device lies a mixed-signal embedded system that is taking on an increased amount of data processing, fueled by cloud connectivity. Devices such as door locks, factory machinery, and wearables are becoming smart — sensing, connecting, learning and responding — to make life easier. With connectivity, security becomes critical to protect users from malicious activity. These next-generation IoT devices require increased processing and security without incurring power and cost penalties.

### Increased Data Processing

Today's IoT devices are collecting and processing more data than ever. Even wearable devices can contain more than a dozen sensors, including biometric, environmental, and motion sensors. Sensor data is collected and processed in real-time requiring a processor capable of sensor aggregation.



### Flexible Connectivity

IoT devices connect to the cloud via various wired and wireless protocols including USB, Bluetooth Low Energy (BLE), Wi-Fi, and LPWAN. Having the flexibility to connect via different connectivity options is essential.

## Security

Security and privacy are significant IoT concerns. Users must be confident that their personal data is always protected while their IoT devices are connected to the Internet. Similarly, IoT developers must be able to ensure the authenticity of their products to eliminate counterfeits and perform secure over-the-air updates to keep their products current.



## Extended Battery Life

From wearables to remote sensors, more and more IoT devices are running on batteries. Extending the time between battery charges is a key requirement for battery-powered IoT devices.



# UNMATCHED SOLUTIONS FOR THE INTERNET OF THINGS

The Oura Ring

# OURA

The Oura Ring is the world's most-advanced wearable that helps you achieve restorative sleep. This innovation is delivered through PSoC 6 MCUs, enabling the following features:

## SMALL FORM FACTOR

Integration of several functions into a single PSoC 6 MCU helped reduce the size of the ring over the prior generation by 50%.

## DATA STORAGE

PSoC 6's on-chip flash memory enables storage of up to six weeks of user data.

## BLUETOOTH LOW ENERGY

The built-in BLE wireless connectivity in PSoC 6 provides communication to the mobile app device.



## EXTENDED BATTERY LIFE

PSoC 6's ultra-low power was able to extend battery life to seven days, 3X longer than the prior generation ring.

## SENSOR FUSION

PSoC 6, as the host processor, connects different biometric sensors in the ring to collect and process data.



## DATA PROCESSING

The dual Cortex-M4 and Cortex-M0+ cores in PSoC 6 enabled 10X more processing capability vs. the prior-generation ring.

"The Oura ring required long-lasting battery life, increased processing capacity, and the use of advanced sensors, all in a stylish and comfortable form factor. Choosing Cypress as our partner helped us meet these requirements and redefine what is possible for wearable health products."

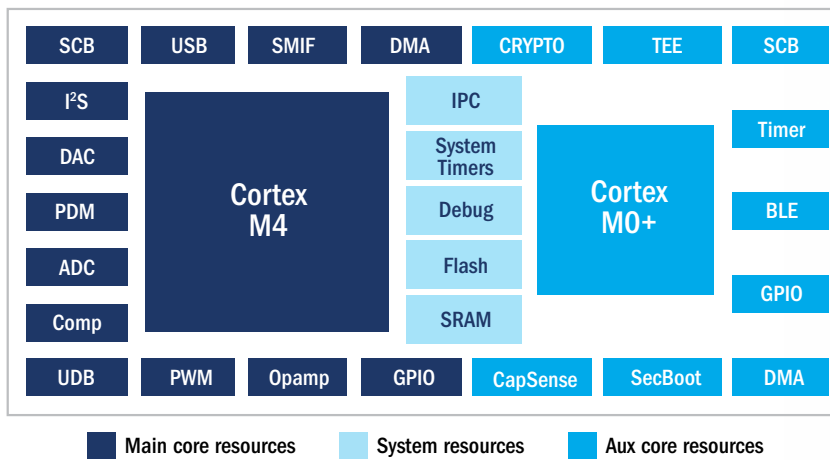
Petteri Lahtela  
CEO and Co-founder at Oura Health

For more information on the Oura Ring, please visit: [www.ouraring.com](http://www.ouraring.com)

# PSoC 6 MCU PORTFOLIO

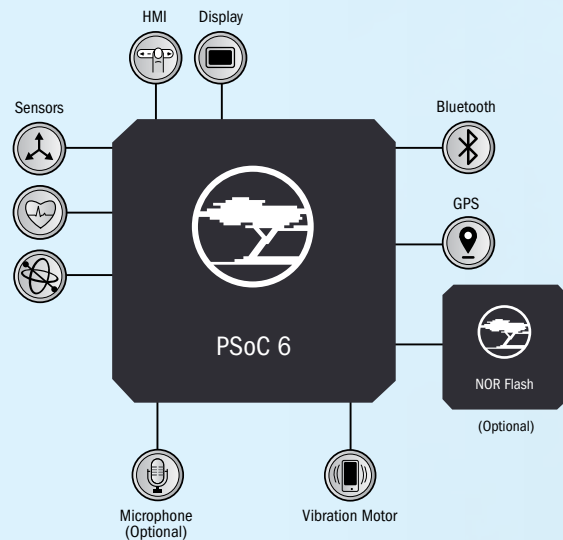
Value Line	Programmable Line	Performance Line	Connectivity Line	Security Line
PSoC 60	PSoC 61	PSoC 62	PSoC 63	PSoC 64
Arm Cortex-M4 (50 MHz)	Arm Cortex-M4 (150 MHz)	Arm Cortex-M4 (150 MHz) & Cortex-M0+ (100 MHz)	Arm Cortex-M4 (150 MHz) & Cortex-M0+ (100 MHz)	Arm Cortex-M4 (150 MHz) & Cortex-M0+ (100 MHz)
Up to 2MB Flash / 1MB SRAM	Up to 2MB Flash / 1MB SRAM	Up to 2MB Flash / 1MB SRAM	Up to 1MB Flash / 288KB SRAM	Up to 2MB Flash / 1MB SRAM
				Rich Execution Environment Secure Execution Environment Hardware-based Root-of-Trust and Trusted Services
				BLE
			ULP/LP	
			CapSense, UDBs, Opamps, Crypto, PDM-PCM	
SCBs, TCPWMs, QSPI, I2S, USB, DMA, SAR ADC, DAC, LCD, LP COMP, RTC, Efuse, PLLs, OSCs, GPIOs, SmartIO				

PSoC 6 DUAL-CORE MCU ARCHITECTURE



## WEARABLE EXAMPLE

Modern wearables incorporate a growing number of functions and capabilities while maximizing battery life. Functions such as sleek user interfaces with sliders and proximity sensors, voice command support, seamless BLE connectivity, display driving, and process-intensive sensor aggregation can all be achieved in a single PSoC 6 MCU without sacrificing battery life.



## KEY FEATURES



### LOW POWER

PSoC 6 was designed for ultra-low power consumption. Starting with the dual-core architecture, the Cortex-M4 core can be put to sleep to conserve power, while monitoring functions can be managed by the Cortex-M0+ core. Dynamic voltage and frequency scaling can be controlled by the user to optimize power for different operating environments. With multiple sleep and hibernate modes, users can fine-tune their power profiles.



### BUILT-IN SECURITY

PSoC 6 is designed to provide a hardware-based root of trust for secure applications. A hardware-based root of trust provides extra protection against unauthorized access to keys. In addition, hardware accelerated cryptography and true random-number generation are provided, which are needed for secure boot, authentication, secure over-the-air updates and other functions.



### CONNECTIVITY

PSoC 6 supports multiple wired and wireless connectivity options including Bluetooth Low Energy, Wi-Fi, and USB.



### CAPSENSE

PSoC 6 leverages Cypress' industry-leading CapSense solution for capacitive sensing with state-of-the-art noise immunity and water rejection used for applications including touch buttons and sliders, proximity detection and liquid-level sensing.



### SOFTWARE-DEFINED PERIPHERALS

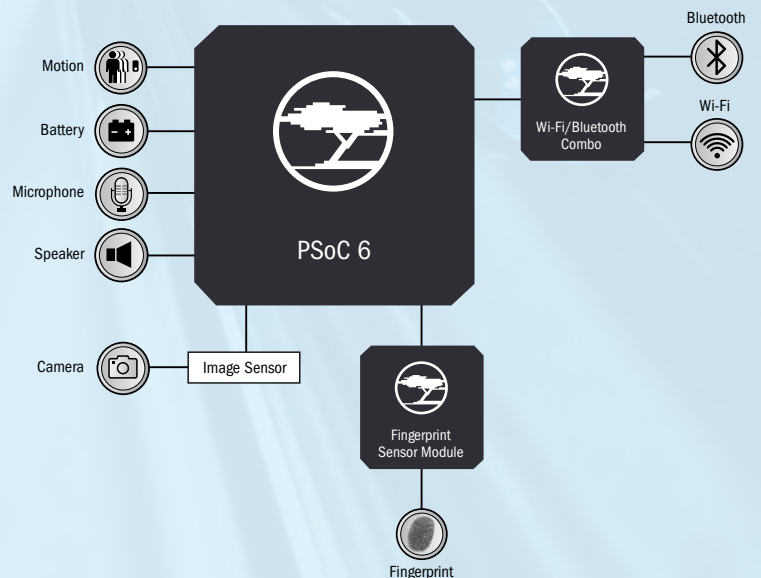
Cypress' software-defined peripherals can be configured using pre-built library functions or customized using the programmable architecture inside of PSoC 6 devices:

Programmable analog blocks are composed of an assortment of opamps, comparators, ADCs, and DACs, enabling complex analog signal flows.

Programmable digital blocks are composed of Universal Digital Blocks (UDBs), Serial Communication Blocks (SCBs), and Timer / Counter / Pulse Width Modulators (TCPWMs). These blocks can be configured to set-up custom digital interfaces, state machines, and custom logic functions.

## VIDEO DOORBELL EXAMPLE

For a smart home application like a video doorbell, PSoC 6, with its dual Cortex-M4 and Cortex-M0+ cores, can transmit real-time video as well as incorporate proximity detection, capture and play audio, and interface to a Cypress fingerprint sensor module or Cypress WICED Wi-Fi chipset. The PSoC 6 MCU's ultra-low-power profile enables smart applications to run off batteries.



# ACCELERATE YOUR NEXT IOT DESIGN CYCLE

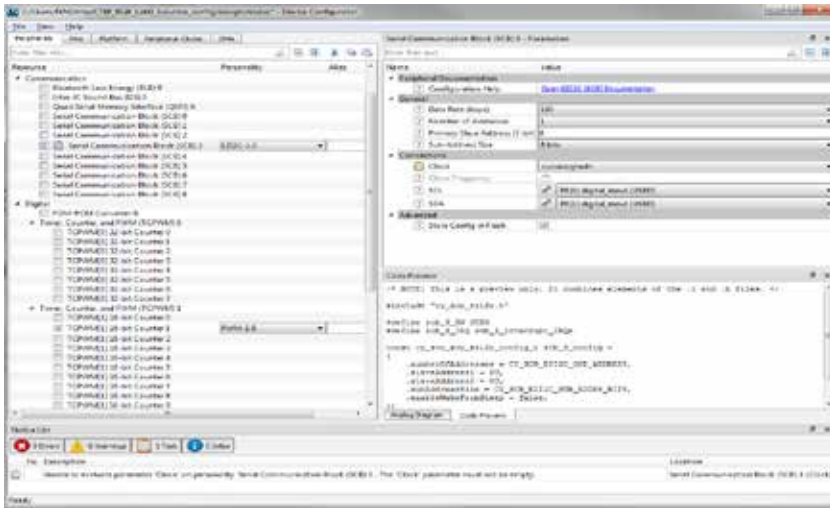
## ModusToolbox™ Software Environment

ModusToolbox simplifies development for IoT designers, delivering easy-to-use tools and a familiar IDE, with support for Windows®, macOS®, and Linux. It provides a powerful suite of tools for system and peripheral set-up. Code examples, documentation, RTOS and Cloud service support, and technical support forums are available to help your IoT development process along.

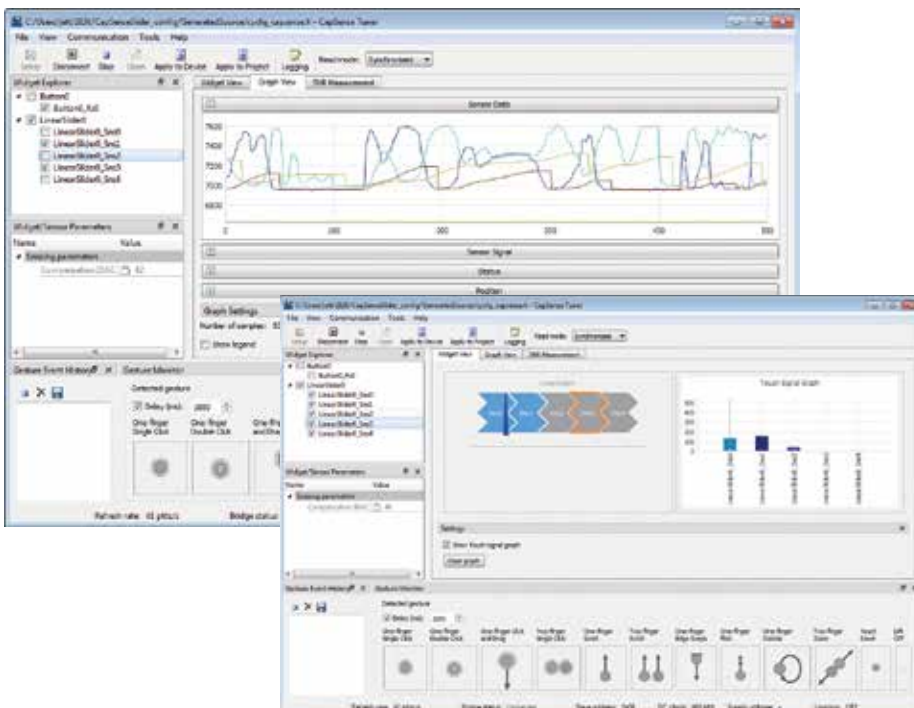


## Graphical Configuration Tools:

GUI-based configuration tools used to configure peripherals such as Smart I/O, CapSense, and wireless connectivity to quickly design and develop IoT systems.



PSoC 6 MCU Peripherals Configurator



CapSense Configurator Tool

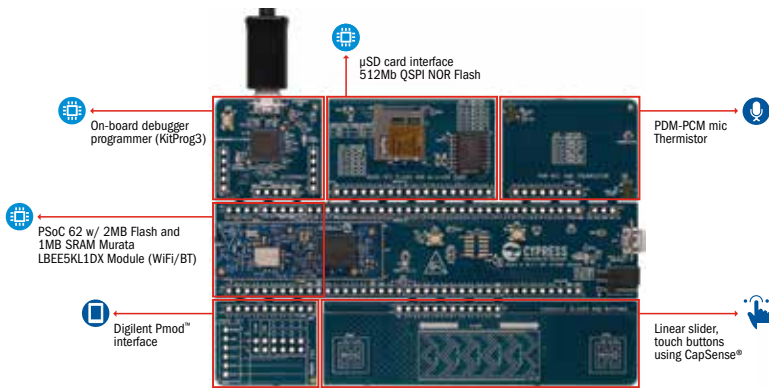
To start designing with the ModusToolbox Software Environment, please visit [www.cypress.com/ModusToolbox](http://www.cypress.com/ModusToolbox)



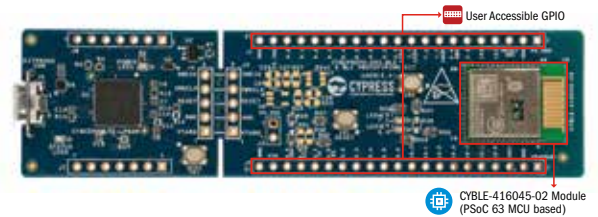
# PSOC 6 DEVELOPMENT KITS

Cypress offers award winning development kits along with hundreds of code examples allowing you to evaluate, prototype and debug designs with PSoC 6. The PSoC 6 development kits are pin-compatible with various 3rd party expansion boards including Arduino™ shield boards and Digilent® Pmod™ daughter cards.

PSOC 6 WI-FI BT PROTOTYPING KIT  
(CY8CPROTO-062-4343W)



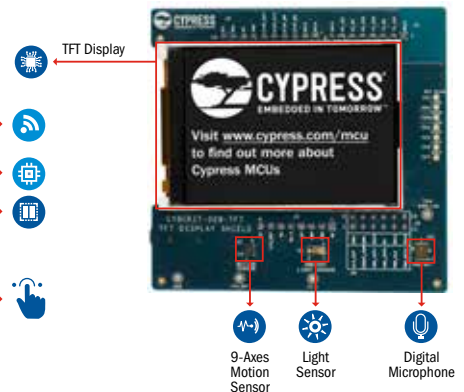
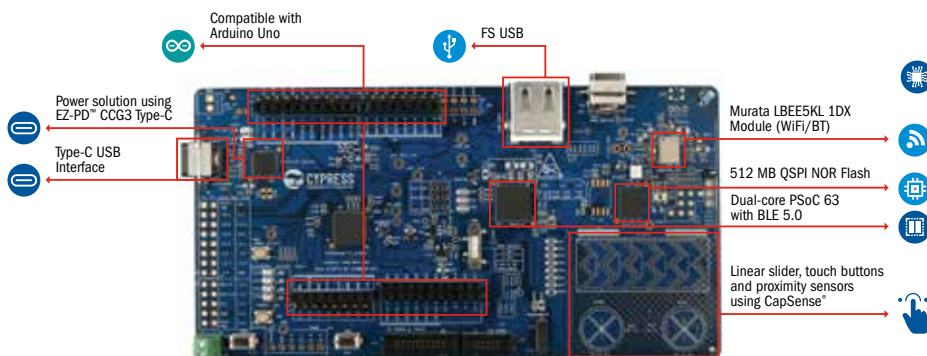
PSOC 6 BLE PROTOTYPING KIT  
(CY8CPROTO-063-BLE)



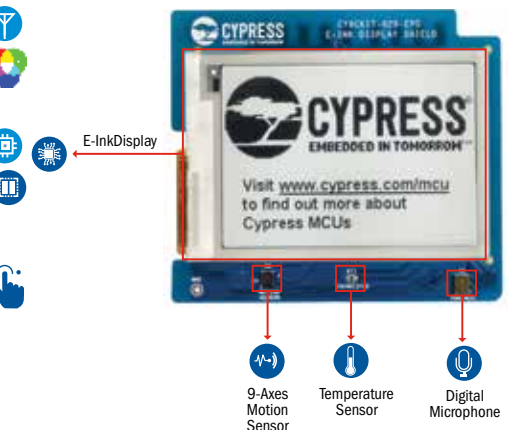
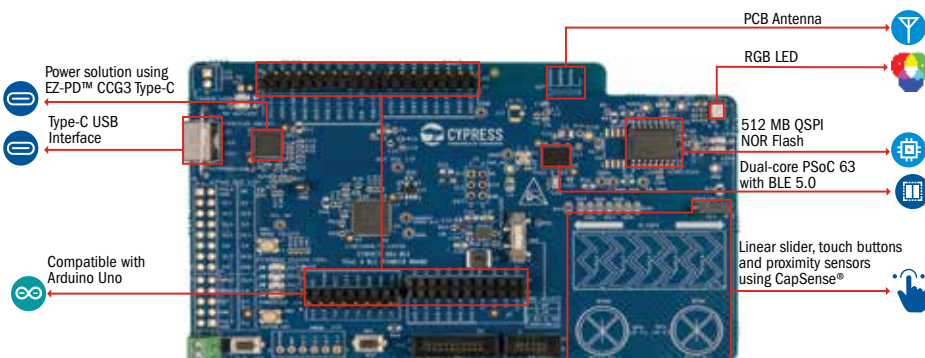
PSOC 64 SECURE BOOT PROTOTYPING KIT  
(CY8CPROTO-064-SB)



PSOC 6 WIFI-BT PIONEER KIT  
(CY8CKIT-062-WIFI-BT)



PSOC 6 BLE PIONEER KIT  
(CY8CKIT-062-BLE)



For more information on PSoC 6 kits, go to:  
<http://www.cypress.com/microcontrollers-mcus-kits>

# SOLVE YOUR IoT PROBLEM HERE

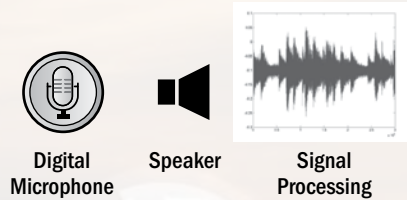
What's your next game-changing application?

## Graphic Display



Incorporate a slick graphics display to your next IoT application with the use of the Universal Digital Blocks (programmable logic).

## Audio Processing



Add an audio subsystem with an I<sup>2</sup>S interface and two Pulse Density Modulation (PDM) channels.

## Sensor Fusion



Analog Sensors



Digital Sensors

Interface to analog sensors with the programmable analog block functions of PSoC 6, which includes op-amps, comparators, and a 12-bit SAR ADC. Digital sensors can easily be connected via the Serial Communication Blocks (SCBs).

## PSoC 63 Connectivity Line

### MCU Subsystem

**arm**

Cortex-M4  
with SP FPU  
150-MHz

I-Cache 8KB

**arm**

Cortex-M0+  
100-MHz

I-Cache 8KB

SRAM  
Up to 1MB

Flash: Up to 2MB

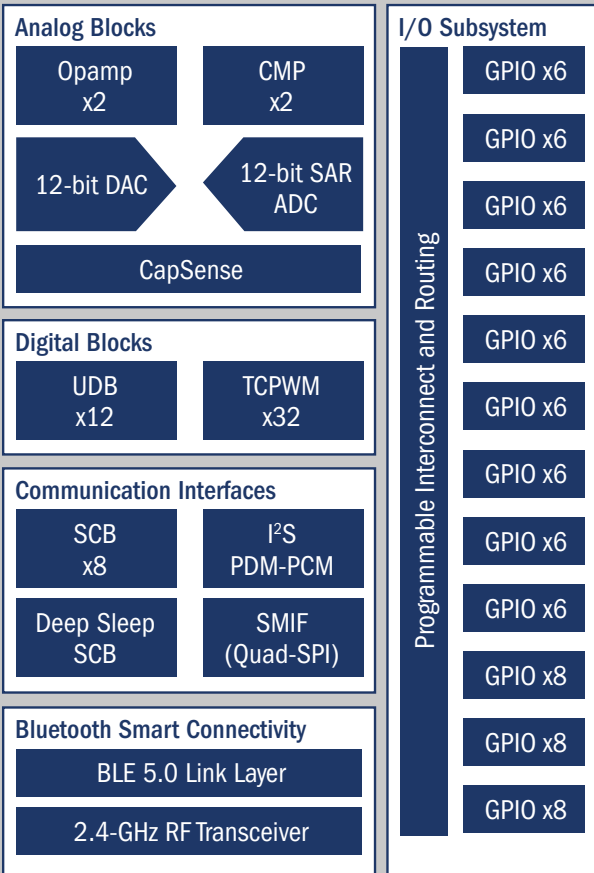
CRYPTO

DMA X2

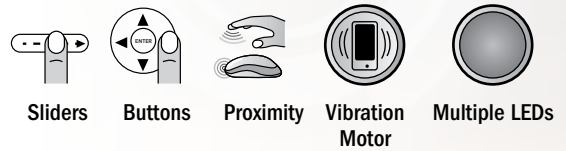
eFUSE

RTC

Advanced Microcontroller Bus Architecture (AMBA-AHB) and IPC



## Human Machine Interface



Replace traditional buttons with touch, add touch sliders, or add proximity detection with Cypress' CapSense technology. Use the TCPWM to drive motors, actuators or LEDs.

## Interface Bridging and Port Expansion



Serial Communication Blocks (SCBs) can be configured to support serial interfaces such as UART, I<sup>2</sup>C and SPI. USB 2.0 host and device support is available with PSoC 6.

## Wireless Connectivity



Add Bluetooth Low Energy connectivity with built-in BLE radio and sub-system. Add Wi-Fi or Bluetooth with Cypress' WICED portfolio.

# PSOC<sup>®</sup>



LOWEST POWER,  
MOST FLEXIBILITY,  
BUILT-IN SECURITY.

## BE A GAME-CHANGER. GET STARTED TODAY.

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### ABOUT CYPRESS

Cypress is the leader in advanced embedded system solutions for the world's most-innovative automotive, industrial, home automation and appliances, consumer electronics and medical products. Cypress' programmable and general-purpose microcontrollers, analog ICs, wireless and USB-based connectivity solutions and reliable, high-performance memories help engineers design differentiated products and get them to market first. To learn more, go to [www.cypress.com](http://www.cypress.com).

