CYPRESS AUTOMOTIVE SOLUTIONS

DIFFERENTIATION, RELIABILITY, AND SAVINGS WITH CUTTING-EDGE TECHNOLOGIES
DISCOVER A BROAD RANGE OF RELIABLE, HIGH-QUALITY AUTOMOTIVE PARTS

COMMITMENT TO QUALITY

- ISO/TS 16949 quality management systems
- Product qualifications to AEC Q100
- Dedicated A-grade (-40°C to +85°C) and E-grade (-40°C to +125°C) parts
- Zero-defects manufacturing processes
- Extended Process Change Notification (PCN) to accommodate automotive cycles
- Long product lifecycles
- Mature technologies

Demand nothing less than the best for your groundbreaking automotive designs. For ten years, Cypress solutions have been designed into some of the most demanding automotive applications, including engine control. Now Cypress offers a broad portfolio of automotive-quality A-grade and E-grade products for use in body electronics or under the hood:

- PSoC® Programmable System-on-Chip™ devices
- CapSense™ capacitive touch-sensing solutions
- TrueTouch™ touchscreen solutions
- Memory and nonvolatile memory devices
- Timing devices
- USB controllers

QUALITY DELIVERED

Cypress’s automotive-grade products adhere to the most stringent standards in the industry.

These products:

- Meet or exceed the toughest automotive-grade qualifications
- Employ strict, zero-defect manufacturing processes
- Give automotive customers pipeline visibility and end-to-end traceability
- Benefit from long product lifecycles based on reliable process technologies
- Utilize dedicated process flows with in-line inspections, controls, and monitors
**PSOC: ONE PLATFORM, COUNTLESS SOLUTIONS**

PSOC is a programmable embedded SoC integrating configurable analog and digital peripheral functions, memory and a microcontroller on a single chip. With an extremely flexible visual embedded design methodology that includes preconfigured, user-defined peripherals and hierarchical schematic entry, you can change your mind as often as you want and stay on schedule.

PSOC’s configurable blocks enable you to:

- Adapt to changing feature requirements
- Meet aggressive development deadlines
- Make products that satisfy market demands
- Adjust designs during debug/system bring-up

Additionally, one PSoC device integrates as many as 100 peripheral functions, allowing reduced design costs and higher functionality.

**ROBUST ANALOG FUNCTIONALITY**

With PSoC, it is easy to develop embedded automotive digital systems with advanced analog sensing, monitoring, and control, including:

- Capacitive touch sensing
- Voltage monitoring
- Environmental sensing
- Fan/motor control

Cypress’s TrueTouch™ touchscreen solution enables a wide array of infotainment applications.

**FUNCTIONS ENABLED BY PSoC**

**Environmental Sensing**
- Pressure
- Humidity
- Current
- Airflow
- Acceleration
- Tilt
- Pyroelectric Infrared (PIR)
- Light
- Voltage
- Temperature
- Inductive
- Gas
- Liquid-level

**Touch Sensing**
- Capacitive sensing (buttons, sliders)
- Touchscreens
- Touchpads
- Proximity sensing
- Interface control

**Fan/Motor Control**
- AC motor
- DC motor
- Fan
- Fuel pump
- Instrument gauges

**Communications Interfaces**
- Wireless radio control
- LIN bus
- Optical cable conversion
- DTMF (Dual Tone Multi-Frequency) dialer
- USB 2.0

**Power Control**
- Battery charging
- Voltage
- System power
- AC power metering
- Lighting

**Other**
- Magnetic card writing
- Mechanical buttons or other inputs
- LCD display control
- LED control
THE FUTURE IS AT YOUR FINGERTIPS

Revolutionary touch and proximity solutions make traditional HMI interfaces a thing of the past.

CREATE SUPERIOR
NEXT-GENERATION CAPACITIVE TOUCH-BASED APPLICATIONS WITH PSoC PRODUCTS

Enhancing the driver experience just got a lot easier with Cypress’s PSoC-based CapSense and TrueTouch technologies. PSoC provides a flexible, efficient means for implementing highly differentiated and reliable capacitive sensing, proximity detection, and capacitive touchscreen solutions with a single chip. Around the globe, these innovations are making the driver experience safer and more intuitive.

As market leader, Cypress makes it easy for designers to merge new features with pre-existing mechanical platforms for functionality enhancement and vastly improved touchpad input devices. You can even replace or customize the color of the touch interface to match a specific car’s interior — without tinkering with the backend technology.

CapSense-enabled Steering Wheel Controls
Why have mechanical buttons and sliders? Controls that can wear down are now replaced by CapSense “buttons” that never wear out.

CapSense-enabled Touchpad
Who needs buttons when you can simply point where you want to go?

CapSense-enabled Keyless
Starting your car could be as easy as a touch.

CapSense-enabled Lighting
Touch the controls to illuminate or adjust interior or exterior lighting.

Proximity-sensing Dimmer
Put your hand in the door’s map pocket and a light turns on. Place your hand near a control panel or touchscreen and the backlight illuminates surroundings so that you can see the controls better.
LEADERSHIP YOU CAN TRUST

Drivers want safer, simpler access to everything that their vehicle offers: navigation, entertainment, mirrors, HVAC, dome lights, occupant detection, passive keyless entry and other applications. That’s why so many of the world’s leading vehicle OEMs and suppliers choose Cypress’s capacitive touch sensing, touchscreen and proximity sensing solutions.

Cypress is the world leader in capacitive touch-sensing applications with more than 2.5 billion buttons replaced to date. Our best-in-class solutions are backed by dedicated business-unit support, so you can rest assured you’ll get the world-class service you deserve.

TrueTouch-enabled Infotainment
Touch an enhanced button to pop-up a menu, then press it to activate. Or with button replacement, intuitively use your fingertips to quickly and easily adjust temperature, change audio volume, or find a location on the map.

CapSense-enabled HVAC
Adjust the comfort level inside your vehicle with a single touch.

CapSense-enabled Infotainment
Add style and elegance to information and entertainment systems with buttonless, touch-activated CapSense controls.

CapSense-enabled Seat & Window Controls
Be as comfortable as you’d like with controls that never wear out.

For more information, visit us at www.cypress.com/go/automotive
MEMORY APPLICATIONS

- ECU
- Body control units
- Navigation
- Dashboard
- Cluster
- GPS module
- Digital tachograph
- Satellite radio
- Audio equipment
- On-board computer
- Data logger
- Infotainment

NONVOLATILE SRAMS: THE AUTOMOTIVE “BLACK BOX” ADVANTAGES

- Critical and fast data storage (20 years data retention)
- Directly replaces SRAM, battery-backed SRAM
- Stores full array on power-down using zero system time
- No batteries or contacts to fail
- RoHS compliant
- No data loss from electrical noise
- Smaller footprint than competing technologies
- No power monitoring required
- Unlimited read, write and recall cycles
- No component sockets
- 25 ns access time
- RTC & serial access via SPI

Cypress is committed to your long-term automotive memory needs with more than 25 years of technology innovation and the broadest product portfolio in the industry. If you need a Cypress part that is not currently A- or Equalified, please contact us so that we can add it to our roadmap.

SRAM

Cypress provides the broadest SRAM portfolio from 4 Kbit to 32 Mbit for its fast asynchronous memories and 64 Kbit to 64 Mbit for its low-power asynchronous memories. The products are available in industry-standard voltage, bus width, and package options. Cypress’s low-power MoBL™ SRAMs are ideal for ECUs, TCU, infotainment systems, dashboard clusters, and other applications.

Low-Power SRAM Portfolio Base Comparison

<table>
<thead>
<tr>
<th>Supplier</th>
<th>64K</th>
<th>256K</th>
<th>1M</th>
<th>2M</th>
<th>4M</th>
<th>8M</th>
<th>16M</th>
<th>32M</th>
<th>64M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cypress</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>A</td>
<td>EOL</td>
<td>EOL</td>
<td>EOL</td>
<td>EOL</td>
<td>EOL</td>
<td>EOL</td>
<td>EOL</td>
<td>EOL</td>
<td>EOL</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fast Asynchronous SRAM Base Comparison

<table>
<thead>
<tr>
<th>Supplier</th>
<th>4K</th>
<th>16K</th>
<th>64K</th>
<th>256K</th>
<th>1M</th>
<th>2M</th>
<th>3M</th>
<th>4M</th>
<th>8M</th>
<th>16M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cypress</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>A</td>
<td>EOL</td>
<td>EOL</td>
<td>EOL</td>
<td>EOL</td>
<td>EOL</td>
<td>EOL</td>
<td>EOL</td>
<td>EOL</td>
<td>EOL</td>
<td>EOL</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

nvSRAM

Cypress’s nonvolatile SRAMs support standard system designs while retaining data when power is lost. On power-up, the nonvolatile elements set the state of the SRAM, then the device can be read or written to without altering nonvolatile elements. Data transfer between non-volatile elements and SRAM is completed in 20 ms or less.

Cypress’s nvSRAMs are available in 0.13 µm technology (256 Kbit to 1 Mbit under development)
USB SOLUTIONS

Cypress is the USB market share leader and can qualify any of the below products for your automotive applications. USB host and USB hub solutions are AEC-Q100 qualified and are actively used in today’s automotive market.

- **USB Embedded Full Speed Hosts**: World’s first automotive-qualified full-speed embedded host/peripheral controller; microprocessor-based 4-port embedded host/peripheral controller
- **USB Embedded High Speed HUB**: Automotive-qualified, low-power USB 2.0 hub controller, 4-port/single transaction translator
- **USB High/Full/Low Speed Peripheral**: High-Speed (up to 480 Mbps)/Full-Speed (up to 12 Mbps)/Low-Speed (up to 1.5 Mbps). High Speed UMTI-compliant transceiver, intelligent serial I/F engine, programmable MCU for bus-powered applications

TIMING SOLUTIONS

Cypress offers a broad portfolio of clocks catering to every unique system timing requirement. Products are classified into the following families: Programmable Synthesizers, EMI Reduction Clocks, Voltage Control Crystal Oscillators (VCXOs), Zero Delay Buffers (ZDBs), Non Zero Delay Buffers (NZDBs), RoboClock® (programmable skew devices), Specialty Clocks, High Performance Clocks and Buffers.

To learn more about Cypress’s products for automotive applications, visit: [www.cypress.com/go/automotive](http://www.cypress.com/go/automotive) or contact your local sales office.
ABOUT CYPRESS

Cypress delivers high-performance, mixed-signal, programmable solutions that provide customers with rapid time-to-market and exceptional system value. Cypress offerings include the PSoC Programmable System-on-Chip, USB controllers, general-purpose programmable clocks, and memories. Cypress also offers wired and wireless connectivity solutions ranging from its CyFi low-power RF solution, to West Bridge and EZ-USB FX2LP controllers that enhance connectivity and performance in multimedia handsets. Cypress serves numerous markets, including consumer, computation, data communications, automotive and industrial. Cypress trades on the NYSE under the ticker symbol CY. Visit Cypress online at www.cypress.com.