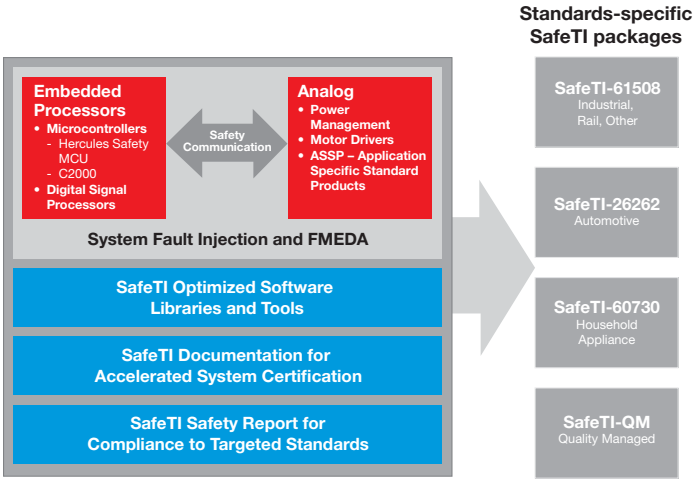
SafeTI™ System Design Packages for Functional Safety

SafeTI functional safety design packages (**www.ti.com/safeti**) provide help to manage both systematic and random failures, enabling customers to design their functional safety systems. SafeTI design packages help enable compliance with standards such as ISO 26262, IEC 61508, and IEC 60730 for applications in transportation, industrial, medical, railway and other areas where functional safety is important. Using SafeTI components makes it easier for customers to achieve compliance to safety standards and get to market quickly in rapidly growing safety-critical markets. These SafeTI design packages include five key components:

- **Functional safety-enabled semiconductor components** developed as safety standard-compliant items in order to help enable designers to build safe systems with confidence.
- **Safety documents, tools and software** to decrease development and certification time. SafeTI Documents include a *Safety Manual* which details product safety architecture and recommended usage, a *Safety Analysis Report* which includes details of safety analysis, and a *Safety Report* which is a summary of compliance to targeted standards.
- **Complementary embedded processing and analog components** work together to help designers meet safety standards.
- **Quality manufacturing process** has been applied to help assure that SafeTI components meet the component-level requirements concerning ISO9001 and/or ISO/TS 16949 (including AEC-Q100 for automotive) to enable the customer to deliver robust solutions.
- **Safety development process** that follows ISO 26262, IEC 61508 and IEC 60730 requirements. This process is also assessed by auditors as prescribed by safety standards.



External certification

TI has used external third parties to assess SafeTI products to safety standards such as IEC 61508. An example of this is our certificate from exida for the TMS570LS20x and TMS570LS10x families of Safety Microcontrollers.


Certificate / Certificat
Zertifikat / 合格証
TI 1204073 C001
TMS570LS20x/10x Microcontrollers
Texas Instruments
Stafford, TX - USA
IEC 61508 : 2010 Parts 1-7
Systematic Integrity: SIL 3 Capable
Random Integrity: Type B Element
PFH and Architecture Constraints must be verified for each application
Evaluating Assessor
Certifying Assessor

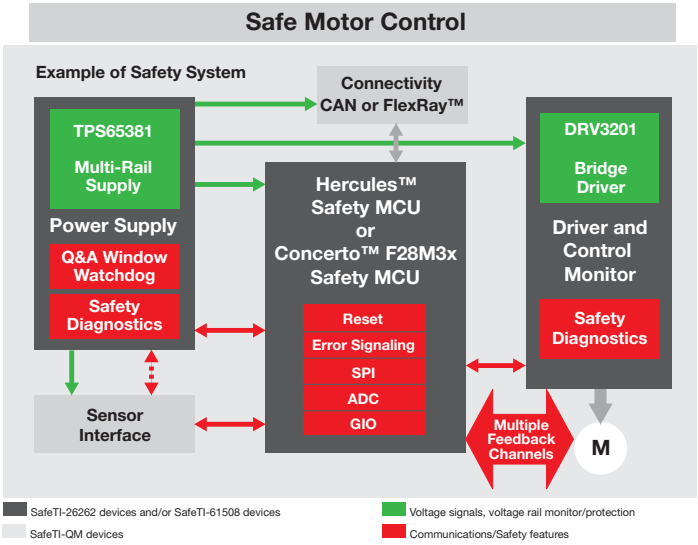
- **SafeTI-26262** – SafeTI-26262 design packages for functional safety include component-level compliance to ISO 26262 for passenger road vehicles, which supports ASIL levels from ASIL-A to ASIL-D. TI is a member of U.S. and international working groups for ISO 26262.
- **SafeTI-61508** – SafeTI-61508 design packages for functional safety include component-level compliance to IEC 61508:2010, which supports SIL levels from SIL-1 to SIL-3 and system-level compliance to SIL-4. SafeTI-61508 is targeted for industrial process, industrial machinery, railway, medical and a variety of other industries.
- **SafeTI-60730** – SafeTI-60730 design packages for functional safety include software that is certified to IEC 60730 for household appliances supporting Class A to Class C.
- **SafeTI-QM** – SafeTI-QM products are developed under a rigorous development process and come with a Safety Manual and Safety Analysis Report for evaluating system components. SafeTI-QM components include embedded processors, power-management devices, motor drivers, and many other analog components.

SafeTI™ system design packages for functional safety – Achieve certification easier and faster

SafeTI devices include

SafeTI products	SafeTI devices	SafeTI functional safety	Safety integrity level
Microcontrollers	TMS570LS31x/21x	SafeTI-26262 SafeTI-61508	ASIL-D SIL-3
	TMS570LS12x/11x	SafeTI-26262 SafeTI-61508	ASIL-D SIL-3
	TMS570LS04x/03x	SafeTI-26262 SafeTI-61508	ASIL-D SIL-3
	TMS570LS20x/10x	SafeTI-61508	SIL-3
	RM48x	SafeTI-61508	SIL-3
	RM46x	SafeTI-61508	SIL-3
	RM42x	SafeTI-61508	SIL-3
	F28M35x	SafeTI-61508	SIL-3
	TMS470M	SafeTI-QM	QM
	TMS320F2802x	SafeTI-60730	Class B
	TMS320F2803x	SafeTI-60730	Class B
	TMS320F2806x	SafeTI-60730	Class B
	TMS320F2833x	SafeTI-60730	Class B
	TMS320C2823x	SafeTI-60730	Class B
Power management	TPS65381	SafeTI-26262 SafeTI-61508	ASIL-D SIL-3
	TPS65310	SafeTI-26262	ASIL-B
Motor drivers	DRV3201	SafeTI-26262 SafeTI-61508	ASIL-D SIL-3
CAN transceiver	SN65HVDA1040 / 1050 / 54x / 251	SafeTI-QM	QM
Power and sensor interface ASSP	TPIC7218	SafeTI-QM	QM
Sensor signal conditioner	PGA400	SafeTI-QM	QM

SafeTI functional safety system example



SafeTI development tools and software

Compilers for Safety

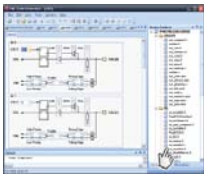
Compilers and debuggers:

- Code Composer Studio™ Compiler – SafeTI ARM Compiler Qualification Package available 2012
- 3P compiler coming soon

GUI-Based Peripheral Configuration Tools

SafeTI HALCoGen

- GUI to configure peripherals, interrupts, clocks, and other µC parameters.
- Generate peripheral init and driver code
- Import into CCS and select 3P IDEs
- Quick start for new projects
- Code Certification Package coming soon



MCAL and AutoSAR for ISO 26262

Real-Time Operating System support:

- AUTOSAR: Vector MICROSAR Safe
  - Protection mechanisms to ASIL D
  - Safe AutoSAR from TTTech/Vector
- AUTOSAR: ElektroBit tresos
  - Services and project support to ASIL-D
- MCAL 4.0 from TI (certification package soon)

vector
TTTech
AUTOSAR

Certifiable RTOS Support for IEC

Real-Time Operating System support:

- SAFERTOS®: High Integrity Systems
  - Certification packs, design history files available to target applications that fall under IEC 61508, EN62304 and FDA 510(k) regulatory requirements
- µC/OS: Micrium
- ThreadX®: Express Logic
- SCIOPTA: SCIOPTA RTOS
  - Kernel certified by TÜV for IEC 61508 and EN50128 Cortex-R4F products to SIL-3

WITTENSTEIN
Micriµm
expresslogic

You're only 1-click away from safety. Visit www.ti.com/safeti to learn more.

Texas Instruments

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as “components”) are sold subject to TI’s terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI’s terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers’ products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers’ products and applications, Buyers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of significant portions of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI components or services with statements different from or beyond the parameters stated by TI for that component or service voids all express and any implied warranties for the associated TI component or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI’s goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or “enhanced plastic” are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have ***not*** been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components which meet ISO/TS16949 requirements, mainly for automotive use. Components which have not been so designated are neither designed nor intended for automotive use; and TI will not be responsible for any failure of such components to meet such requirements.

Products		**Applications**	
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial
Interface	interface.ti.com	Medical	www.ti.com/medical
Logic	logic.ti.com	Security	www.ti.com/security
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video
RFID	www.ti-rfid.com		
OMAP Applications Processors	www.ti.com/omap	**TI E2E Community**	e2e.ti.com
Wireless Connectivity	www.ti.com/wirelessconnectivity		

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265