TPS-1

PROFINET IRT Single Chip Device Interface

The TPS-1 is a single-chip PROFINET interface component integrating a CPU, a 2-port switch supporting latest PROFINET specifications, the Ethernet PHYs and peripheral modules to interface to the application layer of any application building a PROFINET device.

The TPS-1 complements the existing PROFINET technology components (ERTEC series of PROFINET devices). It rounds off the Renesas technology offering of Best-in-Class PROFINET IRT. Easy integration options, extraordinary robustness and an outstanding low power dissipation form the base for this feature-rich PROFINET product.

Applications

- Industrial Machines
- Industrial Drives
- Compact and modular Remote I/Os

Product features

- Integrated PROFINET CPU
- Compliant with Conformance Class C
- 2 external ports, 100 Mbit/s, full duplex
- 2 integrated PHYs with auto negotiation, auto crossover
- Integrated IRT switch, 8 priority levels
- Supports RJ45 or fiber optic interfaces

- Fiber optic diagnosis via I^2C interface per port
- IRT bridge-delay < 3 µs
- Hardware support for PROFINET protocols including PTCP and LLDP
- Versatile host interface for serial or parallel connection of external CPUs or local inputs/outputs
- Small package (15 x 15 mm), 1 mm ball pitch

Application interface

The TPS-1 provides 48 General Purpose I/O (GPIO) pins that you can individually configure according to your specific application requirements.

- 48 GPIO pins for digital IO's
- Parallel host interface
- Serial host 8- or 16-bit interface (SPI-Slave)

- Serial application interface (SPI master)
- 5 GPIO for internal signals (e.g. LEDs)

The TPS-1 interfaces to an application CPU via the internal shared memory either through the fast SPI slave interface or through the 8- or 16-bit parallel port.

Solution kit

A solution kit for the TPS-1 including evaluation board and complete software package for PROFINET communication is available.
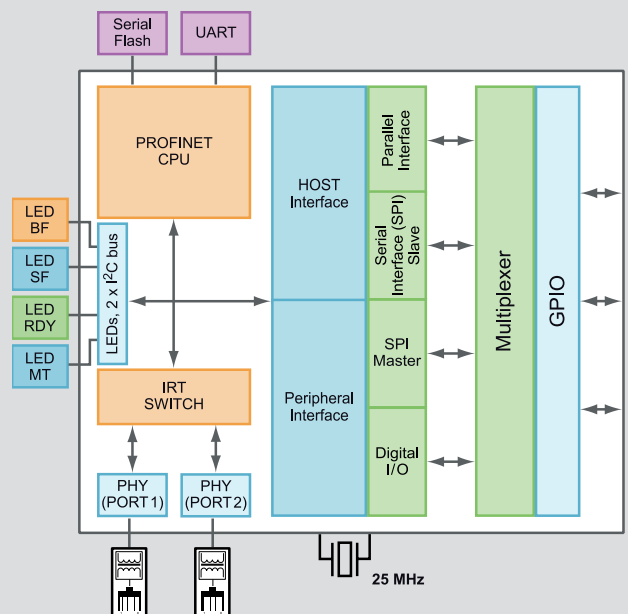
Configuration and Software

The TPS-1 is configured by a specific configuration file. It contains manufacturer data, device type data, I&M information, operating modes of the TPS-1 and further required information. The configuration file is easily created with the configuration tool TPS Configurator, available through KW-Software.

Specification summary

Parallel host interface	Data bus width	8-bit or 16-bit
	Address area	Max. 64 KByte (segmentation possible)
	Read/Write mode	Intel mode (separate read/write line) or Motorola mode (common read/write line) / (RDY low or high active)

Serial host interface (SPI slave)	Frame format	Motorola SPI frame format; TI synchronous format; National Microwire format
	SPH	Phase angle of the SPI_CLK (Motorola-relevant)
	SPO	Polarity of the SPI_CLK (Motorola-relevant)
	SPI_Handshake	Wait mode; Busy mode
	Timeout_CNT	Watchdog for detection of SPI data stream in case of an error

PROFINET CPU	Internal microprocessor	32-bit, 100 MHz, RAM integrated

PROFINET interface	Transmission speed	100 Mbit/s, full duplex
	PROFINET connection	Two ports with auto negation and auto crossover for star and line topologies
	Transmission medium	RJ45 or fiber optic interfaces (fiber optic diagnosis via I^2C possible)

Electrical parameters	Supply voltages	3.3 V; 1.0 V
	Power consumption	< 800 mW
	Temperature range	-45 °C up to 85 °C

Housing	Package	FPBGA 196-pins
	Dimensions	15 x 15 mm
	Ball pitch	1.0 mm
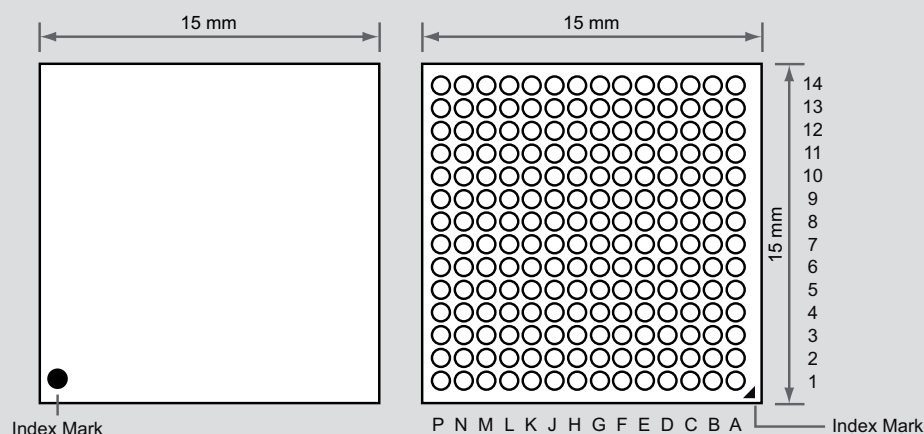
Further information available under www.renesas.eu/automation

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