THE DATASHEET OF

ISP1703BUKTS

USB TRANSCEIVERS

Ultra-low-power transceiver solutions for mobile and portable applications

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Designed for use with ASICs, FPGAs, and system chipsets that interface with the physical layer of the USB connection, these transceivers provide reliable USB performance in a UTMI+ low pin interface (ULPI) format and support a full range of mobile and portable applications.

KEY FEATURES

- Fully compliant with:
  - Universal Serial Bus Specification revision 2.0
  - On-The-Go supplement to the USB Specification revision 1.3
  - UTMI+ low pin interface (ULPI) Specification revision 1.1
  - Battery Charging Specification version 1.0
  - USB 2.0 link power management addendum
- Interface support to Hi-Speed USB host, peripheral, and dual-role device cores
- Ability to support 60-MHz, 8- or 12-pin interface between ASIC and transceiver
  - 4-bit dual data rate (DDR)
  - 8-bit single data rate (SDR)
- Flexibility with chip select pin polarity
  - Provides an option to fit the ASIC polarity
- Support for wide range of clock frequencies to suit the industrial needs
  - 13, 19.2, 24, 26, 38.4, and 60 MHz
- Variable I/O voltage support
  - 1.65 V to 3.6 V
- Integrated Hi-Speed USB transceiver solutions to minimize external components
  - Integrated 2.7 V or 3.3 V and 1.8 V regulators
  - Integrated ESD protection circuit
  - Integrated V_{BUS} overvoltage protection circuit
- Low power consumption for longer battery life
  - Typical operating current of 13 mA for full-speed and 34 mA for high-speed
- Separate I/O voltage supply pins to minimize crosstalk
- Input clock mode support, eliminates the external reference clock/oscillator
- Fully integrated USB battery-charger detection with automatic hardware detection and software-controlled detection
- Robust design to handle noisy clock and power supplies
- Very good receiver sensitivity handling data errors with bad cables
- UART pass-through mode for serial application
- Full industrial grade operating temperature range from –40 °C to +85 °C
- ESD compliance:
  - JESD22-A114F ±2 kV contact human body model (HBM)
  - JESD22-C101-C ±500 V charged device model (CDM)
  - IEC 61000-4-2 ±8 kV contact and ±15 kV air on the DP and DM pins
- Small foot print for efficient space utilization
  - WLCSP25, TFBGA36, HVQFN36/32/24

TARGETED APPLICATIONS

- Mobile phones
- Digital still and video cameras
- Digital TVs
- Digital video disc (DVD) recorders
- Media players
- Set-top boxes (STB)
- GPS personal navigation devices
- Personal media players (PMPs)
- External hard disk drives
- Printers and multifunction printer (MFP)
- Point of sale terminals
- Test and measurement equipment
- Gaming consoles
- Industrial systems
- Communications/networking equipment (wireless access points, LAN switches, network routers)

HI-SPEED USB TRANSCEIVERS WITH ULPI INTERFACE: FOR MOBILE

		Products				
	Features	**ISP1504**	**ISP1508**	**ISP1514**	**ISP1703**	**ISP1704***
Form factor	Commercial product code	ISP1504A1ETTM ISP1504C1ETTM	ISP1508AETTM ISP1508BETTM	ISP1514AUKTS	ISP1703AUKTS ISP1703BUKTS	ISP1704AETTM
	Package type	TFBGA36	TFBGA36	WLCSP25	WLCSP25	TFBGA36
	Package dimensions (mm) (L x W x H)	3.5 x 3.5 x 0.8	3.5 x 3.5 x 0.8	2.24 x 2.21 x 0.6	2.24 x 2.21 x 0.6	3.5 x 3.5 x 0.8
	Ball or lead pitch (mm)	0.5	0.5	0.4	0.4	0.5
	ULPI mode	SDR	SDR or DDR	SDR	SDR	SDR
Features	Transparent UART mode	no	yes	yes	yes	yes
	Active chip select pin polarity	low	AETTM: high BETTM: low	high	AUKTS: low BUKTS: high	low and high
	USB charger detection	supports resistive method	supports resistive method	supports resistive method	Battery Charging Spec. Rev. 1.0	Battery Charging Spec. Rev. 1.0
	Input clock mode	no	no	no	yes	no
	Crystals and clocks supported (MHz)	A1ETTM: 19.2 C1ETTM: 26	13, 19.2, 24, 26	19.2	AUKTS: 19.2 BUKTS: 26	19.2, 26
	Control external charge pump/switch	yes	yes	no	no	yes
Power	Main supply input voltage, V_{CC} (V)	3.0 to 4.5	3.0 to 4.5	3.0 to 4.5	3.0 to 4.5	3.0 to 4.5
	Digital I/O input voltage, $V_{CC(I/O)}$ (V)	1.65 to 3.6	1.65 to 1.95	1.65 to 1.95	1.65 to 1.95	1.65 to 1.95
	V_{BUS} protection (V)	5.5 limiting	5.5 limiting	5.5 limiting	16	5.5 limiting
Others	Operating temperature (°C)	–40 to +85	–40 to +85	–40 to +85	–40 to +85	–40 to +85
	Charger detect pin polarity	NA	NA	NA	low	high
	USB application	Peripheral/host/OTG	Peripheral/host/OTG	Peripheral/host	Peripheral/host/OTG	Peripheral/host/OTG

* ISP1704 is qualified in EMP reference platform design

HI-SPEED USB TRANSCEIVERS WITH ULPI INTERFACE: GENERIC

		Products			
	Features	**ISP1507A/B**	**ISP1507C/D**	**ISP1507E/F**	**ISP1715**
Form factor	Commercial product code	ISP1507ABSTM ISP1507BBSTM	ISP1507CBSUM ISP1507DBSUM	ISP1507EBSUM ISP1507FBSUM	ISP1715AHNUM ISP1715AETTM
	Package type	HVQFN32	HVQFN24	HVQFN24	AHNUM: HVQFN36 AETTM: TFBGA36
	Package dimensions (mm) (L x W x H)	5 x 5 x 0.85	4 x 4 x 0.85	4 x 4 x 0.85	AHNUM: 5 x 5 x 0.85 AETTM: 3.5 x 3.5 x 0.8
	Ball or lead pitch (mm)	-	-	-	0.5
	ULPI mode	SDR	SDR	DDR	SDR
Features	Transparent UART mode	no	no	no	yes
	Active chip select pin polarity	low	no	no	low and high
	USB charger detection	no	no	no	supports resistive method
	Input clock mode	no	no	no	no
	Crystals and clocks supported (MHz)	ABSTM: 19.2 BBSTM: 26	CBSUM: 19.2 DBSUM: 26	EBSUM: 19.2 FBSUM: 26	13, 19.2, 24, 26
	Control external charge pump/switch	yes	yes	yes	yes
Power	Main supply input voltage, V_{CC} (V)	3.0 to 3.6	3.0 to 3.6	3.0 to 3.6	3.0 to 4.5
	Digital I/O input voltage, $V_{CC(I/O)}$ (V)	1.65 to 3.6	1.65 to 3.6	1.65 to 1.95	3.0 to 3.6
	V_{BUS} 5 V output: charge pump (mA)	50	no	50	no
	V_{BUS} protection (V)	5.5 limiting	5.5 limiting	5.5 limiting	5.5 limiting
Others	Operating temperature (°C)	–40 to +85	–40 to +85	–40 to +85	–40 to +85
	USB application	Peripheral/host/OTG	Peripheral/host	Peripheral/host/OTG	Peripheral/host/OTG

USB TRANSCEIVERS

			Products			
	Key Feature	**Comments**	**ISP1102**	**ISP1105**	**ISP1110 UART mode**	**ISP1302 OTG with carkit support**
Form factor	Commercial part code		ISP1102BSTS, ISP1102BSTM, ISP1102AWTS, ISP1102AWTM	ISP1105BSTM, ISP1105-WTS, ISP1105WTM	ISP1110VHTS, ISP1110VHTM	ISP1302UKTS
	Package	HBBC	16-pin, 3 x 3 x 0.65 mm	16-pin, 3 x 3 x 0.65 mm	16-pin, 3 x 3 x 0.65 mm	NA
		HQVFN	14-pin, 2.5 x 2.5 x 0.85 mm	16-pin, 3 x 3 x 0.85 mm	NA	NA
		Others	NA	NA	NA	WLCSP25, 2.5 x 2.5 x 0.6 mm
Features	Single-ended receiver output	VP/VM	VP/VPO, VM/VMO Bidirectional	Supported	Supported	SE0/VM, DAT/VP Bidirectional
	Diffrential data receiver output	RCV	Supported	Supported	Supported	Supported
	Driver data input	VPO/VO, VMO/FSE0	VPO/VMO	VPO/VO, VMO/FSE0	VPO,VMO	SEO/VM, DA/VP
	Bypass mode	$V_{REG(3.3)}$ short to $V_{CC(5.0)}$	Supported	Supported	NA	NA
	Disable mode	Only $V_{CC(5.0)}$ connected	NA	Supported	NA	Supported
	Sharing mode (isolate)	$V_{CC(I/O)}$ only	Supported	Supported	NA	Supported Isolate mode
Power	Low I/O voltage level (V)		1.65 to 3.6	1.65 to 3.6	1.65 to 2.85	1.4 to 3.6
Others	SOFTCON		Supported	Supported	Supported	NA
	Resistor 1.5 kΩ		External	External	Internal	Internal (registers)
	Data transfer rates		Full-speed and low-speed	Full-speed and low-speed	Full-speed	Full-speed and low-speed
	V_{BUS} detect		Supported	NA	Supported	V_{BUS} comparator (OTG)
	ESD (on D+,D-,$V_{CC(5.0)}$,and GND) (kV)		±12	±12	-	±2
	Target applications		Mobile phone, DSC	DSC	GSM,PDA	PDA, DSC, mobile phone
	USB application		Peripheral/host	Peripheral/host	Peripheral	Peripheral/host/OTG

To order the evaluation kits for these products, contact your local sales office or distributor.
For product related information, contact wired.support@stericsson.com.

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