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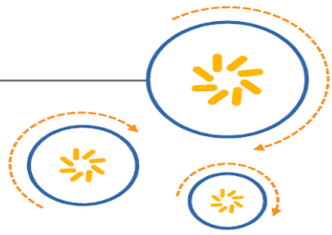

CSR102X FAMILY SELECTION GUIDE

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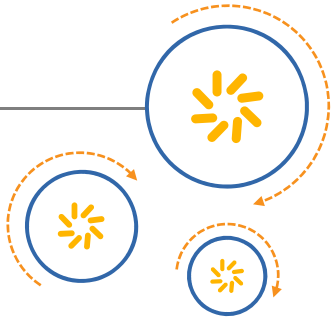

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CSR

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Qualcomm® µEnergy™

CSR102x Family Selection Guide

Issue 2

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Document History

Revision	Date	Change Reason
1	16 OCT 15	Original publication of this document.
2	19 NOV 15	Updated information for Engineering Sample release.

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- Information for designers concerning CSR product in development. All values specified are the target values of the design. Minimum and maximum values specified are only given as guidance to the final specification limits and must not be considered as the final values.

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1 Introduction

This document describes the features of the CSR102x family of ICs.

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2 Family Selection Guide

Note:

Features shown in **bold** have values that differ across the CSR102x family.

Wireless	CSR1020	CSR1021	CSR1024	CSR1025
Bluetooth Smart Device	Yes	Yes	Yes	Yes
Transmit Power (dBm)	4	4	4	4
Nominal Transmit Power (dBm)	0	0	0	0
Receive Sensitivity (dBm)	-87	-87	-87	-87
RSSI	Yes	Yes	Yes	Yes
50 Ω Direct Antenna Connection	Yes	Yes	Yes	Yes

Package Information	CSR1020	CSR1021	CSR1024	CSR1025
Package Type	**QFN**	**QFN**	**LGA**	**LGA**
Package Size W x L x H (mm)	**5 x 5 x 0.65**	**8 x 8 x 0.65**	**5 x 5 x 0.75**	**8 x 8 x 0.75**
Package Pitch (mm)	**0.50**	**0.50**	**0.50**	**0.50**
Number of Pins	**36**	**60**	**36**	**60**
Ground Paddle / Pins	**1 / 3**	**1 / 3**	**2 / 3**	**5 / 3**

PIOs	CSR1020	CSR1021	CSR1024	CSR1025
Digital I/O (Flexible PIOs)	**15**	**32**	**15**	**32**
Static I/O [(a)]	**-**	**5**	**-**	**1**
Analogue I/O	**1**	**2**	**1**	**2**

[(a)] These are PIOs not in the full PIO mux for digital features. For details, see *CSR102x Data Sheets*.

Processor	CSR1020	CSR1021	CSR1024	CSR1025
MCU (RISC)	16-bit	16-bit	16-bit	16-bit
Max. Speed (MHz)	16	16	16	16
Peak Dhrystone MIPS (MIPS)	16	16	16	16

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Memory	CSR1020	CSR1021	CSR1024	CSR1025
Internal Mask ROM (KB)	192	192	192	192
Internal Data RAM (KB)	16	16	16	16
Internal Code (Cache) RAM (KB) (Data/Code RAM Configurable Split)	64	64	64	64
OTP (KB)	60	60	60	60
MTP (Bytes) (NVRAM for Bluetooth Address, Link Keys etc.)	256	256	256	256
Internal Flash (KB)	**No**	**No**	**256**	**256**
External SPI Flash support from System Generated 3 V Rail	**No**	**Yes**	**No**	**No**
External SPI Flash support via Serial Memory Flash Controller	**Yes**	**Yes**	**No**	**No**
Maximum supported size of SPI Flash (MB)	**16**	**16**	**N/A**	**N/A**

Interfaces	CSR1020	CSR1021	CSR1024	CSR1025
Microphone (PDM)	1	1	1	1
G722 Codec	Yes	Yes	Yes	Yes
PCM	1	1	1	1
I²S	1	1	1	1
I²C Master/Slave (General)	1	1	1	1
I²C Master (Bus Controller)	1	1	1	1
SPI Master (General)	1	1	1	1
Serial Memory Flash Controller SPI Master	1	1	1	1
SPI Debug Interface (CSR Proprietary)	1	1	1	1
UART (General)	1	1	1	1
Sensor Quadrature Decoders	4	4	4	4
LCD Glass Driver	Yes	Yes	Yes	Yes
LED Driver State in Deep Sleep	PWM Flasher	PWM Flasher	PWM Flasher	PWM Flasher

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Counters / Timers / PWM / Keyscan	CSR1020	CSR1021	CSR1024	CSR1025
Application Timer Resolution (µs)	1	1	1	1
Watchdog Timer (Configurable Timeout)	Yes	Yes	Yes	Yes
IR Modulator Timer	Yes	Yes	Yes	Yes
LED PWM (Fast)	2	2	2	2
LED PWM (Slow)	2	2	2	2
Keyscan (Input x Output)[a]	12 x 18	12 x 18	12 x 18	12 x 18
Keyscan Debounce and Ghost Processing	Yes	Yes	Yes	Yes

[a] Maximum Keyscan (Input x Output) supported: This value is device limited by the number of PIOs available in a package.

XTAL / OSC	CSR1020	CSR1021	CSR1024	CSR1025
Internal Slow Oscillator (Approximately 32 kHz)	Yes	Yes	Yes	Yes
Internal Oscillator (MHz) (Calibrated from 16 MHz Fast Clock)	0.1 to 8	0.1 to 8	0.1 to 8	0.1 to 8
External XTAL Option (MHz)	16 or 32	16 or 32	16 or 32	16 or 32

ADC	CSR1020	CSR1021	CSR1024	CSR1025
ADC (bit)	10	10	10	10
ADC Type	SAR	SAR	SAR	SAR
ADC Sample Rate (ksps)	TBD to TBD	TBD to TBD	TBD to TBD	TBD to TBD
ADC Channels [a]	**8** [b]	**8**	**8** [b]	**8**
ADC Range (V)	1.2 (VDD_AUX)	1.2 (VDD_AUX)	1.2 (VDD_AUX)	1.2 (VDD_AUX)

[a] 1 channel is ground.

[b] 2 of the channels are not used by this package.

Battery Input	CSR1020	CSR1021	CSR1024	CSR1025
Battery Input Power Regulation	Buck-Boost	Buck-Boost	Buck-Boost	Buck-Boost
Battery Level Monitor (V)	**0.9 to 3.6**	**0.9 to 3.6**	**1.4 to 3.6**	**1.4 to 3.6**
Regulated Power Output (mA)	Sufficient	Sufficient	Sufficient	Sufficient
Low Battery Interrupt (Battery Monitor Event to Application)	Yes	Yes	Yes	Yes
Direct Battery Connection	Yes	Yes	Yes	Yes
Battery Charger	No	No	No	No

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Power Management	CSR1020	CSR1021	CSR1024	CSR1025
Power Modes	5	5	5	5
Power Mode: Off	Yes	Yes	Yes	Yes
Power Mode: Dormant	Yes	Yes	Yes	Yes
Power Mode: Hibernate	Yes	Yes	Yes	Yes
Power Mode: Deep Sleep	Yes	Yes	Yes	Yes
Power Mode: Active	Yes	Yes	Yes	Yes
Power On Reset (Low Voltage Detect)	Yes	Yes	Yes	Yes

Software Support	CSR1020	CSR1021	CSR1024	CSR1025
Internal Bluetooth v4.2 / v4.2 Stack (L2CAP, SM, GAP, ATT, GATT)	Yes	Yes	Yes	Yes
Bluetooth Smart Compliant Profiles	In SDK	In SDK	In SDK	In SDK

Ordering Information	CSR1020	CSR1021	CSR1024	CSR1025
Part Number	**CSR1020C04-IQQX-R**	**CSR1021C04-IQQS-R**	**CSR1024C04-ILLP-R**	**CSR1025C04-ILLQ-R**

Example Applications	CSR1020	CSR1021	CSR1024	CSR1025
Document Reference	*CSR µEnergy Mouse Application Note*	*CSR µEnergy Keyboard Application Note*	*CSR µEnergy Activity Monitor Application Note*	*CSR µEnergy Advanced Remote Control Application Note*

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3 Document References

Document	Reference
CSR1020 QFN Data Sheet	CS-303914-DS
CSR1020 QFN Technical Overview	CS-303920-TO
CSR1021 QFN Data Sheet	CS-303917-DS
CSR1021 QFN Technical Overview	CS-303921-TO
CSR1024 LGA Data Sheet	CS-304306-DS
CSR1024 LGA Technical Overview	CS-304305-TO
CSR1025 LGA Data Sheet	CS-303919-DS
CSR1025 LGA Technical Overview	CS-303922-TO
CSR µEnergy Activity Monitor Application Note	TBD
CSR µEnergy Advanced Remote Control Application Note	TBD
CSR µEnergy Keyboard Application Note	CS-228074-AN
CSR µEnergy Mouse Application Note	CS-229634-AN

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Terms and Definitions

Term	Definition
ADC	Analogue to Digital Converter
ATT	ATTribute protocol
Bluetooth®	Set of technologies providing audio and data transfer over short-range radio connections
codec	Coder decoder
CSR	Cambridge Silicon Radio
dBm	Decibels relative to 1 mW
GAP	Generic Access Profile
GATT	Generic ATTribute protocol
I²C	Inter-Integrated Circuit Interface
I²S	Inter-Integrated Circuit Sound
I/O	Input/Output
IC	Integrated Circuit
IR	InfraRed
KB	Kilobyte
L2CAP	Logical Link Control and Adaptation Protocol
LCD	Liquid-Crystal Display
LED	Light-Emitting Diode
MB	MegaByte
MCU	MicroController Unit
MIPS	Million Instructions Per Second
MTP	Multiple-Time Programmable
NVRAM	Non-Volatile Random Access Memory
OTP	One-Time Programmable
PCM	Pulse Code Modulation
PDM	Pulse-Density Modulation
PIO	Programmable Input/Output, also known as general purpose I/O
plc	public limited company
PWM	Pulse Width Modulation
RAM	Random Access Memory
RISC	Reduced Instruction Set Computer
RoHS	Restriction of Hazardous Substances in Electrical and Electronic Equipment Directive (2002/95/EC)

Term	Definition
ROM	Read Only Memory
RSSI	Received Signal Strength Indication
SAR	Successive Approximation Register (ADC)
SDK	Software Development Kit
SIG	(Bluetooth) Special Interest Group
SPI	Serial Peripheral Interface
TBD	To Be Defined
UART	Universal Asynchronous Receiver Transmitter
XTAL	Crystal

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