

SMARTJAC

Identity Everywhere



TECHNICAL BRIEF DIM SERIES® INDUSTRIAL – SJ170

BU: Mobile Operators

Software Features

- Java Card 3.0.1
- 3GPP Release 14
- Global Platform 2.3
- OTA
 - OTA over SMS / AES ciphering
 - OTA over Https / GP2.2 AmdB
 - Over CAT-TP
 - KVN-TAR binding
- Authentication applications
 - 4 logical channels
 - SIM
 - USIM
 - ISIM
- Authentication algorithms
 - Comp128 2&3
 - Milenage
 - TUAK
- Cryptographic features for OTA
 - CRC16, CRC32
 - DES, 3DES, AES 128/256 bits
 - HTTPs OTA
- Java Card™ Cryptographic APIs
 - CRC16, CRC32
 - DES, 3DES, AES
- Low Power Network features
 - Poll Interval Negotiation
 - UICC Suspend & Resume
- User memory
 - 128 kB and above

Hardware Features

- CORTUS APS3cd 32 bits core with Harvard RISC Architecture
- Supply voltages range: Class A,B,C
- Ruggedized Form Factors

M2M Specific Features

- USAT Pairing
- Built-In Self Testing
- Temperature Range
 - Operating -40°C +105°C
- Data Retention
 - Up to 15 years at 85°C
- Extended Lifetime Features 2.0
 - High Endurance: Up to 30Millions Erase/Write cycles
 - On-card & Remote Counters Monitoring/Audit
- ETSI TS 102 671 compliancy
 - MFF2 *: TB-MA-HA-CC-VA-SA-RC-UC
 - 2FF or 3FF or 4FF : TB-HA-CC-RC-UC
 - SIMFIT : TB-HA-CC-RC-UC

* Ordering Information for SJ170 DIM MFF2: 1864809

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Comments	
Supply Voltage	Vcc	4.5	5	5.5	V	Class A	
	Vdd	2.7	3	3.3		Class B	
		1.62	1.8	1.98		Class C	
Supply Current	Icc	10		60	mA	Class A	
		10		50		Class B	
		10		60		Class C	
Supply Current Spikes	Iccs			200 60 60	mA	Class A Q < 40 nAs* Class B Q < 12 nAs Class C Q < 12 nAs *place a capacitor (e.g. 100 nF, ceramic) as close as possible to the contacting elements.	
Idle Current	Icc			200		uA	at 1Mhz and 25° C
CLK signal							
Rise/fall time	tr , tf			9 % of period with a maximum of 0,5 µs		Class A Cout=Cin=30 pF	
				50	ns	Class B Cout=Cin=30 pF	
				50	ns	Class C Cout=Cin=30 pF	
Frequency	fCLK	1		5	MHz		
Duty Cycle		40		60	%		
Output Voltage * To allow for overshoot the	VOH VOL	0.7xVcc 0*		Vcc* 0.5	V	Class A IOHmax = + 20uA IOLmax = -200uA	

Parameter	Symbol	Min.	Typ.	Max.	Unit	Comments
voltage on CLK shall remain between -0,3 V and Vcc + 0,3 V during dynamic operation.	VOH VOL	0.7xVcc 0*		Vcc* 0.2xVcc	V	Class B IOHmax = + 20uA IOLmax = -20uA
	VOH VOL	0.7xVcc 0*		Vcc* 0.2xVcc	V	Class C IOHmax = + 20uA IOLmax = -20uA
RST signal						
Output Voltage * To allow for overshoot, the voltage on RST shall remain between -0,3 V and Vcc + 0,3 V during dynamic operation	VOH VOL	Vcc-0.7 0*		Vcc* 0.6	V	Class A IOHmax = + 20uA IOLmax = -200uA
	VOH VOL	0.8xVcc 0*		Vcc 0.2xVcc	V	Class B IOHmax = + 20uA IOLmax = -200uA
	VOH VOL	0.8xVcc 0*		Vcc 0.2xVcc	V	Class C IOHmax = + 20uA IOLmax = -200uA
Rise/fall time	tr , tf			400	us	Cout=Cin=30 pF
I/O signal						
Rise/fall time	tr , tf			1 100*	us ns	Cout=Cin=30 pF * This value applies when the low impedance buffer is selected
Input Voltage	VIH	0.7xVcc		Vcc + 0.3	V	Class A IIHmax = ±20uA (see Note 2) IILmax = +1mA
	VIL	-0.3		0.15xVcc		
	VIH	0.7xVcc		Vcc + 0.3	V	Class B IIHmax = ±20uA (see Note 2) IILmax = +1mA
	VIL	-0.3		0.2xVcc		
	VIH	0.7xVcc		Vcc + 0.3	V	Class C IIHmax = ±20uA (see Note 2)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Comments
	VIL	-0.3		0.2xVcc		IILmax = +1mA
Output Voltage	VOH (see Note 1)	3.8		Vcc (see Note 3)	V	Class A IOH = + 20 ua
		0.7xVcc		Vcc (see Note 3)	V	Class B IOH = + 20 ua
		0.7xVcc		Vcc (see Note 3)	V	Class C IOH = + 20 ua
	VOL	0 (see Note 3)		0.4 0.4 0.3	V	IOL = -1 mA Class A IOL = -1 mA Class B IOL = -1 mA Class C

NOTE 1: It is assumed that a pull-up resistor is used in the interface device (recommended value: 20 kΩ).

NOTE 2: During static conditions (idle state) only the positive value can apply. Under dynamic operating conditions (transmission) short-term voltage spikes on the I/O line may cause a current reversal.

NOTE 3: To allow for overshoot the voltage on I/O shall remain between -0,3 V and Vcc + 0,3 V during dynamic operation.

Qualification Data

Qualification	Plug Size / Chip Package		ETSI/JEDEC
	MFF2	2FF/ 3FF/ 4FF/SIMFIT	
TEMPERATURE RANGE (OPERATING & STORAGE)	TB	TB	JESD22-A104 TS 102 221
MOISTURE/REFLOW	MA	-	J-STD020
HUMIDITY	HA	HA	JESD22-A101
CORROSION	CC	CC	JESD22-A107
VIBRATION	VA	-	JESD22-B103
SHOCK	SA	-	JESD22-B104
RETENTION TIME (DATA)	RC	RC	TS 102 671
UPDATES (PER MEMORY PAGE)	UC	UC	TS 102 671

Standards reference		
Code	Release	Title
SIM		
GSM 11.12	V5.2.0	Specification of the 3 Volt Subscriber Identity Module - Mobile Equipment (SIM - ME) interface
GSM 11.18	V7.0.1	Specification of the 1.8 Volt Subscriber Identity Module - Mobile Equipment (SIM - ME) interface
3GPP TS 23.048	V5.9.0	Security Mechanisms for the (U)SIM application toolkit; Stage 2
3GPP TS 42.019	V5.1.0	Subscriber Identity Module Application Programming Interface (SIM API); Stage 1
3GPP TS 43.019	V6.0.0	Subscriber Identity Module Application Programming Interface (SIM API); Stage 2
3GPP TS 51.011	V4.15.0	Specification of the Subscriber Identity Module - Mobile Equipment (SIM-ME) interface
3GPP TS 51.013	V14.0.0	Test specification for Subscriber Identity Module (SIM) Application Programming Interface (API) for Java
3GPP TS 51.014	V4.5.0	Specification of the SIM Application Toolkit for the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface
3GPP TS 51.017	V4.2.0	Subscriber Identity Module (SIM) test specification
Security algorithms		
3GPP TS 35.205 3GPP TS 35.206 3GPP TS 35.207 3GPP TS 35.208	V14.0.0	Specification of the MILENAGE algorithm Set
3GPP TS 35.231 3GPP TS 35.232 3GPP TS 35.233	V14.1.0 V14.0.0 V14.0.0	Specification of the TUK algorithm set
3GPP PLATFORM		
3GPP TS 31.048	V5.1.0	Test of (U)SAT security
3GPP TS 21.111	V14.1.0	USIM and IC card requirements
3GPP TS 22.038	V14.0.0	USIM Application Toolkit (USAT) - Stage 1
3GPP TS 23.040	V14.0.0	Technical realization of the Short Message Service (SMS)
3GPP TS 23.041	V 14.2..0	Technical realization of Cell Broadcast Service (CBS)
3GPP TS 31.101	V14.2.0	UICC-terminal interface; Physical and logical characteristics

3GPP TS 31.102	V 14.8.0	Characteristics of the Universal Subscriber Identity Module (USIM) application
3GPP TS 31.103	V14.6.0	Characteristics of the IP Multimedia Services Identity Module (ISIM) application
3GPP TS 31.111	V14.8..0	Universal Subscriber Identity Module (USIM) Application Toolkit (USAT)
3GPP TS 31.115	V14.0.0	Secured packet structure for (Universal) Subscriber Identity Module (U)SIM Toolkit applications
3GPP TS 31.116	V14.0.0	Remote APDU Structure for (U)SIM Toolkit applications
3GPP TS 31.122	V14.1.0	Universal subscribers Identity module (USIM) Conformance test specification
3GPP TS 31.130	V14.2.1	The USIM API for Java Card™
3GPP TS 31.133	V14.1.1	Application Programming Interface (API); ISIM API for Java™ Card
3GPP TS 31.213	V14.0.0	API for JAVA Card
3GPP TR 31.900	V14.0.0	SIM/USIM internal and external Inter-working Aspects
3GPP TR 31.919	V8.0.0	2G/3G Java Card™ API based applet interworking
3GPP TS 33.102	V14.1.0	3G Security; Security architecture
3GPP TS 33.105	V14.0.0	Cryptographic algorithm requirements
3GPP TS 33.203	V13.0.0	Access security for IP-based services
3GPP TS 33.220	V13.0.0	Generic AKA bootstrapping function and the detailed procedure how to bootstrap the credential specified
3GPP TS 33.401	V14.6.0	3GPP System Architecture Evolution (SAE); Security architecture
3GPP TS 55.205	V14.0.0	Technical Specification Group Services and System Aspects; Specification of the GSM-MILENAGE Algorithms: An example algorithm set for the GSM Authentication and Key Generation functions A3 and A8
ETSI PLATFORM		
ETSI TS 101 220	V14.0.0	Integrated Circuit Cards (ICC); ETSI numbering system for telecommunication application providers
ETSI TS 102 124	V6.1.0	Transport protocol for CAT applications; Stage 1
ETSI TS 102 127	V14.0.0	Transport protocol for CAT applications; Stage 2
ETSI TS 102 151	V6.0.0	Measurement of Electromagnetic Emission of SIM cards
ETSI TS 102 221	V14.2.0	Smart Cards; UICC-Terminal interface; Physical and logical characteristics
ETSI TS 102 222	V14.0.0	Administrative commands

ETSI TS 102 223	V14.3.0	Smart cards; Card Application Toolkit (CAT)
ETSI TS 102 224	V14.0.0	Smart Cards; UICC-Terminal interface; Physical and logical characteristics
ETSI TS 102 225	V14.0..0	Smart cards; Secured packet structure for UICC based applications
ETSI TS 102 226	V14.0.0	Smart cards; Remote APDU Structure for UICC based Applications
ETSI TS 102 240	V11.1.0	UICC Application Programming Interface & Loader Requirements
ETSI TS 102 241	V14.2.0	UICC Application Programming Interface (UICC API) for Java Card™
ETSI TS 102 268	V7.0.0	Test specification for UICC Application Programming Interface (API) for Java Card
ETSI TS 102 310	V9.1.0	EAP using UICC
ETSI TS 102 412	V14.0.0	Smart Card Platform Requirements
GLOBAL PLATFORM		
GP 2.3	V2.3	Global Platform Card Specification
	V1.0.1	Mapping Guideline
	V1.1.3	Global Platform RAM over HTTPS- Amendment B
JAVA CARD		
Java Card Platform	3.0.1	Java Card Runtime Environment, Virtual Machine and API
ID MFF2		
FQR 200 1207 Ed3	Revision 3	Recommendations for PCB Assembly of DIM QFN Package



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