INTEGRATED CIRCUITS, SILICON MONOLITHIC, CMOS, LOW POWER, 8-BIT AVR® MICROCONTROLLER

BASED ON TYPE ATmegaS64M1

ESCC Detail Specification No. 9521/004

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DOCUMENTATION CHANGE NOTICE

(Refer to https://escies.org for ESCC DCR content)

DCR No.	CHANGE DESCRIPTION

TABLE OF CONTENTS

1 GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics and test and inspection data for the component type variants and/or the range of components specified below. It supplements the requirements of, and shall be read in conjunction with, the ESCC Generic Specification listed under Applicable Documents.

1.2 APPLICABLE DOCUMENTS

The following documents form part of this specification and shall be read in conjunction with it:

(a) ESCC Generic Specification No. 9000.

(b) MIL-STD-883, Test Method Standard for Microcircuits.

1.3 TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESCC Basic Specification No. 21300 shall apply.

1.4 THE ESCC COMPONENT NUMBER AND COMPONENT TYPE VARIANTS

1.4.1 The ESCC Component Number

The ESCC Component Number shall be constituted as follows:

Example: 952100401E

- Detail Specification Reference: 9521004
- Component Type Variant Number: 01
- Total Dose Radiation Level Letter: E (as required)

1.4.2 Component Type Variants

The component type variants applicable to this specification are as follows:

Variant Number	Based on Type	Case	Terminal Material and Finish	Weight max g	Total Dose Radiation Level Letter (Notes 2, 3)
01	ATmegaS64M1	CQFP-32	D2 (Note 1)	1.5	E [20krad(Si)]

NOTES:

1. The terminal material and finish shall be in accordance with the requirements of ESCC Basic Specification No. 23500.
2. Total dose radiation level letters are defined in ESCC Basic Specification No. 22900. If an alternative radiation test level is specified in the Purchase Order the letter shall be changed accordingly.
3. The Total Dose Radiation Level Letter (E) is guaranteed for read-mode only, with no write operation in FLASH or EEPROM memory.

1.5 MAXIMUM RATINGS

The maximum ratings shall not be exceeded at any time during use or storage. Functional performance for extended periods at the maximum ratings may adversely affect device reliability.

Maximum ratings shall only be exceeded during testing to the extent specified in this specification and when stipulated in the Test Methods and Procedures of the applicable ESCC generic specification.

Characteristics	Symbols	Maximum Ratings	Units	Remarks
Supply Voltage	V_{CC}	-0.5 to 4	V	Notes 1, 2
Input Voltage Range (except $\overline{RESET}$ (PE0 pin))	V_{IN}	-0.5 to V_{CC}+0.5	V	Note 2
Input Voltage Range ($\overline{RESET}$ (PE0 pin))	$V_{IN(reset)}$	-0.5 to 13	V	Note 2
Output Voltage Range (all Outputs)	V_{OUT}	-0.5 to V_{CC}+0.3	V	Note 2
DC Current per pin: I/Os V_{CC} V_{SS}	I_{DD}	 40 200 400	mA	
Operating Temperature Range	T_{op}	-55 to +125	°C	Note 1 T_{amb}
Storage Temperature Range	T_{stg}	-65 to +150	°C	
Junction Temperature	T_j	+175	°C	
Thermal Resistance, Junction-to-Case	$R_{th(j-c)}$	8	°C/W	
Soldering Temperature	T_{sol}	+345	°C	Note 3

NOTES:

1. The following operating conditions also apply. Device performance beyond these operating conditions is not guaranteed:

Characteristics	Symbols	Maximum Rated Operating Conditions	Units	Remarks
Supply Voltage	V_{CC}	3 to 3.6	V	Note 2
Analog Supply Voltage Range	AV_{CC}	V_{CC}-0.3 to V_{CC}+0.3	V	Note 2
Operating Temperature Range	T_{op}	As per Maximum Ratings table		T_{amb}

2. With reference to V_{SS} = 0V.
3. Duration 10 seconds maximum at a distance of not less than 1.6 mm from the device body and the same terminal shall not be re-soldered until 3 minutes have elapsed.

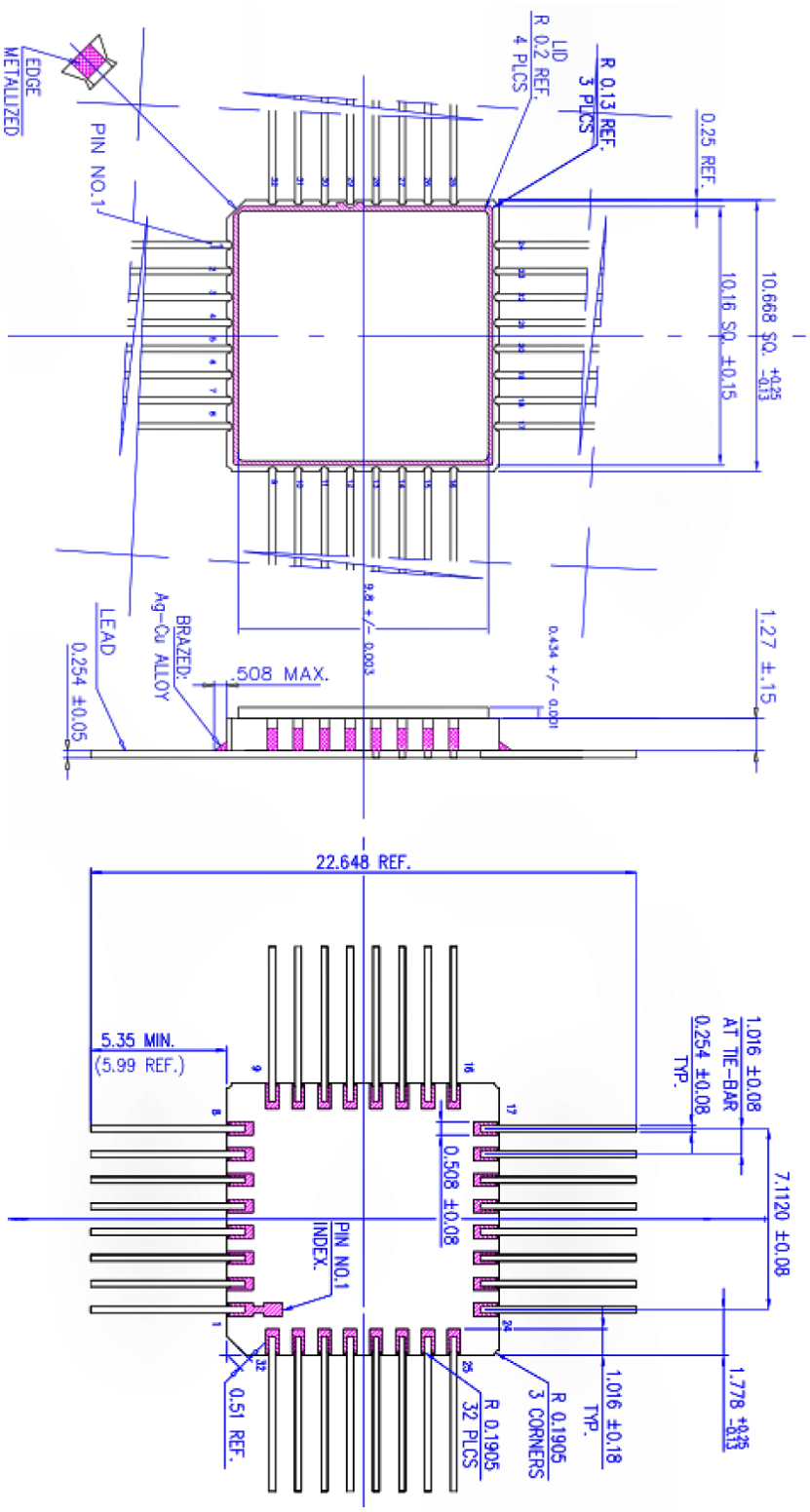
1.6 HANDLING PRECAUTIONS

These devices are susceptible to damage by electrostatic discharge. Therefore, suitable precautions shall be employed for protection during all phases of manufacture, testing, packaging, shipment and any handling.

These components are categorised as Class 2 per ESCC Basic Specification No. 23800 with a Minimum Critical Path Failure Voltage of 2000 Volts.

1.7 PHYSICAL DIMENSIONS AND TERMINAL IDENTIFICATION

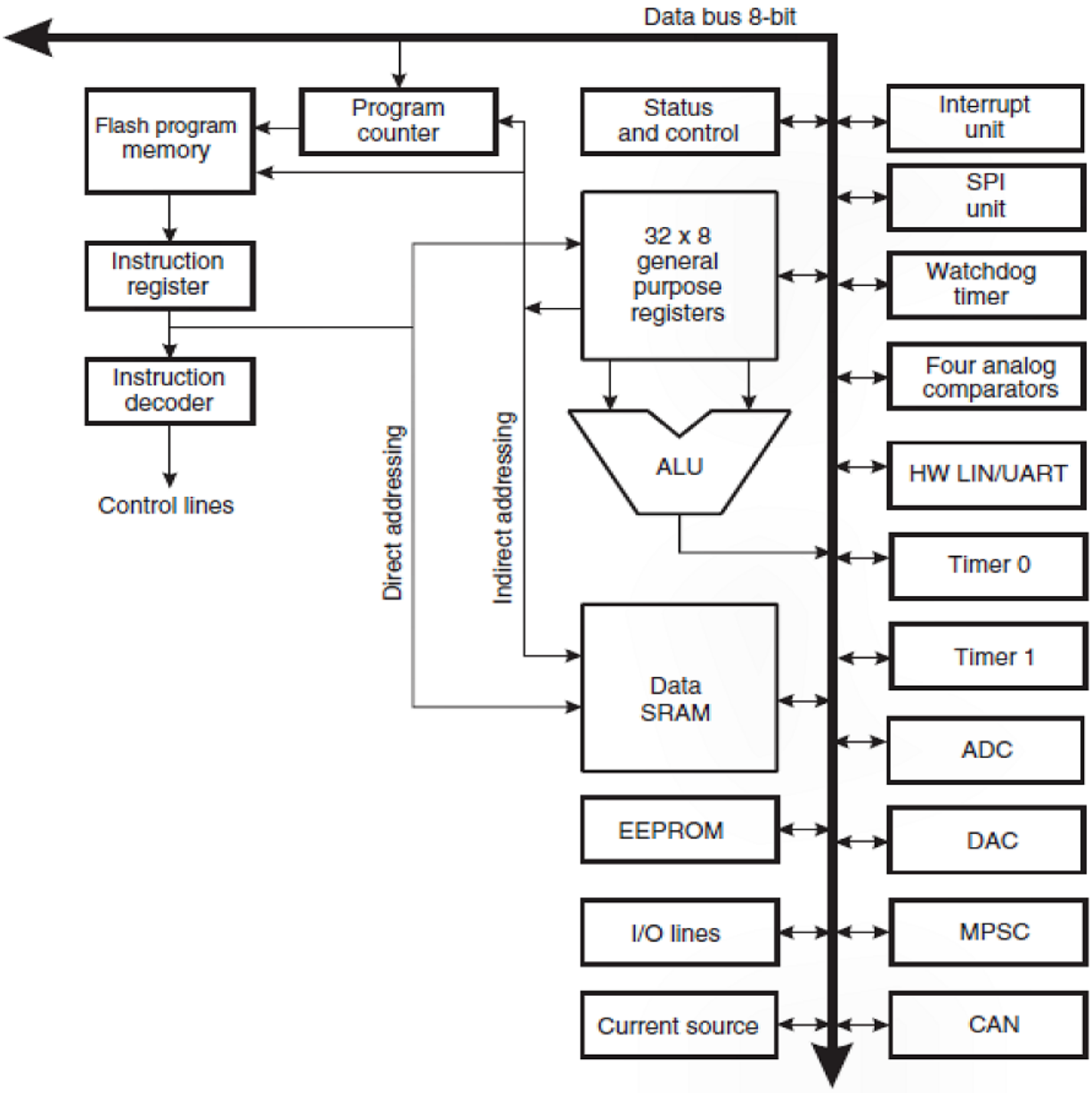
Ceramic Quad Flat Package (CQFP-32) – 32 Leads
(all dimensions are in mm)



NOTES:

1. Terminal identification is specified by reference to the index corner and mark as shown.
2. The lid is connected to ground.

1.8 FUNCTIONAL DIAGRAM



1.9 PIN ASSIGNMENT

Pin	Name	Type
1	PD2/PCINT18/PSCIN2/OCI1A/MISO_A	I/O
2	PD3/PCINT19/TXD/TXLIN/OC0A/SS/MOSI_A	I/O
3	PC1/PCINT9/PSCIN1/OC1B/SS_A	I/O
4	VCC	V_{CC}
5	GND	GND
6	PC2/PCINT10/T0/TXCAN	I/O
7	PC3/PCINT11/T1/RXCAN/ICP1B	I/O
8	PB0/PCINT0/MISO/PSCOUT2A	I/O
9	PB1/PCINT1/MOSI/PSCOUT2B	I/O
10	PE1/PCINT25/OC0B/XTAL1	I/O
11	PE2/PCINT26/ADC0/XTAL2	I/O
12	PD4/PCINT20/ADC1/RXD/RXLIN/ICP1A/SCK_A	I/O
13	PD5/ADC2/ACMP2/PCINT21	I/O
14	PD6/ADC3/ACMPN2/INT0/PCINT22	I/O
15	PD7/ACMP0/PCINT23	I/O
16	PB2/ADC5/INT1/ACMPN0/PCINT2	I/O
17	PC4/ADC8/ACMPN3/AMP1-/PCINT12	I/O
18	PC5/ADC9/ACMP3/AMP1+/PCINT13	I/O
19	AVCC	AV_{CC}
20	AGND	AGND
21	AREF	I/O
22	PC6/ADC10/ACMP1/PCINT14	I/O
23	PB3/AMP0-/PCINT3	I/O
24	PB4/AMP0+/PCINT4	I/O
25	PC7/D2A/AMP2+/PCINT15	I/O
26	PB5/ADC6/INT2/ACMPN1/AMP2-/PCINT5	I/O
27	PB6/ADC7/PSCOUT1B/PCINT6	I/O
28	PB7/ADC4/PSCOUT0B/SCK/PCINT7	I/O
29	PD0/PCINT16/PSCOUT0A	I/O
30	PC0/PCINT8/INT3/PSCOUT1A	I/O
31	PE0/PCINT24/RESET/OCD	I/O
32	PD1/PCINT17/PSCIN0/CLKO	I/O

Pin Number	Main Function	Alternate Functions
1	PD2 Bit Number 3 of Port D (an 8-bit bi-directional I/O port) with internal pull-up resistor.	PCINT18 (Pin Change Interrupt 18) PSCIN2 (PSC Digital Input 2) OCI1A (Timer 1 Output Compare A) MISO_A (Programming & Alternate SPI Master In Slave Out)
2	PD3 Bit Number 4 of Port D (an 8-bit bi-directional I/O port) with internal pull-up resistor.	PCINT19 (Pin Change Interrupt 19) TXD (UART T_X data) TXLIN (LIN Transmit Output) OC0A (Timer 0 Output Compare A) SS (SPI Slave Select) MOSI_A (Programming & Alternate Master Out SPI Slave In)
3	PC1 Bit Number 2 of Port C (an 8-bit bi-directional I/O port) with internal pull-up resistor.	PCINT9 (Pin Change Interrupt 9) PSCIN1 (PSC Digital Input 1) OC1B (Timer 1 Output Compare B) SS_A (Alternate SPI Slave Select)
4	Power Supply	-
5	Ground (0V reference)	-
6	PC2 Bit Number 3 of Port C (an 8-bit bi-directional I/O port) with internal pull-up resistor.	PCINT10 (Pin Change Interrupt 10) T0 (Timer 0 Clock Input) TXCAN (CAN Transmit Output)
7	PC3 Bit Number 4 of Port C (an 8-bit bi-directional I/O port) with internal pull-up resistor.	PCINT11 (Pin Change Interrupt 11) T1 (Timer 0 Clock Input) RXCAN (CAN Receive Input) ICP1B (Timer 1 Input Capture Alternate B Input)
8	PB0 Bit Number 1 of Port B (an 8-bit bi-directional I/O port) with internal pull-up resistor.	PCINT0 (Pin Change Interrupt 0) MISO (SPI Master In Slave Out) PSCOUT2A (PSC Module 2 Output A)
9	PB1 Bit Number 2 of Port B (an 8-bit bi-directional I/O port) with internal pull-up resistor.	PCINT1 (Pin Change Interrupt 1) MOSI (SPI Master Out Slave In) PSCOUT2B (PSC Module 2 Output B)
10	PE1 Bit Number 2 of Port E (a 3-bit bi-directional I/O port) with internal pull-up resistor.	PCINT25 (Pin Change Interrupt 25) OC0B (Timer 0 Output Compare B) XTAL1 (XTAL Input)
11	PE2 Bit Number 3 of Port E (a 3-bit bi-directional I/O port) with internal pull-up resistor.	PCINT26 (Pin Change Interrupt 26) ADC0 (Analog Input Channel 0) XTAL2 (XTAL Output)
12	PD4 Bit Number 5 of Port D (an 8-bit bi-directional I/O port) with internal pull-up resistor.	PCINT20 (Pin Change Interrupt 20) ADC1 (Analog Input Channel 1) RXD (UART R_X Data) RXLIN (LIN Receive Input) ICP1A (Timer 1 Input Capture Alternate A Input) SCK_A (Programming & Alternate SPI Clock)

Pin Number	Main Function	Alternate Functions
13	PD5 Bit Number 6 of Port D (an 8-bit bi-directional I/O port) with internal pull-up resistor.	ADC2 (Analog Input Channel 2) ACMP2 (Analog Comparator 2 Positive Input) PCINT21 (Pin Change Interrupt 21)
14	PD6 Bit Number 7 of Port D (an 8-bit bi-directional I/O port) with internal pull-up resistor.	ADC3 (Analog Input Channel 3) ACMPN2 (Analog Comparator 2 Negative Input) INT0 (External Interrupt 0 Input) PCINT22 (Pin Change Interrupt 22)
15	PD7 Bit Number 8 of Port D (an 8-bit bi-directional I/O port) with internal pull-up resistor.	ACMP0 (Analog Comparator 0 Positive Input) PCINT23 (Pin Change Interrupt 23)
16	PB2 Bit Number 3 of Port B (an 8-bit bi-directional I/O port) with internal pull-up resistor.	ADC5 (Analog Input Channel 5) INT1 (External Interrupt 1 Input) ACMPN0 (Analog Comparator 0 Negative Input) PCINT2 (Pin Change Interrupt 2)
17	PC4 Bit Number 5 of Port C (an 8-bit bi-directional I/O port) with internal pull-up resistor.	ADC8 (Analog Input Channel 8) ACMPN3 (Analog Comparator 3 Negative Input) AMP1- (Analog Differential Amplifier 1 Negative Input) PCINT12 (Pin Change Interrupt 12)
18	PC5 Bit Number 6 of Port C (an 8-bit bi-directional I/O port) with internal pull-up resistor.	ADC9 (Analog Input Channel 9) ACMP3 (Analog Comparator 3 Positive Input) AMP1+ (Analog Differential Amplifier 1 Positive Input) PCINT13 (Pin Change Interrupt 13)
19	Analog Power Supply (this pin must be connected for normal operation of the analog part of the ATmegaS64M1)	-
20	Analog Ground (0V reference for the analog part of the ATmegaS64M1)	-
21	Analog Reference (this is the reference voltage of the A/D converter. As output, can be used by external analog ISRC (Current Source Output))	-
22	PC6 Bit Number 7 of Port C (an 8-bit bi-directional I/O port) with internal pull-up resistor.	ADC10 (Analog Input Channel 10) ACMP1 (Analog Comparator 1 Positive Input) PCINT14 (Pin Change Interrupt 14)
23	PB3 Bit Number 4 of Port B (an 8-bit bi-directional I/O port) with internal pull-up resistor.	AMP0- (Analog Differential Amplifier 0 Negative Input) PCINT3 (Pin Change Interrupt 3)
24	PB4 Bit Number 5 of Port B (an 8-bit bi-directional I/O port) with internal pull-up resistor.	AMP0+ (Analog Differential Amplifier 0 Positive Input) PCINT4 (Pin Change Interrupt 4)
25	PC7 Bit Number 8 of Port C (an 8-bit bi-directional I/O port) with internal pull-up resistor.	D2A (DAC Output) AMP2+ (Analog Differential Amplifier 2 Positive Input) PCINT15 (Pin Change Interrupt 15)

Pin Number	Main Function	Alternate Functions
26	PB5 Bit Number 6 of Port B (an 8-bit bi-directional I/O port) with internal pull-up resistor.	ADC6 (Analog Input Channel 6) INT2 (External Interrupt 2 Input) ACMPN1 (Analog Comparator 1 Negative Input) AMP2- (Analog Differential Amplifier 2 Negative Input) PCINT5 (Pin Change Interrupt 5)
27	PB6 Bit Number 7 of Port B (an 8-bit bi-directional I/O port) with internal pull-up resistor.	ADC7 (Analog Input Channel 7) PSCOUT1B (PSC Module 1 Output A) PCINT6 (Pin Change Interrupt 6)
28	PB7 Bit Number 8 of Port B (an 8-bit bi-directional I/O port) with internal pull-up resistor.	ADC4 (Analog Input Channel 4) PSCOUT0B (PSC Module 0 Output B) SCK (SPI Clock) PCINT7 (Pin Change Interrupt 7)
29	PD0 Bit Number 1 of Port D (an 8-bit bi-directional I/O port) with internal pull-up resistor.	PCINT16 (Pin Change Interrupt 16) PSCOUT0A
30	PC0 Bit Number 1 of Port C (an 8-bit bi-directional I/O port) with internal pull-up resistor.	PCINT8 (Pin Change Interrupt 8) INT3 (External Interrupt 3 Input) PSCOUT1A
31	PE0 Bit Number 1 of Port E (a 3-bit bi-directional I/O port) with internal pull-up resistor.	PCINT24 (Pin Change Interrupt 24) RESET (Reset Input) OCD (On-Chip Debug I/O)
32	PD1 Bit Number 2 of Port D (an 8-bit bi-directional I/O port) with internal pull-up resistor.	PCINT17 (Pin Change Interrupt 17) PSCIN0 (PSC Digital Input 0) CLKO (System Clock Output)

1.10 PROTECTION NETWORK

Pads are protected with standard I/O protection, wafer manufacturer proprietary and confidential.

2 REQUIREMENTS

2.1 GENERAL

The complete requirements for procurement of the components specified herein are as stated in this specification and the ESCC Generic Specification. Permitted deviations from the Generic Specification, applicable to this specification only, are listed below.

Permitted deviations from the Generic Specification and this Detail Specification, formally agreed with specific manufacturers on the basis that the alternative requirements are equivalent to the ESCC requirements and do not affect the component's reliability, are listed in the appendices attached to this specification.

2.1.1 Deviations from the Generic Specification

2.1.1.1 Deviations from Screening Tests for Packaged Components – Chart F3A

High Temperature Reverse Bias Burn-in shall not be performed.

2.2 MARKING

The marking shall be in accordance with the requirements of ESCC Basic Specification No. 21700 and as follows.

The information to be marked on the component shall be:

(a) Terminal identification (see Para. 1.7).
(b) The ESCC qualified components symbol (for ESCC qualified component only).
(c) The ESCC Component Number (see Para. 1.4.1).
(d) Traceability information.

2.3 ELECTRICAL MEASUREMENTS AT ROOM, HIGH AND LOW TEMPERATURES

Electrical measurements shall be performed at room, high and low temperatures.

2.3.1 Room Temperature Electrical Measurements

The measurements shall be performed at T_{case} = +25 (+3 -5)°C.

Characteristics	Symbols	MIL-STD-883 Test Method	Test Conditions 3V < V_{CC} < 3.6V (Notes 1, 2)	Limits		Units
				Min	Max	
Functional Tests	-	3014	Self-tests	-	-	-
High Level Input Voltage	V_{IH1}	-	Port pins B, C, D and I/O pins XTAL1, XTAL2	0.6×V_{CC} (Note 3)	V_{CC}+0.5	V
	V_{IH2}		XTAL1 pin with external clock selected	0.7×V_{CC} (Note 3)	V_{CC}+0.5	
	V_{IH3}		RESET pin	0.9×V_{CC} (Note 3)	V_{CC}+0.5	
	V_{IH4}		I/O pin RESET	0.8×V_{CC} (Note 3)	V_{CC}+0.5	
Low Level Input Voltage	V_{IL1}	-	Port pins B, C, D and I/O pins XTAL1, XTAL2	-0.5	0.2×V_{CC} (Note 4)	V
	V_{IL2}		XTAL1 pin with external clock selected	-0.5	0.1×V_{CC} (Note 4)	
	V_{IL3}		RESET pin	-0.5	0.2×V_{CC} (Note 4)	
	V_{IL4}		I/O pin RESET	-0.5	0.2×V_{CC} (Note 4)	
Low Level Output Voltage	V_{OL1}	3007	V_{CC} = 3V I_{OL} = 6mA Port pins B, C, D and I/O pins XTAL1, XTAL2	-	0.5	V
	V_{OL2}		V_{CC} = 3V I_{OL} = 0.8mA I/O pin RESET	-	0.7	

Characteristics	Symbols	MIL-STD-883 Test Method	Test Conditions $3V < V_{CC} < 3.6V$ (Notes 1, 2)	Limits		Units
				Min	Max	
High Level Output Voltage	V_{OH1}	3006	V_{CC} = 3V I_{OH} = -8mA Port pins B, C, D and I/O pins XTAL1, XTAL2	2.2	-	V
	V_{OH2}		V_{CC} = 3V I_{OH} = -0.4mA I/O pin RESET	2.2	-	
Low Level Input Current	I_{IL}	3009	$V_{CC} = V_{CCmax}$ $V_{IN} = V_{SS}$	-1	1	µA
High Level Input Current	I_{IH}	3010	$V_{IN} = V_{CC} = V_{CCmax}$	-1	1	µA
Reset Pull-up Resistor Resistance Value	R_{RST}	3002	$V_{CC} = V_{CCmax}$	30	200	kΩ
I/O Pin Pull-up Resistor Resistance Value	R_{PU}	3002	$V_{CC} = V_{CCmax}$	20	50	kΩ
Dynamic Operating Current	I_{CCOP}	3005	V_{CC} = 3.6V, f = 8MHz	-	29	mA
Idle Supply Current	I_{CCIDLE}	3005	V_{CC} = 3.6V, f = 8MHz	-	29	mA
Power-down Supply Current (Note 5)	I_{CCPD}	3005	V_{CC} = 3.6V, Watchdog Timer enabled	-	80	µA
			V_{CC} = 3.6V, Watchdog Timer disabled	-	80	
Oscillator Frequency after calibration	f_{AC}	-	V_{CC} = 3.3V	7.76	8.24	MHz

NOTES:

1. Unless otherwise specified, all inputs and outputs shall be tested for each characteristic. Inputs not under test shall be $V_{IN} = V_{SS}$ or V_{CC} and outputs not under test shall be open. V_{SS} = 0V.
2. Unless otherwise specified, output load = 70pF.
3. The specified limit is the lowest value where the pin is guaranteed to be read as High.
4. The specified limit is the highest value where the pin is guaranteed to be read as Low.
5. Minimum V_{CC} for power-down is 2.5V.

2.3.2 High and Low Temperatures Electrical Measurements

The measurements shall be performed at T_{case} = +125 ±3°C and T_{case} = -55 ±3°C.

The characteristics, test methods, conditions and limits shall be as specified in Para. 2.3.1, Room Temperature Electrical Measurements.

2.4 PARAMETER DRIFT VALUES

Unless otherwise specified, the measurements shall be performed at T_{case} = +25 ±3°C.

The test methods and test conditions shall be as per the corresponding test defined in Para. 2.3.1, Room Temperature Electrical Measurements.

The drift values (Δ) shall not be exceeded for each characteristic specified. The corresponding absolute limit values for each characteristic shall not be exceeded.

Characteristics	Symbols	Limits			Units
		Drift Value Δ	Absolute		
			Min	Max	
Low Level Output Voltage	V_{OL1}	±0.1	-	0.5	V
	V_{OL2}	±0.1	-	0.7	
High Level Output Voltage	V_{OH1}	±0.1	2.2	-	V
	V_{OH2}	±0.1	2.2	-	
Low Level Input Current	I_{IL}	±0.1	-1	1	µA
High Level Input Current	I_{IH}	±0.1	-1	1	µA
Dynamic Operating Current	I_{CCOP}	+2.9	-	29	mA
Idle Supply Current	I_{CCIDLE}	+2.9	-	29	mA
Power-down Supply Current (Note 5 of Para. 2.3.1)	I_{CCPD}	+8	-	80	µA

2.5 INTERMEDIATE AND END-POINT ELECTRICAL MEASUREMENTS

Unless otherwise specified, the measurements shall be performed at T_{case} = +25 ±3°C.

The characteristics, test methods, conditions and limits shall be the same as specified in Para. 2.3.1, Room Temperature Electrical Measurements.

2.6 POWER BURN-IN CONDITIONS

Prior to submitting the parts to Burn-In or Operating Life, a specific application is loaded in the Flash memory. This application automatically starts after the RESET pin is released. The correct behaviour of the device can be monitored with an on-board LED.

Characteristics (Note 1)	Symbols	Test Conditions	Units
Ambient Temperature	T_{amb}	+125(+8 -0)	°C
Operating Frequency (Note 2)	f_{op}	8	MHz
Supply Voltage	V_{CC}	3.6	V

NOTES:

1. Pin connections shall be as follows, with NC = Not Connected:

Pin	Name	Serial R	Wired To
1	PD2/PCINT18/PSCIN2/OCI1A/MISO_A	20 kΩ	Ground
2	PD3/PCINT19/TXD/TXLIN/OC0A/SS/MOSI_A	-	LED control
3	PC1/PCINT9/PSCIN1/OC1B/SS_A	20 kΩ	Ground
4	VCC	-	V_{CC}
5	GND	-	Ground
6	PC2/PCINT10/T0/TXCAN	20 kΩ	Ground
7	PC3/PCINT11/T1/RXCAN/ICP1B	20 kΩ	Ground
8	PB0/PCINT0/MISO/PSCOUT2A	20 kΩ	Ground
9	PB1/PCINT1/MOSI/PSCOUT2B	20 kΩ	Ground
10	PE1/PCINT25/OC0B/XTAL1	1 kΩ	1.65 MHz
11	PE2/PCINT26/ADC0/XTAL2	20 kΩ	Ground
12	PD4/PCINT20/ADC1/RXD/RXLIN/ICP1A/SCK_A	20 kΩ	Ground
13	PD5/ADC2/ACMP2/PCINT21	-	NC
14	PD6/ADC3/ACMPN2/INT0/PCINT22	20 kΩ	Ground
15	PD7/ACMP0/PCINT23	-	NC
16	PB2/ADC5/INT1/ACMPN0/PCINT2	20 kΩ	Ground
17	PC4/ADC8/ACMPN3/AMP1-/PCINT12	20 kΩ	Ground
18	PC5/ADC9/ACMP3/AMP1+/PCINT13	20 kΩ	Ground
19	AVCC	-	V_{CC}
20	AGND	-	Ground
21	AREF	-	Ground
22	PC6/ADC10/ACMP1/PCINT14	20 kΩ	Ground
23	PB3/AMP0-/PCINT3	20 kΩ	Ground
24	PB4/AMP0+/PCINT4	20 kΩ	Ground
25	PC7/D2A/AMP2+/PCINT15	20 kΩ	Ground
26	PB5/ADC6/INT2/ACMPN1/AMP2-/PCINT5	20 kΩ	Ground
27	PB6/ADC7/PSCOUT1B/PCINT6	20 kΩ	Ground

Pin	Name	Serial R	Wired To
28	PB7/ADC4/PSCOUT0B/SCK/PCINT7	20 kΩ	Ground
29	PD0/PCINT16/PSCOUT0A	20 kΩ	Ground
30	PC0/PCINT8/INT3/PSCOUT1A	20 kΩ	Ground
31	PE0/PCINT24/RESET/OCD	-	NC
32	PD1/PCINT17/PSCIN0/CLKO	20 kΩ	Ground

2. Running self-tests.

2.7 OPERATING LIFE CONDITIONS

The conditions shall be as specified in Para. 2.6, Power Burn-in Conditions.

2.8 TOTAL DOSE IRRADIATION TESTING

2.8.1 Bias Conditions and Total Dose Level for Total Dose Radiation Testing

Irradiation testing shall be carried out in dose rate Window 2 ("Low Rate"): 36 to 360 rad(Si)/hour, as defined in ESCC Basic Specification No. 22900.

Continuous bias shall be applied during irradiation testing as specified below.

The total dose level applied shall be as specified in Para. 1.4.2 or in the Purchase Order.

Characteristics (Note 1)	Symbols	Test Conditions	Units
Ambient Temperature	T_{amb}	+22±3	°C
Supply Voltage	V_{CC}	3.6	V

NOTES:

1. Pin connections shall be as follows, with NC = Not Connected:

Pin	Name	Serial R	Wired To
1	PD2/PCINT18/PSCIN2/OCI1A/MISO_A	10 kΩ	Ground
2	PD3/PCINT19/TXD/TXLIN/OC0A/SS/MOSI_A	10 kΩ	Ground
3	PC1/PCINT9/PSCIN1/OC1B/SS_A	10 kΩ	Ground
4	VCC	-	V_{CC}
5	GND	-	Ground
6	PC2/PCINT10/T0/TXCAN	10 kΩ	Ground
7	PC3/PCINT11/T1/RXCAN/ICP1B	10 kΩ	Ground
8	PB0/PCINT0/MISO/PSCOUT2A	10 kΩ	Ground
9	PB1/PCINT1/MOSI/PSCOUT2B	10 kΩ	Ground
10	PE1/PCINT25/OC0B/XTAL1	10 kΩ	Ground
11	PE2/PCINT26/ADC0/XTAL2	10 kΩ	Ground
12	PD4/PCINT20/ADC1/RXD/RXLIN/ICP1A/SCK_A	10 kΩ	Ground
13	PD5/ADC2/ACMP2/PCINT21	10 kΩ	Ground
14	PD6/ADC3/ACMPN2/INT0/PCINT22	10 kΩ	Ground

Pin	Name	Serial R	Wired To
15	PD7/ACMP0/PCINT23	10 kΩ	Ground
16	PB2/ADC5/INT1/ACMPN0/PCINT2	10 kΩ	Ground
17	PC4/ADC8/ACMPN3/AMP1-/PCINT12	10 kΩ	Ground
18	PC5/ADC9/ACMP3/AMP1+/PCINT13	10 kΩ	Ground
19	AVCC	-	V_{CC}
20	AGND	-	Ground
21	AREF	10 kΩ	Ground
22	PC6/ADC10/ACMP1/PCINT14	10 kΩ	Ground
23	PB3/AMP0-/PCINT3	10 kΩ	Ground
24	PB4/AMP0+/PCINT4	10 kΩ	Ground
25	PC7/D2A/AMP2+/PCINT15	10 kΩ	Ground
26	PB5/ADC6/INT2/ACMPN1/AMP2-/PCINT5	10 kΩ	Ground
27	PB6/ADC7/PSCOUT1B/PCINT6	10 kΩ	Ground
28	PB7/ADC4/PSCOUT0B/SCK/PCINT7	10 kΩ	Ground
29	PD0/PCINT16/PSCOUT0A	10 kΩ	Ground
30	PC0/PCINT8/INT3/PSCOUT1A	10 kΩ	Ground
31	PE0/PCINT24/RESET/OCD	10 kΩ	Ground
32	PD1/PCINT17/PSCIN0/CLKO	10 kΩ	Ground

2.8.2 Electrical Measurements for Total Dose Radiation Testing

Prior to, during and on completion of irradiation testing the devices shall have successfully met the Room Temperature Electrical Measurements specified in Para. 2.3.1.

Unless otherwise stated the measurements shall be performed at T_{case} = +25 ±3°C.

For initial measurements, the characteristics, test methods, conditions and limits shall be as per the corresponding test defined in Para. 2.3.1, Room Temperature Electrical Measurements.

For intermediate and final measurements, the characteristics, test methods, conditions and limits shall be as per the corresponding test defined in Para. 2.3.1, Room Temperature Electrical Measurements except as shown below:

Characteristics	Symbols	MIL-STD-883 Test Method	Test Conditions 3V < V_{CC} < 3.6V (Notes 1, 2)	Limits		Units
				Min	Max	
Power-down Supply Current (Note 5 of Para. 2.3.1)	I_{CCPD}	3005	V_{CC} = 3.6V, Watchdog Timer enabled	-	2	mA
			V_{CC} = 3.6V, Watchdog Timer disabled	-	2	

APPENDIX A

AGREED DEVIATIONS FOR MICROCHIP (F)

ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS
Para. 2.8.1, Bias Conditions and Total Dose Level for Total Dose Radiation Testing	The maximum total dose radiation exposure level applicable to the total dose radiation test shall be 30krad(Si) or as stipulated in the Purchase Order. **NOTE:** The total dose radiation level letter (E) shall remain unchanged (see Para. 1.4.2) unless an alternative radiation test level has been stipulated in the Purchase Order.