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SUBJECT Thema	Generic ISM Module with integral antenna	PAGE Seite	1 of 16
CUSTOMER'S CODE PAN3550	PANASONIC CODE N/A	DATE Datum	31.07.2006

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1. KEY FEATURES

Schlüsseigenschaften

- Module including CC1100-RF-Transceiver and HC9S08GT32 Microcontroller
- 300-1000 MHz Frequency Range
- up to 10 dBm Output Power (programmable)
- Data rate up to 500 kbps
- 32K Flash Memory and 2K RAM
- in total 14 GPIOs, configurable as special function pin
- 4 10-bit AD Ports with externally accessible reference inputs
- 3 Keyboard interrupt pins
- 2 UARTs
- 1 I²C-Bus
- internal antenna for 868 MHz
- Wide Supply voltage range of 1.8 – 3.6 V
- Software configurable processor clock from 135 kHz to 26 MHz

2. APPLICATIONS FOR THE MODULE

Anwendungen für das Modul

All kinds of wireless applications, as for example:

- Wireless sensor and actor networks
- Remote control
- Home automation systems
- Automatic Meter Reading
- Low Power Telemetry
- Wireless alarms and security systems
- Wireless serial cable replacement
- Prepared for Konnex Stack

3. DESCRIPTION FOR THE MODULE

Modulbeschreibung

The PAN3550 provides a complete RF transceiver system including a powerful microcontroller for all kind of wireless applications. Application code can be stored in on-module Flash memory. All kind of external IOs allow for a wide range of options for the application circuit. Due to the very low-power components and the wide voltage range a battery operated system can be realized.

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4. SCOPE OF THIS DOCUMENT

Umfang dieses Dokumentes

This document applies to the PAN3550 module. The module is based upon a Chipcon (based in Oslo/Norway) CC1100 transceiver and a Freescale (based in Denver/US) HC9S08GT32 microcontroller.

Dieses Dokument bezieht sich auf das Funkmodul PAN3550. Es basiert auf einem Chipcon CC1100 Transceiver in Kombination mit einem Freescale HC9S08GT32 Mikrokontroller.

5. HISTORY FOR THIS DOCUMENT

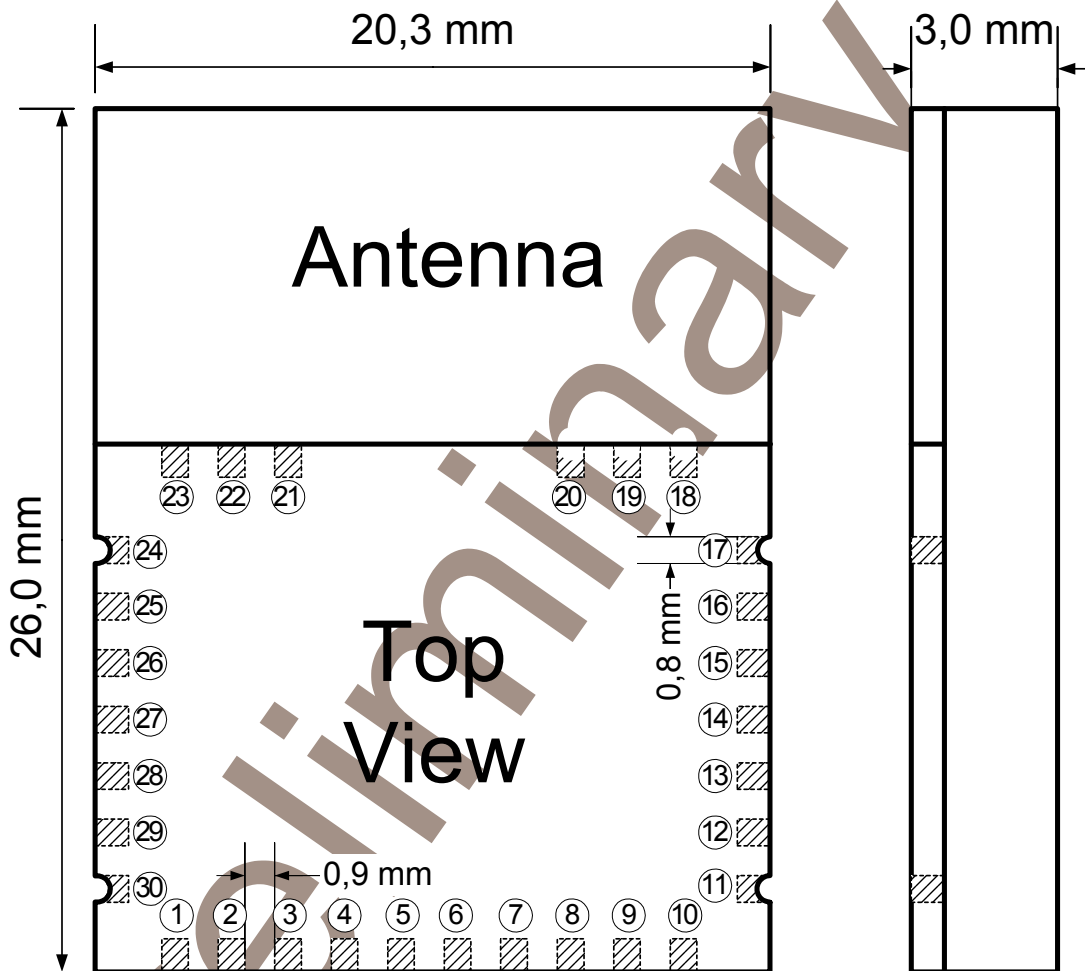
Versionsverwaltung dieses Dokumentes

Revision Version	Date Datum	Modification / Remarks Änderungen / Bemerkungen
A	09.11.2005	Initial DRAFT version in the European Technology Center (AS)
B	31.07.2006	Change operating temperature range and change date (PS)

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6. TERMINAL LAYOUT
Anschlußbelegung



Pin no.	Pin Name	Pin Type	Description
1	AD Port 0 / GPIO0	I/O	Analog Input Port 0 or GPIO 0 (=PTB0)
2	AD Port 1 / GPIO1	I/O	Analog Input Port 1 or GPIO 1 (=PTB1)
3	AD Port 2 / GPIO2	I/O	Analog Input Port 2 or GPIO 2 (=PTB2)
4	AD Port 3 / GPIO3	I/O	Analog Input Port 3 or GPIO 3 (=PTB3)
5	3V Reg. Out	O	3V Output for optional on-module regulator ¹
6	AD Reference Input H	I	High-Level Reference Input for AD-Converter ²

¹ Usable only for low current applications. If not equipped with regulator: connected to Pin 16 (Vcc)

² Must be connected to +3V (Pin 5) if not used

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Pin no.	Pin Name	Pin Type	Description
7	AD Reference Input L	I	Low-Level Reference Input for AD-Converter ³
8	Keyb. Int 0 / GPIO 4	I/O	Keyboard Interrupt Input 0 or GPIO 4 (PTA0)
9	Keyb. Int 1 / GPIO 5	I/O	Keyboard Interrupt Input 1 or GPIO 5 (PTA1)
10	Keyb. Int 2 / GPIO 6	I/O	Keyboard Interrupt Input 2 or GPIO 6 (PTA2)
11	GND		ground connection (0Vdc)
12	BKGD / GPIO 7	I/O	BKGD Pin (Programming/Debugging) or GPIO7 (PTG0)
13	Reset	I	Microcontroller Reset Pin (Active Low)
14	UART2 TXD / GPIO 8	I/O	UART2 TxD Line or GPIO 8 (PTC0)
15	UART2 RXD / GPIO 9	I/O	UART2 RxD Line or GPIO 9 (PTC1)
16	Vcc	I	Power Supply Input
17	GND		ground connection (0Vdc)
18	GND		ground connection (0Vdc)
19	GND		ground connection (0Vdc)
20	GND		ground connection (0Vdc)
21	GND		ground connection (0Vdc)
22	RF / NC	I/O	Optionally RF Output – Not used with internal antenna ⁴
23	GND		ground connection (0Vdc)
24	GND		ground connection (0Vdc)
25	I ² C SDA / GPIO 10	I/O	I ² C Bus SDA Line or GPIO 10 (PTC2)
26	I ² C SCL / GPIO 11	I/O	I ² C Bus SCL Line or GPIO 11 (PTC3)
27	GND		ground connection (0Vdc)
28	UART1 TXD / GPIO 12	I/O	UART1 TxD Line or GPIO 12 (PTE0)
29	UART1 RXD / GPIO 13	I/O	UART1 RxD Line or GPIO 13 (PTE1)
30	GND		ground connection (0Vdc)

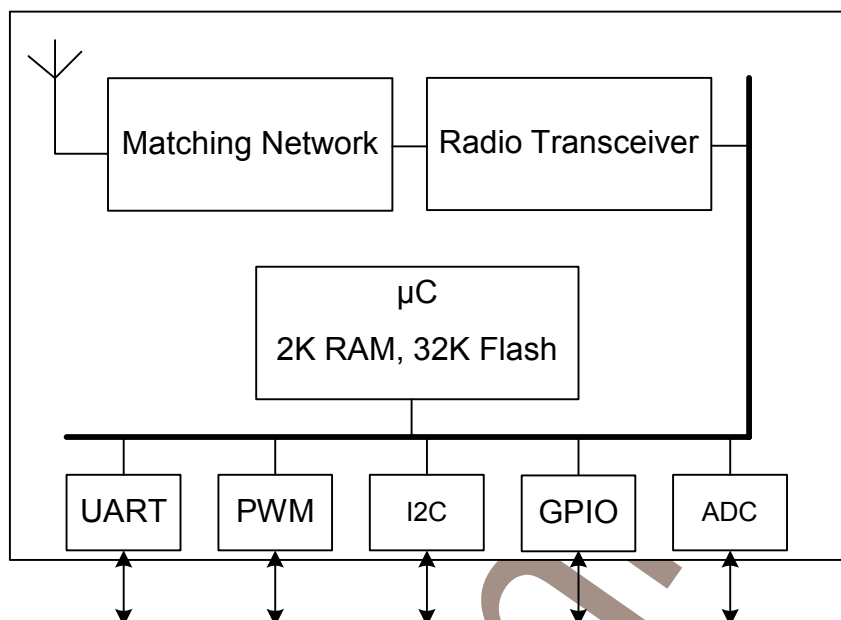
³ Must be connected to GND if not used

⁴ This Pin must be left open on modules with internal antenna

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7. BLOCK DIAGRAM Blockdiagramm



8. KEY PARTS LIST Liste der Schlüsselkomponenten

Part Name Teilenummer	Material Material
P.W.Board Leiterplatte	Glass cloth epoxide resin FR4
Casing Deckel	Steel 0.2 mm
Transceiver	Chipcon CC1100
Antenna	PCB Loop Antenna
Microcontroller	Freescale HC9S08GT32

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9. TEST CONDITIONS
Meßbedingungen

Measurements shall be made under room temperature and humidity unless otherwise specified.

Messungen unter normalen Bedingungen, Abweichungen sind gesondert notiert.

Temperature	25 ± 10°C	Humidity	40 to 85%RH
Temperatur	25 ± 10°C	Luftfeuchtigkeit	40 to 85%RH

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10. ABSOLUTE MAXIMUM RATINGS

Absolute Grenzwerte

The maximum ratings may not be exceeded under any circumstances, not even momentarily and individually, as permanent damage to the module will result.

No.	Item Punkt	Symbol Zeichen	Absolute Maximum Ratings Absolute Grenzwerte	Unit Einheit
1	Supply voltage Versorgungsspannung	Vdd	-0.3 to +5.0	V
2	Voltage on any pin Spannung an jedem Pin	Vpin	-0,3 to Vdd +0.3 (5 V max.)	V
3	Storage temperature range Lagertemperatur	Tstg	-40 to +125	°C
4	Operating temperature range Betriebstemperatur	Top	-40 to +85	°C
5	Input RF level Eingangs HF-Leistung	Pmax	10	dBm
6	Lead temperature Löttemperatur	Tdeath	Tbd °C for t = tbd sec	°C
7	ESD on any pin ESD Festigkeit	V ESD	max tbd	V

Notes:

11. ELECTRICAL REQUIREMENTS

Vcc = 3.3V, T_{amb} = 25°C if nothing else stated

No	Item Punkt	Condition Bedingung	Limit / Grenzen			Unit Einheit
			Min	Typ	Max	
1	Frequency Range Frequenzbereich	General on RF Output	300		348	MHz
	Frequency Range Frequenzbereich	General on RF Output	400		464	MHz
	Frequency Range Frequenzbereich	General on RF Output	800		928	MHz
2	Frequency Range Frequenzbereich	With internal antenna	865		928	MHz
3	Supply voltage Versorgungsspg.	The typical voltage is recommended Vdd at voltage pin	1.8	3.3	3.6	Vdc
4	Ripple on Vcc	Ripple frequency ≥200kHz			tbd	mVpp
	AC Anteil auf Vcc	Ripple frequency <200kHz			tbd	

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12. I/O OPERATING CHARACTERISTICS

$V_{cc} = 3.3V$, $T_{amb} = 25^{\circ}C$ if nothing else stated

NR.	Punkt	Bedingung	Min	Max	Unit
1	Low-Level Input Voltage	$V_{dd} > 2.3V$		$0.35 \times V_{dd}$	V
2	High-Level Input Voltage	$V_{dd} > 2.3V$		$0.70 \times V_{dd}$	V
3	Input hysteresis (all digital inputs)			$0.09 \times V_{dd}$	V
4	Input leakage current per pin			1.0	μA
5	Maximum total current for all pins			60	mA
6	DC injection current for a single pin			0.2	mA
7	DC injection current For the complete module			5.0	mA
8	Input capacitance			7	pF

13. TYPICAL CURRENT CONSUMPTION

$V_{cc} = 3.0V$, $T_{amb} = 25^{\circ}C$, 50Ω antenna

No Nr.	Modes Modi	Average Durchschnitt	Unit Einheit
1	Sleep Mode (lowest power)	1.0	μA
2	Standby Mode	2.7	μA
3	Receiving	20	mA
4	Transmitting -10 dBm	17	mA
5	Transmitting 0 dBm	20	mA
6	Transmitting +10 dBm	34	mA

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14. ELECTRICAL RF-CHARACTERISTICS

Vcc = 3.3V, T_{amb} = 25°C, 50Ω antenna

No Nr.	Receiver Empfänger	Data rate Datenrate	Limit / Grenzen			Spec	Unit Einheit
			Min	Typ	Max		
1	Sensitivity at 1% PER	1.2 kbps	-	-110	-		dBm
2		38.4 kbps	-	-100	-		
3		250 kbps	-	-88	-		
4	Maximum input power		-		-15		dBm

No Nr.	Transmitter Sender	Frequency [MHz] Frequenz [MHz]	Limit / Grenzen			Spec	Unit Einheit
			Min	Typ	Max		
5	RF transmit power	300-348	-30		10		dBm
6		400-464	-30		10		
7		800-928	-30		10		
8	RF power control range		-	40			dB
9	Output power step size		-	2.2			dB
10	2 nd Harmonics content			-39			dBm
11	3 rd Harmonics content			-77			dBm
12	Integrated antenna gain	908			-10		dBi
13	Integrated antenna gain	868			-7.5		dBi

15. MECHANICAL REQUIREMENTS Mechanische Anforderungen

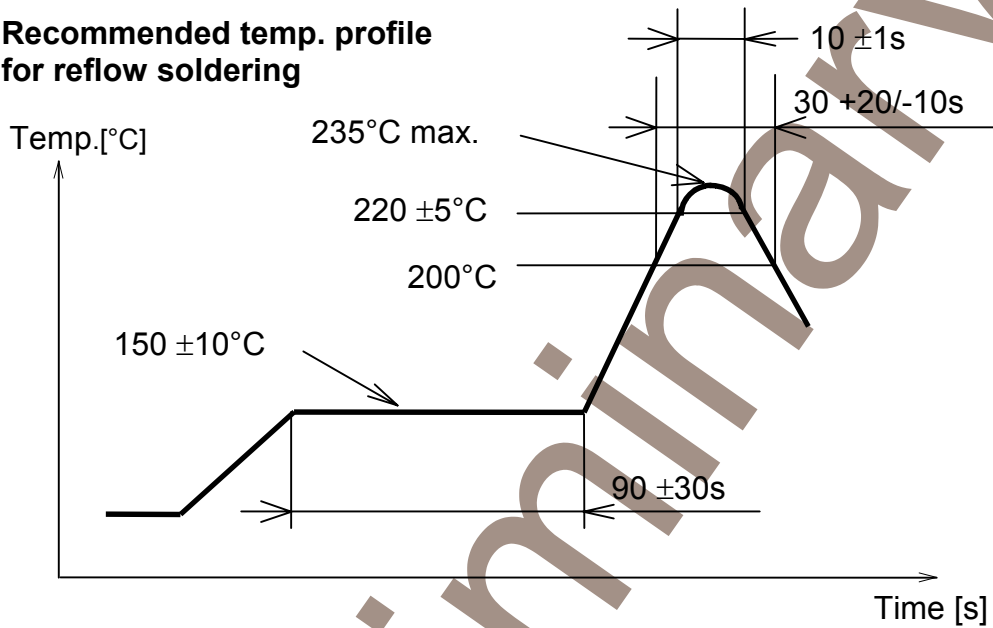
No.	Item Punkt	Limit Grenzwerte	Condition Bedingung
1	Solderability Lötfähigkeit		
2	Resistance to soldering heat		

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16. SOLDERING TEMPERATURE-TIME PROFILE (FOR REFLOW SOLDERING)
Temperatur-Zeit Profil für die Reflowlötung

**Recommended temp. profile
for reflow soldering**



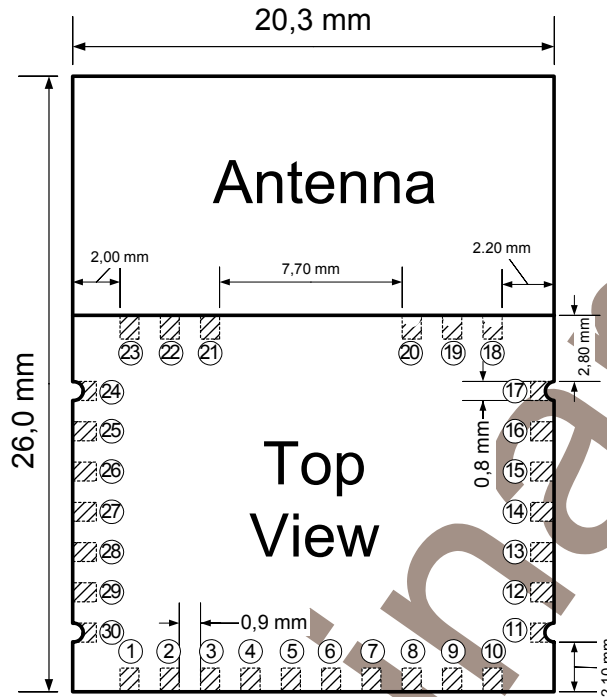
17. MODULE DRAWING
Mechanische Modulzeichnung

Will be finalized in the next revision.

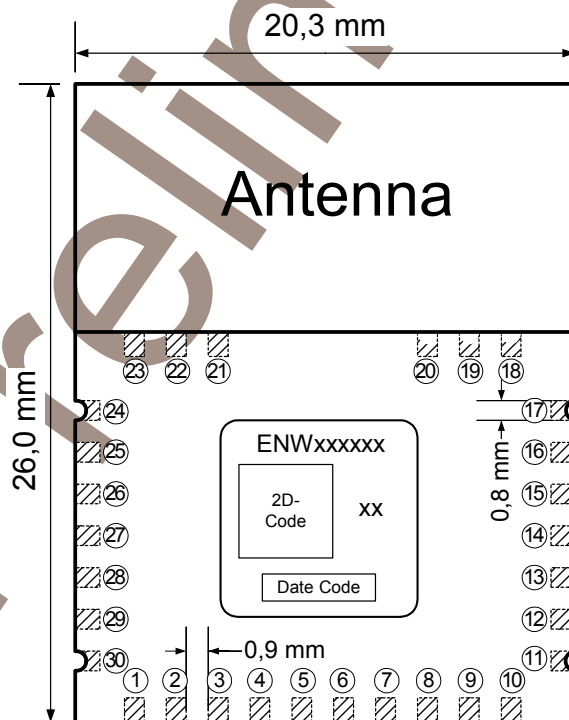
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18. FOOT PRINT AND SIZE OF THE MODULE
Löt pads and dimensions of the module



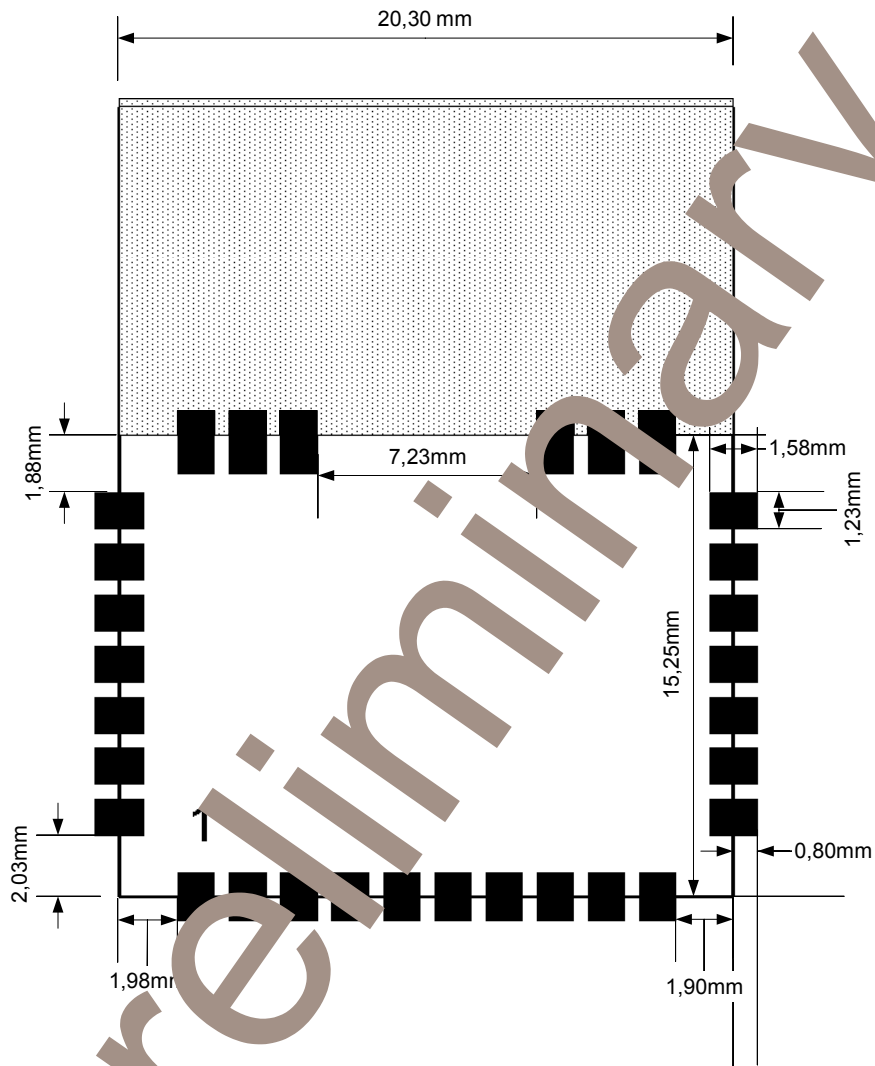
19. LABELLING DRAWING



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20. RECOMMENDED FOOT PATTERN
Empfohlenes Land Pattern



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21. RELIABILITY TESTS

Zuverlässigkeitstests

The measurement should be done after storage room temperature and normal humidity for 1 hour.

Die Messungen sollten erst nach einer Stunde Lagerung unter normalen Bedingungen erfolgen.

No.	Item Punkt	Limit Grenzwerte	Condition Bedingung
1	Vibration test	Electrical parameter should be in specification	a) Freq.:10~50Hz, Amplitude:1.5mm a) 20min. / cycle, 1hrs. each of XYZ axis b) Freq.:30~100Hz, 6G b) 20min. / cycle, 1hrs. each of XYZ axis
2	Shock test	the same as the above	Dropped onto hard wood from height of 50cm for 3 times
3	Heat cycle test	the same as the above	-40°C for 30min. and +85°C for 30min.; each temperature 300 cycles
4	Moisture test	the same as the above	+60°C, 90% RH, 300h
5	Low temp. test	the same as the above	-40°C, 300h
6	High temp. test	the same as the above	+85°C, 300h

22. PACKAGING

Verpackung

Will be finalized in the next revision.

23. ORDERING INFORMATION

Bestellinformationen

Ordering part number	Description	MOQ

24. DATA SHEET STATUS

Datenblatt Status

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This data sheet contains data from the PRELIMINARY specification. Supplementary data will be published at a later date. Panasonic reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.

Please consult the most recently issued data sheet before initiating or completing a design.

25. RELATED DOCUMENTS
Mitgeltende Dokumente

- [1] **Chipcon CC1100 Data Sheet Rev. 1.1**
- [2] **Freescale Data Sheet MC9S08GT-Series**

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26. GENERAL INFORMATION

Allgemeine Informationen

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This product description does not lodge the claim to be complete and free of mistakes.

Please contact the related product manager in every case.

If we deliver samples to the customer, these samples have the status Engineering Samples. This means, the design of this product is not yet concluded. Engineering Samples may be partially or fully functional, and there may be differences to be published Data Sheet.

Engineering Samples are not qualified and are not to be used for reliability testing or series production.

Waiver:

Customer acknowledges that samples may deviate from the Data Sheet and may bear defects due to their status of development and the lack of qualification mentioned above.

Panasonic rejects any liability or product warranty for Engineering Samples. In particular, Panasonic waives liability for damages caused by

- the use of the Engineering Sample other than for Evaluation Purposes, particularly the installation or integration in an other product to be sold by Customer,
- deviation or lapse in function of Engineering Sample,
- improper use of Engineering Samples.

Panasonic waives any liability for consequential and incidental damages.

In case of any questions, please contact your local sales partner or the related product manager.

27. LIFE SUPPORT POLICY

Politik für Lebenserhaltungssysteme

This Panasonic product is not designed for use in life support appliances, devices, or systems where malfunction can reasonably be expected to result in a significant personal injury to the user, or as a critical component in any life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness. Panasonic customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Panasonic for any damages resulting

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