Application for Production

Applicant / Manufacturer Hardware	Panasonic Electronic Devices Europe GmbH Zeppelinstrasse 19 21337 Lüneburg Germany
Applicant / Manufacturer Software	Zensysy A/S Emdrupvej 26 2100 Copenhagen Denmark
Software Version	tbd
Contents	Approval for Mass Production
Customer	

CHECKED / APPROVED:

DATE:	NAME:	SIGNATURE:

NOTE:

AT LEAST ONE SET OF APPROVED SPECIFICATIONS SHOULD BE RETURNED TO THE ADDRESS OF THE ISSUING PARTY.

TABLE OF CONTENTS

1. KEY FEATURES
Schlüsseleigenschaften

- System-on-Chip including
  - Transceiver for 868.42 or 908.42 MHz
  - 8051 compatible Microcontroller
  - Z-Wave Home automation protocol stack
- 9.6 kbit/s Data rate
- High sensitivity (-104 dBm)
- RF output power up to 3 dBm
- 32K Flash memory and 2K RAM
- In total 10 I/O lines, configurable as GPIO
- 12-Bit ADC, SPI, UART and PWM peripherals
- Triac controller for dimming applications
- Supply voltage 2.1-3.6V
- Low power consumption for battery operated applications
- Complies to EN300328, EN301489, EN60950

2. APPLICATIONS FOR THE MODULE
Anwendungen für das Modul

Home Automation Wireless Applications

- Wireless sensor and actor networks
- Light switching and dimming
- Automatic meter reading
- Remote control
- Door openers
- HVAC

3. DESCRIPTION FOR THE MODULE
Modulbeschreibung

The PAN8550 contains a low-power transceiver for 868.42 MHz (EU) or 908.42 MHz (US) which together with the Z-Wave protocol stack allows building of a self-organizing wireless network. A 8051-compatible low-power microcontroller hosts the stack as well as user application software, which are stored in the built-in, in-circuit programmable Flash memory.

4. SCOPE OF THIS DOCUMENT
Umfang dieses Dokumentes

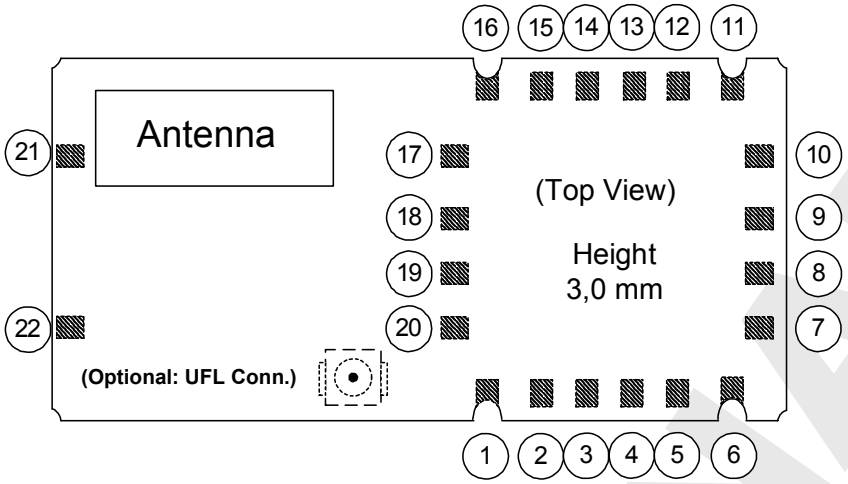
This product specification applies to the PAN8550 Z-Wave module PAN8550.
The last 3 characters indicates different versions (refer to chapter 27. Ordering Information)
The implemented transceiver chip is the ZW0201 from the US company Zensys Inc. (www.zen-sysy.com).

Diese Produktionsunterlagen beziehen sich auf das PAN8550 Z-Wave Modul PAN8550.
Die letzten 3 Zeichen kennzeichnen dabei verschiedene Versionen (Erklärung im Kapitel 27. Ordering Information)
Der verwendete Transceiver Chip ist der ZW0201 der US Firma Zensys Inc.

5. HISTORY FOR THIS DOCUMENT
Versionsverwaltung dieses Dokumentes

Revision Version	Date Datum	Modification / Remarks Änderungen / Bemerkungen	
A	26.07.2005	Initial DRAFT version in the European Technology Center	AS
B	02.08.2005	Updates on the antenna characteristics	AS
C	10.10.2005	Updates on technical data and module Rev. 1.3	AS
D	09.11.2005	Included data on mounting recommendations and antenna diagrams	AS
E	29.03.2006	Updated electrical values	AS
0.90	03.05.2006	Initial DRAFT version in the factory PEDEU	HK
0,91	02.06.2006	Add chapter Regulatory Information and updated some RF performance values after measuring the first bigger quantity.	HK

6. TERMINAL LAYOUT
Anschlußbelegung



6.1. PIN ASSIGNMENT

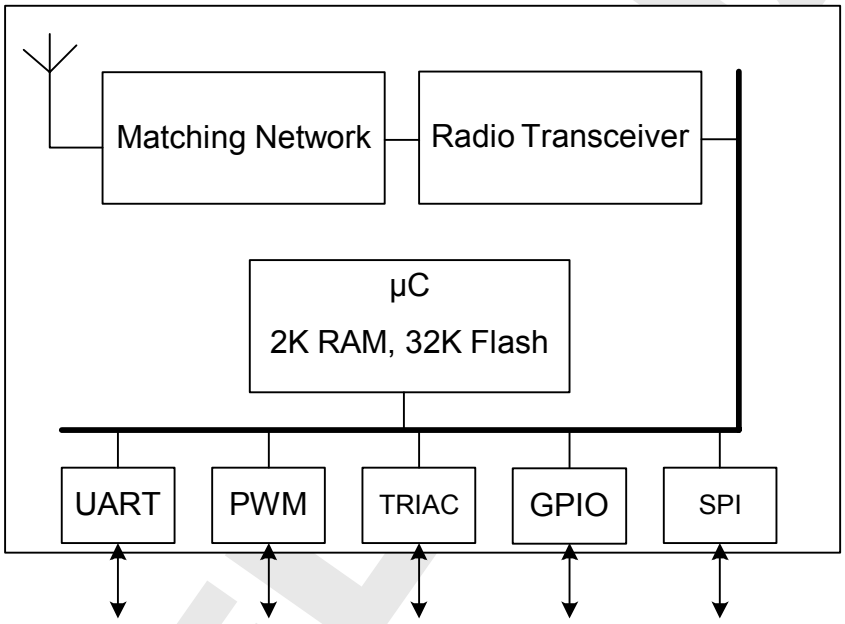
Pin No.	Pin Name (1)	Pin Type	Description (from module sight)
1	GND	O	ground connection (0Vdc)
2	RESET	I	Reset input (active low for 5 ms); Schmitt triggered
3	P1.7/INT1	I/O	GPIO Port 1.7 and Interrupt Input 1
4	P1.6/INT0/PWM	I/O	GPIO Port 1.6, Interrupt Input 0 and PWM Port
5	P1.5/EECS	I/O	GPIO Port 1.5 and external EEPROM Chip-Select
6	GND	O	ground connection (0Vdc)
7	P1.4/SCK	I/O	GPIO Port 1.4 and SPI Clock Signal
8	P1.3/MOSI	I/O	GPIO Port 1.3 and SPI Master Out Slave In
9	P1.2/MISO	O	GPIO Port 1.2 and SPI Master In Slave Out
10	P1.1/RXD/ADC	I/O	GPIO Port 1.1, UART RxD Input and multiplexed ADC port
11	GND	O	ground connection (0Vdc)
12	VCC	I	DC Power supply, typical 3.3V DC
13	P1.0/TXD/ADC	I/O	GPIO Port 1.1, UART TxD Output and multiplexed ADC port
14	P0.1/ADC/TRIAC	I/O	GPIO Port 0.1, multiplexed ADC port and Triac control output
15	P0.0/ADC/ZEROX	I/O	GPIO Port 0.0, multiplexed ADC port and Zero crossing input
16	GND	O	ground connection (0Vdc)
17	NC	NC	Not connected, Reserved for later use, leave open
18	NC	NC	Not connected, Reserved for later use, leave open

Pin No.	Pin Name (1)	Pin Type	Description (from module sight)
19	NC	NC	Not connected, Reserved for later use, leave open
20	NC	NC	Not connected, Reserved for later use, leave open
21	NC	NC	Not connected, Reserved for later use, leave open
22	NC	NC	Not connected, Reserved for later use, leave open

Notes:

(1) The names refer also to the IC name from ZW0201

7. BLOCK DIAGRAM
Blockdiagramm



8. PAN8550 TERMINAL SPECIFICS
PAN8550 Interfacebeschreibungen

8.1. RF-INTERFACE - ANT

The PAN8550 presents a 50Ω impedance on the plug connector. If you need additional antenna support please e-mail to wireless@ecom.panasonic.de or use the PAN8550 with integrated ceramic antenna. The details please refer to chapter 27.

8.2. RESET

The RESET pin is an active low input that can be used to perform a full reset of the device from an external signal. This pin does not contain an internal pull-up, so it should be pulled-up externally if not used.

9. KEY PARTS LIST
Liste der Schlüsselkomponenten

Part Name Teilenummer	Material Material
P.W.Board Leiterplatte	Glass cloth epoxide resin with gold plating FR4 mit Goldauflage
Casing Deckel	Material: CuNi18ZN20, thickness 0.2mm Material: Weißblech 0,2mm Dicke
IC part name IC Name	ZW0201 (Zensysy Inc www.zen-sysy.com) All information are based on [1] chapter 30
Antenna name Antennenname	0920AT50A080 (Johanson www.johanson.com) All information are based on [2] chapter 30
Connector name Steckername	U.FL-R-SMT(10) No. 331-0471-0-10 (Hirose www.hirose.com) All information are based on [3] chapter 30

10. 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

11. ABSOLUTE MAXIMUM RATINGS (1)

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	V_{cc}	-0.3 to +5.0	V
2	Voltage on any pin Spannung an jedem Pin	V_{Pin}	-0.3 to Vcc+0.3 (5V max)	V
3	Storage temperature range Lagertemperatur	T_{stg}	-40 to +105	°C
4	Operating temperature range Betriebstemperatur	T_{op}	-20 to +70 (2)	°C
5	Input RF level Eingangs HF-Leistung	P_{max}	10	dBm
6	Lead temperature Löttemperatur	T_{Death}	See chapter 17.2	°C
7	ESD on any pin ESD Festigkeit	V_{ESD}	max tbd V (C_{LOAD}=150pF, R_{LOAD}=330Ω Human Body Model mMax tbd V Machine Model	V

Notes:

(1) ABSOLUTE MAXIMUM RATINGS indicate limits beyond which damage to the device may occur.

(2) For wider ranges for operating temperature, please ask your sales representative.

12. ELECTRICAL REQUIREMENTS

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

No Nr.	Item Punkt	Condition Bedingung	Limit / Grenzen Min	Typ	Max	Unit Einheit
1	Frequency Range Frequenzbereich	EU operations US operations		868.42 908.42		MHz
2	Load impedance Ausgangsimpedanz	Measured with network analyzer in the frequency at connector pin		50		Ω
3	Output return loss Ausgangsanpassung	Receive Mode to 50Ω load Transmit Mode to 50Ω load	-10 -10			dBm
4	Supply voltage Versorgungsspg.	The typical voltage is recommended Vcc at voltage pin	2.1	3.0	3.6	Vdc
5	Ripple on Vcc AC Anteil auf Vcc	Ripple frequency ≥200kHz Ripple frequency <200kHz			tbd tbd	mVpp

13. I/O OPERATING CHARACTERISTICS

Vcc = 3.0V, T_{amb} = 25°C if nothing else stated

No Nr.	Symbol	Item Punkt	Condition Bedingung	Limit / Grenzen Min	 Max	Unit Einheit
1	V_{IL}	Low-Level Input Voltage	Vcc > 2.3V	-	0.35 x Vcc	V
2	V_{IH}	High-Level Input Voltage	Vcc > 2.3V	-	0.70 x Vcc	V
3		Input hyteresis (all digital inputs		-	0.09 x Vcc	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

14. TYPICAL CURRENT CONSUMPTION

Vcc = 3.0V, Tamb = 25°C, 50Ω antenna

No Nr.	Modes Modi	Average Durchschnitt	Unit Einheit
1	Sleep Mode (lowest power)	2.5	µA
2	Normal Mode (MCU on, RF off)	5	mA
3	Receiving	21	mA
4	Transmitting +3 dBm (Register value from IC)	39	mA
5	Transmitting -5 dBm (Register value from IC)	23	mA
6	ADC supply current	150	µA

15. ELECTRICAL RF-CHARACTERISTICS

Vcc = 3.0V, T_{amb} = 25°C, 50Ω antenna

No Nr.	Receiver Empfänger	Frequency [GHz] Frequenz [GHz]	Limit / Grenzen Min	Typ	Max	Z-Wave Spec	Unit Einheit
1	Sensitivity at 0.1% FER	868.42	-	-94	-	tbd	dBm
2		908.42	-	-94	-		

No Nr.	Transmitter Sender	Frequency [GHz] Frequenz [GHz]	Limit / Grenzen Min	Typ	Max	Z-Wave Spec	Unit Einheit
3	RF transmit power 50 Ω load, at UFL connector	868.42	-	-4	-	tbd	dBm
4		908.42	-	-4	-		
5	RF power control range		-	23	-	tbd	dB
6	Output power step size		-	2		tbd	dB
7	Frequency Accuracy			15		tbd	ppm
8	2nd Harmonics content			-70		-30	dBm
9	3rd Harmonics content			-50		-30	dBm
10	Integrated antenn again for antenna solution	868.42	-	0	-7.5	tbd	dBi
11		908.42	-	0	-10		

16. MECHANICAL REQUIREMENTS
Mechanische Anforderungen

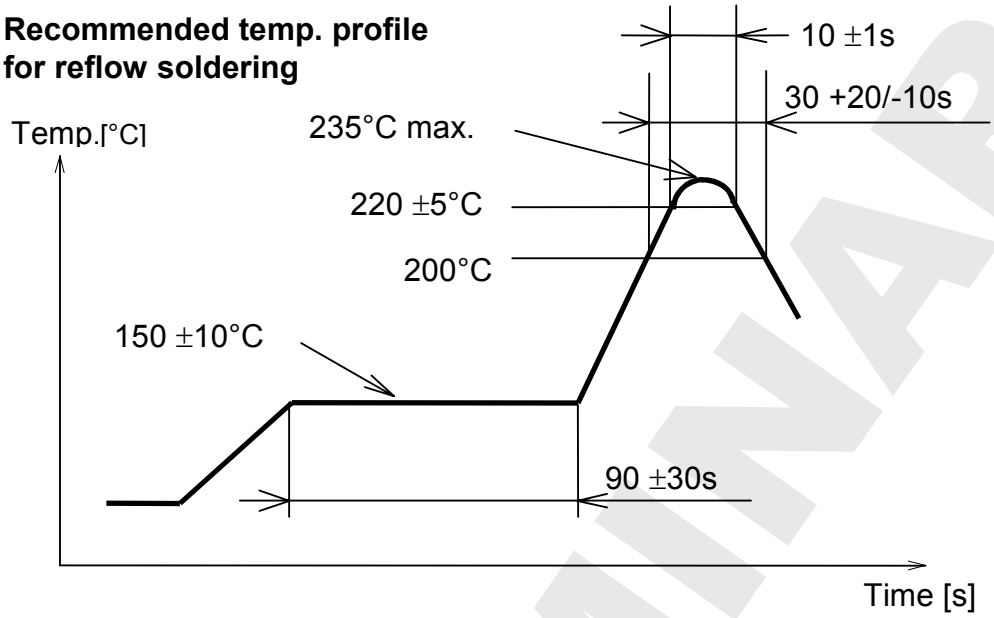
No.	Item Punkt	Limit Grenzwerte	Condition Bedingung
1	Solderability Lötfähigkeit	More than 75% of the soldering area shall be coated by solder Mehr als 75% der Lötfläche soll mit Lötpaste bedeckt sein.	Reflow soldering with recommendable temperature profile
2	Resistance to soldering heat	It shall be satisfied electrical requirements and not be mechanical damage	See chapter 17.2

17. SOLDERING TEMPERATURE-TIME PROFILE (FOR REFLOW SOLDERING)

Temperatur-Zeit Profil für die Reflowlötung

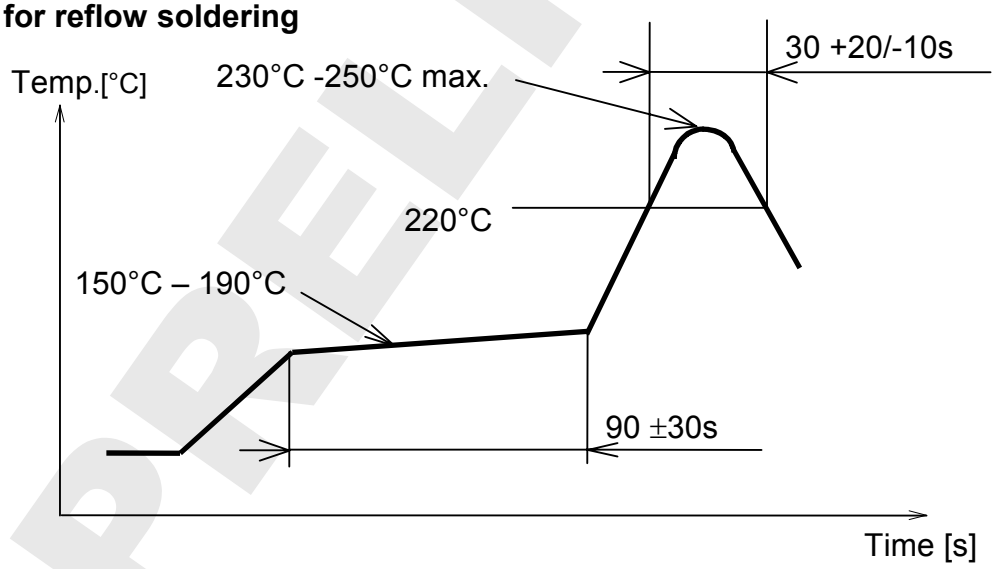
17.1. FOR LEAD SOLDER

Recommended temp. profile for reflow soldering



17.2. FOR LEADFREE SOLDER

Our used temp. profile for reflow soldering

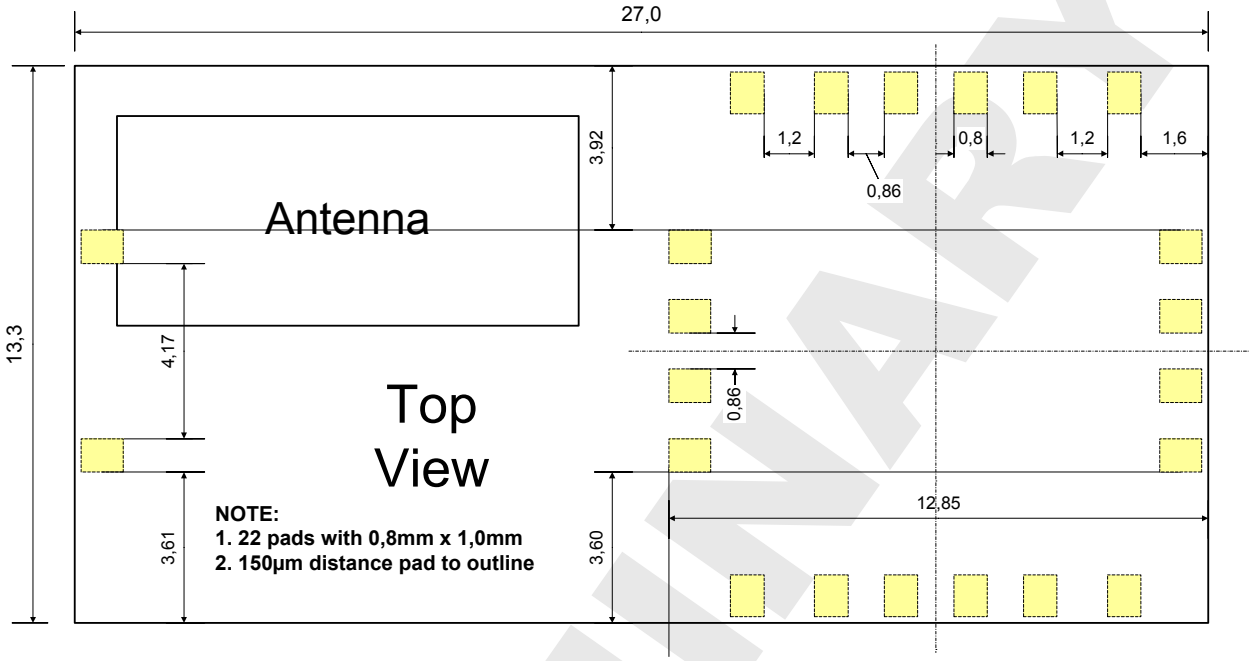


Reflow permissible cycle: 2
Opposite side reflow is prohibited due to module weight.

18. MODULE DIMENSION
Modulabmessungen

No.	Item Punkt	Dimension Abmessung	Tolerance Toleranz	Remark Bemerkung
1	Width	13.30	± 0.2	
2	Lenght	27,00	± 0.2	
3	Hight	3.10	± 0.05	

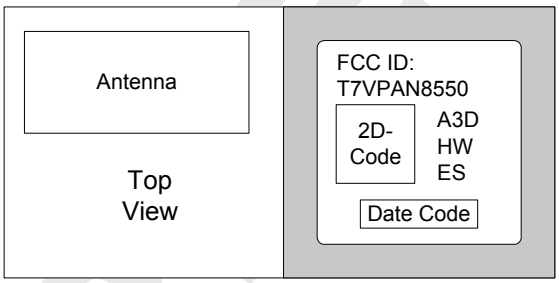
19. FOOT PRINT OF THE MODULE
Lötpads vom Modul



Dimensions in mm.

20. LABELLING DRAWING
Kennzeichnung des Modules durch Label

This label shows the 908MHz US version. This label is suitable for reflow soldering and designed for the mass production status.

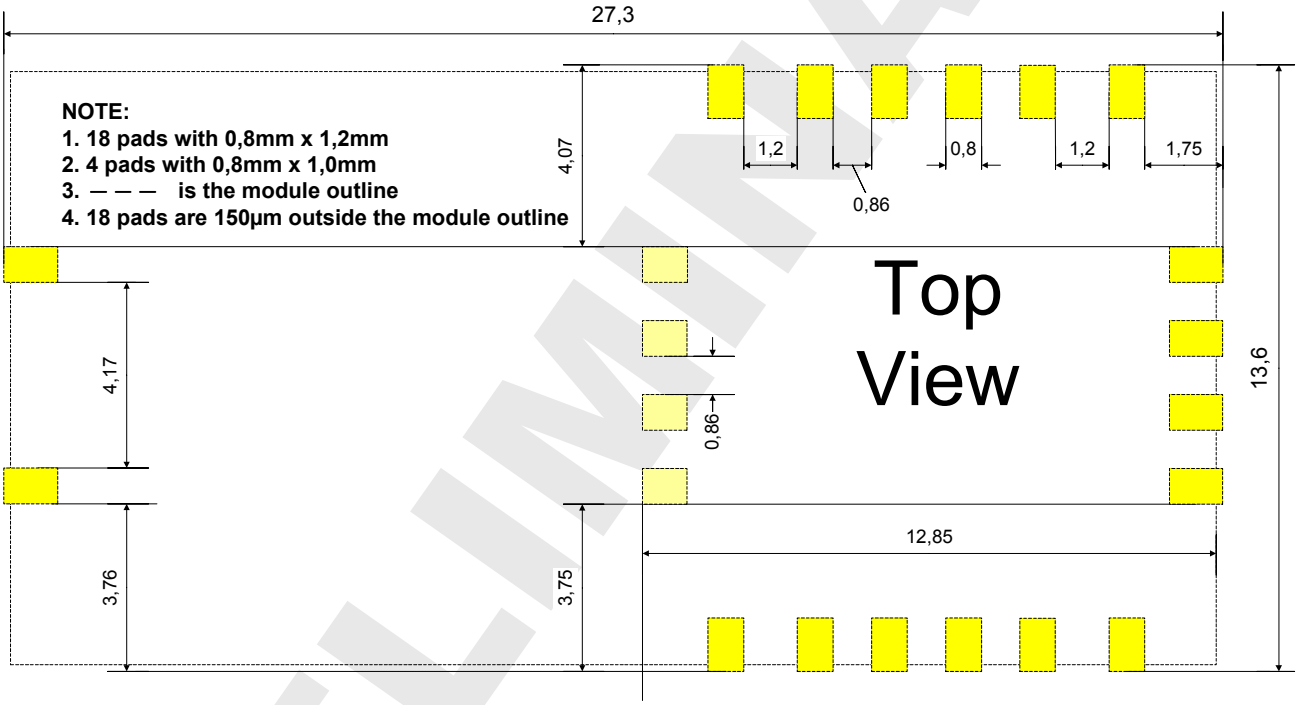


The last 3 symbol of the module number, here e.g. A3D, refer to chapter 27 Ordering Information. Every hardware release, needed for performance improvement, can be identified with 2 symbols, here *HW.* If you need an individual explanation, please ask for details.

The sign *ES* stands for Engineering Sample, please refer to chapter General Information. If this moule is in mass production status, the *ES* will be removed from the label.

Information in the 2D-Barcode are the Serial Number [12 signs], the ENW-Part-Number [11 signs], the identifier for the hardware release [2 signs] and the production date code in the format Year-Month-Day [6 signs], separated by a semicolon.

21. RECOMMENDED FOOT PATTERN
Empfohlenes Land Pattern



Dimensions in mm.

If you have no experience about the land pattern, this figure can guide you, but this information is given without any legal responsibility.

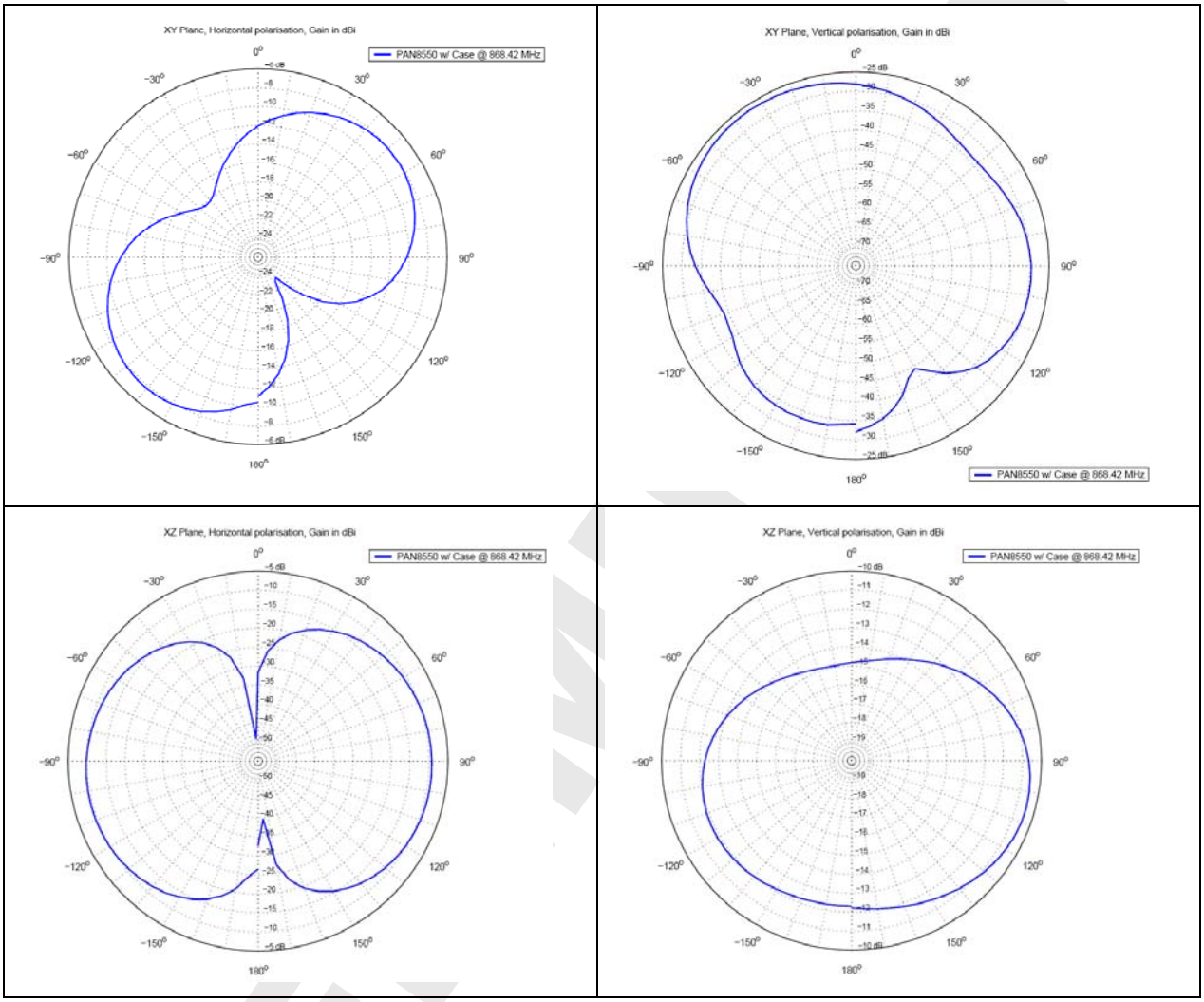
We recommend the same dimension for the solder paste screen.
The solder screen thickness depends on your production standard, we recommend 150µm.

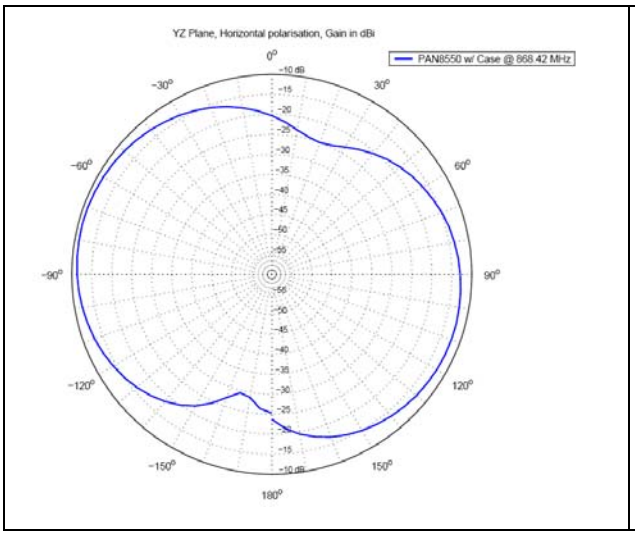
IMPORTANT:
Please be careful with the area under the module to avoid short cuts.

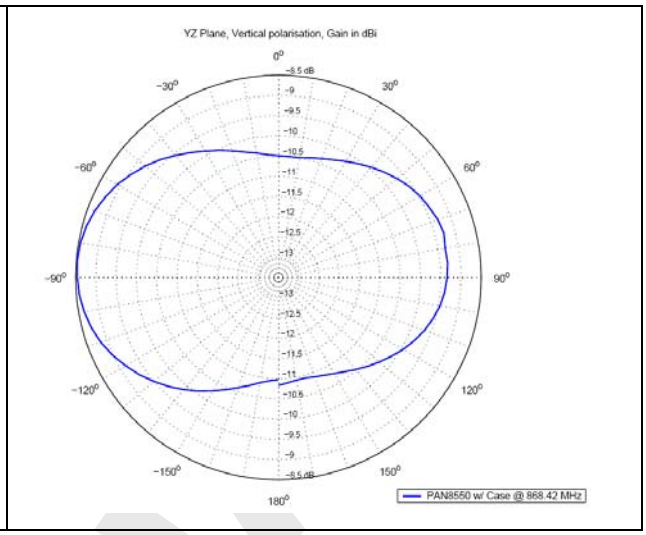
If you have any questions on this point, we are open to discuss your individual situation.

22. ANTENNA DIAGRAMS
Antennenrichtdiagramme

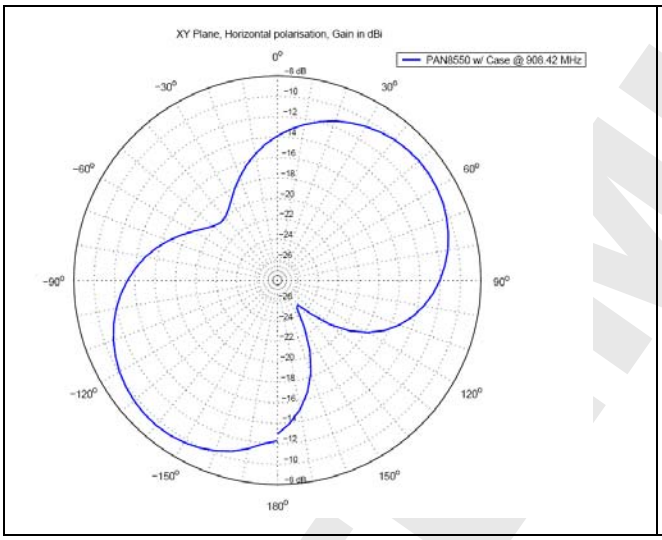
22.1. DIAGRAMS AT 868MHZ

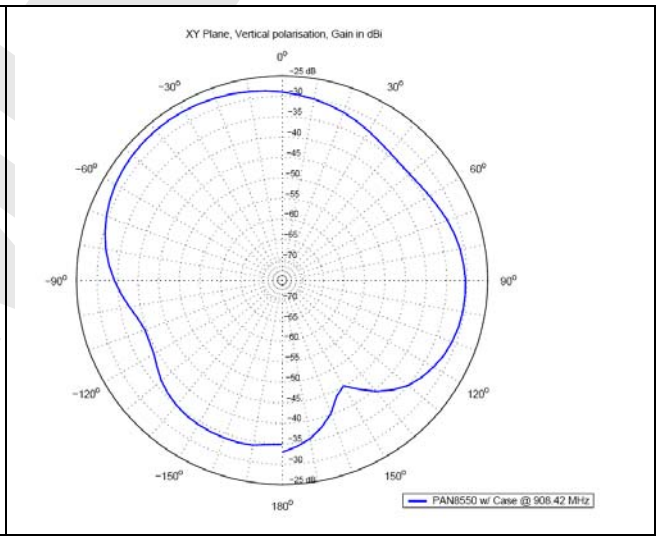


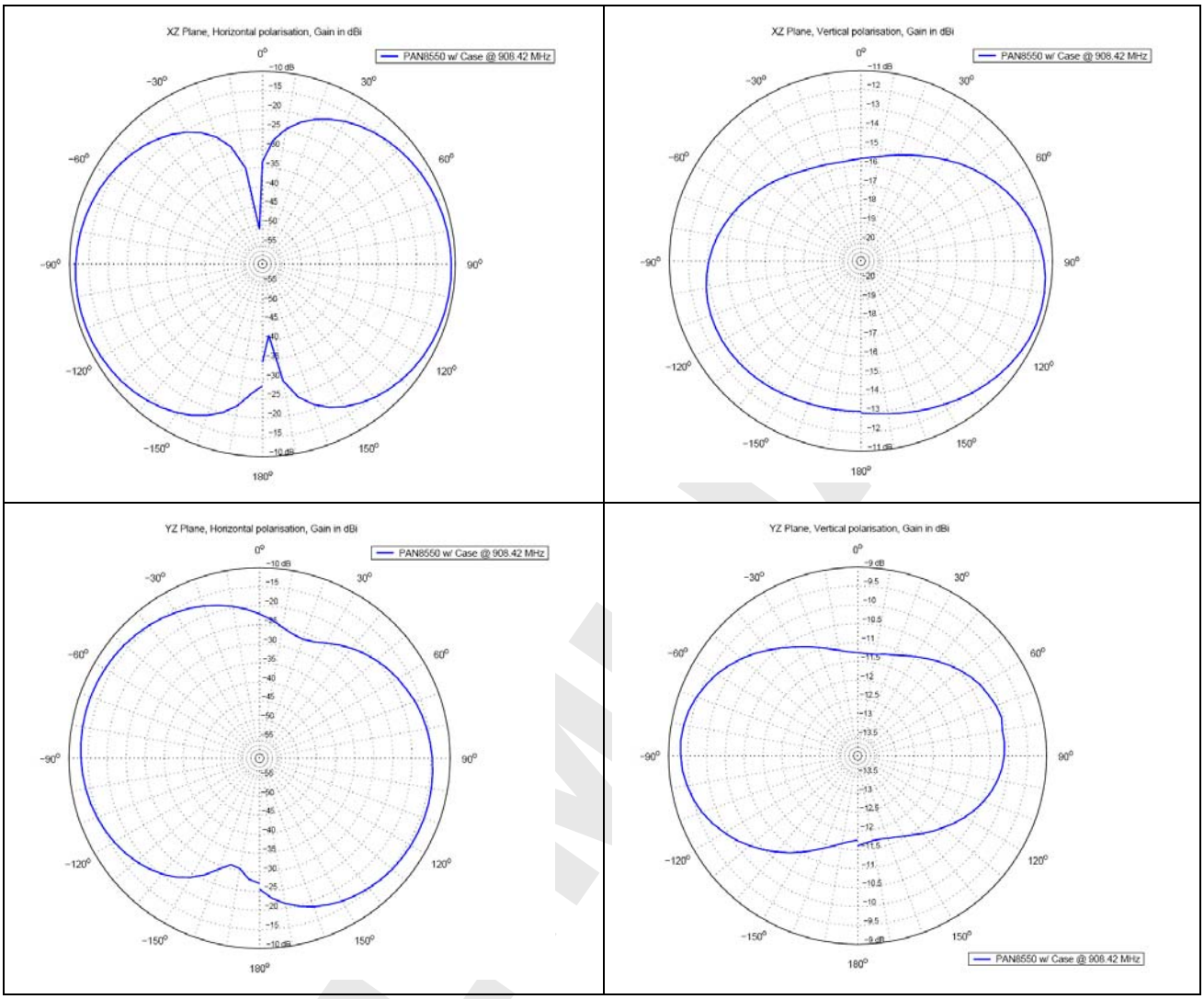




22.2. DIAGRAMS AT 908MHZ







23. SOFTWARE
Software

Defined in a later version, but please be informed, that the basic software come from company Zensysy. To get this basic software you need a membership in the Z-Wave alliance.

Details could be found under www.z-wavealliance.org.

24. RELIABILITY TESTS
Zuverlässigkeitstests

The measurement should be done after exposed to room temperature and humidity for 1hour.
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 100 cycles
4	Moisture test	the same as the above	+60°C, 90% RH, 100h
5	Low temp. test	the same as the above	-40°C, 100h
6	High temp. test	the same as the above	+85°C, 100h

25. CAUTIONS
Warnungen

25.1. NOTES OF DESIGN
Designhinweise

(1) Please follow the condition written in this specification.
(2) This product should not be stressed when installed.
(3) Please keep this product the module away from heat.
(4) The supply voltage should not be exceeding or reverse, and should not carry noise and spike.
(5) Please keep this product away from other high frequency circuits.
(6) Please follow the condition written in this interface specification, about the control signals of this module.

25.2. NOTES OF INSTALLATION
Verarbeitungshinweise

(1) Reflow soldering is possible for twice on the condition in chapter 17. Please set up the temperature at the soldering portion of this product according to this reflow profile.
(2) This product should not be stressed or vibrated when reflowed.
(3) Please keep the following conditions when you install this product for reparation by hand soldering.
(4) Please do not wash this product.
(5) Please refer to the recommended pattern when designing a board.

25.3. NOTES OF USAGE CONDITIONS
Benutzerhinweise

(1) Please take measure against static electricity.
(2) Please do not use the fallen product.
(3) Please do not put on damage and dirt to the pin , and don't touch the electric components.
(4) Please follow the condition written in the ratings , about the power supply instruments applied to this product.
(5) Electrode peeling strength: Do not add pressure of more than 4.9N when soldered on PCB

25.4. NOTES OF STORAGE
Lagerhinweise

(1) Storage period: Please check the adhesive strength of the embossed tape and soldering after 6 months of storage.
(2) Please keep this product away from water, poisonous gas and corrosive gas.
(3) This product should not be stressed or shocked when transported.
(4) Please follow the specification when piling up the packed crate (max. 10).

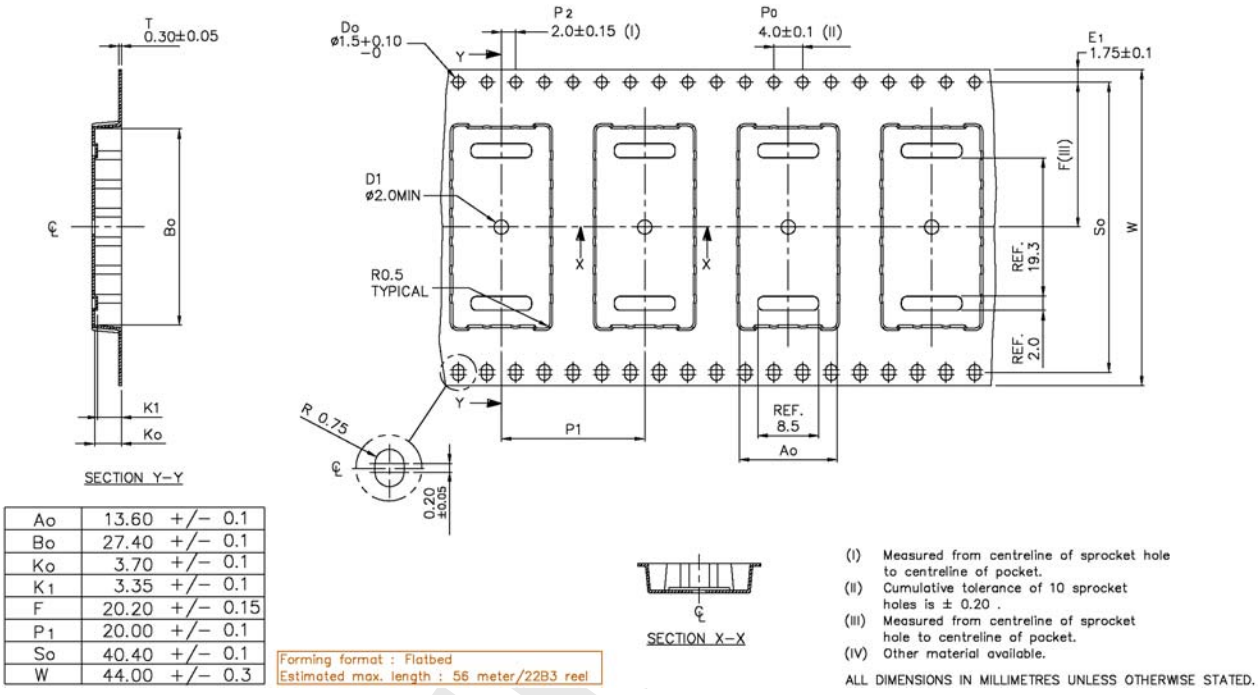
25.5. OTHER CAUTIONS
Weitere Hinweise

(1) This specification sheet is copyrighted. Please do not open it to the third party.
(2) Please do not use this product of our company for another purpose.
(3) Be sure to provide an appropriate fail-safe function on your product to prevent a second damage that may be caused by the abnormal function or the failure of our product.
(4) This product has not been manufactured with any ozone chemical controlled under the Montreal Protocol.
(5) When you have any question or uncertainty , both of you and Panasonic sincerely cope with it.

26. PACKAGING
Verpackung

26.1. EMBOSSED TAPE / BLISTERGURT

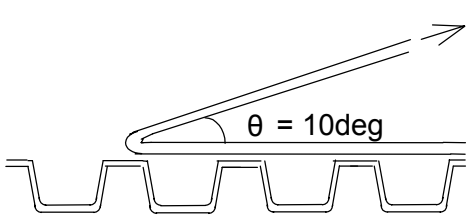
(1) Dimension of the tape / Abmessungen des Gurtes (EIAJ-tbd)



Ao	13.60 +/− 0.1
Bo	27.40 +/− 0.1
Ko	3.70 +/− 0.1
K1	3.35 +/− 0.1
F	20.20 +/− 0.15
P1	20.00 +/− 0.1
So	40.40 +/− 0.1
W	44.00 +/− 0.3

Forming format : Flatbed
Estimated max. length : 56 meter/22B3 reel

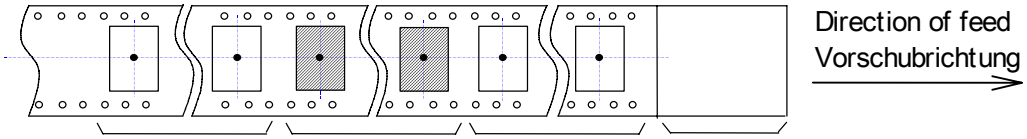
(2) Cover tape reel strength / Abzugskräfte Blistergurt Deckfolie



Speed = 300mm/min.

Cover tape reel strength
=0.098 ~ 0.68N (10 ~ 70g)

(3) Empty hollow / leere Taschen



Empty hollow more than 10 pitch Mehr als 10 leere Taschen	Component packed area Modulbereich	Empty hollow more than 10pitch Mehr als 10 leere Taschen	Top cover tape more than 200mm Deckfolie groesser als 200mm

Empty hollow in component packed area shall be less than two per reel and those hollows shall not be consecutive.
Es dürfen minimal 2 leere Taschen im Bereich der Komponenten vorhanden sein, diese dürfen aber nicht aufeinander folgen.

26.2. COMPONENT DIRECTION
Komponentenanordnung

Top cover tape shall not be found on reel holes and shall not stick out from reel.
Deckfolien darf nicht durch die Löcher der Spule und nicht außerhalb der Spule geführt werden.

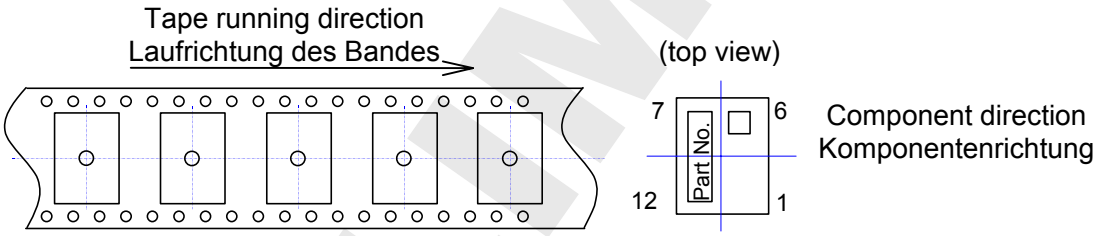


Figure 1

26.3. REEL DIMENSION
Abmaße der Rolle

(1) Quantity per reel : 500 pieces
Anzahl pro Rolle : 500 Stück

(2) Marking : Customer's part No. / Quantity / Lot No. and Our part# with bar-code shall be on the reel.
Kennzeichnung : Kundennummer / Anzahl / Losnummer und unsere Komponentennummer als Barcode wird auf die Rolle gedruckt
Refer to figure 2
Bezugnehmend zur Zeichnung 2

26.4. PACKAGE
Umverpackung

(1) Package box : 1 or 2 reel (depends on quantity)
Paketbox.: 1 oder 2 Rollen (abhängig von der Liefermenge)

(2) Marking : Customer's part No. / Quantity / Lot No. and Our part# with bar-code shall be on the package box.

Kennzeichnung : Kundennummer / Anzahl / Losnummer und unsere Komponentennummer als Barcode wird auf die Verpackung gedruckt
Refer to figure 2 and 3
Bezugnehmend zur Zeichnung 2 und 3

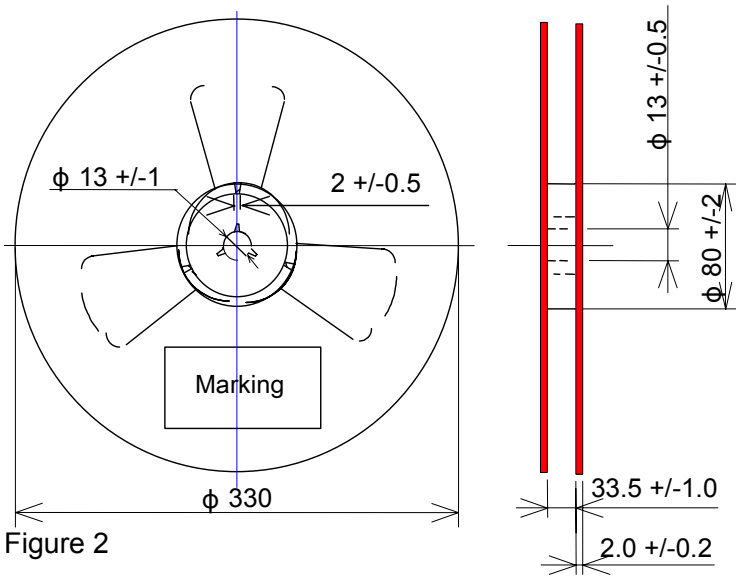
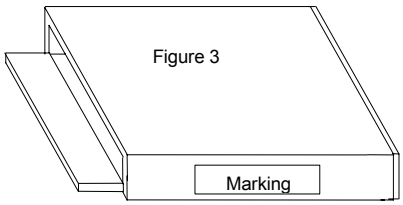


Figure 2



27. ORDERING INFORMATION
Bestellinformationen

Ordering part number	Description	MOQ (1)
ENW9ZA01N2D(2)	Engineering Sample PAN8550 908,42MHz and plug connector	1
ENW9ZA01A3D(2)	Engineering Sample PAN8550 908,42MHz and ceramic antenna	1
ENW9ZA01N2C(2)	Engineering Sample PAN8550 868,42MHz and plug connector	1
ENW9ZA01A3C(2)	Engineering Sample PAN8550 868,42MHz and ceramic antenna	1

Notes:

(1) Abbreviation for Minimum Order Quantity (MOQ). If this module is in mass production the standard MOQ are 500 pieces, fewer only on customer demand.

(2) The "Z" in the ordering part number indicates the engineering sample status. If this module is in mass production the "Z" will change to "9".

28. ROHS DECLARATION
RoHS-Erklärung

Declaration of environmental compatibility for supplied products:

Hereby we declare to our best present knowledge based on declaration of our suppliers that this product do not contain by now the following substances which are banned by Directive 2002/95/EC (RoHS) or if contain a maximum concentration of 0,1% by weight in homogeneous materials for

- Lead and lead compounds
- Mercury and mercury compounds
- Chromium (VI)
- PBB (polybrominated biphenyl) category
- PBDE (polybrominated biphenyl ether) category

And a maximum concentration of 0,01% by weight in homogeneous materials for

- Cadmium and cadmium compounds

29. DATA SHEET STATUS
Datenblatt Status

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.

30. RELATED DOCUMENTS
Mitgeltende Dokumente

[1] Data Sheet ZW0201 General Release Version 4.3 23. Feb 2005

[2] Data Sheet Antenna Johanson P/N 0920AT50A080 09/15/05

[3] Data Sheet UFL Series Hirose P/N U.FL-R-SMT 2004.2

31. REGULATORY INFORMATION

31.1. FCC NOTICE

The device PAN8550, including the ceramic antenna (ENW99A01A3D) complies with Part 15 of the FCC Rules. The device meets the requirements for modular transmitter approval as detailed in FCC public Notice DA00-1407.transmitter
Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

31.2. CAUTION

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Panasonic Electronic Devices Europe GmbH may void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help

31.3. LABELING REQUIREMENTS

The Original Equipment Manufacturer (OEM) must ensure that FCC labeling requirements are met. This includes a clearly visible label on the outside of the OEM enclosure specifying the appropriate Panasonic FCC identifier for this product as well as the FCC Notice above. The FCC identifier are **FCCID: T7VPAN8550**. This FCC identifier is only valid for the part number ENW99A01A3D (PAN8550 with mounted ceramic antenna). For details, please see the chapter 27. Ordering Information.

The EUT is labelled with FCC ID: T7VPAN8550. This Label must be visible for the user in the end product. If the module is inside of an end product, the label will not be visible. In this case the end product will be labelled exterior with "Contains FCC ID: T7VPAN8550"

Part 2.925 (a) (1) describes "...The FCC Identifier shall be preceded by the term FCC ID in capital letters on a single line, ...". Due to the limited size, we have 2 lines and could not fulfill this rule. Otherwise the letters are too small and could not be readable, therefore we made this compromise.

31.4. ANTENNA WARNING

The related part number for this device is ENW99A01N2D (PAN8550 with mounted connector). For details, please see the chapter 27. Ordering Information. This device will be tested with an UFL connector from company Hirose and with the antennas listed below. When integrated in the OEMs product, these fixed antennas require installation preventing end-users from replacing them with non-approved antennas. Any antenna not in the following table must be tested to comply with FCC Section 15.203 for unique antenna connectors and Section 15.247 for emissions. The FCC identifier for this device will be available, after a first measurement with an approved antenna.

31.5. APPROVED ANTENNA LIST

Note: We are able to qualify your antenna and will add to this list as that process is completed.

Item	Part Number	Manufacturer	Frequency Band	Type	Gain (dBi)
1					
2					

31.6. RF EXPOSURE PAN8550

To comply with FCC RF Exposure requirements, the Original Equipment Manufacturer (OEM) must ensure that the approved antenna in the previous table must be installed and/or configured to operate with a separation distance of 2.5cm or more from all persons to satisfy RF Exposure compliance.

The preceding statement must be included as a CAUTION statement in manuals for products operating with the approved antennas in the previous table to alert users on FCC RF Exposure compliance.

Any notification to the end user of installation or removal instructions about the integrated radio module is not allowed.

The radiated output power of PAN8550 with mounted ceramic antenna (FCC ID: T7VPAN8550) is far below the FCC radio frequency exposure limits. Nevertheless, the PAN8550 shall be used in such a manner that the potential for human contact during normal operation is minimized.

The EUT meets the requirements of FCC section 15.249, even if the EUT transmitted at the maximum allowed field strength (50,000 uV/m),which the equivalent e.i.r.p would be 0.75 mW. End users may not be provided with the module installation instructions. OEM integrators and end users must be provided with transmitter operating conditions for satisfying RF exposure compliance.

32. GENERAL INFORMATION
Allgemeine Informationen

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.

Disclaimer:
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 disclaims 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 disclaimes any liability for consequential and incidental damages.
In case of any questions, please contact your local sales partner or the related product manager.

33. 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.