Application for Production

Applicant / Manufacturer Hardware	Panasonic Electronic Devices Europe GmbH Zeppelinstrasse 19 21337 Lüneburg Germany
Applicant / Manufacturer Software	
Software Version	No Software included
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

- Module using CC1100-RF-Transceiver
- generally 300-1000 MHz Frequency Range (upon request, standard frequency is 868 MHz)
- up to 10 dBm Output Power (programmable)
- Data rate up to 500 kbps
- all configuration and data access via SPI bus
- Wide Supply voltage range of 2.1 – 3.6 V
- extremely small size (8 x 8.2 x 2 mm)

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
- Wireless alarms and security systems
- Wireless serial cable replacement
- Automatic Meter Reading
- Low Power Telemetry

3. DESCRIPTION FOR THE MODULE
Modulbeschreibung

The PAN2355 provides a complete RF transceiver module utilizing a powerful transceiver for all kind of wireless applications. This module is specifically suited for low-power operation and small-size applications.

4. SCOPE OF THIS DOCUMENT
Umfang dieses Dokumentes

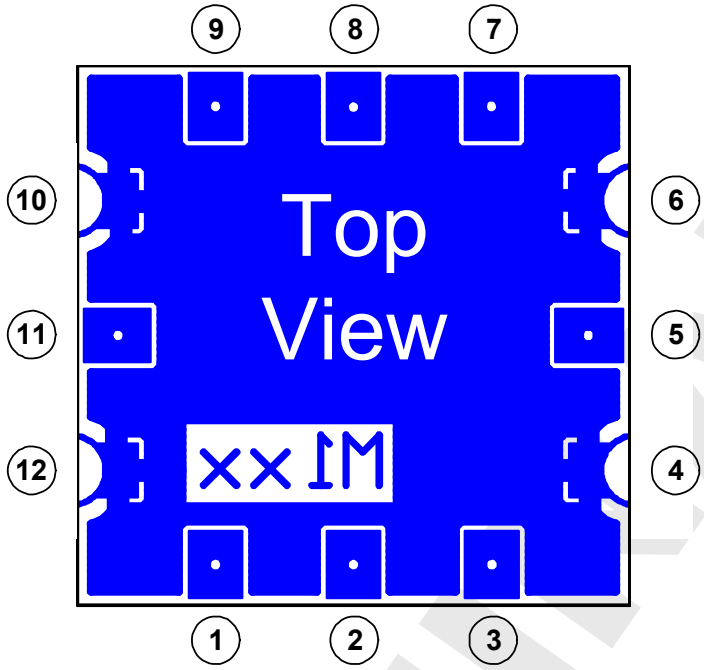
This document applies to the PAN2355 module. The module is based upon a Chipcon/TI (based in Oslo/Norway) CC1100 transceiver.

Dieses Dokument bezieht sich auf das Funkmodul PAN2355. Es basiert auf einem Chipcon/TI CC1100 Transceiver.

5. HISTORY FOR THIS DOCUMENT
Versionsverwaltung dieses Dokumentes

Revision Version	Date Datum	Modification / Remarks Änderungen / Bemerkungen
A	04.05.2006	Initial DRAFT **(AS)**
B	30.06.2006	Change of Supply Voltage and Temperature Range **(AS)**
C	10.07.2006	Adapt specification to the newest data sheet from Chipcon, please refer to [1] in chapter Related Documents. **(HK)**
D	28.07.2006	Correct link to number [1] in chapter Related Documents and add chapter 22 Packaging, 17 Module Dimension and 19 Labelling Drawing, revised chapter 18 Foot Print and Size of the Module **(HK)**

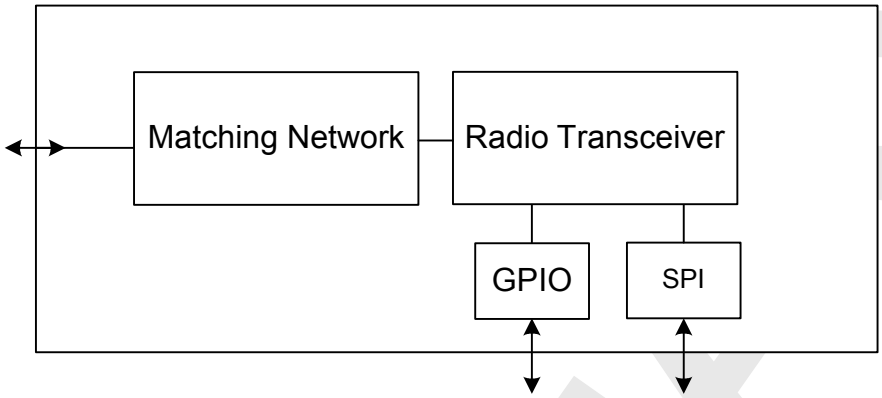
6. TERMINAL LAYOUT
Anschlußbelegung



Pin no.	Pin Name	Pin Type	Description
1	SPI SI	I	SPI Slave Data In
2	SPI CLK	I	SPI Clock
3	SPI SO	O	SPI Slave Data Out
4	GND	PWR	Ground
5	GDO0	O	General Purpose Output[1]
6	GND	PWR	Ground
7	SPI CSN	I/O	SPI Chip Select
8	Vdd	PWR	Supply Voltage
9	GDO2	O	General Purpose Output[1]
10	GND	PWR	Ground
11	RF	I/O	50 Ω RF Port
12	GND	PWR	Ground

[1] See CC1100 Datasheet for Details on how to configure this output

7. BLOCK DIAGRAM
Blockdiagramm



8. 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 0.15mm Material: Weißblech 0,15mm Dicke
IC part name IC Name	CC1100 (Chipcon AS www.chipcon.com) All information are based on [1] in chapter Related Documents

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

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 +3.6	V
2	Voltage on any pin Spannung an jedem Pin	Vpin	-0,3 to Vdd +0.3 (3.6 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

Vdd = 3.0V, 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	Available upon request	300		348	MHz
	Frequency Range Frequenzbereich	Available upon request	400		464	MHz
	Frequency Range Frequenzbereich	Available upon request	800		928	MHz
2[1]	Frequency Range Frequenzbereich	Default Frequency range	863		928	MHz
3	Frequency Accuracy Freqenzgenauigkeit	Settings are done with SMART RF Studio vom Chipcon		20		ppm
4	Supply voltage Versorgungsspg.	The typical voltage is recommended Vdd at voltage pin	2.1	3.0	3.6	Vdc
5	Ripple on Vdd AC Anteil auf Vdd	Ripple frequency ≥200kHz Ripple frequency <200kHz			tbd tbd	mVpp

[1] Standard Frequency range. Frequencies as indicated in No. 1 are available upon request.

12. I/O OPERATING CHARACTERISTICS

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

No Nr.		Item Punkt	Condition Bedingung	Min	Max	Unit
1		Low-Level Input Voltage	Vdd > 2.3V		0.35 x Vdd	V
2		High–Level Input Voltage	Vdd > 2.3V		0.70 x Vdd	V
3		Input hyteresis (all digital inputs)			0.09 x Vdd	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

Vdd = 3.0V, T_{amb} = 25°C, 50Ω Output

No Nr.	Modes Modi	Average Durchschnitt	Unit Einheit
1	Sleep Mode (lowest power)[2]	0.09	µA
2	Standby Mode[2]	5.7	µA
3	Idle Mode[2]	1.7	mA
4	Receiving[2]	18.3	mA
5	Transmitting –10 dBm[2]	14.2	mA
6	Transmitting 0 dBm[2]	16.8	mA
7	Transmitting +10 dBm[2]	36	mA

[2] Current values may differ with register settings

14. ELECTRICAL RF-CHARACTERISTICS

Vdd = 3.0V, T_{amb} = 25°C, 50Ω Output

No Nr.	Receiver Empfänger	Data rate Datenrate	Limit / Grenzen Min	Typ	Max	Spec	Unit Einheit
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 Min	Typ	Max	Spec	Unit Einheit
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		-	tbd			dB
10	2nd Harmonics content		-102[3]	-49[4]	-34[5]		dBm
11	3rd Harmonics content		-111[3]	-60[4]	-45[5]		dBm

15. MECHANICAL REQUIREMENTS
Mechanische Anforderungen

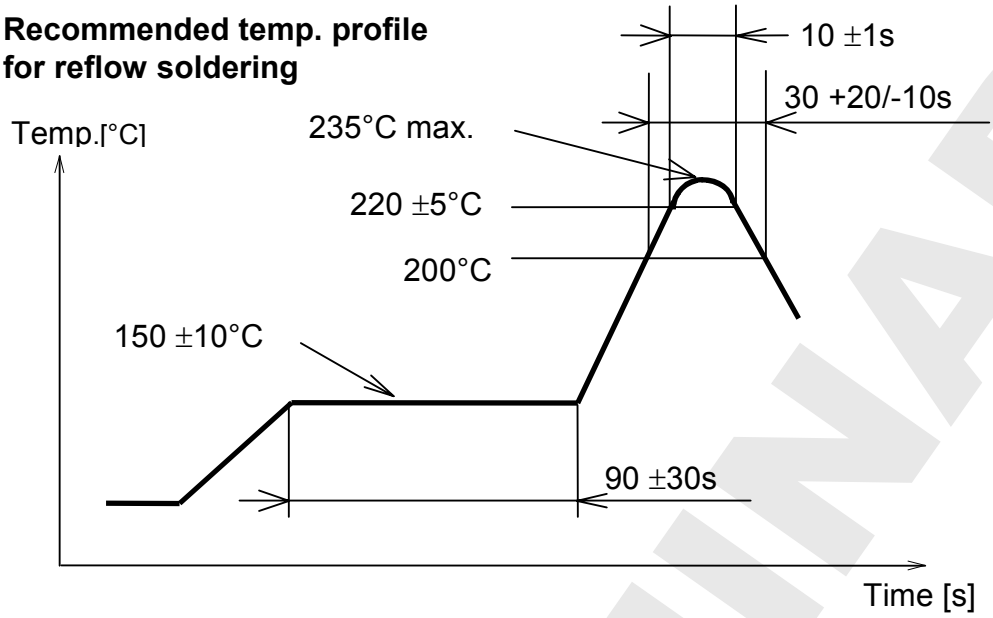
No.	Item Punkt	Limit Grenzwerte	Condition Bedingung
1	Solderability Lötfähigkeit	More than 75% of the soldering area shall be coated by solder Mehr als 75% der Lötfläche soll mit Lötpaste bedeckt sein.	Reflow soldering with recommendable temperature profile
2	Resistance to soldering heat	It shall be satisfied electrical requirements and not be mechanical damage	See chapter 16.2

[3] RF Output set to –52 dBm
[4] RF Output set to 0 dBm
[5] RF Output set to +10 dBm

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

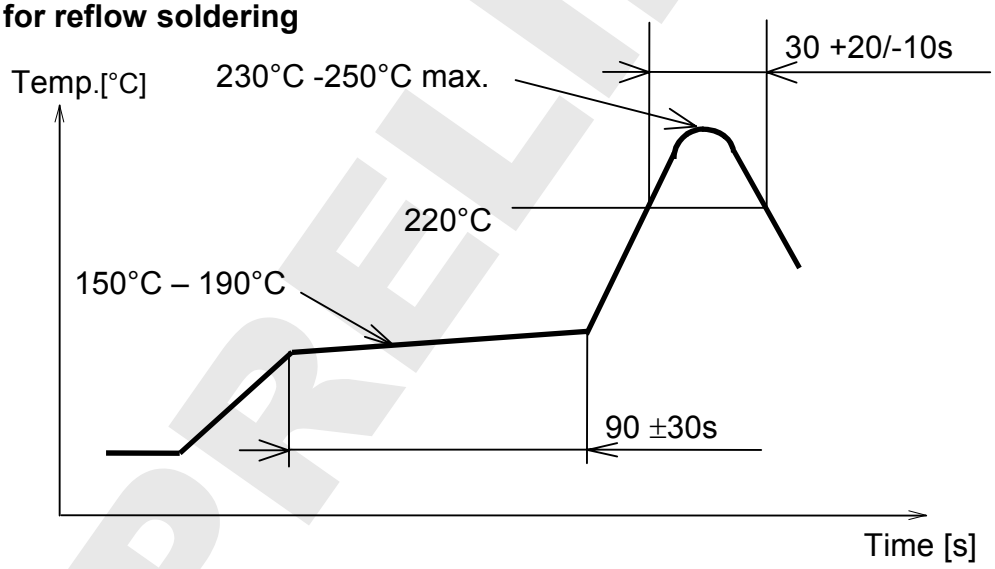
16.1. FOR LEAD SOLDER

Recommended temp. profile for reflow soldering



16.2. FOR LEADFREE SOLDER

Our used temp. profile for reflow soldering

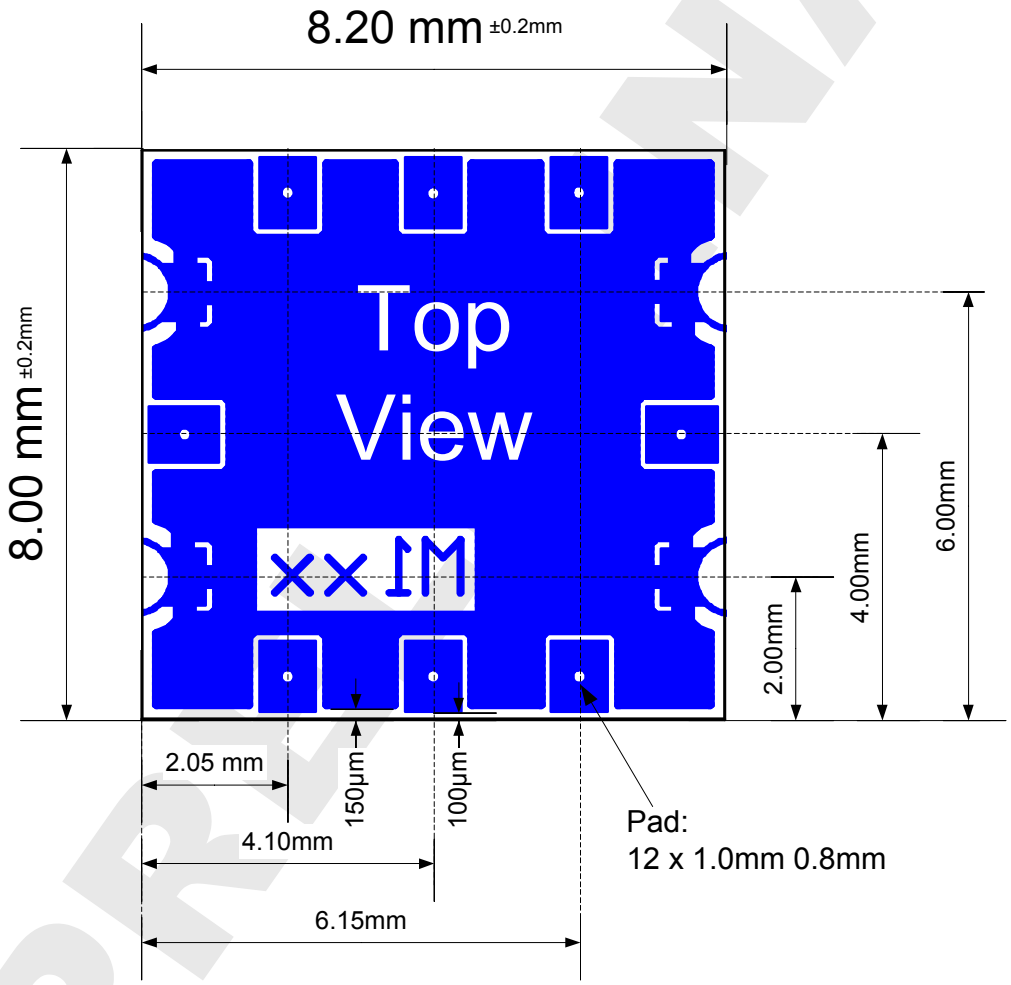


Reflow permissible cycle: 2
Opposite side reflow is prohibited due to module weight.

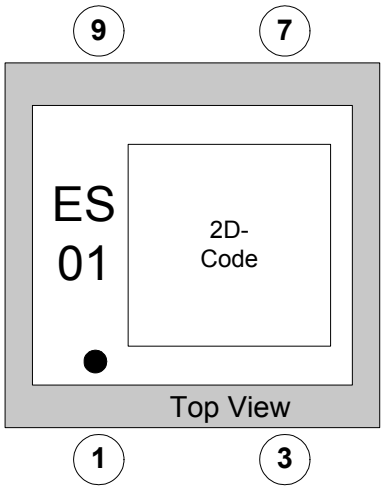
17. MODULE DIMENSION
Modulabmessungen

No.	Item Punkt	Dimension Abmessung	Tolerance Toleranz	Remark Bemerkung
1	Width	8.00	± 0.2	
2	Lenght	8.20	± 0.2	
3	Hight	1.95	± 0.1	Depends on label or laser marking

18. FOOT PRINT AND SIZE OF THE MODULE
Lötpads und Abmessungen des Moduls



19. LABELLING DRAWING



This label is suitable for reflow soldering and designed for the engineering sample status.

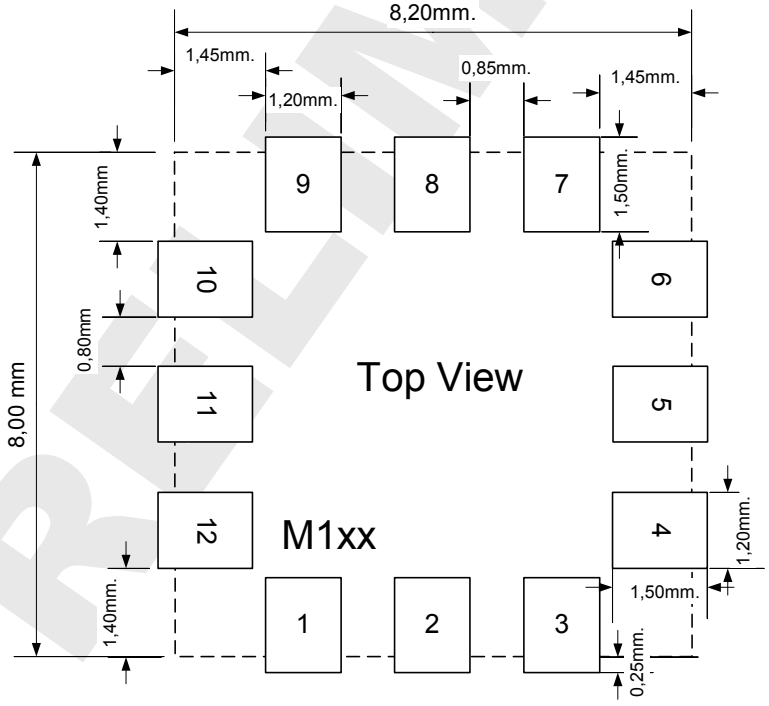
Information in the 2D-Barcode are the date code in the format Year-Month-Day [6 signs], serial number [5 signs] and the identifier for the hardware release [2 signs, now 01], separated by a semicolon.

The point on the label is the identifier for pin 1 of the module.

ES stands for Engineering Samples, please refer to chapter General Information.

01 is the hardware revision.

20. RECOMMENDED FOOT PATTERN
Empfohlenes Land Pattern



21. RELIABILITY TESTS
Zuverlässigkeitstests

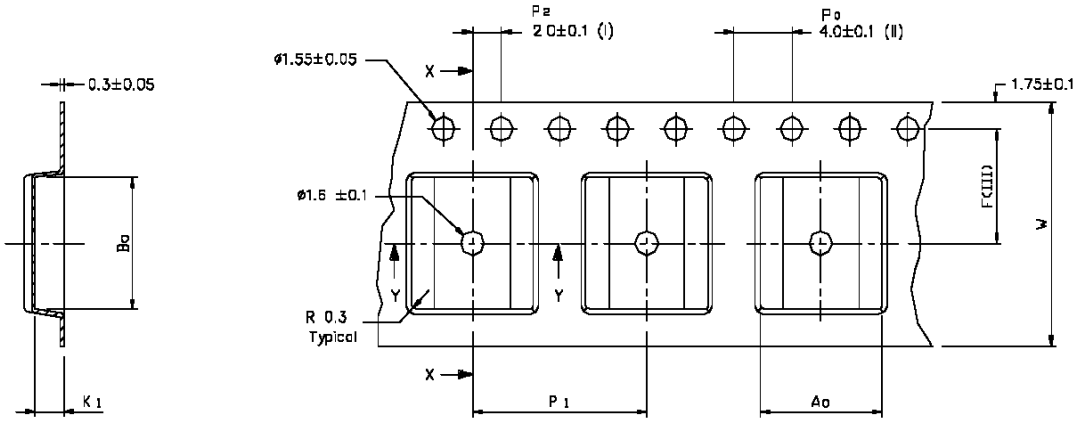
The measurement should be done after storage room temperature and normal humidity for 1 hour.
Die Messungen sollten erst nach einer Stunde Lagerung unter normalen Bedingungen erfolgen.

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

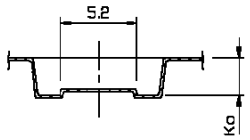
22.1. EMBOSSED TAPE / BLISTERGURT

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



SECTION X – X

Ao	8.40	+/−0.1
Bo	8.70	+/−0.1
Ko	2.50	+/−0.1
K1	2.00	+/−0.1
F	7.50	+/−0.1
P1	12.00	+/−0.1
W	16.00	+/−0.3

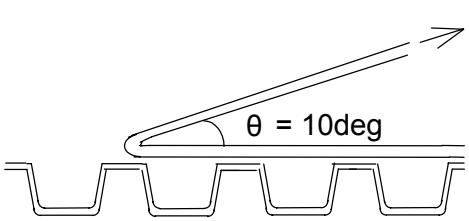


SECTION Y – Y

(I) Measured from centreline of sprocket hole to centreline of pocket.
(II) Cumulative tolerance of 10 sprocket holes is ± 0.20 .
(III) Measured from centreline of sprocket hole to centreline of pocket
(IV) Other material available

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.

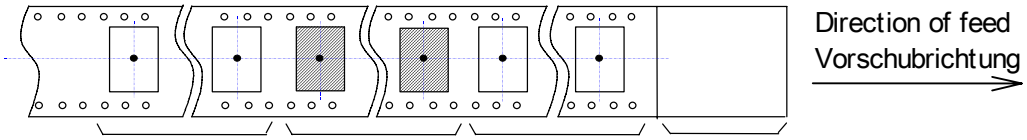
(2) Cover tape reel strength / Abzugskräfte Blistergurt Deckfolie



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.

22.2. 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.

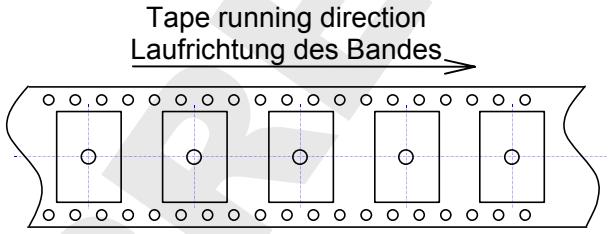
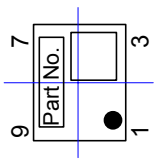


Figure 1

(top view)



Component direction
Komponentenrichtung
(See also chapter 21)

22.3. REEL DIMENSION
Abmaße der Rolle

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

(5) 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 und 3

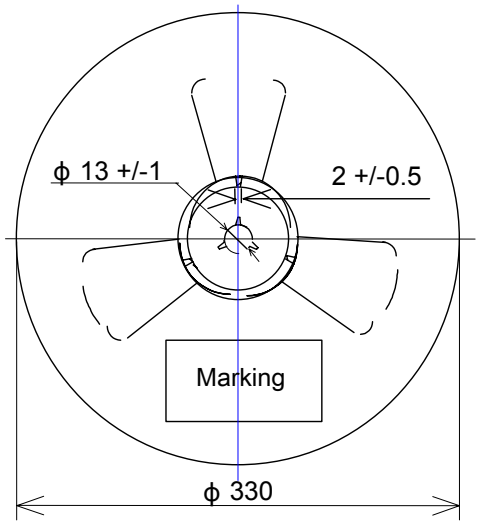
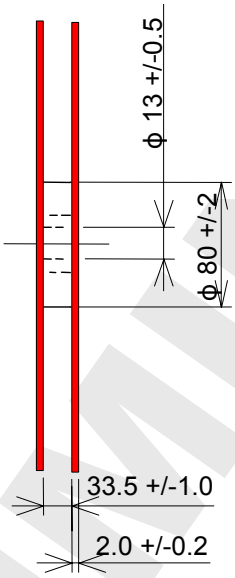


Figure 2



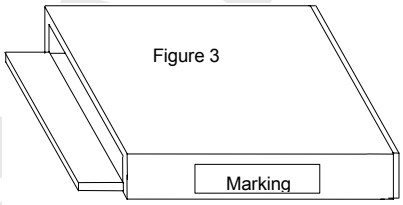


Figure 3

23. ORDERING INFORMATION
Bestellinformationen

Ordering part number	Description	MOQ
ENW5Z611N3A	Engineering Sample for PAN2355	1

24. 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.

25. RELATED DOCUMENTS
Mitgeltende Dokumente

[1] CC1100 Data Sheet (Rev. 1.1) SWRS038a

[2] CC1100 Errata Note Rev 1.0

[3] Application Note AN039 (Using the CC1100/CC1150 in the European 433 and 868 MHz ISM bands)

26. 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.

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