RP-M110A
Datasheet

(No.BRP0017)
V1.0

REVISION HISTORY

Version	Date	Description
VER.1.0	2012.4.6	▪ First Version Release

CONTENTS

1. SPECIFICATIONS

This specification is applied to IEEE802.15.4 ZigBee Transceiver Module which has chip antenna and embeds 16MHz X-TAL and single chip SOC.

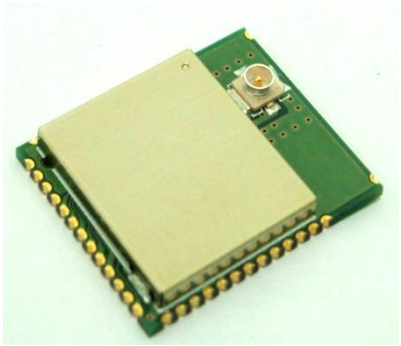
1.1. Description

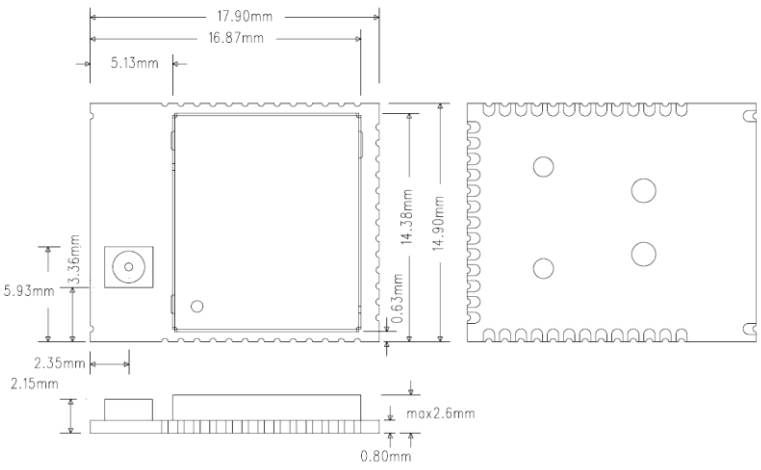
Item	Description
Application	Transceiver Module
Frequency Range	2.4 ~ 2.4835 GHz
Technical Standard	IEEE802.15.4
Type	SMD Type
Size	17.9 x 14.9 x 2.6 mm
RF OUTPUT TYPE	CMJ(CMP) CONNECTOR

1.2. Drawing

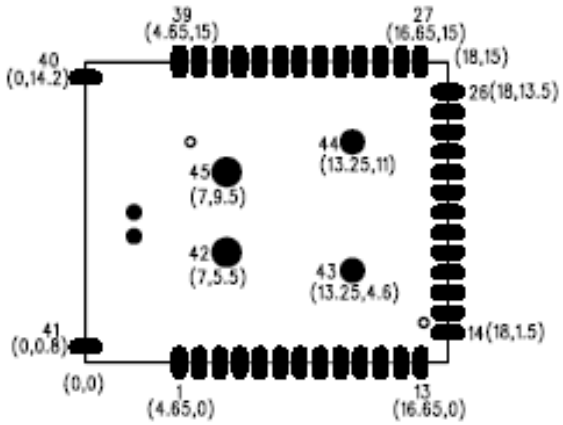
1.2.1. Outline

Unit :mm





1.2.2. PCB drawing (top view)



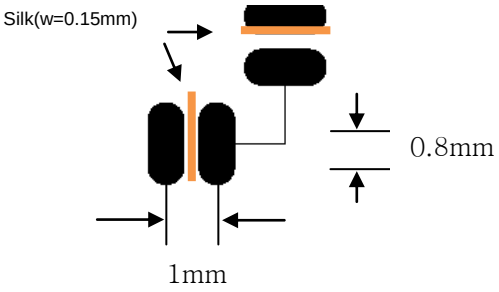
Pads of pin 1~41; (W*L: 0.7*1.6mm)

Pads of pin 42, 45; (R=0.75, Circle)

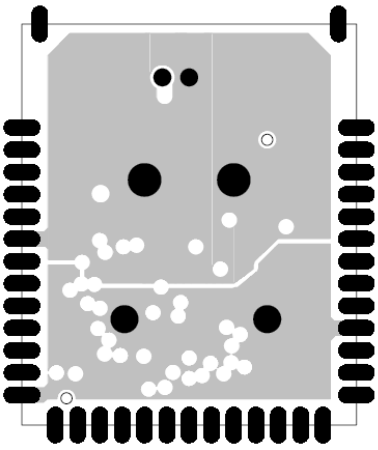
Pads of pin 43, 44; (R=0.625, Circle)

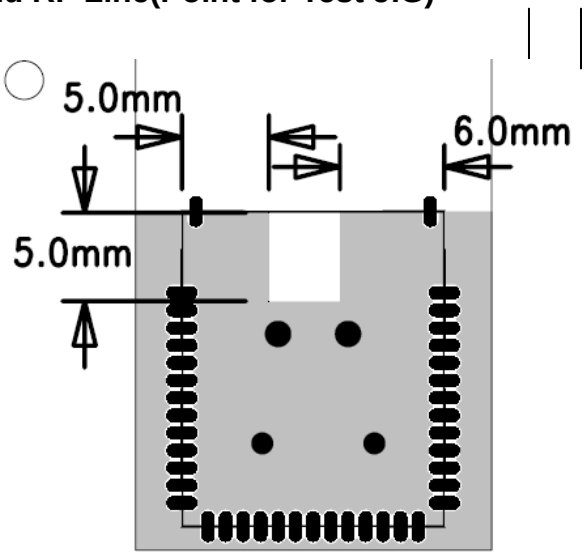
NOTE1: Solder mask opening of 42~45 pins should be enough about 25~50% against these pads size.

NOTE2: Silk paste inserting for Short protection, when soldering.



1.2.3. Copper pour Rules of Ground RF Line(Point for Test JIG)





<TOP VIEW> **<Main PCB board>**

1.3. Absolute maximum ratings

Symbol	Parameter	Rating	Unit
VDD	Chip core supply voltage	-0.3 to 1.65	V
VDDIO	I/O supply voltage(3V_IN)	-0.3 to 3.3	V
RFIN	Input RF level	10	dBm
TSTG	Storage Temperature	-40 to 85	℃
ESD	HBM(JESD22-A114-F)	2000	V
	MM(JESD22-A115-A)	150	V
	CDM(JESD22-C101-E)	500	V

1.4. DC Characteristics

Symbol	Parameter	Min	Typ.	Max	Unit
VDD	Chip core supply voltage (AVDD_1.5V,DVDD_1.5V)	1.35	1.5	1.65	V
VDDIO	I/O supply voltage(3V_IN)	1.35(*)	3.0	3.3	V
VIH	High level input voltage	0.7X VDDIO		VDDIO	V
VIL	Low level input voltage	0		0.3X VDDIO	V
VOH	High level output voltage	VDDIO -0.5		VDDIO	V
VOL	Low level output voltage	0		0.4	V
TA	Air temperature	-40		85	℃

(*) : MSV=”L”, min 1.9V(regulator drop voltage), 3VIN=2.7~3.3V is Recommended.

1.5. Electrical specifications

(Condition: EVM Board RF Conduction, at 25℃, 3V_IN=3.0V, VDD(AVDD,DVDD=1.5V,X-tal 16MHz)

Parameter	Min	Typ.	Max	Unit
Current consumption				
Active MCU without RX/TX operation (AES, Peripheral, SADC Disabled)		4.6		mA
Active MCU with TX Mode (AES, Peripheral, SADC Disabled) @+8dBm output power @+0dBm output power		 44 32		mA
Active MCU with RX Mode (AES, Peripheral, SADC Disabled)		35		mA
PM1		25		uA
PM2		1.7		uA
PM3		0.3		uA
AES		3.1		mA
Peripheral		2.6		mA
Sensor ADC		1		mA
RF Characteristics(Fc=2450MHz)				
Spurious radiation @30MHz ~ 1000MHz @1GHz ~ 12.75GHz		 -65 -70		dBm
Received RF Bandwidth		2		MHz
Channel Bandwidth		5		MHz
Receiver Sensitivity (PER≤1%,Packet length of 22-byte) Normal mode (250 kbps) Turbo mode (500 kbps) Premium mode (1000 kbps)		 -98 -95 -91		dBm
Adjacent Channel Rejection +5MHz -5MHz		 49 49		dB
Alternate Channel Rejection +10MHz -10MHz		 53 54		dB
Co-Channel Rejection		-8		dB
Blocking / Desensitization +5MHz / -5MHz +10MHz / -10MHz		 -53 / -52 -48 / -46		dBm

+20MHz / -20MHz +30MHz / -30MHz +50MHz / -50MHz		-44 / -40 -43 / -38 -41 / -37		
TX output power		5.5	8	dBm
Transmit chip rate		2000		kChips/s
Spurious Emission(30Hz~1GHz)		-50		dBm
Spurious Emission(1GHz~2.5GHz)		-40		dBm
Spurious Emission(2.5GHz~12.7GHz)		-50		dBm
2nd Harmonics		-55		dBm
3nd Harmonics		-70		dBm
Frequency Error Tolerance	-100		+100	KHz
Error Vector Magnitude(EVM)		10	35	%
Saturation(Maximum Input Level)		5		dBm
RSSI Dynamic Range		90		dB
RSSI Accuracy		±1.2	+6/-3	dB
RSSI Linearity		±0.2	±6	dB
RSSI Average Time		128		usec
Frequency Synthesizer				
Phase Noise (Unmodulated carrier) @±100KHz offset @±1MHz offset @±2MHz offset @±3MHz offset @±5MHz offset		 -75 -106 -112 -118 -129		dBc/Hz
PLL Lock Time		110		us
PLL Jitter		16		Psec
16MHz Crystal Oscillator				
Crystal Frequency		16		MHz
Crystal Frequency Accuracy Requirement	-20		+20	ppm
ESR			80	Ω
C0			3	pF

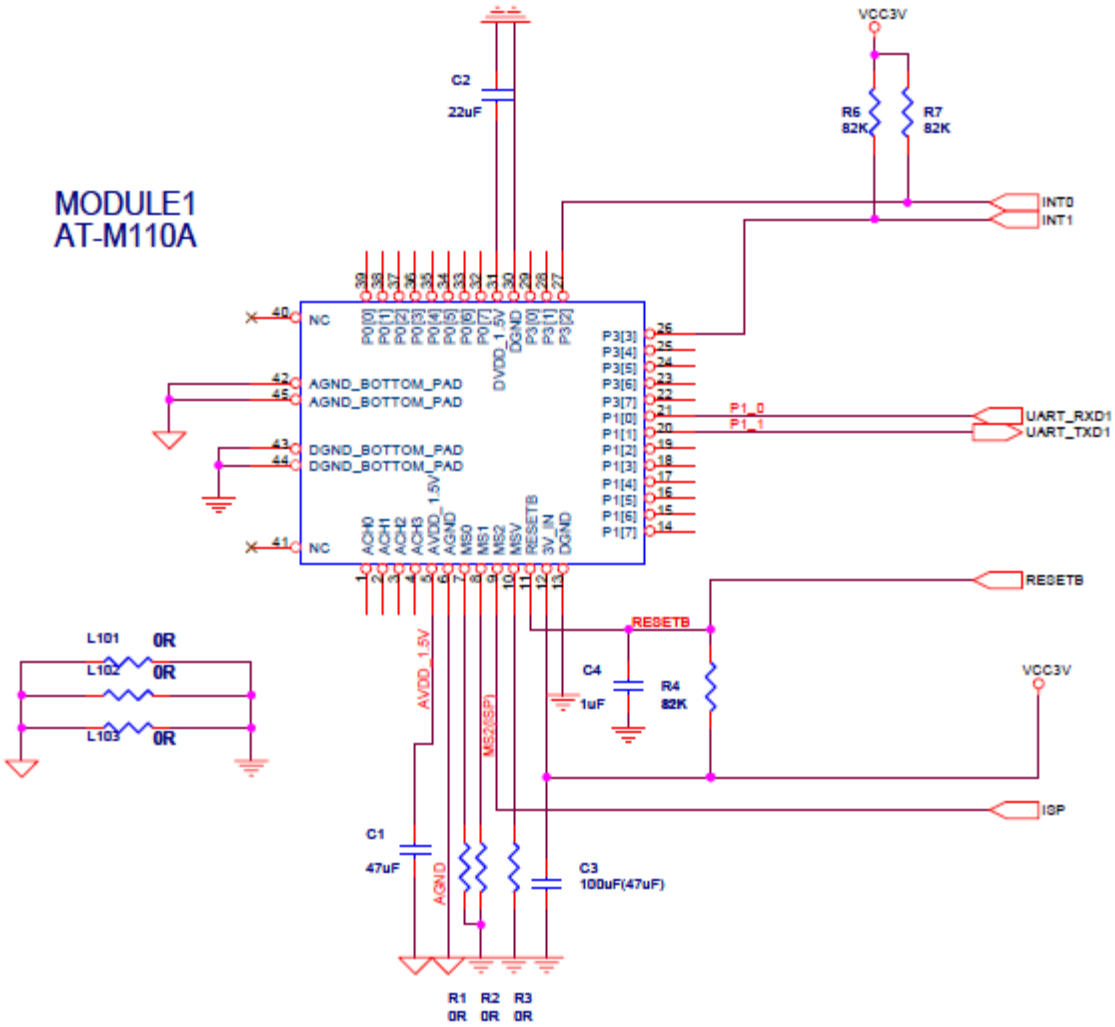
CL		9		pF
On-chip RC Regulator				
Frequency		32.78		KHz
Sensor ADC				
Number of Bits		12		bits
Conversion Time		256		usec
Differential Nonlinearity(DNL)		±16		LSB
Integral Nonlinearity(INL)		±16		LSB
SINAD(Sine Input)		51.0		dB
On-Chip Voltage Regulator				
Supply range for Regulator	1.9	3.0	3.6	V
Regulated Output		1.5		V
Maximum Current			140	mA
No Load Current		15		uA
Start-up Time		260		usec

1.6. Electrical Interface

Terminal	NAME	Inter face	I/O	Description
1	ACH0	Analog	I/O	Sensor ADC input
2	ACH1	Analog	I/O	Sensor ADC input
3	ACH2	Analog	I/O	Sensor ADC input
4	ACH3	Analog	I/O	Sensor ADC input
5	AVDD_1.5V	Power	I/O	1.5V Power Supply input/output
6	AGND	Ground	-	RF Ground
7	MS0	Digital	I	Mode select
8	MS1	Digital	I	Mode select
9	MS2	Digital	I	Mode select
10	MSV	Digital	I	Mode select of voltage(0=1.5V)
11	RESETB	Digital	I	Reset (Active Low)
12	3V_IN	Power	I	3V Power supply
13	DGND	Ground	-	Ground for digital core and I/O
14	P1[7]	Digital	O	Port P1.7GPO/P0AND/TRSW
15	P1[6]	Digital	B	Port P1.6/TRSWB
16	P1[5]	Digital	B	Port P1.5
17	P1[4]	Digital	B	Port P1.4 /QUADZB/Sleep Timer OSC Buffer Input.
18	P1[3]	Digital	B	Port P1.3/QUADZA/Sleep Timer OSC Buffer Output/RTCLKOUT
19	P1[2]	Digital	B	Port P1.2
20	P1[1]	Digital	B	Port P1.1/TXD1
21	P1[0]	Digital	B	Port P1.0/RXD1
22	P3[7]	Digital	B	Port P3.7/12mA Drive capability /PWM3/CTS1/SPICSN(slave only)
23	P3[6]	Digital	B	Port P3.6/12 mA Drive capability /PWM2/RTS1/SPICLK
24	P3[5]	Digital	B	Port P3.5/T1/CTS0/QUADYB/SPIDO
25	P3[4]	Digital	B	Port P3.4/T0/RTS0/QUADYA/SPIDI
26	P3[3]	Digital	B	Port P3.3/INT1(active low)
27	P3[2]	Digital	B	Port P3.2/INT0(active low)
28	P3[1]	Digital	B	Port P3.1/TXD0/QUADXB
29	P3[0]	Digital	B	Port P3.0/RXD0/QUADXA
30	DGND	Ground	-	Ground for digital core and I/O
31	DVDD_1.5V	Power	I/O	1.5V Power Supply input/output
32	P0[7]	Digital	B	Port P0.7/I2STX_MCLK
33	P0[6]	Digital	B	Port P0.6/I2STX_BCLK
34	P0[5]	Digital	B	Port P0.5/I2STX_LRCK
35	P0[4]	Digital	B	Port P0.4/I2STX_DO
36	P0[3]	Digital	B	Port P0.3/I2SRX_MCLK
37	P0[2]	Digital	B	Port P0.2/I2SRX_BCLK
38	P0[1]	Digital	B	Port P0.1/I2SRX_LRCK
39	P0[0]	Digital	B	Port P0.0/I2SRX_DI
40	NC	NC	-	No Connection
41	NC	NC	-	No Connection
42	AGND	Ground	-	RF Ground

43	DGND	Ground	-	Ground for digital core and I/O
44	DGND	Ground	-	Ground for digital core and I/O
45	AGND	Ground	-	RF Ground

2. APPLICATION DESIGN GUIDE

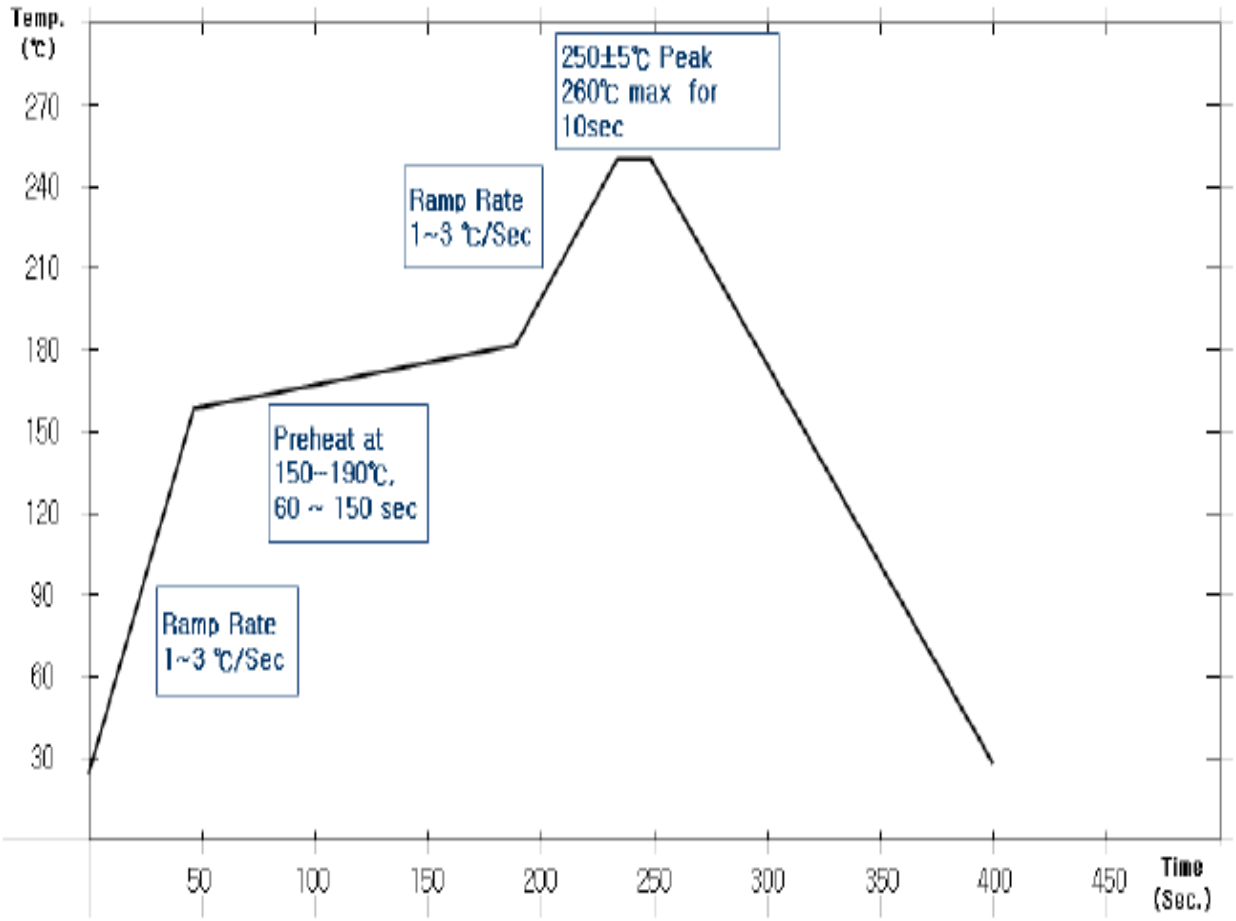


3. Realiability & RF INSPECTION SPECIFICATION

3.1. Reliability

No.	Test item	Test condition
1	Reflow Thermal Cycle	Normal Pbfree reflow Condition.2 times
2	Thermal Shock Cycle	30min. at -40℃, 30min. at 85℃ , 100Cycles Recovery Time 2hours
3	Vibration Test	50Hz -> 500Hz -> 50Hz , 15min/Cycle X,Y,Z : Each 12 times [Total : 9hours]
4	High Temperature Storage Test	96 hours at 85℃±2℃, Recovery Time 2hours
5	Low Temperature Storage Test	96 hours at -40℃±2℃, Recovery Time 2hours
6	High Temperature & Humidity Storage Test	96 hours at 60℃±2℃ & 95%RH±2%RH. Recovery Time 2hours
7	Operating Temperature TEST	96hours at -40℃,85℃
8	High Temperature & Humidity Operating Test	24hours at 60℃ & 85%±2%RH.
9	Drop Test	Height min 76㎝, All sides onto Iron plate(T=min2mm).
10	ESD	HBM : ±2000V MM : 150V CDM : 500V

4. Reflow Profile

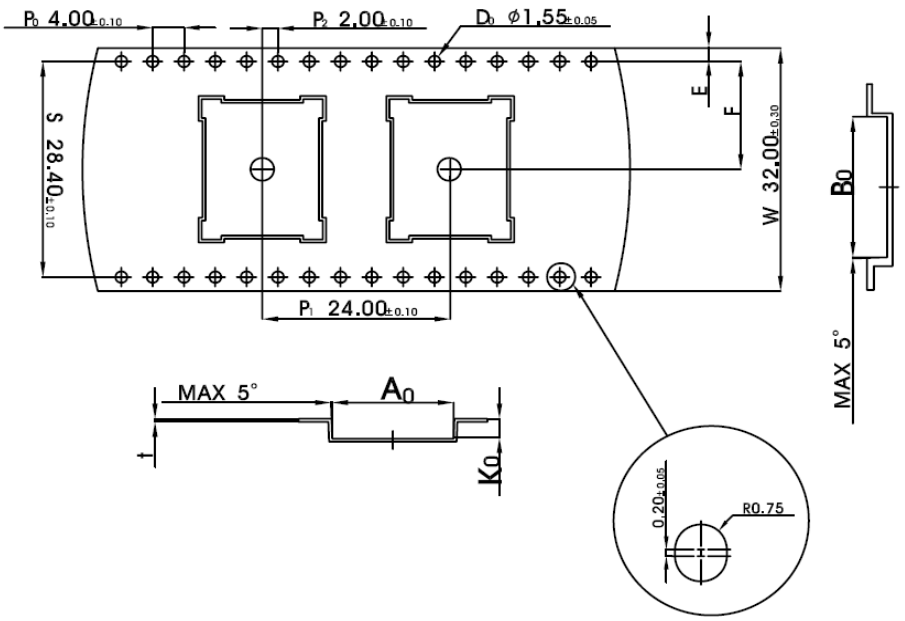


5. ROHS Data

ITEM	PART NO.	REPORT NO.	Issued date	Testing Company	Testing Report
RF MODULE	M110A	RLSHD000589650001	APR 20 2011	CENTRE TESTING INTERNATIONAL CORPORATION	ROHS
Shield Case	C7701	F690501/LF-CTSAYAU10-02041	APR 30 2010	SGS	ROHS

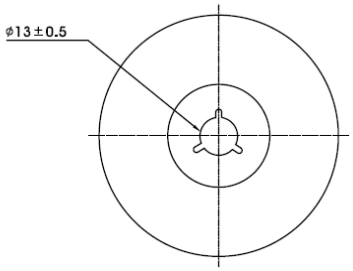
6. PACKAGE

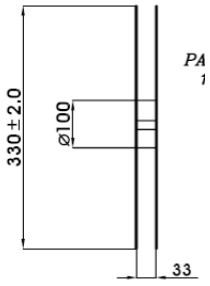
6.1. Dimensions of tape



A0: 15.50 ± 0.10
B0: 18.50 ± 0.10
E: 1.75 ± 0.10
F: 14.20 ± 0.10
K0: 2.60 ± 0.10
t: 0.40 ± 0.05

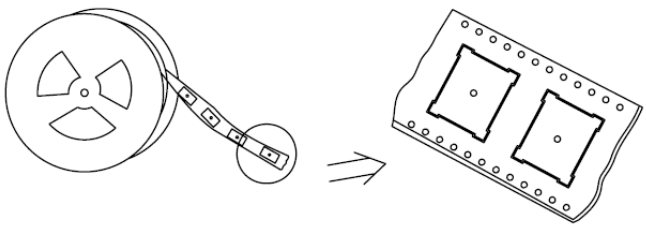
6.2. Dimensions of reel





Packing Quantity
800 PCS/REEL

6.3. Taping style



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About RadioPulse Inc.

RadioPulse is a Being Wireless solution provider offering wireless communication & network technologies and developing next generation wireless networking technologies.

The new wireless networking solutions envisioned by RadioPulse will enable user to enjoy wireless technologies with easy interface.

Founded in April of 2003, the company maintains it headquarters and R&D center in Seoul, Korea.