



RFM Integrated Device, Inc.

## PRODUCT SPECIFICATION

Part Number: XTL2002

XTAL,48MHz -1 +5 -15 +13  
-40C to +105C 9.9pF

# Crystal Unit SMD 1.2x1.0 48MHz

## Features:

- Surface Mount Hermetic Package
- Excellent Reliability Performance
- Good Frequency Perturbation and Stability over temperature
- Ultra Miniature Package
- Moisture Sensitivity Level (MSL) : Level-1

RoHS Compliant  
Lead free  
Lead-free soldering

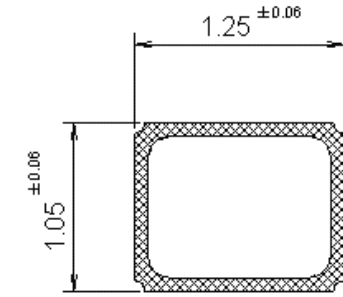
## Description and Applications:

Surface mount 1.2mmx1.0mm crystal unit for use in wireless communications devices, especially for a need of ultra miniature package for mobility.

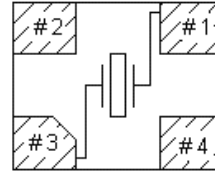
## Electrical Specifications:

XTL2002	Specification				
	Characteristic	Min	Nom	Max	Unit
Nominal Frequency			48.000000		MHz
Mode of Oscillation			Fundamental		°C
Storage Temperature Range	-40			125	°C
Operating Temperature Range	-40			105	°C
Frequency Stability over Operating Temperature Range -40°C~100°C (referred to the value at 25°C)	-15			13	ppm
Frequency Make Tolerance(@ 25°C +/- 3°C)	-1			5	ppm
IR Reflow(2 times)	-1			1	ppm
Aging(5 years)	-2			0	ppm
Frequency perturbation(ppm)	-1			1	ppm
Total Budget(ppm)	-20			20	ppm
Equivalent Series Resistance (ESR)	10	17		25	Ω
Nominal Drive Level	0.01	200		300	uW
Motional Inductance	4.3	5.3		7.0	mH
Load Capacitance (CL) (Measure by Saunders(S&A) Network Analyzer 250B)		9.9			pF
Motional Capacitance	1.5	2.5		4.0	fF
Shunt Capacitance	0.3	0.7		1.0	pF
Insulation Resistance(DC 100V)	500				MR

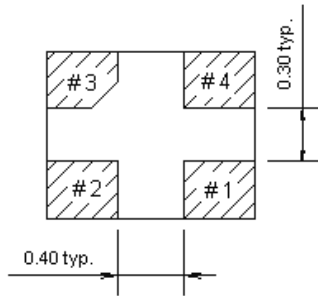
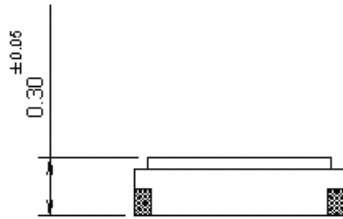
## Mechanical Dimensions (mm):



Internal Connections  
(Top View)

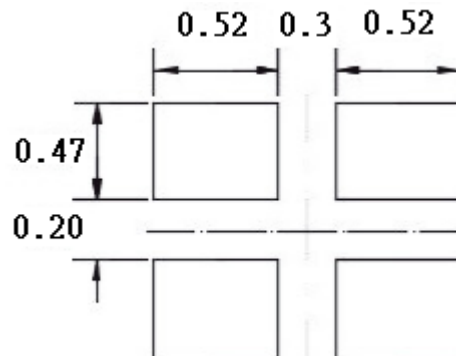


[NOTE] #2 =NC, #4 is connected with a metal cover



	Pin Connection
#1 Pin	IN/OUT
#2 Pin	NC
#3 Pin	IN/OUT
#4 Pin	GND

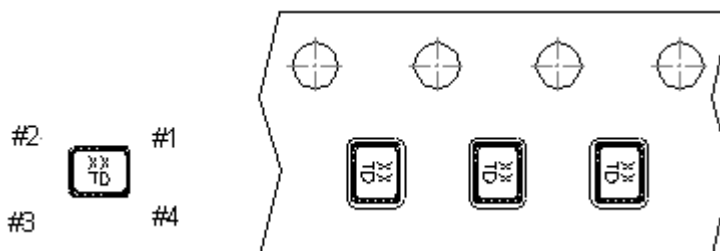
## Recommended Land Pattern: (unit: mm)



## Marking:

Line 1: XX; Frequency (48)

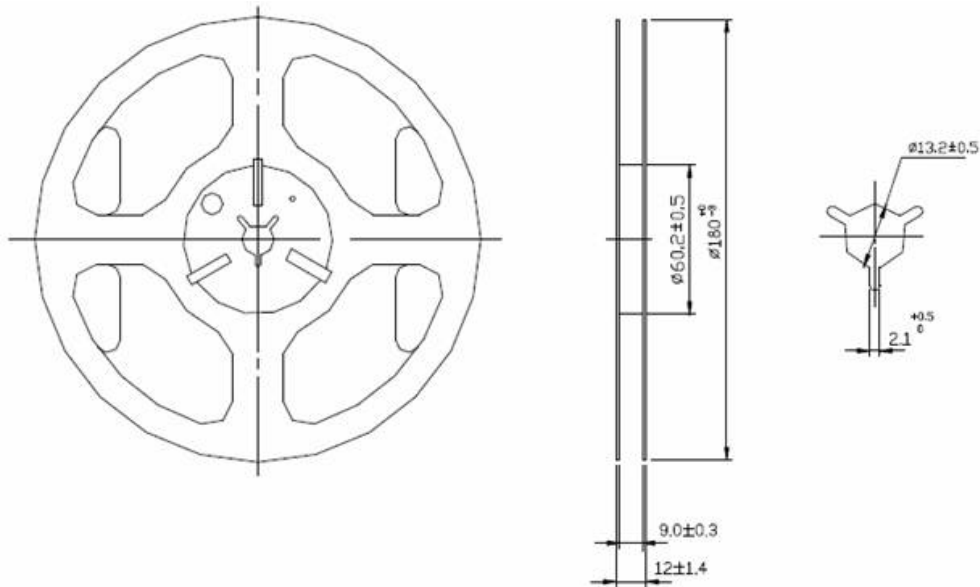
Line 2: T; Traceable Code + D; date Code of Year/Month



**Date Code Table: Year/Month**

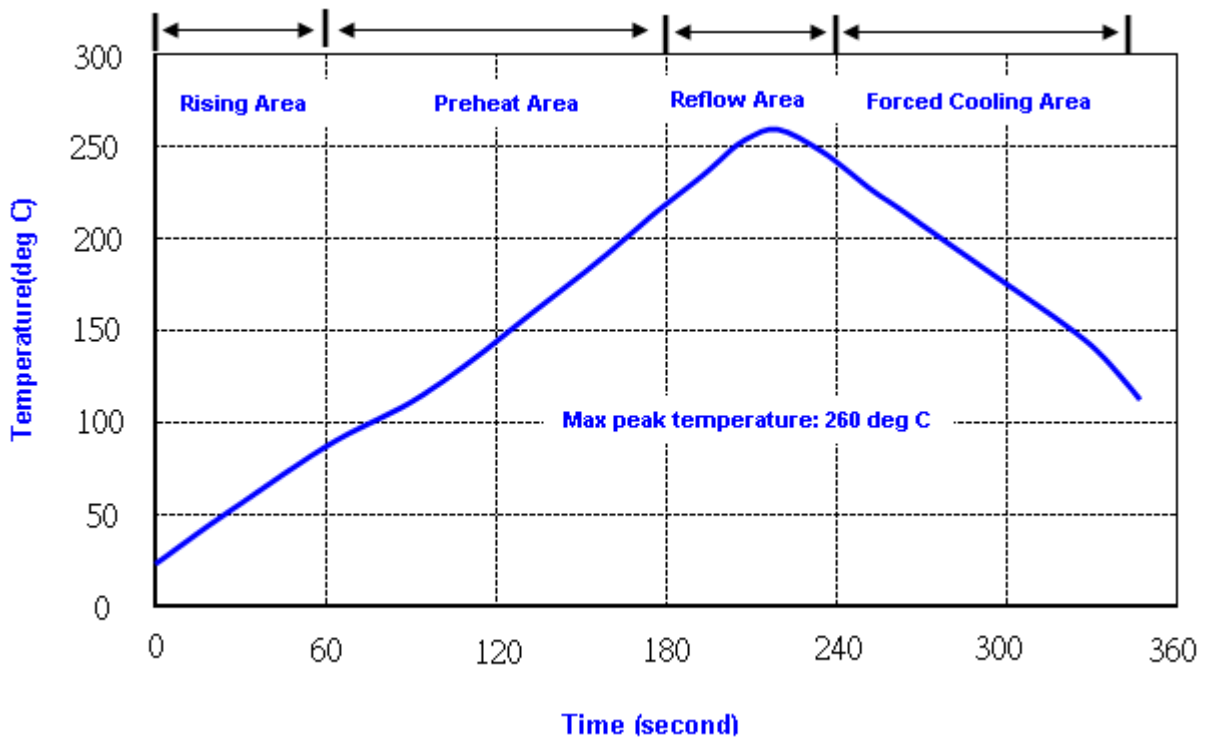
Year/Month	1	2	3	4	5	6	7	8	9	10	11	12
2012	a	b	c	d	e	f	g	h	i	j	k	m
2013	n	p	q	r	s	t	u	v	w	x	y	z
2014	A	B	C	D	E	F	G	H	J	K	L	M
2015	N	P	Q	R	S	T	U	V	W	X	Y	Z
2016	a	b	c	d	e	f	g	h	i	j	k	m
2017	n	p	q	r	s	t	u	v	w	x	y	z
2018	A	B	C	D	E	F	G	H	J	K	L	M
2019	N	P	Q	R	S	T	U	V	W	X	Y	Z
2020	a	b	c	d	e	f	g	h	i	j	k	m
2021	n	p	q	r	s	t	u	v	w	x	y	z
2022	A	B	C	D	E	F	G	H	J	K	L	M
2023	N	P	Q	R	S	T	U	V	W	X	Y	Z
2024	a	b	c	d	e	f	g	h	i	j	k	m
2025	n	p	q	r	s	t	u	v	w	x	y	z

**Reel Dimensions (mm):**





## Reflow Profile:



- Note:**
1. Max peak temperature: 260 $\pm$ 5 deg C; Time: 10 $\pm$ 2 sec
  2. Temperature: 217 $\pm$ 5 deg C; Time: 90~100 sec

## Reliability Specifications

Test name	Test process / method	Reference standard
<b>Mechanical characteristics</b>		
resistance to Soldering heat (IR reflow)	Temp./ Duration : 265°C /10sec ×2 times Total time : 4min.(IR-reflow)	EIAJED-4701 -300(301)M(II)
Vibration	Total peak amplitude : 1.5mm Vibration frequency : 10 to 2000 Hz Sweep period : 20 minute Vibration directions : 3 mutually perpendicular Duration : 2 hr / direc.	MIL-STD 202G method 204
Mechanical Shock	directions : 3 impacts per axis Acceleration : 3000g's, +20/-0 % Duration : 0.3 ms (total 18 shocks) Waveform : Half-sine	MIL-STD 202G method 213
Solderability	Solder Temperature:265±5°C Duration time: 5±0.5 seconds.	J-STD-002
<b>Environmental characteristics</b>		
Thermal Shock	Heat cycle conditions -40 °C (30min) ↔ 85 °C (30min) * cycle time : 10 times	MIL-STD 883G method 1010.8
Humidity test	Temperature : 85 ± 2 °C Relative humidity : 85% Duration : 96 hours	MIL-STD 202G method 103
Dry heat ( Aging test )	Temperature : 125 ± 2 °C Duration : 168 hours	MIL-STD 202G method 108A
Cold resistance (Low Temp Storage)	Temperature : -40 ± 2 °C Duration : 96 hours	IEC 60068-2-1