

# LEAD FREE RESONATORS

## FAR Resonators (RESONATOR 6 MHz to 25 MHz)

### C7 Series (Type F/G/H)

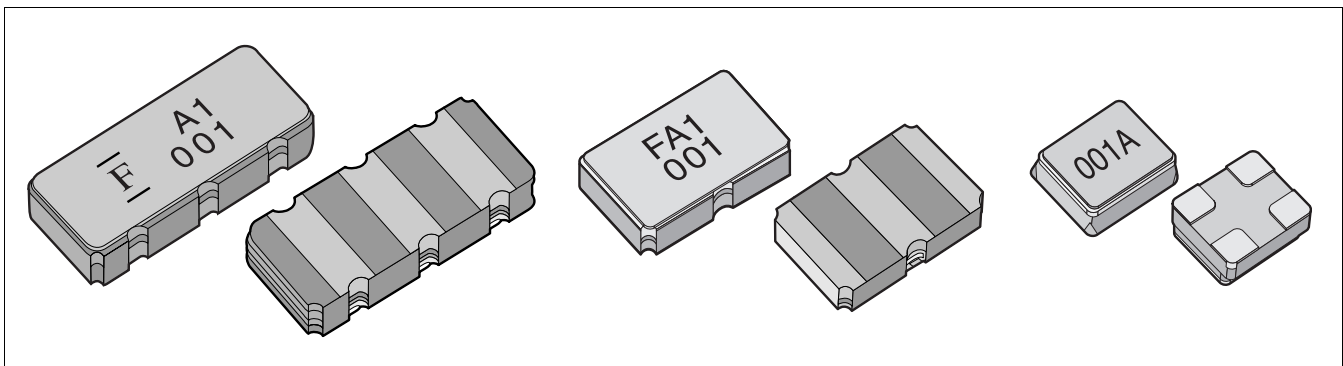
#### ■ GENERAL DESCRIPTION

FAR C7 series is the small and highly precise resonator which is utilizing LT (LiTaO<sub>3</sub> : Lithium Tantalate) crystal with high electro-mechanical coupling coefficient and has built-in load capacitors for use in microprocessor clock in the small ceramic package of low profile. FAR C7 series is excellent in the mechanical property, and has realized high reliability.

#### ■ FEATURES

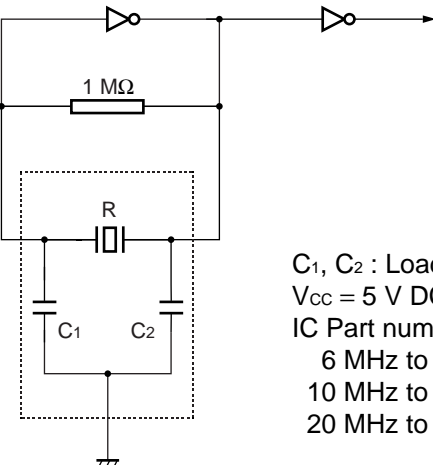
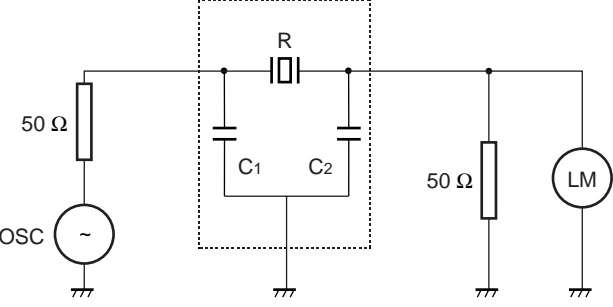
- Frequency Range : 6 MHz to 25 MHz
- Ultra-small package www.DataSheet4U.com
- Built-in load capacitors for use in microprocessor clock
- Completely lead-free device.
- Excellent in heat resistance to lead-free reflow soldering (Reflow temperature at +260 °C)
- High reliability, excellent in shock and vibration resistance

#### ■ PACKAGES



# C7 Series (Type F/G/H)

## ■ PRODUCT LINEUP

Items \ Name	F type	G type	H type
Package	F package	G package	H package
Material	LT (LiTaO <sub>3</sub> : Lithium Tantalate) Crystal		
Frequency range	6 MHz to 11.9 MHz	12 MHz to 20 MHz	20.1 MHz to 25 MHz
Standard frequency	See "■ STANDARD FREQUENCIES"		
Frequency tolerance *	± 500 ppm (G) , ± 1,000 ppm (J)		
Frequency stability (Over temperature)	+ 400 ppm / - 200 ppm (- 10 °C to + 60 °C) + 700 ppm / - 200 ppm (- 30 °C to + 85 °C)		
Built-in capacitance	10 pF ± 4 pF	5 pF ± 2 pF	
Aging stability	± 500 ppm (+ 25 °C ± 2 °C for 10 years)		
Operating temperature	- 30 °C to + 85 °C		
Storage temperature (Device only)	- 40 °C to + 100 °C		
Measurement circuit for frequency (R : Resonator)	 <p>           C<sub>1</sub>, C<sub>2</sub> : Load capacitors (built-in)            V<sub>CC</sub> = 5 V DC            IC Part number            6 MHz to 10 MHz : MB84069B × 2            10 MHz to 20 MHz : MC74HC04 × 2            20 MHz to 25 MHz : MC74HCU04 × 2         </p>		
Measurement circuit for resonant resistance (R : Resonator)	 <p>Measurement equipment : Network Analyzer</p>		

\* : Other frequency tolerances available. Contact our sales representatives for specific requirements.

# C7 Series (Type F/G/H)

## ■ STANDARD FREQUENCIES

Standard Frequency [kHz]	Package Size	Resonance Resistance
		C7 Series (type F/G/H)
6000	F	800 $\Omega$ Max (Symbol : 9)
8000	F	400 $\Omega$ Max (Symbol : 8)
12000	G	300 $\Omega$ Max (Symbol : 0)
16000	G	150 $\Omega$ Max (Symbol : 1)
24000	H	300 $\Omega$ Max (Symbol : 0)

Notes : • Other frequencies (within 6 MHz to 25 MHz) than standard are available.  
• Standard resonant resistance is specified according to applied frequency.

## ■ NOTES FOR USE

- The C7 series is designed in due consideration of impact resistance. The product can however be damaged by excessive impact applied, for example, when the product is let fall. Be careful in handling it.
- Solder under the following conditions :  
10 seconds Max at + 260 °C (temperature at surface of substrate)  
Preheating is recommended to avoid extreme temperature change on device.
- Avoid rapid and drastic temperature change during operation.
- There is no specific direction in resonator mounting.
- Although the characteristics of the product are adjusted with the Fujitsu's standard circuit, some of them may change depending on the combination with the IC used actually and on the design conditions of the target board. It is strongly recommended to check oscillation characteristic data before using the product in a real circuit. Also, Fujitsu is ready to obtain oscillation data from the IC or board of interest supplied from the customer.
- This device is designed for reflow soldering and not fit for flow soldering.

# C7 Series (Type F/G/H)

## ■ PART NUMBERING SYSTEM

FAR	-	C	7	C	□	-	□	□	□	□	□	-	□	□	□	□	□
		(1)	(2)	(3)			(4)						(5)	(6)	(7)	(8)	(9)

### (1) Series

Series	Single Crystal	Load Capacitors
C7	LiTaO <sub>3</sub>	Built-in

### (2) Package Type

Designator	Package Type
C	CHIP

### (3) Package Size

Designators	Package Size
F	4.8 × 2.1 × 1.2 mm
G	3.2 × 2.1 × 0.9 mm
H	1.9 × 1.5 × 0.7 mm

### (4) Frequency

See "■ STANDARD FREQUENCIES".

(Example) Unit : kHz (Expressed in five digits)

8.0 MHz → 08000

### (5) Initial Frequency Tolerance

Designators	Initial Frequency Tolerance
G	± 500 ppm
J	± 1,000 ppm
K	± 3,000 ppm
M	± 5,000 ppm

### (6) Built-in Load Capacitors

Designators	Capacitance
1	10 pF ± 4 pF
3	5 pF ± 2 pF

# C7 Series (Type F/G/H)

## (7) Resonance Resistance

Designators	Resonance Resistance
0	300 $\Omega$ Max
1	150 $\Omega$ Max
8	400 $\Omega$ Max
9	800 $\Omega$ Max

## (8) Customization

Designators	Descriptions
-	Not specified
A to Z	Serial number for custom design.

## (9) Taping Specification

Designators	Descriptions
R	12 mm width career tape (F/G package)
	8 mm width career tape (H package)

# C7 Series (Type F/G/H)

## MARKING

F Package

G Package

H Package

A	Manufacturing code (EIAJ)
2	Manufacturing week
001	Reserved for factory control

Note : All marking is laser marking.

The manufacturing code (EIAJ) is expressed as in a cycle of 4 years according to the following table.

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
2001	A	B	C	D	E	F	G	H	J	K	L	M
2002	N	P	Q	R	S	T	U	V	W	X	Y	Z
2003	a	b	c	d	e	f	g	h	j	k	l	m
2004	n	p	q	r	s	t	u	v	w	x	y	z

## PIN CONFIGURATIONS

F Package

G Package

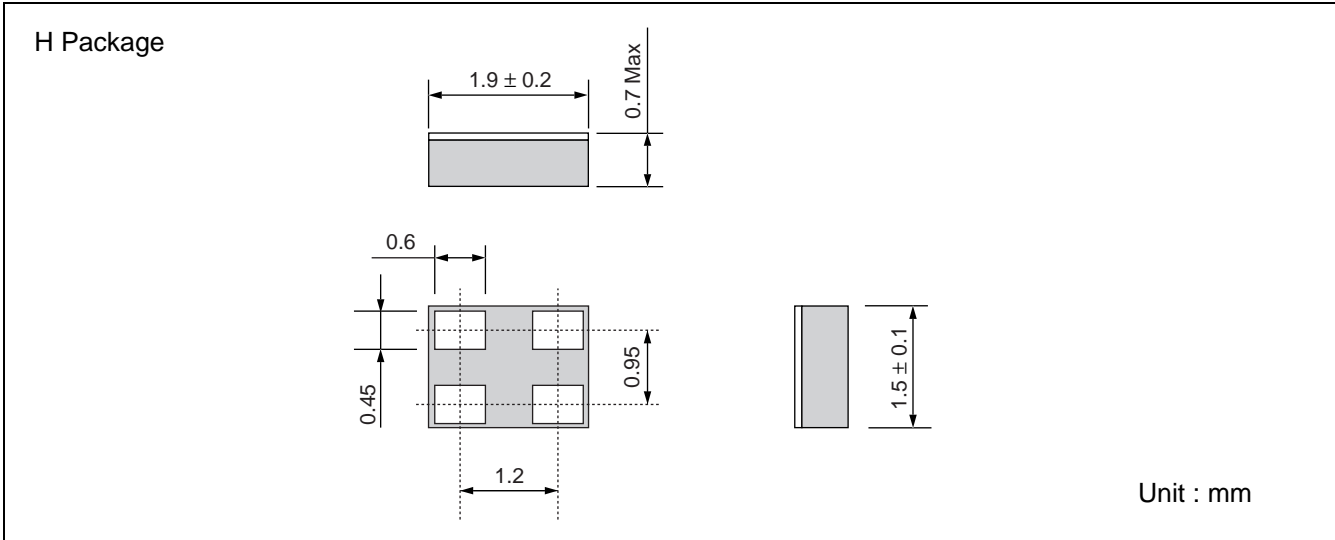
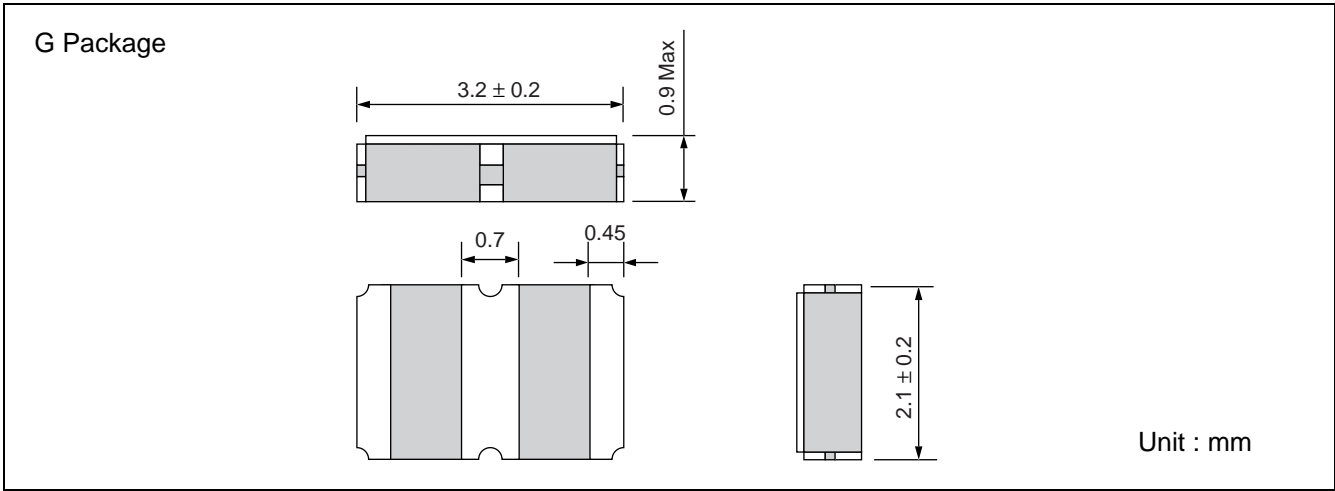
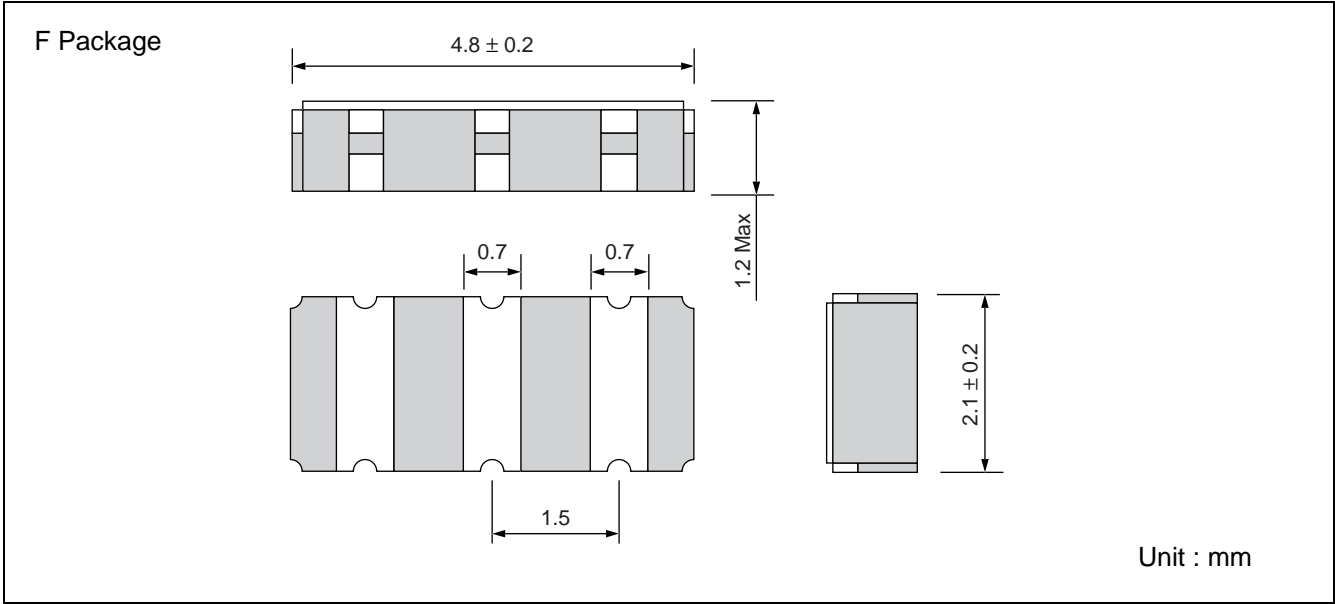
H Package

Notes :

- Bottom view.
- There is no specific direction for mounting.

# C7 Series (Type F/G/H)

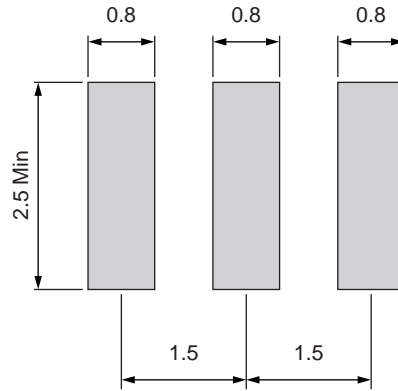
## PACKAGE DIMENSIONS



# C7 Series (Type F/G/H)

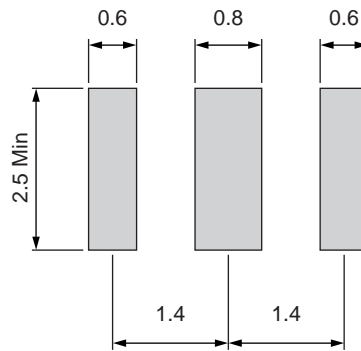
## RECOMMENDED FOOTPRINT

F Package



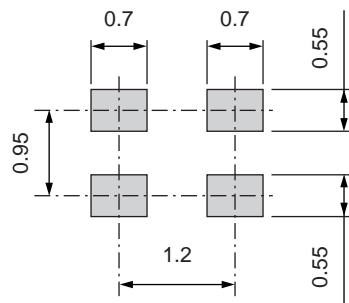
Unit : mm

G Package



Unit : mm

H Package



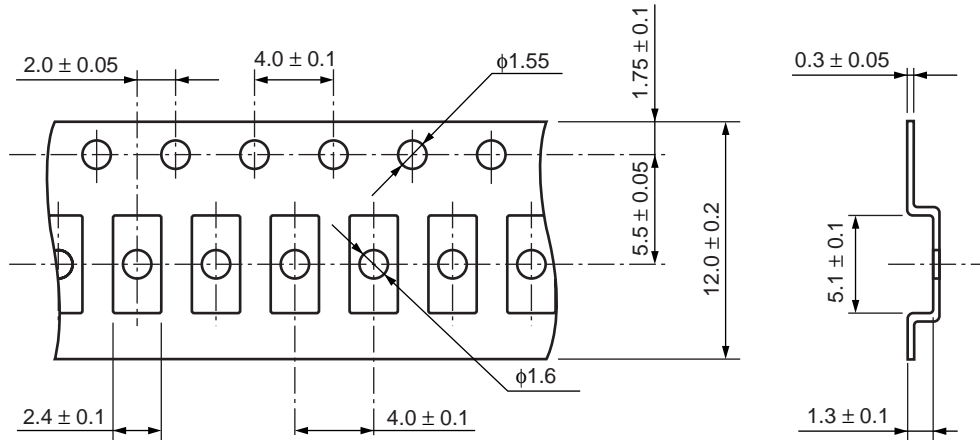
Unit : mm



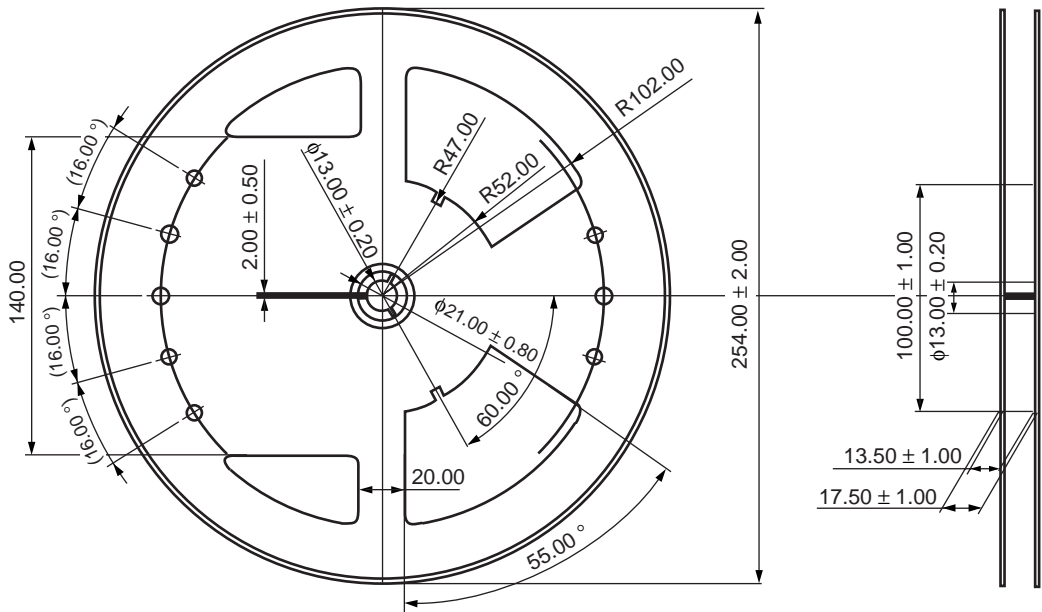
# C7 Series (Type F/G/H)

## TAPE AND REEL

• F Package



Material : Ps (Polystyrene)



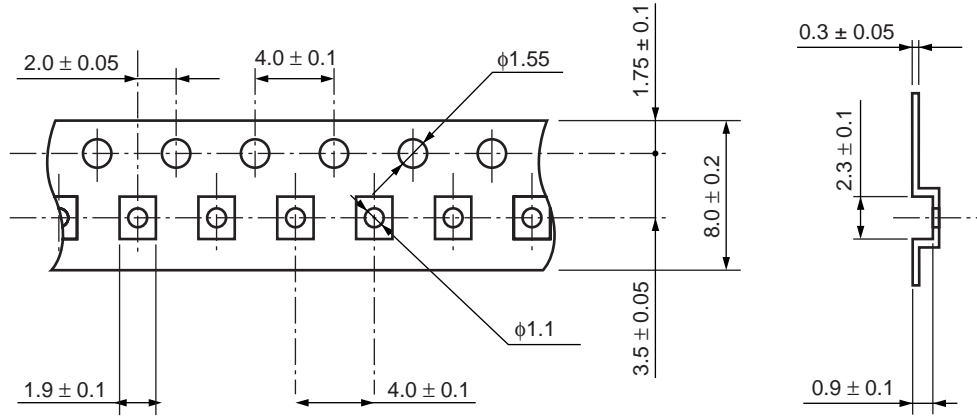
Material : Ps (Polystyrene) + Carbon

Unit : mm

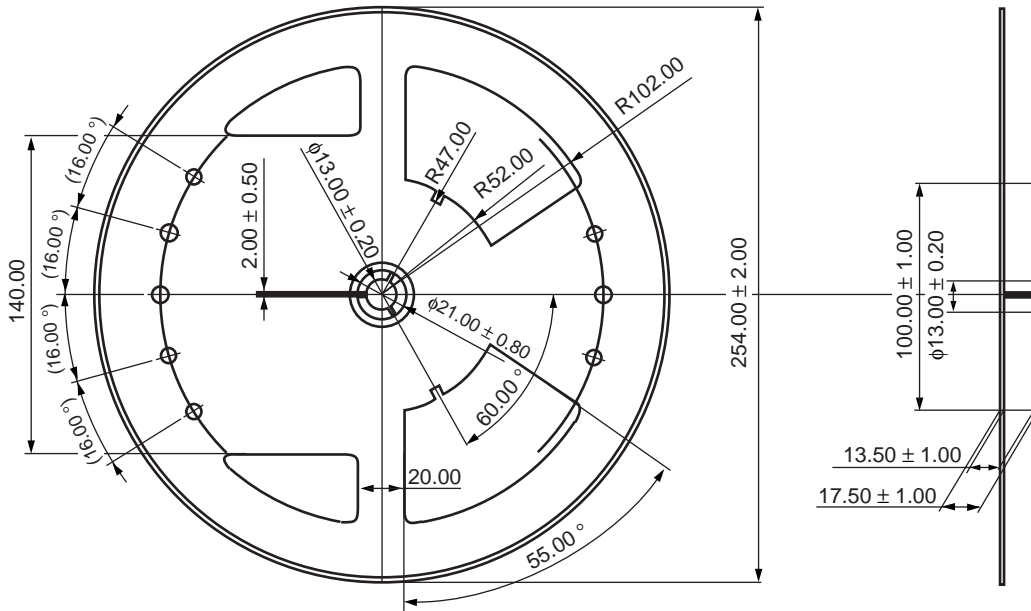
Note : Reel Quantity : 3,000 pcs/reel

# C7 Series (Type F/G/H)

• G Package



Material : Ps (Polystyrene)



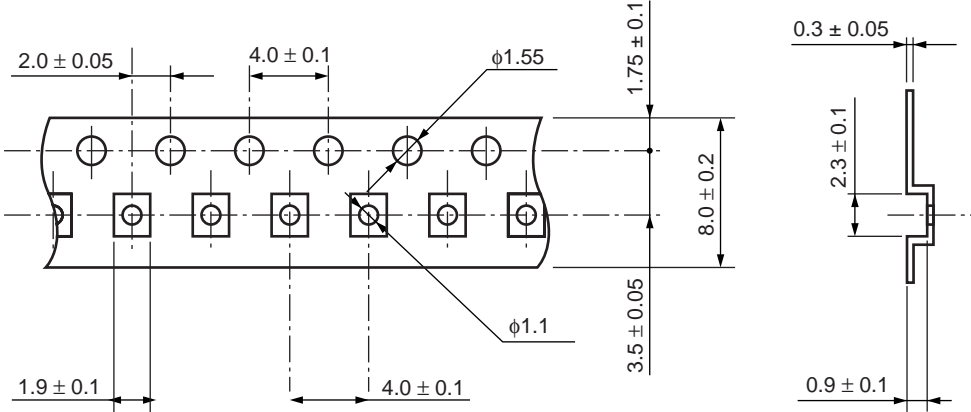
Material : Ps (Polystyrene) + Carbon

Unit : mm

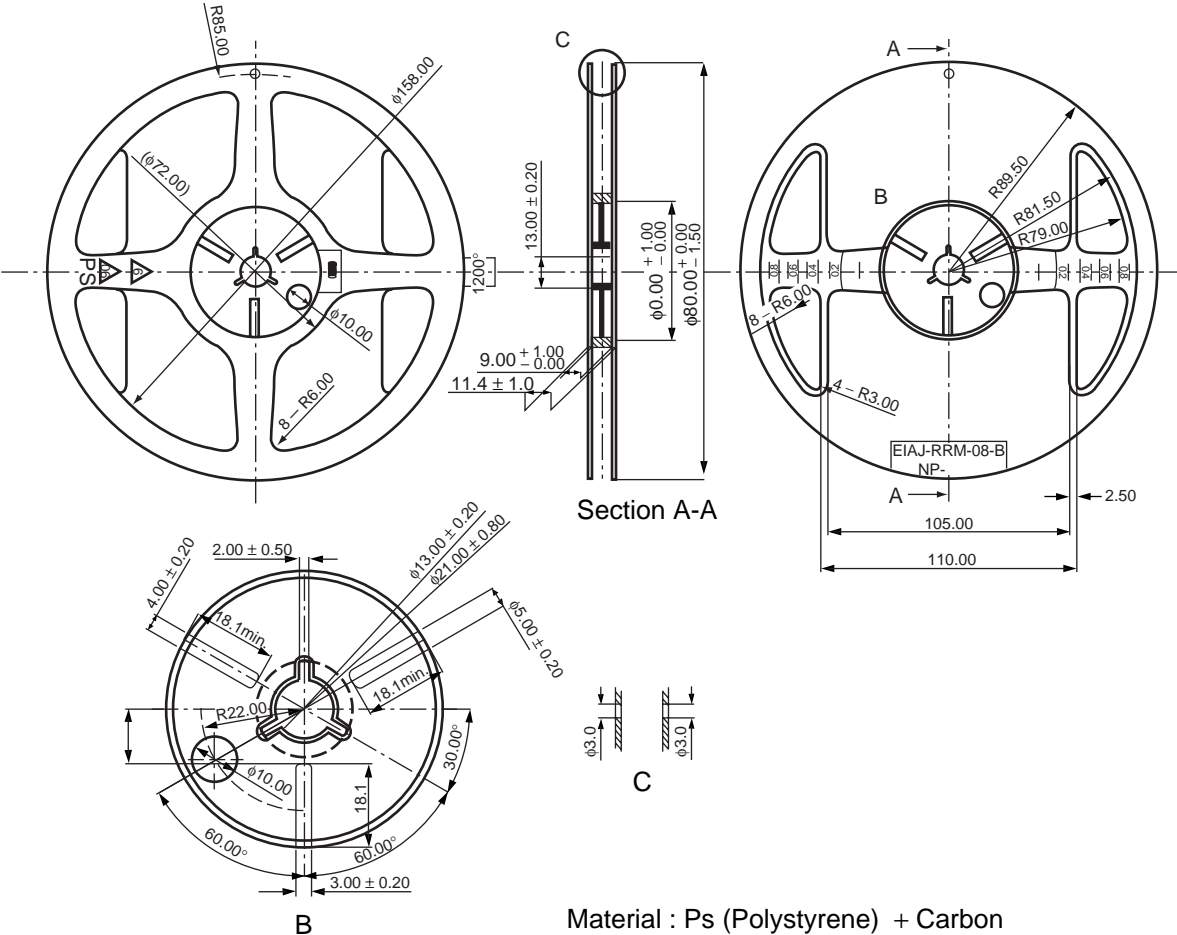
Note : Reel Quantity : 3,000 pcs/reel

# C7 Series (Type F/G/H)

• H Package



Material : Pt (Polystyrene Terephthalate)



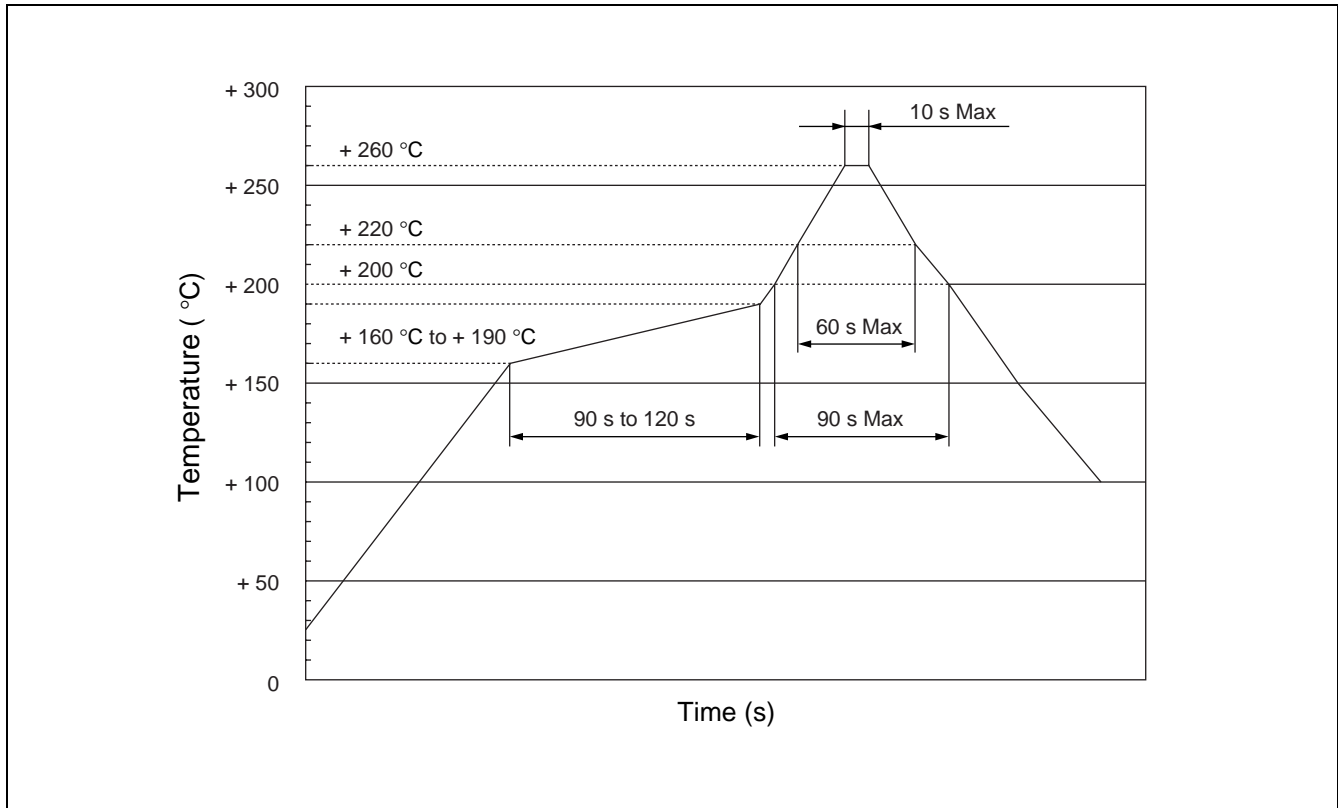
Material : Ps (Polystyrene) + Carbon

Unit : mm

Note : Reel Quantity : 3,000 pcs/reel

# C7 Series (Type F/G/H)

## RECOMMENDED REFLOW PROFILE



# C7 Series (Type F/G/H)

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