FUJITSU MEDIA DEVICE
DATA SHEET

DS04-21718-1E

ASSP for Mobile Telephone

VCO (700 to 2000 MHz)

VC-80 Series

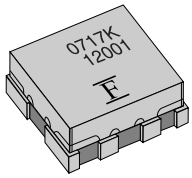
■ DESCRIPTION

With excellent C/N characteristics and low current consumption, this VCO series is ideal for PDC, PHS, CDMA, PCS and GSM mobile communication equipment. The VC-80 series can be used in any frequency band in the 700MHz to 2000MHz range. The device utilizes FUJITSU MEDIA DEVICE's high-frequency design technology, high-density mounting technology, and frequency adjustment technology to provide a high level of reliability in addition to high performance and small size.

■ FEATURES

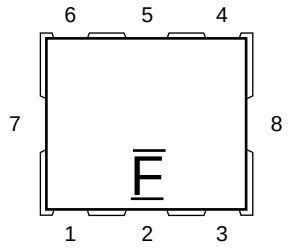
- Superior noise characteristics (C/N, S/N)
- High level of stability in response to ambient temperature and load variations
- FUJITSU MEDIA DEVICE's proprietary fabrication process provides the uniformity of the central frequency distribution
- Small size, light-weight, slim-package : 5.5 × 4.8 × 1.6 mm (Typ.)
- SMD-type taping specifications suitable for automatic mounting and reflow soldering

■ PACKAGE



■ PIN ASSIGNMENT

(TOP VIEW)



■ PIN DESCRIPTION

Pin No.	Symbol	Description
1	Vt	Control voltage
2	GND	GND
3	V_{CC}	Power supply voltage
4	OUT	Output
5	GND	GND
6	GND	GND
7	GND	GND
8	GND	GND

■ PRODUCT LINEUP (STANDARD MODELS)

System	Center Frequency (MHz)	Band Width (MHz)	Power Supply Voltage (V)	Part Number
PDC800 makitori	717	±37.5	2.2 ± 0.2	VC-2R2A80-0717K
cdmaOne	739	±19.5	2.8 ± 0.1	VC-2R8A80-0739A
PHS Data communication device	1668	±18.3	3.0 ± 0.2	VC-3R0A80-1668N
K-PCS	1635	±15	2.8 ± 0.15	VC-2R8A80-1635L
CDMA	967	±13	2.8 ± 0.15	VC-2R8A80-0967L

■ ELECTRICAL CHARACTERISTICS

1. For PDC800 makitori (Part number : VC-2R2A80-0717K)

• Absolute Maximum Ratings

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Input DC voltage	V_{CC}	—	+ 3.0	V
Control voltage	Vt	—	+ 3.0	V
Operating temperature	Ta	–20	+70	°C
Storage temperature	Tstg	–30	+80	°C
Storage humidity	Hstg	5	95	%

WARNING: VCO can be permanently damaged by application of stress (voltage, temperature, humidity, etc.) in excess of absolute maximum ratings. Do not exceed these ratings.

• Electrical Characteristics

(Ta = +25 °C ± 3 °C)

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Current consumption	I_{CC}	V_{CC} = 2.2 V, Vt = 1.4 V	—	—	6.8*	mA
Frequency	fmin	V_{CC} = 2.2 V, Vt = 0.4 V	—	—	680.0*	MHz
Frequency	fmax	V_{CC} = 2.2 V, Vt = 2.4 V	755.0*	—	—	MHz
Control voltage sensitivity	kv	(fmax – fmin) / 2.0	44.0	—	56.0	MHz/V
Oscillator output	P_O	V_{CC} = 2.2 V, Vt = 1.4 V	–7.0*	—	–1.0*	dBm
C/N	C/N	V_{CC} = 2.2 V, Vt = 1.4 V, Offset = 50 kHz, BW = 21 kHz	67.0* 69.0	—	—	dBc/Hz
S/N	S/N	V_{CC} = 2.2 V, Vt = 1.4 V, Dev = ±2 kHz, B.W. = 0.3 kHz to 3 kHz	28.0*	—	—	dBc/Hz
Higher harmonics	Hs	V_{CC} = 2.2 V, Vt = 1.4 V, Up to 3rd	—	—	–10.0*	dBc
Power supply variation	Push	V_{CC} = 2.2 V ± 0.2 V, Vt = 1.4 V	—	—	±600*	kHz
Load variation	Pull	V_{CC} = 2.2 V, Vt = 1.4 V, VSWR = 2 ALL PHASE	—	—	±500*	kHz
Temperature drift	Td	Ta = +25 °C ± 45 °C	—	—	±3000*	kHz

* : Ta = –20 °C to +70 °C

2. For cdmaOne (Part number : VC-2R8A80-0739A)

• Absolute Maximum Ratings

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Input DC voltage	V_{CC}	—	+ 3.2	V
Control voltage	Vt	—	+ 3.2	V
Operating temperature	Ta	–30	+80	°C
Storage temperature	Tstg	–40	+85	°C
Storage humidity	Hstg	5	95	%

WARNING: VCO can be permanently damaged by application of stress (voltage, temperature, humidity, etc.) in excess of absolute maximum ratings. Do not exceed these ratings.

• Electrical Characteristics

(Ta = +25 °C ± 3 °C)

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Current consumption	I_{CC}	V_{CC} = 2.8 V, Vt = 1.5 V	—	—	6.5*	mA
Frequency	fmin	V_{CC} = 2.8 V, Vt = 0.5 V	—	—	719.65*	MHz
Frequency	fmax	V_{CC} = 2.8 V, Vt = 2.5 V	758.65*	—	—	MHz
Control voltage sensitivity	kv	(fmax – fmin) / 2.0	25.0	31.0	37.0	MHz/V
Oscillator output	P_O	V_{CC} = 2.8 V, Vt = 1.5 V	–4.0*	—	2.0*	dBm
C/N	C/N	V_{CC} = 2.8 V, Vt = 1.5 V, Offset = 25 kHz, BW = 1 Hz	108.0*	—	—	dBc/Hz
		V_{CC} = 2.8 V, Vt = 1.5 V, Offset = 50 kHz, BW = 1 Hz	113.0*	—	—	dBc/Hz
		V_{CC} = 2.8 V, Vt = 1.5 V, Offset = 100 kHz, BW = 1 Hz	118.0*	—	—	dBc/Hz
		V_{CC} = 2.8 V, Vt = 1.5 V, Offset = 285 kHz, BW = 1 Hz	128.0*	—	—	dBc/Hz
		V_{CC} = 2.8 V, Vt = 1.5 V, Offset = 900 kHz, BW = 1 Hz	138.0*	—	—	dBc/Hz
Higher harmonics	Hs	V_{CC} = 2.8 V, Vt = 1.5 V, Up to 3rd	—	—	–10.0	dBc
Power supply variation	Push	V_{CC} = 2.8 V ± 0.1 V, Vt = 1.5 V	—	—	±500	kHz
Load variation	Pull	V_{CC} = 2.8 V, Vt = 1.5 V, VSWR = 2 ALL PHASE	—	—	±500	kHz
Temperature drift	Td	Ta = +25 °C ± 55 °C	—	—	±3000*	kHz

* : Ta = –30 °C to +80 °C

3. For PHS (Part number : VC-3R0A80-1668N)

• **Absolute Maximum Ratings**

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Input DC voltage	V_{CC}	—	+ 3.2	V
Control voltage	Vt	—	+ 3.0	V
Operating temperature	Ta	–20	+70	°C
Storage temperature	Tstg	–30	+85	°C
Storage humidity	Hstg	5	95	%

WARNING: VCO can be permanently damaged by application of stress (voltage, temperature, humidity, etc.) in excess of absolute maximum ratings. Do not exceed these ratings.

• **Electrical Characteristics**

(Ta = +25 °C ± 3 °C)

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Current consumption	I_{CC}	V_{CC} = 3.0 V, Vt = 1.25 V	—	—	10.0*	mA
Frequency	fmin	V_{CC} = 3.0 V, Vt = 0.6 V	—	—	1649.7*	MHz
Frequency	fmax	V_{CC} = 3.0 V, Vt = 1.9 V	1686.3	—	—	MHz
Control voltage sensitivity	kv	(fmax – fmin) / 1.3	43.0	—	57.0	MHz/V
Oscillator output	P_O	V_{CC} = 3.0 V, Vt = 1.25 V	–6.0*	—	—	dBm
C/N	C/N	V_{CC} = 3.0 V, Vt = 1.25 V, Offset = 100 kHz, BW = 1 Hz	110.0*	—	—	dBc/Hz
Higher harmonics	Hs	V_{CC} = 3.0 V, Vt = 1.25 V, Up to 3rd	—	—	–15.0	dBc
Power supply variation	Push	V_{CC} = 3.0 V ± 0.2 V, Vt = 1.25 V	—	—	±800	kHz
Load variation	Pull	V_{CC} = 3.0 V, Vt = 1.25 V, VSWR = 2 ALL PHASE	—	—	±1000	kHz
Temperature drift	Td	Ta = +25 °C ± 45 °C	—	—	±4000*	kHz

* : Ta = –20 °C to +70 °C

4. For K-PCS (Part number : VC-2R8A80-1635L)

• **Absolute Maximum Ratings**

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Input DC voltage	V_{CC}	—	+ 7.0	V
Control voltage	Vt	—	+ 10.0	V
Operating temperature	Ta	–30	+80	°C
Storage temperature	Tstg	–40	+85	°C
Storage humidity	Hstg	5	95	%

WARNING: VCO can be permanently damaged by application of stress (voltage, temperature, humidity, etc.) in excess of absolute maximum ratings. Do not exceed these ratings.

• **Electrical Characteristics**

(Ta = +25 °C ± 3 °C)

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Current consumption	I_{CC}	V_{CC} = 2.8 V, Vt = 1.5 V	—	—	8.5	mA
Frequency	fmin	V_{CC} = 2.8 V, Vt = 0.5 V	—	—	1620.0*	MHz
Frequency	fmax	V_{CC} = 2.8 V, Vt = 2.5 V	1650.0*	—	—	MHz
Control voltage sensitivity	kv	(fmax – fmin) / 2.0	22.0	—	—	MHz/V
Oscillator output	P_O	V_{CC} = 2.8 V, Vt = 1.5 V	–3.0	—	1.0	dBm
C/N	C/N	V_{CC} = 2.8 V, Vt = 1.5 V, Offset = 1 kHz, BW = 1 Hz	70.0*	—	—	dBc/Hz
		V_{CC} = 2.8 V, Vt = 1.5 V, Offset = 100 kHz, BW = 1 Hz	111.0*	—	—	dBc/Hz
		V_{CC} = 2.8 V, Vt = 1.5 V, Offset = 1250 kHz, BW = 1 Hz	134.0*	—	—	dBc/Hz
Higher harmonics	Hs	V_{CC} = 2.8 V, Vt = 1.5 V, Up to 3rd	—	—	–10.0*	dBc
Spurious	Sp	V_{CC} = 2.8 V, Vt = 1.5 V	—	—	–70.0*	dBc
Power supply variation	Push	V_{CC} = 2.8 V ± 0.15 V, Vt = 1.5 V	—	—	±700	kHz
Load variation	Pull	V_{CC} = 2.8 V, Vt = 1.5 V, VSWR = 2 ALL PHASE	—	—	±800	kHz
Temperature drift	Td	Ta = +25 °C ± 55 °C	—	—	±3000*	kHz

* : Ta = –30 °C to +80 °C

5. For CDMA (Part number : VC-2R8A80-0967L)

• Absolute Maximum Ratings

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Input DC voltage	V_{CC}	—	+ 7.0	V
Control voltage	Vt	—	+ 10.0	V
Operating temperature	Ta	–30	+80	°C
Storage temperature	Tstg	–40	+85	°C
Storage humidity	Hstg	5	95	%

WARNING: VCO can be permanently damaged by application of stress (voltage, temperature, humidity, etc.) in excess of absolute maximum ratings. Do not exceed these ratings.

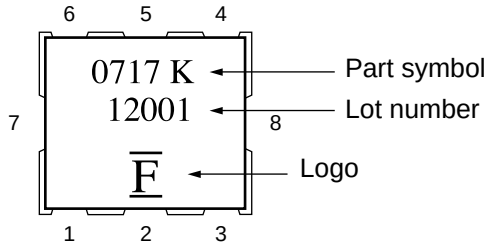
• Electrical Characteristics

(Ta = +25 °C ± 3 °C)

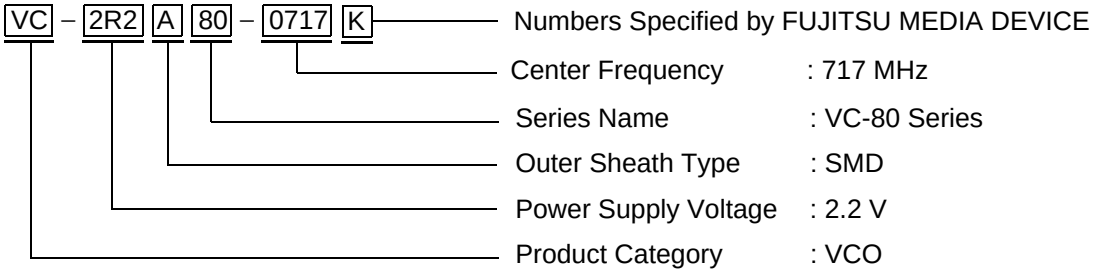
Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Current consumption	I_{CC}	V_{CC} = 2.8 V, Vt = 1.5 V	—	—	7.5*	mA
Frequency	fmin	V_{CC} = 2.8 V, Vt = 0.5 V	—	—	954.0*	MHz
Frequency	fmax	V_{CC} = 2.8 V, Vt = 2.5 V	980*	—	—	MHz
Control voltage sensitivity	kv	(fmax – fmin) / 2.0	18.0	—	28.0	MHz/V
Oscillator output	P_O	V_{CC} = 2.8 V, Vt = 1.5 V	–3.0	—	1.0	dBm
C/N	C/N	V_{CC} = 2.8 V, Vt = 1.5 V, Offset = 1 kHz, BW = 1 Hz	70.0*	—	—	dBc/Hz
		V_{CC} = 2.8 V, Vt = 1.5 V, Offset = 10 kHz, BW = 1 Hz	100.0*	—	—	dBc/Hz
		V_{CC} = 2.8 V, Vt = 1.5 V, Offset = 30 kHz, BW = 1 Hz	110.0*	—	—	dBc/Hz
		V_{CC} = 2.8 V, Vt = 1.5 V, Offset = 60 kHz, BW = 1 Hz	115.0*	—	—	dBc/Hz
Higher harmonics	Hs	V_{CC} = 2.8 V, Vt = 1.5 V, Up to 3rd	—	—	–10.0*	dBc
Spurious	Sp	V_{CC} = 2.8 V, Vt = 1.5 V	—	—	–70.0*	dBc
Power supply variation	Push	V_{CC} = 2.8 V ± 0.15 V, Vt = 1.5 V	—	—	±500	kHz
Load variation	Pull	V_{CC} = 2.8 V, Vt = 1.5 V, VSWR = 2 ALL PHASE	—	—	±600	kHz
Temperature drift	Td	Ta = +25 °C ± 55 °C	—	—	±3000*	kHz

* : Ta = –30 °C to +80 °C

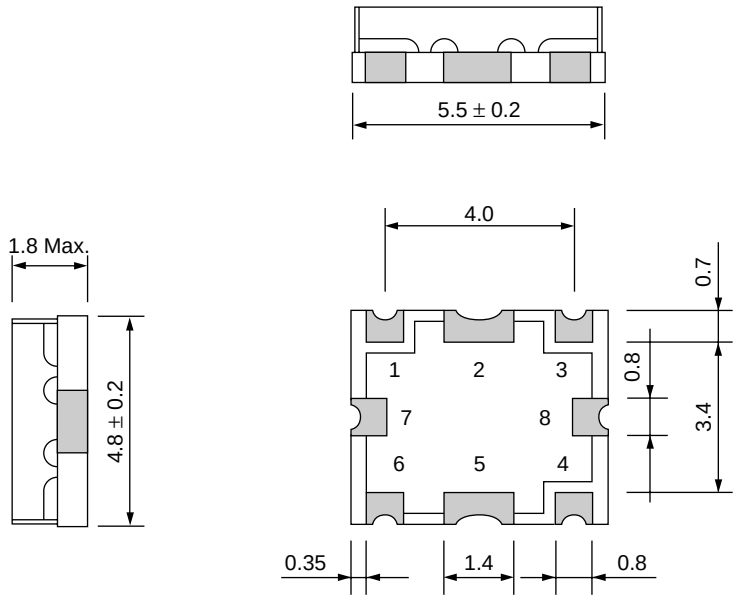
■ MARKING



■ PART NUMBER DESIGNATION

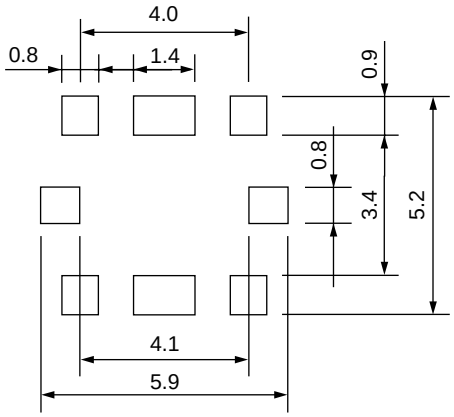


■ PACKAGE DIMENSION



Dimensions in mm

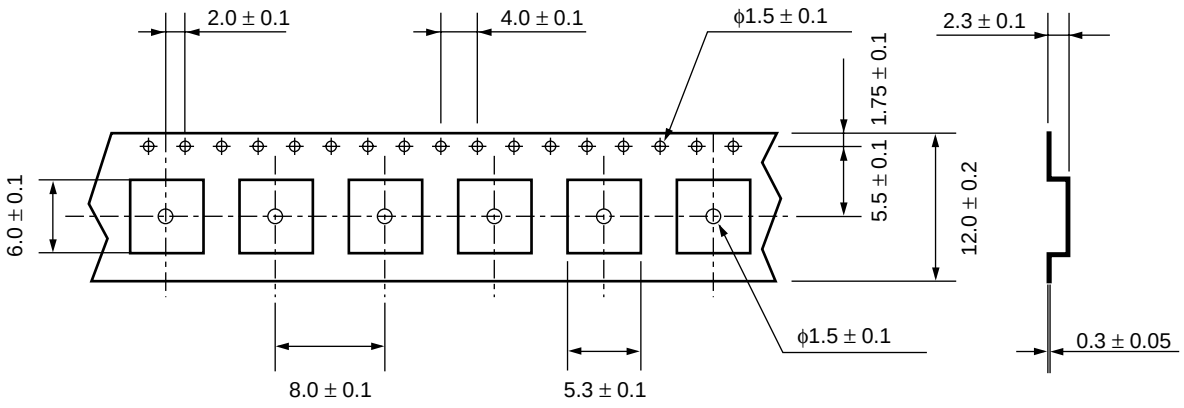
■ RECOMMENDED PATTERN FOR SOLDERING



Dimensions in mm
Dimension tolerance : ± 0.1 mm

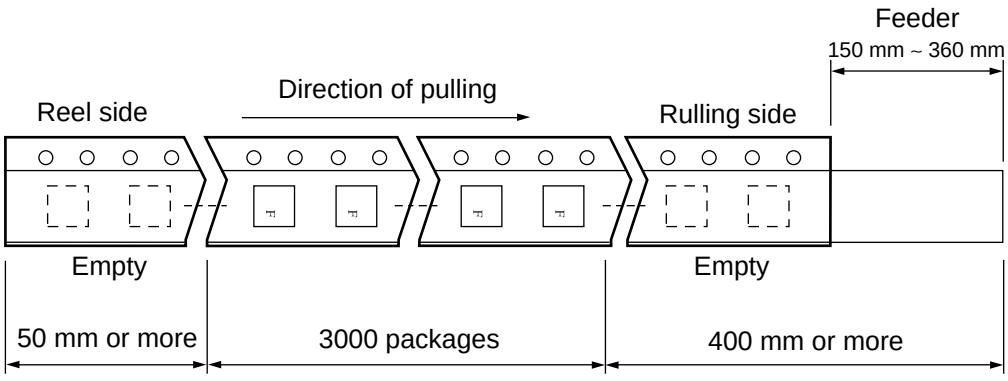
■ TAPING AND PACKAGING

(1) Carrier Tape and Packaging

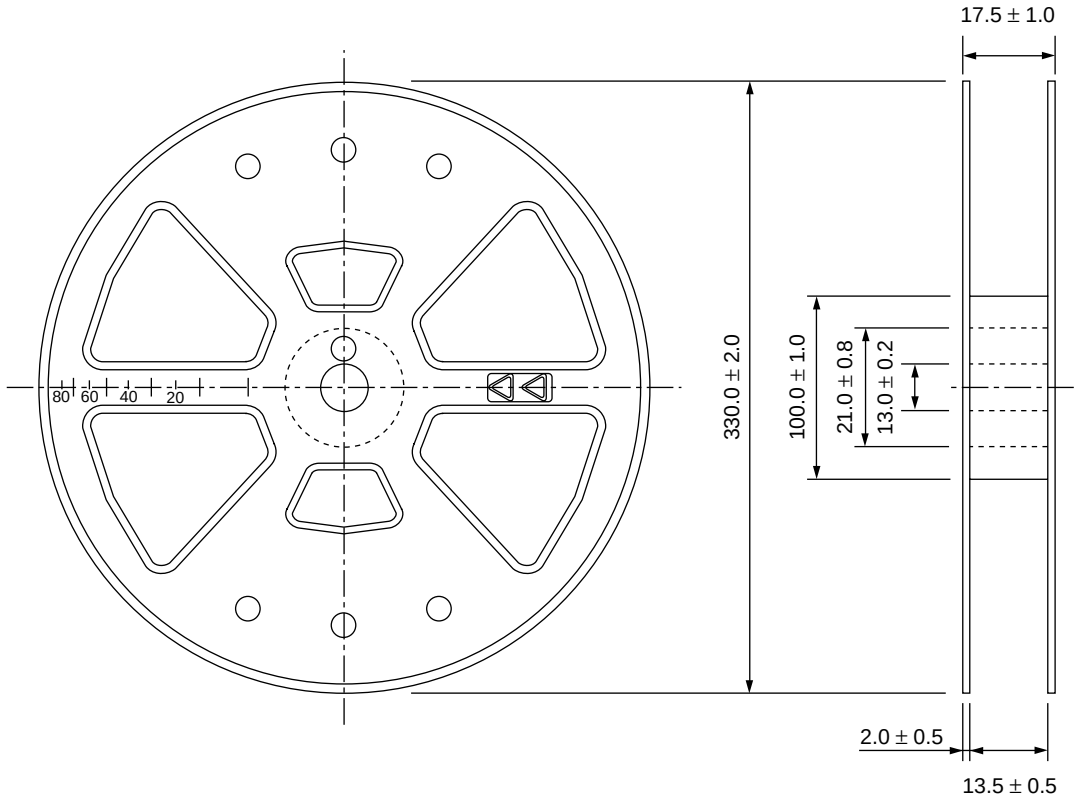


Dimensions in mm

(2) Taping Layout



(3) Reel Shape and Dimensions



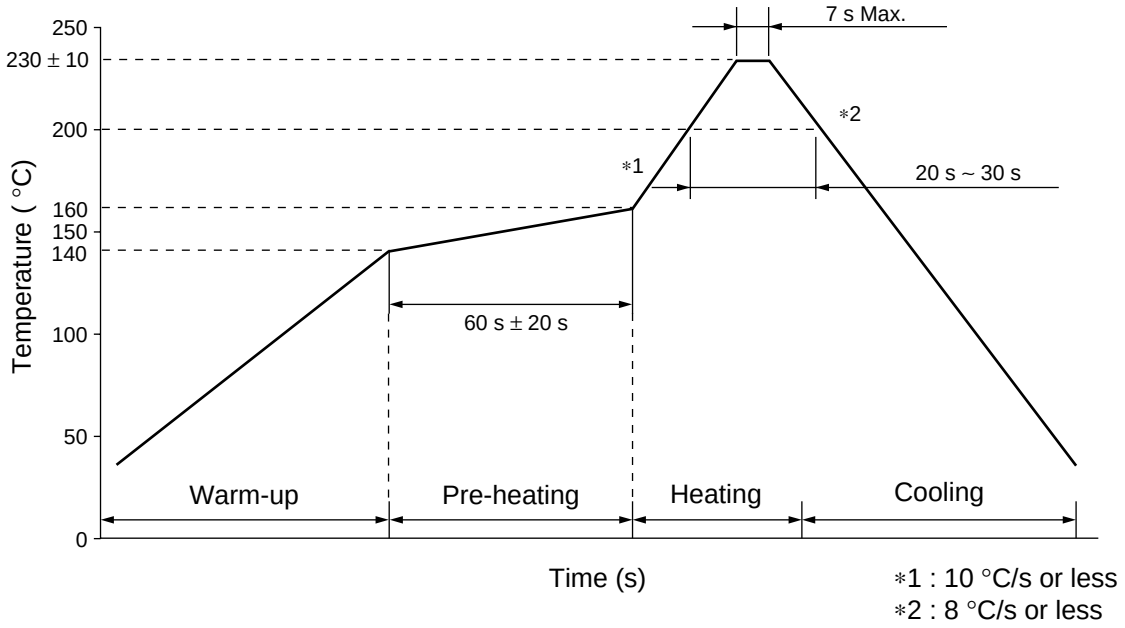
Note : The label specifies the part number, quantity, and lot number.

Volume : 3000 pcs/reel
Type : (L) 340 × (W) 340 × (t) 30 (mm)

Dimensions in mm

■ REFLOW MOUNTING CONDITIONS (RECOMMENDED)

- Perform mounting using the temperature profile shown below. To prevent thermal stress to the VCO, ensure gentle temperature gradients and use preheating whenever possible. (Recommended preheating: 140 °C to 160 °C for 60 s ± 20 s)
- Always consult FUJITSU MEDIA DEVICE beforehand if mounting more than once.
- Never remove a VCO that has already been mounted and attempt to reuse.
- For mounting, use a general-purpose flux suitable for mounting electronic components.



■ WASHING CONDITIONS

- Washing solution: Use isopropyl alcohol.
- Washing procedure: Immersion or steam cleaning is recommended.
- Washing time: For immersion: Less than 5 minutes at 40 °C or less.
  For steam: Less than 2 minutes at 90 °C or less is recommended.

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F0101

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