

## *ASSP for Mobile Telephone*

# VCO (230 to 2300 MHz)

## VC-50 Series

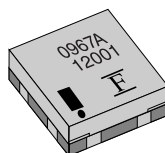
### ■ DESCRIPTION

With excellent C/N characteristics and low current consumption, this VCO series is ideal for CDMA, PCS, PHS and GSM mobile communication equipment. The VC-50 series can be used in any frequency band in the 230MHz to 2300MHz 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

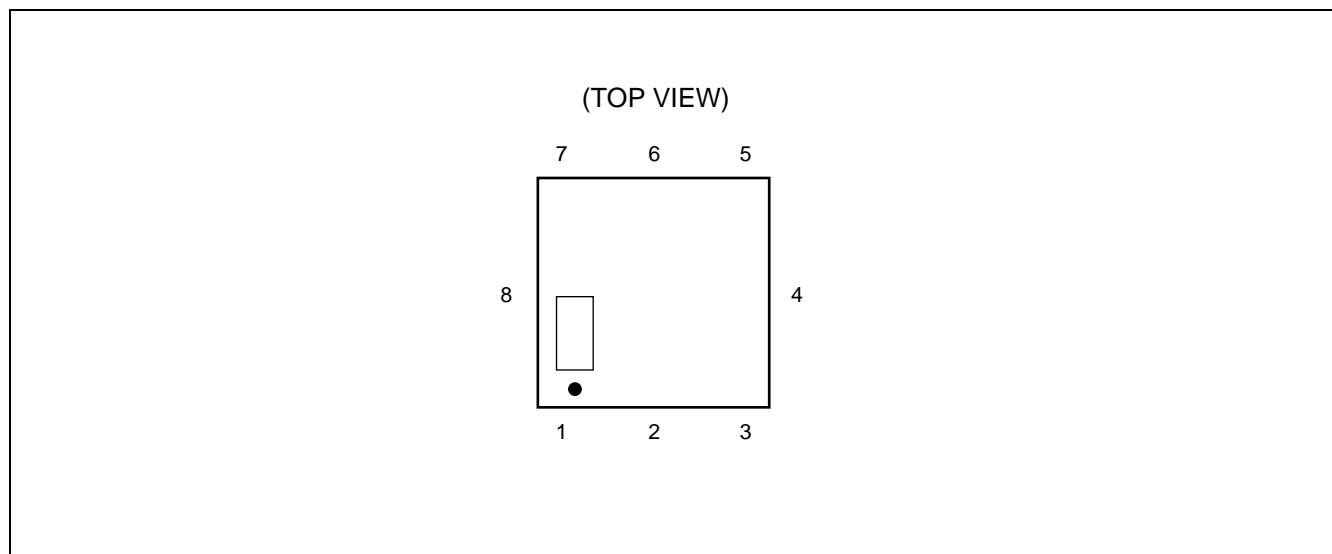
- Superior noise characteristics (C/N, S/N)
- High level of stability in response to ambient temperature and load variations
- FUJITSU MEDIA DEVICE's proprietary fabrication process provides the uniformity of the central frequency distribution
- Small size, light-weight, slim-package :  $6.0 \times 6.0 \times 1.8$  mm (Typ.)
- SMD-type taping specifications suitable for automatic mounting and reflow soldering

### ■ PACKAGE



# VC-50 Series

## ■ PIN ASSIGNMENT



## ■ PIN DESCRIPTION

Pin No.	Symbol	Description
1	V <sub>t</sub>	Control voltage
2	GND	GND
3	V <sub>cc</sub>	Power supply voltage
4	GND	GND
5	OUT	Output
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
CDMA	967	$\pm 13$	$3.0 \pm 0.25$	VC-3R0A50-0967A
	991	$\pm 13$	$2.5 \pm 0.15$	VC-2R5A50-0991
	1035	$\pm 15.5$	$2.55 \pm 0.15$	VC-2R5A50-1035
PCS	1750	$\pm 30$	$3.0 \pm 0.16$	VC-3R0A50-1750
K-PCS	1635	$\pm 15$	$2.7 \pm 0.15$	VC-2R7A50-1635
		$\pm 15$	$3.0 \pm 0.15$	VC-3R0A50-1635S
GSM	897	$\pm 17.5$	$2.8 \pm 0.1$	VC-2R8A50-0897F
	1171	$\pm 35$	$2.8 \pm 0.07$	VC-2R8A50-1171
GSM/DCS	1360	$\pm 80$	$2.85 \pm 0.15$	VC-2R8A50-1360
PHS	1652	$\pm 20$	$2.7 \pm 0.1$	VC-2R7A50-1652
	1668	$\pm 18.3$	$3.0 \pm 0.2$	VC-3R0A50-1668N

# VC-50 Series

## ■ ELECTRICAL CHARACTERISTICS

### 1. For CDMA (Part number : VC-3RA50-0967A)

#### • Absolute Maximum Ratings

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Input DC voltage	V <sub>CC</sub>	—	+3.25	V
Control voltage	V <sub>t</sub>	—	+3.25	V
Operating temperature	T <sub>a</sub>	−30	+80	°C
Storage temperature	T <sub>stg</sub>	−40	+85	°C
Storage humidity	H <sub>stg</sub>	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

(T<sub>a</sub> = +25°C ± 3°C)

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Current consumption	I <sub>CC</sub>	V <sub>CC</sub> = 3.0 V, V <sub>t</sub> = 1.7 V	—	—	6.4*	mA
Frequency	f <sub>min</sub>	V <sub>CC</sub> = 3.0 V, V <sub>t</sub> = 0.7 V	—	—	954.0*	MHz
Frequency	f <sub>max</sub>	V <sub>CC</sub> = 3.0 V, V <sub>t</sub> = 2.7 V	980.0*	—	—	MHz
Control voltage sensitivity	k <sub>v</sub>	(f <sub>max</sub> − f <sub>min</sub> ) / 2.0	18.0	23.0	28.0	MHz/V
Oscillator output	P <sub>o</sub>	V <sub>CC</sub> = 3.0 V, V <sub>t</sub> = 1.7 V	−6.0*	—	1.0*	dBm
C/N	C/N	V <sub>CC</sub> = 3.0 V, V <sub>t</sub> = 1.7 V, Offset = 1 kHz, BW = 1 Hz	70.0*	—	—	dBc/Hz
		V <sub>CC</sub> = 3.0 V, V <sub>t</sub> = 1.7 V, Offset = 10 kHz, BW = 1 Hz	100.0*	—	—	dBc/Hz
		V <sub>CC</sub> = 3.0 V, V <sub>t</sub> = 1.7 V, Offset = 30 kHz, BW = 1 Hz	110.0*	—	—	dBc/Hz
		V <sub>CC</sub> = 3.0 V, V <sub>t</sub> = 1.7 V, Offset = 60 kHz, BW = 1 Hz	115.0*	—	—	dBc/Hz
Higher harmonics	H <sub>s</sub>	V <sub>CC</sub> = 3.0 V, V <sub>t</sub> = 1.7 V, 2nd, 3rd	—	—	−10.0*	dBc
Spurious	S <sub>P</sub>	V <sub>CC</sub> = 3.0 V, V <sub>t</sub> = 1.7 V	—	—	−70.0*	dBc
Power supply variation	Push	V <sub>CC</sub> = 3.0 V ± 0.25 V, V <sub>t</sub> = 1.7 V	—	—	±800*	kHz
Load variation	Pull	V <sub>CC</sub> = 3.0 V, V <sub>t</sub> = 1.7 V, VSWR = 2 ALL PHASE	—	—	±1000	kHz
Temperature drift	T <sub>d</sub>	T <sub>a</sub> = +25 °C ± 55 °C	—	—	±3000*	kHz

\* : T<sub>a</sub> = −30°C to +80°C

## 2. For CDMA (Part number : VC-2R5A50-0991)

### • Absolute Maximum Ratings

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Input DC voltage	V <sub>CC</sub>	—	+6.0	V
Control voltage	V <sub>t</sub>	—	+10.0	V
Operating temperature	T <sub>a</sub>	−40	+85	°C
Storage temperature	T <sub>stg</sub>	−50	+125	°C
Storage humidity	H <sub>stg</sub>	5	95	%

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### • Electrical Characteristics

(T<sub>a</sub> = −40°C to +85°C)

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Current consumption	I <sub>CC</sub>	V <sub>CC</sub> = 2.5 V, V <sub>t</sub> = 1.4 V	—	—	8.0 7.0*	mA
Frequency	f <sub>min</sub>	V <sub>CC</sub> = 2.5 V, V <sub>t</sub> = 0.6 V	—	—	978.0	MHz
Frequency	f <sub>max</sub>	V <sub>CC</sub> = 2.5 V, V <sub>t</sub> = 2.2 V	1004.0	—	—	MHz
Control voltage sensitivity	k <sub>v</sub>	(f <sub>max</sub> − f <sub>min</sub> ) / 1.6	23.0	27.0	31.0	MHz/V
Oscillator output	P <sub>o</sub>	V <sub>CC</sub> = 2.5 V, V <sub>t</sub> = 1.4 V	−4.5	−1.5	1.5	dBm
C/N	C/N	V <sub>CC</sub> = 2.5 V, V <sub>t</sub> = 1.4 V, Offset = 20 kHz, BW = 1 Hz	107.0 108.0*	—	—	dBc/Hz
		V <sub>CC</sub> = 2.5 V, V <sub>t</sub> = 1.4 V, Offset = 25 kHz, BW = 1 Hz	110.0 111.0*	—	—	dBc/Hz
		V <sub>CC</sub> = 2.5 V, V <sub>t</sub> = 1.4 V, Offset = 60 kHz, BW = 1 Hz	118.0	—	—	dBc/Hz
		V <sub>CC</sub> = 2.5 V, V <sub>t</sub> = 1.4 V, Offset = 900 kHz, BW = 1 Hz	140.0	—	—	dBc/Hz
Higher harmonics	H <sub>s</sub>	V <sub>CC</sub> = 2.5 V, V <sub>t</sub> = 1.4 V, Up to 3rd	—	—	−15.0	dBc
Spurious	S <sub>p</sub>	V <sub>CC</sub> = 2.5 V, V <sub>t</sub> = 1.4 V, Up to 3 GHz	—	—	−70.0	dBc
Power supply variation	Push	V <sub>CC</sub> = 2.5 V ± 0.15 V, V <sub>t</sub> = 1.4 V	—	—	±500	kHz
Load variation	Pull	V <sub>CC</sub> = 2.5 V, V <sub>t</sub> = 1.4 V, VSWR = 2 ALL PHASE	—	—	±500	kHz

\* : T<sub>a</sub> = +25 °C ± 3°C

# VC-50 Series

## 3. For CDMA (Part number : VC-2R5A50-1035)

### • Absolute Maximum Ratings

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Input DC voltage	V <sub>cc</sub>	—	+6.0	V
Control voltage	V <sub>t</sub>	—	+10.0	V
Operating temperature	T <sub>a</sub>	−40	+85	°C
Storage temperature	T <sub>stg</sub>	−50	+125	°C
Storage humidity	H <sub>stg</sub>	5	95	%

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### • Electrical Characteristics

(T<sub>a</sub> = −40°C to +85°C)

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Current consumption	I <sub>cc</sub>	V <sub>cc</sub> = 2.55 V, V <sub>t</sub> = 1.35 V	—	—	10.0	mA
Frequency	f <sub>min</sub>	V <sub>cc</sub> = 2.55 V, V <sub>t</sub> = 0.5 V	—	—	1019.0	MHz
Frequency	f <sub>max</sub>	V <sub>cc</sub> = 2.55 V, V <sub>t</sub> = 2.2 V	1050.0	—	—	MHz
Control voltage sensitivity	k <sub>v</sub>	(f <sub>max</sub> − f <sub>min</sub> ) / 1.7, V <sub>t</sub> = 1.35 V	24.0	28.0	32.0	MHz/V
Oscillator output	P <sub>o</sub>	V <sub>cc</sub> = 2.55 V, V <sub>t</sub> = 1.35 V	−3.0	0.0	3.0	dBm
C/N	C/N	V <sub>cc</sub> = 2.55 V, V <sub>t</sub> = 1.35 V, Offset = 625 kHz, BW = 1 Hz	137.0	—	—	dBc/Hz
		V <sub>cc</sub> = 2.55 V, V <sub>t</sub> = 1.35 V, Offset = 1.25 MHz, BW = 1 Hz	143.0	—	—	dBc/Hz
Higher harmonics	H <sub>s</sub>	V <sub>cc</sub> = 2.55 V, V <sub>t</sub> = 1.35 V, 2nd, 3rd, 4th	—	—	−15.0	dBc
Spurious	S <sub>p</sub>	V <sub>cc</sub> = 2.55 V, V <sub>t</sub> = 1.35 V, Up to 3 GHz	—	—	−70.0	dBc
Power supply variation	Push	V <sub>cc</sub> = 2.55 V ± 0.15 V, V <sub>t</sub> = 1.35 V	—	—	±500	kHz
Load variation	Pull	V <sub>cc</sub> = 2.55 V, V <sub>t</sub> = 1.35 V, VSWR = 2 ALL PHASE	—	—	±500	kHz

## 4. For PCS (Part number : VC-3R0A50-1750)

### • Absolute Maximum Ratings

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Input DC voltage	V <sub>cc</sub>	—	+3.2	V
Control voltage	V <sub>t</sub>	—	+3.2	V
Operating temperature	T <sub>a</sub>	−30	+80	°C
Storage temperature	T <sub>stg</sub>	−35	+85	°C
Storage humidity	H <sub>stg</sub>	5	95	%

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### • Electrical Characteristics

(T<sub>a</sub> = −30°C to +80°C)

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Current consumption	I <sub>cc</sub>	V <sub>cc</sub> = 3.0 V, V <sub>t</sub> = 1.65 V	—	—	8.5	mA
Frequency	f <sub>min</sub>	V <sub>cc</sub> = 3.0 V, V <sub>t</sub> = 0.3 V	—	—	1720.0	MHz
Frequency	f <sub>max</sub>	V <sub>cc</sub> = 3.0 V, V <sub>t</sub> = 3.0 V	1780.0	—	—	MHz
Control voltage sensitivity	k <sub>v</sub>	(f <sub>max</sub> − f <sub>min</sub> ) / 2.7	30.0	40.0	50.0	MHz/V
Oscillator output	P <sub>o</sub>	V <sub>cc</sub> = 3.0 V, V <sub>t</sub> = 1.65 V	−3.0	0.0	3.0	dBm
C/N	C/N	V <sub>cc</sub> = 3.0 V, V <sub>t</sub> = 1.65 V, Offset = 100 kHz, BW = 1 Hz	112.0	—	—	dBc/Hz
Higher harmonics	H <sub>s</sub>	V <sub>cc</sub> = 3.0 V, V <sub>t</sub> = 1.65 V, Up to 3rd	—	—	−10.0	dBc
Spurious	S <sub>p</sub>	V <sub>cc</sub> = 3.0 V, V <sub>t</sub> = 1.65 V	—	—	−80.0	dBc
Power supply variation	Push	V <sub>cc</sub> = 3.0 V ± 0.16 V, V <sub>t</sub> = 1.65 V	—	—	±600	kHz
Load variation	Pull	V <sub>cc</sub> = 3.0 V, V <sub>t</sub> = 1.65 V, VSWR = 2 ALL PHASE	—	—	±1200	kHz
Temperature drift	T <sub>d</sub>	T <sub>a</sub> = +25 °C ± 55 °C	—	—	±6000	kHz

# VC-50 Series

## 5. For K-PCS (Part number : VC-2R7A50-1635)

### • Absolute Maximum Ratings

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Input DC voltage	V <sub>CC</sub>	—	+3.0	V
Operating temperature	T <sub>a</sub>	−30	+80	°C
Storage temperature	T <sub>stg</sub>	−40	+90	°C
Storage humidity	H <sub>stg</sub>	5	95	%

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### • Electrical Characteristics

(T<sub>a</sub> = +25°C ± 3°C)

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Current consumption	I <sub>CC</sub>	V <sub>CC</sub> = 2.7 V, V <sub>t</sub> = 0.5 V to 2.5 V	—	—	8.5*	mA
Frequency	f <sub>min</sub>	V <sub>CC</sub> = 2.7 V, V <sub>t</sub> = 0.5 V	—	—	1620.0*	MHz
Frequency	f <sub>max</sub>	V <sub>CC</sub> = 2.7 V, V <sub>t</sub> = 2.5 V	1650.0*	—	—	MHz
Control voltage sensitivity	k <sub>v</sub>	(f <sub>max</sub> − f <sub>min</sub> ) / 2.0	22.0	—	—	MHz/V
Oscillator output	P <sub>o</sub>	V <sub>CC</sub> = 2.7 V, V <sub>t</sub> = 1.5 V	−3.0	—	—	dBm
C/N	C/N	V <sub>CC</sub> = 2.7 V, V <sub>t</sub> = 1.5 V, Offset = 1 kHz, BW = 1 Hz	70.0	—	—	dBc/Hz
		V <sub>CC</sub> = 2.7 V, V <sub>t</sub> = 1.5 V, Offset = 100 kHz, BW = 1 Hz	111.0	—	—	dBc/Hz
		V <sub>CC</sub> = 2.7 V, V <sub>t</sub> = 1.5 V, Offset = 1.25 MHz, BW = 1 Hz	134.0	—	—	dBc/Hz
Higher harmonics	H <sub>s</sub>	V <sub>CC</sub> = 2.7 V, V <sub>t</sub> = 1.5 V, 2nd, 3rd	—	—	−10.0	dBc
Power supply variation	Push	V <sub>CC</sub> = 2.7 V ± 0.15 V, V <sub>t</sub> = 1.5 V	—	—	±800	kHz
Load variation	Pull	V <sub>CC</sub> = 2.7 V, V <sub>t</sub> = 1.5 V, VSWR = 2 ALL PHASE	—	—	±1500	kHz

\* : T<sub>a</sub> = −30°C to +80°C



## 6. For K-PCS (Part number : VC-3R0A50-1635S)

### • Absolute Maximum Ratings

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Input DC voltage	V <sub>cc</sub>	—	+6.0	V
Control voltage	V <sub>t</sub>	—	+6.0	V
Operating temperature	T <sub>a</sub>	−30	+80	°C
Storage temperature	T <sub>stg</sub>	−40	+90	°C
Storage humidity	H <sub>stg</sub>	5	95	%

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### • Electrical Characteristics

(T<sub>a</sub> = +25°C ± 3°C)

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Current consumption	I <sub>cc</sub>	V <sub>cc</sub> = 3.0 V, V <sub>t</sub> = 1.5 V	—	—	8.5	mA
Frequency	f <sub>min</sub>	V <sub>cc</sub> = 3.0 V, V <sub>t</sub> = 0.5 V	—	—	1620.0	MHz
Frequency	f <sub>max</sub>	V <sub>cc</sub> = 3.0 V, V <sub>t</sub> = 2.5 V	1650.0	—	—	MHz
Control voltage sensitivity	k <sub>v</sub>	(f <sub>max</sub> − f <sub>min</sub> ) / 2.0	22.0	—	—	MHz/V
Oscillator output	P <sub>o</sub>	V <sub>cc</sub> = 3.0 V, V <sub>t</sub> = 1.5 V	−3.0	—	—	dBm
C/N	C/N	V <sub>cc</sub> = 3.0 V, V <sub>t</sub> = 1.5 V, Offset = 1 kHz, BW = 1 Hz	70.0*	—	—	dBc/Hz
		V <sub>cc</sub> = 3.0 V, V <sub>t</sub> = 1.5 V, Offset = 100 kHz, BW = 1 Hz	111.0*	—	—	dBc/Hz
		V <sub>cc</sub> = 3.0 V, V <sub>t</sub> = 1.5 V, Offset = 1.25 MHz, BW = 1 Hz	134.0*	—	—	dBc/Hz
Higher harmonics	H <sub>s</sub>	V <sub>cc</sub> = 3.0 V, V <sub>t</sub> = 1.5 V, 2nd, 3rd	—	—	−10.0	dBc
Spurious	S <sub>P</sub>	V <sub>cc</sub> = 3.0 V, V <sub>t</sub> = 1.5 V	—	—	−70.0*	dBc
Power supply variation	Push	V <sub>cc</sub> = 3.0 V ± 0.15 V, V <sub>t</sub> = 1.5 V	—	—	±500	kHz
Load variation	Pull	V <sub>cc</sub> = 3.0 V, V <sub>t</sub> = 1.5 V, VSWR = 2 ALL PHASE	—	—	±1000	kHz
Temperature drift	T <sub>d</sub>	T <sub>a</sub> = +25 °C ± 55 °C	—	—	±3000*	kHz

\* : T<sub>a</sub> = −30°C to +80°C

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## 7. For GSM (Part number : VC-2R8A50-0897F)

### • Absolute Maximum Ratings

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Input DC voltage	V <sub>cc</sub>	—	+4.0	V
Control voltage	V <sub>t</sub>	0	+2.9	V
Operating temperature	T <sub>a</sub>	−20	+75	°C
Storage temperature	T <sub>stg</sub>	−40	+85	°C
Storage humidity	H <sub>stg</sub>	5	95	%

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### • Electrical Characteristics

(T<sub>a</sub> = +25°C ± 3°C)

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Current consumption	I <sub>cc</sub>	V <sub>cc</sub> = 2.8 V, V <sub>t</sub> = 1.2 V	—	—	25.0*	mA
Frequency	f <sub>min</sub>	V <sub>cc</sub> = 2.8 V, V <sub>t</sub> = 0.5 V	—	—	880.0*	MHz
Frequency	f <sub>max</sub>	V <sub>cc</sub> = 2.8 V, V <sub>t</sub> = 1.9 V	915.0*	—	—	MHz
Control voltage sensitivity	k <sub>v</sub>	(f <sub>max</sub> − f <sub>min</sub> ) / 1.4	24.0	—	36.0	MHz/V
Oscillator output	P <sub>o</sub>	V <sub>cc</sub> = 2.8 V, V <sub>t</sub> = 1.2 V	2.0	—	—	dBm
C/N	C/N	V <sub>cc</sub> = 2.8 V, V <sub>t</sub> = 1.2 V, Offset = 100 kHz, BW = 1 Hz	100.0	—	—	dBc/Hz
		V <sub>cc</sub> = 2.8 V, V <sub>t</sub> = 1.2 V, Offset = 400 kHz, BW = 1 Hz	125.0	—	—	dBc/Hz
		V <sub>cc</sub> = 2.8 V, V <sub>t</sub> = 1.2 V, Offset = 20 MHz, BW = 1 Hz	165.0	—	—	dBc/Hz
Higher harmonics	H <sub>s</sub>	V <sub>cc</sub> = 2.8 V, V <sub>t</sub> = 1.2 V, 2nd, 3rd	—	—	−15.0	dBc
Power supply variation	Push	V <sub>cc</sub> = 2.8 V ± 0.1 V, V <sub>t</sub> = 1.2 V	—	—	±1000	kHz
Load variation	Pull	V <sub>cc</sub> = 2.8 V, V <sub>t</sub> = 1.2 V, VSWR = 2 ALL PHASE	—	—	±2000	kHz
Temperature drift	T <sub>d</sub>	T <sub>a</sub> = +25 (+50/−45) °C	—	—	±2000*	kHz

\* : T<sub>a</sub> = −20°C to +75°C

## 8. For GSM (Part number : VC-2R8A50-1171)

### • Absolute Maximum Ratings

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Input DC voltage	V <sub>CC</sub>	-0.3	+2.9	V
Control voltage	V <sub>t</sub>	0	+2.9	V
Operating temperature	T <sub>a</sub>	-20	+75	°C
Storage temperature	T <sub>stg</sub>	-30	+85	°C
Storage humidity	H <sub>stg</sub>	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

(T<sub>a</sub> = +25°C ± 3°C)

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Current consumption	I <sub>CC</sub>	V <sub>CC</sub> = 2.8 V, V <sub>t</sub> = 1.425 V	—	—	8.0*	mA
Frequency	f <sub>min</sub>	V <sub>CC</sub> = 2.8 V, V <sub>t</sub> = 0.85 V	—	—	1136.0*	MHz
Frequency	f <sub>max</sub>	V <sub>CC</sub> = 2.8 V, V <sub>t</sub> = 2.0 V	1206.0*	—	—	MHz
Control voltage sensitivity	k <sub>v</sub>	(f <sub>max</sub> – f <sub>min</sub> ) / 1.15	70.0*	—	90.0*	MHz/V
Oscillator output	P <sub>o</sub>	V <sub>CC</sub> = 2.8 V, V <sub>t</sub> = 1.425 V	-5.0*	—	+1.0*	dBm
C/N	C/N	V <sub>CC</sub> = 2.8 V, V <sub>t</sub> = 1.425 V, Offset = 10 kHz, BW = 1 Hz	85.0*	—	—	dBc/Hz
		V <sub>CC</sub> = 2.8 V, V <sub>t</sub> = 1.425 V, Offset = 400 kHz, BW = 1 Hz	117.0*	—	—	dBc/Hz
		V <sub>CC</sub> = 2.8 V, V <sub>t</sub> = 1.425 V, Offset = 600 kHz, BW = 1 Hz	122.0*	—	—	dBc/Hz
		V <sub>CC</sub> = 2.8 V, V <sub>t</sub> = 1.425 V, Offset = 1.6 MHz, BW = 1 Hz	132.0*	—	—	dBc/Hz
		V <sub>CC</sub> = 2.8 V, V <sub>t</sub> = 1.425 V, Offset = 3 MHz, BW = 1 Hz	142.0*	—	—	dBc/Hz
		V <sub>CC</sub> = 2.8 V, V <sub>t</sub> = 1.425 V, Offset = 10 MHz, BW = 1 Hz	147.0*	—	—	dBc/Hz
Higher harmonics	H <sub>s</sub>	V <sub>CC</sub> = 2.8 V, V <sub>t</sub> = 1.425 V, 2nd, 3rd	—	—	-10.0*	dBc
Power supply variation	Push	V <sub>CC</sub> = 2.8 V ± 0.07 V, V <sub>t</sub> = 1.425 V	—	—	±500*	kHz
Load variation	Pull	V <sub>CC</sub> = 2.8 V, V <sub>t</sub> = 1.425 V, VSWR = 2 ALL PHASE	—	—	±1000*	kHz
Temperature drift	T <sub>d</sub>	T <sub>a</sub> = +25 (+50/-45) °C	—	—	±3000*	kHz

\* : T<sub>a</sub> = -20°C to +75°C

# VC-50 Series

## 9. For GSM (Part number : VC-2R8A50-1360)

### • Absolute Maximum Ratings

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Input DC voltage	V <sub>CC</sub>	—	+3.0	V
Control voltage	V <sub>t</sub>	—	+3.0	V
Operating temperature	T <sub>a</sub>	−20	+80	°C
Storage temperature	T <sub>stg</sub>	−30	+80	°C
Storage humidity	H <sub>stg</sub>	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

(T<sub>a</sub> = +25°C ± 3°C)

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Current consumption	I <sub>CC</sub>	V <sub>CC</sub> = 2.85 V, V <sub>t</sub> = 1.3 V	—	—	9.0	mA
Frequency	f <sub>min</sub>	V <sub>CC</sub> = 2.85 V, V <sub>t</sub> = 0.3 V	—	—	1280.0	MHz
Frequency	f <sub>max</sub>	V <sub>CC</sub> = 2.85 V, V <sub>t</sub> = 2.3 V	1440.0	—	—	MHz
Control voltage sensitivity	k <sub>v</sub>	(f <sub>max</sub> − f <sub>min</sub> ) / 2.0	86.0	—	106.0	MHz/V
Oscillator output	P <sub>o</sub>	V <sub>CC</sub> = 2.85 V, V <sub>t</sub> = 1.3 V	−3.0	—	—	dBm
C/N	C/N	V <sub>CC</sub> = 2.85 V, V <sub>t</sub> = 1.3 V, Offset = 10 kHz, BW = 1 Hz	94.0	—	—	dBc/Hz
		V <sub>CC</sub> = 2.85 V, V <sub>t</sub> = 1.3 V, Offset = 3 MHz, BW = 1 Hz	145.0	—	—	dBc/Hz
Higher harmonics	H <sub>s</sub>	V <sub>CC</sub> = 2.85 V, V <sub>t</sub> = 1.3 V, 2nd, 3rd	—	—	−10.0	dBc
Power supply variation	Push	V <sub>CC</sub> = 2.85 V ± 0.15 V, V <sub>t</sub> = 1.3 V	—	—	±1000	kHz
Load variation	Pull	V <sub>CC</sub> = 2.85 V, V <sub>t</sub> = 1.3 V, VSWR = 2 ALL PHASE	—	—	±2000	kHz
Temperature drift	T <sub>d</sub>	T <sub>a</sub> = +25 (+55/−45) °C	—	—	±3000	kHz

## 10. For PHS (Part number : VC-2R7A50-1652)

### • Absolute Maximum Ratings

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Input DC voltage	V <sub>cc</sub>	—	+5.0	V
Control voltage	V <sub>t</sub>	—	+5.0	V
Operating temperature	T <sub>a</sub>	−20	+60	°C
Storage temperature	T <sub>stg</sub>	−35	+85	°C
Storage humidity	H <sub>stg</sub>	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

(T<sub>a</sub> = +25°C ± 3°C)

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Current consumption	I <sub>cc</sub>	V <sub>cc</sub> = 2.7 V, V <sub>t</sub> = 0.4 V to 2.1 V	—	—	5.5*	mA
Frequency	f <sub>min</sub>	V <sub>cc</sub> = 2.7 V, V <sub>t</sub> = 0.4 V	—	—	1632.5*	MHz
Frequency	f <sub>max</sub>	V <sub>cc</sub> = 2.7 V, V <sub>t</sub> = 2.1 V	1672.5*	—	—	MHz
Control voltage sensitivity	k <sub>v</sub>	(f <sub>max</sub> − f <sub>min</sub> ) / 1.7	36.0	—	48.0	MHz/V
Oscillator output	P <sub>o</sub>	V <sub>cc</sub> = 2.7 V, V <sub>t</sub> = 0.4 V to 2.1 V	−6.0*	—	—	dBm
		V <sub>cc</sub> = 2.7 V, V <sub>t</sub> = 0.0 V to 2.7 V	−10.0*	—	—	dBm
C/N	C/N	V <sub>cc</sub> = 2.7 V, V <sub>t</sub> = 0.4 V to 2.1 V, Offset = 100 kHz, BW = 1 Hz	109.0*	—	—	dBc/Hz
Higher harmonics	H <sub>s</sub>	V <sub>cc</sub> = 2.7 V, V <sub>t</sub> = 0.4 V to 2.1 V, 2nd, 3rd	—	—	−15.0*	dBc
Power supply variation	Push	V <sub>cc</sub> = 2.7 V ± 0.1 V, V <sub>t</sub> = 0.4 V to 2.1 V	—	—	±600	kHz
Load variation	Pull	V <sub>cc</sub> = 2.7 V, V <sub>t</sub> = 0.4 V to 2.1 V, VSWR = 2 ALL PHASE	—	—	±1000	kHz
Temperature drift	T <sub>d</sub>	T <sub>a</sub> = +25 (+45/−35) °C	—	—	±3000	kHz

\* : T<sub>a</sub> = −20°C to +60°C

# VC-50 Series

## 11. For PHS (Part number : VC-3R0A50-1668N)

### • Absolute Maximum Ratings

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Input DC voltage	V <sub>CC</sub>	—	+3.2	V
Operating temperature	T <sub>a</sub>	−10	+60	°C
Storage temperature	T <sub>stg</sub>	−30	+85	°C
Storage humidity	H <sub>stg</sub>	5	85	%

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.

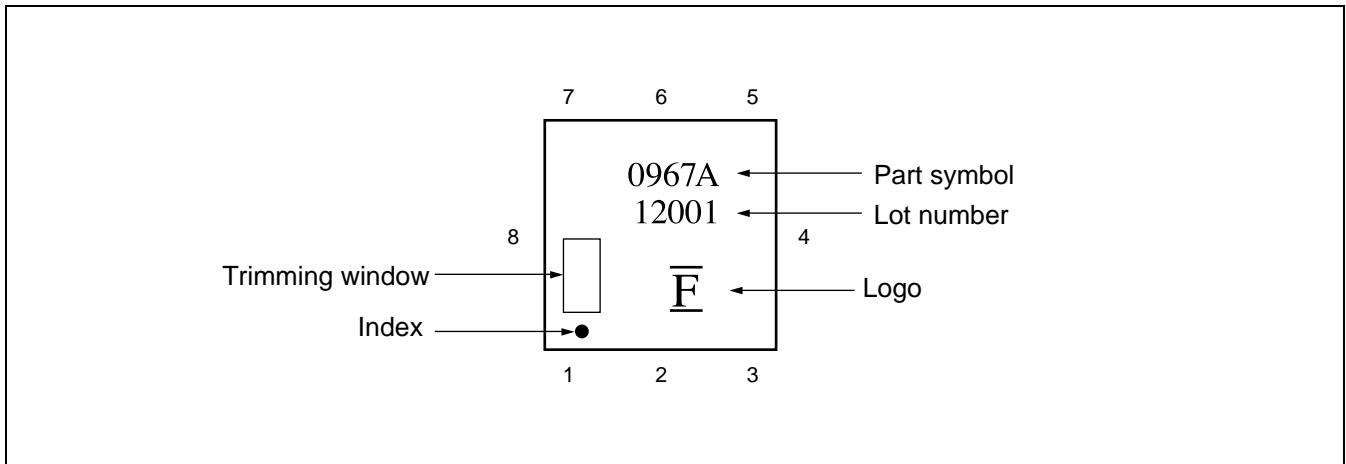
### • Electrical Characteristics

(T<sub>a</sub> = +25°C ± 3°C)

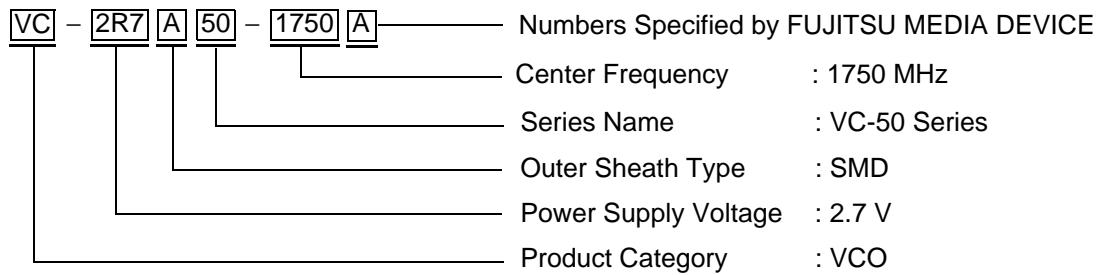
Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Current consumption	I <sub>CC</sub>	V <sub>CC</sub> = 3.0 V, V <sub>t</sub> = 1.5 V	—	—	7.0*	mA
Frequency	f <sub>min</sub>	V <sub>CC</sub> = 3.0 V, V <sub>t</sub> = 0.5 V	—	—	1649.7*	MHz
Frequency	f <sub>max</sub>	V <sub>CC</sub> = 3.0 V, V <sub>t</sub> = 2.5 V	1686.3*	—	—	MHz
Control voltage sensitivity	k <sub>v</sub>	(f <sub>max</sub> − f <sub>min</sub> ) / 2.0	25.0	31.0	37.0	MHz/V
Oscillator output	P <sub>o</sub>	V <sub>CC</sub> = 3.0 V, V <sub>t</sub> = 1.5 V	−6.0*	—	—	dBm
C/N	C/N	V <sub>CC</sub> = 3.0 V, V <sub>t</sub> = 1.5 V, Offset = 100 kHz, BW = 1 Hz	110.0*	—	—	dBc/Hz
Higher harmonics	H <sub>s</sub>	V <sub>CC</sub> = 3.0 V, V <sub>t</sub> = 1.5 V, Up to 3rd	—	—	−15.0	dBc
Power supply variation	Push	V <sub>CC</sub> = 3.0 V ± 0.2 V, V <sub>t</sub> = 1.5 V	—	—	±800	kHz
Load variation	Pull	V <sub>CC</sub> = 3.0 V, V <sub>t</sub> = 1.5 V, VSWR = 2 ALL PHASE	—	—	±1000	kHz
Temperature drift	T <sub>d</sub>	T <sub>a</sub> = +25°C ± 35°C	—	—	±4000*	kHz

\* : T<sub>a</sub> = −10°C to +60°C

## ■ MARKING

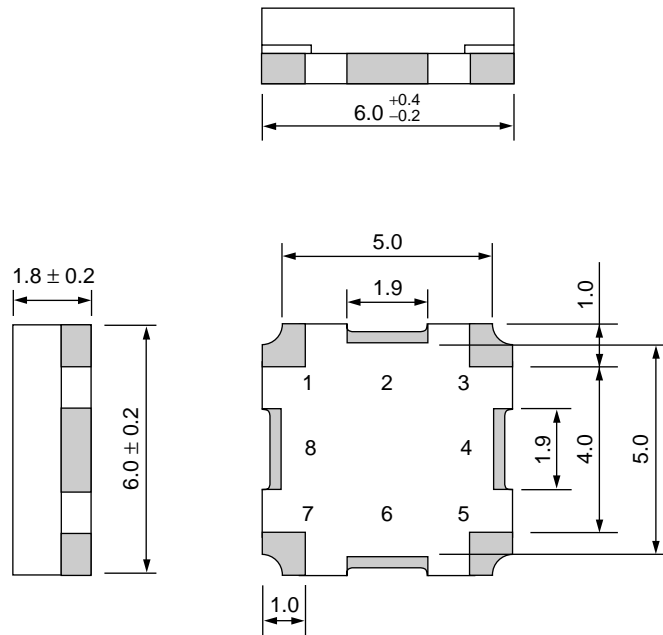


## ■ PART NUMBER DESIGNATION



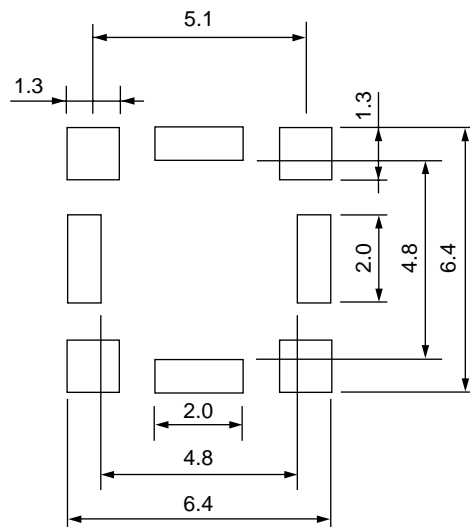
# VC-50 Series

## ■ PACKAGE DIMENSION



Dimensions in mm

## ■ RECOMMENDED PATTERN FOR SOLDERING

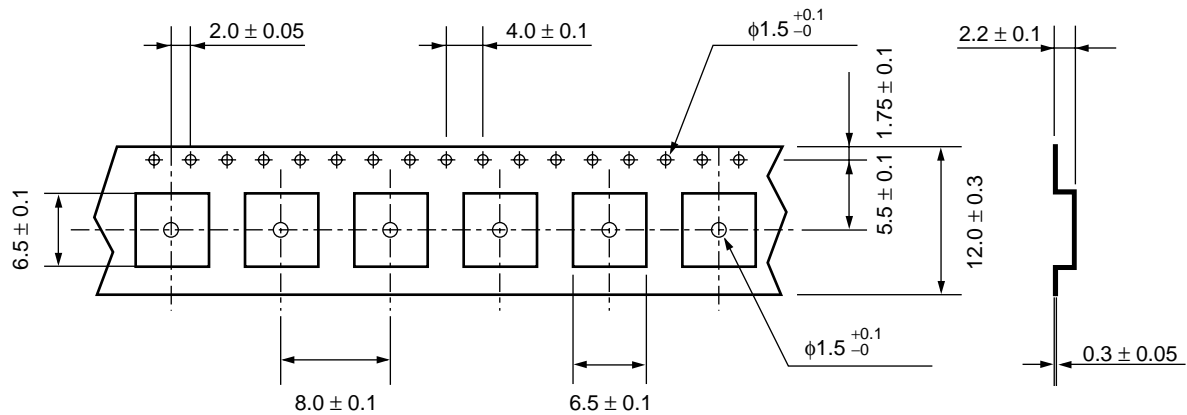


Dimensions in mm  
Dimension tolerance :  $\pm 0.1$  mm



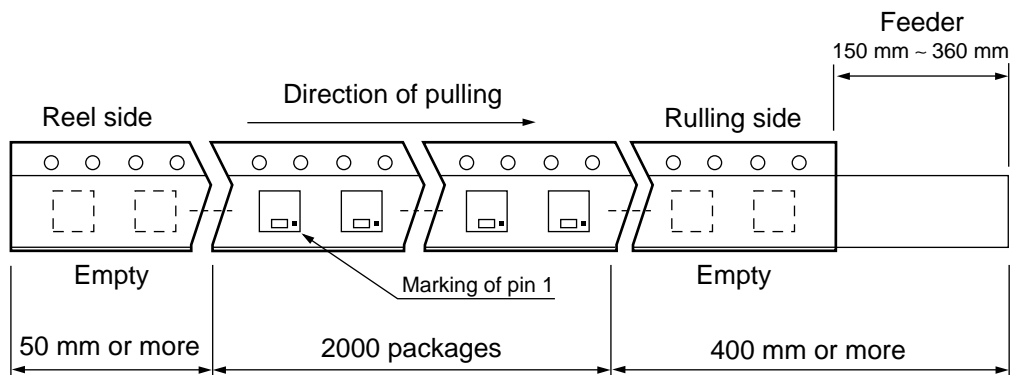
## ■ TAPING AND PACKAGING

### (1) Carrier Tape and Packaging



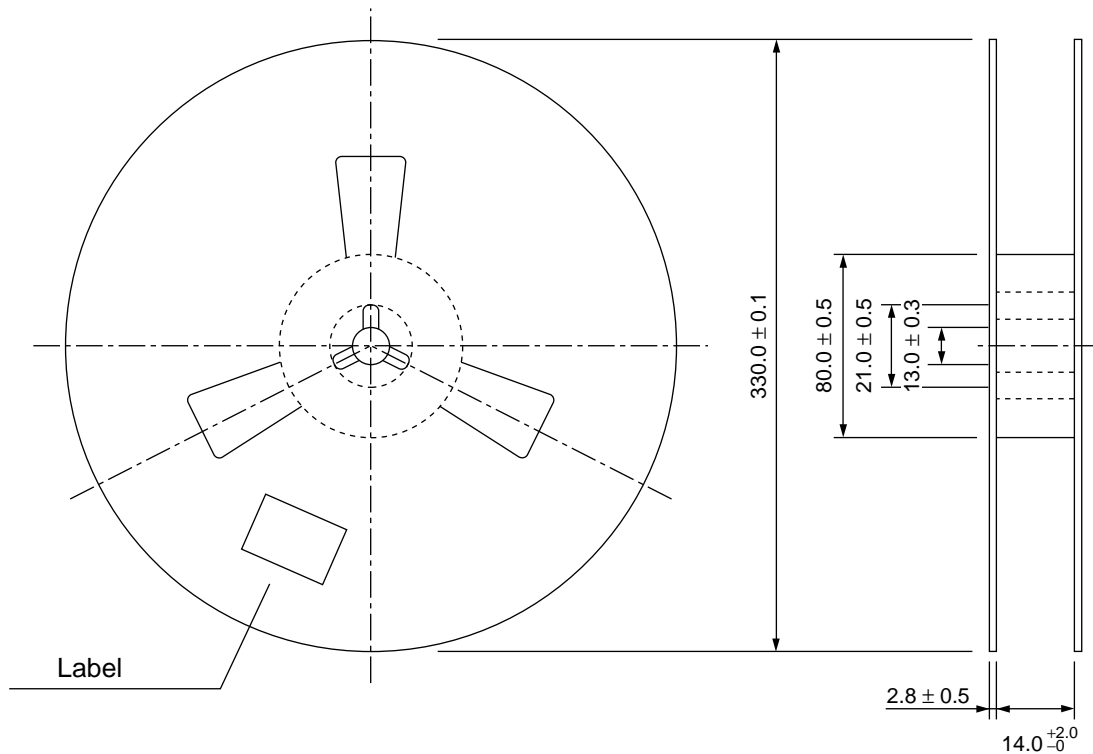
Dimensions in mm

### (2) Taping Layout



# VC-50 Series

## (3) Reel Shape and Dimensions



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

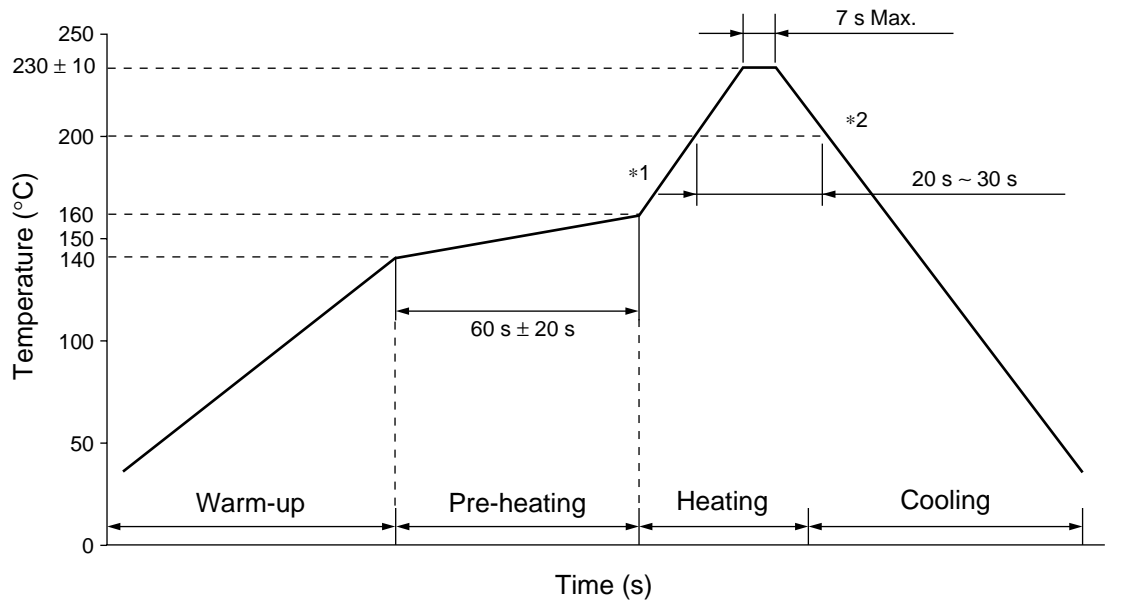
Volume : 2000 pcs/reel

Type : (L)  $340 \times$  (W)  $340 \times$  (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  $\pm$  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.



\*1 : 10 °C/s or less  
\*2 : 8 °C/s or less

## 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.

# VC-50 Series

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