FUJITSU SEMICONDUCTOR
DATA SHEET

DS04-21710-1E

ASSP

Piezoelectric VCO (6 to 30 MHz)

M2 Series (F150)

PRELIMINARY

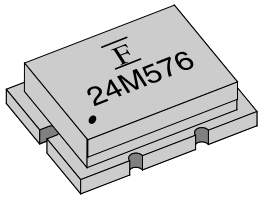
■ DESCRIPTION

The M2 series (F150) of VCO (Voltage Controlled Oscillator) apply to the frequency range 6 to 30 MHz.
These VCOs have a high stability and wide controllable frequency ranges using a $LiTaO_3$ piezoelectric single crystal with high electromechanical coupling coefficient. Output level applies to CMOS type for digital interface.

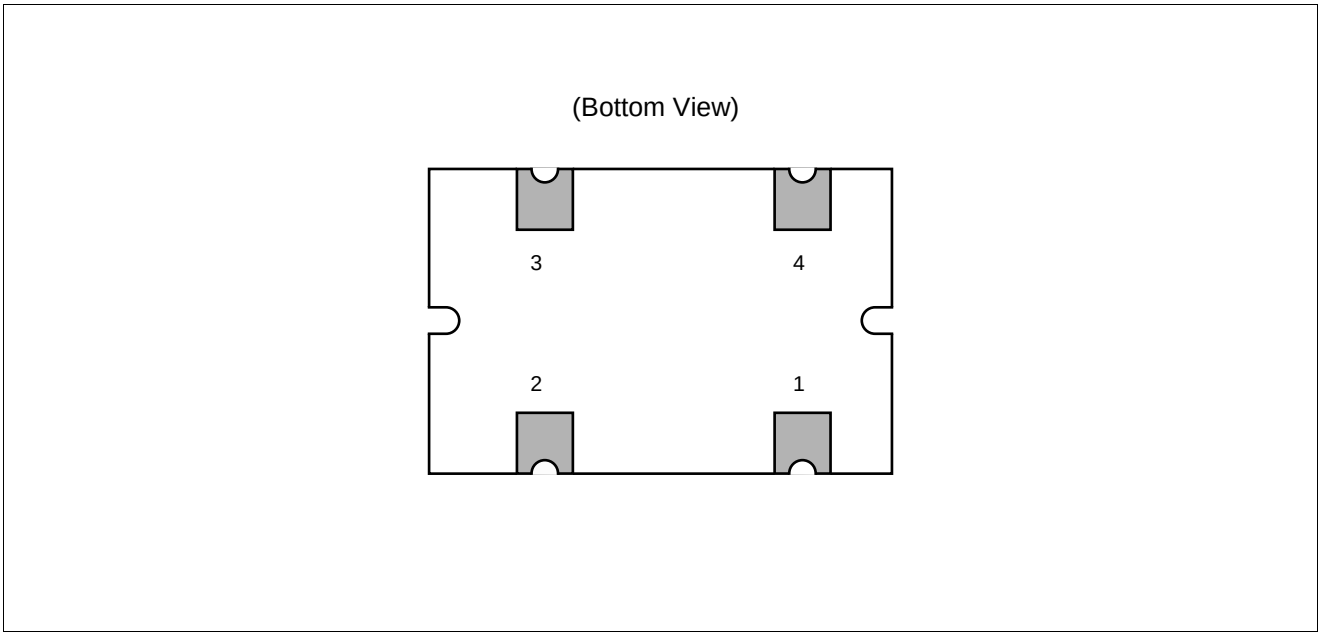
■ FEATURES

- Wide frequency controllable range (Over than ±2000 ppm)
- High carrier noise ratio
- Excellent temperature stability
- CMOS output level
- Compact package (8 × 11 × 2.6 mm)
- Surface mountable package (SMD)

■ PACKAGE



■ PIN ASSIGNMENT



■ PIN DESCRIPTIONS

Pin No.	Symbol	Descriptions
1	V_{IN}	INPUT (Control voltage)
2	GND	GROUND
3	V_{CC}	V_{CC} (Supply voltage)
4	V_{OUT}	OUTPUT

■ ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Supply voltage	V_{CC}	–0.5	+7.0	V
Control voltage	V_{IN}	–0.5	+7.0	V
Output voltage	V_{OUT}	–0.5	V_{CC} +0.5	V
Output current	I_{OUT}	–25	+25	mA
Operating temperature	T_a	–10	+70	°C
Storage temperature	T_{stg}	–40	+100	°C

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

■ RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Value		Unit
		Min.	Max.	
Supply voltage	V_{CC}	+4.75	+5.25	V
Control voltage	V_{IN}	0	+5.0	V
Operating temperature	T_a	–10	+70	°C

WARNING: The recommended operating conditions are required in order to ensure the normal operation of the piezoelectric device. All of the device's electrical characteristics are warranted when the device is operated within these ranges.

Always use semiconductor devices within their recommended operating condition ranges. Operation outside these ranges may adversely affect reliability and could result in device failure.

No warranty is made with respect to uses, operating conditions, or combinations not represented on the data sheet. Users considering application outside the listed conditions are advised to contact their FUJITSU representatives beforehand.

■ STANDARD FREQUENCIES

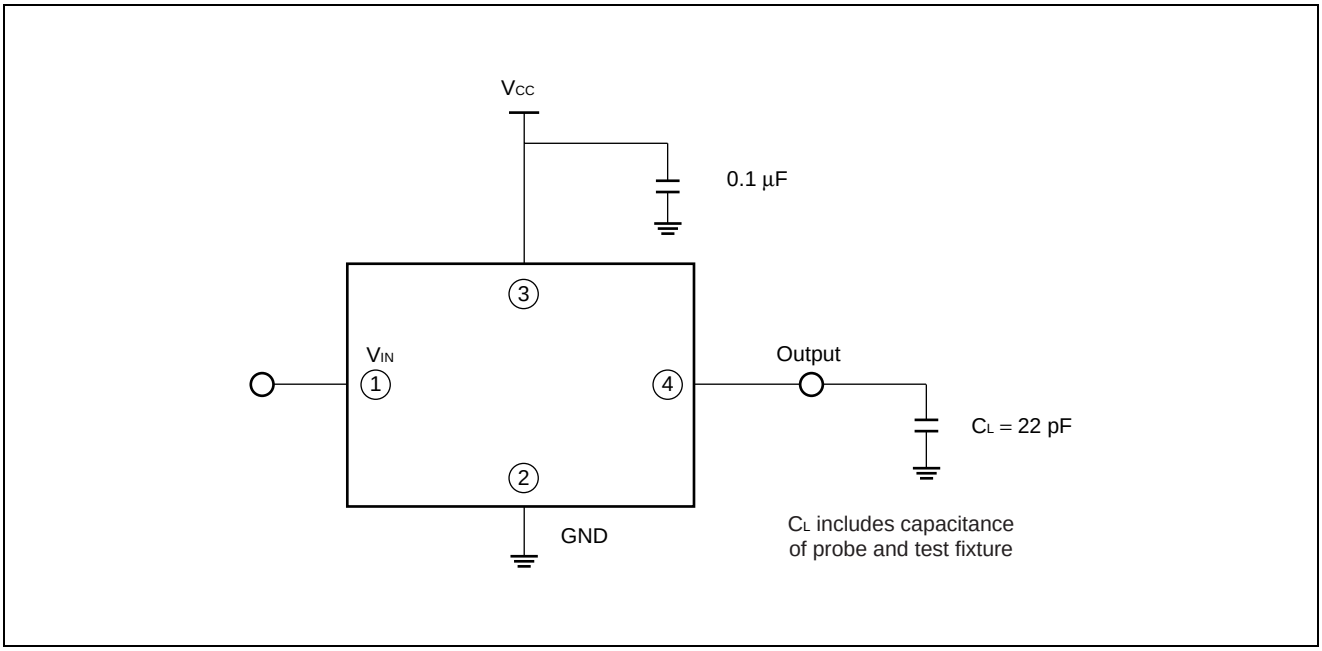
Nominal frequency	Part number	Application
14.318 MHz	FAR-M2CC-14M318-F150	Video
16.934 MHz	FAR-M2CC-16M934-F150	Audio
18.432 MHz	FAR-M2CC-18M432-F150	Video
24.576 MHz	FAR-M2CC-24M576-F150	Audio
25.175 MHz	FAR-M2CC-25M175-F150	Display

■ ELECTRICAL CHARACTERISTICS

Parameter		Symbol	Condition	Value			Unit	Remarks
				Min.	Typ.	Max.		
Current consumption		I_{CC}	Without load	—	5.0	10	mA	
Output voltage	"H"	V_{OH}	V_{IN} = 2.5 V	V_{CC} – 0.5	5.0	—	V	
	"L"	V_{OL}		—	0	+0.5	V	
Oscillation frequency		f_H	V_{IN} = 5.0 V	+2000	—	—	ppm	Nominal frequency reference
		f_L	V_{IN} = 0.0 V	—	—	–2000	ppm	
Frequency stability		$\Delta f(V_{CC})$	V_{CC} = 4.75 V to 5.25 V V_{IN} = 2.5 V	–150	—	+150	ppm	V_{CC} = 5.0 V reference
Frequency stability with temperature		$\Delta f(Ta)$	V_{IN} = 2.5 V Ta = –10 to +70 °C	–500	—	+500	ppm	25°C reference

Unless otherwise specified Ta = +25 °C, V_{CC} = 5.0 V

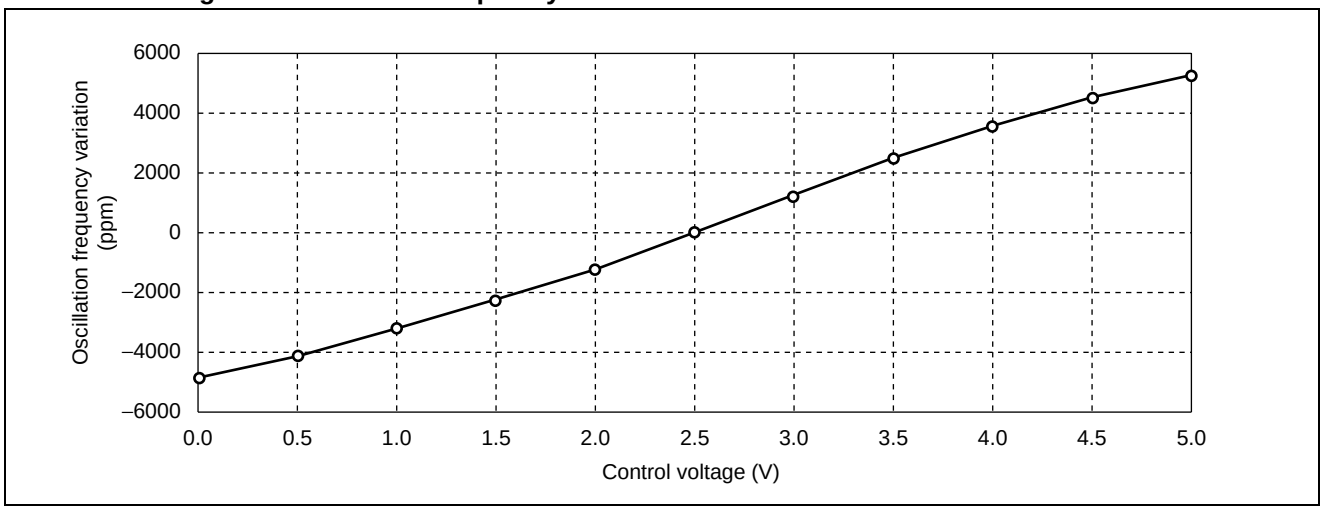
■ MEASURMENT CIRCUIT



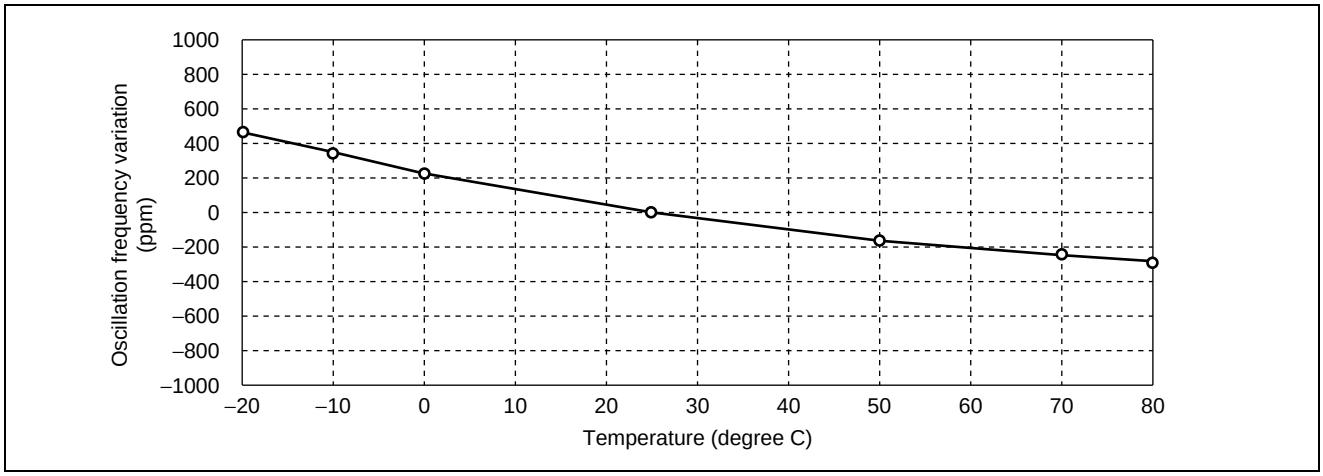
■ TYPICAL CHARACTERISTICS

Part number: FAR-M2CC-16M934-F150

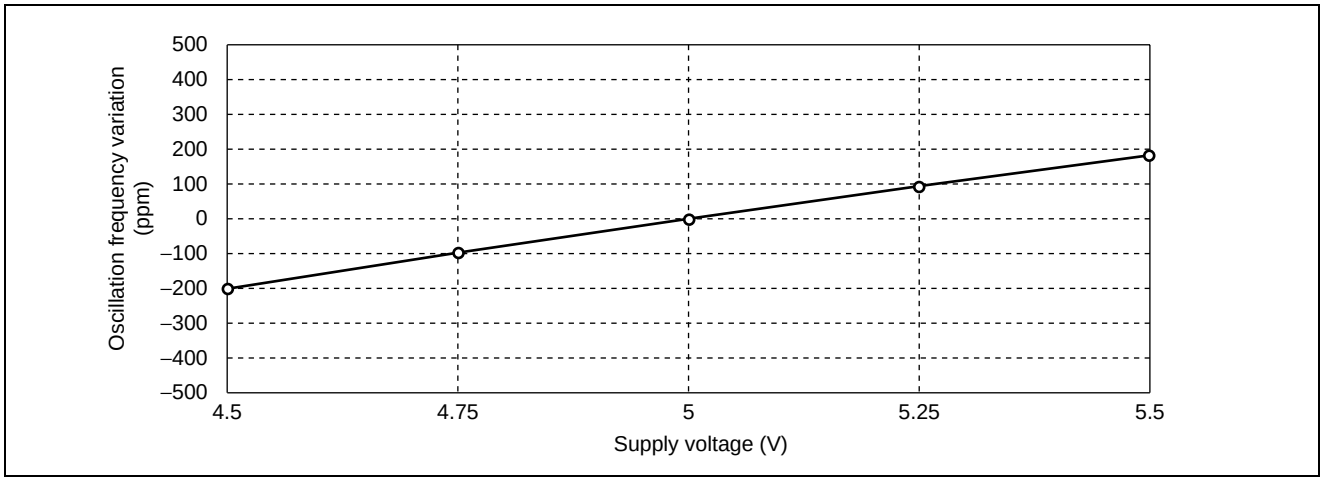
1. Control Voltage vs. Oscillation Frequency Variation



2. Temperature Characteristics



3. Supply Voltage (Vcc) vs. Oscillation Frequency Variation



■ PART NUMBER DESIGNATION

[Designation example]

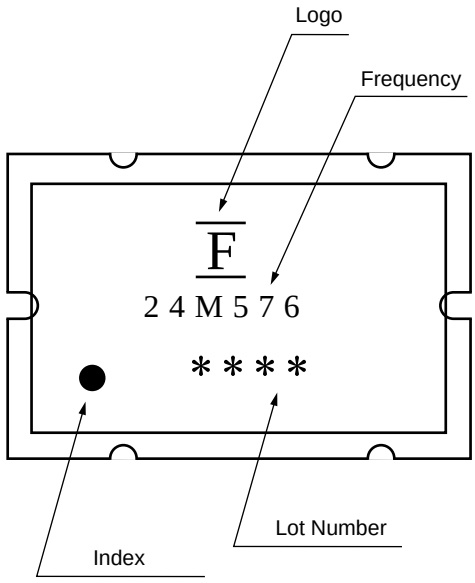
FAR – M2CC – □□□□□□ – F150 – R
(1) (2)

(1) : Frequency : This specifies the nominal frequency using six alphanumeric characters. M indicates the decimal point.

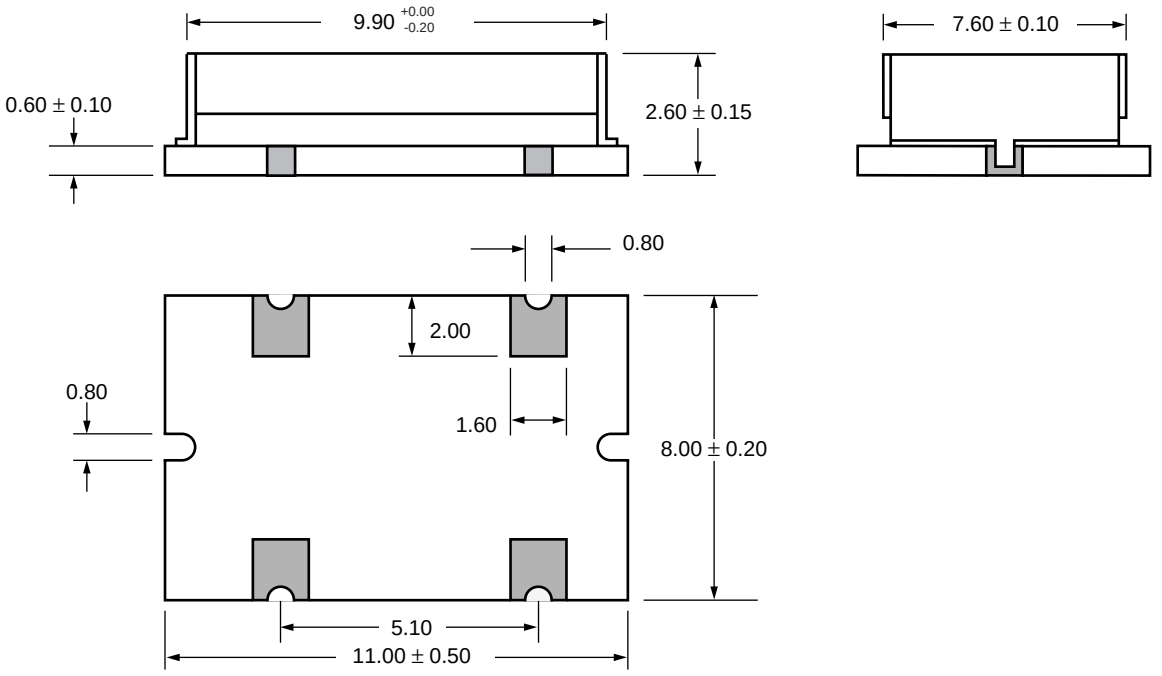
[Example] 24.576 MHz → 24M576

(2) : Taping : "–R" means 1000 pcs/reel

■ MARKING

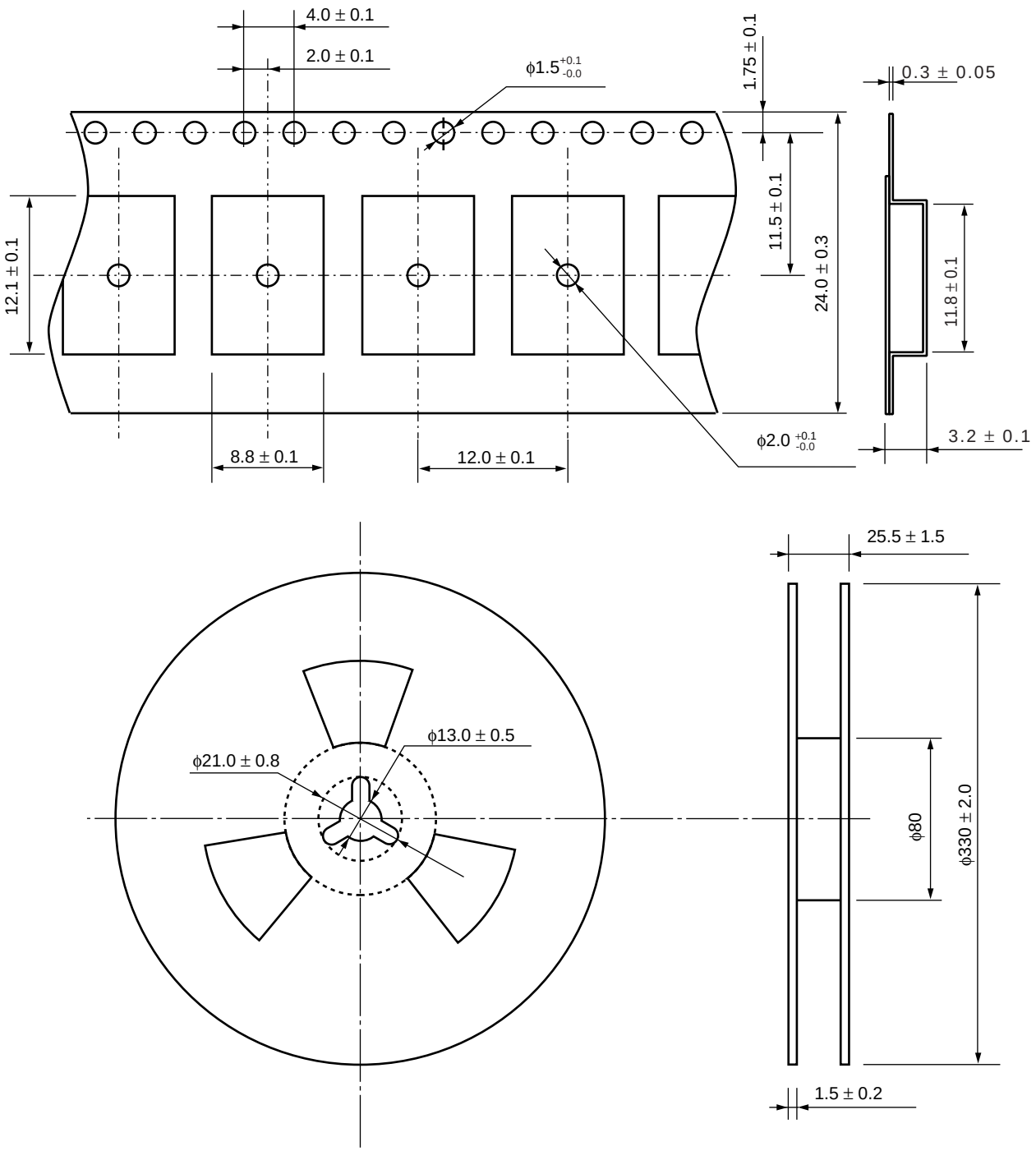


■ PACKAGE DIMENSION



Dimensions in mm.

■ PACKAGE: Reel type



Type	Quantity
R	1 k pcs

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