EPSON
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15H

Temperature Compensated Crystal Oscillator (TCXO)

TG-5006CE-17H 16.369MHz

- Reflowable and high density mounting type ultra small size SMD (3.2×2.5×0.9 mm Typ.).
- Using the heat-resisting type AT cut quartz crystal allows almost the same temperature soldering as universal SMD IC.
- Operating supply voltage : Vcc= 1.8 V, 2.8 V, or 3.0 V.

■ Specifications

1. Absolute maximum ratings

Parameter	Symbol	Value	Unit	Note
Supply voltage	V_{CC}-GND	-0.3 to 4.0	V	
Storage temperature range	$T_{_STG}$	-40 to +90	°C	

2. Operating range

Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power voltage		Vcc	1.7	—	3.3	V	
		GND	0.0		0.0	V	
Operating temperature range		T_use	-30	+25	+85	°C	
Output load		Load_R	9	10	11	kΩ	
		Load_C	9	10	11	pF	
	DC-cut capacitor	C_C	0.01			μF	

DC-cut capacitor is not included in our TCXO. Please insert DC-cut capacitor in output line.

3.Frequency characteristics

1) Output frequency 16.369 000 MHz
2) Frequency characteristics

(Condtion : V_{CC}= 1.8 V, 2.8 V or 3.0 V, GND=0.0V, Load 10 kΩ//10 pF(DC cut), T_use = +25°C)

Parameter	Symbol	Value	Unit	Note
Frequency tolerance	f_tol(OSC)	+/- 0.8 ×10^{-6} Max.	-	T_use = +25°C +/-2°C Before reflow soldering
	f_tol	+/- 2.0 ×10^{-6} Max. .*1	-	T_use = +25°C +/-2°C Reflow cycles : 2 times.*2
Frequency / temperature characteristics	fo-Tc	+/- 0.5 ×10^{-6} Max.	-	T_use = -30°C to +85°C Based on frequency at +25°C
Frequency / Load coefficient	fo-Load	+/- 0.2 ×10^{-6} Max.	-	Load :10kΩ//10pF +/-10% each
Frequency / voltage coefficient	fo-Vcc	+/- 0.2 ×10^{-6} Max.	-	Vcc +/- 5%
Frequency aging	f_age	+/- 1.0 ×10^{-6} Max.	-	First year T_use = +25°C

*1 Include initial frequency tolerance and frequency deviation after reflow cycles.
*2 Measurement of frequency deviation is made 24h after reflow soldering.
*3 Vcc +/- 5% must be in operating supply voltage range (1.7 V to 3.3 V)

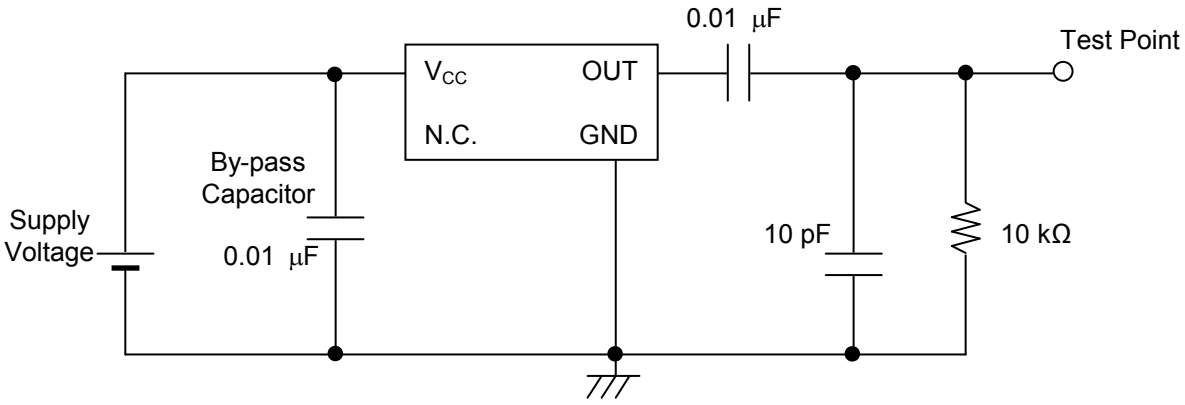
4.Electrical characteristics

(Condtion : V_{CC}= 3.0 V, GND=0.0V, Load 10 kΩ//10 pF(DC cut), T_use = +25°C)

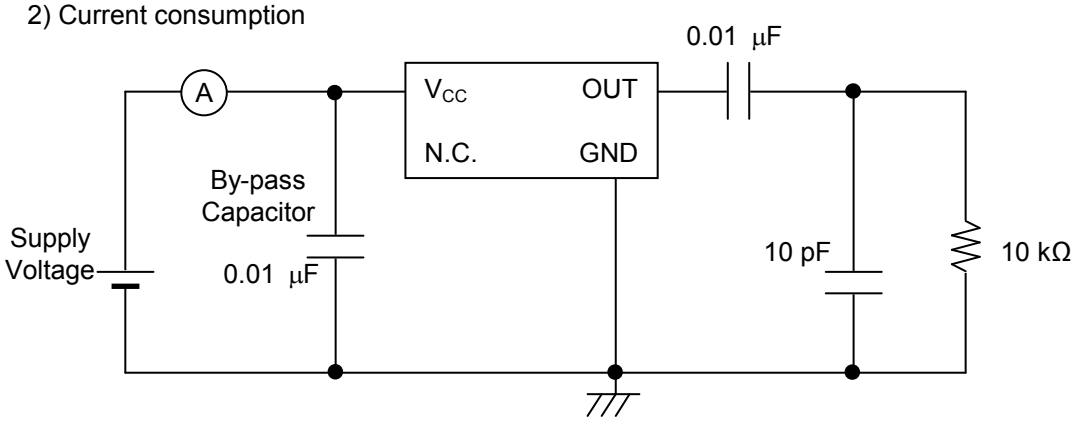
Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Current consumption	Icc			1.5	mA	
Output level	Vpp	0.8		1.5	V	Peak to peak voltage
Symmetry	SYM	40		60	%	GND Level
Harmonics	-			-8	dBc	
Start up time	tosc			2.0	ms	Until output signal has been reached min 90% of final amp.
				2.0		Until freqency has been reached within +/-1 ppm of final freq.
SSB Phase noise	L(f)			-85	dBc/Hz	Offset:10 Hz
				-110		Offset:100 Hz
				-132		Offset:1 kHz
				-148		Offset:10 kHz
				-148		Offset:100 kHz
				-148		Offset:1 MHz

5. Test circuit

1) Output Load : 10 kΩ // 10 pF



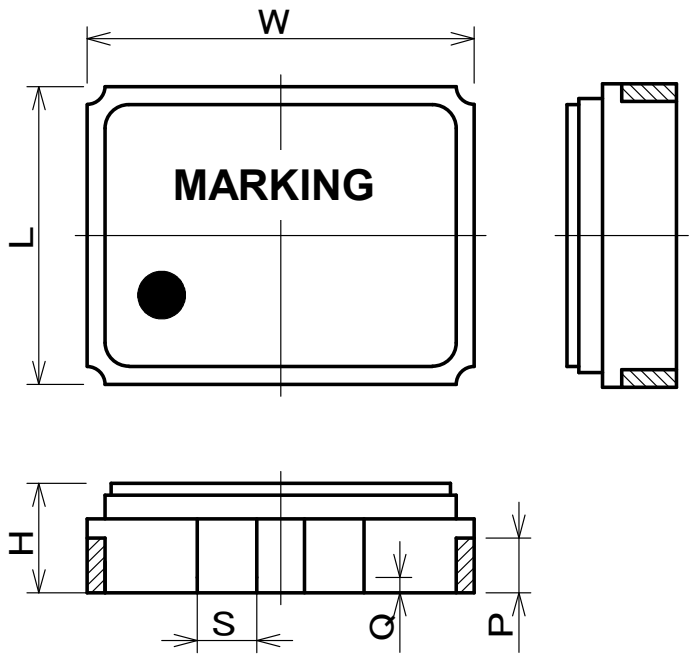
2) Current consumption



3) Conditions

1. Oscilloscope: Impedance Min. 1 MΩ
   Input capacitance Max. 10 pF
   Band width Min. 300 MHz
   Impossible to measure both frequency and wave form at the same time.(In case of using oscilloscope's amplifier output, possible to measure both at the same time.)
2. CL includes probe capacitance.
3. A capacitor (By-pass:0.01 µF) is placed between V_{CC} and GND,and closely to TCXO.
4. Use the current meter whose internal impedance value is small.
5. Power Supply
   Impedance of power supply should be as lowest as possible.
6. GND should apply one point earth.

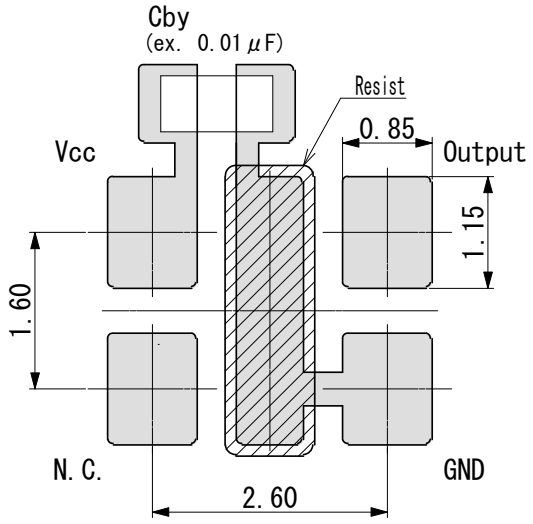
6. Outline Drawing



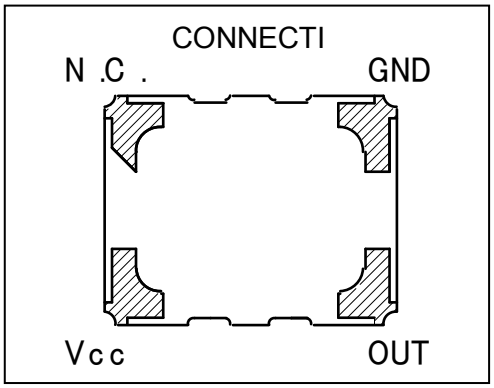
Marking
TBD

Material
Ceramics(base)
Au coated nickel(terminal)
Fe-Ni-Co(lid)

7. Recommended soldering pattern



Please connect Cby(bypass capacitor) quite near by "Vcc" terminal.
Do not design any patterns except GND on the shaded area.



BOTTOM VIEW

(unit : mm)

DIM.	MIN.	TYP.	MAX.	DIM.	MIN.	TYP.	MAX.
W	3.00	3.20	3.40	F	—	0.57	—
L	2.30	2.50	2.70	G	—	C 0.27	—
H	0.80	0.90	1.00	J	—	0.08	—
A	—	0.765	—	K	—	0.08	—
B	0.76	0.86	0.96	M	0.80	0.90	1.00
C	—	0.765	—	P	0.41	0.46	0.51
D	—	0.57	—	S	0.40	0.50	0.60
E	1.85	1.95	2.05				