

### Features

- Frequency : 10, 19.2, 20, 25, 30.72  
40, 48MHz
- SMD type package
- Supply voltage : 3.3V
- CMOS output
- Frequency stability over temperature :  
±10ppb over -40°C ~ +85°C
- External dimensions (mm)  
L : 9.5 x W : 7.3 x H : 5.5
- RoHS compliant & Pb free

### Applications

- Small cell, Base station
- OTN, PTN, Switch, Router
- Precise timing & synchronization  
network (IEEE1588, Sync.E)
- Enterprise networking
- Smart grid
- Test and measurement equipment

### Electrical Characteristics

Item		QTO107	Conditions
Nominal Frequency (F <sub>0</sub> )		10 MHz	
Supply Voltage (V <sub>DD</sub> )		3.3 V	Note [4]
Current Consumption (I <sub>DD</sub> )	During warm up	550 mA Typ.	Ambient temperature at 25°C
	At steady state	170 mA Max.	
Initial Frequency Accuracy		±500 ppb Max.	Note [1]
Warm-up Time		3 minutes Max.	Note [2]
Reflow Shift		±1 ppm Max.	After 1 hour recovery at 25°C
Operating Temperature Range (T <sub>OTR</sub> )		-40°C ~ +85°C	
Frequency Stability	vs Temperature	±10ppb , ±15ppb , ±20ppb	Note [3]
	vs Supply Voltage	±10ppb Typ.	Note [4]
	vs Load	±10ppb Typ.	Note [5]
Frequency Slope (in still air)		±1 ppb/°C Max.	Note [6]
Output Load		15 pF	
Output Type		CMOS	
Output Voltage High (V <sub>OH</sub> )		90% V <sub>DD</sub> Min.	
Output Voltage Low (V <sub>OL</sub> )		10% V <sub>DD</sub> Min.	
Duty Cycle		45% ~ 55%	
Rise & Fall Time (T <sub>r</sub> / T <sub>f</sub> )		4 ns Max.	

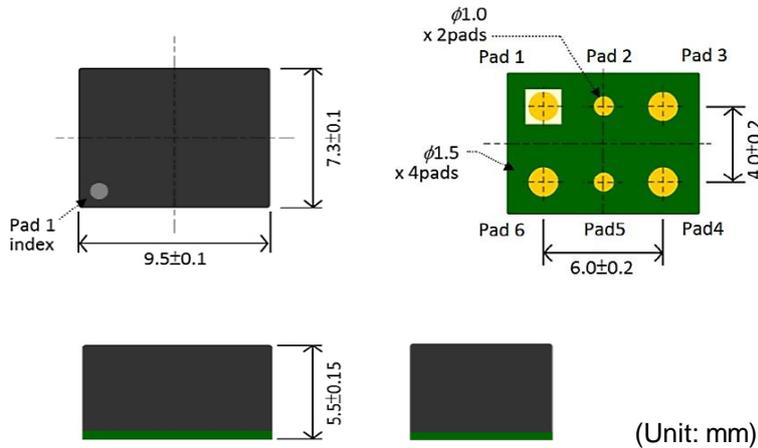
### Electrical Characteristics (Continued)

Item		QTO107	Conditions
Phase Noise (@10MHz Carrier)	at 1Hz offset	-80 dBc/Hz Typ.	Ambient temperature at 25°C Note [7]
	at 10Hz offset	-112 dBc/Hz Typ.	
	at 100Hz offset	-135 dBc/Hz Typ.	
	at 1kHz offset	-150 dBc/Hz Typ.	
	at 10kHz offset	-158 dBc/Hz Typ.	
	at 100kHz offset	-158 dBc/Hz Typ.	
	at 1MHz offset	-160 dBc/Hz Typ.	
Allan Deviation (Tau = 1.0s)		5.0* e-11 Typ.	Ambient temperature at 25°C
Aging (F <sub>aging</sub> )	Daily	±1.0 ppb Max.	After 60 days of operation
	1st year	±0.5 ppm Max.	
	10 years	±2.0 ppm Max.	
Free-run Accuracy		±4.6 ppm Max.	Note [8]
Storage Temperature Range (T <sub>STR</sub> )		-55°C ~ +125°C	

**Notes:**

- [1] At time of shipment, refer to nominal frequency at 25°C±2°C.
- [2] Time needed for frequency to be within ±20ppb refer to frequency after 1 hour, at 25°C.
- [3] Within operating temperature range, refer to (F<sub>max</sub> + F<sub>min</sub>)/2.
- [4] F<sub>0</sub> < 40MHz, V<sub>DD</sub> variation ±5%, refer to frequency at V<sub>DD</sub> = 3.3V.  
F<sub>0</sub> ≥ 40MHz, V<sub>DD</sub> variation ±2%, refer to frequency at V<sub>DD</sub> = 3.3V.
- [5] Load variation ±5%, refer to frequency at Load = 15pF.
- [6] Temperature ramping rate 0.5°C/minute max.
- [7] Phase noise degrades with increasing output frequency.
- [8] Including all causes in 20years, refer to nominal frequency at 25°C±2°C.

### Dimensions

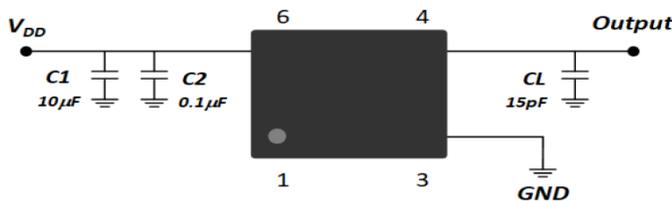


### Pin function

Pin	Function
1	No Connection
2	No Connection
3	GND
4	Output
5	No Connection
6	V <sub>DD</sub>

(Unit: mm)

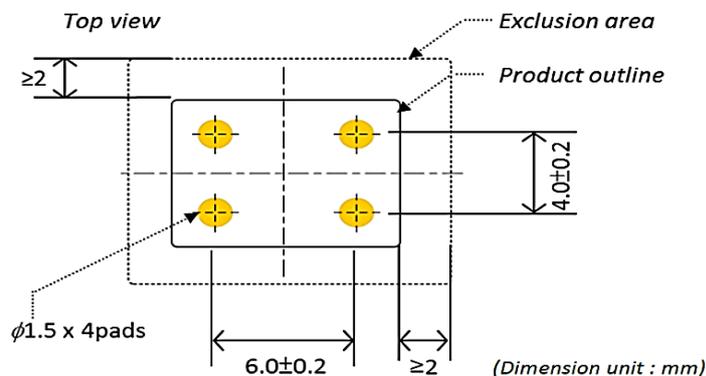
### Testing Circuit



### External components

C1	AC noise bypass for V <sub>DD</sub>
C2	AC noise bypass for V <sub>DD</sub>
CL	Load capacitance
<b>Note:</b> Bypass capacitor should be placed	

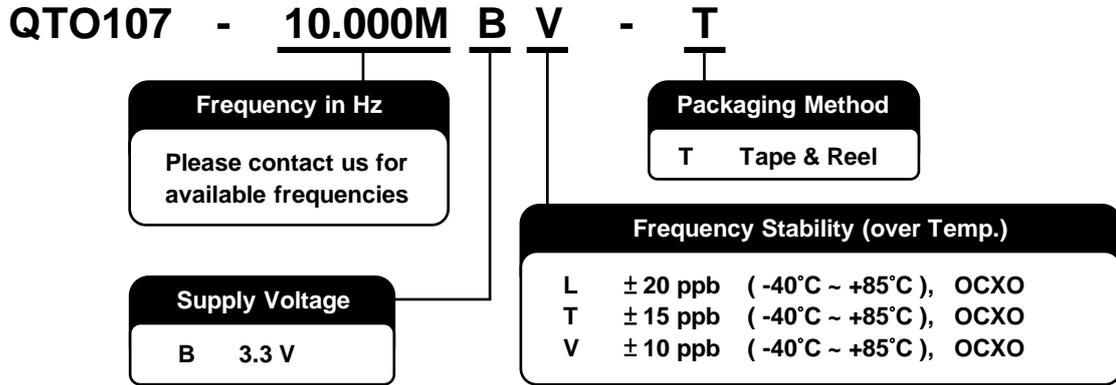
### Recommended Pad Layout



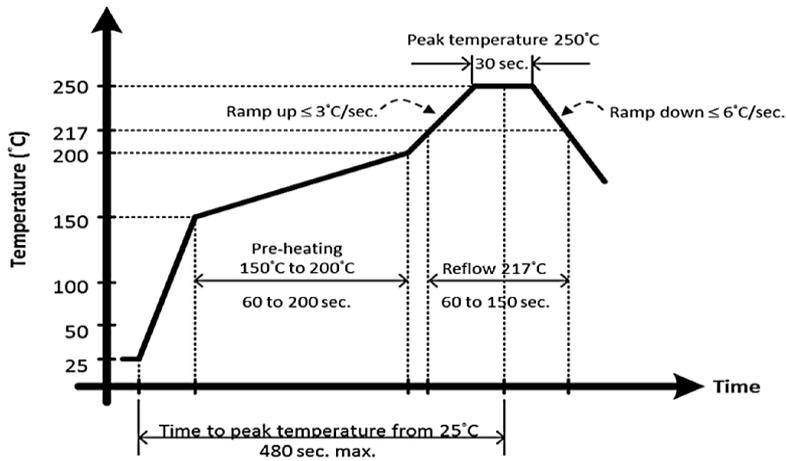
### Notes:

- (1) Recommended exclusion area in any copper plane to isolate the OCXO from the underlying ground or power planes to reduce thermal loss.
- (2) To further minimize the thermal loss, it is also recommended that the trace connecting to the pads should not connect to any layer inside the exclusion area.
- (3) For the same reason, it is recommended to preserve the exclusion area larger than the product size of 2mm in both of length and width.

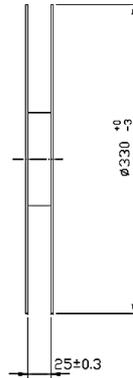
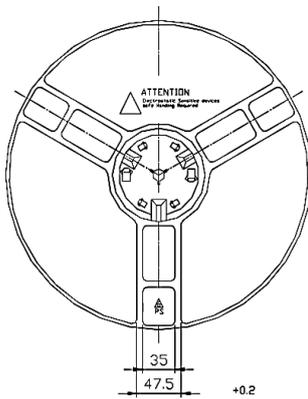
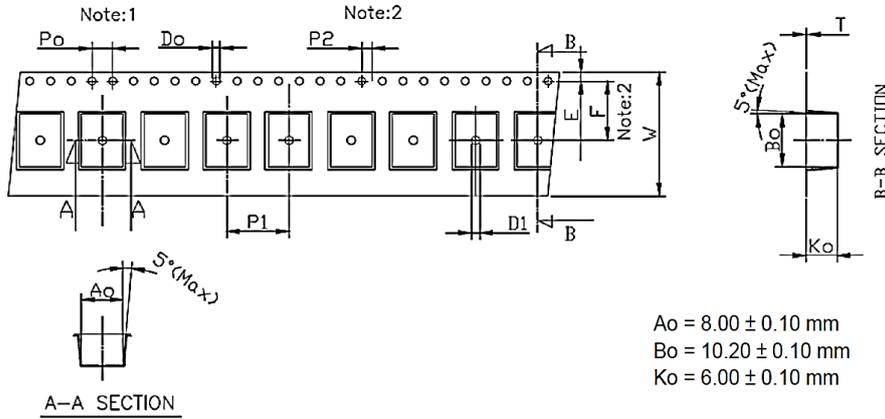
### Ordering Information



### Reflow Profile (Pb-free)



### Packing



Symbol	Spec.
Po	4.0±0.10
P1	12.0±0.10
P2	2.0±0.10
Do	1.50 <sup>+0.1</sup> / <sub>-0</sub>
D1	1.50(MIN)
E	1.75±0.10
F	11.50±0.10
10Po	40.0±0.10
W	24.0 <sup>+0.3</sup> / <sub>-0.1</sub>
T	0.40±0.05

(Unit: mm)

#### Notes.

- (1) 10 sprocket hole pitch cumulative tolerance is  $\pm 0.1 \text{ mm}$ .
- (2) Pocket position relative to sprocket hole measured as true position of pocket not pocket hole.
- (3)  $A_o$  &  $B_o$  measured on a plane 0.3mm above the bottom of the pocket to top surface of the carrier.
- (4)  $K_o$  measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
- (5) Carrier camber shall be not than 1mm per 100mm through a length of 250mm.