

Features

- Frequency : 10 , 20 , 30.72 , 40 MHz
- SMD type package
- Supply voltage : 3.3V
- CMOS output
- Frequency stability over temperature : ± 10 ppb over -40°C to $+85^{\circ}\text{C}$
- 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_0)		10 , 20 , 30.72 , 40 MHz	
Supply Voltage (V_{DD})		3.3V	$\pm 5\%$
Current Consumption (I_{DD})	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_{OTR})		$-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$	
Frequency Stability	vs Temperature	± 10 ppb , ± 15 ppb , ± 20 ppb	Note [3]
	vs Supply voltage	± 10 ppb Typ.	Note [4]
	vs Load	± 10 ppb Typ.	Note [5]
Frequency Slope (in still air)		± 1 ppb/ $^{\circ}\text{C}$ Max.	Note [6]
Output Load		15 pF	
Output Type		CMOS	
Output Voltage High (V_{OH})		90% V_{DD} Min.	
Output Voltage Low (V_{OL})		10% V_{DD} Max.	

Notes:

- [1] At time of shipment, reference to nominal frequency, at $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$.
- [2] Time needed for frequency to be within ± 20 ppb reference to frequency after 1 hour, at 25°C .
- [3] Within operating temperature range, reference to $(F_{max} + F_{min})/2$.
- [4] V_{DD} variation $\pm 5\%$, reference to frequency at $V_{DD} = 3.3\text{V}$.
- [5] Load variation $\pm 5\%$, reference to frequency at Load = 15pF.
- [6] Temperature ramping rate 0.5 $^{\circ}\text{C}/\text{minute}$ max.

Electrical Characteristics (Continued)

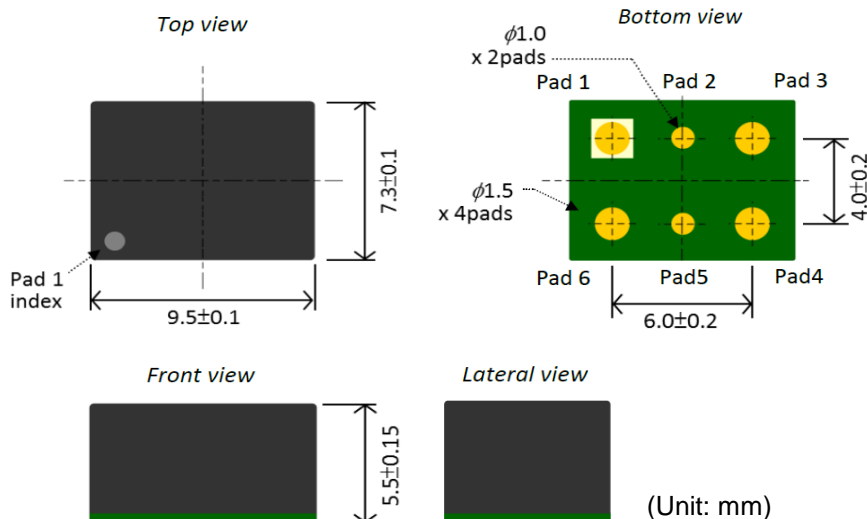
Item		QTO107	Conditions
Duty Cycle		45% ~ 55%	
Rise / Fall Time (T_r / T_f)		4 ns Max.	
Phase Noise (@10MHz Carrier)	at 1Hz offset	-80 dBc/Hz Typ.	Ambient temperature at 25°C Note [7]
	at 10Hz offset	-112 dBc/Hz Typ.	
	at 100Hz offset	-135 dBc/Hz Typ.	
	at 1kHz offset	-150 dBc/Hz Typ.	
	at 10kHz offset	-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	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_{STR})		-55°C ~ +125°C	

Notes:

[7] Phase noise degrades with increasing output frequency.

[8] Including all causes in 20years, reference to nominal frequency at 25°C±2°C.

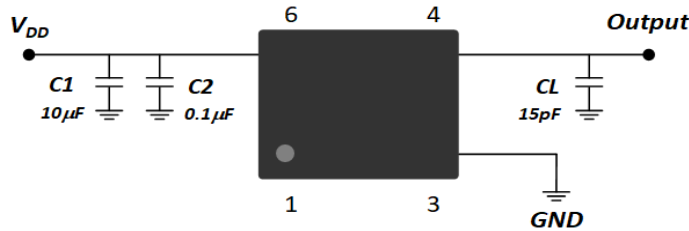
Dimensions



Pin	Function
1	NC
2	DNC
3	GND
4	Output
5	DNC
6	V _{DD}

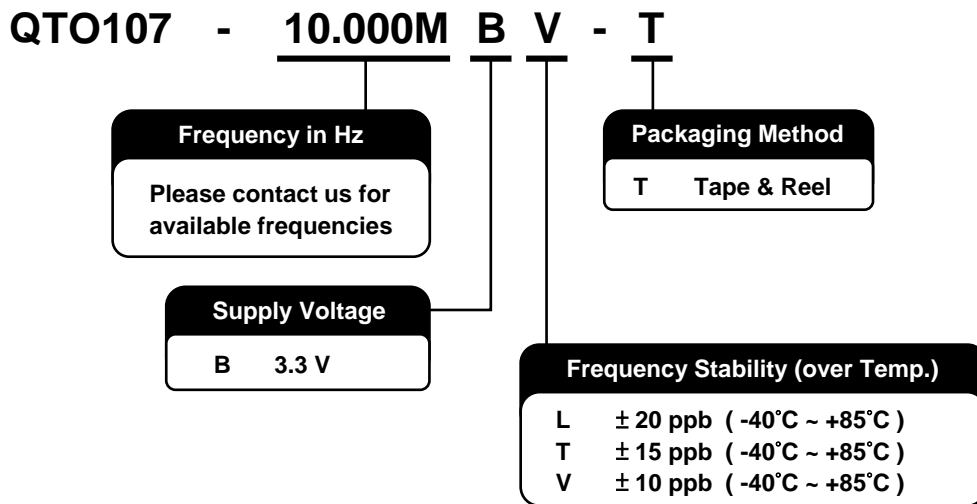
Note:
DNC = Do not connect

Testing circuit

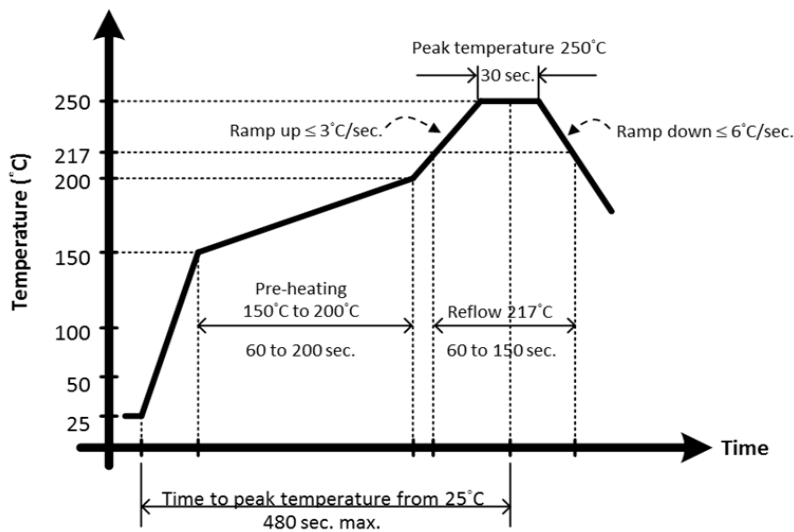


External components	
C1	AC noise bypass for V_{DD}
C2	AC noise bypass for V_{DD}
CL	Load capacitance
Note: Bypass capacitor should be placed	

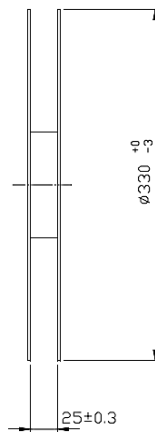
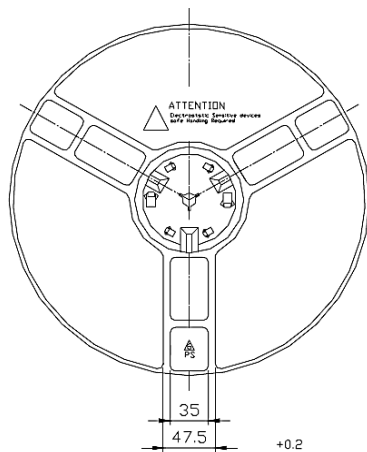
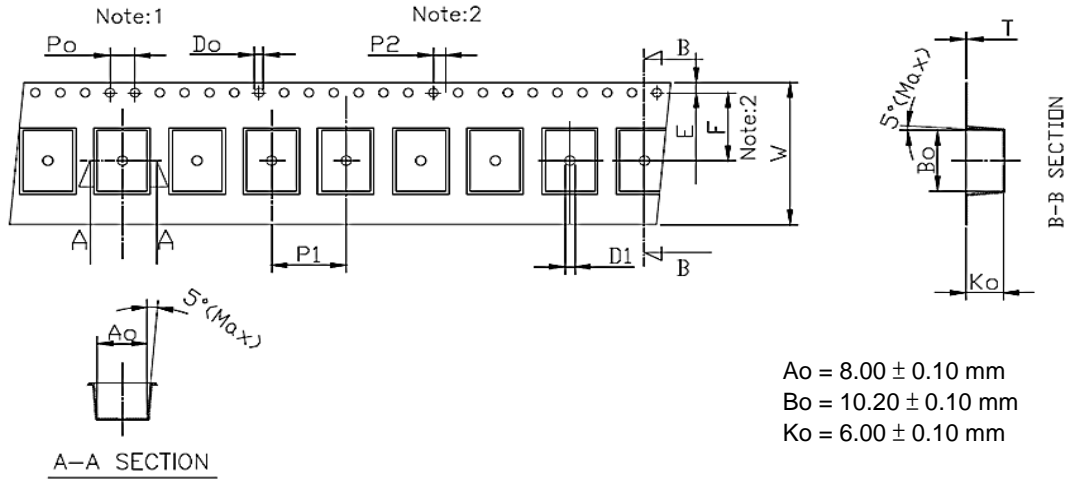
Ordering Information



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 ^{+0.1} ₋₀
D1	1.50(MIN)
E	1.75±0.10
F	11.50±0.10
10Po	40.0±0.10
W	24.0 ^{+0.3} _{-0.1}
T	0.40±0.05

(Unit: mm)

Notes:

- (1) 10 sprocket hole pitch cumulative tolerance is ±0.1mm.
- (2) Pocket position relative to sprocket hole measured as true position of pocket not pocket hole.
- (3) Ao & Bo measured on a plane 0.3mm above the bottom of the pocket to top surface of the carrier.
- (4) Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
- (5) Carrier camber shall be not more than 1mm per 100mm through a length of 250mm.