Fuel The Digital World

QTO107

Oven Controlled Crystal Oscillator

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_0)		10 MHz	
Supply Voltage (V_{DD})		3.3 V	Note [4]
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°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_{OH})		90% V_{DD} Min.	
Output Voltage Low (V_{OL})		10% V_{DD} Min.	
Duty Cycle		45% ~ 55%	
Rise & Fall Time (T_r / T_f)		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_{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 Accuacy		±4.6 ppm Max.	Note [8]
Storage Temperature Range (T_{STR})		-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 (Fmax + Fmin)/2.

[4] F0 < 40MHz, V_{DD} variation ±5%, refer to frequency at V_{DD} = 3.3V.
F0 ≥ 40MHz, V_{DD} variation ±2%, refer to frequency at V_{DD} = 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.

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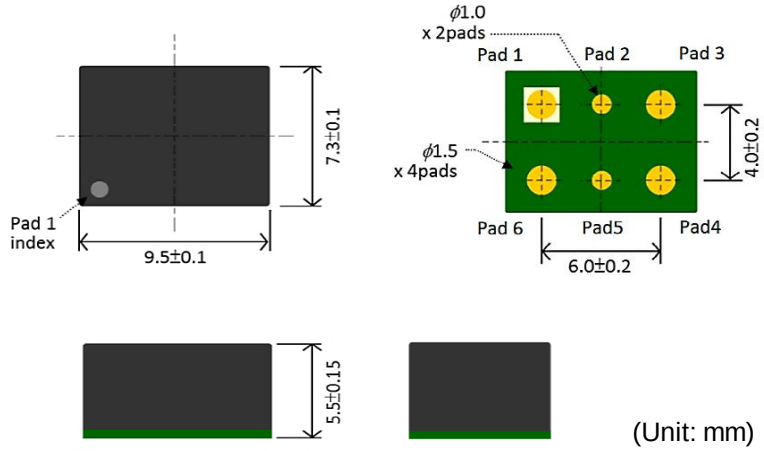
Dimensions

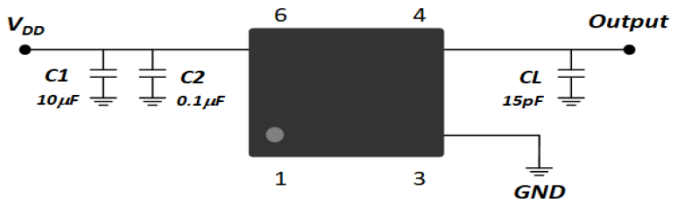


(Unit: mm)

Pin function

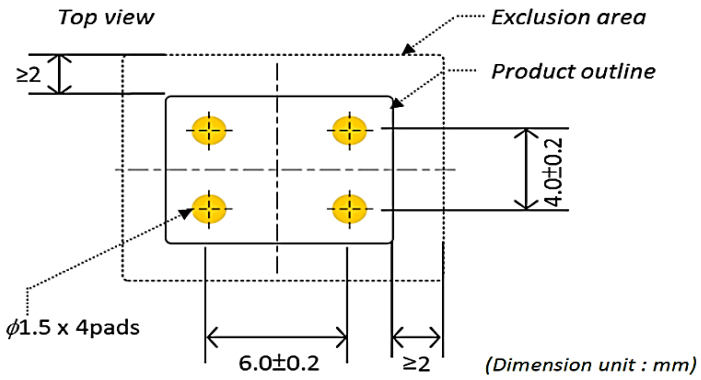
Pin	Function
1	No Connection
2	No Connection
3	GND
4	Output
5	No Connection
6	V_{DD}

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	

Recommended Pad Layout



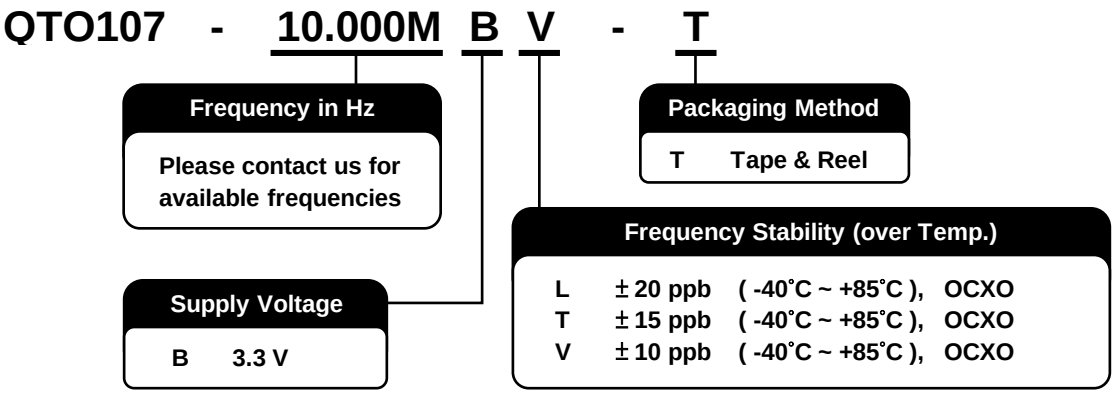
Notes:

(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)