

- Pletronics' THA3002-20.0MHz is a temperature compensated crystal oscillator
- Optional Voltage Control Function
- HCMOS output.
- The package is designed for high density surface mount designs.
- Tape and Reel packaging is available.
- Select Stratum-III frequencies available
- 5 x 7 mm LCC Ceramic Package

**Pletronics Inc. certifies this device is in accordance with the RoHS 6/6 (2002/95/EC) and WEEE (2002/96/EC) directives.**

Pletronics Inc. guarantees the device does not contain the following:

Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's

Weight of the Device: 0.10 grams

Moisture Sensitivity Level: 1 As defined in J-STD-020D.1

Second Level Interconnect code: e4

### Absolute Maximum Ratings:

Parameter	Unit
V <sub>CC</sub> Supply Voltage	-0.5V to +6.5V
V <sub>i</sub> Input Voltage	-0.5V to V <sub>CC</sub> + 0.5V
V <sub>o</sub> Output Voltage	-0.5V to V <sub>CC</sub> + 0.5V

### Thermal Characteristics

The maximum die or junction temperature is 155°C

The thermal resistance junction to board is 30 to 50°C/Watt depending on the solder pads, ground plane and construction of the PCB.

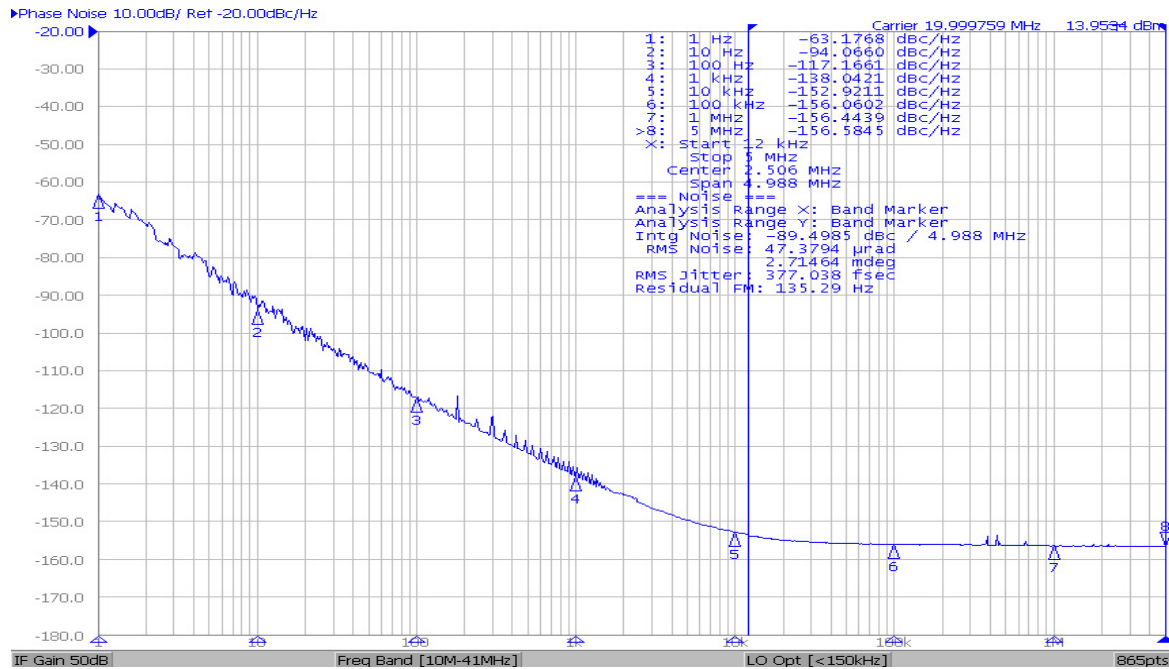
### ESD Rating

Model	Minimum Voltage	Conditions
Human Body Model	1500	MIL-STD-883 Method 3115
Charged Device Model	1000	JESD 22-C101

## Electrical Specification for specified Vcc over the specified temperature range

Item	Min	TYP	Max	Unit	Condition
Frequency Range		20.0		MHz	
Frequency Stability <sup>1</sup>	-0.28		+0.28	ppm	Vcontrol @ 1.50 volts (Fmax-Fmin)/2
Holdover	-0.37		+0.37	ppm	GR-1244-CORE
Frequency Calibration	-0.5		+0.5	ppm	Frequency offset at 25°C, 60 minutes after reflow
Frequency Stability / Supply	-0.1		+0.1	ppm	Load: 10K ohm // 10 pF & Vcc ± 5%
Load Sensitivity	-0.2		+0.2	ppm	±2% variation in magnitude from 10K ohm ±10%    10 pF
Long Term Stability (Aging)	-3.4		+3.4	ppb	After 15 years.
Output Waveform	CMOS				
Output V <sub>HIGH</sub> as % of Supply	90			%V <sub>S</sub>	Load: 10K ohm ± 10% // 10 pF ± 10%
Output V <sub>LOW</sub> as % of Supply			10	%V <sub>S</sub>	
T <sub>RISE</sub> and T <sub>FALL</sub> (10% to 90%)			6.5	nS	
Duty Cycle at 50% Supply	40	50	60	%	
Phase Noise	10 Hz	-	-90	-	Typical values for a 20.0 MHz oscillator at 25°C
	100 Hz	-	-115	-	
	1 kHz	-	-135	-	
	10 kHz	-	-145	-	
Jitter	-	-	1.7	pS	10 Hz to 1 MHz offset from carrier
V Supply Range V <sub>CC</sub>	3.15	3.3	3.45	Volts	
Supply Current I <sub>CC</sub>	-	-	7.0	mA	
Vcontrol Range	0.5		2.50	Volts	1.50 volts nominal
Frequency Pullability	± 9.2	± 10.0	-	ppm	
Linearity	-	0.05	2.0	%	In accordance with MIL-PRF-55310
Operating Temperature Range	-40		+85	°C	
Storage Temperature Range	-55		+95	°C	

## Phase Noise:



## MTIE:



## Reliability: Environmental Compliance

Parameter	Condition
Mechanical Shock	MIL-STD-883 Method 2002, Condition B
Vibration	MIL-STD-883 Method 2007, Condition A
Solderability	MIL-STD-883 Method 2003
Thermal Shock	MIL-STD-883 Method 1011, Condition A

## Part Marking:



or



ffff.yww = frequency in MHz . Year week  
 PLE = Pletronics  
 xx.xxxx = internal code

## Package Labeling

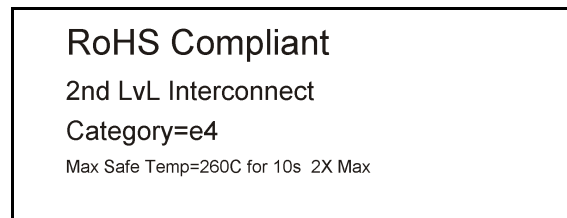
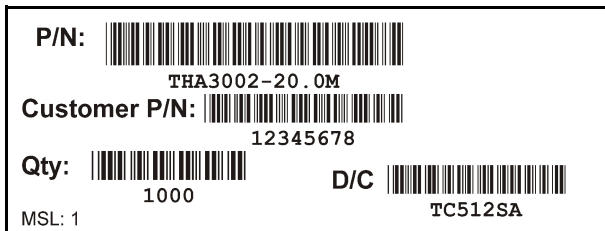
Label is 1" x 2.6" (25.4mm x 66.7mm)

Font is Courier New

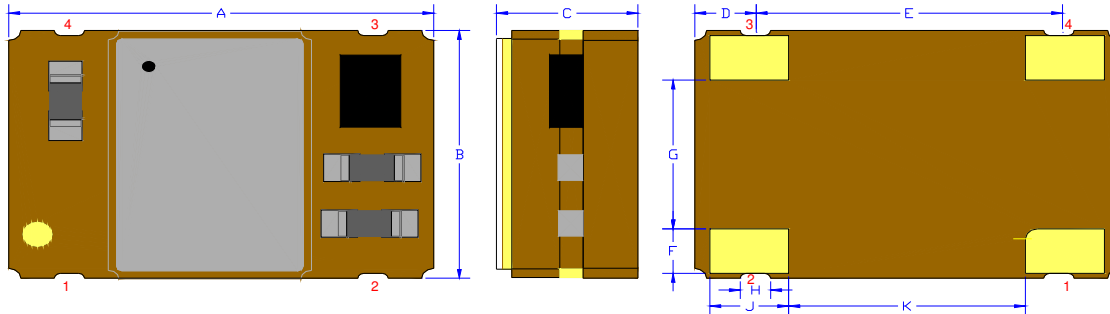
Bar code is 39-Full ASCII

Label is 1" x 2.6" (25.4mm x 66.7mm)

Font is Arial



## Mechanical:



Not to Scale

Pad	Function	Note
1	Vcontrol Input	If this function is not specified, recommend connecting this pad to ground.
2	Ground (GND)	
3	Output	
4	Supply Voltage ( $V_{CC}$ )	Recommend connecting appropriate power supply bypass capacitors as close as possible.

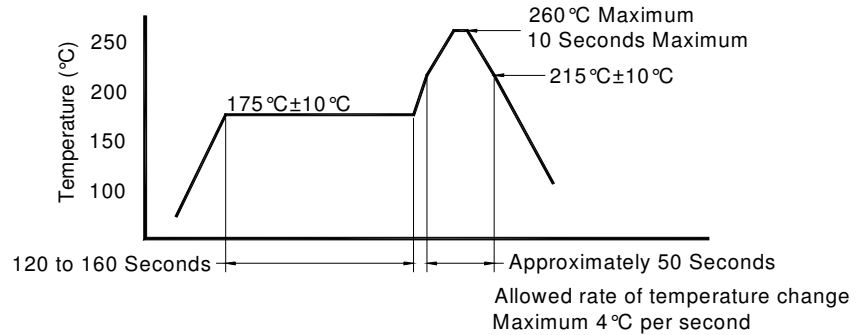
	Inches	mm
A	0.276 $\pm$ 0.006	7.00 $\pm$ 0.15
B	0.197 $\pm$ 0.006	5.00 $\pm$ 0.15
C	0.099 max	2.50 max
D <sup>1</sup>	0.039	1.00
E <sup>1</sup>	0.197	5.00
F <sup>1</sup>	0.025	0.90
G <sup>1</sup>	0.118	3.00
H <sup>1</sup>	0.020	0.50
J <sup>1</sup>	0.051	1.30
K <sup>1</sup>	0.154	3.90

<sup>1</sup> Typic dimensions

Contacts :

Gold 11.8  $\mu$ mches 0.3  $\mu$ m minimum over Nickel 50 to 350  $\mu$ mches 1.27 to 8.89  $\mu$ m

## Reflow Cycle (typical for lead free processing)

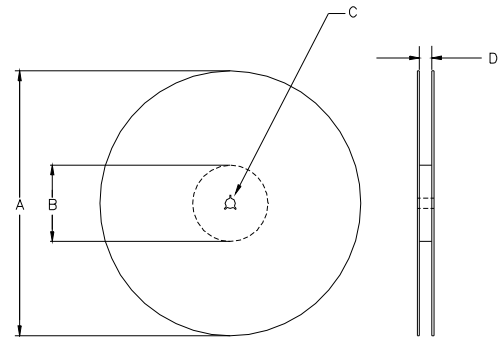


The part may be reflowed 2 times without degradation.

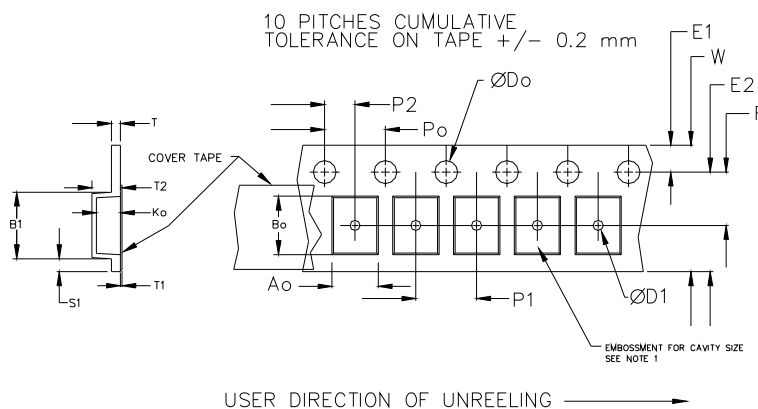
## Tape and Reel: available for quantities of 250 to 1000 per reel, cut tape for < 250

Constant Dimensions Table 1								
Tape Size	D0	D1 Min	E1	P0	P2	S1 Min	T Max	T1 Max
8mm	1.5	1.0	1.75	4.0	2.0 ± 0.05	0.6	0.6	0.1
12mm		1.5			2.0 ± 0.1			
16mm	+0.1 -0.0	1.5	± 0.1	± 0.1	2.0 ± 0.1			
24mm		1.5						

Variable Dimensions Table 2							
Tape Size	B1 Max	E2 Min	F	P1	T2 Max	W Max	Ao, Bo & Ko
16 mm	12.1	14.25	7.5 ± 0.1	8.0 ± 0.1	8.0	16.3	Note 1



Note 1: Embossed cavity to conform to EIA-481-B      Dimensions in mm      Not to scale



REEL DIMENSIONS					
A	inches	7.0	10.0	13.0	Tape Width
	mm	177.8	254.0	330.2	
B	inches	2.50	4.00	3.75	Tape Width
	mm	63.5	101.6	95.3	
C	mm	13.0 +0.5 / -0.2			Tape Width
D	mm	16.4	16.4	16.4	16.0
		+2.0	+2.0	+2.0	
		-0.0	-0.0	-0.0	

Reel dimensions may vary from the above

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