



- Pletronics' THD3005-19.44M 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
- 3.2 x 5 mm LCC Ceramic Package
- Tape and Reel packaging is available.
- Select Stratum-III frequencies available

**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                                      |                                    | 19.44            |                             | MHz              |   |  |
| Frequency Stability vs Temp.                         | -0.28                              |                  | +0.28                       | ppm              | Vcontrol = 1.50 volts (Fmax-Fmin)/2                   |  |
| 24 Hour 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                         | -0.10                              |                  | +0.10                       | ppm              | Load: 10K ohm // 10 pF & Vcc ± 5%                     |  |
| Load Sensitivity                                     | -0.20                              |                  | +0.20                       | ppm              | ±2% variation in magnitude from 10K ohm ±10%    10 pF |  |
| Long Term Stability (Aging)                          | -3.4                               |                  | +3.4                        | ppm              | 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                          |  |
| 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<br>100 Hz<br>1 kHz<br>10 kHz | -<br>-<br>-<br>- | -90<br>-115<br>-135<br>-145 | -<br>-<br>-<br>- | dBc/Hz  | Typical values for a 20.0 MHz oscillator at 25°C |
| Jitter   | -                                  | -                | 1.7                         | pS               | 10 Hz to 1 MHz offset from carrier                    |  |
| V Supply Range V <sub>CC</sub>                       | 2.8                                | -                | 5.5                         | 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               | Specified by part number                              |  |
| 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 |

## Package Labeling

|   |   |
|---|---|
| P/N:           |   |
| THD3005-19.44M  |   |
| Customer P/N:  |   |
| 12345678  |   |
| Qty:           | D/C  |
| 1000  | TC512SA   |
| MSL: 1  |   |

|   |
|---|
| <p>RoHS Compliant</p> <p>2nd LvL Interconnect</p> <p>Category=e4</p> <p>Max Safe Temp=260C for 10s 2X Max</p> |
|---|

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

## Part Marking:

**fff.yww**  
• PLExx.xxxx

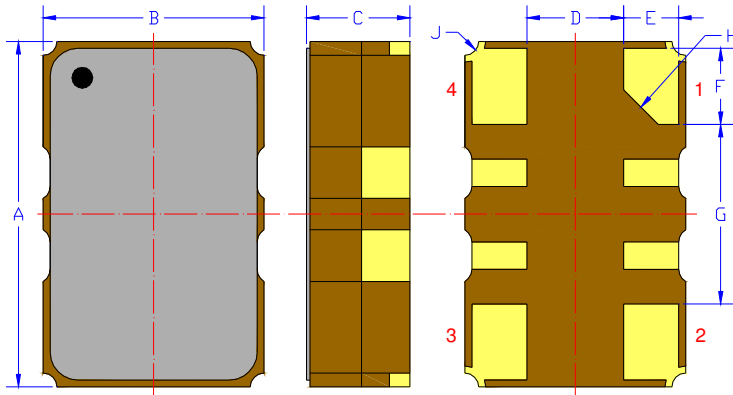
or

**fff.yww**  
• PLExx.xxxx

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

\* Marking will show 38.88 MHz Frequency. Actual output will be 19.44 MHz.

## Mechanical:



|                | Inches       | mm         |
|----------------|--------------|------------|
| A              | 0.197 ±0.008 | 5.00 ±0.20 |
| B              | 0.126 ±0.008 | 3.20 ±0.20 |
| C              | 0.059 max    | 1.50 max   |
| D <sup>1</sup> | 0.055        | 1.40       |
| E <sup>1</sup> | 0.031        | 0.80       |
| F <sup>1</sup> | 0.043        | 1.10       |
| G <sup>1</sup> | 0.102        | 2.60       |
| H <sup>1</sup> | 0.013C       | 0.50C      |
| J <sup>1</sup> | 0.008        | 0.20R      |

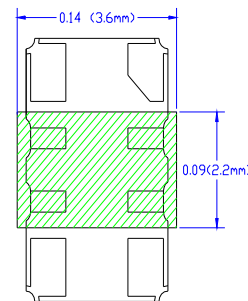
| Pad | Function                          | Note   |
|-----|-----------------------------------|--|
| 1   | Vcontrol Input                    | If this function is not specified, recommend connecting this pad to ground.  |
| 2   | Ground (GND)                      |  |
| 3   | Output                            |  |
| 4   | Supply Voltage (V <sub>CC</sub> ) | Connect an appropriate power supply bypass capacitors as close as possible.  |
| -   | N. C.                             | All other pads on the bottom shall not be connected. These are internally connected and were for the TCXO compensation process |

## Layout and application information

All connection points in the designated region have solder mask cover to avoid any electrical connections

For Optimum Stability and Jitter Performance, Pletronics recommends:

- a ground plane under the device
- no large transient signals (both current and voltage) should be routed under the device
- do not layout near a large magnetic field such as a high frequency switching power supply
- do not place near piezoelectric buzzers or mechanical fans.
- minimize air flow across the device



## 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<br>±0.05 | 0.6    | 0.6   | 0.1    |
| 12mm                        |     | 1.5          |      |     | 2.0<br>±0.1  |        |       |        |
| 16mm                        |     | +0.1<br>-0.0 |      |     | ±0.1         |        |       |        |
| 24mm                        |     | 1.5          |      |     | ±0.1         |        |       |        |

| 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<br>+2.0<br>-0.0 | 16.4<br>+2.0<br>-0.0 | 16.4<br>+2.0<br>-0.0 |            |

Reel dimensions may vary from the above

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