

# TP5 Series

## 5.0\*3.2 mm SMD PECL/LVDS Crystal Oscillator



### FEATURE

- Typical 5.0\*3.2\*1.2mm hermetically sealed ceramic package.
- Very low jitter performance: typical 0.3Ps RMS from 12k-20MHz.
- Fundamental/3<sup>rd</sup> overtone crystal design.
- Output frequency up to 320MHz
- Tri-state enable/disable

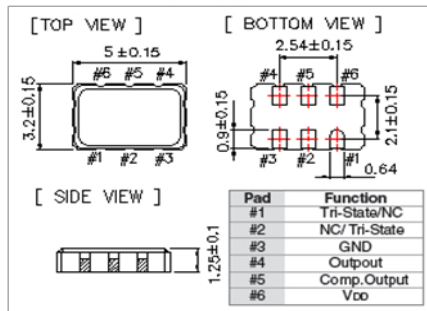


### TYPICAL APPLICATION

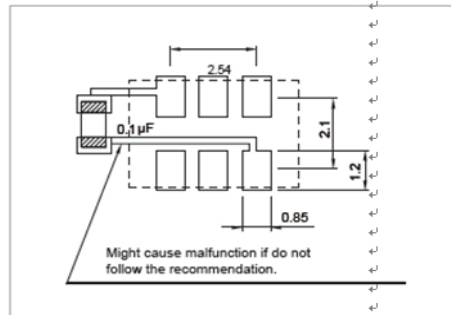
- 10G-BIT, Ethernet, Fiber Channel, Storage Area Network, SONET
- Enterprise Servers, Reference clocks for ADC and DAC
- Telecom

**RoHS Compliant Standard**

#### DIMENSION (mm)



#### SOLDER PAD LAYOUT (mm)



| Parameter   | PECL                                       |         |        |         | LVDS   |         |        |         | Unit |    |
|---|--|---------|--------|---------|--------|---------|--------|---------|------|----|
|   | 3.3V                                       |         | 2.5V   |         | 3.3V   |         | 2.5V   |         |      |    |
|   | Min  | Max     | Min.   | Max.    | Min.   | Max.    | Min.   | Max.    |      |    |
| <b>Supply Voltage Variation (VDD) 5%</b>                            | 3.135                                      | 3.465   | 2.375  | 2.625   | 3.135  | 3.465   | 2.375  | 2.625   | V    |    |
| <b>Frequency Range</b>  | 80   | 320     | 80     | 320     | 80     | 320     | 80     | 320     | MHz  |    |
| <b>Standard Frequency</b>   | 106.25,125,155.52,156.25,187.5,212.5,312.5 |         |        |         |        |         |        |         |      |    |
| <b>Supply Current</b>   | 80 MHz $\leq$ F0 < 160 MHz                 | -       | 75     | -       | 75     | -       | 50     | -       | 50   | mA |
|   | 160 MHz $\leq$ F0 < 250 MHz                | -       | 100    | -       | 100    | -       | 50     | -       | 50   |    |
|   | 250 MHz $\leq$ F0 $\leq$ 320 MHz           | -       | 100    | -       | 100    | -       | 65     | -       | 65   |    |
| <b>Output Level Output High (Logic"1")<br/>Output Low(Logic"0")</b> | 2.275                                      | -       | 1.475  | -       | -      | 1.6     | -      | 1.6     | V    |    |
|   | -  | 1.68    | -      | 1.095   | 0.9    | -       | 0.9    | -       |      |    |
| <b>Transition Time: Rise/Fall Time+</b>                             | -  | 1.0     | -      | 1.0     | -      | 1.0     | -      | 1.0     | nSec |    |
| <b>Start Time</b>   | -  | 3       | -      | 3       | -      | 2.4     | -      | 3       | mSec |    |
| <b>Tri-State(Input to Pin 2 or Pin 1)</b>                           |  |         |        |         |        |         |        |         |      |    |
| <b>Enable(High voltage or floating)</b>                             | 0.7Vdo                                     | -       | 0.7Vdo | -       | 0.7Vdo | -       | 0.7Vdo | -       | V    |    |
| <b>Disable(Low voltage or GND)</b>                                  | -  | 0.3 Vdc | -      | 0.3 Vdc | -      | 0.3 Vdc | -      | 0.3 Vdc |      |    |

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| RMS Phase Jitter (Integrated 12KHz~20MHz) |     |         |     |         |     |         |     |         |        |
|---|-----|---------|-----|---------|-----|---------|-----|---------|--------|
| 80MHz $\cong$ F0<125MHz                   | -   | 0.9     | -   | 0.9     | -   | 0.9     | -   | 0.9     | pSec   |
| 125MHz $\cong$ F0<150MHz                  | -   | 0.7     | -   | 0.7     | -   | 0.7     | -   | 0.7     |        |
| 150MHz $\cong$ F0<200MHz                  | -   | 0.5     | -   | 0.5     | -   | 0.5     | -   | 0.5     |        |
| 200MHz $\cong$ F0                         | -   | 0.3     | -   | 0.3     | -   | 0.3     | -   | 0.3     |        |
| Phase Noise                               |     |         |     |         |     |         |     |         |        |
| 100 Hz                                    | -   | -70     | -   | -70     | -   | -70     | -   | -70     | dBc/Hz |
| 1 KHz                                     | -   | -100    | -   | -100    | -   | -100    | -   | -100    |        |
| 10 KHz                                    | -   | -125    | -   | -125    | -   | -125    | -   | -125    |        |
| Aging (@25°C 1st year)                    | -   | $\pm 3$ | -   | $\pm 3$ | -   | $\pm 3$ | -   | $\pm 3$ | ppm    |
| Storage Temp.Range                        | -55 | 125     | -55 | 125     | -55 | 125     | -55 | 125     | °C     |

Standard frequencies are frequencies which the crystal has been designed and does not imply a stock position.

+ Transition times are measured between 20% and 80% of V<sub>DD</sub>.

Packing: Tape & Reel, 1000/3000pcs per Reel.

### FREQ. STABILITY vs. TEMP. RANGE

| Temp. (°C) | ppm      |          |
|------------|----------|----------|
|            | $\pm 25$ | $\pm 50$ |
| -10 ~ +60  | $\Delta$ | $\circ$  |
| -20 ~ +70  | $\Delta$ | $\circ$  |
| -40 ~ +85  | X        | $\circ$  |

\*  $\circ$ : Available  $\Delta$ : Conditional X: Not available

\* Inclusive of calibration @ 25 °C, operating temperature range, input voltage variation, load variation, aging (1<sup>st</sup> year), shock, and vibration