



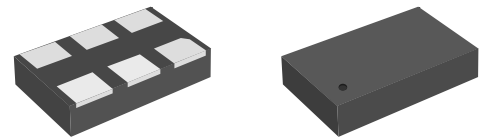
# 156.25 MHz Ultra-Low Jitter Oscillator Plus-PPM Margining MEMS Oscillator (LVPECL)

## 4HF156250Z3

### ADVANCE DATASHEET

#### Features

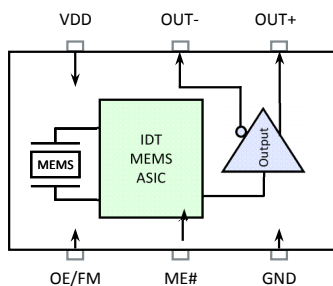
- Nominal Frequency: 156.25 MHz (LVPECL)
- Any Freq Tuning ( $\pm 1000$  ppm): 156.0938 to 156.4063 MHz
- RMS phase jitter: 0.1 ps typical
- Frequency Stability:  $\pm 25$  /  $\pm 50$  ppm
- Standard Packages: 7050 / 5032 / 3225
- Internal MEMS Resonator No external XTAL or XO required



7.0 x 5.0 mm package shown  
(also available in 5.0 x 3.2 and 3.2 x 2.5 mm)

The **4HF156250Z3** is an ultra-low Phase Jitter (100 fs) oscillator capable of up to  $\pm 1000$  ppm of real time frequency margining in one ppm steps. It is ideal for applications requiring extremely low jitter and/or Plus-PPM clocking. Any frequency from 156.0938 to 156.4063 MHz can be generated in real time without any external XTAL or XO.

#### Block Diagram

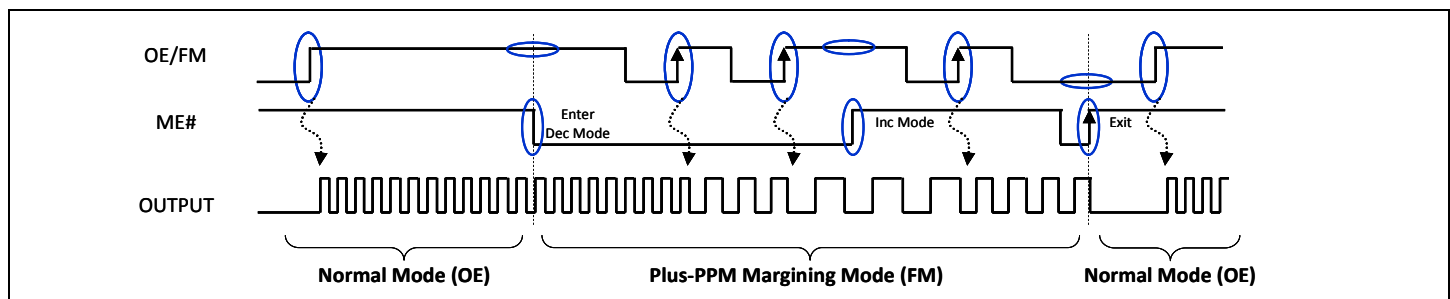


#### Pin Description

| Pin # | Name | Description                               |
|-------|------|-------------------------------------------|
| 1*    | OE   | Output Enable                             |
|       | FM   | Frequency Margining (decrement/increment) |
| 2*    | ME#  | Margining Enable                          |
| 3     | GND  | Ground                                    |
| 4     | OUT+ | Output                                    |
| 5     | OUT- | Output (Complementary)                    |
| 6     | VDD  | Power Supply Voltage                      |

\* Pulled high internally

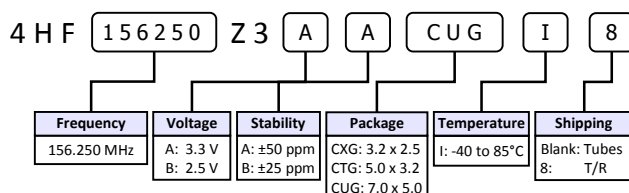
#### Plus-PPM Margining & Real Time Frequency Tuning ( $\pm 1000$ ppm)



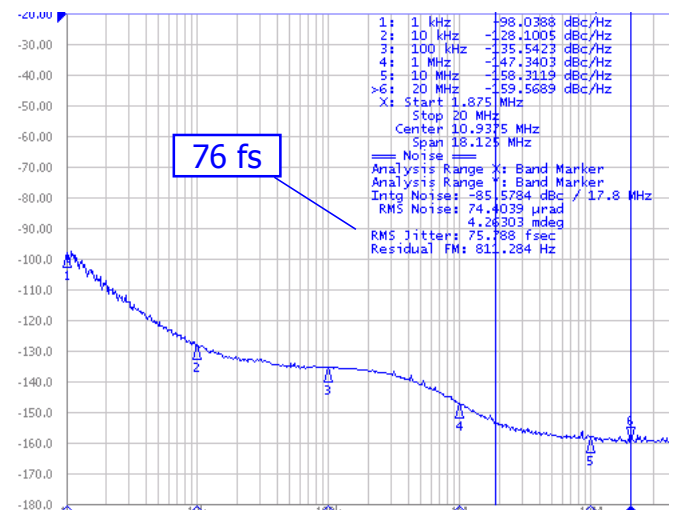
#### Part Ordering Information

| Package (mm) | Voltage (V) | Ordering Code     |                   |
|--------------|-------------|-------------------|-------------------|
|              |             | $\pm 50$ ppm      | $\pm 25$ ppm      |
| 7.0 x 5.0    | 3.3         | 4HF156250Z3AACUGI | 4HF156250Z3ABCUGI |
|              | 2.5         | 4HF156250Z3BACUGI | 4HF156250Z3BBCUGI |
| 5.0 x 3.2    | 3.3         | 4HF156250Z3AACTGI | 4HF156250Z3ABCTGI |
|              | 2.5         | 4HF156250Z3BACTGI | 4HF156250Z3BBCTGI |
| 3.2 x 2.5    | 2.5         | 4HF156250Z3BACXGI | 4HF156250Z3BBCXGI |

\* Factory minimum order quantity: 500pcs (T/R)



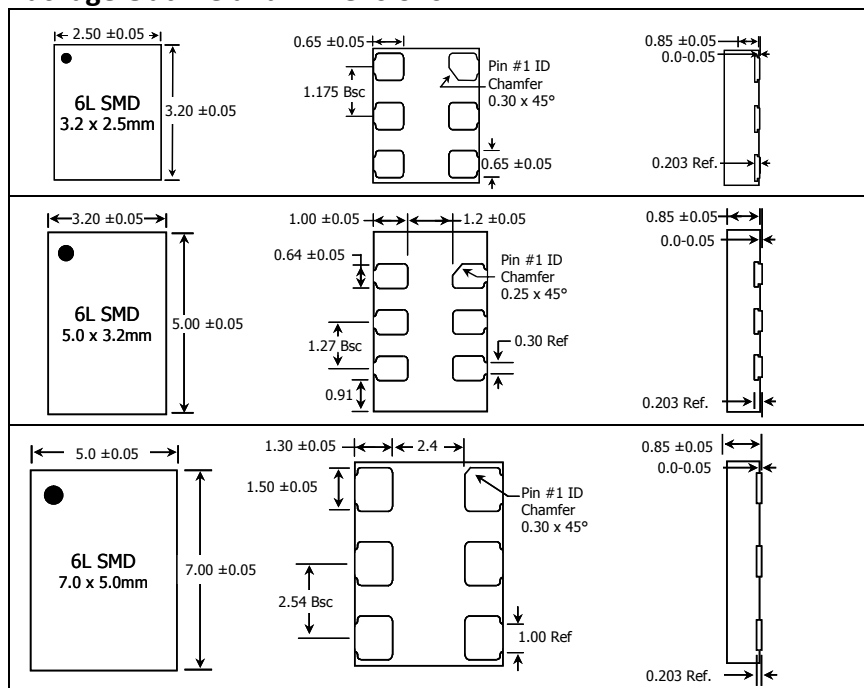
#### Typical Phase Jitter



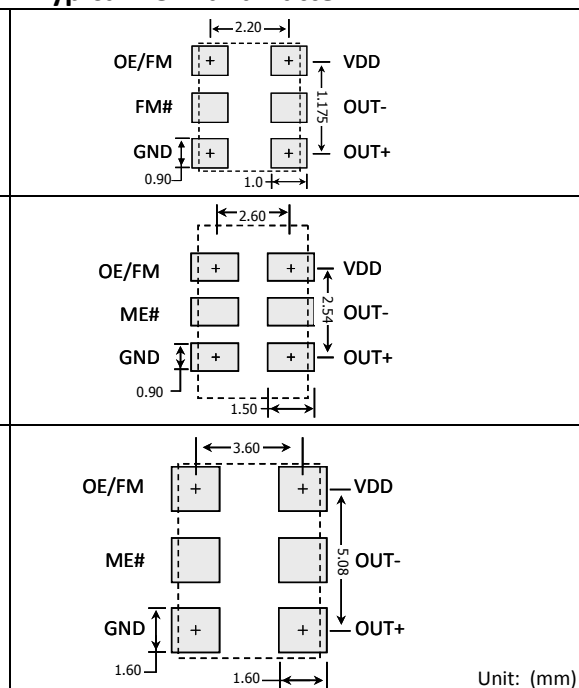
## Specification

| Parameter                   | 2.5 V Specifications |              |              | 3.3 V Specifications |              |              | Units | Conditions                                                                                |
|-----------------------------|----------------------|--------------|--------------|----------------------|--------------|--------------|-------|-------------------------------------------------------------------------------------------|
|                             | Min                  | Typ          | Max          | Min                  | Typ          | Max          |       |                                                                                           |
| Supply Voltage ( $V_{DD}$ ) | 2.375                | 2.50         | 2.625        | 2.97                 | 3.30         | 3.63         | V     |                                                                                           |
| Output Frequency            |                      | 156.25       |              |                      | 156.25       |              | MHz   |                                                                                           |
| Frequency Stability         | - 50                 |              | + 50         | - 50                 |              | + 50         | ppm   | Includes supply voltage and temperature variation (-40 to 85°C), reflow drift, and aging. |
| Supply Current              |                      | 90           |              |                      | 95           |              | mA    | No load                                                                                   |
| Enable/Disable Time         |                      |              | 1            |                      |              | 1            | us    | Guaranteed by design                                                                      |
| Input HIGH/LOW level        | 0.7 $V_{DD}$         |              | 0.3 $V_{DD}$ | 0.7 $V_{DD}$         |              | 0.3 $V_{DD}$ | V     | At OE pin                                                                                 |
| Output LOW level            |                      | 0.8          | $V_{DD}-1.8$ |                      | 1.5          | $V_{DD}-1.8$ | V     |                                                                                           |
| Output HIGH level           | $V_{DD}-1.0$         | 1.6          |              | $V_{DD}-1.1$         | 2.3          |              | V     |                                                                                           |
| Amplitude ( $V_A$ )         |                      | 0.75         |              |                      | 0.75         |              | V     | Single Ended output swing (Pk-Pk)                                                         |
| Mid Level ( $V_M$ )         |                      | $V_{DD}-1.3$ |              |                      | $V_{DD}-1.3$ |              | V     |                                                                                           |
| Rise/Fall Time ( $T_R$ )    |                      |              | 300          |                      | 250          |              | ps    | Maximum; 20/80% of $V_A$ ; Output load (CL) = 2pF; Guaranteed by Char.                    |
| Symmetry (SYM)              | 48                   | 50           | 52           | 48                   | 50           | 52           | %     | Worst case; measured at 50% of waveform                                                   |
| Phase Jitter                |                      | 0.08         |              |                      | 0.08         |              | ps    | 1.875MHz to 20MHz, RMS; Measured Differentially (IEEE802.3-2005)                          |
|                             |                      | 0.25         |              |                      | 0.25         |              | ps    | 12k to 20MHz, RMS; Measured Differentially                                                |
| Period Jitter               |                      | 2.5          |              |                      | 2.5          |              | ps    | RMS                                                                                       |
| Cycle-to-Cycle Jitter       |                      | 20           |              |                      | 20           |              | ps    | 1,000 cycles, Peak                                                                        |
| Start-up Time               |                      | 10           |              |                      | 10           |              | ms    | Output valid time after power up, 25°C                                                    |
| Aging                       |                      | ± 5          |              |                      | ± 5          |              | ppm   | 25°C, 10 years                                                                            |

## Package Outline and Dimensions



## Typical PCB Land Pattern



www.IDT.com

6024 Silver Creek Valley Road  
San Jose, California 95138

## Sales

800-345-7015 (inside USA)  
+1 408-284-8200 (outside USA)

## Technical Support

MEMS\_Support@idt.com  
www.idt.com/go/MEMS

DISCLAIMER Integrated Device Technology, Inc. (IDT) and its subsidiaries reserve the right to modify the products and/or specifications described herein at any time and at IDT's sole discretion. All information in this document, including descriptions of product features and performance, is subject to change without notice. Performance specifications and the operating parameters of the described products are determined in the independent state and are not guaranteed to perform the same way when installed in customer products. The information contained herein is provided without representation or warranty of any kind, whether express or implied, including, but not limited to, the suitability of IDT's products for any particular purpose, an implied warranty of merchantability, or non-infringement of the intellectual property rights of others. This document is presented only as a guide and does not convey any license under intellectual property rights of IDT or any third parties. IDT's products are not intended for use in life support systems or similar devices where the failure or malfunction of an IDT product can be reasonably expected to significantly affect the health or safety of users. Anyone using an IDT product in such a manner does so at their own risk, absent an express, written agreement by IDT.

Integrated Device Technology, IDT and the IDT logo are registered trademarks of IDT. Other trademarks and service marks used herein, including protected names, logos and designs, are the property of IDT or their respective third party owners.

Copyright 2010, 2011, 2012, 2013. All rights reserved.