



MX775ABD156M250
Ultra-Low Jitter 156.25MHz HCSL XO
with Integrated Quartz Crystal

General Description

The MX775ABD156M250 is an ultra-low phase jitter XO with HCSL output optimized for high line rate applications.

Applications

- 10/40/400 Gigabit Ethernet
- Fibre Channel 10G/12G SERDES

Absolute Maximum Ratings¹

Supply Voltage (VDD).....+4.6V
 Input Voltage (VIN).....-0.50V to VDD +4.6V
 ESD Protection (HBM).....2kV
 ESD Protection (MM).....200V

Features

- 156.25MHz HCSL
- Typical phase noise:
 - 85fs (Integration range: 12kHz-20MHz)
- ±50ppm total frequency stability
- -40°C to +85°C temperature range
- Standard 6-Pin 7mm x 5mm LGA package
- Both the package and the crystal are MSL-1

Operating Ratings²

Supply Voltage (VDD).....+2.375V to +3.465V
 Junction Thermal Resistance
 LGA (θ_{JA})52.8°C/W

Electrical Characteristics

VDD = 3.3V ±5% to 2.5V ±5%, TA = -40°C to +85°C, unless otherwise noted. RL = 50Ω to VSS.

| Parameter | Symbol | Min. | Typ. | Max. | Units | Condition |
|-------------------------------|---------|----------------|------------|----------------|-------|---|
| Supply Voltage | VDD | 2.375 3.135 | 2.5 3.3 | 2.625 3.465 | V | 2.5V Operation 3.3V Operation |
| Current Consumption | IDD | - | 135 | 180 | mA | @3.3V |
| Frequency Stability | | | | ±50 | ppm | Note 4 |
| Output High Voltage | VOH | 660 | 700 | 850 | mV | |
| Output Low Voltage | VOL | -150 | 0 | 27 | mV | |
| Crossing Point Voltage | VCROSS | - | 350 | - | V | |
| Output Rise/Fall Time | tR/tF | 175 | 200 | 400 | ps | |
| Output Duty Cycle | ODC | 45 48 | 50 50 | 55 52 | % | All output frequencies < 450MHz output frequencies |
| PLL Lock Time | TLOCK | - | 5 | 20 | ms | Time from 90% VDD |
| RMS Phase Jitter ³ | tJIT(Ø) | - | 85 | - | fs | 156.25MHz, Integration range (12kHz-20MHz) |

Notes:

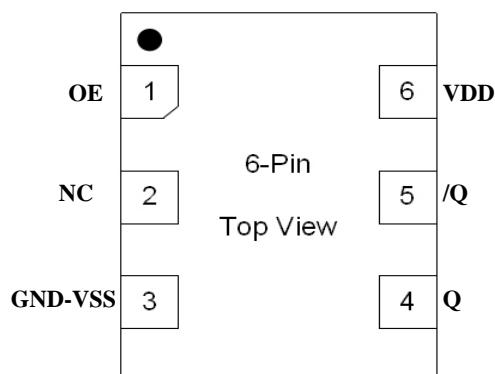
1. Exceeding the absolute maximum ratings may damage the device.
 2. The device is not guaranteed to function outside its operating ratings.
 3. All phase noise measurements were taken with an Agilent 5052B phase noise system.
 4. Inclusive of initial accuracy, temperature drift, aging, shock, vibration.
- ClockWorks is a registered trademark of Microchip Technology Inc.

Ordering Information

| Ordering Part Number | Marking Line 1 | Marking Line 3 | Shipping | Package |
|----------------------|----------------|----------------|---------------|---------------------|
| MX775ABD156M250 | MX775AB | D156M250 | Tube | 6-Pin 7mm x 5mm LGA |
| MX775ABD156M250-TR | MX775AB | D156M250 | Tape and Reel | 6-Pin 7mm x 5mm LGA |

Devices are Green and RoHS compliant. Sample material may have only a partial top mark.

Pin Configuration



Pin Description

| Pin Number | Pin Name | Pin Type | Pin Level | Pin Function |
|------------|----------|----------|-----------|--|
| 1 | OE | I, SE | LVC MOS | Output Enable, disables to tri-state, 0 = Disabled, 1 = Enabled, 75k Ω Pull-Up (Internal) |
| 2 | NC | | | No connect No internal connections to the ASIC are made |
| 3 | GND-VSS | PWR | | Power Supply Ground |
| 4, 5 | Q, /Q | O, Diff | HCSL | Clock Output Frequency = 156.25MHz |
| 6 | VDD | PWR | | Power Supply |

Environmental Specifications

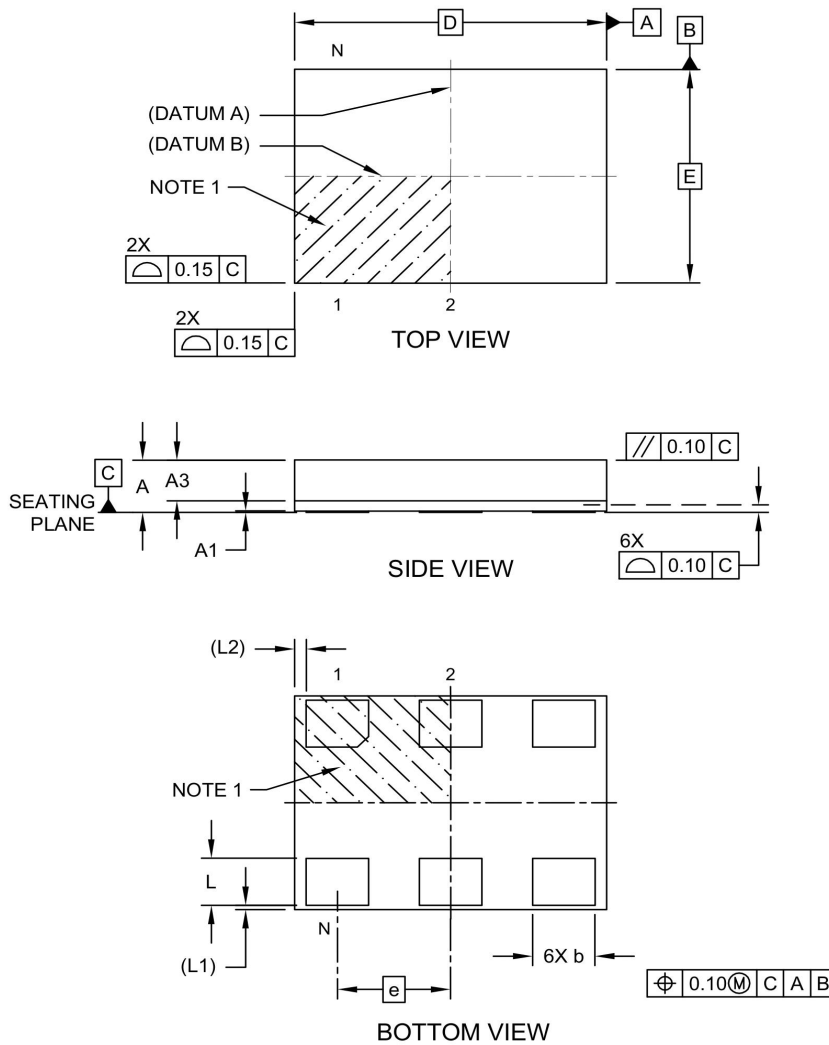
| | |
|------------------------------|--|
| Thermal Shock | MIL-STD-883, Method 1011, Condition A |
| Moisture Resistance | MIL-STD-883, Method 1004 |
| Mechanical Shock | MIL-STD-883, Method 2002, Condition C |
| Mechanical Vibration | MIL-STD-883, Method 2007, Condition B |
| Resistance to Soldering Heat | J-STD-020C, Table 5-2 Pb-free devices (except 2 cycles max) |
| Hazardous Substance | Pb-free / RoHS / Green Compliant |
| Solderability | JESD22-B102-D Method 2 (Preconditioning E) |
| Terminal Strength | MIL-STD-883, Method 2004, Test Condition D |
| Gross Leak | MIL-STD-883, Method 1014, Condition C |
| Fine Leak | MIL-STD-883, Method 1014, Condition A2, R1=2x10 ⁻⁸ atm cc/s |
| MSL Level | Crystal and Package MSL-1 |
| Solvent Resistance | MIL-STD-202, Method 215 |

Package Information



6-Lead Low Profile Land Grid Array (LLX) - 5x7x1.22 mm Body [LLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



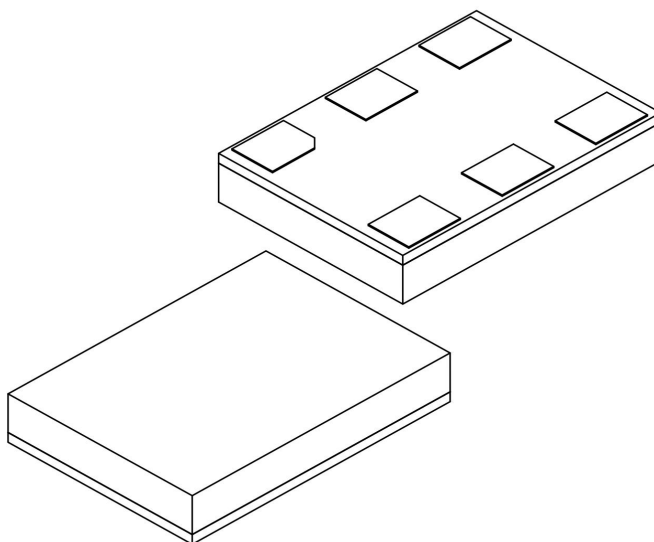
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6-Lead Low Profile Land Grid Array (LLX) - 5x7x1.22 mm Body [LLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



| Units | | MILLIMETERS | | |
|---------------------|----|-------------|------|------|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Terminals | N | 6 | | |
| Pitch | e | 2.54 BSC | | |
| Overall Height | A | 1.08 | 1.15 | 1.22 |
| Standoff | A1 | – | – | 0.03 |
| Mold Cap Thickness | A3 | 0.85 | 0.90 | 0.95 |
| Overall Length | D | 7.00 BSC | | |
| Overall Width | E | 5.00 BSC | | |
| Terminal Width | b | 1.35 | 1.40 | 1.45 |
| Terminal Length | L | 1.05 | 1.10 | 1.15 |
| Terminal Pullback | L1 | 0.10 REF | | |
| Terminal Offset | L2 | 0.26 REF | | |

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Dimensioning and tolerancing per ASME Y14.5M
 BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 REF: Reference Dimension, usually without tolerance, for information purposes only.

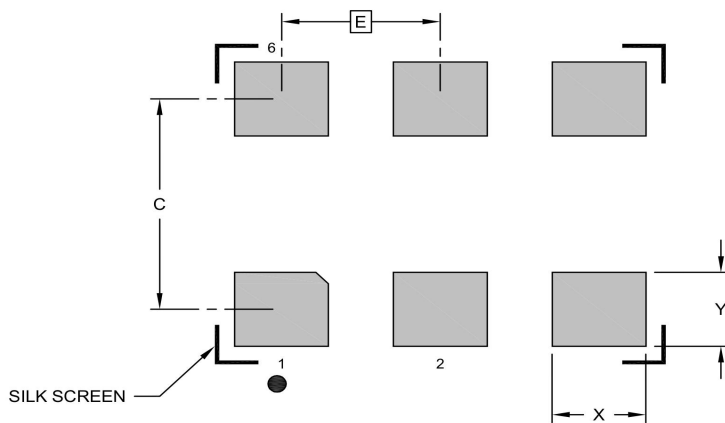
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RECOMMENDED LAND PATTERN

| Dimension Limits | Units | MILLIMETERS | | |
|--------------------------|-------|-------------|----------|------|
| | | MIN | NOM | MAX |
| Contact Pitch | E | | 2.54 BSC | |
| Contact Pad Spacing | C | | 3.70 | |
| Contact Pad Width (Xnn) | X | | | 1.50 |
| Contact Pad Length (Xnn) | Y | | | 1.30 |

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

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