

MEMS CLOCK OSCILLATOR



7.0 x 5.0 x 0.85mm

ASVMP

Moisture Sensitivity Level – MSL 1



RoHS/RoHS II compliant

FEATURES:

- Low Power Consumption for high speed communication
- Exceptional Stability Over Temp. at -40 to +85°C, ±15ppm
- Extended Automotive Grade Temp. stability at -55 to +125°C, ±25ppm
- Available in 50kG Shock Resistance Configuration upon request
- MIL-STD-883 shock and vibration compliant
- Durable QFN Plastic Compact Packaging
- Standby or Disable Tri-state function
- Low jitter (Period jitter RMS and Phase jitter RMS)
- High power supply noise reduction, -50dBc

APPLICATIONS:

- Storage Area Networks (SATA, SAS, Fiber Channel)
- Passive Optical Networks (EPON, 10G-EPON, GPON, 10G-PON)
- Ethernet (1G, 10GBASE-T/KR/LR/SR, FCoE)
- PCI Express
- Display port

Low Jitter
High Performance
3G MEMS Technology!

STANDARD SPECIFICATIONS:

Common Key Electrical Specifications – CMOS, LVPECL, LVDS, and HCSL

| Parameters | Minimum | Typical | Maximum | Units | Notes | |
|--------------------------------------|--|---------|---------|----------|--------------------------------|------------------------------------|
| Frequency Range | CMOS | 2.3000* | | 170.0000 | MHz | -20 ~ +70°C -40 ~ +85°C |
| | CMOS | 3.3000* | | 170.0000 | | -40 ~ +105°C -55 ~ +125°C |
| | LVPECL | 2.3000* | | 460.0000 | | Commercial, Industrial temp. range |
| | LVDS | 2.3000* | | 460.0000 | | Commercial, Industrial temp range |
| | HCSL | 2.3000* | | 460.0000 | | Commercial, Industrial temp. range |
| Operating Temperature | -20 | | +70 | °C | See options | |
| Storage Temperature | -55 | | +150 | °C | | |
| Overall Frequency Stability | -50 | | +50 | ppm | See options | |
| Supply Voltage (Vdd) | +2.25 | | +3.6 | V | | |
| Startup Time | | | 5 | ms | | |
| Enable Time | | | 20 | ns | STD (Tri-state) | |
| | | | 5 | ms | PD option (Power Down) | |
| Disable Time | | | 5 | ns | | |
| Disable Current | | 20 | 22 | mA | STD (Tri-state) | |
| | | | 0.095 | | PD option (Power Down) | |
| Tri-state Function (Standby/Disable) | "1" (VIH ≥ 0.75*Vdd) or Open: Oscillation "0" (VIL < 0.25*Vdd) : Hi Z | | | V | 40kΩ pull-up resistor embedded | |
| Aging | -5.0 | | +5.0 | ppm | First year | |

* For 2.3000MHz ≤ F0 ≤ 9.9999MHz, 6-8 weeks lead-time applies

Key Electrical Specifications – CMOS

| Parameters | Minimum | Typical | Maximum | Units | Notes |
|--|-----------------|---------------------|---------------------|-------|-----------------------|
| Supply Current (I _{dd}) | | 31 | 35 | mA | CL=15pF, 125MHz |
| Output Logic Level | V _{OH} | 0.9*V _{dd} | | V | I=±6mA |
| | V _{OL} | | 0.1*V _{dd} | V | |
| Rise Time | T _r | 1.1 | 2.0 | ns | CL=15pF |
| Fall Time | T _f | 1.3 | 2.0 | ns | 20% to 80% |
| Duty Cycle | | 45 | 55 | % | |
| Integrated Phase Jitter (J _{PH}) | | 0.30 | 2 | ps | 200kHz ~ 20MHz@125MHz |
| | | 0.38 | 2 | | 100kHz ~ 20MHz@125MHz |
| | | 1.70 | 2 | | 12kHz ~ 20MHz@125MHz |
| Period Jitter RMS (J _{PER}) | | 3.0 | | ps | |



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REVISED: 11.30.2018

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Key Electrical Specifications – LVPECL

| Parameters | | Minimum | Typical | Maximum | Units | Notes |
|--|----------|---------------|---------|---------------|-------|-------------------------------|
| Supply Current (I_{dd}) | | | 56.5 | 58 | mA | RL=50Ω |
| Output Logic Level | V_{OH} | $V_{dd}-1.08$ | | | V | RL=50Ω |
| | V_{OL} | | | $V_{dd}-1.55$ | V | |
| Peak to Peak Output Swing (V_{pp}) | | | 800 | | mV | Single ended |
| Rise Time | T_r | | 250 | | ps | RL=50Ω , CL=0pF 20% to 80% |
| Fall Time | T_f | | 250 | | | |
| Duty Cycle | | 48 | | 52 | % | Differential |
| Integrated Phase Jitter (J_{PH}) | | | 0.25 | 2 | ps | 200kHz ~ 20MHz @156.25MHz |
| | | | 0.38 | 2 | | 100kHz ~ 20MHz @156.25MHz |
| | | | 1.70 | 2 | | 12kHz ~ 20MHz @156.25MHz |
| Period Jitter RMS (J_{PER}) | | | 2.5 | | ps | |

Key Electrical Specifications – LVDS

| Parameters | | Minimum | Typical | Maximum | Units | Notes |
|--|-------|---------|---------|---------|-------|-------------------------------|
| Supply Current (I_{dd}) | | | 29 | 32 | mA | RL=100Ω |
| Output Offset Voltage (V_{OS}) | | 1.125 | | 1.4 | V | RL=100Ω differential |
| Delta Offset Voltage (ΔV_{OS}) | | | | 50 | mV | |
| Peak to Peak Output Swing (V_{pp}) | | | 350 | | mV | Single ended |
| Rise Time | T_r | | 200 | | ps | RL=50Ω , CL=2pF 20% to 80% |
| Fall Time | T_f | | 200 | | | |
| Duty Cycle | | 48 | | 52 | % | Differential |
| Integrated Phase Jitter (J_{PH}) | | | 0.28 | 2 | ps | 200kHz ~ 20MHz @156.25MHz |
| | | | 0.40 | 2 | | 100kHz ~ 20MHz @156.25MHz |
| | | | 1.70 | 2 | | 12kHz ~ 20MHz @156.25MHz |
| Period Jitter RMS (J_{PER}) | | | 2.5 | | ps | |

Key Electrical Specifications – HCSL

| Parameters | | Minimum | Typical | Maximum | Units | Notes |
|--|----------|---------|---------|---------|-------|-------------------------------|
| Supply Current (I_{dd}) | | | 40 | 42 | mA | RL=50Ω |
| Output Logic Level | V_{OH} | 0.725 | | | V | RL=50Ω |
| | V_{OL} | | | 0.1 | V | |
| Peak to Peak Output Swing (V_{pp}) | | | 750 | | mV | Single ended |
| Rise Time | T_r | 200 | | 400 | ps | RL=50Ω , CL=2pF 20% to 80% |
| Fall Time | T_f | 200 | | 400 | | |
| Duty Cycle | | 48 | | 52 | % | Differential |
| Integrated Phase Jitter (J_{PH}) | | | 0.25 | 2 | ps | 200kHz ~ 20MHz @156.25MHz |
| | | | 0.37 | 2 | | 100kHz ~ 20MHz @156.25MHz |
| | | | 1.70 | 2 | | 12kHz ~ 20MHz @156.25MHz |
| Period Jitter RMS (J_{PER}) | | | 2.5 | | ps | |



7.0 x 5.0 x 0.85mm

ASVMP



RoHS/RoHS II compliant

Absolute Maximum Ratings

| Item | Minimum | Maximum | Unit | Condition |
|-----------------|---------|----------------------|------|-----------|
| Supply Voltage | -0.3 | +4.0 | V | |
| Input Voltage | -0.3 | V _{dd} +0.3 | V | |
| Junction Temp. | | +150 | °C | |
| Storage Temp. | -55 | +150 | °C | |
| Soldering Temp. | | +260 | °C | 40sec max |
| ESD | | | V | |
| HBM | | 4,000 | | |
| MM | | 400 | | |
| CDM | | 1,500 | | |

OPTIONS AND PART IDENTIFICATION: (Left Blank if Standard)

Programmed Orders (Quantity > 1,000pcs)

ASVMP - MHz - - -

| Output Type | Frequency in MHz | Operating Temp. | Overall Freq. Stability | Tri-state (Pin 1) | Packaging |
|-------------|---|----------------------|-------------------------|-------------------|--------------------------------|
| C: CMOS | e.g. 156.2500 MHz (Maximum 4 digits after decimal) | Blank: -20°C ~ +70°C | Blank: ±50ppm | Blank: Tri-state | Blank***: Tube (50pcs / Tube) |
| LP: LVPECL | | L: -40°C ~ +85°C | Y: ±10ppm* | PD: Power Down | T: Tape & Reel (1kpcs / reel) |
| LV: LVDS | | X: -40°C ~ +105°C | R: ±25 ppm | | T3: Tape & Reel (3kpcs / reel) |
| HC: HCSL | | Z** : -55°C ~ +125°C | | | |

* Temp option L, X or -20°C ~ +70°C, only

** CMOS output only

*** For Quick turn-around programmable orders < 1000pcs: Due to the immediate availability of stock and the qty of the order, the parts may be delivered as BULK: Cut Tape, Loose parts in Antistatic Bag or in Tube(s). The MOQ per the series will still apply for Tube packaging.

Un-Programmed Orders

Blank un-programmed oscillators and our low cost portable programmer are available for quick turn engineering requirements. Please call ABRACON or visit MEMSpeed Pro II site <http://www.abracon.com/memspeedpro/MEMSpeedProFlyerII.pdf> for more information.

ASVMP - BLANK - - -

| Output Type | Operating Temp. | Overall Freq. Stability | Tri-state (Pin 1) | Packaging |
|-------------|----------------------|-------------------------|-------------------|--------------------------------|
| C: CMOS | Blank: -20°C ~ +70°C | Blank: ±50ppm | Blank: Tri-state | Blank: Tube (50pcs / Tube) |
| LP: LVPECL | L: -40°C ~ +85°C | Y: ±10ppm* | PD: Power Down | T: Tape & Reel (1kpcs / reel) |
| LV: LVDS | X: -40°C ~ +105°C | R: ±25 ppm | | T3: Tape & Reel (3kpcs / reel) |
| HC: HCSL | Z** : -55°C ~ +125°C | | | |

* Temp option L, X or -20°C ~ +70°C, only

** CMOS output only



7.0 x 5.0 x 0.85mm

ASVMP

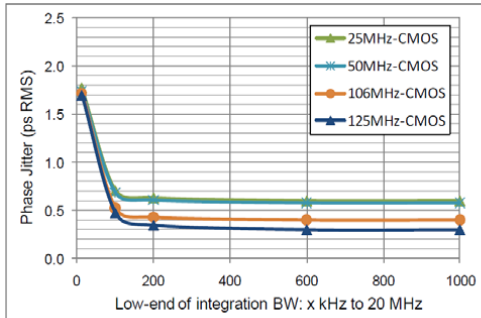


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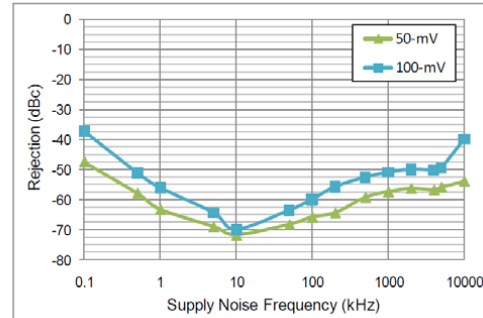
PERFORMANCE PARAMETERS

(Unless specified otherwise: T=25° C, VDD=3.3 V)

CMOS OUTPUT

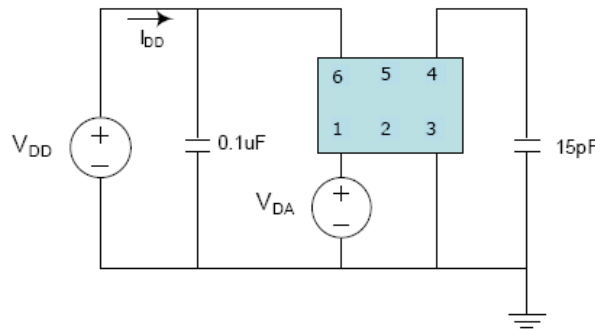


Phase jitter (integrated phase noise)

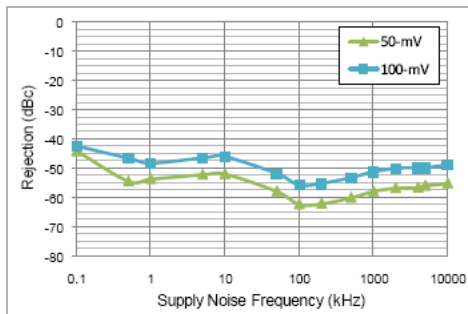


Power supply rejection ratio

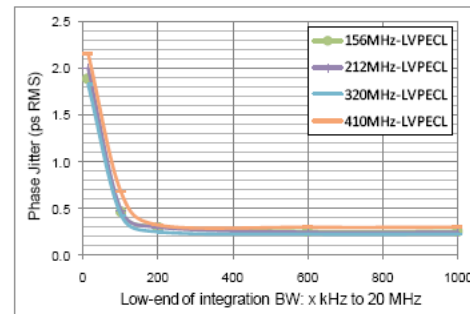
Test Circuit



LVPECL output

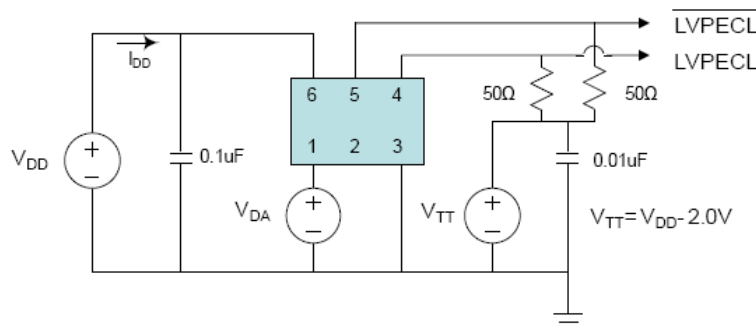


Power supply rejection ratio



Phase jitter (integrated phase noise)

Test Circuit





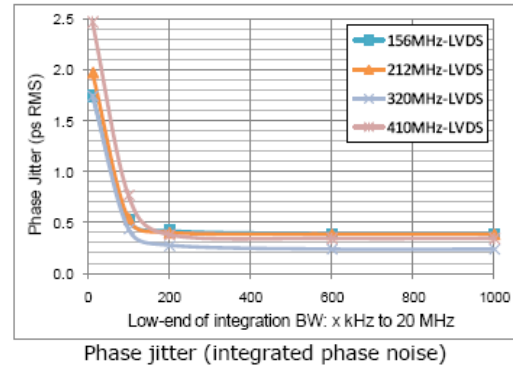
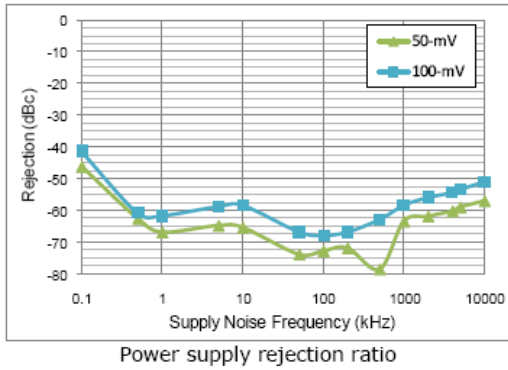
7.0 x 5.0 x 0.85mm

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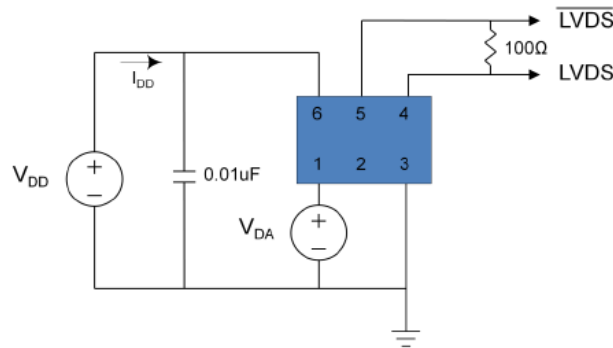


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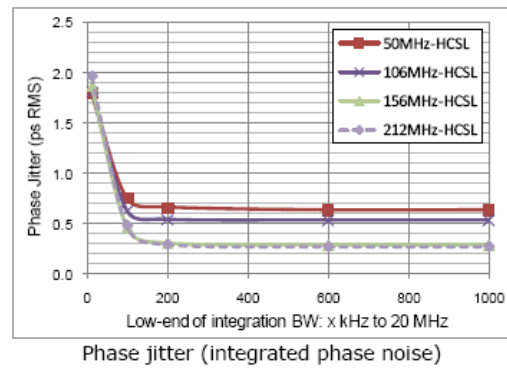
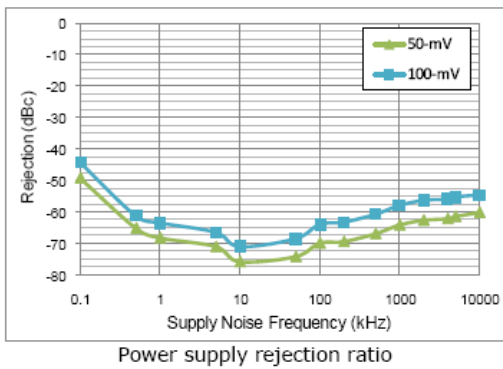
LVDS OUTPUT



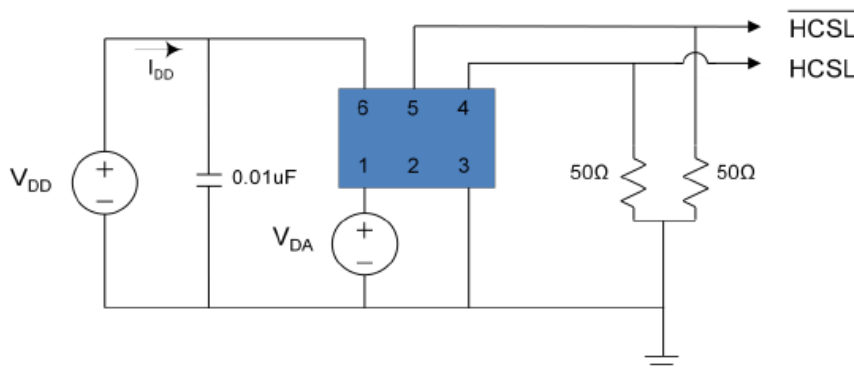
Test Circuit



HCSL OUTPUT



Test Circuit



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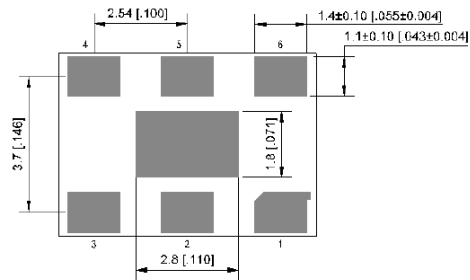
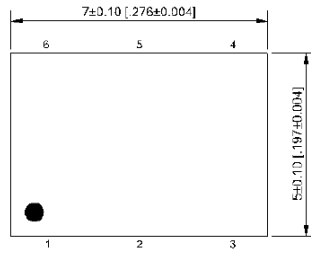
7.0 x 5.0 x 0.85mm

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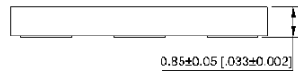


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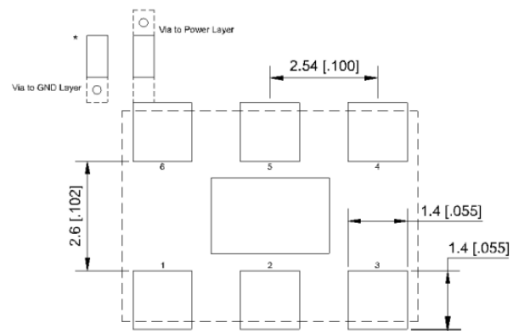
OUTLINE DIMENSIONS:



Center pad: NC / GND

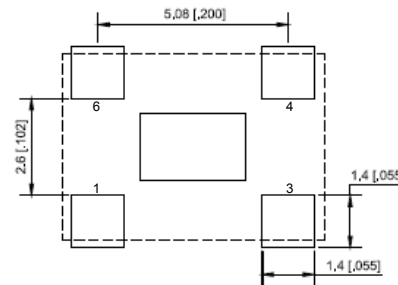


| Pin # | Function |
|-------|--|
| 1 | Tri-state |
| 2 | NC |
| 3 | GND |
| 4 | Output |
| 5 | NC (CMOS) Output (LVPECL, LVDS, HCSL) |
| 6 | Vdd |



Recommended Land Pattern for LVPECL, LVDS, HCSL

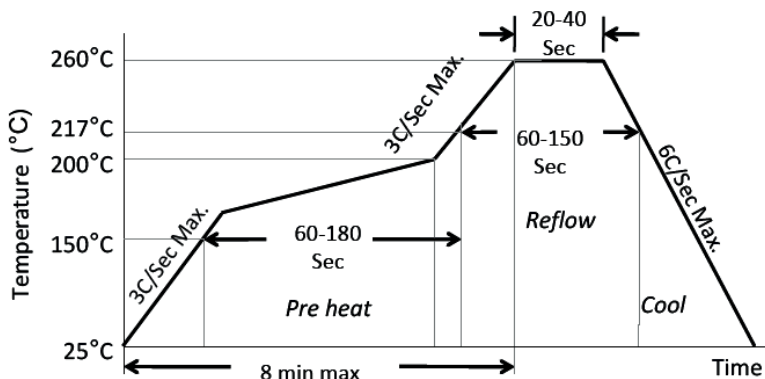
Note: Recommend using an approximately 0.01uF bypass capacitor between PIN 6 and 3.



Recommended Land Pattern for CMOS

Dimensions: mm (inches)

REFLOW PROFILE:



| | |
|-----------------------------------|--------------|
| Ramp-Up Rate (200°C to Peak Temp) | 3°C/Sec Max. |
| Preheat Time 150°C to 200°C | 60-180 Sec |
| Time maintained above 217°C | 60-150 Sec |
| Peak Temperature | 255-260°C |
| Time within 5°C of actual Peak | 20-40 Sec |
| Ramp-Down Rate | 6°C/Sec Max. |
| Time 25°C to Peak Temperature | 8 min Max. |

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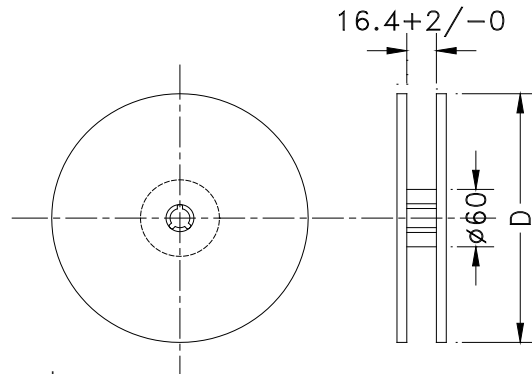
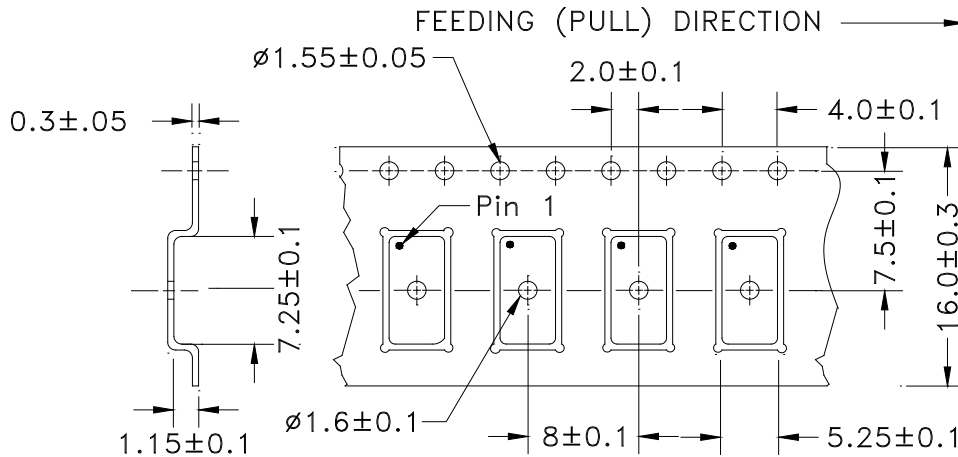
RoHS/RoHS II compliant



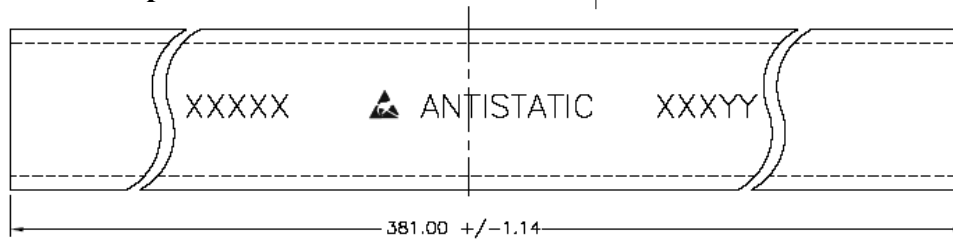
7.0 x 5.0 x 0.85mm

TAPE AND REEL:

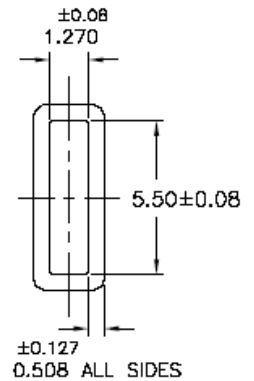
T= 1,000pcs/reel (D=180mm)
T3= 3,000pcs/reel (D=330mm)



Tube: 50 pcs/tube



Unit orientation in tube:



Dimensions: mm

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