

# PERFORMANCE PLASTIC PACKAGE ULTRA MINIATURE PURE SILICON™ CLOCK OSCILLATOR

ASVMP

Moisture Sensitivity Level – MSL 1



RoHS/RoHS II compliant



7.0 x 5.0 x 0.85mm

## FEATURES:

- Ultra Miniature Pure Silicon™ Clock Oscillator
- High Performance MEMS Technology by Discera
- 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   | Commercial, Industrial temp. range |
|                                      | CMOS                                                                     | 2.3000* | 100.0000 |       | Automotive temp range -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<br>"0" (VIL < 0.25*Vdd) : Hi Z |         |          | V     | 40kΩ pull-up resister 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 <sub>dd</sub> )          |                 | 31                  | 35                  | mA    | CL=15pF, 125MHz       |
| Output Logic Level                         | V <sub>OH</sub> | 0.9*V <sub>dd</sub> |                     | V     | I=±6mA                |
|                                            | V <sub>OL</sub> |                     | 0.1*V <sub>dd</sub> | V     |                       |
| Rise Time                                  | T <sub>r</sub>  | 1.1                 | 2.0                 | ns    | CL=15pF<br>20% to 80% |
| Fall Time                                  | T <sub>f</sub>  | 1.3                 | 2.0                 | ns    |                       |
| Duty Cycle                                 | 45              |                     | 55                  | %     |                       |
| Integrated Phase Jitter (J <sub>PH</sub> ) |                 | 0.30                | 2                   | ps    | 200kHz ~ 20MHz@125MHz |
|                                            |                 | 0.38                | 2                   |       | 100kHz ~ 20MHz@125MHz |
|                                            |                 | 1.70                | 2                   |       | 12kHz ~ 20MHz@125MHz  |
| Period Jitter RMS (J <sub>PER</sub> )      |                 | 3.0                 |                     | ps    |                       |

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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<br>20% to 80% |
| Fall Time                              | $T_f$    |               | 250     |               |       |                              |
| Duty Cycle                             |          | 48            |         | 52            | %     | Differential                 |
| Integrated Phase Jitter ( $J_{PH}$ )   |          |               | 0.25    | 2             | ps    | 200kHz ~ 20MHz<br>@156.25MHz |
|                                        |          |               | 0.38    | 2             |       | 100kHz ~ 20MHz<br>@156.25MHz |
|                                        |          |               | 1.70    | 2             |       | 12kHz ~ 20MHz<br>@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 ( $\Delta V_{OS}$ ) |       |         |         | 50      | mV    |                              |
| Peak to Peak Output Swing ( $V_{pp}$ )   |       |         | 350     |         | mV    | Single ended                 |
| Rise Time                                | $T_r$ |         | 200     |         | ps    | RL=50Ω, CL=2pF<br>20% to 80% |
| Fall Time                                | $T_f$ |         | 200     |         |       |                              |
| Duty Cycle                               |       | 48      |         | 52      | %     | Differential                 |
| Integrated Phase Jitter ( $J_{PH}$ )     |       |         | 0.28    | 2       | ps    | 200kHz ~ 20MHz<br>@156.25MHz |
|                                          |       |         | 0.40    | 2       |       | 100kHz ~ 20MHz<br>@156.25MHz |
|                                          |       |         | 1.70    | 2       |       | 12kHz ~ 20MHz<br>@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<br>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<br>@156.25MHz |
|                                        |          |         | 0.37    | 2       |       | 100kHz ~ 20MHz<br>@156.25MHz |
|                                        |          |         | 1.70    | 2       |       | 12kHz ~ 20MHz<br>@156.25MHz  |
| Period Jitter RMS ( $J_{PER}$ )        |          |         | 2.5     |         | ps    |                              |



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## Absolute Maximum Ratings

| Item            | Minimum | Maximum              | Unit | Condition |
|-----------------|---------|----------------------|------|-----------|
| Supply Voltage  | -0.3    | +4.0                 | V    |           |
| Input Voltage   | -0.3    | V <sub>dd</sub> +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<br>(Maximum 4 digits<br>after decimal) | Blank: -20°C ~ +70°C | Blank: ±50ppm           | Blank: Tri-state  | Blank***: Tube<br>(50pcs / Tube)  |
| LP: LVPECL  |                                                          | L: -40°C ~ +85°C     | Y: ±10ppm*              | PD: Power Down    | T: Tape & Reel<br>(1kpcs / reel)  |
| LV: LVDS    |                                                          | X: -40°C ~ +105°C    | R: ±25 ppm              |                   | T3: Tape & Reel<br>(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

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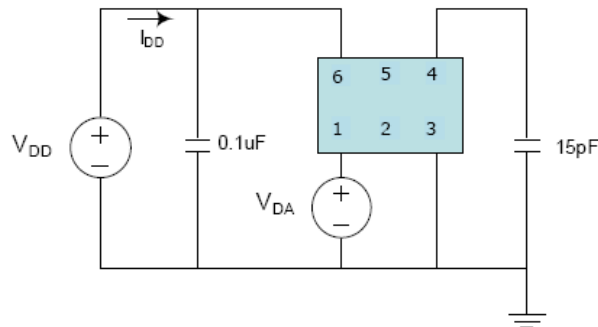
## PERFORMANCE PARAMETERS

(Unless specified otherwise:  $T=25^{\circ}\text{C}$ ,  $V_{DD}=3.3\text{V}$ )

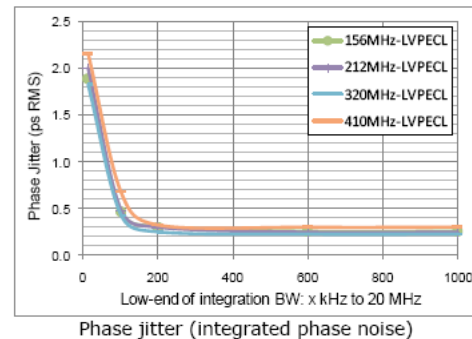
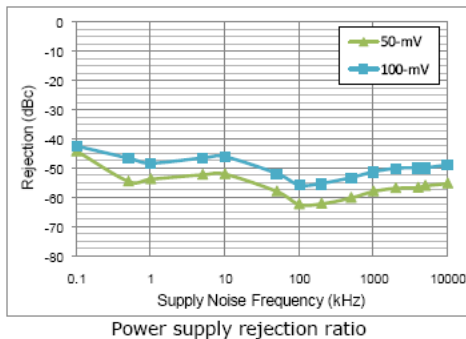
### CMOS OUTPUT



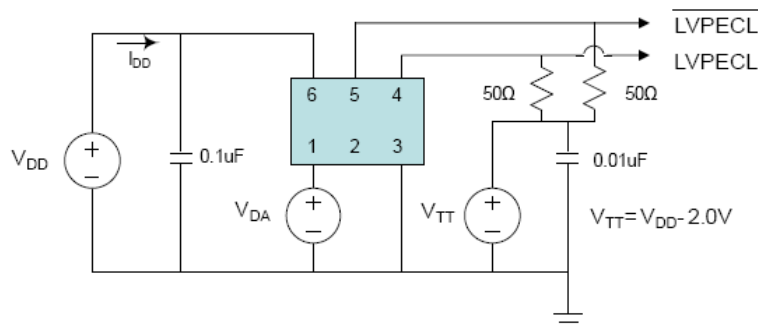
### Test Circuit



### LVPECL output



### Test Circuit



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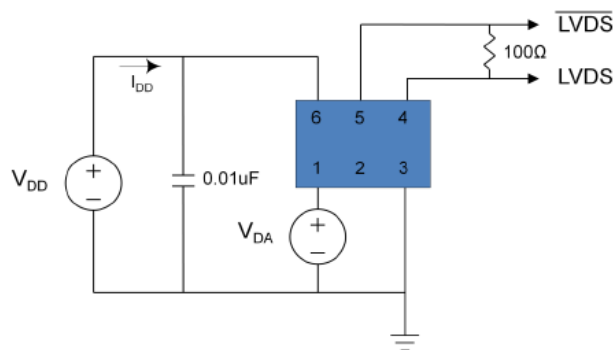


7.0 x 5.0 x 0.85mm

## LVDS OUTPUT



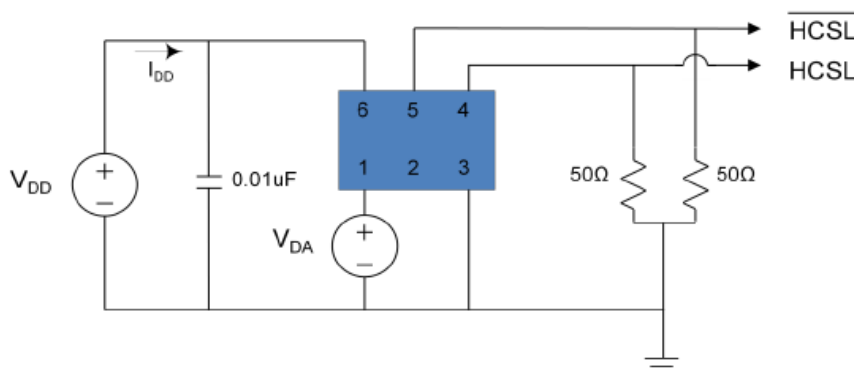
## Test Circuit



## HCSL OUTPUT



## Test Circuit



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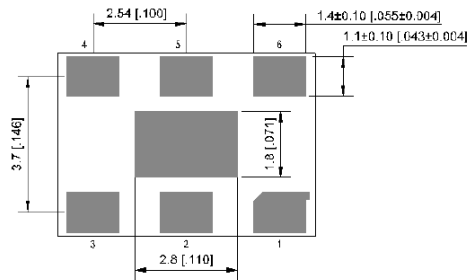


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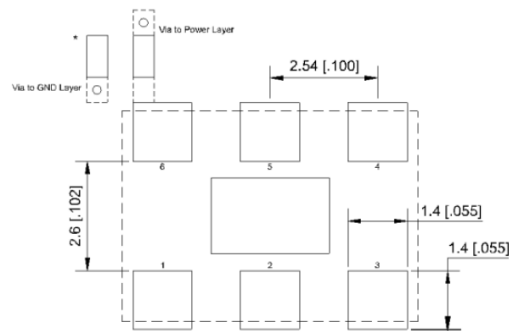
## OUTLINE DIMENSIONS:



Center pad: NC / GND

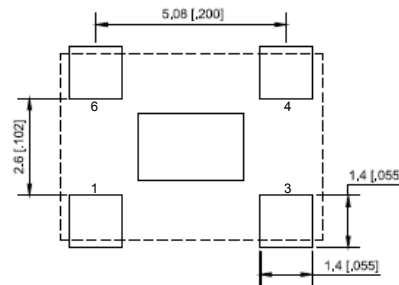


| Pin # | Function                                 |
|-------|------------------------------------------|
| 1     | Tri-state                                |
| 2     | NC                                       |
| 3     | GND                                      |
| 4     | Output                   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



Recommended Land Pattern for LVPECL, LVDS, HCSL

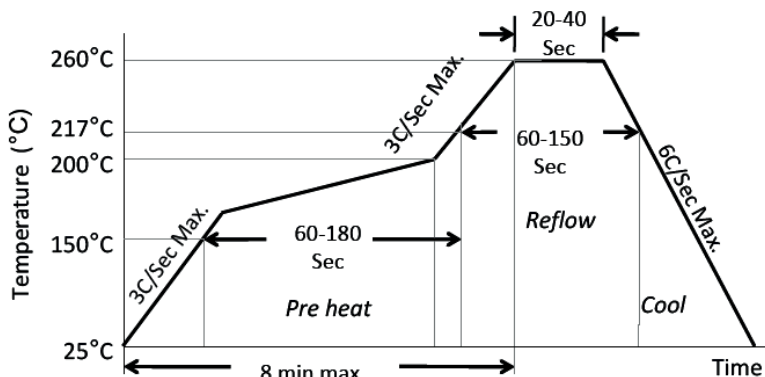
Note: Recommend using an approximately 0.01uF bypass capacitor between PIN 6 and 3.



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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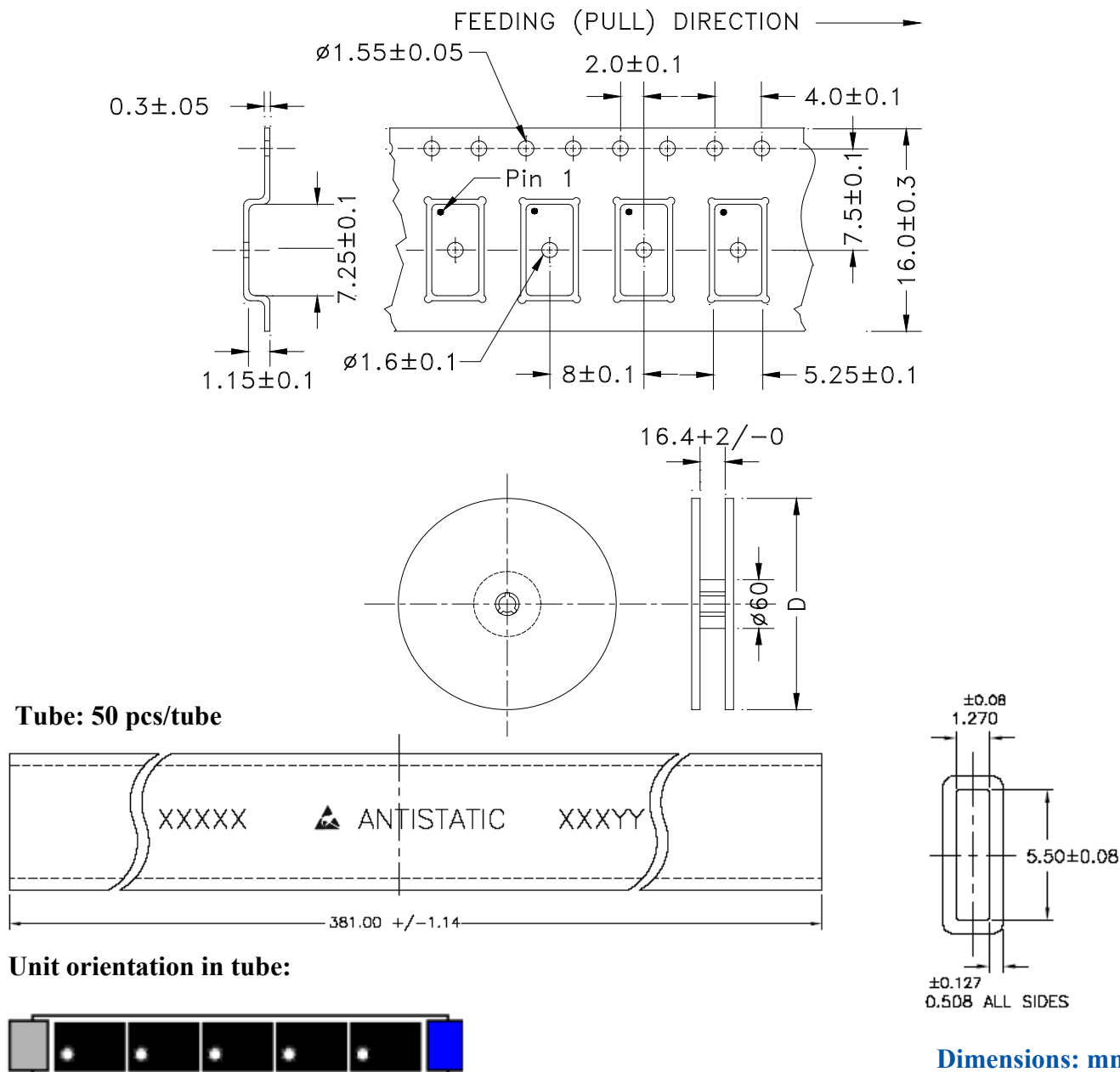


7.0 x 5.0 x 0.85mm

## TAPE AND REEL:

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

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



**ATTENTION:** Abracon Corporation's products are COTS – Commercial-Off-The-Shelf products; suitable for Commercial, Industrial and, where designated, Automotive Applications. Abracon's products are not specifically designed for Military, Aviation, Aerospace, Life-dependant Medical applications or any application requiring high reliability where component failure could result in loss of life and/or property. For applications requiring high reliability and/or presenting an extreme operating environment, written consent and authorization from Abracon Corporation is required. Please contact Abracon Corporation for more information.

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Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.