

# PERFORMANCE PLASTIC PACKAGE ULTRA MINIATURE PURE SILICON™ CLOCK OSCILLATOR

ASEMP



Life Size   
3.2 x 2.5 x 0.85 mm

ASEMP

Moisture Sensitivity Level – MSL 1



RoHS  
Compliant

## 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)
- HD/SD/SDI Video & Surveillance
- 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   | 10.000  | -----   | 170.000 | MHz                            | Commercial, Industrial Temp range |
|                                      | CMOS   | 10.000  | -----   | 100.000 |                                | Automotive -55 ~ +125°C           |
|                                      | LVPECL   | 10.000  | -----   | 460.000 |                                | Commercial, Industrial Temp range |
|                                      | LVDS   | 10.000  | -----   | 460.000 |                                | Commercial, Industrial Temp range |
|                                      | HCSL   | 10.000  | -----   | 460.000 |                                | 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                         | -----  | -----   | 10      | ms      |                                |                                   |
| Enable Time                          | -----  | -----   | 0.005   | ms      | STD (Tri-state)                |                                   |
|                                      | -----  | -----   | 5.0     |         | PD option (Power Down)         |                                   |
| Disable Time                         | -----  | -----   | 100     | ns      |                                |                                   |
| Stand-by Current                     | -----  | 20      | 26      | mA      | STD (Tri-state)                |                                   |
| Disable Current                      | -----  | -----   | 0.1     |         | 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       | 33kΩ pull-up resistor embedded |                                   |
| Aging                                | -5.0   | -----   | +5.0    | ppm     | First year                     |                                   |

### Key Electrical Specifications – CMOS

| Parameters                                 | Minimum         | Typical             | Maximum             | Units | Notes                  |
|--|-----------------|---------------------|---------------------|-------|------------------------|
| Supply Current (I <sub>dd</sub> )          | -----           | 31                  | 35                  | mA    | CL=15p, 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                                  | -----           | 1.1                 | 2.0                 | ns    | CL=15pF                |
| Fall Time                                  | -----           | 1.3                 | 2.0                 | ns    | 20%/80%*VDD            |
| Duty Cycle                                 | 45              | -----               | 55                  | %     |                        |
| Integrated Phase Jitter (J <sub>PH</sub> ) | -----           | 0.30                | 3                   | ps    | 200kHz ~ 20MHz, 125MHz |
|  | -----           | 0.38                | 3                   |       | 100kHz ~ 20MHz, 125MHz |
|  | -----           | 1.70                | 3                   |       | 12kHz ~ 20MHz, 125MHz  |
| Period Jitter RMS (J <sub>PER</sub> )      | -----           | 3.0                 | -----               | ps    | CL=2pF, 125MHz         |
|  | -----           | 6                   | -----               |       | CL=15pF, 125MHz        |

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## Key Electrical Specifications – LVPECL

| Parameters                             | Minimum  | Typical       | Maximum       | Units | Notes                         |
|--|----------|---------------|---------------|-------|-------------------------------|
| Supply Current ( $I_{dd}$ )            | -----    | 51            | 60            | mA    | RL=50Ω, 156.25MHz             |
| Output Logic Level                     | $V_{OH}$ | $V_{dd}-1.08$ | -----         | V     | RL=50Ω, 156.25MHz             |
|  | $V_{OL}$ | -----         | $V_{dd}-1.55$ | V     |                               |
| Peak to Peak Output Swing ( $V_{pp}$ ) |          | 830           |               | mV    | Single ended                  |
| Rise Time                              | $T_r$    | -----         | 250           | ps    | RL=50Ω, CL=2pF<br>20%/80%*VDD |
| Fall Time                              | $T_f$    | -----         | 250           |       |                               |
| Duty Cycle                             | 48       | -----         | 52            | %     | Differential                  |
| Integrated Phase Jitter ( $J_{PH}$ )   | -----    | 0.25          | 3             | ps    | 200kHz ~ 20MHz,<br>156.25MHz  |
|  | -----    | 0.38          | 3             |       | 100kHz ~ 20MHz,<br>156.25MHz  |
|  | -----    | 1.70          | 3             |       | 12kHz ~ 20MHz,<br>156.25MHz   |
| Period Jitter RMS ( $J_{PER}$ )        | -----    | 3.3           | -----         | ps    | RL=50Ω, 156.25MHz             |

## Key Electrical Specifications – LVDS

| Parameters                               | Minimum  | Typical       | Maximum       | Units | Notes                         |
|--|----------|---------------|---------------|-------|-------------------------------|
| Supply Current ( $I_{dd}$ )              | -----    | 29            | 40            | mA    | RL=50Ω, 156.25MHz             |
| Output Offset Voltage ( $V_{OS}$ )       | 1.125    | -----         | 1.4           | V     | RL=100Ω differential          |
| Delta Offset Voltage ( $\Delta V_{OS}$ ) |          |               |               |       |                               |
| Output Logic Level                       | $V_{OH}$ | $V_{dd}-1.08$ | -----         | V     | RL=50Ω, 156.25MHz             |
|  | $V_{OL}$ | -----         | $V_{dd}-1.55$ | V     |                               |
| Peak to Peak Output Swing ( $V_{pp}$ )   |          | 350           |               | mV    | Single ended                  |
| Rise Time                                | $T_r$    | -----         | 300           | ps    | RL=50Ω, CL=2pF<br>20%/80%*VDD |
| Fall Time                                | $T_f$    | -----         | 300           |       |                               |
| Duty Cycle                               | 45       | -----         | 55            | %     | Differential                  |
| Integrated Phase Jitter ( $J_{PH}$ )     | -----    | 0.28          | 3             | ps    | 200kHz ~ 20MHz,<br>156.25MHz  |
|  | -----    | 0.40          | 3             |       | 100kHz ~ 20MHz,<br>156.25MHz  |
|  | -----    | 1.70          | 3             |       | 12kHz ~ 20MHz,<br>156.25MHz   |
| Period Jitter RMS ( $J_{PER}$ )          | -----    | 3.3           | -----         | ps    | RL=50Ω, 156.25MHz             |

## Key Electrical Specifications – HCSL

| Parameters                             | Minimum  | Typical | Maximum | Units | Notes                         |
|--|----------|---------|---------|-------|-------------------------------|
| Supply Current ( $I_{dd}$ )            | -----    | 40      | 60      | mA    | RL=50Ω, 156.25MHz             |
| Output Logic Level                     | $V_{OH}$ | 0.725   | -----   | V     | RL=50Ω, 156.25MHz             |
|  | $V_{OL}$ | -----   | 0.1     | V     |                               |
| Peak to Peak Output Swing ( $V_{pp}$ ) |          | 675     |         | mV    | Single ended                  |
| Rise Time                              | $T_r$    | -----   | 250     | ps    | RL=50Ω, CL=2pF<br>20%/80%*VDD |
| Fall Time                              | $T_f$    | -----   | 250     |       |                               |
| Duty Cycle                             | 45       | -----   | 55      | %     | Differential                  |
| Integrated Phase Jitter ( $J_{PH}$ )   | -----    | 0.25    | 3       | ps    | 200kHz ~ 20MHz,<br>156.25MHz  |
|  | -----    | 0.37    | 3       |       | 100kHz ~ 20MHz,<br>156.25MHz  |
|  | -----    | 1.70    | 3       |       | 12kHz ~ 20MHz,<br>156.25MHz   |
| Period Jitter RMS ( $J_{PER}$ )        | -----    | 2.8     | -----   | ps    | RL=50Ω, 156.25MHz             |

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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              |         | 200                  |      |           |
| CDM             |         | 1,500                |      |           |

## OPTIONS AND PART IDENTIFICATION: (Left Blank if Standard)

### Programmed Orders (Quantity > 1,000pcs)

ASEMP  -  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>(110pcs / 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  |                         |                   | T5: Tape & Reel<br>(5kpcs / reel) |

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

\*\* CMOS output only

### 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.

ASEMP  - 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 (110pcs / 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  |                         |                   | T5: Tape & Reel (5kpcs / reel) |

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

\*\* CMOS output only

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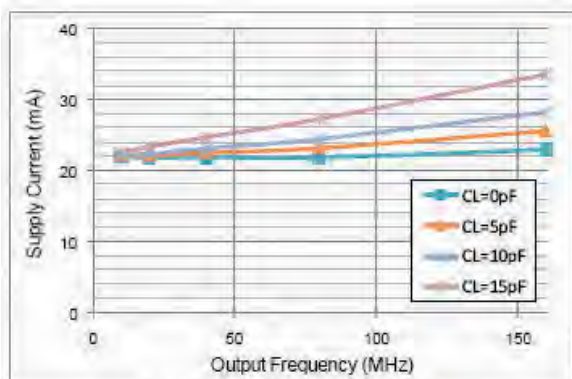
ASEMP

RoHS  
Compliant

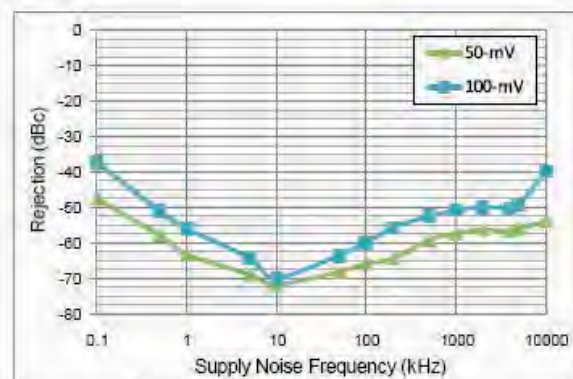
## NOMINAL PERFORMANCE PARAMETERS

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

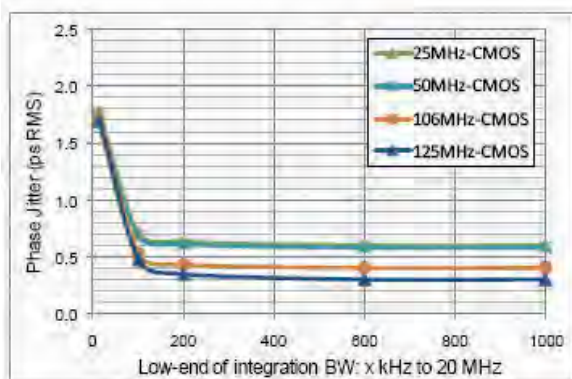
### CMOS OUTPUT



Supply current over freq

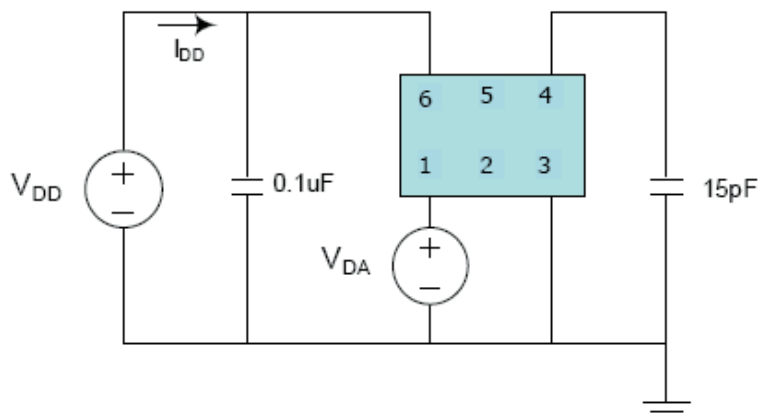


Power supply rejection ratio



Phase jitter (integrated phase noise)

### Test Circuit



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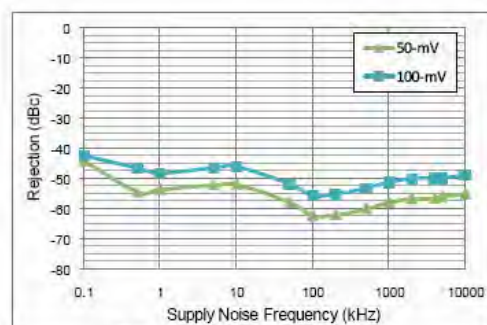
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ASEMP

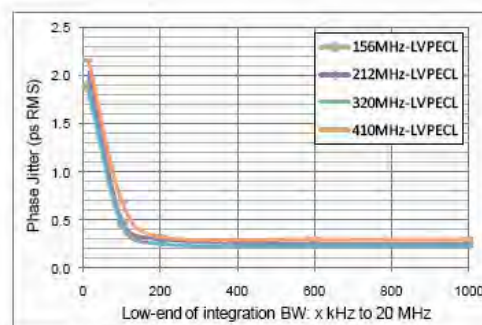


RoHS  
Compliant

## LVPECL OUTPUT

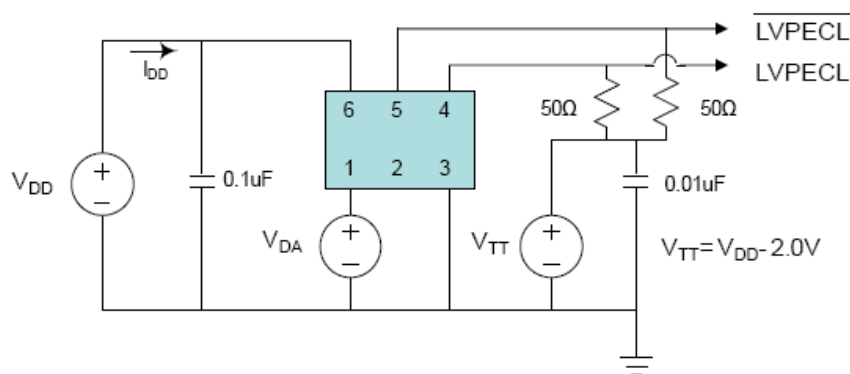


Power supply rejection ratio

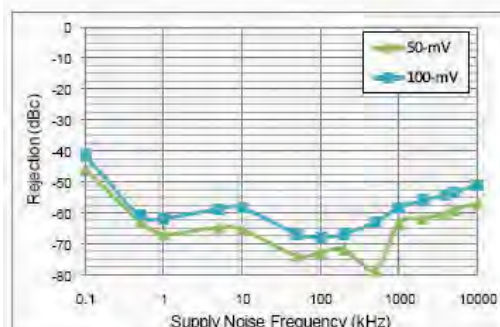


Phase jitter (integrated phase noise)

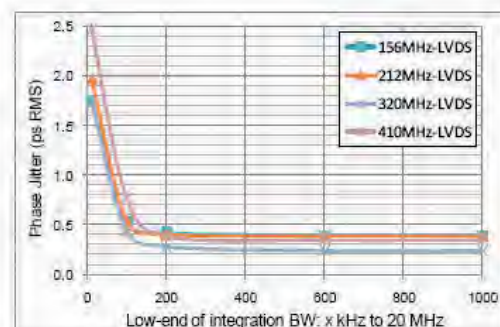
## Test Circuit



## LVDS OUTPUT

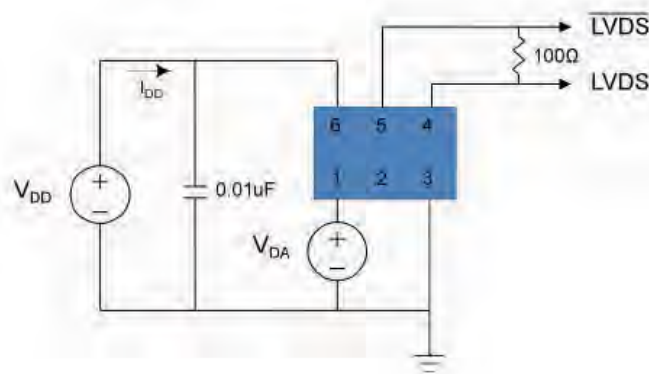


Power supply rejection ratio



Phase jitter (integrated phase noise)

## Test Circuit



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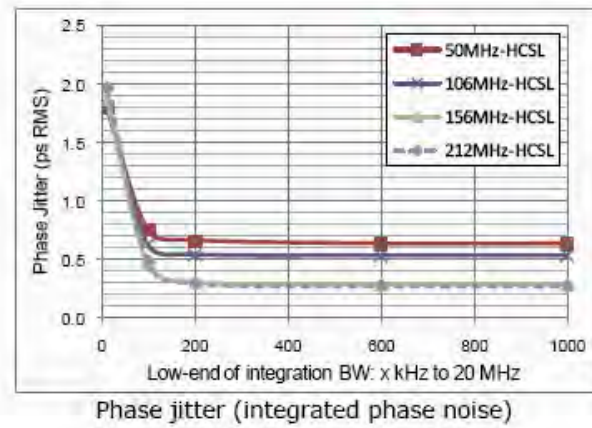
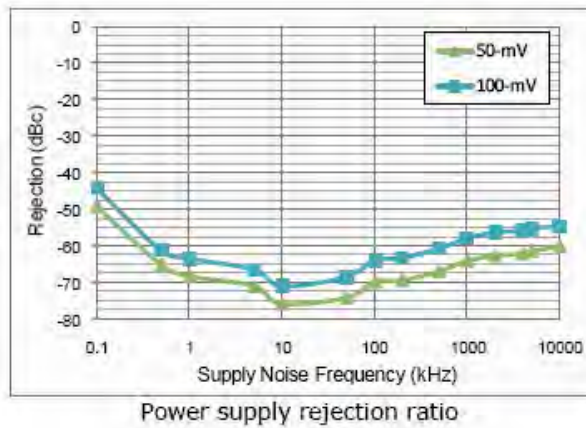
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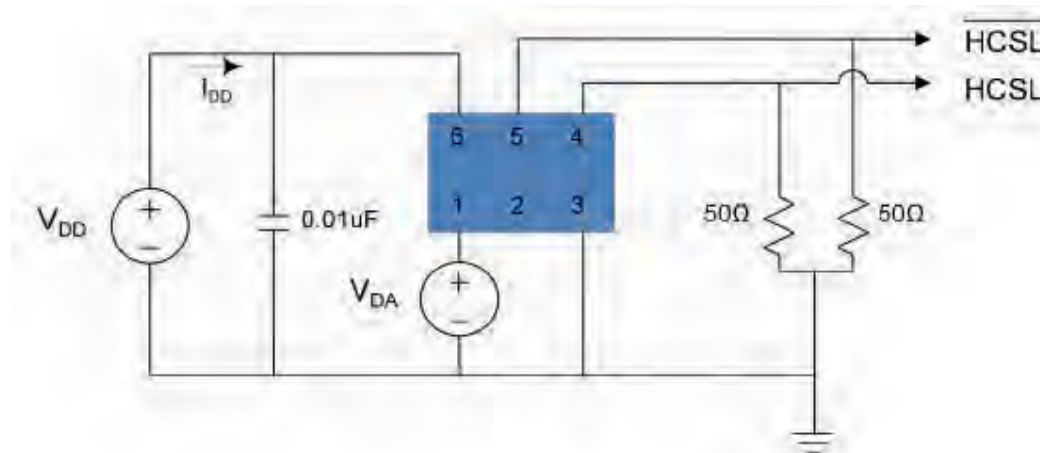


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## HCSSL OUTPUT



## Test Circuit



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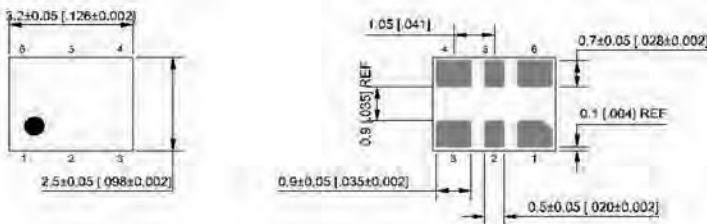


Life Size 3.2 x 2.5 x 0.85 mm

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**RoHS**  
Compliant

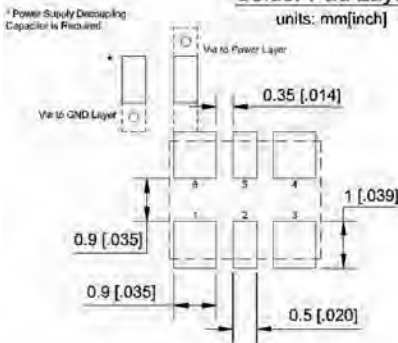
## OUTLINE DIMENSIONS:



| No. | Pin terminal |
|-----|--------------|
| 1   | Enable       |
| 2   | nc           |
| 3   | GND          |
| 4   | Output       |
| 5   | Output       |
| 6   | VDD          |

### Recommended Solder Pad Layout

units: mm[inch]

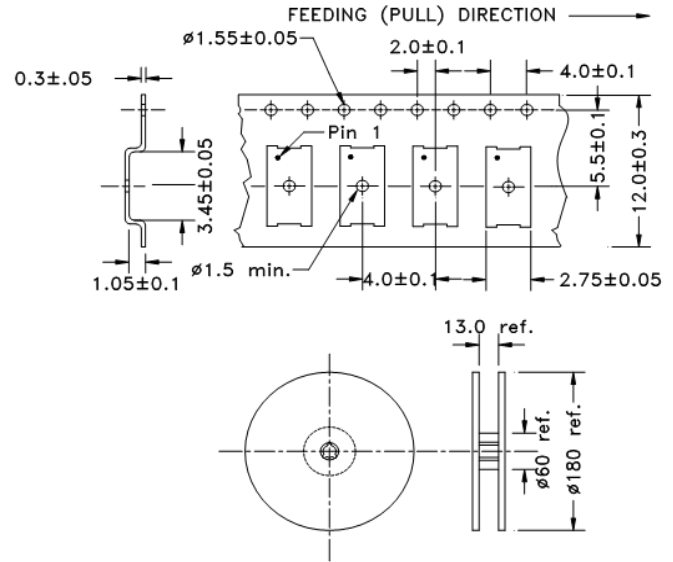


Note: Recommend using an approximately 0.01µF bypass capacitor between PIN 6 and 3.

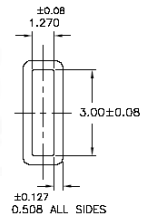
Dimensions: mm (inches)

## TAPE AND REEL:

T= Tape and reel (1,000pcs/reel)



Tube: 110 pcs/tube

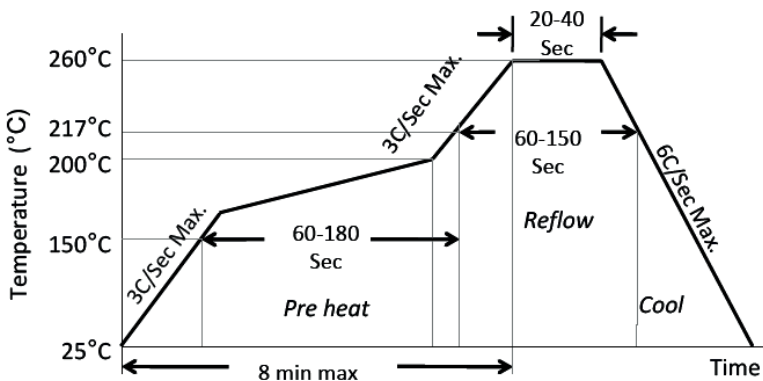


Unit orientation in tube:



Dimensions: mm

## 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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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.);

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- 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

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**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.