

# PERFORMANCE PLASTIC PACKAGE ULTRA MINIATURE PURE SILICON™ CLOCK OSCILLATOR

ASFLMP



Life Size   
5.0 x 3.2 x 0.85 mm

ASFLMP



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                                                               | ----    | 425.000 |       | Commercial, Industrial Temp range |
|                                      | LVDS   | 10.000                                                               | ----    | 425.000 |       | Commercial, Industrial Temp range |
|                                      | HCSL   | 10.000                                                               | ----    | 425.000 |       | 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)                   |
|                                      |        | ----                                                                 | ----    | 10.0    |       | 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     |                        |
|                                            | V <sub>OL</sub> | ----                | ----    | 0.1*V <sub>dd</sub> | V     | I=±6mA                 |
| Rise Time                                  | Tr              | ----                | 1.1     | 2.0                 | ns    | CL=15pF                |
| Fall Time                                  | Tf              | ----                | 1.3     | 2.0                 | ns    | 20%/80%*VDD            |
| Duty Cycle                                 |                 | 45                  | ----    | 55                  | %     |                        |
| Spurious Level                             |                 |                     |         | -50                 | dBc   | Reference to carrier   |
| Integrated Phase Jitter (J <sub>PH</sub> ) |                 | ----                | 0.35    | 3                   | ps    | 200kHz ~ 20MHz, 125MHz |
|                                            |                 | ----                | 0.5     | 3                   |       | 100kHz ~ 20MHz, 125MHz |
|                                            |                 | ----                | 1.8     | 3                   |       | 12kHz ~ 20MHz, 125MHz  |
| Period Jitter RMS (J <sub>PER</sub> )      |                 | ----                | 4.3     | ----                | 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                  |
| Spurious Level                         |          |               |         | -50           | dBc   | Reference to carrier          |
| Integrated Phase Jitter ( $J_{PH}$ )   |          | -----         | 0.35    | 3             | ps    | 200kHz ~ 20MHz,<br>156.25MHz  |
|                                        |          | -----         | 0.5     | 3             |       | 100kHz ~ 20MHz,<br>156.25MHz  |
|                                        |          | -----         | 1.8     | 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                  |
| Spurious Level                           |          |               |         | -50           | dBc   | Reference to carrier          |
| Integrated Phase Jitter ( $J_{PH}$ )     |          | -----         | 0.43    | 3             | ps    | 200kHz ~ 20MHz,<br>156.25MHz  |
|                                          |          | -----         | 0.55    | 3             |       | 100kHz ~ 20MHz,<br>156.25MHz  |
|                                          |          | -----         | 1.8     | 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                  |
| Spurious Level                         |          |         |         | -50     | dBc   | Reference to carrier          |
| Integrated Phase Jitter ( $J_{PH}$ )   |          | -----   | 0.3     | 3       | ps    | 200kHz ~ 20MHz,<br>156.25MHz  |
|                                        |          | -----   | 0.45    | 3       |       | 100kHz ~ 20MHz,<br>156.25MHz  |
|                                        |          | -----   | 1.9     | 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    | Vdd+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)

ASFLMP  -  MHz -   -  -

| Output Type | Frequency in MHz<br>e.g. 156.2500 MHz<br>(Maximum 4 digits<br>after decimal) | Operating Temp.      | Overall Freq.<br>Stability | Tri-state (Pin 1) | Packaging                        |
|-------------|------------------------------------------------------------------------------|----------------------|----------------------------|-------------------|----------------------------------|
| C: CMOS     |                                                                              | Blank: -20°C ~ +70°C | Blank: ±50ppm              | Blank: Tri-state  | Blank: Tube<br>(72pcs / 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                 |                   |                                  |
| HC: HCSL    |                                                                              | Z: -55°C ~ +125°C    |                            |                   |                                  |

\*-20°C ~ +70°C, option L, or X 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.

ASFLMP  - BLANK -   -

| Output Type | Operating Temp.      | Overall Freq. Stability | Packaging                        |
|-------------|----------------------|-------------------------|----------------------------------|
| C: CMOS     | Blank: -20°C ~ +70°C | Blank: ±50ppm           | Blank: Tube (72pcs / Tube)       |
| LP: LVPECL  | L: -40°C ~ +85°C     | Y: ±10ppm*              | T: Tape & Reel<br>(1kpcs / reel) |
| LV: LVDS    | X: -40°C ~ +105°C    | R: ±25 ppm              |                                  |
| HC: HCSL    | Z: -55°C ~ +125°C    |                         |                                  |

\*-20°C ~ +70°C, option L, or X only.

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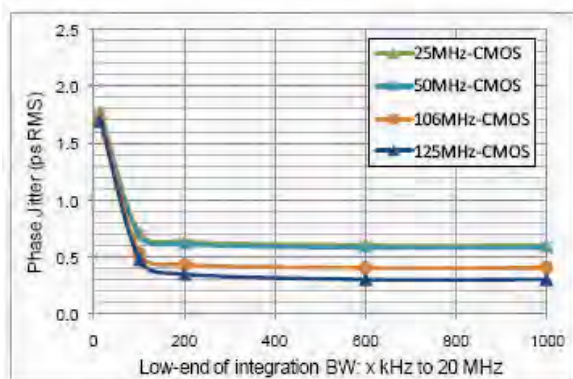
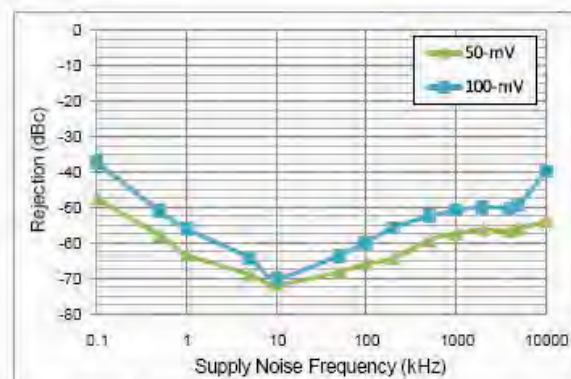
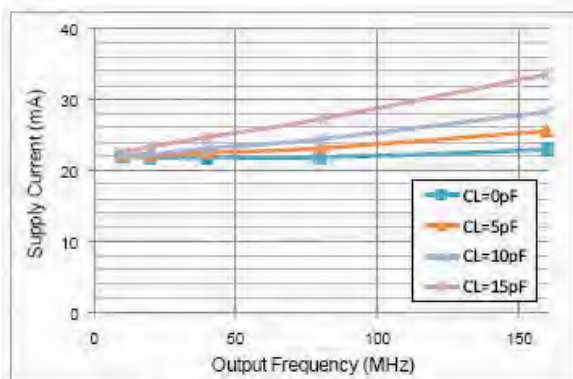


RoHS  
Compliant

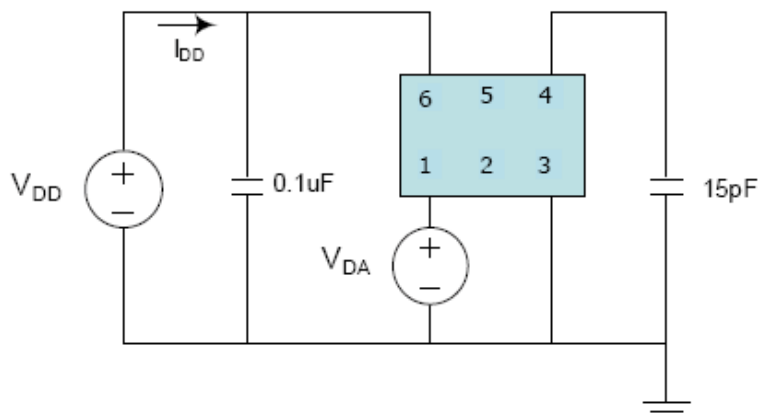
## NOMINAL PERFORMANCE PARAMETERS

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

### CMOS OUTPUT



### Test Circuit



# PERFORMANCE PLASTIC PACKAGE ULTRA MINIATURE PURE SILICON™ CLOCK OSCILLATOR

ASFLMP



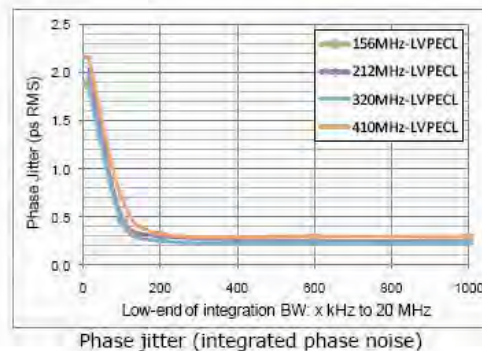
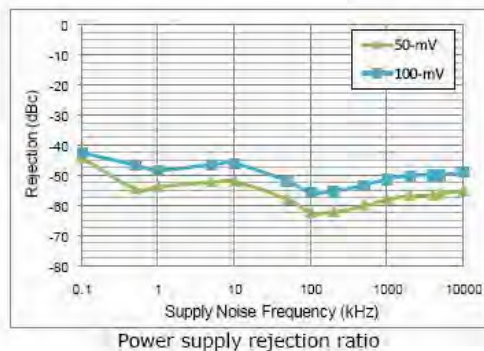
Life Size  
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ASFLMP

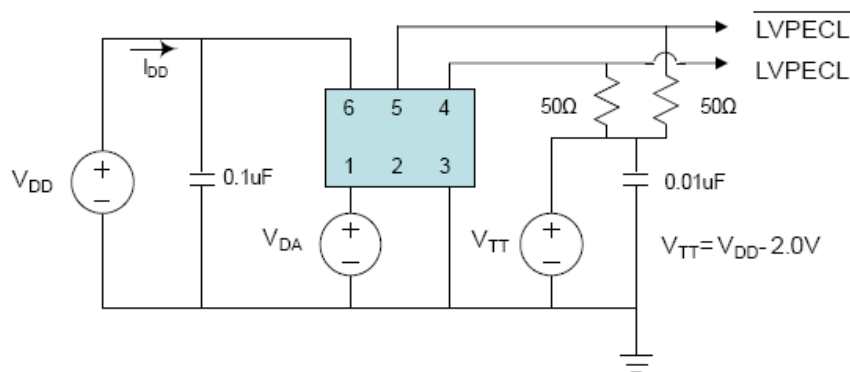


RoHS  
Compliant

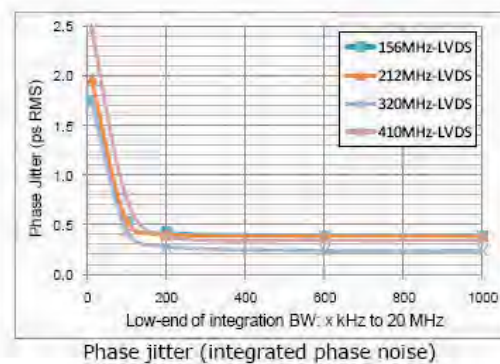
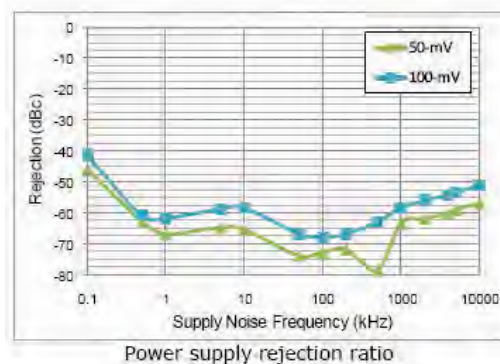
## LVPECL OUTPUT



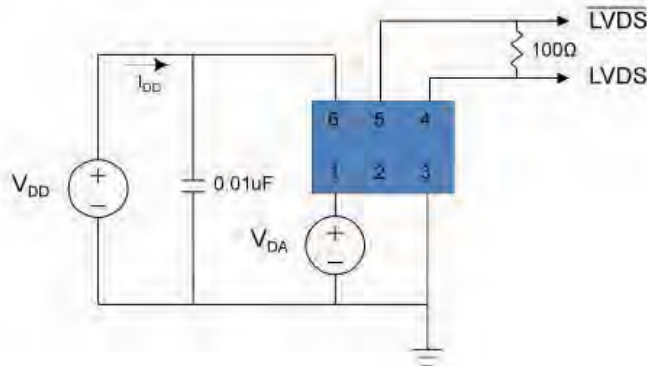
### Test Circuit



## LVDS OUTPUT



### Test Circuit



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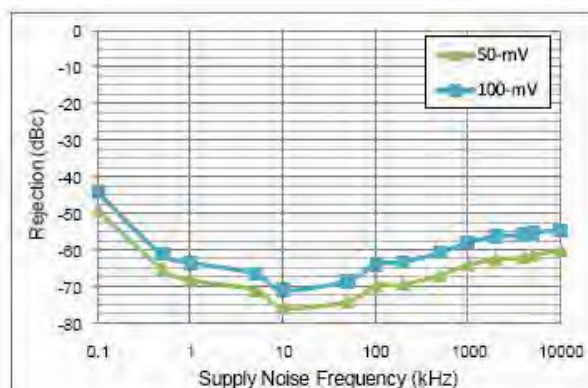
RoHS  
Compliant

Life Size

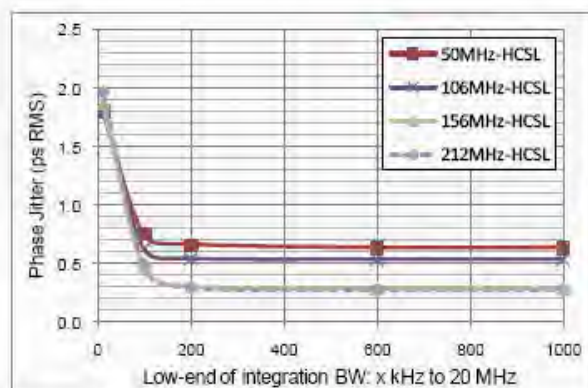


5.0 x 3.2 x 0.85 mm

## HCSL OUTPUT

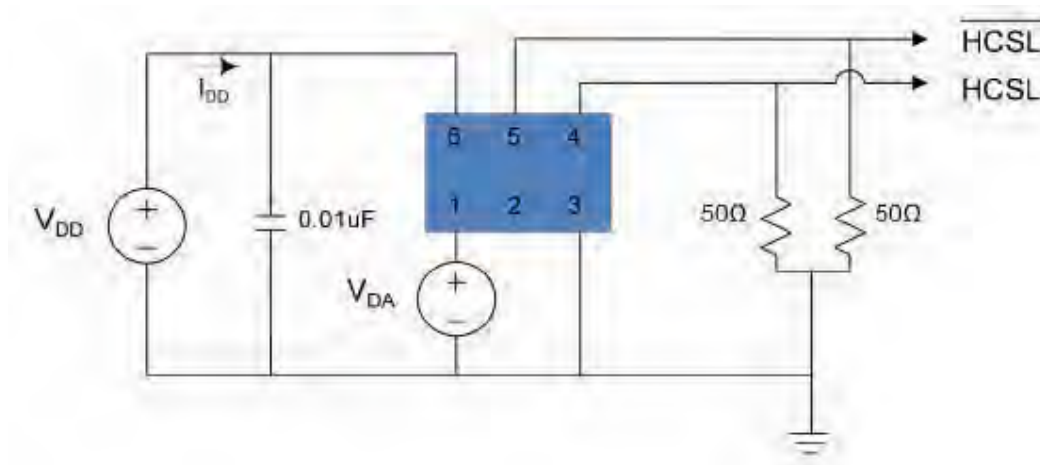


Power supply rejection ratio



Phase jitter (integrated phase noise)

## Test Circuit



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Life Size

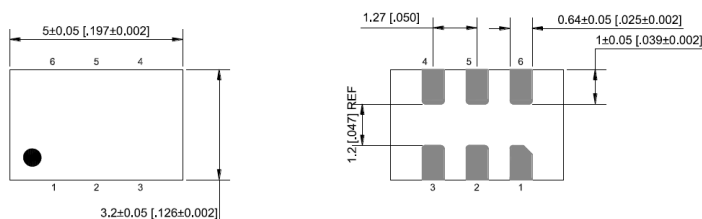
5.0 x 3.2 x 0.85 mm

ASFLMP



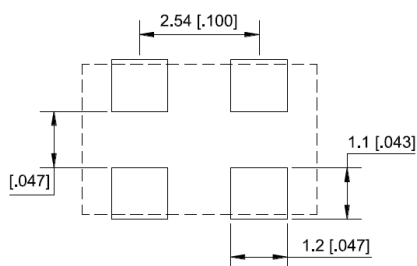
RoHS  
Compliant

## OUTLINE DIMENSIONS:



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

Recommended  
Solder Pad Layout  
units: mm[Inch]

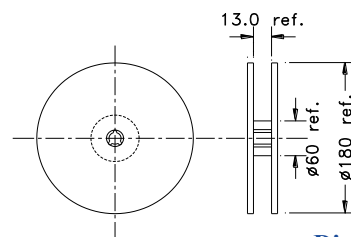
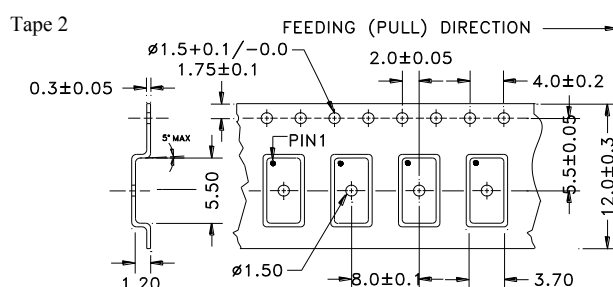
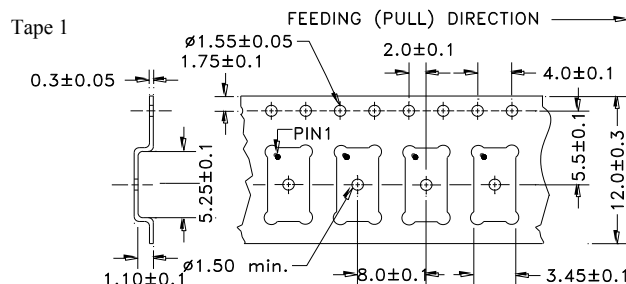


Note: Recommend using  
an approximately 0.01uF  
bypass capacitor between  
PIN 6 and 3.

Dimensions: mm (inches)

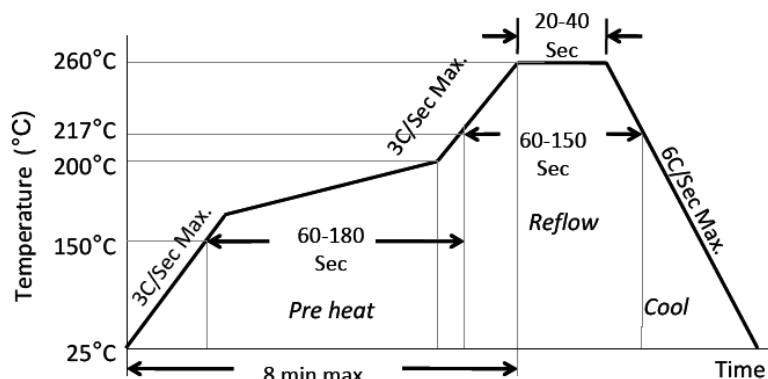
## TAPE AND REEL:

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



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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Электрон  
Связь**

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С нами вы становитесь еще успешнее!

**Наши контакты:**

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**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

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