# 2.5V / 3.3Vdc Programmable Spread Spectrum Low EMI Clock Oscillator

**ASSVP Series**

Request Samples | Check Inventory | ESD Sensitive | Pb

**7.0 x 5.0 x 1.4 mm**
**RoHS/RoHS II Compliant**
**MSL Level = N/A**

## Features

- Spread Spectrum LOW EMI Oscillator
- 7.0 x 5.0 x 1.4mm Ceramic package
- Tri-state function
- Suitable for RoHS reflow profile
- Seam sealed ceramic package assures high reliability.

## Applications

- Wireless LAN
- Digital cameras
- Mobile phones
- Printer
- LCD

## Electrical Specifications

| Parameters | | Minimum | Typical | Maximum | Units | Notes |
|---|---|---|---|---|---|---|
| Frequency | | 10 | | 160 | MHz | |
| Spread Spectrum Type | Center Spread | ±0.25 typ. ~ ±2.0 typ. | | | % | See table for options |
| | Down Spread | -0.5 typ. ~ -4.0 typ. | | | | |
| EMI Reduction (Reduction is applied to the entire frequency spectrum) | 100MHz at C02 | -7 | | | dBc | Refer to the dB level when no modulation. |
| | 100MHz at C04 | -9 | | | | |
| Operating Temperature: | | -40 | | +85 | °C | See options |
| Storage Temperature: | | -55 | | +125 | °C | |
| Overall Frequency Stability*: | | -50 | | +50 | ppm | See options |
| Supply Voltage (Vdd): | $V_{dd}$ = 3.3V | 2.97 | 3.3 | 3.63 | V | Standard |
| | $V_{dd}$ = 2.5V | 2.25 | 2.5 | 2.75 | V | Option 1 |
| Input Current: | 10.000 to 49.999MHz | | 10 | 20 | mA | $V_{dd}$ = 2.5V |
| | 50.000 to 79.999MHz | | 15 | 20 | | |
| | 80.000 to 99.999MHz | | 20 | 25 | | |
| | 100.0 to 160.0MHz | | 25 | 30 | | |
| | 10.000 to 49.999MHz | | 15 | 20 | mA | $V_{dd}$ = 3.3V |
| | 50.000 to 79.999MHz | | 20 | 25 | | |
| | 80.000 to 99.999MHz | | 25 | 30 | | |
| | 100.0 to 160.0MHz | | 30 | 40 | | |
| Symmetry: | $V_{dd}$ = 2.5V | 40 | | 60 | % | CL=15pF |
| | $V_{dd}$ = 3.3V | 45 | | 55 | | |

* Frequency stability includes initial tolerance, temperature characteristics, load variation, and supply voltage variation.

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| Parameters | | Minimum | Typical | Maximum | Units | Notes |
|---|---|---|---|---|---|---|
| Rise and Fall Time (Tr/Tf): | 10.000 to 160.0MHz | | | 5.0 | ns | $V_{dd}$ = 2.5V |
| | 10.000 to 160.0MHz | | | 10.0 | | $V_{dd}$ = 3.3V |
| Output Load: | | | | 15 | pF | CMOS |
| Output Voltage: | VOH | 0.9*Vdd | | | V | |
| | VOL | | | 0.1*Vdd | V | |
| Start-up Time: | | | 2.0 | 10.0 | ms | |
| Tri-state function (Stand-by) : | | "1" (VIH≥0.7*Vdd) or Open: Oscillation<br>"0" (VIH<0.3*Vdd) : Hi Z | | | | |
| Modulation carrier frequency (Dither rate) | | Programmable dependent ( 30kHz to 40kHz ) | | | | |
| Aging: | | -3.0 | | +3.0 | ppm | @+25°C First year |

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## Options and Part Identification (left blank if standard)

ASSVP □ - [ ] MHz - □-□□□-□

| Supply Voltage |
|---|
| Blank: 3.3V±5% |
| 1: 2.5V±5% |

| Frequency in MHz |
|---|
| Please specify the frequency in MHz.<br>e.g. 14.31818 |

| Overall Freq. Stability |
|---|
| Blank: ±50ppm |
| R: ±25ppm |

| SSBW |
|---|
| C□□ or D□□<br>See table below |

| Packaging |
|---|
| Blank: Bulk |
| T: Tape & Reel |

## Table: SPREAD SPECTRUM BANDWIDTH SELECTION TABLE

| SPREAD SPECTRUM BAND WIDTH OPTIONS * | | | |
|---|---|---|---|
| Center Spread (%) | | Down Spread (%) | |
| C02 | ±0.250 | D02 | -0.50 |
| C04 | ±0.50 | D03 | -0.75 |
| C08 | ±1.000 | D04 | -1.00 |
| C12 | ±1.500 | D06 | -1.50 |
| C16 | ±2.000 | D08 | -2.00 |
| | | D12 | -3.00 |
| | | D16 | -4.00 |

**Note *: All spectrum spread percentage numbers are typical values**

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## Reflow Profile [JEDEC J-STD-020]

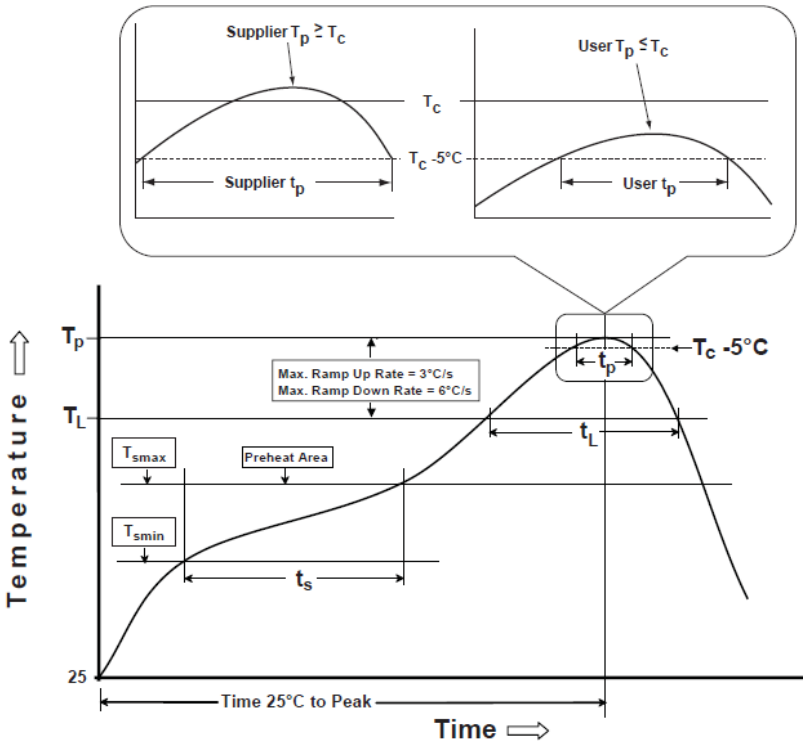



**Table 1**

| SnPb Eutectic Process Classification Temperatures ($T_c$) | | |
|---|---|---|
| Package Thickness | Volume mm³ <350 | Volume mm³ ≥350 |
| <2.5 mm | 235 °C | 220 °C |
| ≥2.5 mm | 220 °C | 220 °C |

**Table 2**

| Pb-Free Process Classification Temperatures ($T_c$) | | | |
|---|---|---|---|
| Package Thickness | Volume mm³ <350 | Volume mm³ 350-2000 | Volume mm³ >2000 |
| <1.6 mm | 260 °C | 260 °C | 260 °C |
| 1.6 mm - 2.5 mm | 260 °C | 250 °C | 245 °C |
| >2.5 mm | 250 °C | 245 °C | 245 °C |

| Profile Feature | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|---|---|---|
| Preheat / soak | | |
| Temperature minimum ($T_{smin}$) | 100°C | 150°C |
| Temperature maximum ($T_{smax}$) | 150°C | 200°C |
| Time ($T_{smin}$ to $T_{smax}$) ($t_s$) | 60 - 120 sec. | 60 - 120 sec. |
| Average ramp-up rate ($T_{smax}$ to $T_P$) | 3°C/sec. max | 3°C/sec. max |
| Liquidous temperature ($T_L$) | 183°C | 217°C |
| Time at liquidous ($t_L$) | 60 - 150 sec. | 60 - 150 sec. |
| Peak package body temperature ($T_P$)* | **see Table 1** | **see Table 2** |
| Time ($t_p$)** within 5°C of the specified classification temperature ($T_C$) | 20 sec. | 30 sec. |
| Ramp-down rate ($T_p$ to $T_{smax}$) | 6°C/sec. max | 6°C/sec. max |
| Time 25°C to peak temperature | 6 min. max | 8 min. max |
| Reflow cycles | 2 max | 2 max |

*Tolerance for peak profile temperature ($T_P$) is defined as a supplier minimum and a user maximum.

**Tolerance for time at peak profile temperature ($t_p$) is defined as supplier minimum and a user maximum.


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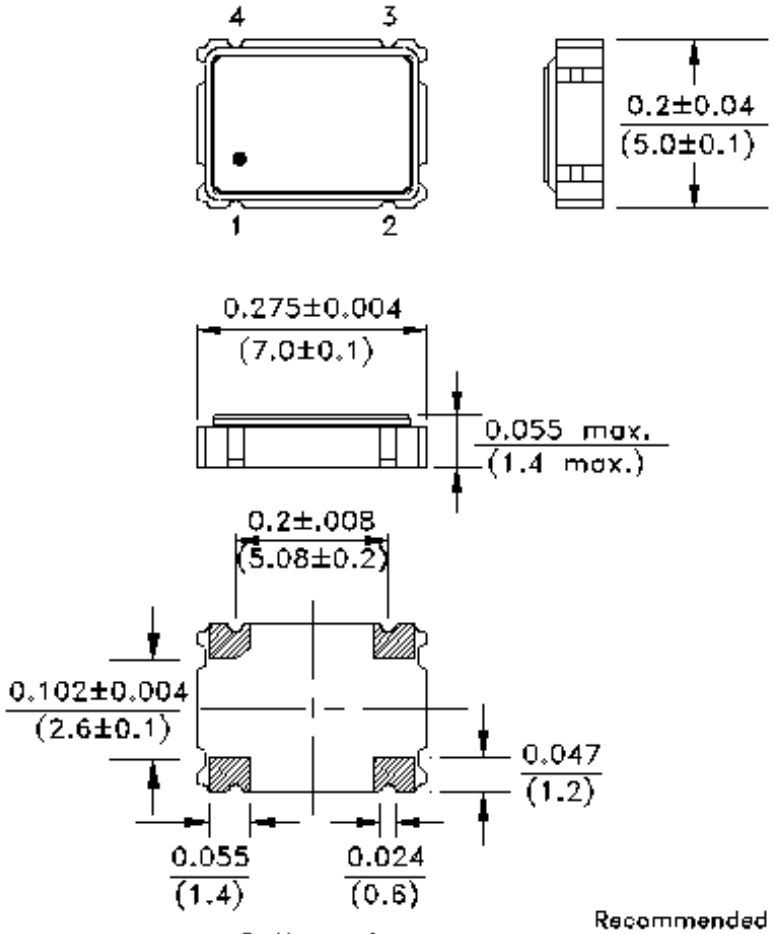
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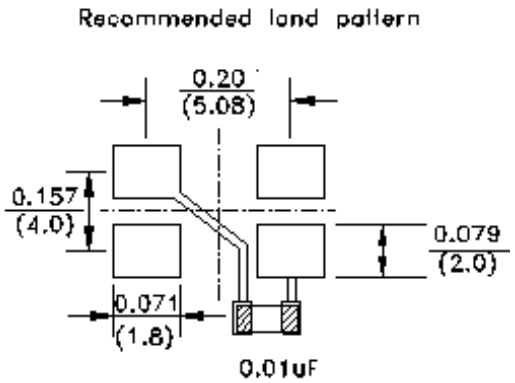
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## MECHANICAL DIMENSIONS




| Pin | Function |
|---|---|
| 1 | Tri-State |
| 2 | GND/Case |
| 3 | Output |
| 4 | Vdd |

**Dimensions: inches (mm)**

Note: Recommend using an approximately 0.01uF bypass capacitor between PIN 2 and 4.


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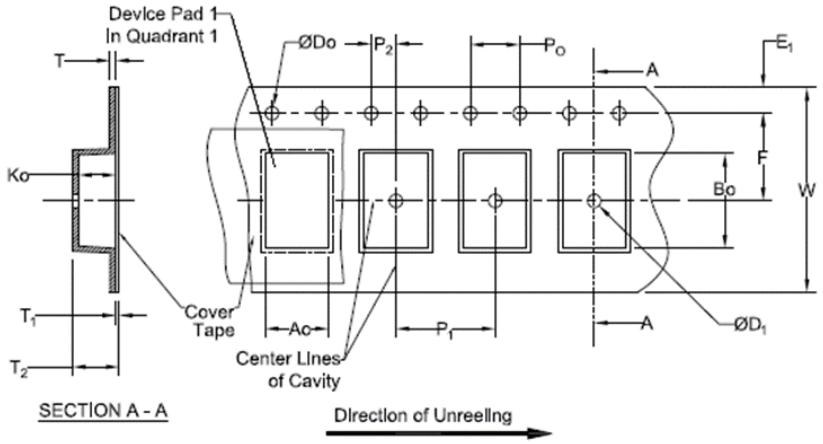
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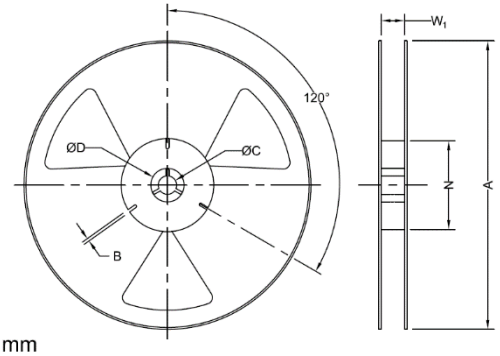
## PACKAGING

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




| Tape Specifications (mm) | | | | | | |
|---|---|---|---|---|---|---|
| Ao | Bo | Do | $D_1$ (Min) | $E_1$ | F | Ko |
| * | * | 1.5±0.1 | 1.5 | 1.75±0.1 | 7.5±0.1 | * |
| $P_1$ | $P_2$ | Po | T (Max) | $T_1$ (Max) | $T_2$ (Max) | W |
| 8.0±0.1 | 2.0±0.1 | 4.0±0.1 | 0.6 | 0.1 | 8.0 | 16 ± 0.3 |

*** Note: Compliant to EIA-481 standards**




Unit: mm

| Reel Specifications (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Width | Qty/Reel | A (Nom) | B (Min) | C (Min) | D (Min) | N (Min) | *$W_1$ |
| 16mm | 1000 | 180 | 1.5 | 13.0+0.5/-0.2 | 20.2 | 60 | 16.4+2.0/-0.0 |

**Dimensions: mm**

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