

# Automotive and Industrial Grade SMD Crystal Oscillator



ASDAIG



2.50 x 2.00 x 0.95mm  
RoHS/RoHS II Compliant  
MSL = N/A: Not Applicable

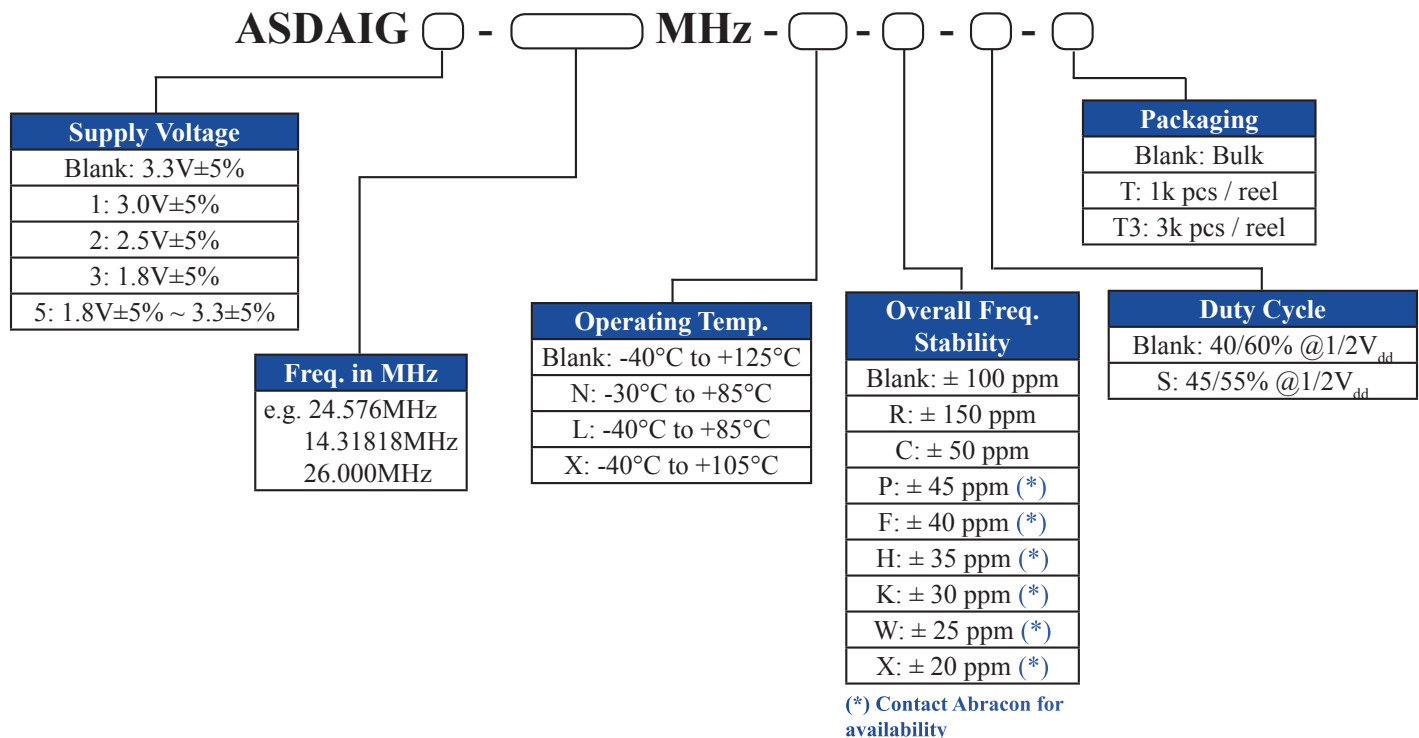
## Features

- AEC-Q200 Qualified
- Automotive Grade 1: -40°C to +125°C
- TS16949 Production Line Certified
- PPAP Available Upon Request
- Hermetically Seam-sealed Ceramic Package
- RoHS/RoHS II Compliant and Pb free

## Applications

- Infotainment Systems
- Keyless Entry & Startup
- GPS & Navigation
- Comfort control
- ADAS (Advanced Driver Assistance Systems)
- Vehicle to Vehicle Communication
- LiDAR (Light Detection and Ranging)
- In-vehicle Networking
- Powertrain & Drive Control
- Power Control & Conversion
- Industrial Control & Automation

## Part Identification (left blank if standard)



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## Electrical Specifications

| Parameters                                 |          | Min.                                                                                                                     | Typ.        | Max.               | Unit | Notes                       |
|--------------------------------------------|----------|--------------------------------------------------------------------------------------------------------------------------|-------------|--------------------|------|-----------------------------|
| Frequency Range                            |          | 1.25                                                                                                                     |             | 156.25             | MHz  |                             |
| Operating Temperature Range                |          | -40                                                                                                                      |             | +125               | °C   | Option "blank"; See options |
| Storage Temperature                        |          | -55                                                                                                                      |             | +125               | °C   | Option "X, blank, L, N"     |
| Overall Frequency Stability [Note 1]       |          | -50                                                                                                                      |             | +50                | ppm  | Option "C"; See options     |
|                                            |          | -100                                                                                                                     |             | +100               |      | Option "blank"; See options |
|                                            |          | -150                                                                                                                     |             | +150               |      | Option "R"; See options     |
| Supply Voltage ( $V_{dd}$ )                |          | +1.71                                                                                                                    | +1.8 ~ +3.3 | +3.465             | V    | Option "5"                  |
|                                            |          | +3.135                                                                                                                   | +3.3        | +3.465             |      | Option "blank"              |
|                                            |          | +2.85                                                                                                                    | +3.0        | +3.15              |      | Option "1"                  |
|                                            |          | +2.375                                                                                                                   | +2.5        | +2.625             |      | Option "2"                  |
|                                            |          | +1.71                                                                                                                    | +1.8        | +1.89              |      | Option "3"                  |
| Supply Current ( $I_{dd}$ ) into 15pF Load |          | $V_{dd} = 3.3 \text{ V}$                                                                                                 |             | 4.0                | mA   | 1.250~39.999 MHz            |
|                                            |          |                                                                                                                          |             | 9.0                |      | 40.000~48.999 MHz           |
|                                            |          |                                                                                                                          |             | 15.0               |      | 49.000~156.000 MHz          |
|                                            |          | $V_{dd} = 3.0 \text{ V}$                                                                                                 |             | 3.5                |      | 1.250~39.999 MHz            |
|                                            |          |                                                                                                                          |             | 8.0                |      | 40.000~48.999 MHz           |
|                                            |          |                                                                                                                          |             | 15.0               |      | 49.000~156.000 MHz          |
|                                            |          | $V_{dd} = 2.5 \text{ V}$                                                                                                 |             | 3.0                |      | 1.250~39.999 MHz            |
|                                            |          |                                                                                                                          |             | 7.0                |      | 40.000~48.999 MHz           |
|                                            |          |                                                                                                                          |             | 15.0               |      | 49.000~156.000 MHz          |
|                                            |          | $V_{dd} = 1.8 \text{ V}$                                                                                                 |             | 2.0                |      | 1.250~39.999 MHz            |
|                                            |          |                                                                                                                          |             | 4.0                |      | 40.000~48.999 MHz           |
|                                            |          |                                                                                                                          |             | 10.0               |      | 49.000~156.000 MHz          |
| Disable Current                            |          |                                                                                                                          |             | 10.0               | μA   |                             |
| Output Load                                |          |                                                                                                                          |             | 15                 | pF   | CMOS                        |
| Output Voltage                             | $V_{OH}$ | $0.9 \cdot V_{dd}$                                                                                                       |             |                    | V    |                             |
|                                            | $V_{OL}$ |                                                                                                                          |             | $0.1 \cdot V_{dd}$ |      |                             |
| Tri-state function                         |          | "1" ( $V_{IH} \geq 0.7 \cdot V_{dd}$ ) or Open: Oscillation;<br>"0" ( $V_{IH} < 0.3 \cdot V_{dd}$ ): No oscillation/Hi Z |             |                    |      |                             |
| Aging                                      |          | -2.0                                                                                                                     |             | +2.0               | ppm  | @25°C ± 3°C First year      |
| Symmetry @1/2 $V_{dd}$                     |          | 40                                                                                                                       | 50          | 60                 | %    | Option "blank"              |
|                                            |          | 45                                                                                                                       | 50          | 55                 |      | Option "S"                  |
| Start-up Time                              |          |                                                                                                                          | 2.0         | 5.0                | ms   |                             |
| Rise/Fall Time ( $T_r/T_f$ )               |          | $V_{dd} = 3.3 \text{ V}$                                                                                                 |             | 2.5                | ns   | 1.250~39.999 MHz            |
|                                            |          |                                                                                                                          |             | 2                  |      | 40.000~156.000 MHz          |
|                                            |          | $V_{dd} = 3.0 \text{ V}$                                                                                                 |             | 2.5                | ns   | 1.250~39.999 MHz            |
|                                            |          |                                                                                                                          |             | 2                  |      | 40.000~156.000 MHz          |
|                                            |          | $V_{dd} = 2.5 \text{ V}$                                                                                                 |             | 3                  | ns   | 1.250~39.999 MHz            |
|                                            |          |                                                                                                                          |             | 2.5                |      | 40.000~156.000 MHz          |
|                                            |          | $V_{dd} = 1.8 \text{ V}$                                                                                                 |             | 3.5                | ns   | 1.250~39.999 MHz            |
|                                            |          |                                                                                                                          |             | 3                  |      | 40.000~156.000 MHz          |

Note 1: Inclusive of initial tolerance at time of shipment, changes in supply voltage, load, temperature and 1st year



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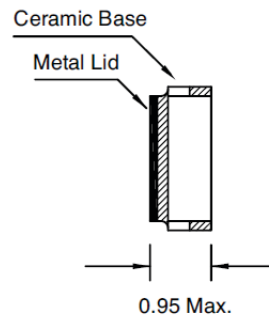
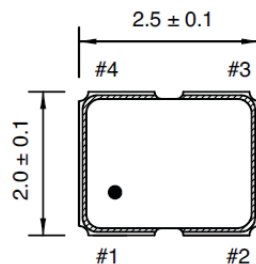


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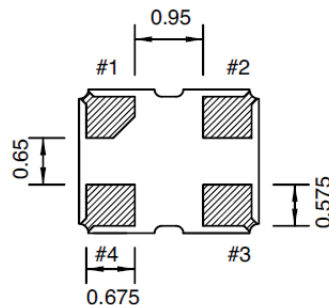
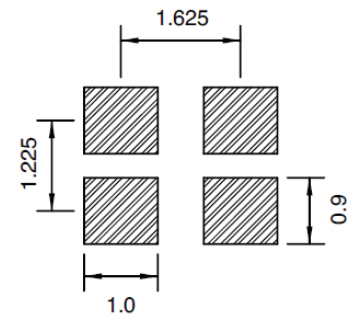
## Electrical Specifications Cont.

| Parameters                                                                        |                          | Min. | Typ. | Max.  | Unit | Notes |
|-----------------------------------------------------------------------------------|--------------------------|------|------|-------|------|-------|
| RMS Phase Jitter @ +25°C<br>(10-39MHz: 12kHz to 5MHz)<br>(>39MHz: 12kHz to 20MHz) | $V_{dd} = 3.3 \text{ V}$ |      | 0.5  | < 1.0 | ps   |       |
|                                                                                   | $V_{dd} = 3.0 \text{ V}$ |      | 0.5  | < 1.0 |      |       |
|                                                                                   | $V_{dd} = 2.5 \text{ V}$ |      | 0.5  | < 1.0 |      |       |
|                                                                                   | $V_{dd} = 1.8 \text{ V}$ |      | 0.5  | < 1.0 |      |       |
| Period Jitter RMS                                                                 | $V_{dd} = 3.3 \text{ V}$ |      | 3.0  | 5.0   | ps   |       |
|                                                                                   | $V_{dd} = 3.0 \text{ V}$ |      | 3.0  | 5.0   |      |       |
|                                                                                   | $V_{dd} = 2.5 \text{ V}$ |      | 3.0  | 5.0   |      |       |
|                                                                                   | $V_{dd} = 1.8 \text{ V}$ |      | 3.0  | 5.0   |      |       |

## Mechanical Dimensions



### Recommended Land Pattern



| Pin # | Function  |
|-------|-----------|
| 1     | Tri-state |
| 2     | GND/Case  |
| 3     | Output    |
| 4     | $V_{dd}$  |

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

Dimensions: mm



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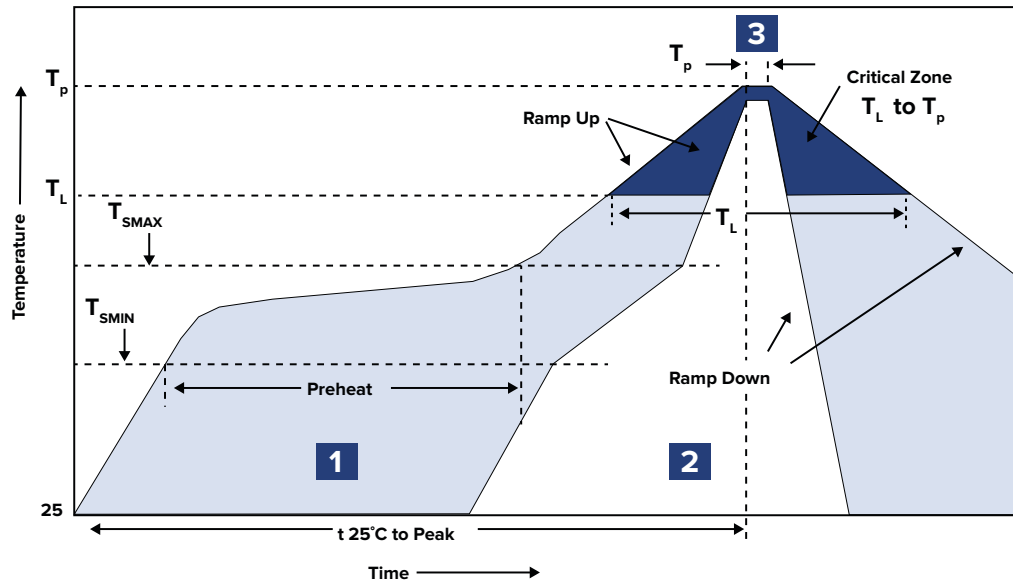


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## Reflow Profile



| Zone | Description    | Temperature                                            | Time          |
|------|----------------|--------------------------------------------------------|---------------|
| 1    | Preheat / Soak | T <sub>SMIN</sub> ~ T <sub>SMAX</sub><br>150°C ~ 180°C | 60 ~ 120 sec. |
| 2    | Reflow         | T <sub>L</sub><br>230°C                                | 30 ~ 40 sec.  |
| 3    | Peak heat      | T <sub>P</sub><br>260°C±5°C                            | 5 sec. MAX    |

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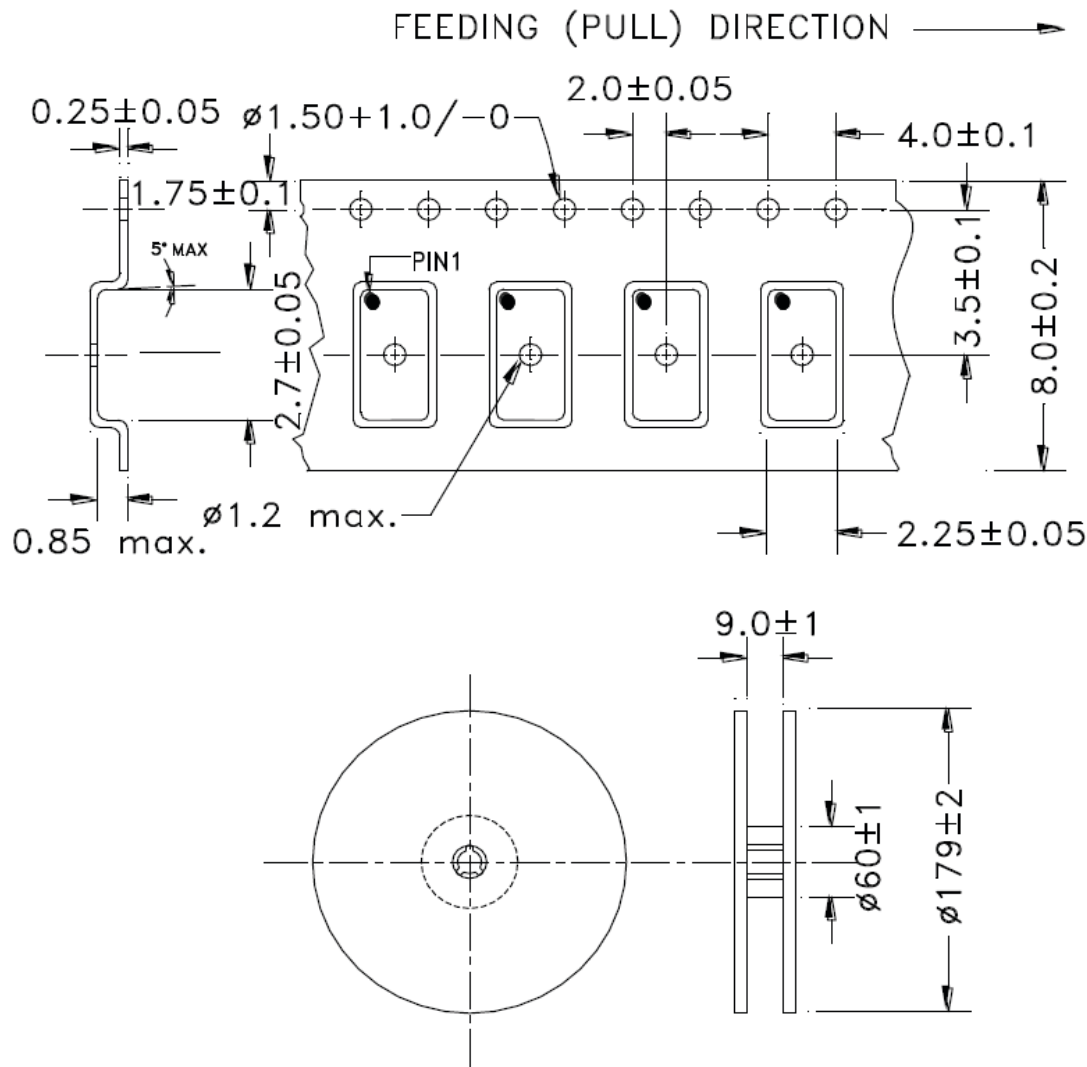
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## Packaging

Tape and Reel:  
T: 1,000pcs/reel  
T3: 3,000pcs/reel



Dimensions: mm

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