

Description

The Abracon ASEM series is a programmable MEMS oscillator, offered in various supply voltages. This series features low power consumption, a wide frequency range, excellent phase noise, tight stabilities, and short lead times for industrial, consumer, and other applications. The ASEM series comes in a 3.2 x 2.5 mm compact package with a CMOS output.



Features

- Low Power Consumption
- Exceptional Stability Over Temp. at -40 to +85°C
- Low Cost-Compact QFN Plastic Packaging
- Supply Voltage options: 1.8V, 2.5V, 2.8V, 3.0V, 3.3V
- Standy-by function
- [REACH/RoHS II Compliant | MSL Level 1](#)

Typical Applications

- CCD Clock for VTR Camera
- Equipment Connected to PCs
- Low Profile Equipment
- Computers and Peripherals
- Portable Electronics
- Consumer Electronics
- Vibrant, Shock-Prone & Humid Environments for Industrial Equipment

Key Electrical Specifications

| Parameters | Min. | Typ. | Max. | Units | Notes |
|---|----------------------------------|------------|------|---------------|---------------------------------------|
| Range Frequency: | 1.0 | | 150 | MHz | |
| Operating Temperature: | 0 | | +70 | °C | See options |
| Storage Temperature: | -55 | | +150 | °C | |
| Overall Frequency Stability <small>[Note 1]</small> | -50 | | +50 | ppm | See options |
| Supply Voltage (Vdd): | +1.8V, 2.5V, 2.8V, 3.0V, or 3.3V | | | V | See options |
| Supply Current (no load): | 1.0 to 39.9999 MHz | | 7 | 15 | Vdd=3.3V No load RL=∞ T=25°C |
| | 4.0 to 79.9999 MHz | | 8 | 15 | |
| | 80.0 to 124.9999 MHz | | 9 | 15 | |
| | 125.0 to 150 MHz | | 10 | 15 | |
| Output Voltage: | V_{OH} | 0.8^*V_d | | | 15pF |
| | V_{OL} | | | 0.2^*V_{dd} | |
| Rise Time: Fall Time: | Tr | | 1.3 | 3.0 | 15pF; T=25°C 20%/80% VDD |
| | Tf | | 1.3 | 3.0 | |
| Output Load: | 15pF max / 10kΩ min. | | | pF | |
| Symmetry: | 45 | | 55 | % | @1/2Vdd |
| Startup Time: | | 1.5 | 3.0 | ms | |

Key Electrical Specifications

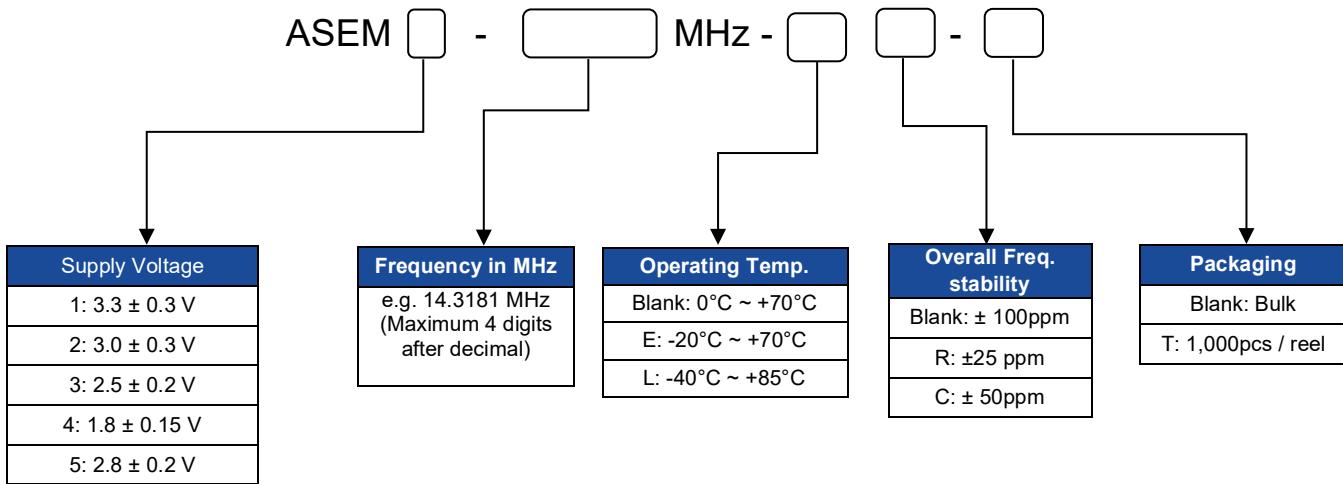
| Parameters | Min. | Typ. | Max. | Units | Notes |
|---------------------------------|---|------|------|-------|------------------|
| Disable Time: | | 20 | 100 | ns | |
| Disable Stand-by Current: | | | 15 | uA | |
| Tri-state Function (Stand-by) : | "1" ($VIH \geq 0.75 * Vdd$) or Open: Oscillation | | | V | |
| | "0" ($VIL < 0.25 * Vdd$) : Hi Z | | | | |
| Cycle to cycle jitter: | | 60 | | ps | F=100MHz |
| Aging: | -5.0 | | +5.0 | ppm | First year @25°C |

Note 1: Includes post reflow frequency accuracy, temperature stability, load pulling and power supply variation.

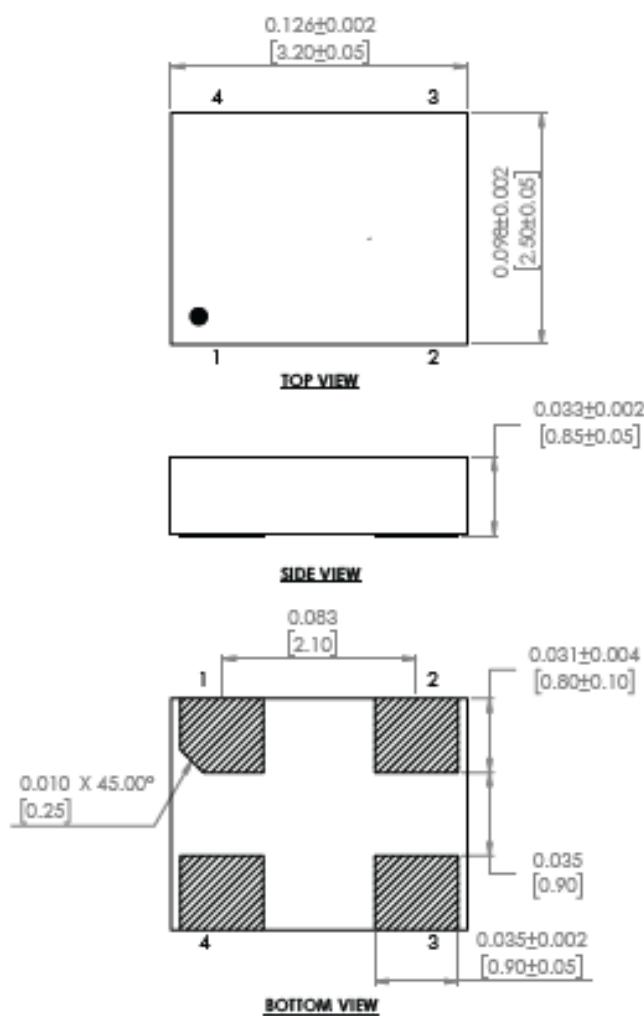
Absolute Maximum Ratings

| Item | Min. | Max. | Units |
|-----------------|------|-------------|-------|
| 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 |
| ESD | | | |
| HBM | | 2,000 | |
| MM | | 200 | |
| CDM | | 500 | V |

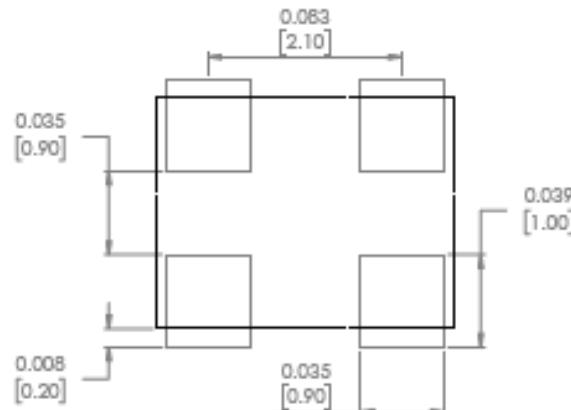
Options and Part Identification



Mechanical Dimensions



Recommended Land Pattern



| Pin# | Function |
|------|----------|
| 1 | Standby |
| 2 | GND |
| 3 | Output |
| 4 | Vdd |

Note: Recommend using 0.01uf bypass capacitor between PIN 2 and 4.

Dimensions: Inches[mm]

Reflow Profile [JEDEC J-STD-020]

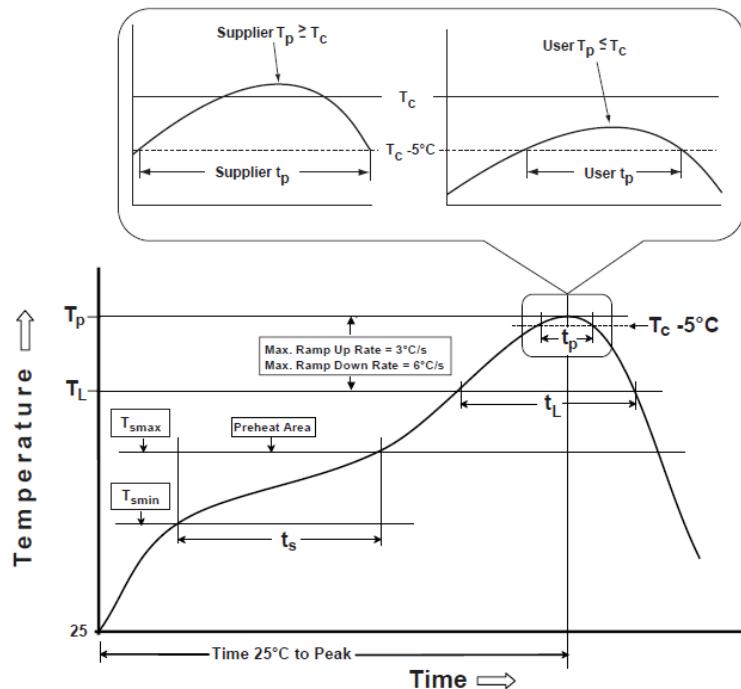


Table 1

**SnPb Eutectic Process
Classification Temperatures (T_c)**

| Package Thickness | Volume mm ³ <350 | Volume mm ³ ≥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 mm ³ <350 | Volume mm ³ 350-2000 | Volume mm ³ >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 |

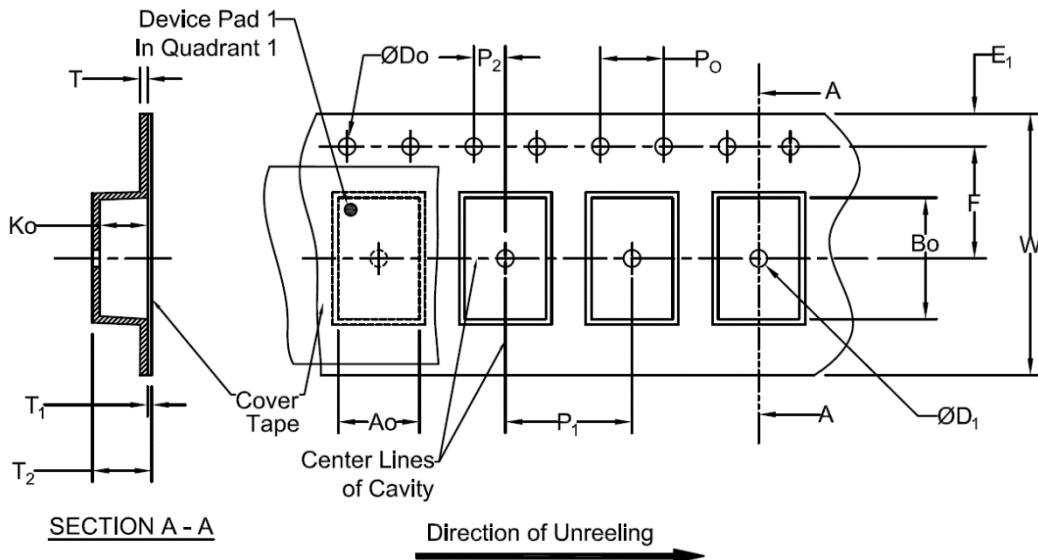
| Profile Feature | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|---|-------------------------|------------------|
| Preheat / soak | | |
| Temperature minimum (T_{smin}) | 100°C | 150°C |
| Temperature maximum (T_{smax}) | 150°C | 200°C |
| Time (T_{smin} to T_{smax}) (t_s) | 60 - 120 sec. | 60 - 120 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.

Packaging

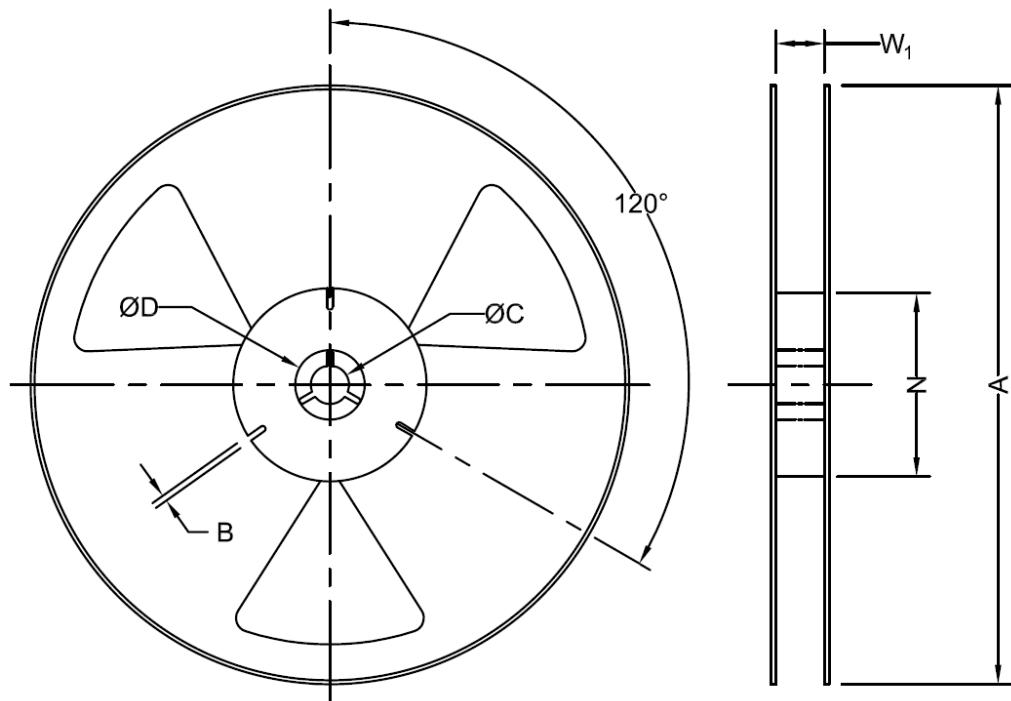
T: 1,000pcs/reel (D=180mm)



| Tape Specifications (mm) | | | | | | | |
|--------------------------|----------------|----------------|----------------|----------------------|----------------------|----------------------|----------------|
| Width | Ao | Bo | Do | D ₁ (Min) | E ₁ | F | K _o |
| 12mm | * | * | 1.5+0.1/-0.0 | 1.0 | 1.75±0.1 | 5.5±0.05 | * |
| Width | P ₁ | P ₂ | P ₀ | T (Max) | T ₁ (Max) | T ₂ (Max) | W (Max) |
| 12mm | 4.0±0.1 | 2.0±0.05 | 4.0±0.1 | 0.6 | 0.1 | 6.5 | 12.3 |

*Note: Compliant to EIA-481

Dimensions: mm



| Reel Specifications (mm) | | | | | | | |
|--------------------------|----------|------------|------------|---------------|------------|------------|-----------------|
| Width | Qty/Reel | A (Nom) | B (Min) | C (Min) | D (Min) | N (Min) | *W ₁ |
| 12mm | 1000 | 178 | 1.5 | 13.0+0.5/-0.2 | 20.2 | 50 | 12.4+2.0/-0.0 |

***Note: Measured at Hub**

Dimensions: mm