

ECN/PCN No.: 4117

| For Manufacturer   |   |  |  |
|--|---|--|--|
| <b>Product Description:</b><br>PLASTIC SMD MEMS OSCILLATOR   | <b>Abracon Part Number / Part Series:</b><br>ASTMUPC  | <input type="checkbox"/> Documentation only<br><input type="checkbox"/> ECN<br><input checked="" type="checkbox"/> EOL | <input checked="" type="checkbox"/> Series<br><input type="checkbox"/> Part Number |
| <b>Affected Revision:</b><br>I.R.  | <b>New Revision:</b><br>EOL   | <b>Application:</b>  | <input type="checkbox"/> Safety<br><input checked="" type="checkbox"/> Non-Safety  |
| <b>Prior to Change:</b><br>Active<br><a href="https://abracon.com/Oscillators/ASTMUPC.pdf">https://abracon.com/Oscillators/ASTMUPC.pdf</a>   |   |  |  |
| <b>After Change:</b><br>EOL  |   |  |  |
| <b>Cause/Reason for Change:</b><br>Discontinuation of manufacturing capability.  |   |  |  |
| Change Plan  |   |  |  |
| <b>Effective Date:</b><br>2/7/2022   | <b>Additional Remarks:</b><br>N/A   |  |  |
| <b>Change Declaration:</b><br>N/A  |   |  |  |
| <b>Issued Date:</b><br>2/7/2022  | <b>Issued By:</b><br><i>Brooke Cushman</i><br>Product Engineer  | <b>Issued Department:</b><br>Engineering   |  |
| <b>Approval:</b><br><i>Thomas Culhane</i><br>Engineering Director  | <b>Approval:</b><br><i>Reuben Quintanilla</i><br>Quality Director   | <b>Approval:</b><br><i>Ying Huang</i><br>Purchasing Director   |  |
| For Abracon EOL only   |   |  |  |
| <b>Last Time Buy (if applicable):</b><br>5/7/2022  | <b>Alternate Part Number / Part Series:</b><br>ASDDV (2.5x2.0mm), ASEDV (3.2x2.5mm), ASFLDV (5.0x3.2mm),<br>ASVDV (7.0x5.0mm) |  |  |
| <b>Additional Approval:</b>  | <b>Additional Approval:</b>   | <b>Additional Approval:</b>  |  |
| Customer Approval (If Applicable)  |   |  |  |
| <b>Qualification Status:</b><br><input type="checkbox"/> Approved <input type="checkbox"/> Not accepted<br><i>Note: It is considered approved if there is no feedback from the customer 1 month after ECN/PCN is released.</i> |   |  |  |
| <b>Customer Part Number:</b>   |   | <b>Customer Project:</b>   |  |
| <b>Company Name:</b>   | <b>Company Representative:</b>  | <b>Representative Signature:</b>   |  |
| <b>Customer Remarks:</b>   |   |  |  |

# High Performance, Programmable LVCMOS SMD MEMS Oscillator



ASTMUPC



RoHS/RoHS II compliant

2.7 x 2.4 x 0.75mm; 3.2 x 2.5 x 0.75mm;  
5.0 x 3.2 x 0.75mm; 7.0 x 5.0 x 0.9mm

## Moisture Sensitivity Level (MSL) – 1

### FEATURES:

- Industry Standard package sizes: 2.7 x 2.4 x 0.75mm (compatible with 2520 package footprint), 3.2 x 2.5 x 0.75mm, 5 x 3.2 x 0.75mm, 7.0 x 5.0 x 0.9mm
- Any frequency between 1MHz and 220MHz
- Supply Voltage options: 3.3V, 2.8V, 2.5V, 1.8V
- Ultra-low RMS phase jitter: 0.5ps typ. (@156.25MHz, integration bandwidth: 12kHz to 20MHz)
- Frequency Stability options: ±10ppm, ±20ppm, ±25ppm, ±50ppm over -20 to +70°C and -40 to +85°C
- Factory programmable drive strength (for 1MHz ~80MHz) for improved jitter, reduced EMI or higher capacitive output load

### APPLICATIONS:

- Ethernet, SATA, SAS, PCI Express
- WiFi
- Video
- Computing
- Storage
- Networking
- Telecom
- Industrial control
- Harsh environment (vibration, shock-prone and humid)

### STANDARD SPECIFICATIONS:

All electrical specifications in this table are specified with 15pF output load and for all  $V_{dd}$  options unless otherwise stated.

| Parameters                                |                      | Min  | Typ | Max  | Unit | Notes   |
|---|----------------------|------|-----|------|------|---|
| Output Frequency Range (F)                |                      | 1    |     | 220  | MHz  |   |
| Frequency Stability ( $F_{stab}$ )        |                      | -10  |     | +10  | ppm  | Inclusive of initial tolerance at 25°C, and variations over operating temperature, rated power supply voltage and load (15pF±10%) |
|   |                      | -20  |     | +20  |      |   |
|   |                      | -25  |     | +25  |      |   |
|   |                      | -50  |     | +50  |      |   |
| Operating Temperature Range ( $T_{use}$ ) |                      | -20  |     | +70  | °C   | Option "E"  |
|   |                      | -40  |     | +85  |      | Option "L"  |
| Aging@25°C                                | 1 <sup>st</sup> year | -1.5 |     | +1.5 | ppm  |   |
|   | 10 years             | -5   |     | +5   |      |   |
| Supply Voltage ( $V_{dd}$ )               |                      | 1.71 | 1.8 | 1.89 | V    | Option "18"   |
|   |                      | 2.25 | 2.5 | 2.75 |      | Option "25"   |
|   |                      | 2.52 | 2.8 | 3.08 |      | Option "28"   |
|   |                      | 2.97 | 3.3 | 3.63 |      | Option "33"   |
| Current Consumption ( $I_{dd}$ )          |                      |      | 31  | 33   | mA   | No load, F=20MHz, $V_{dd}$ =2.5V, 2.8V, 3.3V  |
|   |                      |      | 29  | 31   |      | No load, F=20MHz, $V_{dd}$ =1.8V  |
|   |                      |      | 34  | 36   |      | No load, F=100MHz, $V_{dd}$ =2.5V, 2.8V, 3.3V   |
|   |                      |      | 30  | 33   |      | No load, F=100MHz, $V_{dd}$ =1.8V   |
| OE Disable Current ( $I_{OD}$ )           |                      |      |     | 31   | mA   | $V_{dd}$ =2.5V, 2.8V, 3.3V, OE=GND, output is weakly pulled down  |
|   |                      |      |     | 30   |      | $V_{dd}$ =1.8V, OE=GND, output is weakly pulled down  |
| Standby Current ( $I_{std}$ )             |                      |      |     | 70   | µA   | $V_{dd}$ =2.5V, 2.8V, 3.3V, $\overline{ST}$ =GND, output is weakly pulled down  |
|   |                      |      |     | 10   |      | $V_{dd}$ =1.8V, $\overline{ST}$ =GND, output is weakly pulled down  |
| Startup Time ( $T_{start}$ )              |                      |      | 7   | 10   | ms   | Measured from the time $V_{dd}$ reaches its rated minimum value   |
| OE Enable/Disable Time ( $T_{oe}$ )       |                      |      |     | 150  | ns   | F=80MHz. For other frequencies, $T_{oe}$ =100ns+3*cycles  |
|   |                      |      |     | 115  |      | F=220MHz. For other frequencies, $T_{oe}$ =100ns+3*cycles   |
| Resume Time ( $T_{resume}$ )              |                      |      | 6   | 10   | ms   | In standby mode. Measured from the time $\overline{ST}$ pin crosses 50% threshold   |

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5.0 x 3.2 x 0.75mm; 7.0 x 5.0 x 0.9mm

(Continued)

| Parameters  | Min                 | Typ | Max                 | Unit | Notes   |
|---|---------------------|-----|---------------------|------|---|
| Output Type                                       | LVCMOS              |     |                     |      |   |
| Duty Cycle  | 45                  |     | 55                  | %    | F≤165MHz. All V <sub>dd</sub> options                         |
|   | 40                  |     | 60                  |      | F>165MHz. All V <sub>dd</sub> options                         |
| Rise/Fall Time ( T <sub>r</sub> /T <sub>f</sub> ) |                     | 1.2 | 2                   | ns   | 15pF load, 10%-90%  |
| Output High Voltage (V <sub>OH</sub> )            | 90%*V <sub>dd</sub> |     |                     | V    | I <sub>OH</sub> =-6mA (V <sub>dd</sub> =3.3V, 2.8V, 2.5V)     |
|   |                     |     |                     |      | I <sub>OH</sub> =-3mA (V <sub>dd</sub> =1.8V)                 |
| Output Low Voltage (V <sub>OL</sub> )             |                     |     | 10%*V <sub>dd</sub> | V    | I <sub>OL</sub> =6mA (V <sub>dd</sub> =3.3V, 2.8V, 2.5V)      |
|   |                     |     |                     |      |   |
| Input High Voltage(V <sub>IH</sub> )              | 70%*V <sub>dd</sub> |     |                     | V    | Pin 1   |
| Input Low Voltage(V <sub>IL</sub> )               |                     |     | 30%*V <sub>dd</sub> | V    | Pin 1   |
| Input Pull-up Impedance ( Z <sub>in</sub> )       |                     | 100 | 250                 | kΩ   | Pin 1, OE logic high or logic low, $\overline{ST}$ logic high |
|   | 2                   |     |                     | MΩ   | Pin 1, $\overline{ST}$ logic low                              |
| RMS Period Jitter ( T <sub>jitt</sub> )           |                     | 1.5 | 2                   | ps   | F=75MHz, 156.25MHz, V <sub>dd</sub> =2.5V, 2.8V, 3.3V         |
|   |                     | 2   | 3                   |      | F=75MHz, 156.25MHz, V <sub>dd</sub> =1.8V                     |
| RMS Phase Jitter (random) ( T <sub>phj</sub> )    |                     | 0.5 | 1                   | ps   | F=10MHz, 156.25MHz, integration bandwidth=12kHz to 20MHz      |

## Absolute Maximum Ratings

Attempted operation outside the absolute maximum ratings may cause permanent damage to the part. Actual performance of the IC is only guaranteed within the operational specifications, not at absolute maximum ratings.

| Parameters  | Min. | Max. | Unit |
|---|------|------|------|
| Storage Temperature   | -65  | 150  | °C   |
| V <sub>DD</sub>   | -0.5 | 4    | V    |
| Electrostatic Discharge (HBM)   |      | 2000 | V    |
| Soldering Temperature<br>(follow standard Pb free soldering guidelines) |      | 260  | °C   |
| Junction Temperature  |      | 150  | °C   |

## Thermal Consideration

| Package                    | θJA, 4 Layer Board (°C/W) | θJA, 2 Layer Board (°C/W) | θJC, Bottom (°C/W) |
|----------------------------|---------------------------|---------------------------|--------------------|
| 7.0 x 5.0mm                | 191                       | 263                       | 30                 |
| 5.0 x 3.2mm                | 97                        | 199                       | 24                 |
| 3.2 x 2.5mm                | 109                       | 212                       | 27                 |
| 2.7 x 2.4mm <sup>(1)</sup> | 117                       | 222                       | 26                 |

Note : 1. The 2.7 x 2.4mm Package is compatible with 2.5 x 2.0mm footprint.

# High Performance, Programmable LVCMOS SMD MEMS Oscillator



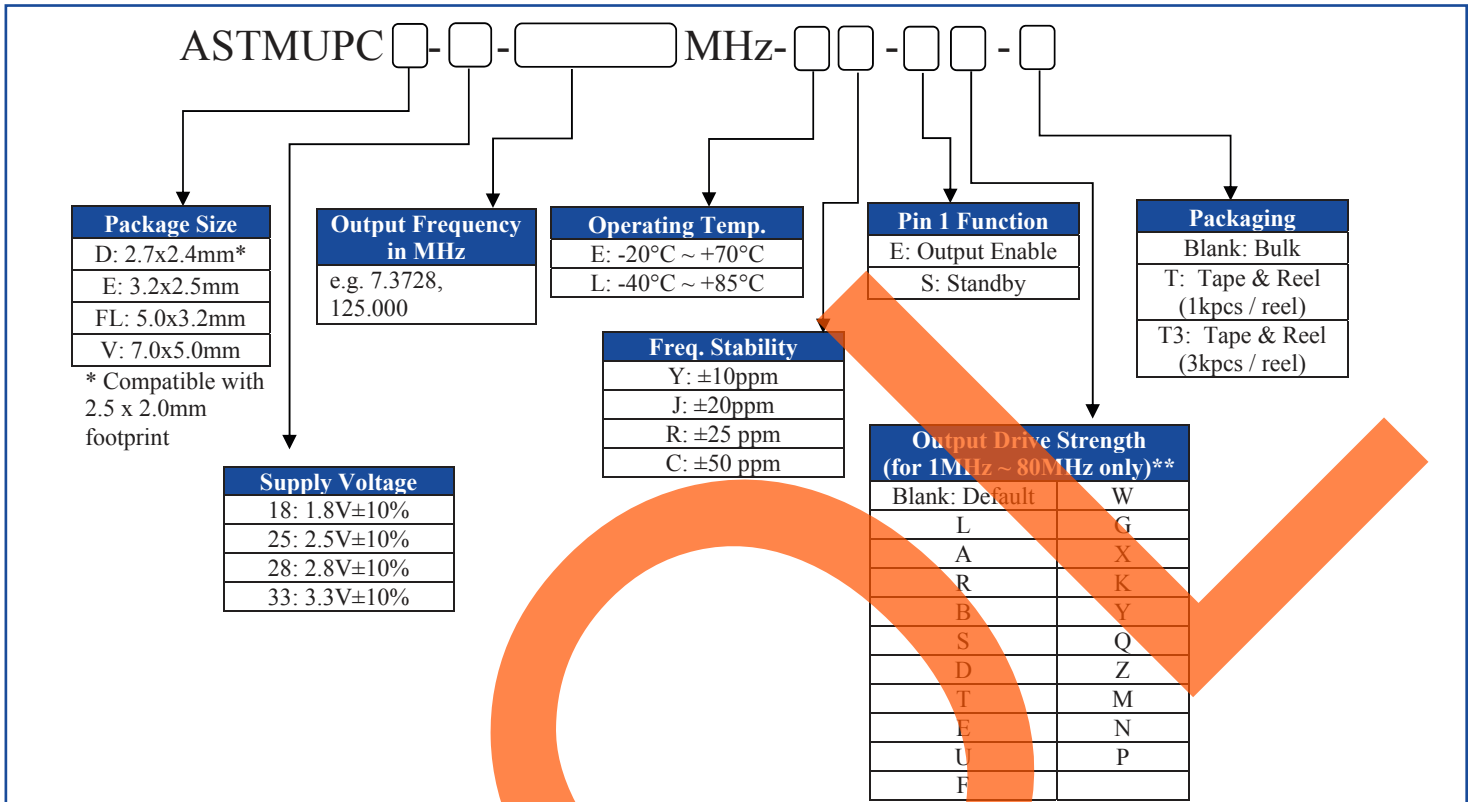
ASTMUPC



RoHS/RoHS II compliant

2.7 x 2.4 x 0.75mm; 3.2 x 2.5 x 0.75mm;  
5.0 x 3.2 x 0.75mm; 7.0 x 5.0 x 0.9mm

## PART IDENTIFICATION:



\*\* See Table 1 to 4 for the Rise/Fall times (10%~90%) at different drive strength and available options

Table 1:  $V_{dd}=1.8V$  Rise/Fall Times for Specific  $C_{LOAD}$

| Drive Strength Options | Rise/Fall Time Typ. (ns) |       |       |       |       |
|------------------------|--------------------------|-------|-------|-------|-------|
|                        | $C_{LOAD}$               |       |       |       |       |
|                        | 5pF                      | 15pF  | 30pF  | 45pF  | 60pF  |
| L                      | 12.45                    | 17.68 | 19.48 | 46.21 | 57.82 |
| A                      | 6.50                     | 10.27 | 16.21 | 23.92 | 30.73 |
| R                      | 4.38                     | 7.05  | 11.61 | 16.17 | 20.83 |
| B                      | 3.27                     | 5.30  | 8.89  | 12.18 | 15.75 |
| S                      | 2.62                     | 4.25  | 7.20  | 9.81  | 12.65 |
| D                      | 2.19                     | 3.52  | 6.00  | 8.31  | 10.59 |
| T                      | 1.76                     | 3.01  | 5.14  | 7.10  | 9.15  |
| E                      | 1.59                     | 2.59  | 4.49  | 6.25  | 7.98  |
| U                      | 1.49                     | 2.28  | 3.96  | 5.55  | 7.15  |
| F                      | 1.22                     | 2.10  | 3.57  | 5.00  | 6.46  |
| W                      | 1.07                     | 1.88  | 3.23  | 4.50  | 5.87  |
| G                      | 1.01                     | 1.64  | 2.95  | 4.12  | 5.40  |
| X                      | 0.96                     | 1.50  | 2.74  | 3.80  | 4.98  |
| K                      | 0.92                     | 1.41  | 2.56  | 3.52  | 4.64  |
| Y                      | 0.88                     | 1.34  | 2.39  | 3.25  | 4.32  |
| Q                      | 0.86                     | 1.29  | 2.24  | 3.04  | 4.06  |
| Z or Blank (default)   | 0.82                     | 1.24  | 2.07  | 2.89  | 3.82  |
| M                      | 0.77                     | 1.20  | 1.94  | 2.72  | 3.61  |
| N                      | 0.66                     | 1.15  | 1.84  | 2.58  | 3.41  |
| P                      | 0.51                     | 1.09  | 1.76  | 2.45  | 3.24  |

Table 2:  $V_{dd}=2.5V$  Rise/Fall Times for Specific  $C_{LOAD}$

| Drive Strength Options | Rise/Fall Time Typ. (ns) |       |       |       |       |
|------------------------|--------------------------|-------|-------|-------|-------|
|                        | $C_{LOAD}$               |       |       |       |       |
|                        | 5pF                      | 15pF  | 30pF  | 45pF  | 60pF  |
| L                      | 8.68                     | 13.59 | 18.36 | 32.70 | 42.06 |
| A                      | 4.42                     | 7.18  | 11.93 | 16.60 | 21.38 |
| R                      | 2.93                     | 4.78  | 8.15  | 11.19 | 14.59 |
| B                      | 2.21                     | 3.57  | 6.19  | 8.55  | 11.04 |
| S                      | 1.67                     | 2.87  | 4.94  | 6.85  | 8.80  |
| D                      | 1.50                     | 2.33  | 4.11  | 5.68  | 7.33  |
| T                      | 1.06                     | 2.04  | 3.50  | 4.84  | 6.26  |
| E                      | 0.98                     | 1.69  | 3.03  | 4.20  | 5.51  |
| U                      | 0.93                     | 1.48  | 2.69  | 3.73  | 4.92  |
| F                      | 0.90                     | 1.37  | 2.44  | 3.34  | 4.42  |
| W                      | 0.87                     | 1.29  | 2.21  | 3.04  | 4.02  |
| G or Blank (default)   | 0.67                     | 1.20  | 2.00  | 2.79  | 3.69  |
| X                      | 0.44                     | 1.10  | 1.86  | 2.56  | 3.43  |
| K                      | 0.38                     | 0.99  | 1.76  | 2.37  | 3.18  |
| Y                      | 0.36                     | 0.83  | 1.66  | 2.20  | 2.98  |
| Q                      | 0.34                     | 0.71  | 1.58  | 2.07  | 2.80  |
| Z                      | 0.33                     | 0.65  | 1.51  | 1.95  | 2.65  |
| M                      | 0.32                     | 0.62  | 1.44  | 1.85  | 2.50  |
| N                      | 0.31                     | 0.59  | 1.37  | 1.77  | 2.39  |
| P                      | 0.30                     | 0.57  | 1.29  | 1.70  | 2.28  |

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2.7 x 2.4 x 0.75mm; 3.2 x 2.5 x 0.75mm;  
5.0 x 3.2 x 0.75mm; 7.0 x 5.0 x 0.9mm

## PART IDENTIFICATION:

**Table 3: V<sub>dd</sub>=2.8V Rise/Fall Times for Specific C<sub>LOAD</sub>**

| Drive Strength Options | Rise/Fall Time Typ. (ns) |       |       |       |       |
|------------------------|--------------------------|-------|-------|-------|-------|
|                        | C <sub>LOAD</sub>        |       |       |       |       |
|                        | 5pF                      | 15pF  | 30pF  | 45pF  | 60pF  |
| L                      | 7.93                     | 12.69 | 17.94 | 30.10 | 38.89 |
| A                      | 4.06                     | 6.66  | 11.04 | 15.31 | 19.80 |
| R                      | 2.68                     | 4.40  | 7.53  | 10.29 | 13.37 |
| B                      | 2.00                     | 3.25  | 5.66  | 7.84  | 10.11 |
| S                      | 1.59                     | 2.57  | 4.54  | 6.27  | 8.07  |
| D                      | 1.19                     | 2.14  | 3.76  | 5.21  | 6.72  |
| T                      | 1.00                     | 1.79  | 3.20  | 4.43  | 5.77  |
| E                      | 0.94                     | 1.51  | 2.78  | 3.84  | 5.06  |
| U                      | 0.90                     | 1.38  | 2.48  | 3.40  | 4.50  |
| F                      | 0.87                     | 1.29  | 2.21  | 3.03  | 4.05  |
| W                      | 0.62                     | 1.19  | 1.99  | 2.76  | 3.68  |
| G or Blank (default)   | 0.41                     | 1.08  | 1.84  | 2.52  | 3.36  |
| X                      | 0.37                     | 0.96  | 1.72  | 2.33  | 3.15  |
| K                      | 0.35                     | 0.78  | 1.63  | 2.15  | 2.92  |
| Y                      | 0.33                     | 0.67  | 1.54  | 2.00  | 2.75  |
| Q                      | 0.32                     | 0.63  | 1.46  | 1.89  | 2.57  |
| Z                      | 0.31                     | 0.60  | 1.39  | 1.80  | 2.43  |
| M                      | 0.30                     | 0.57  | 1.31  | 1.72  | 2.30  |
| N                      | 0.30                     | 0.56  | 1.22  | 1.63  | 2.22  |
| P                      | 0.29                     | 0.54  | 1.13  | 1.55  | 2.13  |

**Table 4: V<sub>dd</sub>=3.3V Rise/Fall Times for Specific C<sub>LOAD</sub>**

| Drive Strength Options | Rise/Fall Time Typ. (ns) |       |       |       |       |
|------------------------|--------------------------|-------|-------|-------|-------|
|                        | C <sub>LOAD</sub>        |       |       |       |       |
|                        | 5pF                      | 15pF  | 30pF  | 45pF  | 60pF  |
| L                      | 7.18                     | 11.59 | 17.24 | 27.57 | 35.57 |
| A                      | 3.61                     | 6.02  | 10.19 | 13.98 | 18.10 |
| R                      | 2.31                     | 3.95  | 6.88  | 9.42  | 12.24 |
| B                      | 1.65                     | 2.92  | 5.12  | 7.10  | 9.17  |
| S                      | 1.43                     | 2.26  | 4.09  | 5.66  | 7.34  |
| D                      | 1.01                     | 1.91  | 3.38  | 4.69  | 6.14  |
| T                      | 0.94                     | 1.51  | 2.86  | 3.97  | 5.25  |
| E                      | 0.90                     | 1.36  | 2.50  | 3.46  | 4.58  |
| U                      | 0.86                     | 1.25  | 2.21  | 3.03  | 4.07  |
| F or Blank (default)   | 0.48                     | 1.15  | 1.95  | 2.72  | 3.65  |
| W                      | 0.38                     | 1.04  | 1.77  | 2.47  | 3.31  |
| G                      | 0.36                     | 0.87  | 1.66  | 2.23  | 3.03  |
| X                      | 0.34                     | 0.70  | 1.56  | 2.04  | 2.80  |
| K                      | 0.33                     | 0.63  | 1.48  | 1.89  | 2.61  |
| Y                      | 0.32                     | 0.60  | 1.40  | 1.79  | 2.43  |
| Q                      | 0.32                     | 0.58  | 1.31  | 1.69  | 2.28  |
| Z                      | 0.30                     | 0.56  | 1.22  | 1.62  | 2.17  |
| M                      | 0.30                     | 0.55  | 1.12  | 1.54  | 2.07  |
| N                      | 0.30                     | 0.54  | 1.02  | 1.47  | 1.97  |
| P                      | 0.29                     | 0.52  | 0.95  | 1.41  | 1.90  |

## CALCULATING MAXIMUM FREQUENCY

Based on the rise and fall time data given in Table 1 through 4, the maximum frequency the oscillator can operate with a guaranteed full swing of the output voltage over temperature is calculated as follows:

$$Max. Frequency = \frac{1}{6 \times T_{r/f}}$$

Example:

Calculate F<sub>max</sub> of a 1MHz ~ 80MHz device with the following condition:

- V<sub>dd</sub> = 1.8V (Table 1)
- Capacitive Load = 30pF
- Desired T<sub>r/f</sub> Time: = 3ns (rise/fall time option code "G")

The F<sub>max</sub> is 55.5000000MHz.

# High Performance, Programmable LVC MOS SMD MEMS Oscillator



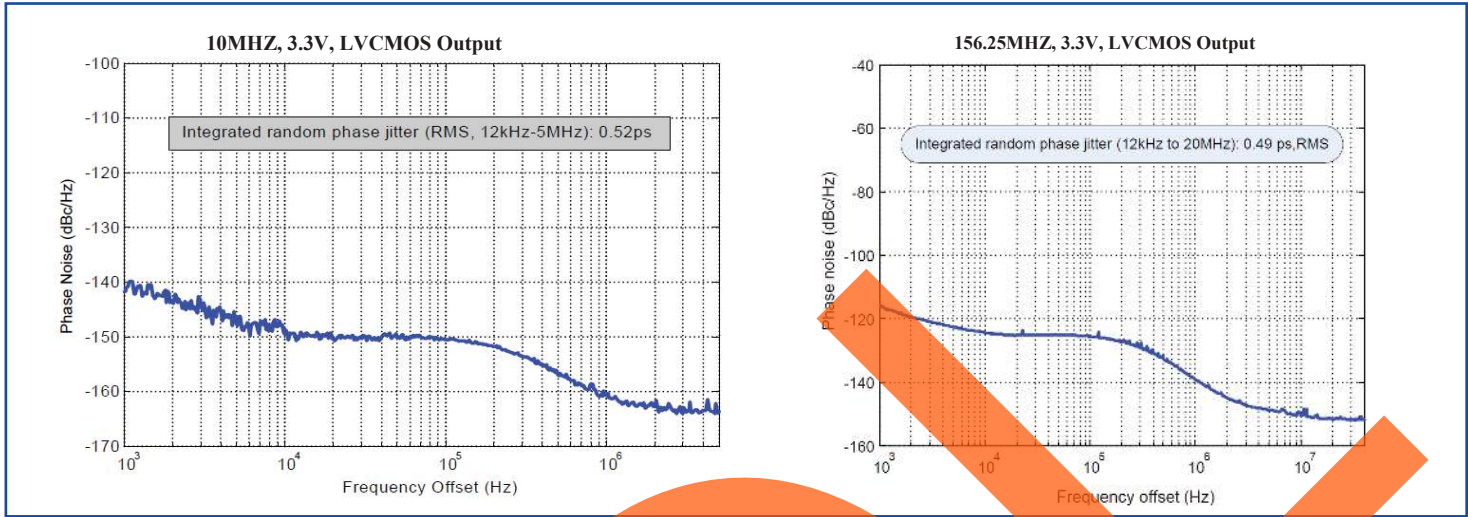
ASTMUPC



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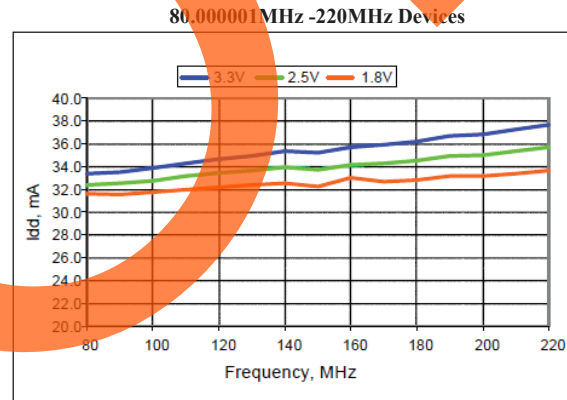
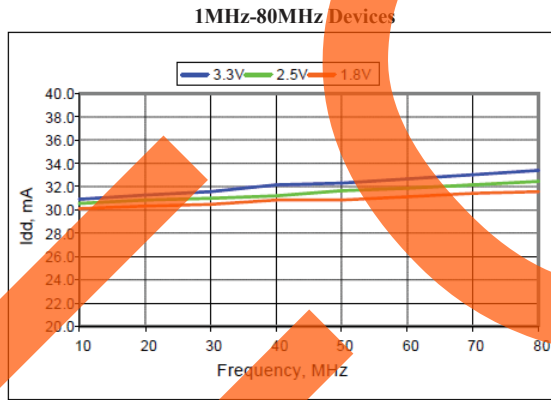
## TYPICAL PHASE NOISE



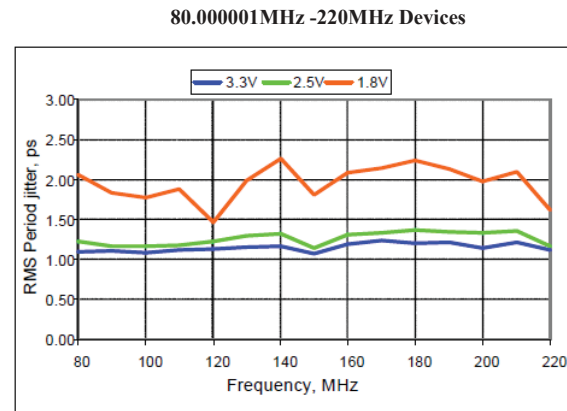
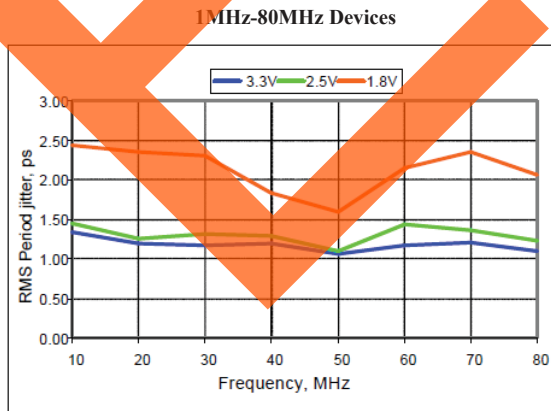
## TYPICAL PERFORMANCE DATA

All plots are measured with 15pF load at room temperature, unless otherwise stated.

### I<sub>DD</sub> vs. Frequency



### RMS Period Jitter vs. Frequency





# High Performance, Programmable LVCMOS SMD MEMS Oscillator



ASTMUPC



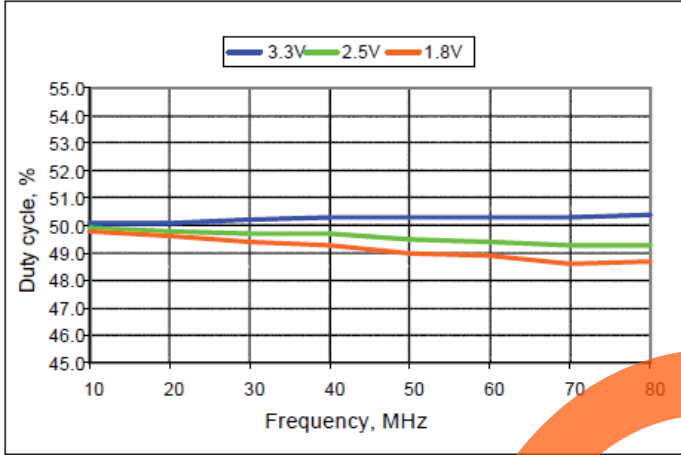
RoHS/RoHS II compliant

2.7 x 2.4 x 0.75mm; 3.2 x 2.5 x 0.75mm;  
5.0 x 3.2 x 0.75mm; 7.0 x 5.0 x 0.9mm

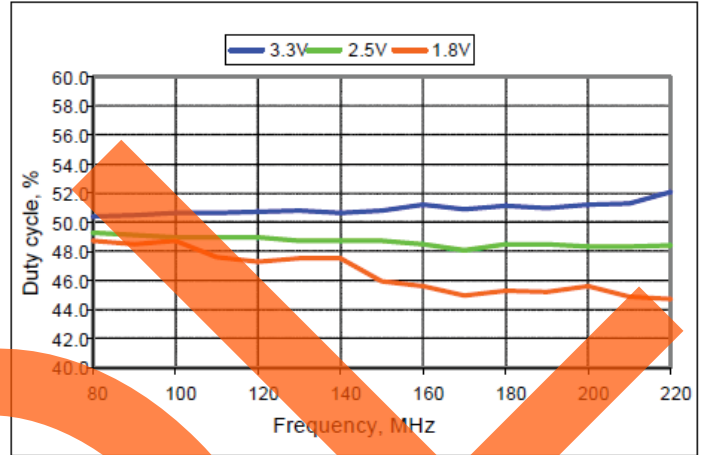
## TYPICAL PERFORMANCE DATA

### Duty Cycle vs. Frequency

1MHz-80MHz Devices

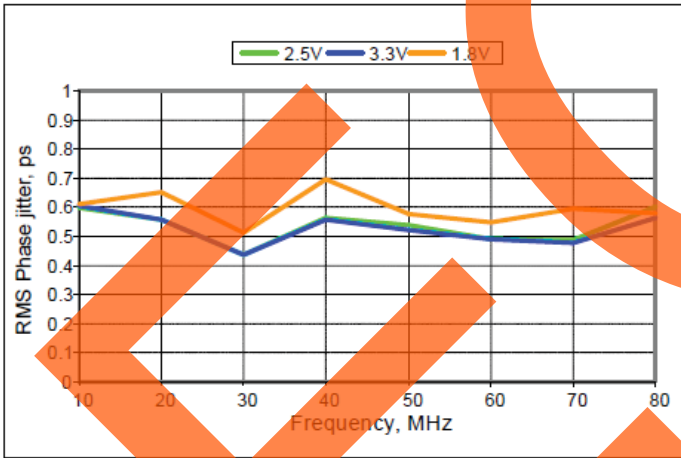


80.000001MHz -220MHz Devices

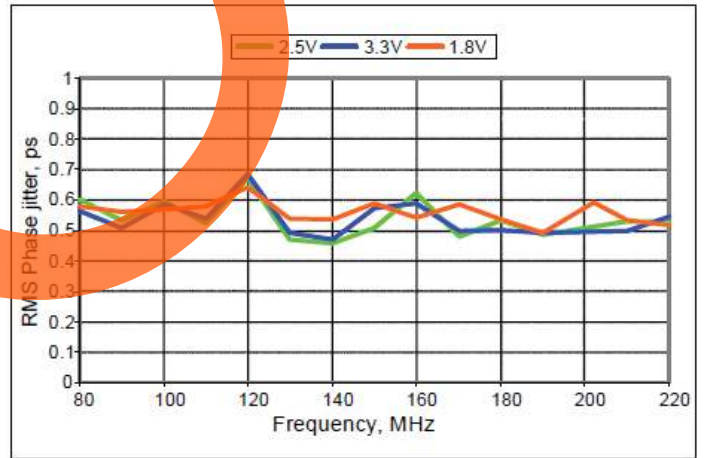


### RMS Phase Jitter vs. Frequency

1MHz-80MHz Devices



80.000001MHz -220MHz Devices





ASTMUPC



RoHS/RoHS II compliant

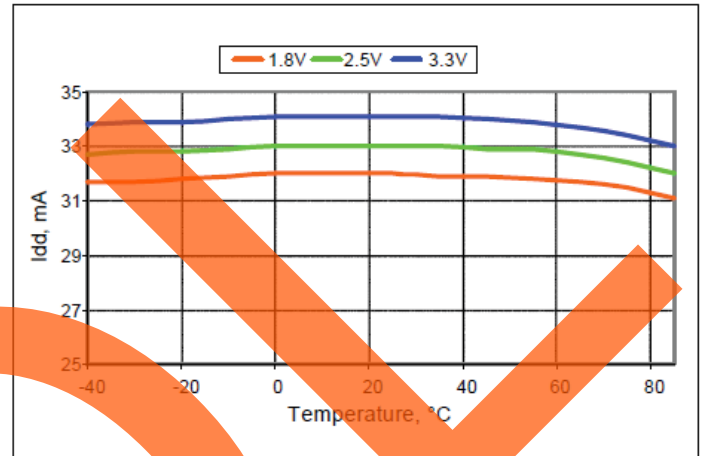
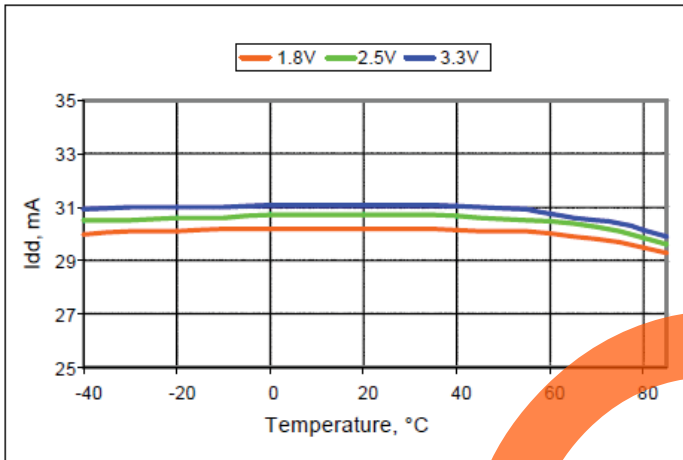
2.7 x 2.4 x 0.75mm; 3.2 x 2.5 x 0.75mm;  
5.0 x 3.2 x 0.75mm; 7.0 x 5.0 x 0.9mm

## TYPICAL PERFORMANCE DATA

### I<sub>DD</sub> vs. Temperature

10MHz Devices

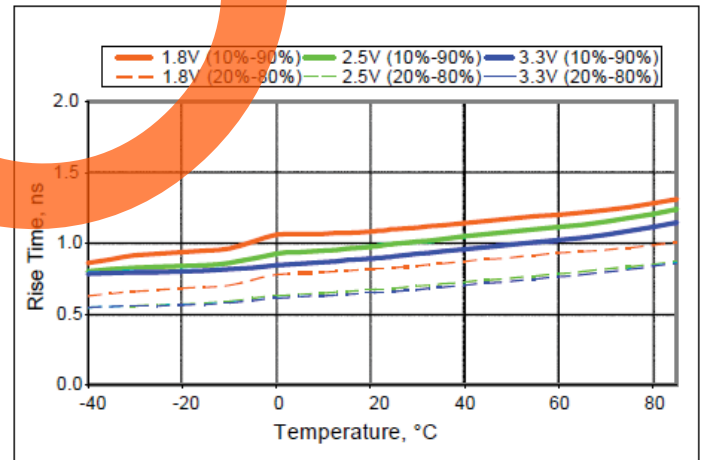
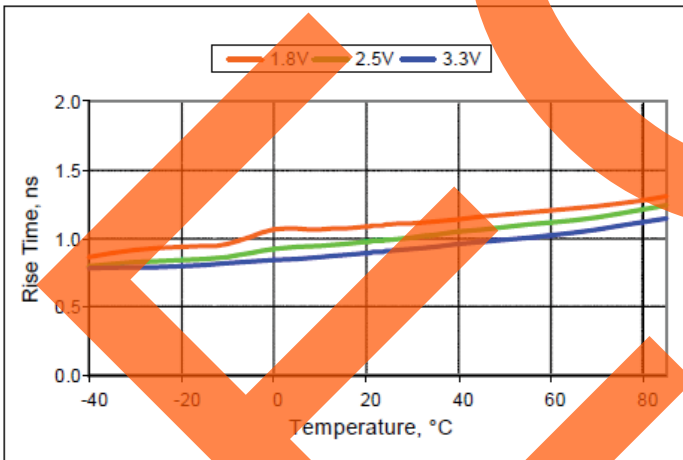
100MHz Devices



### Rise Time vs. Temperature

75MHz Devices

100MHz Devices





# High Performance, Programmable LVCMOS SMD MEMS Oscillator



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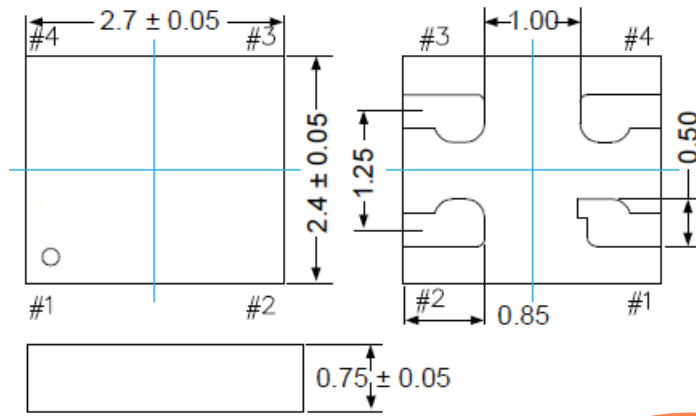


RoHS/RoHS II compliant

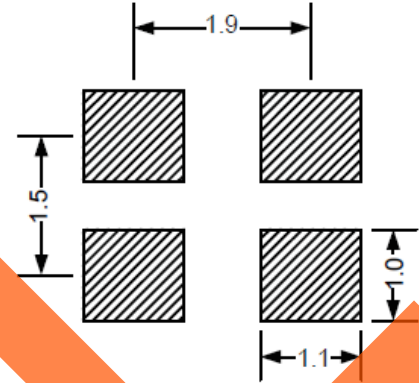
2.7 x 2.4 x 0.75mm; 3.2 x 2.5 x 0.75mm;  
5.0 x 3.2 x 0.75mm; 7.0 x 5.0 x 0.9mm

## OUTLINE DIMENSION:

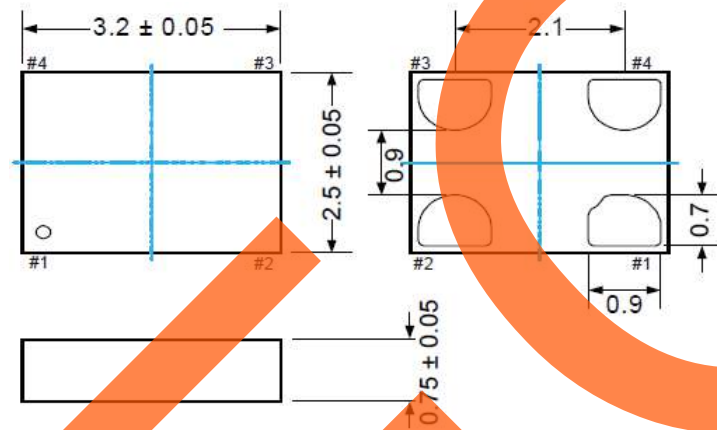
### 2.7 x 2.4mm Package (Option "D", compatible with 2.5 x 2.0mm footprint)



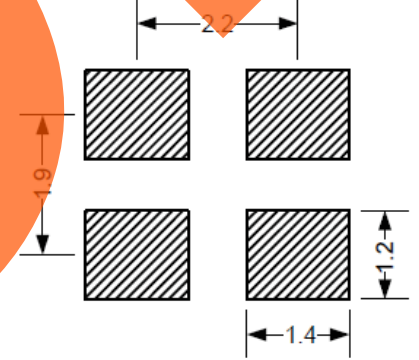
#### Recommended Land Pattern



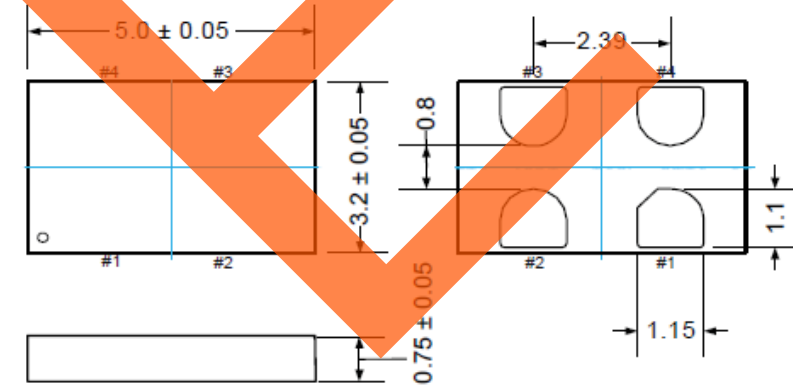
### 3.2 x 2.5mm Package (Option "E")



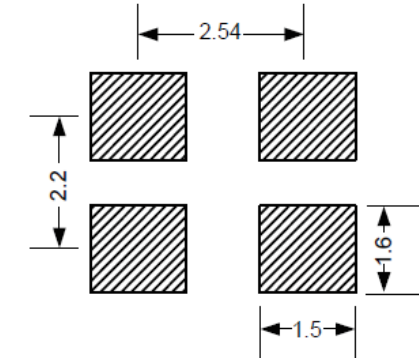
#### Recommended Land Pattern



### 5.0 x 3.2mm Package (Option "FL")



#### Recommended Land Pattern



Dimensions: mm

# High Performance, Programmable LVCMOS SMD MEMS Oscillator



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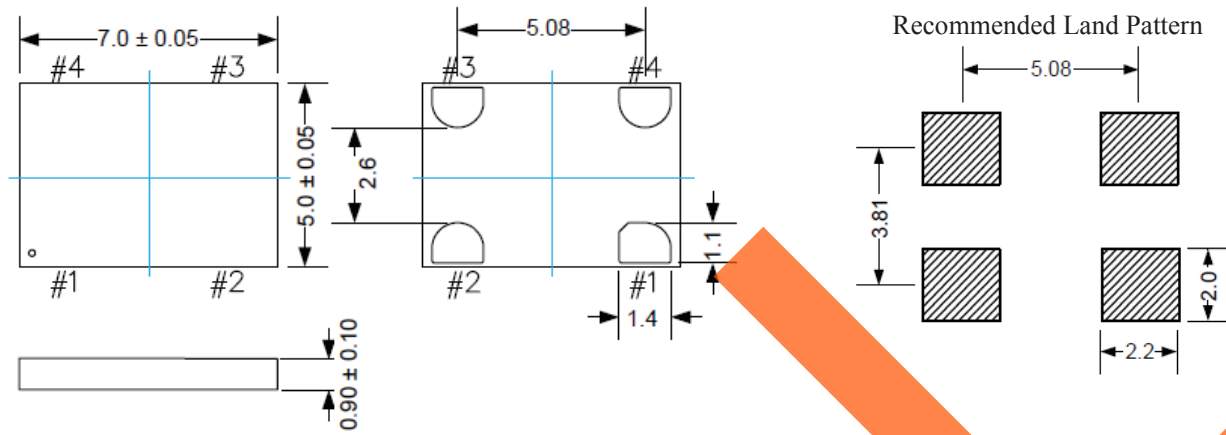


RoHS/RoHS II compliant

2.7 x 2.4 x 0.75mm; 3.2 x 2.5 x 0.75mm;  
5.0 x 3.2 x 0.75mm; 7.0 x 5.0 x 0.9mm

## OUTLINE DIMENSION:

7.0 x 5.0mm Package (Option "V")

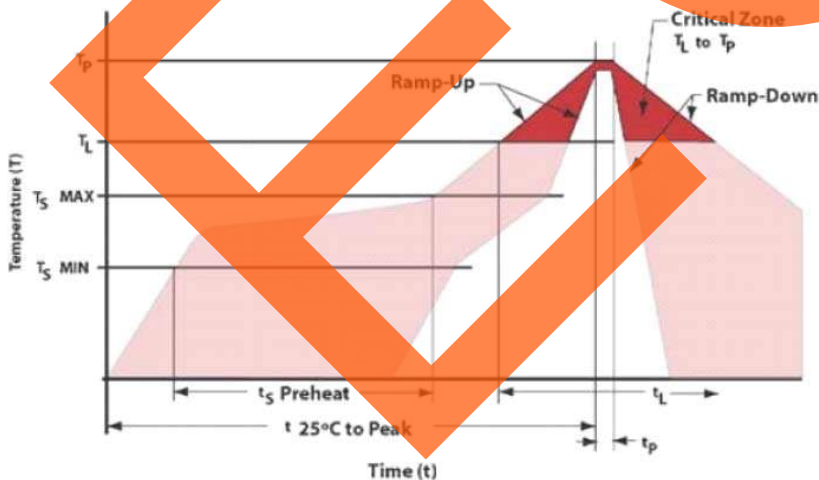


| Pin | Name            | Functionality   |
|-----|-----------------|---|
| 1   | Output Enable   | H or Open <sup>(1)</sup> : specified frequency output<br>L: output is high impedance. Only output driver is disabled  |
|     | Standby         | H or Open <sup>(1)</sup> : specified frequency output<br>L: output is low (weak pull down). Device goes to sleep mode. Supply current reduces to I <sub>std</sub> . |
| 2   | GND             | Power<br>Electrical ground <sup>(2)</sup>   |
| 3   | Out             | Output<br>Oscillator clock output   |
| 4   | V <sub>dd</sub> | Power<br>Power supply voltage <sup>(2)</sup>  |

Notes: 1. A pull-up resistor of <10kΩ between OE/ST pin and V<sub>dd</sub> is recommended in high noise environment.  
2. A capacitor value of 0.1μF between V<sub>dd</sub> and GND is recommended.

Dimensions: mm

## REFLOW PROFILE:



| Item  | Conditions       |
|---|------------------|
| T <sub>S</sub> MAX to T <sub>L</sub> (Ramp-up Rate) | 3°C/second max   |
| Preheat   |                  |
| Temperature Minimum (T <sub>S</sub> MIN)            | 150°C            |
| Temperature Typical (T <sub>S</sub> TYP)            | 175°C            |
| Temperature Maximum (T <sub>S</sub> MAX)            | 200°C            |
| Time (t <sub>S</sub> )                              | 60 – 180 seconds |
| Ramp-up Rate (T <sub>L</sub> to T <sub>p</sub> )    | 3°C/second max   |
| Time Maintained Above                               |                  |
| Temperature (T <sub>L</sub> )                       | 217°C            |
| Time (t <sub>L</sub> )                              | 60 – 150 seconds |
| Peak Temperature (T <sub>p</sub> )                  | 260°C max        |
| Target Peak Temperature (T <sub>p</sub> Target)     | 255°C            |
| Time within 5°C of actual peak (t <sub>p</sub> )    | 20 – 40 seconds  |
| Max. Number of Reflow Cycles                        | 3                |
| Ramp-down Rate                                      | 6°C/second max   |
| Time 25°C to Peak Temperature (t)                   | 8 minutes max    |

# High Performance, Programmable LVCMOS SMD MEMS Oscillator



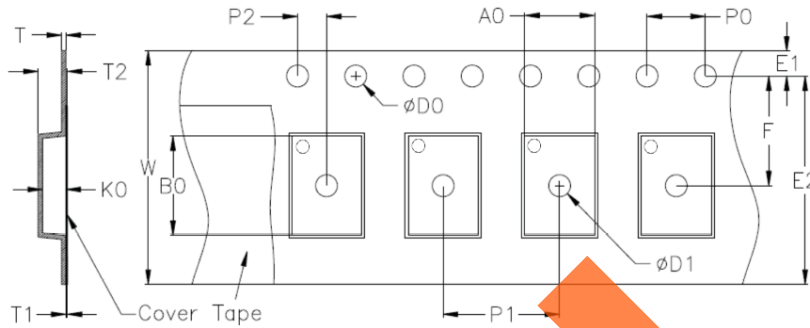
ASTMUPC



RoHS/RoHS II compliant

2.7 x 2.4 x 0.75mm; 3.2 x 2.5 x 0.75mm;  
5.0 x 3.2 x 0.75mm; 7.0 x 5.0 x 0.9mm

## TAPE & REEL:

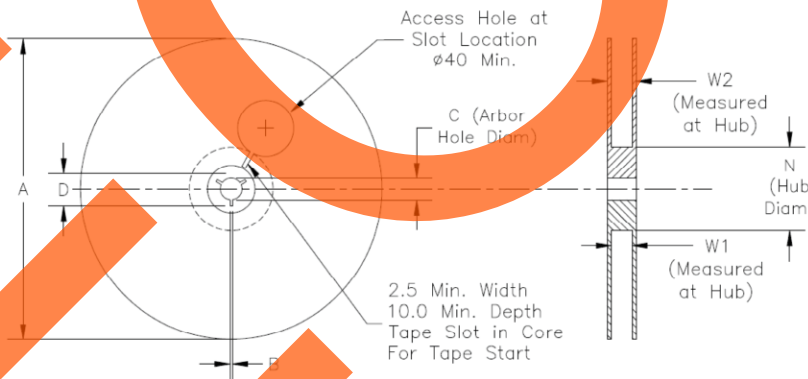


Unit: mm

| Device Size | D0           | D1 min. | E1       | E2 min. | F        | P0      | P1      | P2       |
|-------------|--------------|---------|----------|---------|----------|---------|---------|----------|
| 2724        | 1.55±0.05    | 1.0     | 1.75±0.1 | 9.85    | 5.5±0.05 | 4.0±0.1 | 4.0±0.1 | 2.0±0.05 |
| 3225        | 1.5+0.1/-0.0 | 1.5     | 1.75±0.1 | 10.25   | 5.5±0.05 | 4.0±0.1 | 4.0±0.1 | 2.0±0.05 |
| 5032        | 1.5+0.1/-0.0 | 1.5     | 1.75±0.1 | 10.25   | 5.5±0.05 | 4.0±0.1 | 8.0±0.1 | 2.0±0.05 |
| 7050        | 1.5+0.1/-0.0 | 1.5     | 1.75±0.1 | 14.25   | 7.5±0.1  | 4.0±0.1 | 8.0±0.1 | 2.0±0.1  |

Unit: mm

| Device Size | T        | T1 max. | T2 max. | W max. | A0        | B0        | K0        |
|-------------|----------|---------|---------|--------|-----------|-----------|-----------|
| 2724        | 0.3±0.05 | 0.1     | 1.55    | 12.3   | 2.65±0.10 | 2.95±0.10 | 1.00±0.10 |
| 3225        | 0.6      | 0.1     | 1.65    | 12.3   | 2.8±0.10  | 3.5±0.10  | 1.10±0.10 |
| 5032        | 0.6      | 0.1     | 1.65    | 12.3   | 3.5±0.10  | 5.3±0.10  | 1.10±0.10 |
| 7050        | 0.6      | 0.1     | 1.80    | 16.3   | 5.4±0.10  | 7.4±0.10  | 1.3±0.10  |



Unit: mm

| Tape Size | A max. | B min. | C        | D min. | N       | W1          | W2 max. |
|-----------|--------|--------|----------|--------|---------|-------------|---------|
| 12mm      | 180    | 1.5    | 13.0±0.2 | 20.2   | 60±0.5  | 12.4+2.0/-0 | 18.4    |
|           | 330    | 1.5    | 13.0±0.2 | 20.2   | 100±0.5 | 12.4+2.0/-0 | 18.4    |
| 16mm      | 180    | 1.5    | 13.0±0.2 | 20.2   | 60±0.5  | 16.4+2.0/-0 | 22.4    |
|           | 330    | 1.5    | 13.0±0.2 | 20.2   | 100±0.5 | 16.4+2.0/-0 | 22.4    |

| Device Size | "T" (1k/reel) |         | "T3" (3k/reel) |          |
|-------------|---------------|---------|----------------|----------|
| 2724        | 12mm Tape     | 7" Reel | 12mm Tape      | 7" Reel  |
| 3225        | 12mm Tape     | 7" Reel | 12mm Tape      | 7" Reel  |
| 5032        | 12mm Tape     | 7" Reel | 12mm Tape      | 13" Reel |
| 7050        | 16mm Tape     | 7" Reel | 16mm Tape      | 13" Reel |

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