IoT OPTIMIZED LOW PROFILE QUARTZ CRYSTAL

ABM8W SERIES

FEATURES

- Optimized for energy saving wearables and IoT applications
- Plated at exceptionally low plating capacitance, as low as 4pF, with optimized ESR
- 0.75 mm max height ideally suited for height constrained designs
- Seam sealed for longterm reliability

APPLICATIONS

- Wearables
- Internet of Things (IoT)
- Bluetooth/Bluetooth Low Energy (BLE)
- Wireless modules
- Machine-to-machine (M2M) connectivity
- Ultra-low power MCU
- Near Field Communication (NFC)
- ISM Band

STANDARD SPECIFICATIONS

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Minimum</th>
<th>Typical</th>
<th>Maximum</th>
<th>Units</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>10.0000</td>
<td>54.0000</td>
<td>MHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation Mode</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Mode</td>
<td>Fundamental</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>-40</td>
<td>+125</td>
<td>°C</td>
<td></td>
<td>See options</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-55</td>
<td>+125</td>
<td>°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency Tolerance @ +25°C</td>
<td>-10</td>
<td>+10</td>
<td>ppm</td>
<td></td>
<td>See options</td>
</tr>
<tr>
<td>Frequency Stability over the Operating Temperature (ref. to +25°C)</td>
<td>-10</td>
<td>+10</td>
<td>ppm</td>
<td></td>
<td>See options</td>
</tr>
<tr>
<td>Equivalent series resistance (R1) (over -40°C to +125°C)</td>
<td>&lt; 100</td>
<td>200</td>
<td>Ω</td>
<td>10.0000 – 11.9999MHz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt; 60</td>
<td>100</td>
<td></td>
<td>12.0000 – 15.9999MHz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt; 40</td>
<td>70</td>
<td></td>
<td>16.0000 – 19.9999MHz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt; 25</td>
<td>50</td>
<td></td>
<td>20.0000 – 29.9999MHz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt; 20</td>
<td>40</td>
<td></td>
<td>30.0000 – 39.9999MHz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt; 18</td>
<td>30</td>
<td></td>
<td>40.0000 – 54.0000MHz</td>
<td></td>
</tr>
<tr>
<td>Shunt capacitance (C0)</td>
<td>&lt; 1.2</td>
<td>2.0</td>
<td>pF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load capacitance (CL)</td>
<td>4.0</td>
<td></td>
<td>pF</td>
<td></td>
<td>See options</td>
</tr>
<tr>
<td>Drive Level</td>
<td>10</td>
<td>100</td>
<td>μW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aging (1 year)</td>
<td>-2</td>
<td>+2</td>
<td>ppm</td>
<td>@ 25°C±3°C</td>
<td></td>
</tr>
<tr>
<td>Insulation Resistance</td>
<td>500</td>
<td></td>
<td>MΩ</td>
<td></td>
<td>@ 100Vdc ± 15V</td>
</tr>
</tbody>
</table>
# IoT Optimized Low Profile Quartz Crystal

## ABM8W Series

### Options and Part Identification (Note 1)

Note 1: Contact Abracon for part number requests with carrier frequency callouts up to 5&6 digit accuracy after the decimal.

### Frequency in MHz

- **Please specify the Frequency in MHz out to **4 digit** accuracy after the decimal. (e.g. 16.0000MHz)**

### Load Capacitance (pF)

- 8: 8pF
- 7: 7pF
- 6: 6pF
- 4: 4pF

### Custom ESR if other than standard

- R □: Specify a value in Ω (e.g.: R40)

### Operating Temp.

- I: 0°C ~ 50°C
- E: 0°C ~ +70°C
- B: -20°C ~ +70°C
- C: -30°C ~ +70°C
- N: -30°C ~ +85°C
- D: -40°C ~ +85°C
- J: -40°C ~ +105°C (*)
- K: -40°C ~ +125°C (*)

### Freq. Tolerance

- 1: ± 10 ppm
- 7: ± 15 ppm
- 2: ± 20 ppm
- 3: ± 25 ppm
- 4: ± 30 ppm
- 5: ± 50 ppm

### Freq. Stability

- U: ± 10 ppm (*)
- G: ± 15 ppm (**)
- X: ± 20 ppm (**)
- W: ± 25 ppm (**)
- Y: ± 30 ppm (**)
- H: ± 35 ppm (**)
- Z: ± 50 ppm
- Q: ± 100 ppm

### Packaging

- Blank: Bulk
- T3: 3kpcs / reel

(*) Only offered at Freq. Stability options: Z & Q.

Contact ABRACON for tighter Frequency Stability.

(**) Only offered at Operating Temp. Range options: I, E, B, C, N, & D

Contact ABRACON for wider Operating Temp. Range.
**IoT OPTIMIZED LOW PROFILE QUARTZ CRYSTAL**

**ABM8W SERIES**

3.2 x 2.5 x 0.75mm

RoHS/RoHS II Compliant

MSL = N/A: NOT APPLICABLE

**TYPICAL ESR (EQUIVALENT SERIES RESISTANCE) Vs. TEMPERATURE CHARACTERISTICS**

![Typical ESR (Equivalent Series Resistance) vs. Operating Temperature](image1)

**TYPICAL FREQUENCY Vs. TEMPERATURE CHARACTERISTICS**

![Typical Frequency Stability vs. Temperature](image2)

For terms and conditions of sales, please visit: www.abracon.com

5101 Hidden Creek Ln Spicewood TX 78669

Phone: 512-371-6159 | Fax: 512-351-8858

ABRACON IS ISO9001-2015 CERTIFIED

REVISED: 08.09.2018
TYPICAL FREQUENCY TOLERANCE DISTRIBUTION (AT 25°C ± 3°C)

Frequency Tolerance Distribution
100 samples
10.0000MHz-50.0000MHz

TYPICAL ESR DISTRIBUTION (AT 25°C ± 3°C)

ESR Distribution @ 10.0000MHz
100 samples
MAX ESR = 77.7 Ω

ESR Distribution @ 27.0000MHz
100 samples
MAX ESR = 21.6 Ω

ESR Distribution @ 50.0000MHz
100 samples
MAX ESR = 10.23 Ω
**IoT OPTIMIZED LOW PROFILE QUARTZ CRYSTAL**

**ABM8W SERIES**

**SPICE MODELS (BASED ON TYPICAL VALUES AT 25°C ± 3°C)**

- **Frequency: 10.0000MHz**
  - $C_0 = 0.88 \ \mu F$
  - $R_1 = 53.82 \ \Omega$
  - $L_1 = 162.02 \ \text{mH}$
  - $C_1 = 1.56 \ \mu F$

- **Frequency: 27.0000MHz**
  - $C_0 = 1.10 \ \mu F$
  - $R_1 = 11.83 \ \Omega$
  - $L_1 = 9.16 \ \text{mH}$
  - $C_1 = 3.80 \ \mu F$

- **Frequency: 50.0000MHz**
  - $C_0 = 1.15 \ \mu F$
  - $R_1 = 7.61 \ \Omega$
  - $L_1 = 2.45 \ \text{mH}$
  - $C_1 = 4.11 \ \mu F$

**MECHANICAL DIMENSIONS**

Note:
Due to material availability the Chamfer could be located on pin #1, 2 or 4. Be advised that the Chamfer location has no impact on the electrical performance of the device.
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ABM8W SERIES

REFLOW PROFILE

<table>
<thead>
<tr>
<th>Zone</th>
<th>Description</th>
<th>Temperature</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Preheat</td>
<td>$T_{\text{min}} - T_{\text{max}}$ 130°C – 180°C</td>
<td>60 – 120 sec.</td>
</tr>
<tr>
<td>2</td>
<td>Reflow</td>
<td>$T_L$ 217°C</td>
<td>45 – 90 sec.</td>
</tr>
<tr>
<td>3</td>
<td>Peak Heat</td>
<td>$T_P$ 260°C MAX</td>
<td>10 sec.</td>
</tr>
</tbody>
</table>

PACKAGING

T3: Tape and reel (3,000 pcs/reel)

DIMENSIONS: mm