



# QESM405

HC49 SMD 4 pins Crystal SERIES – Microprocessor Application  
*Specification (Rev-D)*

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|                                    |     |
|------------------------------------|-----|
| ▣ Electrical Characteristics ..... | P01 |
| ▣ Mechanical Characteristics ..... | P01 |
| ▣ Internal Connection .....        | P02 |
| ▣ ESR vs Frequency range .....     | P02 |
| ▣ Ordering Information .....       | P02 |
| ▣ Tape Drawing.....                | P03 |
| ▣ Reel Drawing .....               | P03 |

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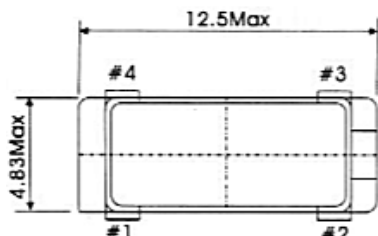
January 27<sup>th</sup>, 2006

### Electrical Characteristics

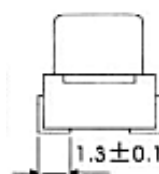
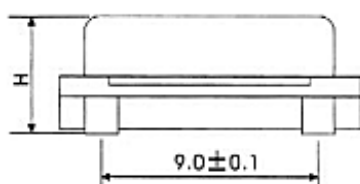
| Electrical Parameters                     | Unit  | Minimum               | Typical    | Maximum    | Test conditions               |
|---|-------|-----------------------|------------|------------|-------------------------------|
| Frequency range                           | MHz   | 3.579                 |            | 60         |                               |
| Frequency tolerance at 25°C               | ±ppm  | 10                    | 30         | 50         | Refer to Ordering Information |
| Frequency stability                       | ±ppm  | 10                    | 30         | 50         | Refer to Ordering Information |
| Operating temperature range (see table 1) | °C    |                       | -10 to +70 | -40 to +85 | Refer to Ordering Information |
| Storage temperature range                 | °C    | -40                   |            | +85        |                               |
| Shunt capacitance C0                      | pF    |                       |            | 7.0        |                               |
| Load capacitance                          | pF    | 10pF ~ 30pF or series |            |            | Refer to Ordering Information |
| Drive Level                               | µW    |                       | 100        | 500        |                               |
| Aging (First Year)                        | ± ppm |                       |            | 5          | Ref at 25°C                   |
| Insulation Resistance                     | MΩ    | 500                   |            |            | Ref at 100Vdc                 |

### Mechanical Characteristics

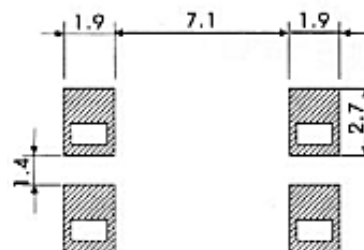
#### BOTTOM VIEW



Hmax = 4.2 mm



#### SUGGESTED PAD



#### Marking

|         |   |
|---------|---|
| QESM405 | A + Frequency in MHz<br>(6 digits on the top) |
| QESM406 | B + Frequency in MHz<br>(6 digits on the top) |
| QESM407 | C + Frequency in MHz<br>(6 digits on the top) |

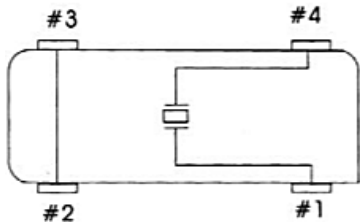
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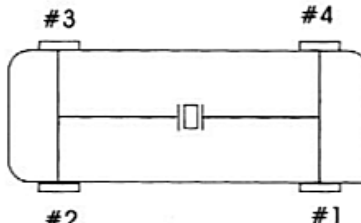
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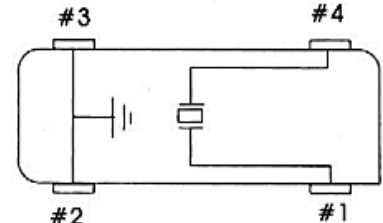
### Internal Connection



**QESM405**



**QESM406**



**QESM407**

### ESR vs Frequency range

**Table 1 : ESR vs frequency range**

| Frequency range (MHz) | Mode of vibration | Max. ESR (Ω) | Frequency range (MHz) | Mode of vibration    | Max. ESR (Ω) |
|-----------------------|-------------------|--------------|-----------------------|----------------------|--------------|
| 3.579 ~ 5.000         | Fund. / AT        | 150          | 9.001 ~ 10.000        | Fund. / AT           | 60           |
| 5.001 ~ 6.000         | Fund. / AT        | 120          | 10.001 ~ 13.000       | Fund. / AT           | 50           |
| 6.001 ~ 7.000         | Fund. / AT        | 100          | 13.001 ~ 30.000       | Fund. / AT           | 40           |
| 7.001 ~ 8.000         | Fund. / AT        | 90           | 30.000 ~ 60.000       | 3 <sup>rd</sup> / AT | 80           |
| 8.001 ~ 9.000         | Fund. / AT        | 80           |                       |                      |              |

### Ordering Information

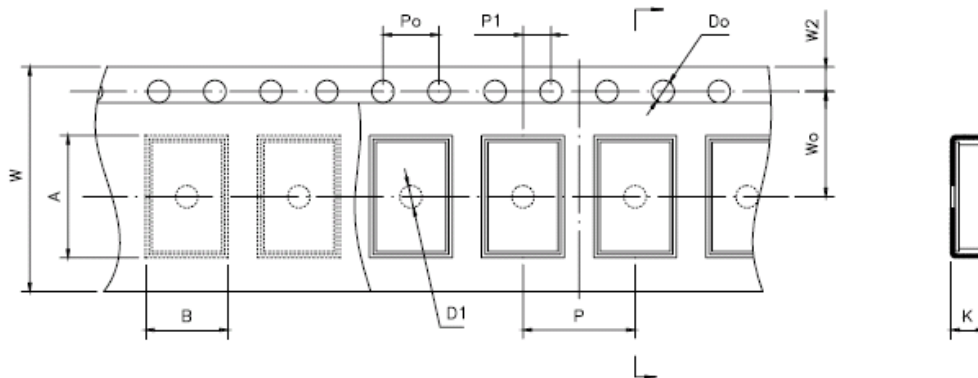
| Part numbering system  |                                     |  |   |  |  |                                    |
|--|-------------------------------------|--|---|--|--|------------------------------------|
| QESM405  | 1                                   | 30   | HQ  | 50   | 30   | 3.57954MHZ                         |
| Package type   | Vibration mode                      | Frequency tolerance                          | Operating temperature range   | Frequency stability                          | Load capacitance   | Nominal Frequency (MHz)            |
| <b>HC49 SMD 4 Pins Package</b><br><b>QESM405</b><br><b>QESM406</b><br><b>QESM407</b> | 1 : Fundamental<br>3 : 3rd Overtone | 10 : ± 10ppm<br>30 : ± 30ppm<br>50 : ± 50ppm | D : -40°C<br>F : -30°C<br>J : -10°C<br>L : 0°C<br>M : +50°C<br>N : +55°C<br>O : +60°C<br>Q : +70°C<br>T : +85°C | 10 : ± 10ppm<br>30 : ± 30ppm<br>50 : ± 50ppm | 00 : series<br>10 : 10pF<br>30 : 30pF<br><br>Please, enter the value of load capacitance | Please enter the nominal frequency |

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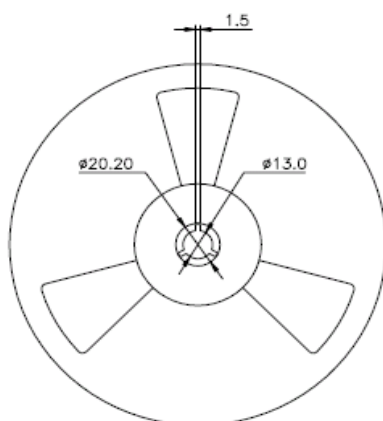
January 27<sup>th</sup>, 2006

## ▣ Tape Drawing



| Item  | Code | Dimension  | Tolerance |
|---|------|------------|-----------|
| Pitch of components                         | P    | 12.0       | ± 0.1     |
| Pitch of sprocket hole                      | Po   | 4.0        | ± 0.1     |
| Length from hole center to component center | P1   | 2.0        | ± 0.1     |
| Width of carrier tape                       | W    | 24.0       | ± 0.3     |
| Width of adhesive tape                      | W0   | 11.5       | ± 0.1     |
| Height of component hole                    | A    | 13.4       | ± 0.1     |
| Width of component hole                     | B    | 5.20       | ± 0.1     |
| Gap of hold down tape and carrier tape      | W2   | 1.75       | ± 0.1     |
| Diameter of sprocket hole                   | Do   | ∅ 1.55     | ± 0.05    |
| Diameter of feed hole                       | D1   | ∅ 2.0      | ± 0.2     |
| Total of tape thickness                     | K    | 5.2 or 4.3 | ± 0.1     |

## ▣ Reel Drawing



Multiple : 1Kpcs per Reel

Unit : mm

