FREQUENCY

TEMEXPRESS

QESM405

HC49 SMD 4 pins Crystal SERIES – Microprocessor Application

Specification (Rev-F)

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September 01st, 2017

Electrical Characteristics

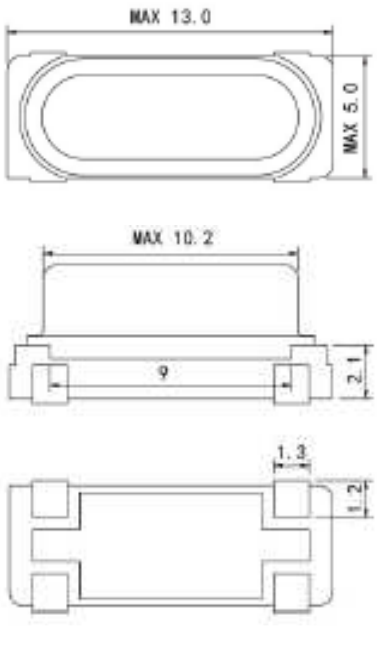
Electrical Parameters	Unit	Minimum	Typical	Maximum	Test conditions
Frequency range	MHz	3.5700		130.00	See Note 1
Frequency Tolerance (at 25°C)	±ppm	10	30	50	Refer to Ordering Information
Frequency stability	±ppm	10	30	50	Refer to Ordering Information
Operating temperature range	°C		-20/+70	-40/+85	Refer to Ordering Information
Storage temperature range	°C	-55		+125	
Shunt capacitance C_0	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

Note 1: For frequency below 10MHz (<10MHz), maximum height is 5.00mm max

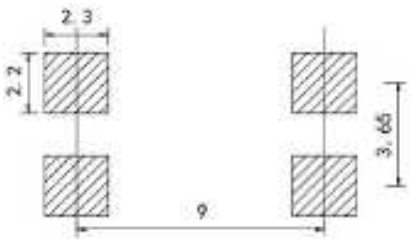
Note 2: QESM405 serie is compliant with RoHS Recast Directive (100/65/EU)

Mechanical Characteristics

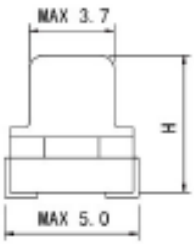
BOTTOM VIEW



SUGGESTED PAD



Hmax = 4.5 mm



Marking	
QESM405	A + Frequency in MHz (6 digits on the top)
QESM406	B + Frequency in MHz (6 digits on the top)

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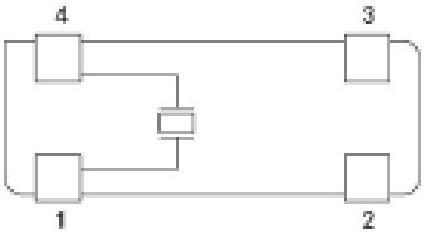
Internal Connection



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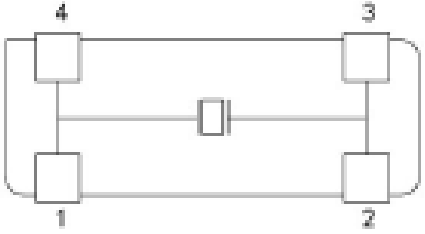

QESM406

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)
3.5700 ~ 3.999	Fund. / AT	150	10.000 ~ 13.999	Fund. / AT	50
4.000 ~ 4.999	Fund. / AT	120	14.000 ~ 19.999	Fund. / AT	40
5.000 ~ 5.999	Fund. / AT	100	20.000 ~ 23.999	Fund. / AT	30
6.000 ~ 6.999	Fund. / AT	80	24.000 ~ 34.999	3rd / AT	100
7.000 ~ 9.999	Fund. / AT	60	≥ 35.000	3rd / 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)**
HC49 SMD 4 Pins Package **QESM405** **QESM406**	1 : Fundamental 3 : 3rd Overtone	10 : ± 10ppm 30 : ± 30ppm 50 : ± 50ppm	D : -40°C H : -20°C J : -10°C L : 0°C M : +50°C O : +60°C Q : +70°C T : +85°C	10 : ± 10ppm 30 : ± 30ppm 50 : ± 50ppm	00 : series 10 : 10pF 30 : 30pF Please, enter the value of load capacitance	Please enter the nominal frequency

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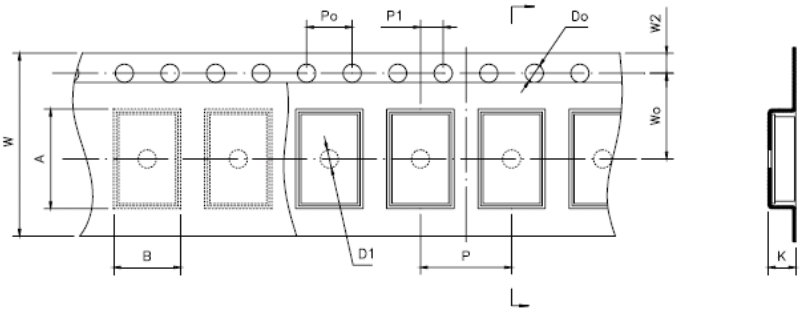
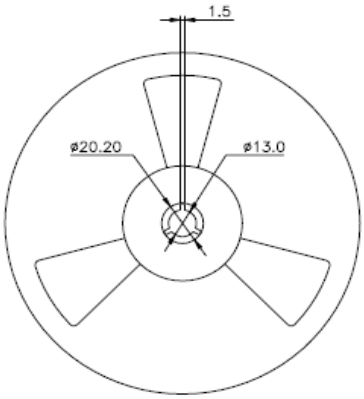
Tape Drawing



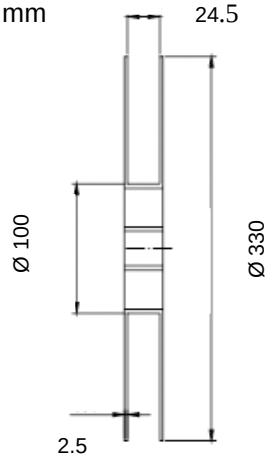
Item	Code	Dimension	Tolerance
Pitch of components	P	12.0	± 0.1
Pitch of sprocket hole	Po	4.0	± 0.1
Length from hole center to component center	P1	2.0	± 0.1
Width of carrier tape	W	24.0	± 0.3
Width of adhesive tape	W0	11.5	± 0.1
Height of component hole	A	13.4	± 0.1
Width of component hole	B	5.20	± 0.1
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

Multiple: 1Kpcs per Reel

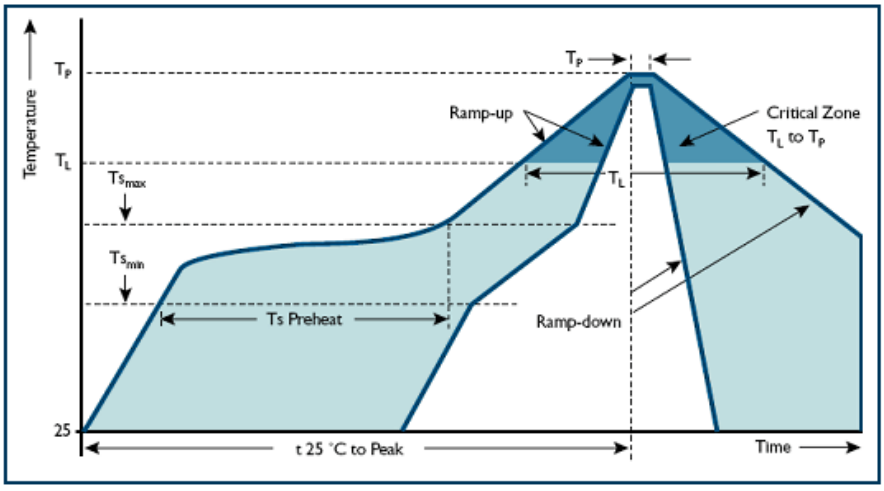
Reel Drawing



Unit : mm



Reflow Soldering Profile



Reference to JEDEC J-STD-020C

Profiles Feature	Pb-Free Assembly
Average Ramp-up Rate (TS max to Tp)	3°C/sec max
Preheat ▪ Temperature Min (T_S min) ▪ Temperature Max (T_S max) ▪ Time (ts min to ts max)	 125°C 200°C 60~180 sec
Time maintained abobe ▪ Temperature (T_L) ▪ Time (t_L)	 217°C 60~150 sec
Peak Temperature (Tp)	250°C
Time within 5°C of actual Peak Temperature (t_P)	20~40 sec
Ramp-down rate	6°C/sec max
Time 25°C to Peak Temperature	8 min max