QESM405

HC49, SMD (4 pins). Microprocessor application

Frequency and Electrical Characteristics

Parameter	Min.	Typ.	Max.	Unit	Test condition / Description
Nominal frequency (Fn)	3.5700		130.00	MHz	
Calibration tolerance			±10 to ±50	ppm	Frequency at 25°C ± 2°C and specified load capacitance
Operating temperature range		-20 to +70	-40 to +85	°C	Refer to ordering information
Storage temperature range	-55		125	°C	
Frequency stability over temperature			±10 to ±50	ppm	Referenced to frequency reading at 25°C and the specified load capacitance
Long-term stability (Aging)			±5	ppm	Frequency drift over 1 year at 25°C
Shunt capacitance (CO)			7.0	pF	
Load capacitance (CL)	10		30 or series	pF	Refer to ordering information
Drive level		100	500	µW	
Equivalent series resistance (ESR)					Mode of vibration:
3.5700 ~ 3.999Mhz			150		Fundamental (AT-cut)
4.000 ~ 4.999Mhz			120		Fundamental (AT-cut)
5.000 ~ 5.999Mhz			100		Fundamental (AT-cut)
6.000 ~ 6.999Mhz			80		Fundamental (AT-cut)
7.000 ~ 9.999Mhz			60		Fundamental (AT-cut)
10.000 ~ 13.999Mhz			50	Ω	Fundamental (AT-cut)
14.000 ~ 19.999Mhz			40		Fundamental (AT-cut)
20.000 ~ 23.999Mhz			30		Fundamental (AT-cut)
24.000 ~ 34.999Mhz			100		3rd Overtone (AT-cut)
≥ 35.000Mhz			80		3rd Overtone (AT-cut)
Insulation resistance (IR)	500			MΩ	100 V ±15 V at 25°C

Order Part Example – QESM405.1.30.HQ.50.20 / 10.000MHZ

Parameter	Package type	Vibration mode	Frenquency tolerance	Operating temperature range	Frenquency stability	Load capacitance	Nominal Frenquency (MHz)
Code	QESM405	1	10	HQ	10	10	10.000MHZ
Decode	QESM = SMD Crystal 405 = Xtal on pin 1 & 4 406 = Xtal on all pins	1 = Fundamental 3 = 3rd Overtone	10 = ±10ppm 30 = ±30ppm 50 = ±50ppm	D = -40°C F = -30°C H = -20°C J = -10°C L = 0°C M = +50°C Q = +70°C T = +85°C	10 = ±10ppm 30 = ±30ppm 50 = ±50ppm	00 = series 10 = 10pF 20 = 20pF 30 = 30pF	Please enter the nominal frequency

Model Outline, Recommended Pad Layout and Marking

TOP VIEW

13.0 max

Marking

5.0 max

FRONT VIEW

10.2 max

2.1

9.0

BOTTOM VIEW

4

3

1.3

1.2

1

2

RECOMMENDED PAD LAYOUT

(TOP VIEW)

2.3

2.2

3.66

9.0

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

Pin	QESM405 Connections	
1	Crystal connection	4 3
2	Connected to package	
3	Connected to package	1 2
4	Crystal Connection	

| Pin	QESM405 Connections	
1, 3	Crystal connection	4 3
2, 4	Crystal Connection	1 2

NOTE: Dimensions are in millimetre.

Reflow Soldering Profile

Referred to JEDEC J-STD-020E

| Profiles Feature	Pb-Free Assembly
Average Ramp-up Rate (Ts_{max} to Tp)	3°C/sec max
Preheat ▪ Temperature Min (Ts_{min}) ▪ Temperature Max (Ts_{max}) ▪ Time (ts_{min} to ts_{max})	125°C 200°C 60~180 sec
Time maintained above ▪ 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

Packaging

TAPE DETAILS:
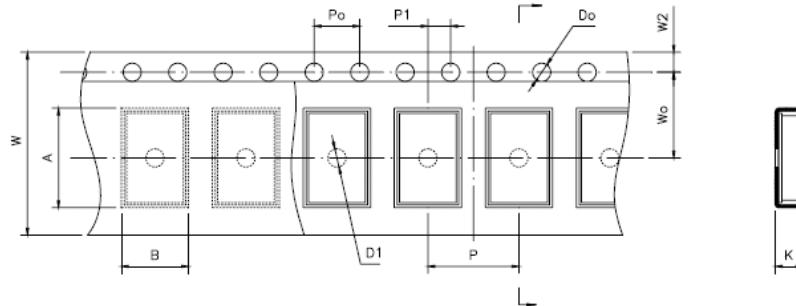
User Direction of Unreeling   Section I - I

Parameter	Code	Dimension	Tolerance
Pitch of components	P	12.0	± 0.1
Pitch of sprocket hole	P_0	4.0	± 0.1
Length from hole center to component center	P_1	2.0	± 0.1
Width of carrier tape	W	24.0	± 0.3
Width of adhesive tape	W_0	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	W_2	1.75	± 0.1
Diameter of sprocket hole	D_0	Φ 1.55	± 0.05
Diameter of feed hole	D_1	Φ 2.0	± 0.2
Total of tape thickness	K	5.2 or 4.3	± 0.1

REEL DETAILS:
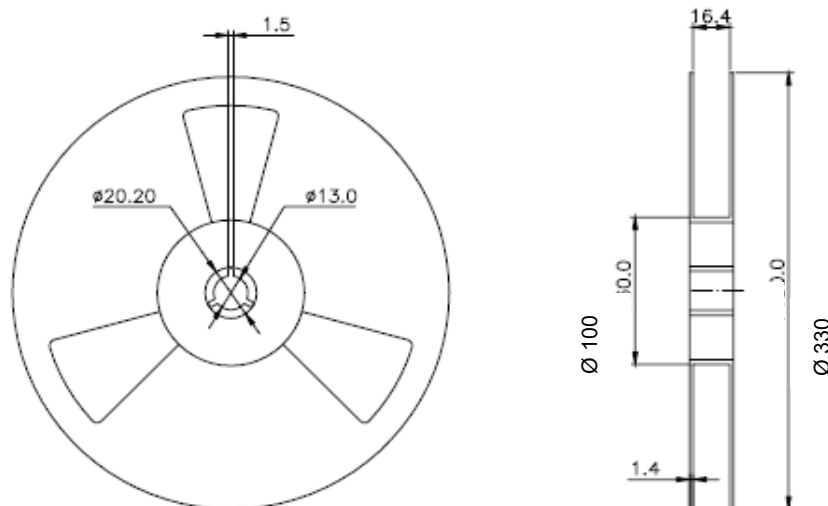
NOTE:
- Standard Packing Quantity (SPQ): 1000 pcs/reel
- Unit: mm