EUROQUARTZ EMEM1001- MEMS OSCILLATOR

Low Power Precision CMOS — Freq: 1.0MHz to 150.0MHz

Features

- Frequency Range 1.0 to 150MHz
- Frequency Stability ±10, ±25 or ±50ppm
- Operating Voltage: 1.7V to 3.6V
- Operating Temperature Range
  - Commercial: 0° to +70°C
  - Ext. Commercial: -20 to +70°C
  - Industrial: -40° to +85°C
  - Ext. Industrial: -40° to +105°C
- Low Operating and Standby Current
  - 5mA operating (40MHz)
  - 15µA Standby
- Ultra-Miniature Footprint
  - 2.5 x 2.0 x 0.85mm
  - 3.2 x 2.5 x 0.85mm
  - 5.0 x 3.2 x 0.85mm
  - 7.0 x 5.0 x 0.85mm
- MIL-STD 883 Shock & Vibration Resistant
- Pb free, RoHS, REACH SVHC Compliant
- ISO9001 (2008) Qualified

Description

The Euroquartz EMEM1001 oscillator range are MEMS (Micro Electro-Mechanical System) devices offering excellent jitter and stability performance over a wide range of supply voltages and temperature ranges (up to -40° to +105°C). EMEM1001 parts incorporate an all-silicon resonator that is robust and perfoms well in high shock and vibration environments.

EMEM1001 oscillators are available in four, industry-standard SMD packages: 7 x 5mm, 5 x 3.2mm, 3.2 x 2.5mm and 2.5 x 2.0mm. The part may be 'dropped in' to most PCB footprints as standard crystal oscillators.

Electrical Specifications

VDD = 1.8V

Parameter	Symbol	Condition		Min.	Typ.	Max.	Unit
Supply Current No load	I_{DD}	C_L = 0p R_L = ∞ T = 25°C	1MHz 27MHz 70MHz 150MHz		6.0 6.5 7.2 8.3	6.3 6.9 7.5 9.1	mA
Output Transition time Rise Time Fall Time	t_R t_F	C_L = 15pF; T = 25°C 20%/80%*V_{DD}			1.0 0.9	3 3	ns
Jitter, max cyle to cycle	J_{CC}	F = 100MHz[3]			60		ps

VDD = 2.5V

Parameter	Symbol	Condition		Min.	Typ.	Max.	Unit
Supply Current No load	I_{DD}	C_L = 0p R_L = ∞ T = 25°C	1MHz 27MHz 70MHz 150MHz		6.0 6.7 7.7 9.6	6.3 7.0 8.0 10.6	mA
Output Transition time Rise Time Fall Time	t_R t_F	C_L = 15pF; T = 25°C 20%/80%*V_{DD}			1.0 0.9	2 2	ns
Jitter, max cyle to cycle	J_{CC}	F = 100MHz[3]			50		ps

VDD = 3.3V

Parameter	Symbol	Condition		Min.	Typ.	Max.	Unit
Supply Current No load	I_{DD}	C_L = 0p R_L = ∞ T = 25°C	1MHz 27MHz 70MHz 150MHz		6.0 6.8 8.2 10.8	6.3 7.2 8.7 12.0	mA
Output Transition time Rise Time Fall Time	t_R t_F	C_L = 15pF; T = 25°C 20%/80%*V_{DD}			1.0 0.9	2 2	ns
Jitter, max cyle to cycle	J_{CC}	F = 100MHz[3]			50		ps

Notes:
1. Absolute maximum ratings are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated beyond these limits.
2. t_{SU} is time to stable frequency output after VDD is applied. t_{SU} and t_{EN} (after EN is asserted) are identical values.
3. Measured over 50k clock cycles.

EUROQUARTZ LIMITED Blacknell Lane CREWKERNE Somerset UK TA18 7HE
Tel: +44 (0)1460 230000 Fax: +44 (0)1460 230001 Email: info@euroquartz.co.uk www.euroquartz.co.uk

Specifications (VDD = 1.8 to 3.3V T_A = 85° unless otherwise specified)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Frequency	f0	Single frequency	1		150	MHz
Frequency Tolerance	Δf	Includes frequency variations due to initial tolerance, temperature and power supply voltage			±10, ±25, ±50	ppm
Ageing	Δf	1 year @25°C			±5	ppm
Supply Current, Standby	I_{DD}	T=25°C			15	μA
Output Logic Levels **Output Logic High** **Output Logic Low**	 V_{OH} V_{OL}	 -4mA 4mA	 0.8*V_{DD}		 0.2*V_{DD}	Volts
Output Startup Time[2]	T_{SU}	T=25°C		1.0	1.3	ms
Output Disable Time	T_{DA}			20	100	ns
Output Duty Cycle	SYM		45		55	%
Input Logic Levels **Input Logic High** **Input Logic Low**	 V_{IH} V_{IL}		 0.75*V_{DD}		 0.25*V_{DD}	Volts

Absolute Maximum Ratings

Item	Min.	Max.	Unit	Condition
Input Voltage	-0.3	VDD+0.3	V	
Junction Temp.	-	+150	°C	
Storage Temp.	-55	+150	°C	
Soldering Temp.	-	+260	°C	40 sec. max.
ESD **HBM** **MM** **CDM**	-	 4000 200 1500	V	

Standby Function

Standby# (Pin 1)	Output (Pin 3)
High Level	Output ON
Open (not connected)	Output ON
Low Level	High Impedance

Ordering Code
Recommended Operating Conditions

Parameter	Symbol	Range
Supply Voltage	VDD	1.7 ~3.6V
Output Load	ZL	R>10kΩ, C≤15pF
Operating Temperature **Option 1** **Option 2** **Option 3** **Option 4**	T	 -40 to +105°C -40 to +85°C -20 to +70°C 0 to + 60°C

Example: **EMEM1001** **CE1** - **123.000** **T**

- EMEM1001: Family
- CE1: Package, Temp., & Stability
- 123.000: Output Freq. 1.0 to 150MHz
- T: Blank = tubes, T = Tape & Reel

Ordering Information

Package (Plastic QFN)	Temperature	Stability	Frequency	Packing Option
P=A: 7.0 x 5.0mm P=B: 5.0 x 3.2mm P=C: 3.2 x 2.5mm P=D: 2.5 x 2.0mm	T=C: 0° ~ +70°C T=E:-20° ~ +70°C T=I:-40° ~ +85°C T=L:-40° ~ +105°C	S=1: ±50ppm S=2: ±25ppm S=3: ±10ppm	XXX.XXX	Blank: Tubes T: Tape & Reel

Order in the form: **EMEM1001PTS-FREQUENCY-SUPPLY FORMAT**

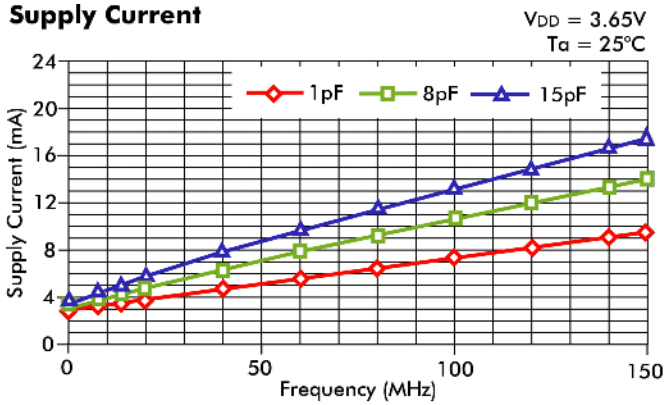
Example: **EMEM1001CE1-123.000T**

This is an 123.000MHz Oscillator in a plastic 3.2 x 2.5mm package; stability ±50ppm over -20° to +70°C, shipped in tape and reel.

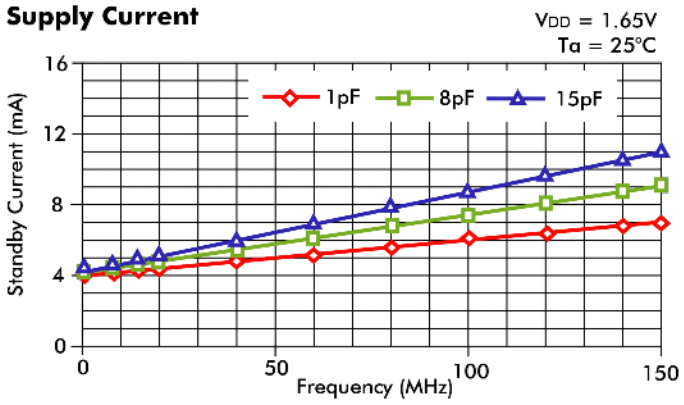
EUROQUARTZ LIMITED Blacknell Lane CREWKERNE Somerset UK TA18 7HE
Tel: +44 (0)1460 230000 Fax: +44 (0)1460 230001 Email: info@euroquartz.co.uk www.euroquartz.co.uk

Nominal Performance Characteristics

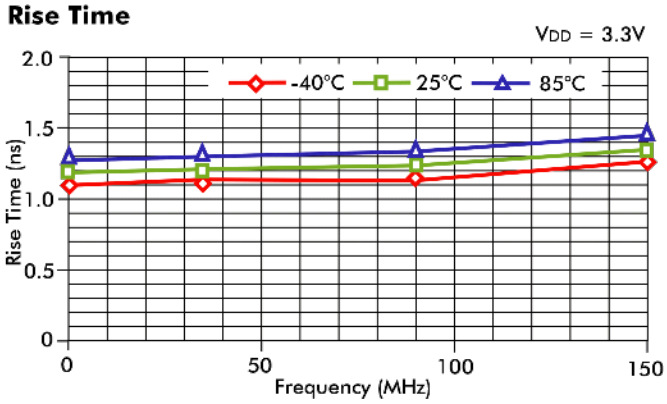
Supply Current



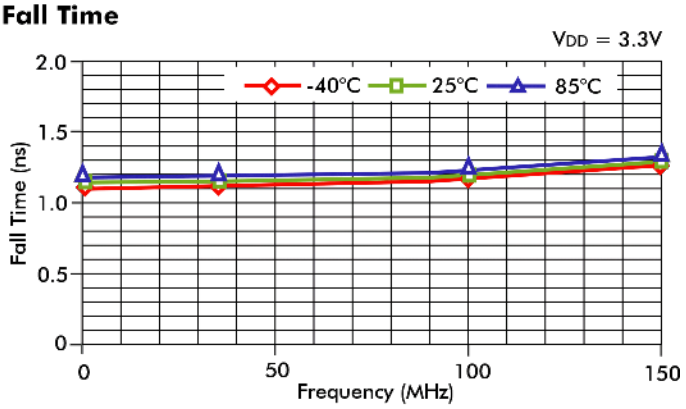
Supply Current



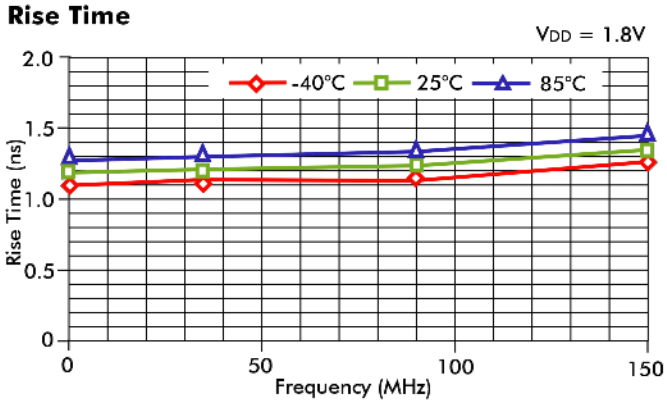
Rise Time



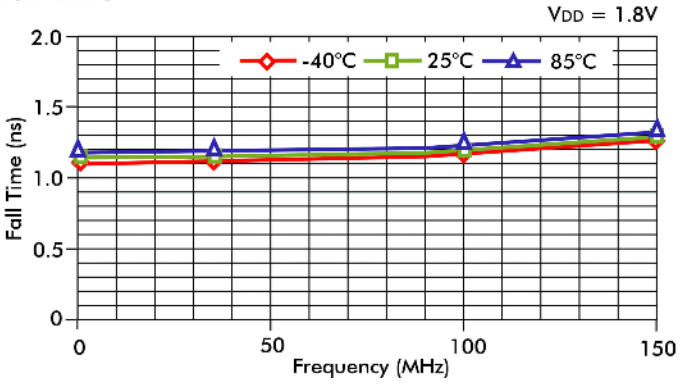
Fall Time



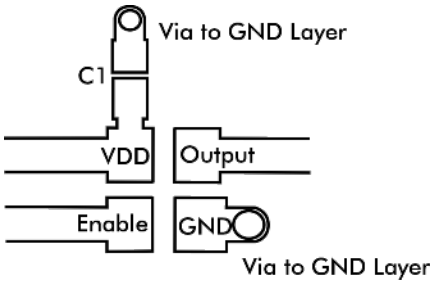
Rise Time



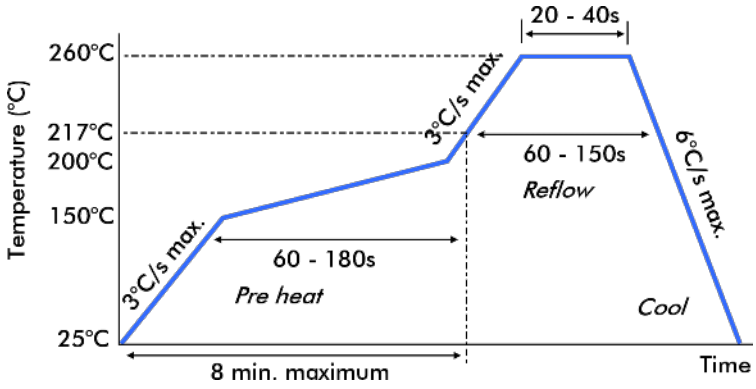
Fall Time



Board Layout (Recommended)



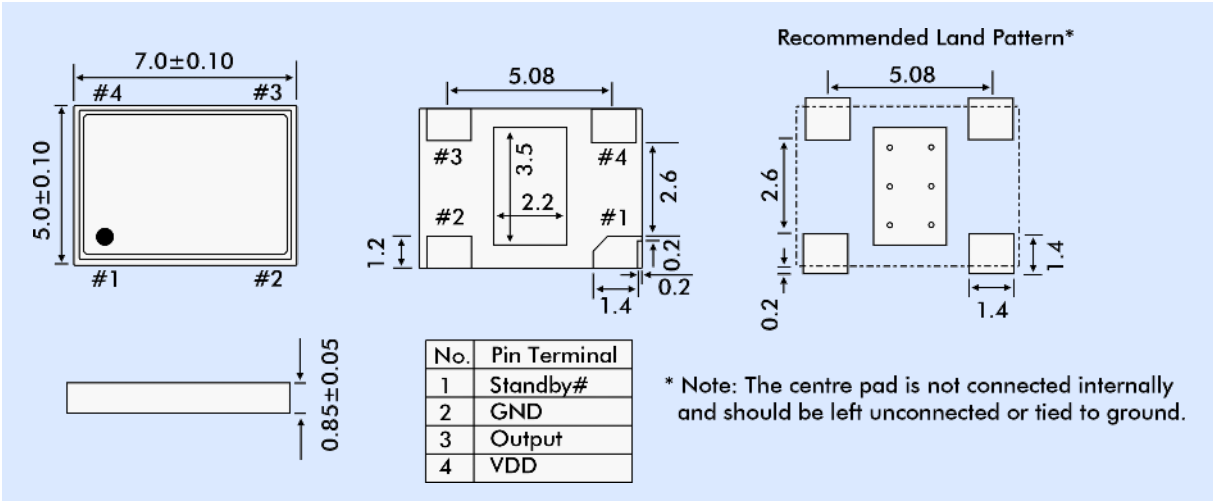
Solder Reflow Profile



MSL1 @ 260°C refer to JSTD-020C	
Ramp-up Rate (200°C to Peak Temp.)	3°C/s max.
Preheat Time 150°C to 200°C	60-180s
Time maintained above 217°C	60-150s
Peak Temperature	255-260°C
Time within 5°C of actual peak	20-40s
Ramp-Down Rate	6°C/s max.
Time 25°C to Peak Temperature	8 min max.

PACKAGE DIMENSIONS

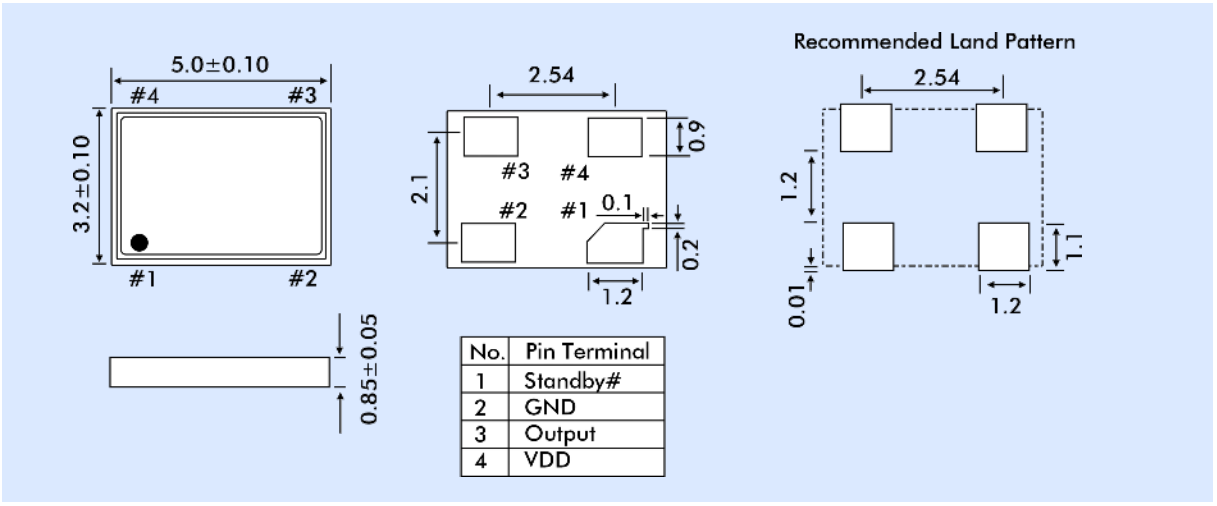
7.0 x 5.0mm Plastic Package



No.	Pin Terminal
1	Standby#
2	GND
3	Output
4	VDD

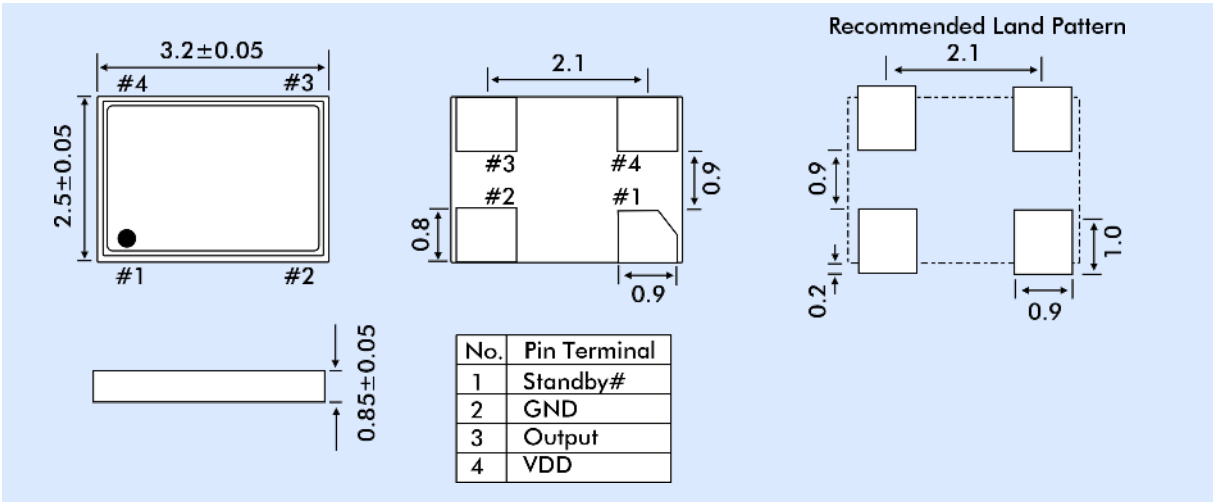
* Note: The centre pad is not connected internally and should be left unconnected or tied to ground.

5.0 x 3.2mm Plastic Package



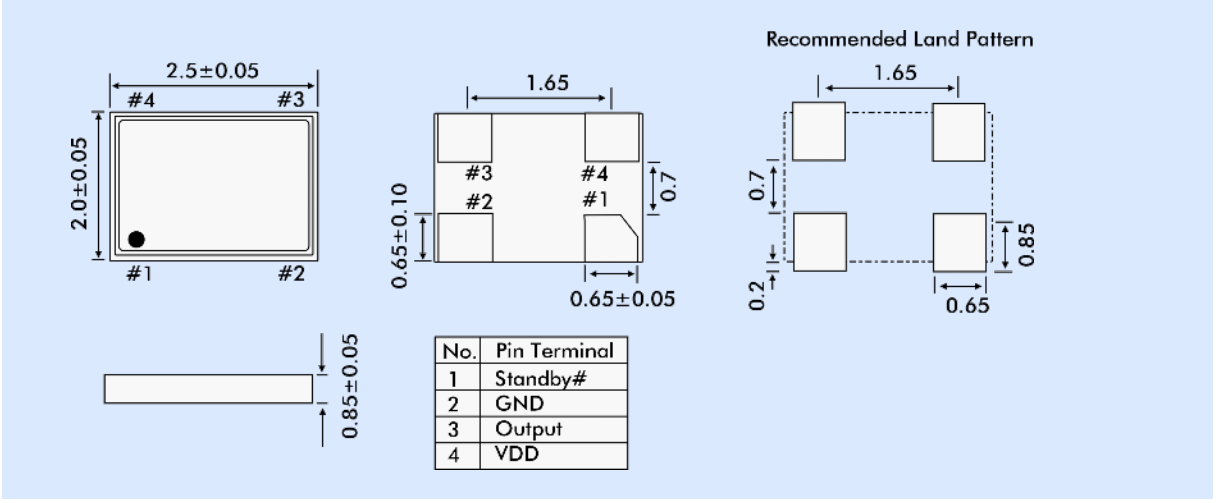
No.	Pin Terminal
1	Standby#
2	GND
3	Output
4	VDD

3.2 x 2.5mm Plastic Package



No.	Pin Terminal
1	Standby#
2	GND
3	Output
4	VDD

2.5 x 2.0mm Plastic Package



No.	Pin Terminal
1	Standby#
2	GND
3	Output
4	VDD