

Features

- Frequency Range 1.0 to 150MHz
- Frequency Stability ± 10 , ± 25 or ± 50 ppm
- 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 performs 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}	$C_L = 0p$ $R_L = \infty$ $T = 25^\circ C$	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	$C_L = 15pF$; $T = 25^\circ C$ 20%/80%*V _{DD}		1.0 0.9	3 3	ns
Jitter, max cycle 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}	$C_L = 0p$ $R_L = \infty$ $T = 25^\circ C$	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	$C_L = 15pF$; $T = 25^\circ C$ 20%/80%*V _{DD}		1.0 0.9	2 2	ns
Jitter, max cycle 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}	$C_L = 0p$ $R_L = \infty$ $T = 25^\circ C$	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	$C_L = 15pF$; $T = 25^\circ C$ 20%/80%*V _{DD}		1.0 0.9	2 2	ns
Jitter, max cycle 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.

Specifications (VDD = 1.8 to 3.3V TA = 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			$\pm 10, \pm 25, \pm 50$	ppm
Ageing	Δf	1 year @25°C			± 5	ppm
Supply Current, Standby	IDD	T=25°C			15	μA
Output Logic Levels Output Logic High Output Logic Low	VOH VOL	-4mA 4mA	0.8*VDD		0.2*VDD	Volts
Output Startup Time ²	TSU	T=25°C		1.0	1.3	ms
Output Disable Time	TDA			20	100	ns
Output Duty Cycle	SYM		45		55	%
Input Logic Levels Input Logic High Input Logic Low	VIH VIL		0.75*VDD		0.25*VDD	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

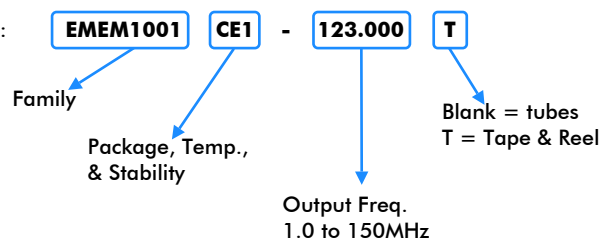
Recommended Operating Conditions

Parameter	Symbol	Range
Supply Voltage	VDD	1.7 ~ 3.6V
Output Load	ZL	R>10k Ω , C $\leq$ 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

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: ± 50 ppm S=2: ± 25 ppm S=3: ± 10 ppm	XXX.XXX	Blank: Tubes T: Tape & Reel

Example:



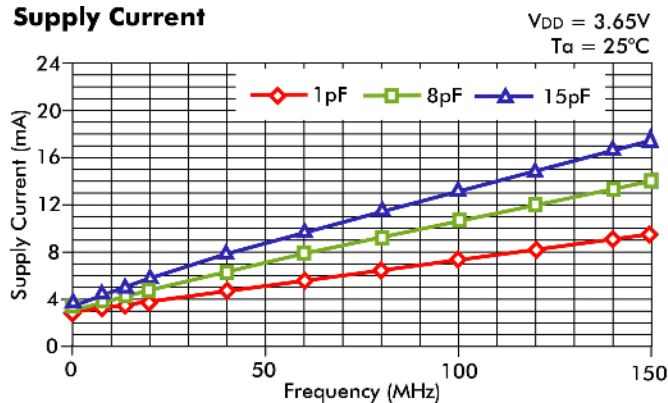
Order in the form: **EMEM1001PTS-FREQUENCY-SUPPLY FORMAT**

Example: **EMEM1001CE1-123.000T**

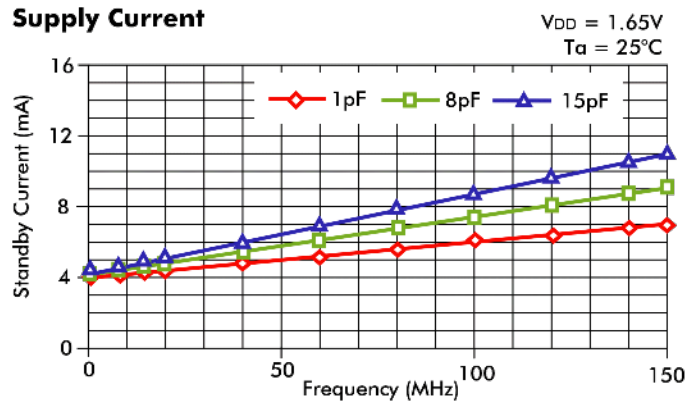
This is an 123.000MHz Oscillator in a plastic 3.2 x 2.5mm package; stability ± 50 ppm over -20° to +70°C, shipped in tape and reel.

Nominal Performance Characteristics

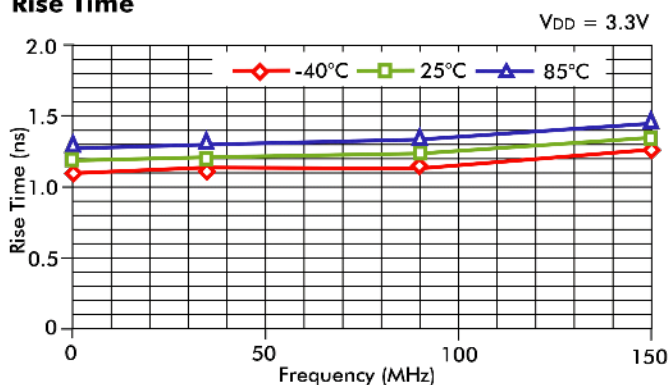
Supply Current



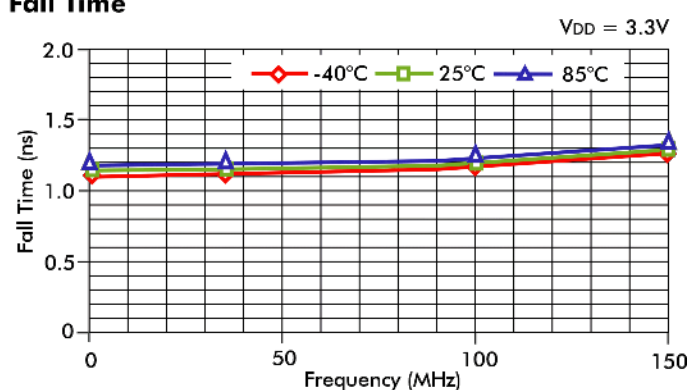
Supply Current



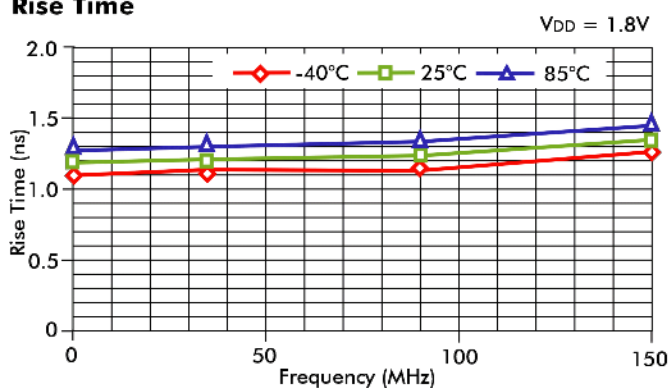
Rise Time



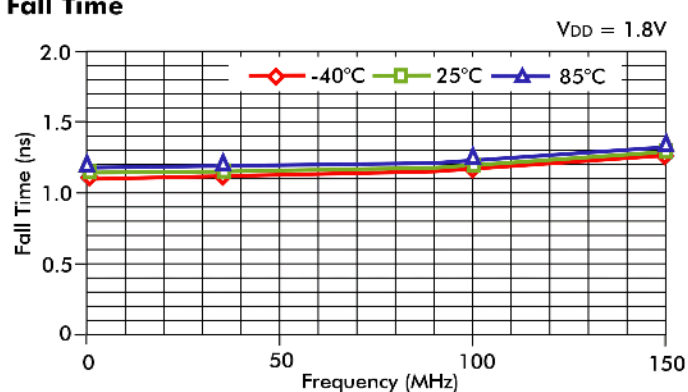
Fall Time



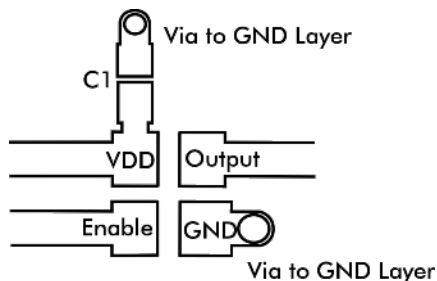
Rise Time



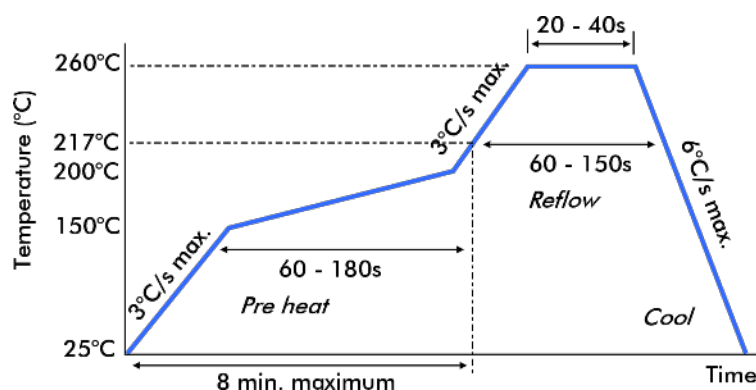
Fall Time



Board Layout (Recommended)



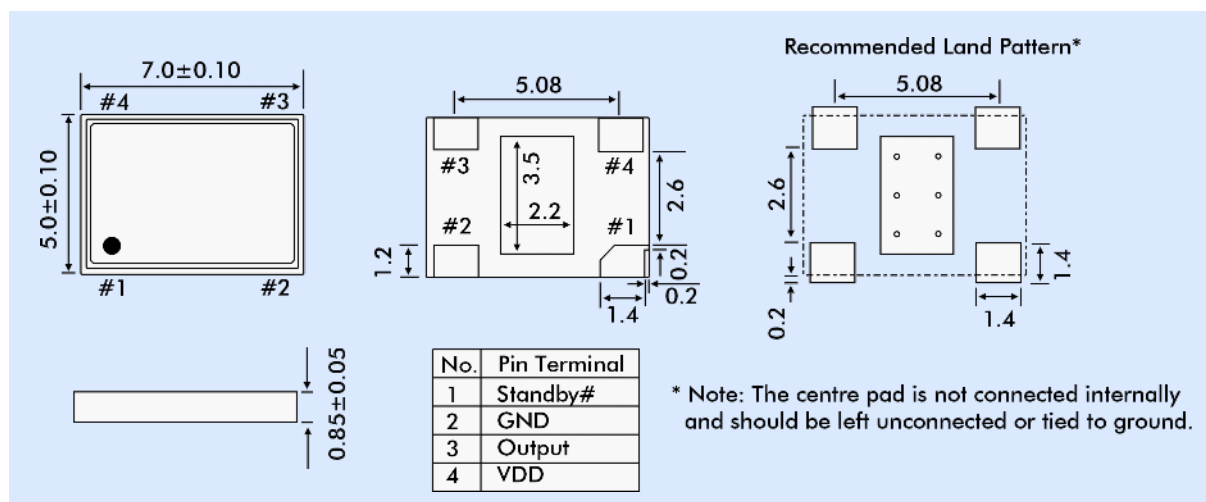
Solder Reflow Profile

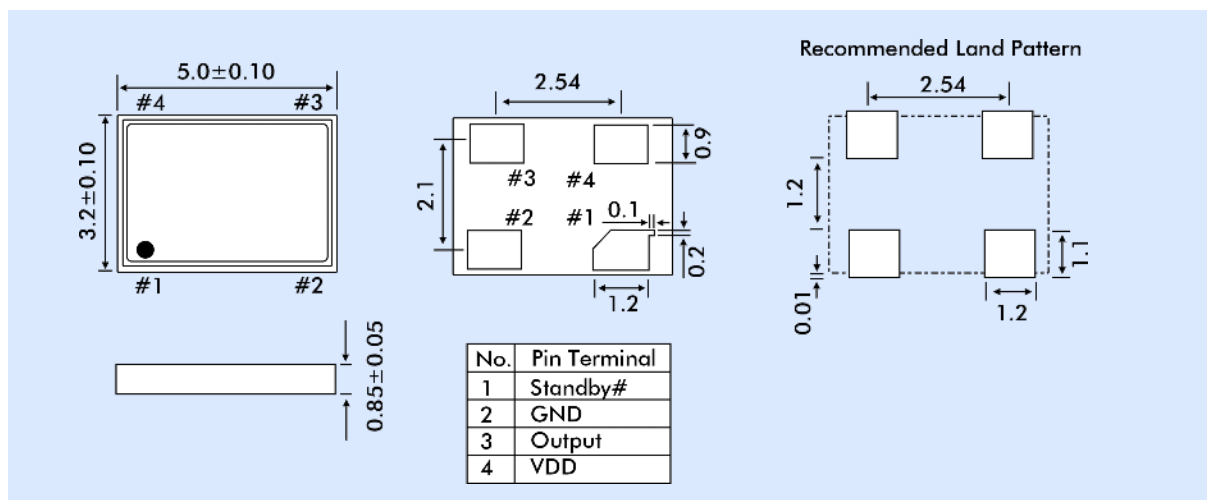
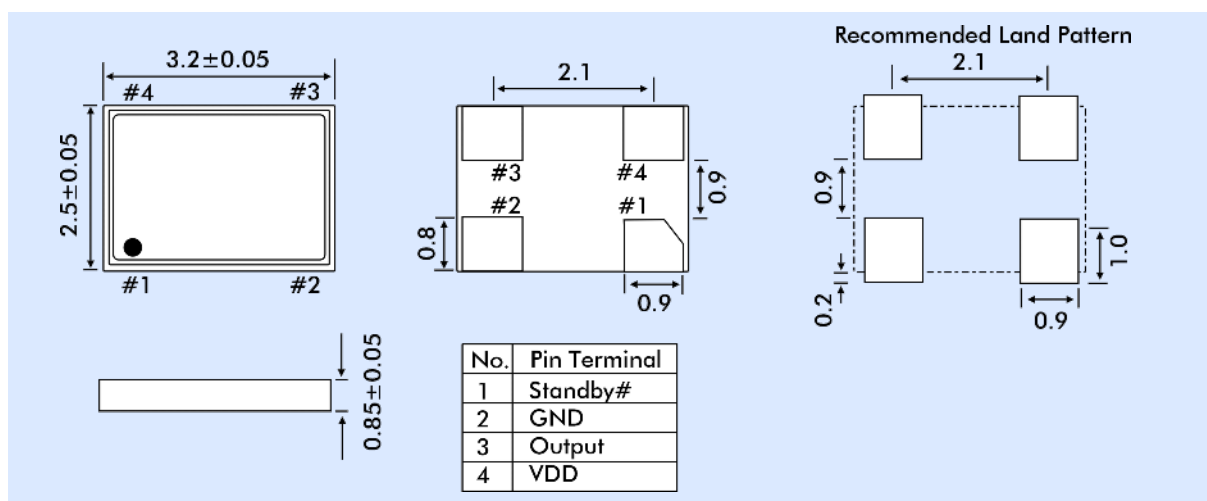


MSL1 @ 260°C refer to JSTD-020C	
Ramp-up Rate (200°C to Peak Temp.)	3°C/s max.
Preheat Time 150°C to 200°C	60-180s
Time maintained above 217°C	60-150s
Peak Temperature	255-260°C
Time within 5°C of actual peak	20-40s
Ramp-Down Rate	6°C/s max.
Time 25°C to Peak Temperature	8 min max.

PACKAGE DIMENSIONS

7.0 x 5.0mm Plastic Package



5.0 x 3.2mm Plastic Package**3.2 x 2.5mm Plastic Package****2.5 x 2.0mm Plastic Package**