EUROQUARTZ EMEM1103/1123 - MEMS OSCILLATOR

Low Jitter Precision LVDS Oscillator 2.3MHz to 460.0MHz

Features

- **Frequency Range 2.3MHz to 460MHz**
- **Frequency Stability ±10, ±25 or ±50ppm**
- **Operating Voltage: 1.71V to 3.60V**
- **Operating Temperature Range**
  - **Industrial: -40° to +85°C**
  - **Ext. Commercial: -20° to +70°C**
- **High Supply Noise Rejection: -50dBc**
- **Short Lead Time**
- **Ultra-Miniature Footprints**
  - **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**
- **Excellent Shock & Vibration Resistance**
  - **Qualified to MIL-STD-883**
- **High Reliability**
- **Low Current Consumption**
- **Supply Voltage from 2.25 to 3.6 Volts**
- **Standby and Output Enable Function**
- **LVPECL and HCSL versions available**

Description

The Euroquartz EMEM1103 and EMEM1123 series of high performance oscillators utilize MEMS (Micro Electro-Mechanical System) technology, offering excellent jitter and stability performance over a wide range of supply voltages and temperature ranges. The EMEM1103 has a standby feature allowing it to completely power down when the 'EN' pin is pulled low; the EMEM1123 outputs are disabled when EN is low.

Both oscillators are available in industry-standard oscillator packages, including the small 2.5 x 2.0mm and are 'drop-in' replacements for standard LVDS output quartz crystal oscillators.

Electrical Specifications

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Voltage[1]			2.25		3.6	V
Supply Current	I_{DD}	EN pin low - outputs disabled EMEM1103 EMEM1123		 20	 0.095 22	mA
Frequency Stability	Δf	Includes frequency variations due to initial tolerance, temp. and power supply voltage.			±10 ±25 ±50	ppm
Ageing	Δf	1 year @ 25°			±5	ppm
Startup Time[2]	T_{SU}	T = 25°C			5	ms
Input Logic Levels **Input Logic High** **Input Logic Low**	 V_{IH} V_{IL}		 0.75*V_{DD}		 0.25*V_{DD}	V
Output Disable Time[3]	T_{DA}				5	ns
Output Enable Time	T_{EN}	EMEM1103 EMEM1123			5 20	ms ns
Enable Pull-up Resistor		Pull-up resistor exists		40		kΩ
LVDS Outputs						
Supply Current	I_{DD}	Output Enabled, R_L = 50Ω		29	32	mA
Output Offset Voltage	V_{OS}	R = 100Ω Differential			1.4	V
Delta Offset Voltage	ΔV_{OS}				50	mV
Pk to Pk Output Swing		Single-Ended		350		mV
Output Transition Time[3] **Rise Time** **Fall Time**	 t_R t_F	20% to 80% R_L = 50Ω, C_L = 2pF		200		ps
Frequency	f_0	Single Frequency	2.3		460	MHz
Output Duty Cycle	SYM	Differential	48		52	%
Period Jitter	J_{PER}			2.5		ps_{RMS}
Integrated Phase Noise	J_{PH}	200kHz to 20MHz @156.25MHz 100kHz to 20MHz @156.25MHz 12kHz to 20MHz @156.25MHz		0.28 0.4 1.7	 2	ps_{RMS}

Notes: 1. Pin 6 V_{DD} should be filtered with 0.1μF capacitor.
2. t_{SU} is time to 100ppm of output frequency after V_{DD} is applied and outputs are enabled.
3. Output waveform and test circuit figures below define the parameters.
4. Output is enabled if pad is floated or not connected.

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Output Enable Modes

EN Pin	DSC1103	DSC1123
High	Outputs Active	Outputs Active
NC	Outputs Active	Outputs Active
Low	Standby	Outputs Disabled

Absolute Maximum Ratings

Item	Min.	Max.	Unit	Condition
Supply Voltage	-0.3	+4.0	V	
Input Voltage	-0.3	V_{DD}+0.3	V	
Junction Temp.	-	+150	°C	
Storage Temp.	-55	+150	°C	
Soldering Temp.	-	+260	°C	40 sec. max.
ESD **HBM** **MM** **CDM**	-	 4000 400 1500	V	

Ordering Code

Enable Modes
0: Enable/Standby
2: Enable/Disable

Temp Range
E: -20 to 70
I: -40 to 85
L: -40 to 105
M: -55 to 125

Packing
T: Tape & Reel
: Tube

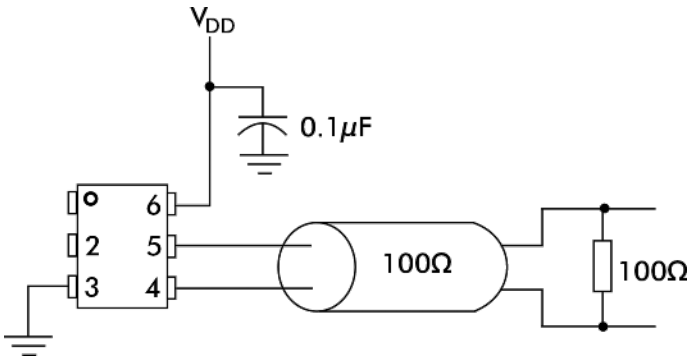
EMEM1103 C I 5 - 125.000 T

Package
A: 7.0 x 5.0mm
B: 5.0 x 3.2mm
C: 3.2 x 2.5mm
D: 2.5 x 2.0mm
N: 7.0 x 5.0mm
(no centre pad)

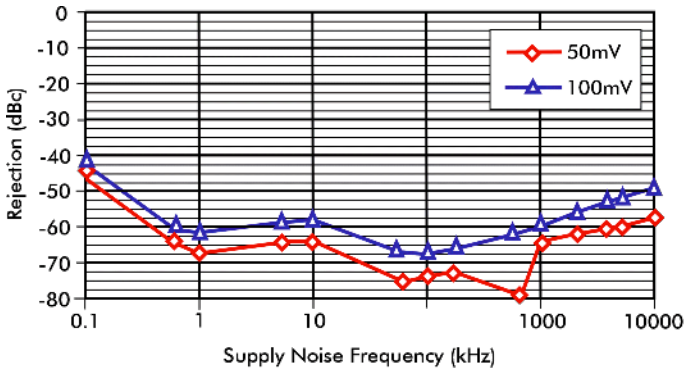
Stability
1: ±50ppm
2: ±25ppm
5: ±10ppm

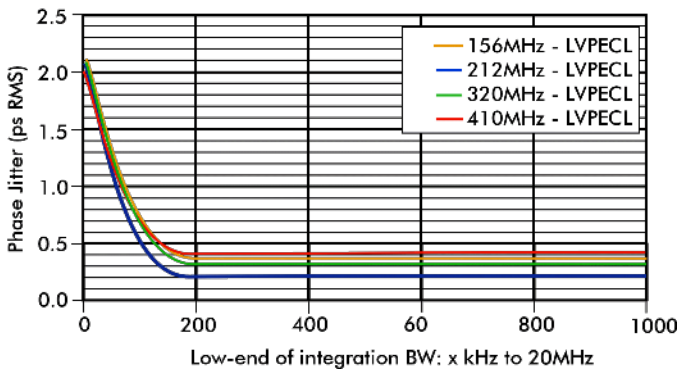
Freq. (MHz)
125.000

Typical Termination Scheme

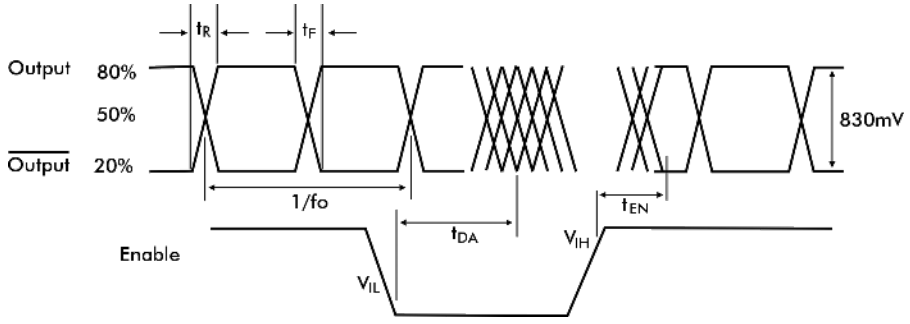


Nominal Performance Parameters (Unless specified otherwise: T = 25°C, V_{DD} = 3.3V)

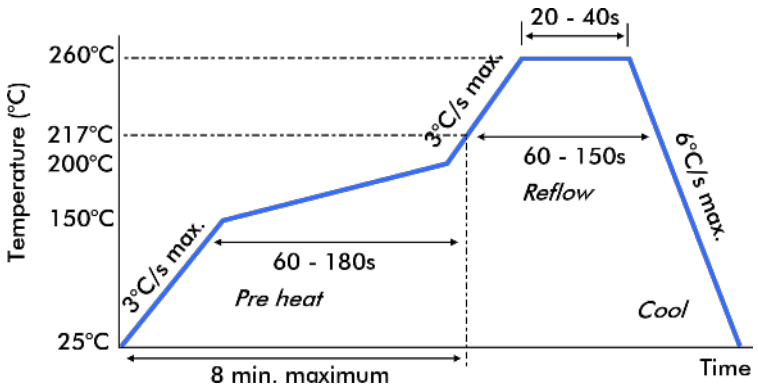




Output Waveform



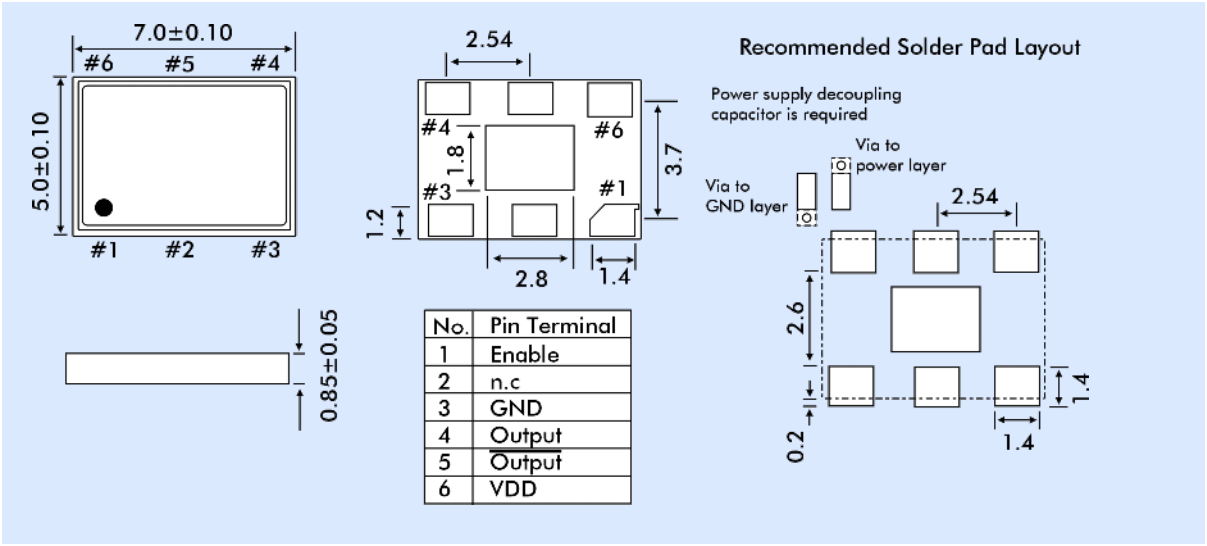
Solder Reflow Profile



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.

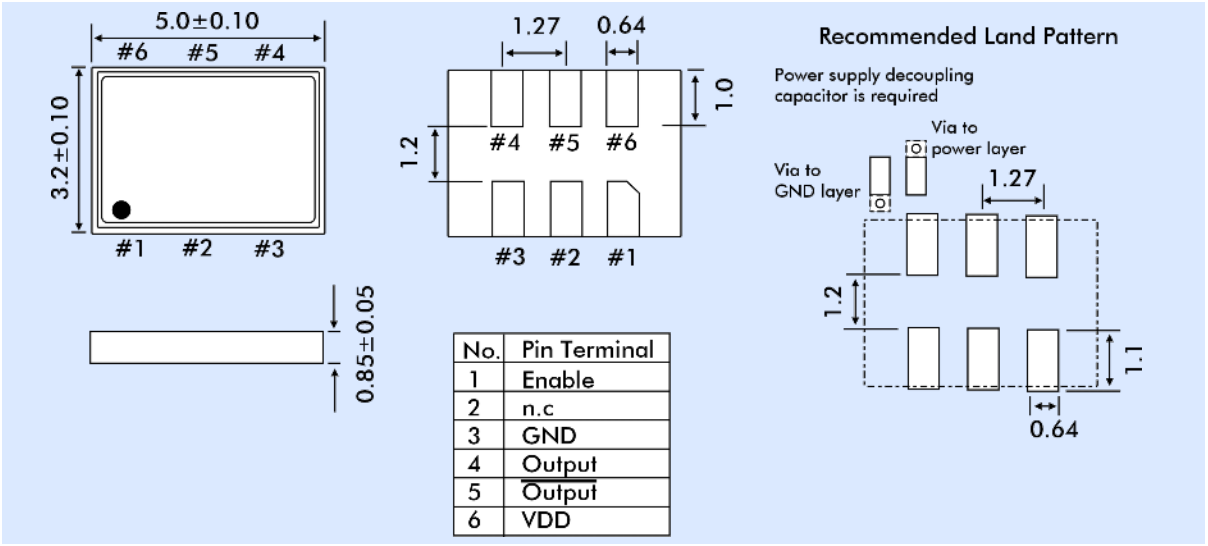
PACKAGE DIMENSIONS

7.0 x 5.0mm Plastic Package



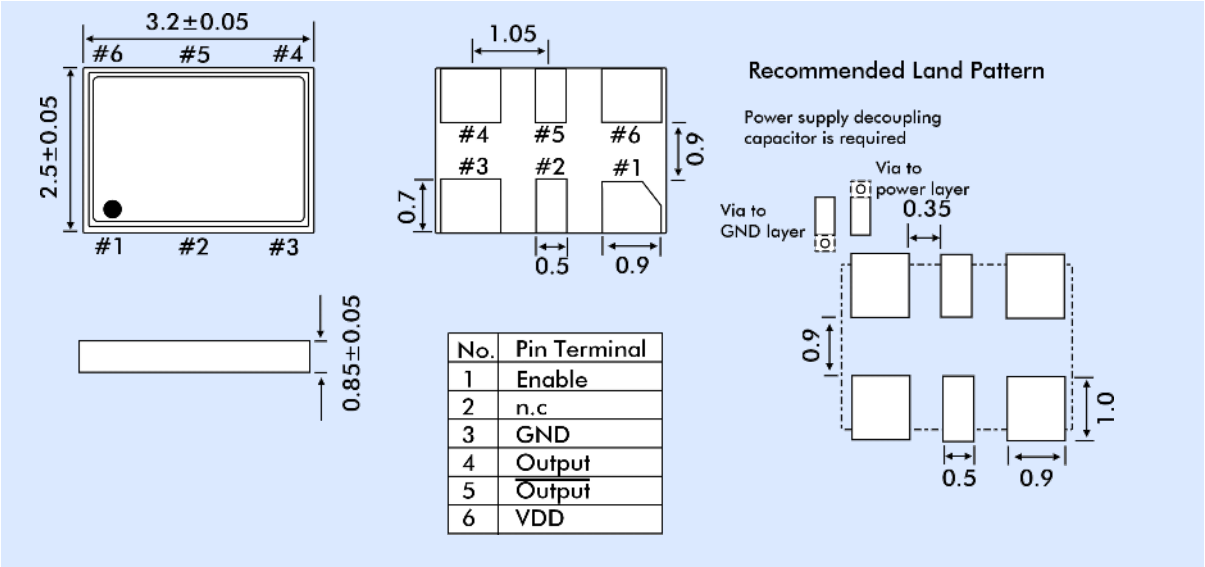
No.	Pin Terminal
1	Enable
2	n.c
3	GND
4	Output
5	$\overline{\text{Output}}$
6	VDD

5.0 x 3.2mm Plastic Package



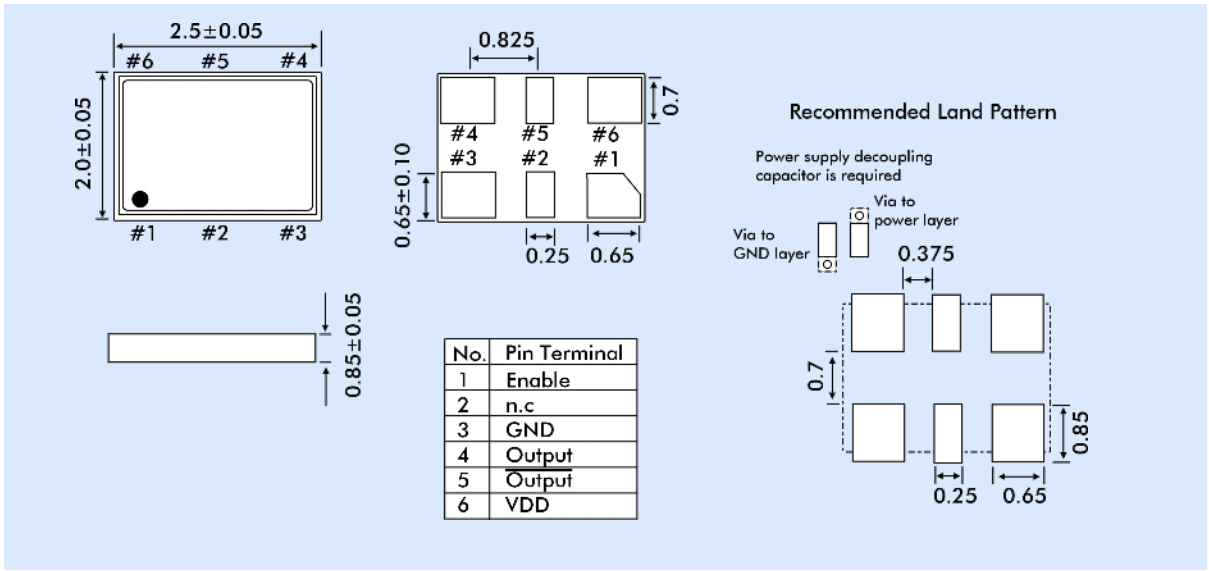
No.	Pin Terminal
1	Enable
2	n.c
3	GND
4	Output
5	$\overline{\text{Output}}$
6	VDD

3.2 x 2.5mm Plastic Package



No.	Pin Terminal
1	Enable
2	n.c
3	GND
4	Output
5	$\overline{\text{Output}}$
6	VDD

2.5 x 2.0mm Plastic Package



No.	Pin Terminal
1	Enable
2	n.c
3	GND
4	Output
5	$\overline{\text{Output}}$
6	VDD