EM MICROELECTRONIC - MARIN SA

A COMPANY OF THE SWATCH GROUP

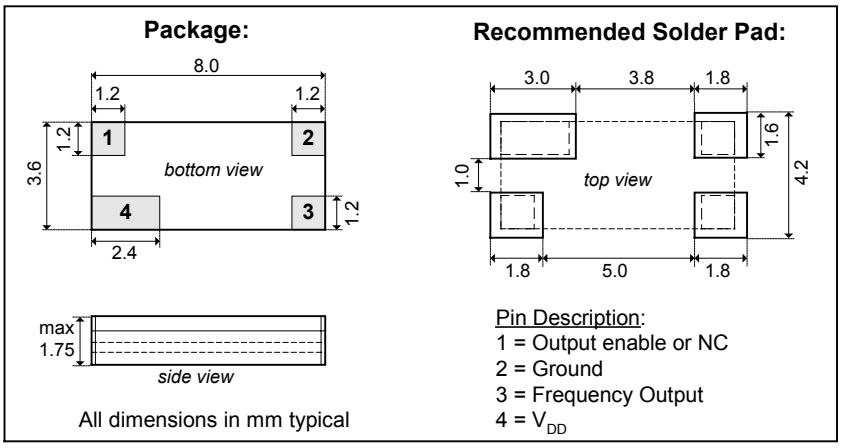
Fact Sheet

EM7602

Low Power Clock Oscillator 32768 Hz

The World's Smallest Thermo-Compensated Oscillator

Dimensions



KEY FEATURES

- ❑ **Temperature compensation**
- ❑ **Small SMD ceramic package**
- ❑ **Low power consumption of 6µA**
- ❑ **Tri state output**

& BENEFITS

- ✓ *Save space and components*
- ✓ *No more matching of quartz with IC*
- ✓ *Easy PCB design*
- ✓ *No more trouble with stray capacitors*
- ✓ *High shock and vibration resistance*
- ✓ *No need for external trimming components*

Typical Applications

- ❑ Clock drivers for Real Time Clocks
- ❑ Timekeeping in network servers and computers
- ❑ Data logger
- ❑ Electricity, gas and water metering
- ❑ Portable field communication
- ❑ Automotive dashboard
- ❑ High-end mobile phones

Description

EM7602 is a low power, low frequency crystal oscillator, with a ***three times better thermal drift than any conventional tuning fork crystal***. It consists of a torsional tuning fork crystal and a CMOS integrated circuit, both assembled in the same package. It is ideal for applications requiring a high timekeeping accuracy over full temperature range.

The oscillator are supplied in trays (91 oscillators per tray).
For pick-and-place equipment, the parts are available in 16mm tapes:
7" (178 mm) reel with 1000 oscillators
10" (254 mm) reel with 2000 oscillators
13" (330 mm) reel with 4000 oscillators

Electrical Characteristics at 25°C

Output Frequency		**F**	**32.768**	**kHz**
Frequency tolerance	*(note 1)*	ΔF/F	±30	ppm
Supply voltage		V_{DD}	2.3 – 3.6	V
Current Consumption (typ/max)	*(note 2)*	I_{DD}	6/10	µA
Duty cycle (min/max)			49/51	%
Output voltage (high)	*(note 3)*	V_{OH}	V_{DD} - 0.4	V
Output voltage (low)	*(note 4)*	V_{OL}	0.4	V
Output rise time (max)	*(note 5)*	t_r	100	ns
Output fall time (max)	*(note 5)*	t_f	100	ns
Start up time		t_{start}	1	s
Voltage coefficient			±1	ppm/V
Turnover temperature (typ)		T_0	20	°C
Temperature coefficient (typ)		β	-0.012	ppm/°C²
Frequency stability (typ) 0°C to +50°C -20°C to +70°C -40°C to +85°C		ΔF/F	 0 to -10 0 to -30 0 to -50	 ppm ppm ppm

Note 1: Tighter tolerance on request
Note 2: V_{DD} = 3.3V, no load
Note 3: I_{OH} = -0.5mA
Note 4: I_{OL} = 0.5mA
Note 5: C_L = 15pF, 10% to 90%

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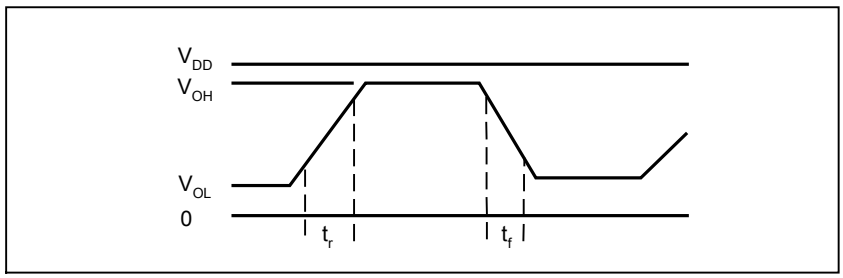
Output Wave Form:



Environmental Characteristics:

		Conditions	Max. Dev.
Storage temp. range		-55°C to +125°C	
Industrial operating temp. range		-40°C to +85°C	
Shock resistance	ΔF/F	5000 g, 0.3 ms, ½ sine	±5 ppm
Vibration resistance	ΔF/F	20 g / 10-2000 Hz	±5 ppm

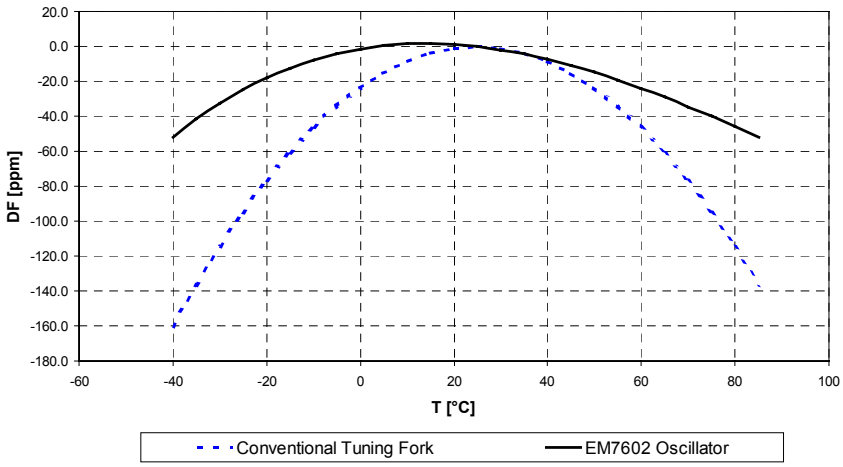
Ordering Information, Terminations and Processing:

Part Nb	Termination	Delivery Form
EM7602V1SM4D	For SMD mounting	Tray (91 pieces)
EM7602V1SM4B	**Au** (gold) flashed pads	Tape & Reel (min. 1000 pieces)

Processing is by reflow soldering at 260°C / 20 s max.

Note: Instead of Au (gold) flashed pads, Sn (tin) plated pads are also available for SMD mounting, subject to availability and minimum order quantity. Please contact EM Microelectronic for availability of Sn (tin) plated pads and refer to EM7602V2 (version 2). For samples, only EM7602V1 is available at all times.

Frequency Temperature Characteristics:



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