EQHM14 Low EMI Oscillator

14 pin Dual-in-Line - Group 'R'

- **Provides up to 15dB reduction in system EMI**
- **'Drop-in' replacement for standard clocks**
- **Choice of modulation rate and spread**
- **Miniature package: 5.0 mm x 3.2 mm x 1.2mm**

In electrical systems the principal cause of electro-magnetic interference (EMI) is the system clock oscillator. Traditional methods of 'patching-up' systems with too high a level of EMI is to use ferrite beads, filters, ground planes, metal shielding and similar costly methods, However, the most efficient and economic method to reduce EMI is to reduce it at source: replace the system clock ocillator with a low EMI clock oscillator.

Compared with conventional clock oscillators, Spread Spectrum (Dithered) Oscillators can reduce EMI by as much as 15dB. The part is a 'drop-in' replacement for a standard clock oscillator hence there is no requirement to re-design existing PCBs.

APPLICATIONS

- **Printers, Multiple Function Printers (MPCs)**
- **Digital Copiers; PDAs**
- **Networking: LAN/WAN; Routers**
- **Storage Systems (CD-ROM, VCD, DVD, HDD)**
- **Scanners; Modems; Projectors**
- **Embedded Systems**
- **Musical Instruments**
- **Automotive: GPS car navigation systems**
- **LCD PC Monitors; LSD TVs**
- **ADSL; PCMCIA**
- **Still Digital Cameras (SDCs)**

DESCRIPTION

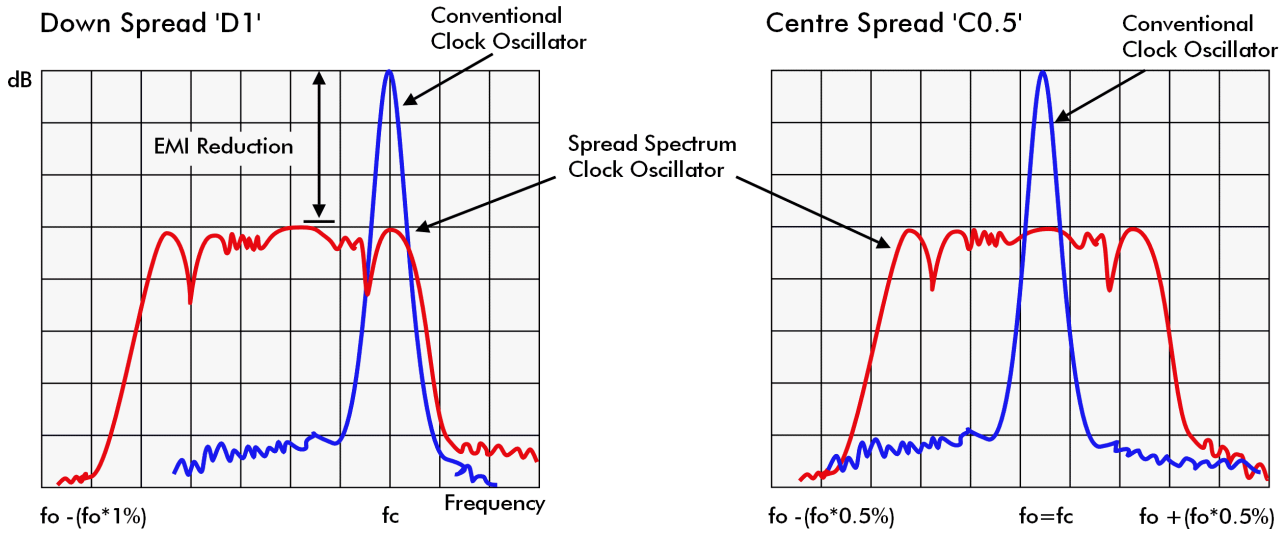
EQHM14 series low EMI oscillators can reduce system EMI by 15dB. The oscillators are a 'drop-in' replacement for standard oscillators. EMI reduction is achieved by the use of Spread Spectrum Technology whereby the mode energy is spread over a wider bandwidth. The modulation carrier frequency, operating in the kHz region, makes the process transparent to the oscillator frequency. There is a choice of modulation rates and spread to suit application requirements.

SPREAD SPECTRUM TECHNOLOGY

Unlike a conventional clock oscillator, in a Spread Spectrum Clock Oscillator the mode energy is spread over a wider bandwidth. This is achieved by the frequency modulation technique. The controlled modulation process may be applied to the 'down' side of the nominal frequency (known as **DOWN SPREAD**,) or spread equally either side of nominal (**CENTRE SPREAD**). Down Spread is preferred if over-clocking would cause a problem to the system.

MODULATION TYPES - EXAMPLES

Output amplitude (dB) vs. frequency span (MHz)



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EQHM14 Low EMI Oscillator

14 pin Dual-in-Line - Group 'R' 3.5MHz to 165MHz

SPECIFICATION

Model No:	3EQHM14 (Group 'R')
Frequency Range:	3.5MHz to 165.0MHz
Spread Types:	See table below
EMI Reduction*:	-7dBc min. 100MHz at C0.25** -9dBc min. 100MHz at C0.5** -15dBc min. 100MHz at C1.5** With reference to dB level at no modulation.
Modulation Carrier Frequency:	6.9kHz min, 55.5kHz max. Frequency dependent *Call for details*
Output Logic:	CMOS
Input Voltage:	Vdd = +3.3VDC ±5%
Frequency Stability***	
Commercial (0~70°C):	±25ppm (Spec. code = 'A') ±50ppm (Spec. code = 'B') ±100ppm (Spec. code = 'C')
Industrial (-40~+85°C):	±25ppm (Spec. code = 'D') ±50ppm (Spec. code = 'E') ±100ppm (Spec. code = 'F')
Output Voltage HIGH '1':	2.0V min., 3.2V typ. (90%Vdd)
Output Voltage LOW '0':	0.8V max., 0.2V typ. (10%Vdd)
Rise/fall Times:	4ns max, (frequency dependant)
Load:	15pF
Start-up Time:	2ms typical, 5ms max.
Storage Temperature:	-65° to +150°C
Current Consumption:	
10 ~ 50MHz:	10mA typical
50 ~ 125MHz:	18mA typical
Duty Cycle:	50%±5% (CL=15pF, 50%Vdd)
Cycle to Cycle Jitter:	±250ps typ. ±300ps max.
Output Impedance:	40 Ohms typical
Static Discharge Voltage:	>2000V (per MIL STD 833)
Ageing:	±5ppm /year max at Ta=25°C
Packaging:	EIA 16mm tape and reel, 1k per.
Pad 1 Option:	Output Enable/Disable. Output is high impedance when taken low Output enable time 100ms max.

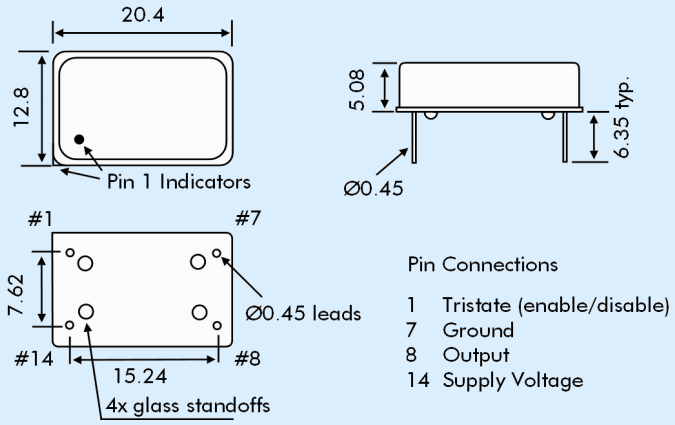
Notes:

* EMI reduction is applied to the entire frequency spectrum

** dBc: with respect to no modulation. Frequency and total % spread dependant.

*** Frequency Stability parameter excludes modulation.

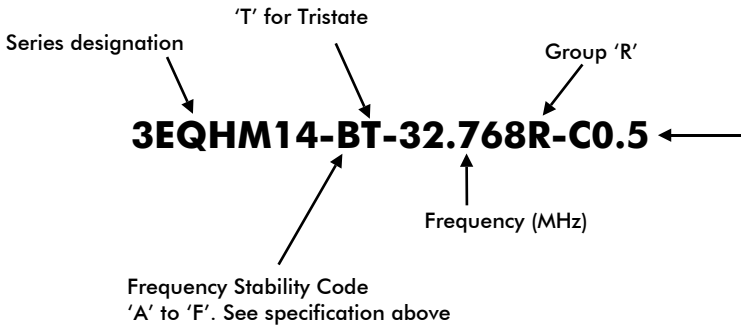
OUTLINE & DIMENSIONS



ENVIRONMENTAL SPECIFICATION

RoHS Compliance:	RoHS compliant and Pb (lead) free
Storage Temperature Range:	-55° to +125°C
Humidity:	85% RH, 85°C for 48 hours
Hermetic Seal:	Leak Rate $2x10^{-8}$ ATM-cm^3/s max.
Solderability:	MIL-STD-2002F method 208E
Reflow:	260° for 10 seconds
Vibration:	MIL-STD-202F method 204, 35g 50Hz to 2000Hz
Shock:	MIL-STD-202F method 213B, test condition: E, 1000g ½ sine wave

PART NUMBER CONFIGURATION



AVAILABILITY OF SPREAD TYPES AND MODULATION RATES

SPREAD TYPES and % MODULATION	
DOWN SPREAD	
D1.0	-1%
D3.0	-3%
CENTRE SPREAD	
C0.5	±0.5%
C1.5	±1.5%

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