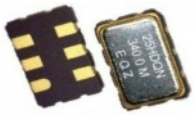
QF Series LVDS Oscillators

'HDQF' Specification Low Jitter Oscillators 10MHz to 1450MHz

FEATURES

- **Low jitter <1.0ps phase jitter**
- **Wide frequency Range 10.0MHz to 1450MHz**
- **Very short delivery leadtimes**
- **Low supply current <16mA at 100MHz**
- **Supply voltage range 2.5V or 3.3Volts**
- **Tristate function to conserve power**



('536' package displayed)

DESCRIPTION

'HDQF' series oscillators have been developed as a precision frequency control component, providing a LVDS output clock oscillator with low current consumption, wide operating frequency range and an integrated phase jitter performance of 1.0ps r.m.s. The part is available in two industry-standard packages, 7 x 5mm SMD and 5 x 3.2mm SMD.

GENERAL SPECIFICATION

Output Logic Type:	LVDS
Frequency Range:	10.0MHz to 1450MHz
Load:	Differential
Power Supply Voltage:	2.5±5%VDC or +3.3±10%VDC
Differential Output Voltage:	(V_{DD}) 175mV min., 350mV typical
V_{DD} Magnitude Change (ΔV_{DD}):	50mV max.
Offset Voltage (V_{OS}):	1.25V typical
V_{OS} Magnitude Change (ΔV_{OS}):	50mV max.
Frequency Stability:	±50ppm over -40° to +85°C*
Duty Cycle:	50%±2%
Rise Time:	150ps minimum**
Fall Time:	250ps maximum**
Current Consumption @+2.5V_{DD}	
100.000MHz:	16mA
250.000MHz:	18mA
500.00MHz:	21mA
750.00MHz:	22mA
1GHz:	24mA
1.35GHz:	26mA
Current Consumption @+3.3V_{DD}	
100.000MHz:	18mA
250.000MHz:	20mA
500.00MHz:	22mA
750.00MHz:	24mA
1GHz:	26mA
1.35GHz:	28mA
Current with output disabled:	16mA typical
Start-up Time:	10ms maximum
Ageing:	±2ppm max., first year, ±10ppm max. over 10 years.
OE Control on Pad 1	
Enable:	0.7% V_{DD} min., or no connection
Disable:	0.3%V_{DD} max., (high impedance).
Output Enable Time:	200ns max.
Output Disable Time:	50ns max.
Phase Jitter r.m.s.:	0.6ps typical (12kHz to 20MHz) <100fs (1.875MHz to 20MHz)

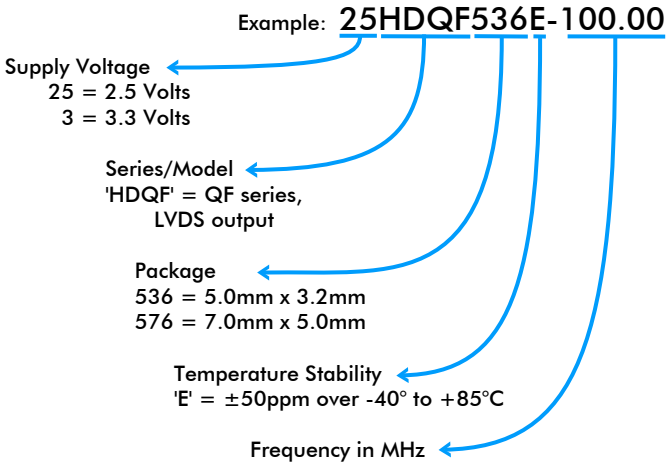
Notes:

* *Stability code for ±50ppm over -40° to +85°C is 'E.' Other stabilities are available, contact Euroquartz for details.*

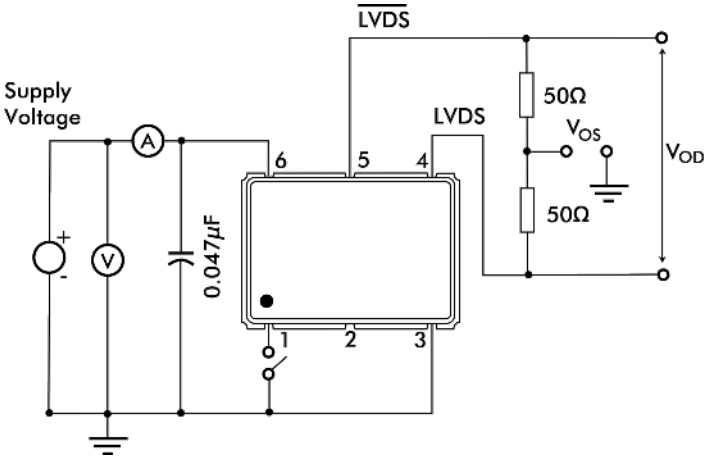
* *Note that Frequency stability quoted is inclusive of all conditions, Calibration Tolerance at 25°C, stability over operating temperature range, 1st year ageing at 25°C, supply voltage & output load changes and shock & vibration.*

** *Rise/Fall times are measure between 10% to 90%V_{DD}*

PART NUMBERING

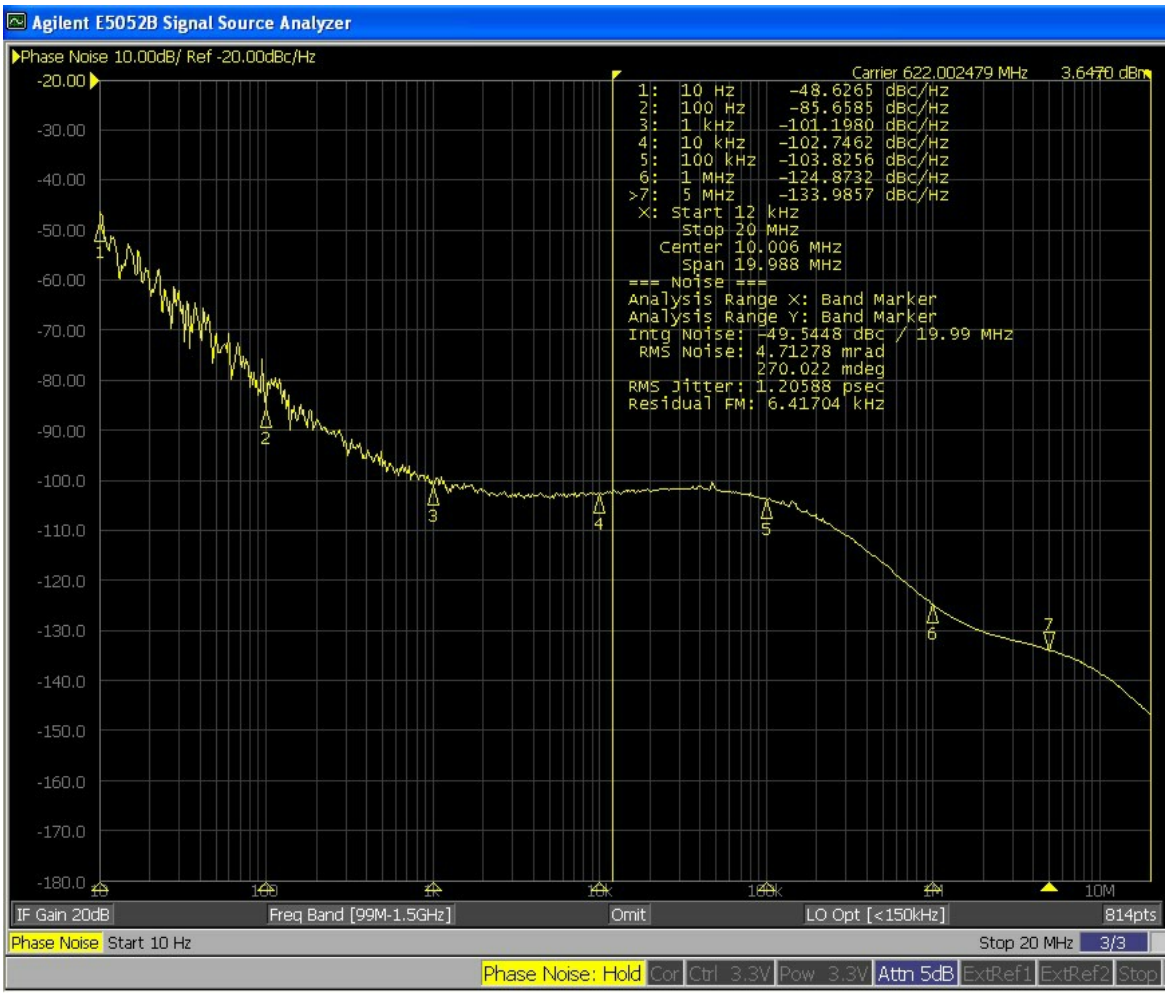


TEST CIRCUIT



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

HDQF SERIES PHASE NOISE & PHASE JITTER DATA

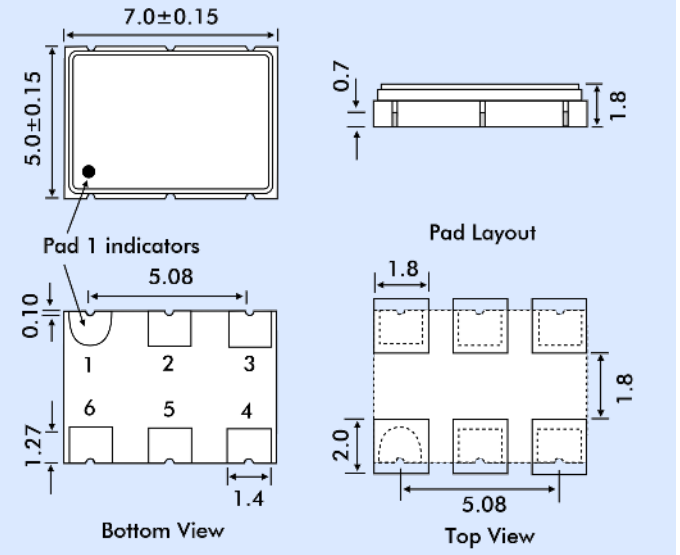


HDQF SERIES PHASE NOISE & PHASE JITTER DATA

	Frequency (MHz)	77.76	122.88	125.00	156.25	212.5	491.25	655.08	1000	1250
SSB Phase Noise Data (dBc/Hz typical)	10Hz offset	-57	-68	-69	-67	-62	-61	-48	-52	-32
	100Hz offset	-94	-99	-97	-92	-93	-86	-85	-82	-68
	1kHz offset	-114	-113	-114	-112	-105	-100	-101	-93	-94
	10kHz offset	-123	-119	-124	-121	-116	-105	-102	-97	-103
	100kHz offset	-124	-120	-129	-124	-118	-105	-103	-97	-105
	1MHz offset	-144	-140	-136	-136	-139	-126	-124	-116	-114
	5MHz offset	-152	-148	-154	-153	-143	-137	-133	-127	-136
Phase Jitter (ps) (12kHz ~ 20MHz. r.m.s.)		0.9	0.8	1.1	0.9	1.0	1.1	1.2	1.5	1.1

OUTLINE & DIMENSIONS

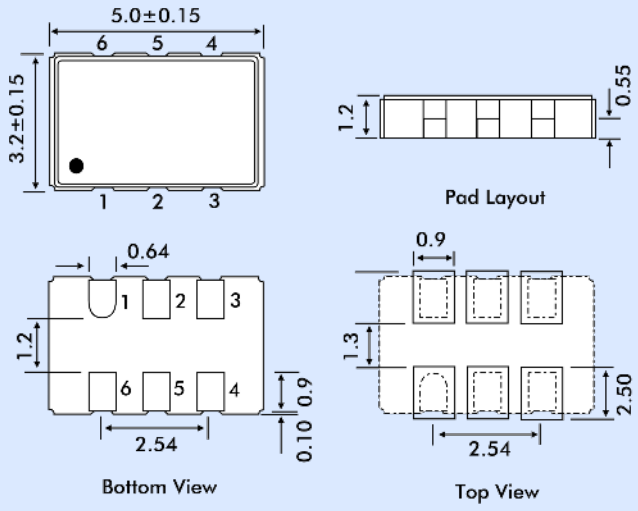
7.0 x 5.0mm SMD Package



Pad Connections

1 OE High Enable
2 No connection
3 Ground
4 Output
5 $\overline{\text{Output}}$
6 Supply Voltage

5.0 x 3.2mm SMD Package



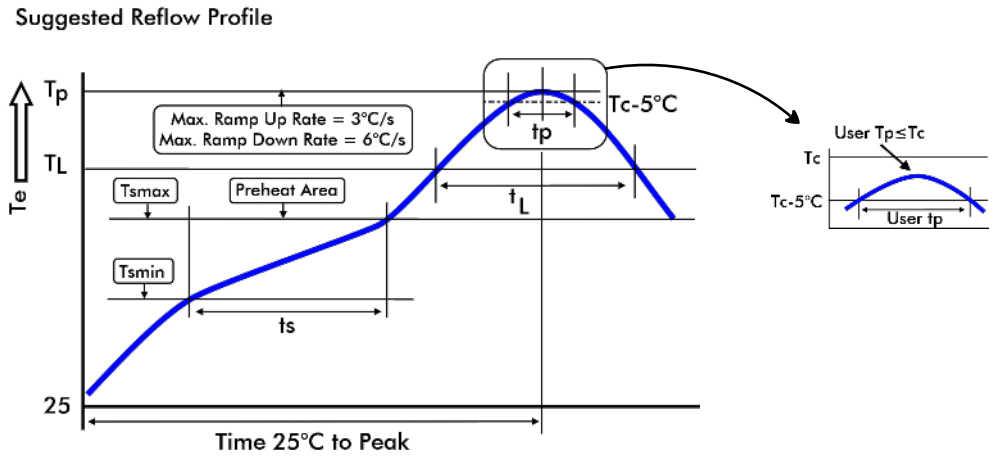
Pad Connections

1 OE High Enable
2 No connection
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5 $\overline{\text{Output}}$
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ENVIRONMENTAL PERFORMANCE SPECIFICATION

Environmental Approvals	RoHS Compliant, Pb (lead) free in accordance with EU Directive 2002/95/EC 6/6 (2002/95EC) and WEEE (2002/96/EC). Free of halide, cadmium, hexavalent chromium, lead, mercury, PBBs and PBDEs
Moisture sensitivity Level	Level 1 (infinite) according to IPC/JEDEC J-STF-020D.1
Second Level Interconnect	'e4
Storage Temperature Range	-55° to +125°C
Humidity	85%RH, 85°C, 48 hours
Fine Leak / Gross Leak	MIL-STD-202F Method 1014, Cond. A / MIL-STD-883, Method 1014, Cond C.
Solderability	MIL-STD-202F method 208E
Reflow	260°C for 10s. 2 times
Vibration	MIL-STD-202F Method 204, 35g, 50 to 2000Hz
Shock	MIL-STD-202F, Method 213B, Test Cond. E, 1000gg 1/2 sine wave.
Resistance to Solvents	MIL-STD-202, Method 215
Temperature Cycling	MIL-STD-883, Method 1010
ESD Rating	Human Body Model (HBM): 1500 V minimum.
Pad Surface Finish	Gold (Au)(0.3µm ot 1.0µm) over nickel (Ni)(1.27µm to 8.89µm)
Weight of the Device	576 package: 0.18gm typical, 536 package: 0.09gm typical.

RECOMMENDED SOLDER TEMPERATURE PROFILE



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat/Soak		
- Temperature min. (Ts min.)	100°C	150°C
- Temperature max. (Ts max.)	150°C	200°
- Time (ts) (Ts min. to Ts max.)	60 to 120 seconds	60 to 180 seconds
Ramp-up Rate (T_L to Tp)	3°C/second max.	3°C/second max.
Luiquidous temperature (T_L)	183°C	217°C
Time (tL) maintained above T_L	60 to 150 seconds	60 to 150 seconds
Peak package body temperature (Tp)	235°C	260°C
Time (Tp) within 5°C of the classification temperature Tc	10 to 30 seconds	20 to 40 seconds
Ramp-down rate (Tp to T_L)	6°C/second max.	6°C/second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.