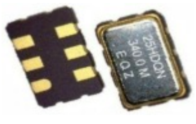
EURO QUARTZ

QN Series LVPECL Oscillators

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

FEATURES

- **Low jitter <0.6ps phase jitter**
- **Wide frequency Range 10.0MHz to 1450MHz**
- **Low supply current <46mA (100MHz)**
- **Supply voltage range 2.5V or 3.3Volts**
- **Tristate function to conserve power**


('536' package displayed)

DESCRIPTION

'HPQN' series oscillators have been developed as a precision frequency control component, providing a LVPECL output clock oscillator with low current consumption, wide operating frequency range and an integrated phase jitter performance of 0.6ps 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:	LVPECL
Frequency Range:	10.0MHz to 1450MHz
Load:	Differential
Power Supply Voltage:	2.5±5%VDC or +3.3±10%VDC
Output Voltage 'HIGH':	VDD - 1.03V minimum VDD - 0.6V maximum
Output Voltage 'LOW':	VDD - 1.85V minimum VDD - 1.6V maximum
Frequency Stability:	±50ppm over -40° to +85°C*
Duty Cycle:	50%±2%
Rise Time:	150ps minimum**
Fall Time:	250ps maximum**
Current Consumption @+2.5VDD	
100.000MHz:	46mA
250.000MHz:	48mA
500.00MHz:	53mA
750.00MHz:	56mA
1GHz:	60mA
1.35GHz:	65mA
Current Consumption @+3.3VDD	
100.000MHz:	48mA
250.000MHz:	50mA
500.00MHz:	55mA
750.00MHz:	59mA
1GHz:	62mA
1.35GHz:	68mA
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% VDD min., or no connection
Disable:	0.3%VDD 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%VDD*

PART NUMBERING

Example: 25HPQN536E-100.00

Supply Voltage
25 = 2.5 Volts
3 = 3.3 Volts

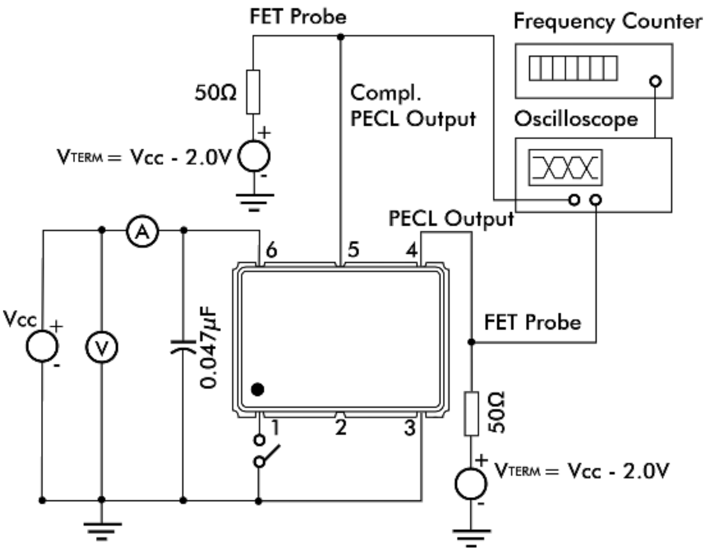
Series/Model
'HPQN' = QN series, LVPECL output

Package
536 = 5.0mm x 3.2mm
576 = 7.0mm x 5.0mm

Temperature Stability
'E' = ±50ppm over -40° to +85°C

Frequency in MHz

TEST CIRCUIT



HPQN SERIES PHASE NOISE & PHASE JITTER DATA

```
  1:  10 Hz      -51.4956 dBc/Hz
  2:  100 Hz     -77.5431 dBc/Hz
  3:  1 kHz      -99.5002 dBc/Hz
  4:  10 kHz    -109.8523 dBc/Hz
  5:  100 kHz   -114.3356 dBc/Hz
  6:  1 MHz     -121.6042 dBc/Hz
 >7:  5 MHz     -141.6723 dBc/Hz
  X: Start 12 kHz
      Stop 20 MHz
    Center 10.006 MHz
      Span 19.988 MHz
=== Noise ===
Analysis Range X: Band Marker
Analysis Range Y: Band Marker
Intg Noise: -55.9636 dBc / 19.99 MHz
 RMS Noise: 2.25079 mrad
            128.96 mdeg
RMS Jitter: 575.986 fsec
Residual FM: 3.37355 kHz
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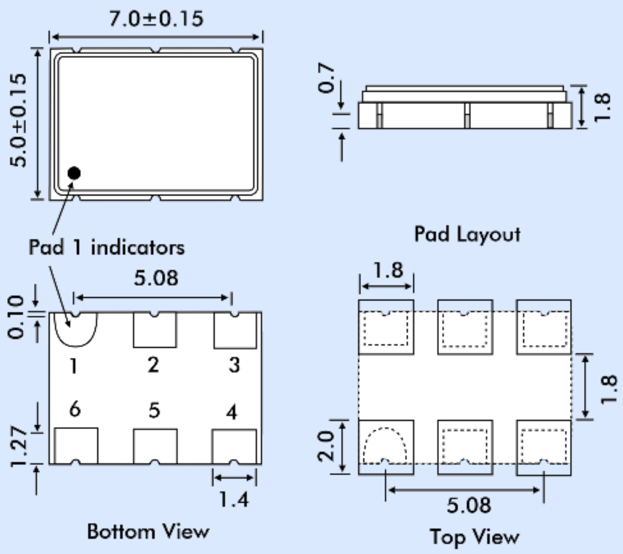
HPQN SERIES PHASE NOISE & PHASE JITTER DATA

	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**	-74	-68	-69	-67	-53	-56	-51	-46	-32
	100Hz offset	-104	-98	-97	-92	-86	-87	-77	-80	-68
	1kHz offset	-121	-114	-114	-112	-109	-101	-99	-96	-94
	10kHz offset	-130	-123	-124	-121	-118	-110	-109	-105	-103
	100kHz offset	-134	-127	-129	-124	-121	-113	-114	-108	-105
	1MHz offset	-140	-138	-136	-136	-133	-125	-121	-116	-114
	5MHz offset	-157	-155	-154	-153	-151	-143	-141	-135	-136
Phase Jitter (ps) (12kHz ~ 20MHz. r.m.s.)		0.5	0.6	0.5	0.6	0.6	0.6	0.5	0.7	0.6

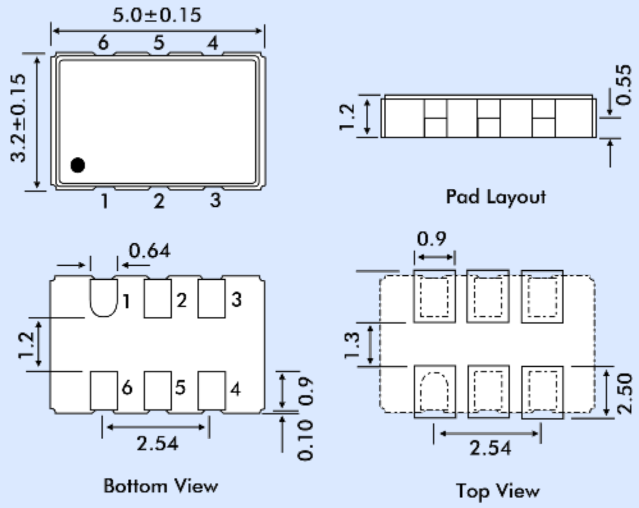
OUTLINE & DIMENSIONS

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
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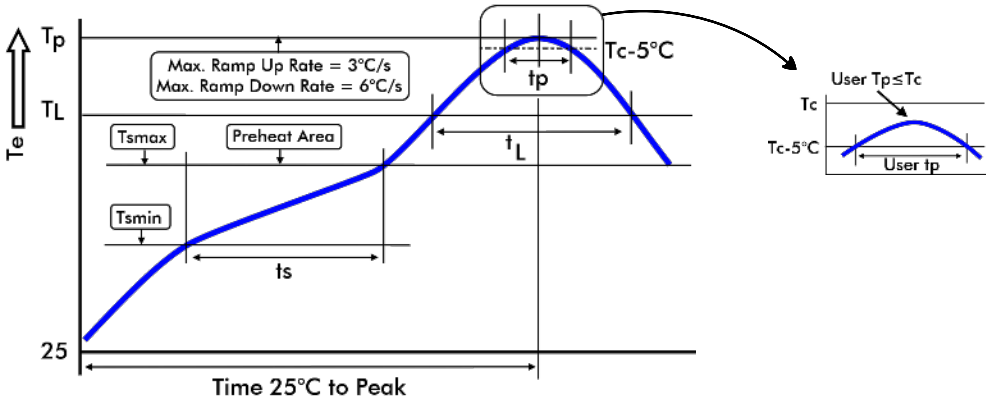
ENVIRONMENTAL PERFORMANCE SPECIFICATION

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 Cyscling	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

Suggested Reflow Profile



Profile Feature	**Sn-Pb Eutectic Assembly**	**Pb-Free Assembly**
Preheat/Soak - Temperature min. (Ts min.) - Temperature max. (Ts max.) - Time (ts) (Ts min. to Ts max.)	 100°C 150°C 60 to 120 seconds	 150°C 200° 60 to 180 seconds
Ramp-up Rate (T_L to Tp)	3°C/second max.	3°C/second max.
Luiquidous temperature (T_L) Time (tL) maintained above T_L	183°C 60 to 150 seconds	217°C 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.