

### 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

'GDQF' series oscillators are a precision frequency control component, providing a LVDS output VCXO with low current consumption, a wide frequency range with 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 <sub>DD</sub> ) 175mV min., 350mV typical
V <sub>DD</sub> Magnitude Change (ΔV <sub>DD</sub> ):	50mV max.
Offset Voltage (V <sub>OS</sub> ):	1.25V typical
V <sub>OS</sub> Magnitude Change (ΔV <sub>OS</sub> ):	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 <sub>DD</sub>	
100.000MHz:	16mA
250.000MHz:	18mA
500.00MHz:	21mA
750.00MHz:	22mA
1GHz:	24mA
1.35GHz:	26mA
Current Consumption @+3.3V <sub>DD</sub>	
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 <sub>DD</sub> min., or no connection
Disable:	0.3%V <sub>DD</sub> 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)

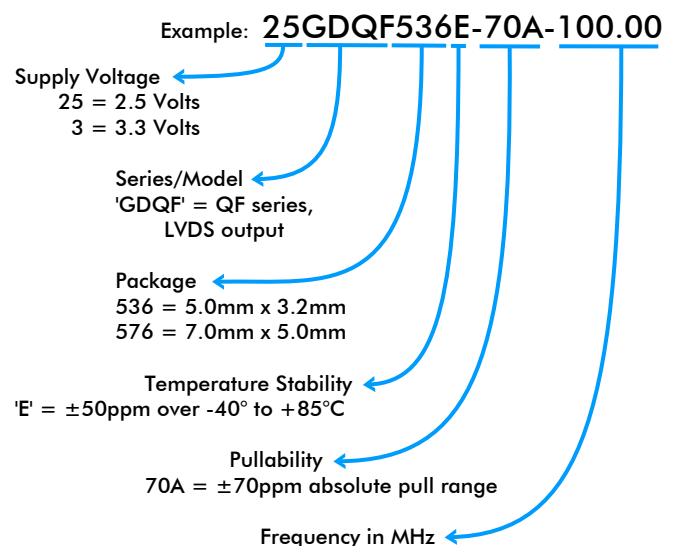
#### Notes:

- \* Stability code for ±50ppm over -40° to +85°C is 'E.' Other stabilities are available, contact Euroquartz for details.
- \* **Absolute Pull Range (APR)**  
APR guarantees the PLL remains locked (enough frequency deviation range) taking into account all the conditions of a VCXO. These conditions include frequency tolerance, frequency-temperature stability, load variation, supply voltage variation and ageing of the VCXO (known as "Total VCXO Frequency Errors"). Therefore APR in ppm = (Total frequency deviation of the VCXO in ppm) - (Total frequency errors of the VCXO in ppm)
- \*\* Rise/Fall times are measured between 10% to 90%V<sub>DD</sub>

### CONTROL VOLTAGE FUNCTION (Pad 1)

Supply Voltage (V <sub>DD</sub> )	+2.5 Volts	+3.3 Volts
VCON Centre:	+1.25 Volts	+1.65 Volts
V. Control Range:	+0.2V~+2.3V	+0.3V~+3.0V
Absolute Pulling Range (APR):	±70ppm	
Linearity:	±3% typical, ±10% max.	
Transfer Function:	Positive transfer	
Absolute Voltage:	2.8 Volts Max.	4.0 Volts max.
Input Impedance:	1MΩ typical	
Bandwidth:	50kHz min., measured at -3dB	

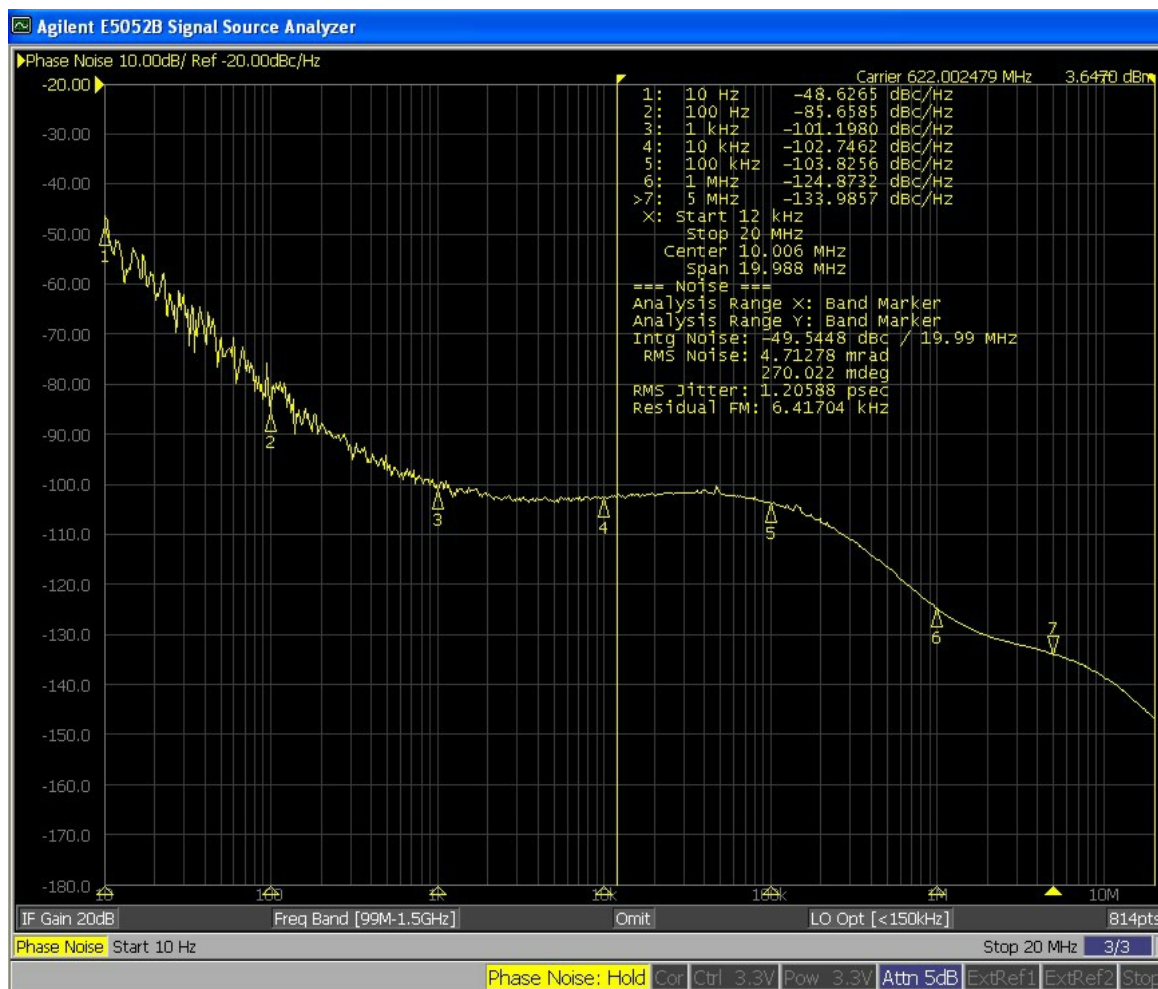
### PART NUMBERING



### ABSOLUTE MAXIMUM RATINGS

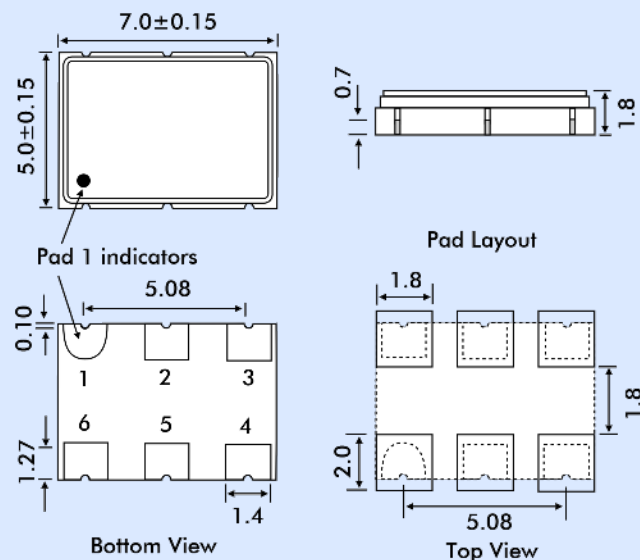
Power Supply Voltage (V <sub>DD</sub> )	+4.0V maximum
Input Voltage	-0.5V min.; V <sub>DD</sub> +0.5V max.
Output Voltage	-0.5V min.; V <sub>DD</sub> +0.5V max.
Operation Junction Temperature	-40°C min.; +125°C max.

### GPQF SERIES PHASE NOISE & PHASE JITTER DATA

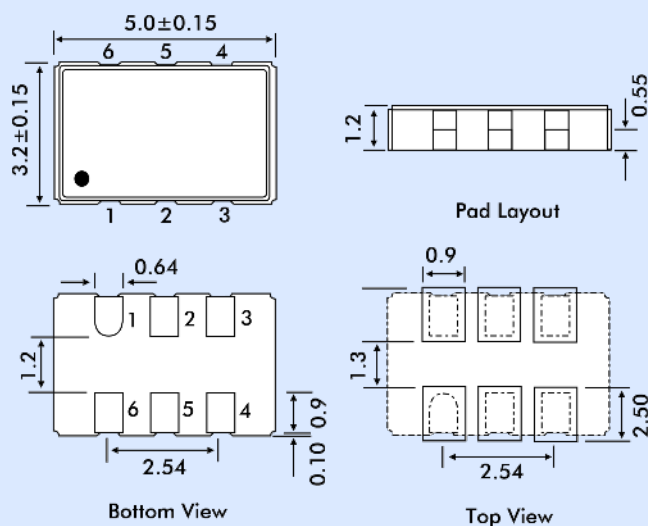


### GPQF SERIES PHASE NOISE & PHASE JITTER DATA

	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 Control Voltage
- 2 OE High Enable
- 3 Ground
- 4 Output
- 5 No connection
- 6 Supply Voltage

**5.0 x 3.2mm SMD Package**

**Pad Connections**

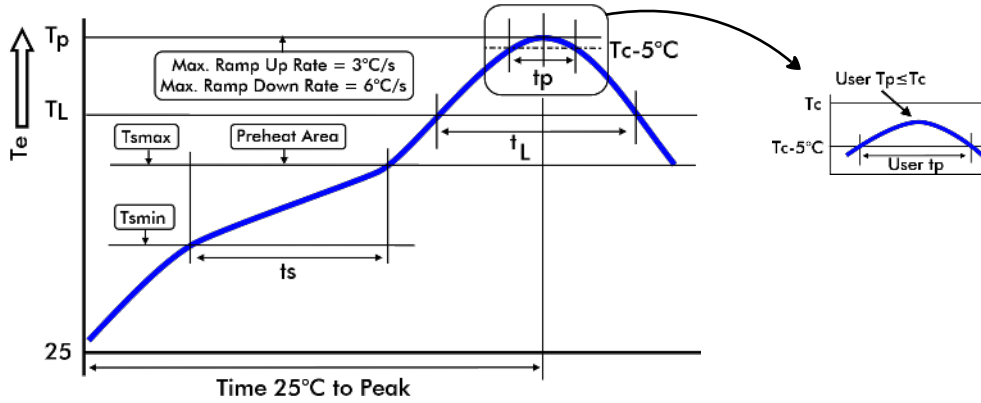
- 1 Control Voltage
- 2 OE High Enable
- 3 Ground
- 4 Output
- 5 No connection
- 6 Supply Voltage

**ENVIRONMENTAL PERFORMANCE SPECIFICATION**

<b>Environmental Approvals</b>	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
<b>Moisture sensitivity Level</b>	Level 1 (infinite) according to IPC/JEDEC J-STF-020D.1
<b>Second Level Interconnect</b>	'e4
<b>Storage Temperature Range</b>	-55° to +125°C
<b>Humidity</b>	85%RH, 85°C, 48 hours
<b>Fine Leak / Gross Leak</b>	MIL-STD-202F Method 1014, Cond. A / MIL-STD-883, Method 1014, Cond C.
<b>Solderability</b>	MIL-STD-202F method 208E
<b>Reflow</b>	260°C for 10s. 2 times
<b>Vibration</b>	MIL-STD-202F Method 204, 35g, 50 to 2000Hz
<b>Shock</b>	MIL-STD-202F, Method 213B, Test Cond. E, 1000gg 1/2 sine wave.
<b>Resistance to Solvents</b>	MIL-STD-202, Method 215
<b>Temperature Cyscling</b>	MIL-STD-883, Method 1010
<b>ESD Rating</b>	Human Body Model (HBM): 1500 V minimum.
<b>Pad Surface Finish</b>	Gold (Au)(0.3µm of 1.0µm) over nickel (Ni)(1.27µm to 8.89µm)
<b>Weight of the Device</b>	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.)	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 (TL to Tp)	3°C/second max.	3°C/second max.
Liquidus temperature (TL)	183°C	217°C
Time (tL) maintained above TL	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 TL)	6°C/second max.	6°C/second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.

**TEST CIRCUIT**

