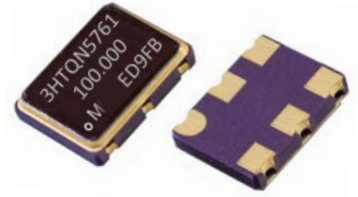


Low Jitter Crystal Oscillators

HTQN	HPQN	HDQN	0.6 ps RMS Jitter	SMD	2.5 V	3.3 V	Min. 50 MHz	Max. 250 MHz
CMOS waveform	PECL Differential	LVDS Differential						

Features

The HTQN, HPQN and HDQN Series are members of MATEL's Low Jitter Crystal Oscillators that can be delivered within days. With low current consumption (42 mA for PECL 400.000 MHz at 3.3V) and an integrated phase jitter performance of 0.6 pS RMS, they have gained its precision frequency control market position by providing engineers with next-day samples for prototypes and low cost, fast delivery for volume production. The perfect solution to replace traditional XO's & VCXO's that use a more expensive, highfrequency, fundamental crystal and a noisy PLL multiplier circuit



General specifications , at Ta=+25°C

Model	HTQN	HPQN	HDQN					
Output Logic	CMOS	PECL	LVDS					
Supply Voltage V _{DD} (code)	+ 2.5 V ± 5% (voltage code " 25 ") + 3.3 V ± 10% (voltage code " 3 ")	+ 2.5 V ± 5% (voltage code " 25 ") + 3.3 V ± 10% (voltage code " 3 ")	+ 2.5 V ± 5% (voltage code " 25 ") + 3.3 V ± 10% (voltage code " 3 ")					
Available Frequency Range	50 ~ 250 MHz	150 ~ 1,500 MHz	150 ~ 1,500 MHz					
Output Load	15 pF	50 Ω into V _{CC} - 2V or Thevenin equivalent	100 Ω					
Output Logic " High " , " 1 "	90 % V _{DD}	V _{DD} - 1.03 (min.) , V _{DD} - 0.6 (max.)	1.4 V Typical , 1.6 V max.					
Output Logic " Low " , " 0 "	10 % V _{DD}	V _{DD} - 1.85 (min.) , V _{DD} - 1.6 (max.)	1.1 V Typical , 0.9 V min.					
Current with Output Disable	16 mA (typ.)	16 mA (typ.)	16 mA (typ.)					
Current Consumption (max.) (V _{DD} = + 3.3V)	50 ~ 100 MHz : 30 mA	150 ~ 250 MHz : 50 mA	150 ~ 250 MHz : 30 mA					
	101 ~ 150 MHz : 38 mA	251 ~ 750 MHz : 55 mA	251 ~ 750 MHz : 34 mA					
	151 ~ 200 MHz : 43 mA	751 ~ 1000 MHz : 57 mA	751 ~ 1,000 MHz : 38 mA					
	201 ~ 250 MHz : 48 mA	1001 ~ 1500 MHz : 60 mA	1001 ~ 1,500 MHz : 40 mA					
Rise Time / Fall Time	1.5 nsec. (typ.) , 3.0 nsec. (max.) Tr / Tf : 10% □ 90% waveform	0.2 nsec. (typ.) , 0.5 nsec. (max.) Tr / Tf : 20% □ 80% waveform	0.2 nsec. (Typ.) , 0.5 nsec. (max.) Tr / Tf : 20% □ 80% waveform					
Start-up Time	10 msec. (max.)	5.0 msec. (typ.) , 10 msec. (max.)	5.0 msec. (typ.) , 10 msec. (max.)					
Aging at Ta = +25°C	± 5 ppm (max.) for first year	± 3 ppm (max.) first year ; ± 2 ppm (max.) per year thereafter	± 3 ppm (max.) first year ; ± 2 ppm (max.) per year thereafter					
Duty Cycle	50 % ± 5%							
Storage Temperature	-55°C to + 150°C							
RMS Jitter (12 KHz to 20 MHz)	0.6 psec (typ.)							
SSB Phase Noise [dBc / Hz (typ.)]	Offset	10 Hz	100 Hz	1 KHz	10 KHz	100 KHz	1 MHz	10 MHz
	156.250 MHz	-55	- 85	-109	-116	-118	-139	-146
	622.08 MHz	-48	- 85	-101	-102	-103	-124	-133
Frequency Stability Codes	Frequency Stability over Operating Temperature Range		± 25 ppm	± 50 ppm	± 100 ppm	If non-standard , please enter the desired stability after the "C " or " I " represents . For example : " C20 " ± 20 ppm over -10°C to +70°C ; " I30 " ± 30 ppm over -40°C to +85°C		
	Commercial (-10°C to +70°C)		A	B	C			
	Industrial (-40°C to +85°C)		D	E	F			
Output Enable / Disable Function	Enable	When 70% (min.) of V _{DD} to Enable Output. Enable time : 200 nsec. (max.)						
	Disable	When 30% (max.) of V _{DD} to Disable Output. Disable current : 16 mA (max.) , Disable time : 50 nsec. (max.)						



Crystal Oscillators

HTQN

CMOS waveform

HPQN

PECL Differential

HDQN

LVDS Differential

0.6 ps RMS Jitter

SMD

2.5 V

3.3 V

Part Number Format and Example

	[1]	[2]	[3]		[4]		[5]
	Supply Voltage	Holder Type	1 or 2	-	Frequency Stability	-	Center Frequency

Example	(1)	25	HPQN576	2	-	D	-	622.080
	(2)	3	HPQN326	1	-	A	-	100.000

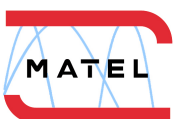
Ex (1) : **25HPQN5762 - D - 622.080** [+2.5V , H_ 576 type , PECL output , QN series , OE on pad # 2 , ±25 ppm from -40°C to 85°C , 622.080MHz]

Ex (2) : **3HPQN3261 - A - 100.000** [+3.3V , H_ 326 type , PECL output , QN series , OE on pad # 1 , ±25 ppm from -10°C to 70°C , 100.000MHz]

[1]	Supply voltage , " 2.5 " for +2.5V ; " 3 " for +3.3V	
[2]	Holder Type	
[3]	" 1 " : OE function on pad # 1 , " 2 " : OE function on pad # 2	
[4]	-10°C ~ 70 °C	" A " ± 25ppm ; " B " ± 50ppm ; " C " ± 100ppm ; If non-standard please enter the desired stability after " C " , for example " C15 " : represents ±15ppm over -10 to +70°C
	-40°C ~ 85 °C	" D " ± 25ppm ; " E " ± 50ppm ; " F " ± 100ppm ; If non-standard please enter the desired stability after " I " , for example " I30 " : represents ± 30ppm over -40 to +85°C
[5]	Frequency in MHz	

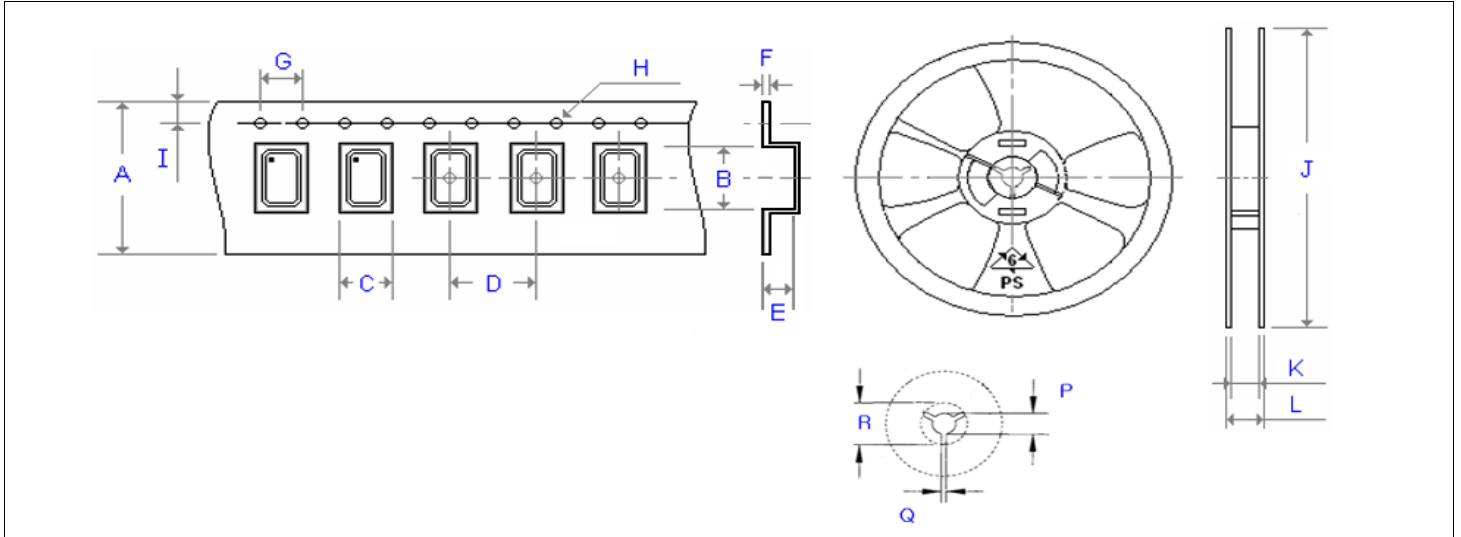
Outline Dimensions (Unit : mm) , Suggested pad Layout for SMDs ; Test Circuit

<p style="text-align: center;">[H_QN326]</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Top View</p> </div> <div style="text-align: center;"> <p>Bottom View</p> </div> <div style="text-align: center;"> <p>Land Pattern</p> </div> </div> <div style="margin-top: 10px;"> <p>Side View</p> </div> <p style="margin-top: 10px;">Pad Connections :</p> <ul style="list-style-type: none"> Pad 1 : OE Pad 2 : No Connection Pad 3 : Ground Pad 4 : Output Pad 5 : Complementary Pad 6 : Supply Voltage 	<p style="text-align: center;">[H_QN536]</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Top View</p> </div> <div style="text-align: center;"> <p>Bottom View</p> </div> <div style="text-align: center;"> <p>Land Pattern</p> </div> </div> <div style="margin-top: 10px;"> <p>Side View</p> </div> <p style="margin-top: 10px;">Pad Connections :</p> <ul style="list-style-type: none"> Pad 1 : OE Pad 2 : No Connection Pad 3 : Ground Pad 4 : Output Pad 5 : Complementary Pad 6 : Supply Voltage
<p style="text-align: center;">LVPECL Test Circuit</p> <p style="font-size: small; margin-top: 5px;"> $V_{DD} = 3.3V ; R1 = R3 = 127 \Omega ; R2 = R4 = 82.5 \Omega$ $V_{DD} = 2.5V ; R1 = R3 = 250 \Omega ; R2 = R4 = 62.5 \Omega$ </p>	<p style="text-align: center;">[H_QN576]</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Top View</p> </div> <div style="text-align: center;"> <p>Bottom View</p> </div> <div style="text-align: center;"> <p>Land pattern</p> </div> </div> <div style="margin-top: 10px;"> <p>Side View</p> </div> <p style="margin-top: 10px;">Pad Connections :</p> <ul style="list-style-type: none"> Pad 1 : OE Pad 2 : No Connection Pad 3 : Ground Pad 4 : Output Pad 5 : Complementary Pad 6 : Supply Voltage
<p style="text-align: center;">LVPECL Test Circuit</p>	<p style="text-align: center;">LVDS Test Circuit</p>



Emboss Taping and Reel Specifications

[Crystal Oscillator Units]

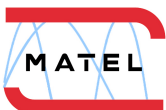


Carrier Type Dimensions (unit : mm) ±0.3mm

	A	B	C	D	E	F	G	H	I	pcs / reel
H21	8.00	2.30	1.90	4.00	0.90	0.25	4.00	Ø 1.50	1.75	3000
H_22	8.00	2.80	2.25	4.00	1.10	0.30	4.00	Ø 1.50	1.75	3000
H_32	8.00	3.40	2.70	4.00	1.40	0.25	4.00	Ø 1.50	1.75	3000
H_53	12.00	5.30	3.60	8.00	1.40	0.30	4.00	Ø 1.50	1.75	1000
H_57	16.00	7.30	5.30	8.00	1.90	0.32	4.00	Ø 1.50	1.75	1000
SWO	16.00	7.20	5.40	8.00	1.80	0.32	4.00	Ø 1.50	1.75	1000
H_226	8.00	2.80	2.25	4.00	1.10	0.30	4.00	Ø 1.50	1.75	3000
H_326	8.00	3.40	2.70	4.00	1.40	0.25	4.00	Ø 1.50	1.75	3000
H_536	12.00	5.30	3.60	8.00	1.40	0.30	4.00	Ø 1.50	1.75	1000
H_576	16.00	7.30	5.30	8.00	1.90	0.32	4.00	Ø 1.50	1.75	1000
H_JF328	8.00	3.40	2.70	4.00	1.40	0.25	4.00	Ø 1.50	1.75	3000
H_JF538	12.00	5.30	3.60	8.00	1.40	0.30	4.00	Ø 1.50	1.75	1000
H_JF578	16.00	7.30	5.30	8.00	1.90	0.32	4.00	Ø 1.50	1.75	1000

Reel Dimensions (unit : mm) ±2mm

	J	K	L	P	Q	R	pcs / reel
H21	180.00	9.00	12.000	13.00	2.50	20.20	3000
H_22	180.00	8.40	11.400	13.00	2.50	20.20	3000
H_32	180.00	9.00	12.000	13.00	2.50	20.20	3000
H_53	180.00	13.00	16.000	13.00	2.50	20.20	1000
H_57	180.00	17.20	19.300	13.00	2.50	20.20	1000
SWO	180.00	17.20	19.300	13.00	2.50	20.20	1000
H_226	180.00	8.40	11.400	13.00	2.50	20.20	3000
H_326	180.00	9.00	12.000	13.00	2.50	20.20	3000
H_536	180.00	13.00	16.000	13.00	2.50	20.20	1000
H_576	180.00	17.20	19.300	13.00	2.50	20.20	1000
H_JF328	180.00	8.00	12.000	13.00	2.50	20.20	3000
H_JF538	180.00	13.00	16.000	13.00	2.50	20.20	1000
H_JF578	180.00	17.20	19.300	13.00	2.50	20.20	1000



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