

Differential Crystal Oscillators with No PLL

Differential

HPK

PECL Differential

HDK

LVDS Differential

HCK

HCSSL Differential

SMD

1.8 V

2.5 V

3.3 V

Min.

13.5 MHz

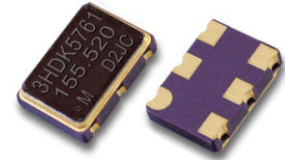
Max.

220.0 MHz

Features

- Femto second integrated phase jitter (200 fs (typ.) , 12 KHz to 20 MHz)
- Superior phase noise (-138 dBc/Hz at 10 KHz and -144 dBc/Hz at 100 KHz offset)

Jitter 0.2 pS (typical)



General specifications , at Ta=+25°C

Model	HPK	HDK	HCK				
Output Logic	PECL	LVDS	HCSSL				
Package (dimensions) unit : mm	HPK2261 (2.5 * 2.0 * 1.0) HPK3261 (3.2 * 2.5 * 1.0) HPK5361 (5.0 * 3.2 * 1.2) HPK5761 (7.0 * 5.0 * 1.7)	HDK2261 (2.5 * 2.0 * 1.0) HDK3261 (3.2 * 2.5 * 1.0) HDK5361 (5.0 * 3.2 * 1.2) HDK5761 (7.0 * 5.0 * 1.7)	HCK2261 (2.5 * 2.0 * 1.0) HCK3261 (3.2 * 2.5 * 1.0) HCK5361 (5.0 * 3.2 * 1.2) HCK5761 (7.0 * 5.0 * 1.7)				
Available Frequency Range	13.5 MHz ~ 220.0 MHz	13.5 MHz ~ 220.0 MHz	13.5 MHz ~ 220.0 MHz				
Supply Voltage (V _{DD})	-- +2.5 V ± 5% +3.3 V ± 10%	+1.8 V ± 5% +2.5 V ± 5% +3.3 V ± 10%	+1.8 V ± 5% +2.5 V ± 5% +3.3 V ± 10%				
Current Consumption (V _{DD} = + 3.3V)	30 mA (typ.) , 50 mA (max.)	16 mA (typ.) , 27 mA (max.)	17 mA (typ.) , 30 mA (max.)				
Output Logic " High " , " 1 "	V _{DD} - 1.03 (min.) , V _{DD} - 0.6 (max.)	1.4 V (typ.) ; 1.6 V (max.)	550 mV (min.) , 850 mV (max.)				
Output Logic " Low " , " 0 "	V _{DD} - 1.85 (min.) , V _{DD} - 1.6 (max.)	0.9 V (min.) ; 1.1 V (typ.)	-150 mV (min.) , 150 mV (max.)				
Rise Time / Fall Time (20%↔80% of waveform)	0.3 nsec. (typ.) , 0.6 nsec. (max.)	0.3 nsec. (typ.) , 0.5 nsec. (max.)	0.3 nsec. (typ.) , 0.6 nsec. (max.)				
Output Voltage Swing	595 mV (min.) , 750 mV (typ.) , 930 mV (max.)	250 mV (min.) , 350 mV (typ.) , 450 mV (max.)	400 mV (min.)				
Output Load	50 Ω into V _{CC} - 2V or Thevenin equivalent	100 Ω between output and complimentary output	50 Ω to ground on each output				
Start-up Time	5.0 ms (typ.) , 10 m sec. (max.)						
Duty Cycle	50% ± 5%						
Storage Temperature	-55°C to + 150°C						
Aging at Ta = +25°C	± 3 ppm (max.) first year ; ± 2 ppm (max.) per year thereafter						
RMS Jitter (12 KHz to 20 MHz)	0.2 psec (typ.) ; 0.5 psec (max.) [For 156.250 MHz]						
SSB Phase Noise [dBc / Hz (typ.)]	Offset	10 Hz	100 Hz	1 KHz	10 KHz	100 KHz	1 MHz
	62.5 MHz	-50	-82	-116	-138	-144	-149
	156.250 MHz	-50	-80	-115	-135	-142	-147
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 : 10 msec (max.)					
	Disable	When 30% max. of V _{DD} to Disable Output. Disable current : 10 uA (max.)(OE ≤ 0.3V) , Disable time : 0.2 usec. (max.)					



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Crystal Oscillators

HP_ [PECL Differential]

HD_ [LVDS Differential]

HC_ [HCSL Differential]

Part Number Format and Example

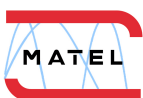
	[1]	[2]	[3]	-	[4]	-	[5]	
	Supply Voltage	Holder Type	1 or 2		Frequency Stability		Center Frequency	
Example	(1)	25	HCK536	1	-	C15	-	125.000
	(2)	18	HDK576	2	-	D	-	156.250
	(3)	3	HPK226	1	-	B	-	212.500
	(4)	25	HCJK536	1	-	A	-	125.000
	(5)	18	HDEK576	1	-	I30	-	156.250

- Ex (1) : **25HCK5361 - C15 - 125.000** [+2.5V, HCK type, HCSL output, 5.0 x 3.2 mm size, OE on pad 1, ±15 ppm from -10°C to 70°C, 125.000MHz]
 Ex (2) : **18HDK5762 - D - 156.250** [+1.8V, HDK type, LVDS output, 7.0 x 5.0 mm size, OE on pad 2, ±25 ppm from -40°C to 85°C, 156.250MHz]
 Ex (3) : **3HPK2261 - B - 212.500** [+3.3V, HPK type, LVPECL output, 2.5 x 2.0 mm size, OE on pad 1, ±50 ppm from -10°C to 70°C, 212.500MHz]
 Ex (4) : **25HCJK5361 - A - 125.000** [+2.5V, HCJK type, HCSL output, 5.0 x 3.2 mm size, OE on pad 1, ±25 ppm from -10°C to 70°C, 125.000MHz]
 Ex (5) : **18HDEK5761 - I30 - 156.250** [+1.8V, HDEK type, LVDS output, 7.0 x 5.0 mm size, OE on pad 1, ±30 ppm from -40°C to 85°C, 156.250MHz]

[1]	Supply voltage, " 18 " for +1.8V ; " 25 " 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 Circuits

[H_K226]	[H_K326]	
<p>Top View: 2.5 ± 0.1, 2.0 ± 0.1 Bottom View: 0.5, 0.6, 0.6, 0.9 Land Pattern: 0.6, 0.6, 0.85, 0.9 Side View: 1.0 ± 0.1</p> <p>Pad Connections : Pad 1 : OE Pad 2 : No Connection Pad 3 : Ground Pad 4 : Output Pad 5 : Complementary Pad 6 : Supply Voltage</p>	<p>Top View: 3.2 ± 0.1, 2.5 ± 0.1 Bottom View: 0.6, 0.8, 1.2 Land Pattern: 0.9, 1.1, 2.4, 0.5 Side View: 1.0 ± 0.1</p> <p>Pad Connections : Pad 1 : OE Pad 2 : No Connection Pad 3 : Ground Pad 4 : Output Pad 5 : Complementary Pad 6 : Supply Voltage</p>	
[H_K536]	[H_K576]	
<p>Top View: 5.0 ± 0.2, 3.2 ± 0.2 Bottom View: 0.1, 2.54, 2.1, 0.9, 0.64 Land Pattern: 0.84, 1.3, 2.54, 2.5 Side View: 1.2 ± 0.1</p> <p>Pad Connections : Pad 1 : OE Pad 2 : No Connection Pad 3 : Ground Pad 4 : Output Pad 5 : Complementary Pad 6 : Supply Voltage</p>	<p>Top View: 7.0 ± 0.2, 5.0 ± 0.2 Bottom View: 1.2 ± 0.1, 1.4 ± 0.1, 5.08, 3.7 Land Pattern: 5.08, 4.2, 1.8, 2.54, 2.0 Side View: 1.7 ± 0.1</p> <p>Pad Connections : Pad 1 : OE Pad 2 : No Connection Pad 3 : Ground Pad 4 : Output Pad 5 : Complementary Pad 6 : Supply Voltage</p>	
LVPECL Test Circuit	LVDS Test Circuit	HCSL Test Circuit
<p>V_{DD} = 3.3V ; R₁ = R₃ = 127 Ω ; R₂ = R₄ = 82.5 Ω V_{DD} = 2.5V ; R₁ = R₃ = 250 Ω ; R₂ = R₄ = 62.5 Ω</p>		<p>Rs = 0 to 33Ω to minimize ringing in application.</p>

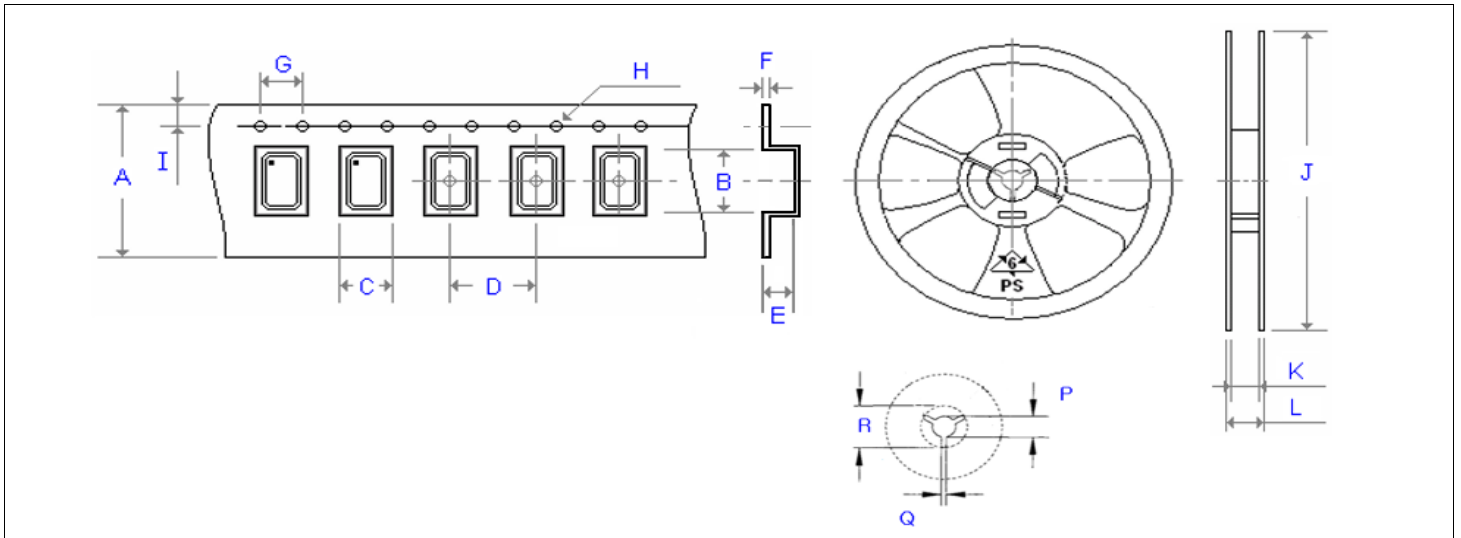


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Emboss Taping and Reel Specifications

[Crystal Oscillator Units]

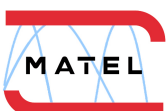


Carrier Type Dimensions (unit : mm) ±0.3mm

	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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