

Differential Crystal Oscillators with No PLL

Differential

HPRK

LVPECL Differential

HDRK

LVDS Differential

HCRK

HCSL Differential

SMD

1.8 V

2.5 V

3.3 V

Min.

10.0 MHz

Max.

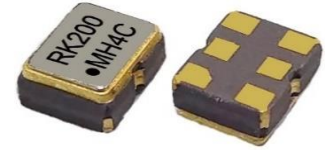
250 MHz

Features

Jitter 0.1 pS (typical)

- Femtosecond integrated phase jitter (84 fs (typ.) , 12 KHz to 20 MHz)
- Superior phase noise (-139 dBc/Hz at 10 KHz and -148 dBc/Hz at 100 KHz offset)

General specifications , at Ta=+25°C



Model	HPRK	HDRK			HCRK			
Output Logic	LVPECL	LVDS			HCSL			
Package (dimensions) unit : mm	HPRK2261 (2.5 * 2.0 * 1.0) HPRK3261 (3.2 * 2.5 * 1.0) HPRK5361 (5.0 * 3.2 * 1.2) HPRK5761 (7.0 * 5.0 * 1.7)	HDRK2261 (2.5 * 2.0 * 1.0) HDRK3261 (3.2 * 2.5 * 1.0) HDRK5361 (5.0 * 3.2 * 1.2) HDRK5761 (7.0 * 5.0 * 1.7)			HCRK2261 (2.5 * 2.0 * 1.0) HCRK3261 (3.2 * 2.5 * 1.0) HCRK5361 (5.0 * 3.2 * 1.2) HCRK5761 (7.0 * 5.0 * 1.7)			
Available Frequency Range	10 MHz ~ 250 MHz	10 MHz ~ 250 MHz	120 MHz ~ 250 MHz	20 MHz ~ 50 MHz				
				100 MHz ~ 200 MHz				
Supply Voltage (V _{DD})	--	--	+1.8 V ± 5%	--				
	+2.5 V ± 5%	+2.5 V ± 5%	--	+2.5 V ± 5%				
	+3.3 V ± 10%	+3.3 V ± 10%	--	+3.3 V ± 10%				
Current Consumption (V _{DD} = + 3.3V)	32 mA (typ.) 60 mA (max.)	10 mA (typ.) 25 mA (max.)	8 mA (typ.) 16 mA (max.)	17 mA (typ.) 25 mA (max.)				
Output Logic " High " , " 1 "	V _{DD} - 1.03 (min.) V _{DD} - 0.6 (max.)	1.4 V (typ.) 1.6 V (max.)	0.8 V (typ.) 1.0 V (max.)	550 mV (min.) 1.0 V (max.)				
Output Logic " Low " , " 0 "	V _{DD} - 1.85 (min.) V _{DD} - 1.6 (max.)	0.9 V (min.) 1.1 V (typ.)	0.3 V (min.) 0.5 V (typ.)	-150 mV (min.) 150 mV (max.)				
Rise Time / Fall Time (20%↔80% of waveform)	0.3 nsec. (typ.) 0.5 nsec. (max.)	0.2 nsec. (typ.) 0.35 nsec. (max.)	0.2 nsec. (typ.) 0.35 nsec. (max.)	0.2 nsec. (typ.) 0.35 nsec. (max.)				
Output Voltage Swing	500 mV (min.) , 750 mV (typ.)	300 mV (min.) , 400 mV (typ.) , 480 mV (max.)	200 mV (min.) , 300 mV (typ.) , 400 mV (max.)	500 mV (min.)				
Output Load	50 Ω into Vcc - 2V or Thevenin equivalent	100 Ω between output and complimentary output			50 Ω to ground on each output			
Start-up Time		0.75 msec. (typ.) , 2.0 msec. (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)		84 fsec (typ.) ; For 156.250 MHz , LVPECL 3.3V						
SSB Phase Noise [dBc / Hz (typ.)]	Offset	10 Hz	100 Hz	1 KHz	10 KHz	100 KHz	1 MHz	
	156.250 MHz	-63	-97	-134	-139	-148	-153	
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 " F " represents .		
	Commercial (-20°C to +70°C)		A	B	C	For example : " C20 " ± 20 ppm over -20°C to +70°C ; " F30 " ± 30 ppm over -40°C to +85°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 : 2 msec (max.)						
	Disable	When 30% max. of V _{DD} to Disable Output. Disable current : 30 uA (max.)(OE≤0.3V) , Disable time : 0.2 usec. (max.)						

Crystal Oscillators

HP_ [PECL Differential] HD_ [LVDS Differential] HC_ [HCSL Differential] HCL_ [LPHCSL 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	HDJK576	2	-	D	-	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 -20°C to 70°C , 125.000MHz]
 Ex (2) : **18HDJK5762 - D - 156.250** [+1.8V , HDJK type , LVDS output , 7.0 x 5.0 mm size , OE on pad 2 , ±25 ppm from -40°C to 85°C , 156.250MHz]

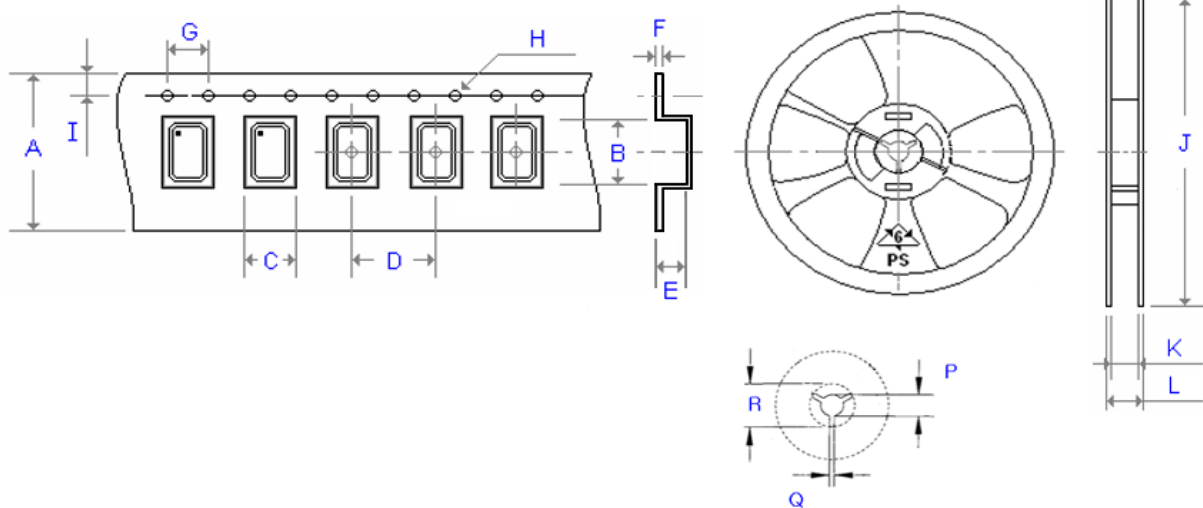
[1]	Supply voltage , " 18 " for +1.8V ; " 25 " for +2.5V ; " 3 " for +3.3V		
[2]	Holder Type		
[3]	" 1 " : OE function on pad # 1 , " 2 " : OE function on pad # 2		
[4]	-20°C ~ 70°C	" A " ± 25ppm ; " B " ± 50ppm ; " C " ± 100ppm ; If non-standard please enter the desired stability after " C " , for example " C15 " : represents ±15ppm over -20 to +70°C	
	-40°C ~ 85°C	" D " ± 25ppm ; " E " ± 50ppm ; " F " ± 100ppm ; If non-standard please enter the desired stability after " F " , for example " F30 " : represents ± 30ppm over -40 to +85°C	
[5]	Frequency in MHz		

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

H_K226 Top View Bottom View Land Pattern Side View Pad Connections : Pad 1 : OE Pad 2 : No Connection Pad 3 : Ground Pad 4 : Output Pad 5 : Complementary Pad 6 : Supply Voltage	H_K326 Top View Bottom View Land Pattern Side View Pad Connections : Pad 1 : OE Pad 2 : No Connection Pad 3 : Ground Pad 4 : Output Pad 5 : Complementary Pad 6 : Supply Voltage
H_K536 Top View Bottom View Land Pattern Side View Pad Connections : Pad 1 : OE Pad 2 : No Connection Pad 3 : Ground Pad 4 : Output Pad 5 : Complementary Pad 6 : Supply Voltage	H_K576 Top View Bottom View Land Pattern Side View Pad Connections : Pad 1 : OE Pad 2 : No Connection Pad 3 : Ground Pad 4 : Output Pad 5 : Complementary Pad 6 : Supply Voltage
LVPECL Test Circuit 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	LVDS Test Circuit
HCSL Test Circuit Rs = 0 to 33Ω to minimize ringing in application.	LPHCSL Test Circuit for HCLK only

Emboss Taping and Reel Specifications

[Crystal Oscillator Units]



Carrier Type Dimensions (unit : mm) $\pm 0.3\text{mm}$

	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	$\varnothing 1.50$	1.75	3000
H_22	8.00	2.80	2.25	4.00	1.10	0.30	4.00	$\varnothing 1.50$	1.75	3000
H_32	8.00	3.40	2.70	4.00	1.40	0.25	4.00	$\varnothing 1.50$	1.75	3000
H_53	12.00	5.30	3.60	8.00	1.40	0.30	4.00	$\varnothing 1.50$	1.75	1000
H_57	16.00	7.30	5.30	8.00	1.90	0.30	4.00	$\varnothing 1.50$	1.75	1000
SWO	16.00	7.20	5.40	8.00	1.80	0.30	4.00	$\varnothing 1.50$	1.75	1000
H_216	8.00	2.30	1.90	4.00	0.90	0.25	4.00	$\varnothing 1.50$	1.75	3000
H_226	8.00	2.80	2.25	4.00	1.10	0.30	4.00	$\varnothing 1.50$	1.75	3000
H_326	8.00	3.40	2.70	4.00	1.40	0.25	4.00	$\varnothing 1.50$	1.75	3000
H_536	12.00	5.30	3.60	8.00	1.40	0.30	4.00	$\varnothing 1.50$	1.75	1000
H_576	16.00	7.30	5.30	8.00	1.90	0.30	4.00	$\varnothing 1.50$	1.75	1000
H_328	8.00	3.40	2.70	4.00	1.40	0.25	4.00	$\varnothing 1.50$	1.75	3000
H_538	12.00	5.40	3.60	8.00	1.70	0.30	4.00	$\varnothing 1.50$	1.75	1000
H_578	16.00	7.30	5.30	8.00	1.90	0.30	4.00	$\varnothing 1.50$	1.75	1000
H_43	24.00	11.80	10.00	16.00	5.00	0.30	4.00	$\varnothing 1.50$	1.75	500

Reel Dimensions (unit : mm) $+2.0 / -0.0\text{mm}$

	J	K	L	P	Q	R	pcs / reel
H21	180.00	9.00	12.00	13.20	2.10	-	3000
H_22	180.00	9.00	12.00	13.20	2.10	-	3000
H_32	180.00	9.00	12.00	13.20	2.10	-	3000
H_53	180.00	13.00	16.00	13.20	2.50	-	1000
H_57	180.00	17.20	19.30	13.30	2.20	22.00	1000
SWO	180.00	17.20	19.30	13.30	2.20	22.00	1000
H_216	178.00	8.40	11.40	13.30	2.50	20.50	3000
H_226	180.00	8.40	11.40	13.20	2.10	-	3000
H_326	180.00	9.00	12.00	13.20	2.10	-	3000
H_536	180.00	13.00	16.00	13.20	2.50	-	1000
H_576	180.00	17.20	19.30	13.30	2.20	22.00	1000
H_328	180.00	8.00	12.00	13.20	2.10	-	3000
H_538	180.00	13.00	16.00	13.20	2.50	-	1000
H_578	180.00	17.20	19.30	13.30	2.20	22.00	1000
H_43	330.00	24.50	29.10	13.00	2.20	17.30	500