Ultra Low Jitter Differential Oscillator

Differential

HPJK	HDJK	HCJK	SMD	1.8 V	2.5 V	3.3 V	Min.	Max.
LVPECL Differential	**LVDS** Differential	**HCSL** Differential					100 MHz	250 MHz

Jitter 50 fsec (typical)

Features

- Femto second integrated phase jitter (50 fs typical , 12 KHz to 20 MHz)
- Superior phase noise (-157 dBc/Hz at 100 KHz and -164 dBc/Hz at 10 MHz offset)
- Small size for 2.5 x 2.0 mm package

General specifications , at Ta=+25°C

Model	HPJK	HDJK	HCJK
Output Logic	**LVPECL**	**LVDS**	**HCSL**
Available Frequency Range	100 MHz ~ 250 MHz	100 MHz ~ 250 MHz	100 MHz ~ 250 MHz
Supply Voltage (V_{DD})	--	+ 1.8 V ± 5%	+ 1.8 V ± 5%
	+ 2.5 V ± 5%	+ 2.5 V ± 10%	+ 2.5 V ± 10%
	+ 3.3 V ± 10%	+ 3.3 V ± 10%	+ 3.3 V ± 10%
Output Load	50 Ω into V_{DD} - 2.0V or Thevenin equivalent	100 Ω between output and complimentary output	50 Ω to ground on each output
Rise Time / Fall Time (20%↔80% of waveform)	0.15 nsec (typ.) 0.4 nsec (max.)	0.15 nsec (typ.) 0.3 nsec (max.)	0.2 nsec (typ.) 0.6 nsec (max.)
Current Consumption	52 mA (typ.) , 65 mA (max.)	22 mA (typ.) , 30 mA (max.)	32 mA (typ.) , 40 mA (max.)
Output Logic " High " , " 1 "	V_{DD} - 1.085 (min.) ,V_{DD} - 0.86 (max.)	1.4 V (typ.) , 1.6 V (max.)	0.55 V (min.) , 1.0 V (max.)
Output Logic " Low " , " 0 "	V_{DD} - 1.81 (min.) , V_{DD} - 1.62 (max.)	0.9 V (min.) , 1.1 V (typ.)	- 0.15 V (min.) , 0.15 V (max.)
Output Swing (single-end)	400 mV (min.)	200 mV (min.)	450 mV (min.)

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*	

Start-up Time	1.0 msec. (typ.) , 5.0 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)	50 fsec (typ.) , 300 fsec (max.) [For 125 MHz , LVDS , 3.3V]

Phase Noise [dBc / Hz (typ.)]	Offset	100 Hz	1 KHz	10 KHz	100 KHz	1 MHz	10 MHz
	125.0 MHz	-114	-135	-147	-157	-163	-164
	156.250 MHz	-108	-132	-141	-152	-160	-161

Output Enable / Disable Function		
	Enable	70% (min.) of V_{DD} to enable output. Enable time : 10 msec (max.)
	Disable	30% (max.) of V_{DD} to disable output. Disable current : 30 uA (max.) [OE=GND] , Disable time : 0.2 usec (max.)

Crystal Oscillators

HP_ [PECL DIfferential] | HD_ [LVDS Differential] | HC_ [HCSL Differential]

Part Number Format and Example

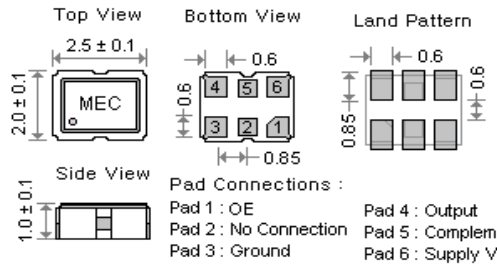
[1] Supply Voltage	[2] Holder Type	[3] 1 or 2	–	[4] Frequency Stability	–	[5] Center Frequency
Example (1)	25	HCK536	1	–	C15	–	125.000
(2)	18	HDK576	2	–	D	–	156.250
(3)	3	HPK226	1	–	B	–	212.500
(4)	25	HCJK536	1	–	A	–	125.000
(5)	18	HDEK576	1	–	I30	–	156.250

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]

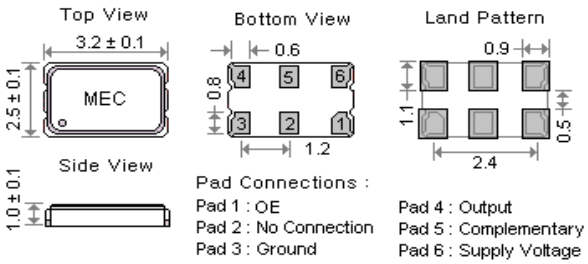
[1]	Supply voltage , " 18 " for +1.8V ; " 25 " for +2.5V ; " 3 " for +3.3V	
[2]	Holder Type	
[3]	" 1 " : OE function on pad # 1 , " 2 " : OE function on pad # 2	
[4]	-10°C ~ 70 °C	" A " ± 25ppm ; " B " ± 50ppm ; " C " ± 100ppm ; If non-standard please enter the desired stability after " C " , for example " 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

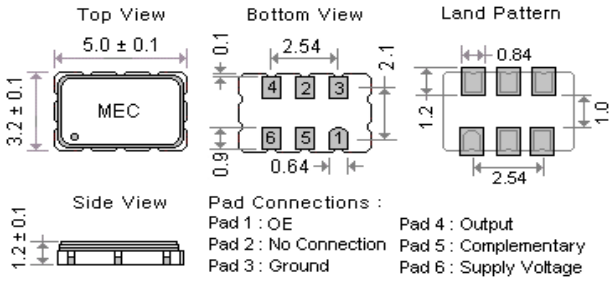
[H__K226]



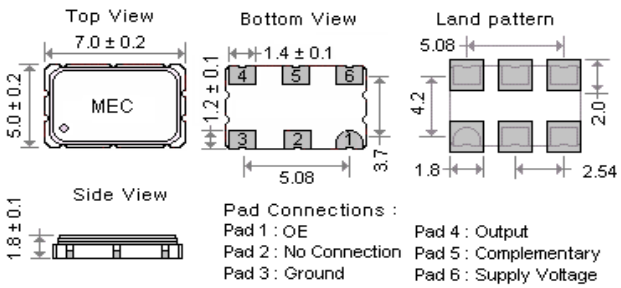
[H__K326]



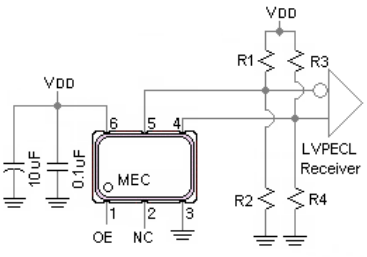
[H__K536]



[H___K576]

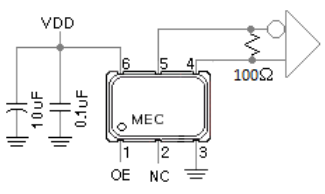


LVPECL Test Circuit

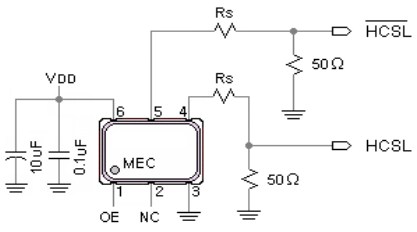


V_{DD} = 3.3V ; R1 = R3 = 127 Ω ; R2 = R4 = 82.5 Ω
V_{DD} = 2.5V ; R1 = R3 = 250 Ω ; R2 = R4 = 62.5 Ω

LVDS Test Circuit



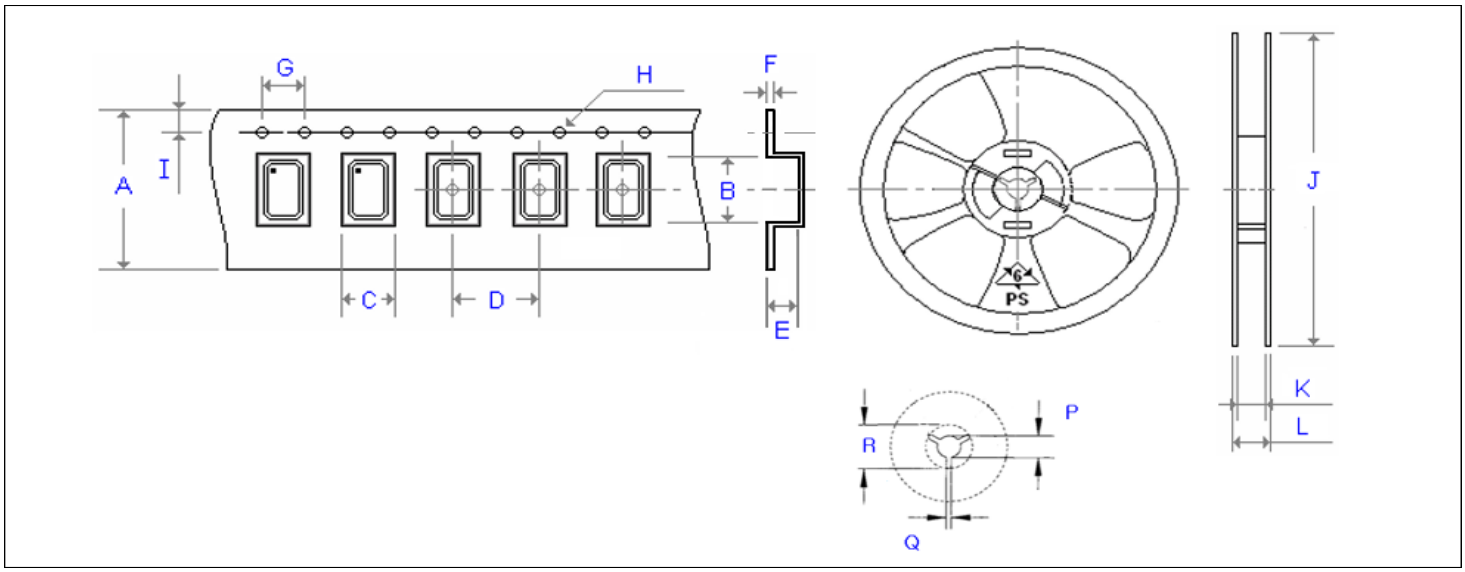
HCSL Test Circuit



Rs = 0 to 33Ω to minmize ringing in application.

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
H_43	24.00	11.80	10.00	16.00	5.00	0.30	4.00	Ø 1.50	1.75	500

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
H_43	330.00	24.50	29.100	13.00	2.50	20.20	500