High Frequency and Stability Differential Oscillators

Differential

HPWH	HDWH	Fundamental Mode	SMD	2.5 V	3.3 V	2.5 V ~ 3.3 V	Frequency		
LVPECL	LVDS						156.250 MHz	212.500 MHz	312.500 MHz

Features

- The H_WH Series are members of Mercury's high frequency & stability differential oscillators
- Femto second integrated phase jitter (31 fsec (typ.) , 312.500MHz , LVDS , 12KHz to 20MHz)
- High - Frequency fundamental (HFF) oscillators



General specifications , at Ta=+25°C

Model	HPWH	HDWH		
Output Logic	LVPECL	LVDS		
Standard Frequency	156.250 MHz , 212.500 MHz , 312.500 MHz			
	If you need other frequencies, please contact Mercury.			
Supply Voltage (V_{DD})	+ 2.5 V ± 5%	+ 2.5 V ± 5%		
	+ 3.3 V ± 5%	+ 3.3 V ± 5%		
	+ 2.5 V ~ + 3.3 V ± 5%	+ 2.5 V ~ + 3.3 V ± 5%		
Output Load	50 Ω into V_{DD} - 2.0V or Thevenin equivalent	100 Ω between output and complimentary output		
Current Consumption	60 mA (max.)	40 mA (max.)		
Output Logic " High " , " 1 "	V_{DD} - 1.1 (min.)	--		
Output Logic " Low " , " 0 "	V_{DD} - 1.5 (max.)	--		
Rise Time / Fall Time	0.35 nsec (max.)	0.35 nsec (max.)		
	Tr / Tf : 20% ↔ 80% waveform	Tr / Tf : 20% ↔ 80% waveform		
Differential Output Voltage (Vod)	--	Options	WA1	250 mV ~ 450 mV
			WA2	300 mV ~ 600 mV
			WA3	400 mV ~ 800 mV
Differential Output Voltage Amplitude (Vdsw)	0.8 V ~ 2.0 V	Options (OUT-OUTN)	WA1	500 mV ~ 900 mV
			WA2	600 mV ~ 1200 mV
			WA3	800 mV ~ 1600 mV

*For detailed explanations, please see the next page: Part number format and example

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 " F " ; " J " represents . For example : " F30 " ± 30 ppm over -40°C to +85°C " J40 " ± 40 ppm over -40°C to +105°C
	Industrial (*-40°C to +85°C*)	*D*	*E*	*F*	
	Extended Industrial (*-40°C to +105°C*)	*G*	*H*	*J*	

Start-up Time	2 msec (max.) (V_{OUT} ≥ 90% V_{DD})							
Duty Cycle	50% ± 5%							
Storage Temperature	-55°C to +125°C							
Aging at Ta = +25°C	± 3 ppm (max.) first year							
RMS Jitter (12 KHz to 20 MHz)	156.250 MHz : 35 fsec (typ.) , 45 fsec (max.)							
	312.500 MHz : 32 fsec (typ.) , 45 fsec (max.)							
Phase Noise [dBc / Hz (typ.)]	Offset	10 Hz	100 Hz	1 KHz	10 KHz	100 KHz	1 MHz	40 MHz
	312.500MHz	-50	-75	-110	-135	-154	-160	-161
Output Enable / Disable Function	Enable	80% (min.) of V_{DD} to enable output. Enable time : 5 msec (max.)						
	Disable	20% (max.) of V_{DD} to disable output. Disable current : 60 uA (max.) , Disable time : 0.2 usec (max.)						

High Frequency and Stability Differential Oscillators

HPWH [LVPECL DIfferential] | HDWH [LVDS Differential]

Part Number Format and Example

	[1] Supply Voltage	[2] OSC Type	[3] Output Waveform	[4] Series	[5] Package Size	[6] OE Function	–	[7] Frequency Stability	–	[8] Center Frequency	–	[9] Special Vdsw
Ex (1)	25V3	H	P	WH	216	1	–	E	–	156.250		
Ex (2)	3	H	D	WH	226	1	–	J20	–	312.500	–	WA3
Ex (3)	25	H	D	WH	216	1	–	H	–	212.500	–	WA1

Ex (1) : 25V3HPWH2161 - E - 156.250

[+2.5V ~ +3.3V , HPWH type , LVPECL output , 2.0 x 1.6mm 6pad , OE on pad 1 , ±50ppm from -40°C to 85°C , 156.250MHz]

Ex (2) : 3HDWH2261 - J20 - 312.500 - WA3

[+3.3V , HDWH type , LVDS output , 2.5 x 2.0mm 6pad , OE on pad 1 , ±20ppm from -40°C to 105°C , 312.500MHz , Vdsw : 800mV ~ 1600mV]

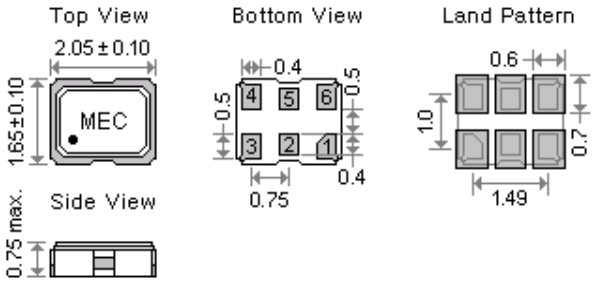
Ex (3) : 25HDWH2161 - H - 212.500 - WA1

[+2.5V , HDWH type , LVDS output , 2.0 x 1.6mm 6pad , OE on pad 1 , ±50ppm from -40°C to 105°C , 212.500MHz , Vdsw : 500mV ~ 900mV]

[1]	Supply Voltage , " 25 " for +2.5V ; " 3 " for +3.3V ; " 25V3 " for +2.5V ~ +3.3V ±5%	
[2]	OSC Type , " H " : XO	
[3]	Output Waveform , " P " : LVPECL ; " D " : LVDS	
[4]	WH Series	
[5]	Package Size , " 216 " : 2.0 x 1.6mm 6pad ; " 226 " : 2.5 x 2.0mm 6pad	
[6]	" 1 " : OE function on pad # 1	
[7]	-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
	-40°C ~ 105 °C	" G " ± 25ppm ; " H " ± 50ppm ; " J " ± 100ppm ; If non-standard please enter the desired stability after " J " , for example " J40 " : represents ± 40ppm over -40 to +105°C
[8]	Frequency in MHz	
[9]	LVDS only options	" WA1 " represents Vdsw : 500mV ~ 900mV , for example (3) " – WA1 "
		" WA2 " represents Vdsw : 600mV ~ 1200mV
		" WA3 " represents Vdsw : 800mV ~ 1600mV , for example (2) " – WA3 "

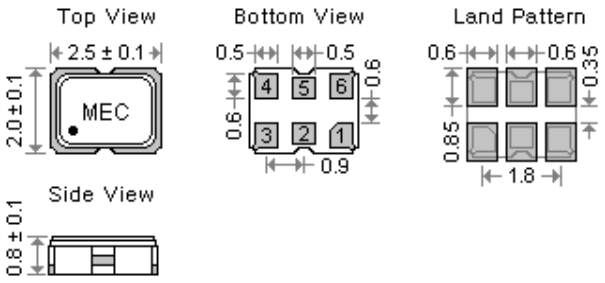
Outline Dimensions (Unit : mm) , Suggested pad Layout for SMDs , Test Circuits

H_WH216



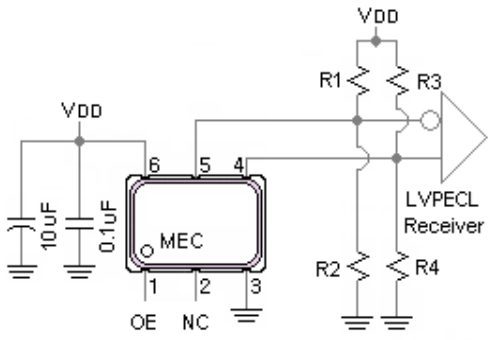
Pad Connection :
Pad 1 : Enable / Disable
Pad 2 : No Connection
Pad 3 : Ground
Pad 4 : Output
Pad 5 : Complementary
Pad 6 : Supply Voltage

H_WH226



Pad Connection :
Pad 1 : Enable / Disable
Pad 2 : No Connection
Pad 3 : Ground
Pad 4 : Output
Pad 5 : Complementary
Pad 6 : Supply Voltage

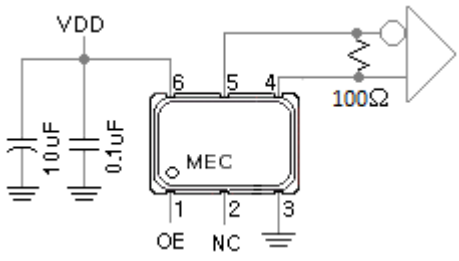
LVPECL Test Circuit



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

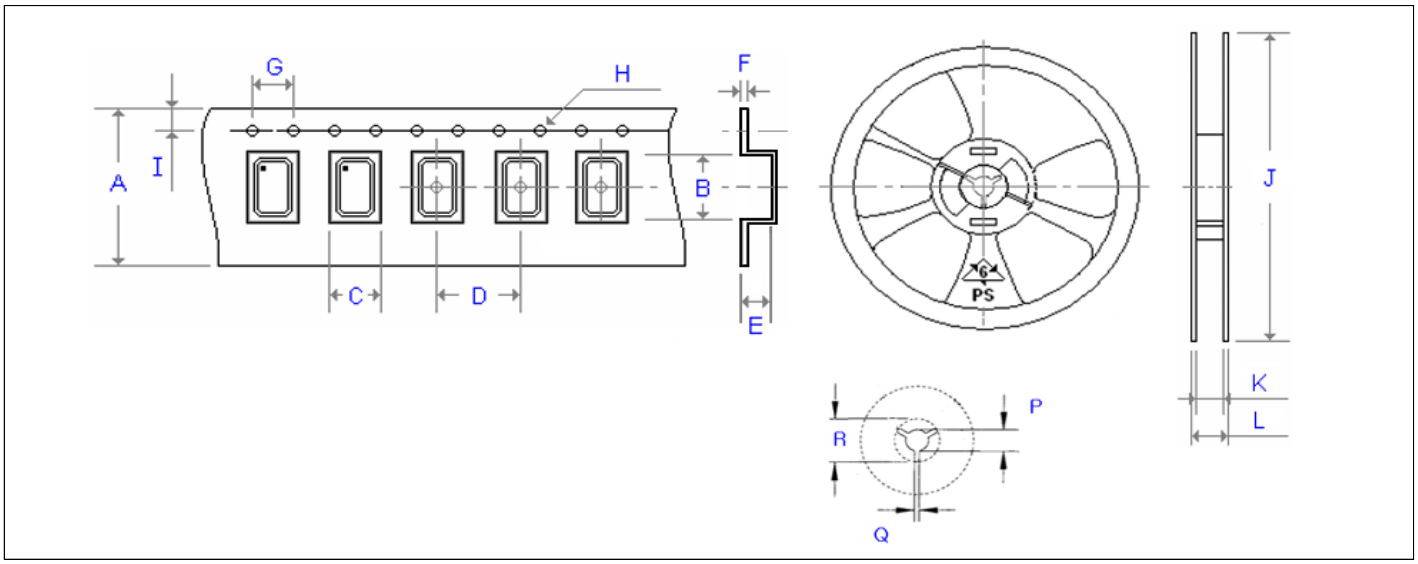
V_{DD} = 2.5V ; R1 = R3 = 250 Ω ; R2 = R4 = 62.5 Ω

LVDS Test Circuit



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	0.30	4.00	Ø 1.50	1.75	1000
SWO	16.00	7.20	5.40	8.00	1.80	0.30	4.00	Ø 1.50	1.75	1000
H _ 216	8.00	2.30	1.90	4.00	0.90	0.25	4.00	Ø 1.50	1.75	3000
H _ WH216	8.00	2.35	1.95	4.00	1.00	0.25	4.00	Ø 1.55	1.75	3000
H _ 226	8.00	2.80	2.25	4.00	1.10	0.30	4.00	Ø 1.50	1.75	3000
H _ WH226	8.00	2.70	2.25	4.00	1.45	0.25	4.00	Ø 1.55	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	0.30	4.00	Ø 1.50	1.75	1000
H _ 328	8.00	3.40	2.70	4.00	1.40	0.25	4.00	Ø 1.50	1.75	3000
H _ 538	12.00	5.40	3.60	8.00	1.70	0.30	4.00	Ø 1.50	1.75	1000
H _ 578	16.00	7.30	5.30	8.00	1.90	0.30	4.00	Ø 1.50	1.75	1000

Reel Dimensions (unit : mm) +2.0 / -0.0mm

	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 _ WH216	180.00	8.00	11.50	13.30	2.30	-	3000
H _ 226	180.00	8.40	11.40	13.20	2.10	-	3000
H _ WH226	180.00	8.00	11.50	13.30	2.30	-	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