

Crystal Oscillators [20.0 ~ 50.0 MHz]

CMOS output

HJ _ _

Ultra low phase noise

RMS Phase Jitter 48 fsec

SMD

CMOS

1.8 V

2.5 V

3.3 V

Min.

20 MHz

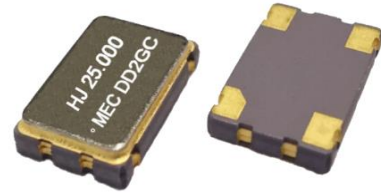
Max.

50 MHz

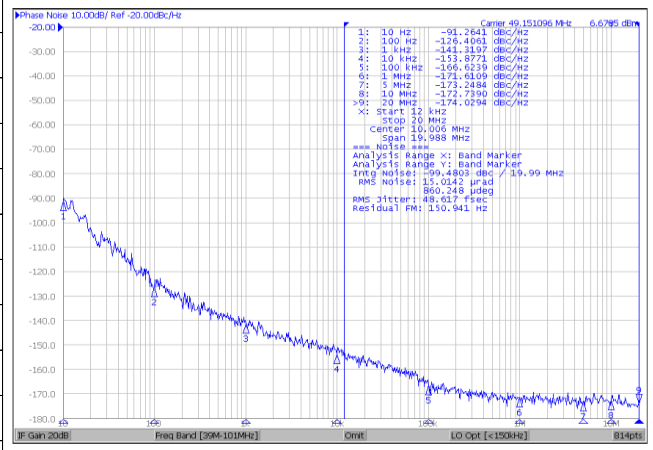
Features

- The HJ series is ultra low phase noise crystal oscillators.
- Compared with standard oscillator, Mercury's HJ series has much better phase noise and jitter. HJ series with output frequency 49.152MHz has phase jitter 48 fsec (RMS, 12 KHz to 20 MHz) when V_{DD} at 3.3V.

General specifications of all available packages , at $T_a=+25^{\circ}\text{C}$, $CL=15\text{pF}$



Model [Output Logic]	" HJ " series [CMOS]									
Type	HJ22		HJ32		HJ53		HJ57			
Dimensions	2.5 * 2.0 * 0.9 mm		3.2 * 2.5 * 1.0 mm		5.0 * 3.2 * 1.2 mm		7.0 * 5.0 * 1.4 mm			
Frequency Range	20.0 ~ 50.0 MHz		20.0 ~ 50.0 MHz		20.0 ~ 50.0 MHz		20.0 ~ 50.0 MHz			
Supply Voltage	1.8 V \pm 5%		+2.5 V \pm 10%		+3.3 V \pm 10%					
	Voltage code is " 18 "		Voltage code is " 25 "		Voltage code is " 3 "					
Current Consumption	3 mA (typ.) ; 5 mA (max.)		5 mA (typ.) ; 7 mA (max.)		7 mA (typ.) ; 10 mA (max.)					
Current With Output Disable	3 uA (typ.) ; 25 uA (max.)		5 uA (typ.) ; 30 uA (max.)		9 uA (typ.) ; 35 uA (max.)					
Output Logic " High " , " 1 "	1.62 V (min.)		2.25 V (min.)		2.97 V (min.)					
Output Logic " Low " , " 0 "	0.18 V (max.)		0.25 V (max.)		0.33 V (max.)					
Rise Time (Tr) / Fall Time (Tf)	5.0 nsec. (typ.) ; 10.0 nsec. (max.)		2.0 nsec. (typ.) ; 5.0 nsec. (max.)		1.5 nsec. (typ.) ; 5.0 nsec. (max.)					
	Measured between 10 % \longleftrightarrow 90 % of V_{DD}									
Frequency Stability Codes	Frequency Stability over		\pm 25 ppm	\pm 50 ppm	\pm 100 ppm	If non-standard , please enter the desired stability after the " C " or " I " For example : " C20 " \pm 20 ppm over -10°C to +70°C ; " I30 " \pm 30 ppm over -40°C to +85°C				
	Operating Temperature Range									
	Commercial (-10°C to +70°C)	A	B	C						
	Industrial (-40°C to +85°C)	D	E	F						
Supply Voltage vs Freq. Sensitivity	\pm 1.0 ppm (max.)									
Output Load	15 pF									
Start-up Time	0.8 msec (typ.) ; 5.0 msec (max.)									
Duty Cycle	50% \pm 5%									
Output Enable / Disable Function on pin1	70% of V_{DD} (min.) to enable output.									
	30% of V_{DD} (max.) to disable output.									
Enable / Disable Time	Enable : 1.0 msec. (max.)									
	Disable : 200 nsec. (max.)									
Storage Temperature	-55°C to + 150°C									
Aging at $T_a=+25^{\circ}\text{C}$	\pm 3 ppm (max.) first year									
RMS Jitter [12 kHz ~ 20 MHz]	48 fsec (typ.) ; 300 fsec (max.)									
SSB Phase Noise	Offset	10 Hz	100 Hz	1 KHz	10 KHz	100 KHz	1 MHz	5 MHz	20 MHz	
	25.000MHz [3.3V]	dBc/Hz (typ.)	-68	-102	-139	-157	-170	-166	-168	---
	49.152MHz [3.3V]	dBc/Hz (typ.)	-91	-126	-141	-153	-166	-171	-172	-174



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

[H8 ; H_8]	[H14 ; H_14]
<p>Top View: 12.8±0.2 x 10.8</p> <p>Side View: 6.3±0.2, 0.8, Ø0.45, 5.5 max.</p> <p>Bottom View: 7.6±0.1, 7.6±0.1</p> <p>Pin Connections: Pin1 : (1) No connection (2) OE Pin4 : Ground Pin5 : Output Pin8 : Supply voltage</p>	<p>Top View: 20.2±0.2 x 18.3</p> <p>Side View: 5.8±0.2, 0.8, Ø0.45, 6.3 max.</p> <p>Bottom View: 10.7±0.1, 15.2±0.1</p> <p>Pin Connections: Pin 1 : (1) No connection (2) Output disabled when low Pin 7 : Ground Pin 8 : Output Pin 14 : Supply voltage</p>
[H21]	[H22 ; H_22]
<p>Top View: 2.0±0.1 x 1.6±0.1</p> <p>Side View: 0.8±0.1</p> <p>Bottom View: 0.6±0.1, 1.0, 1.3</p> <p>Land Pattern: 0.8 x 1.0, 1.4</p> <p>Pad Connections: Pad 1 : OE Pad 2 : Ground Pad 3 : Output Pad 4 : Supply Voltage</p>	<p>Top View: 2.5±0.2 x 2.0±0.2</p> <p>Side View: 0.9±0.1</p> <p>Bottom View: 0.68±0.1, 1.23, 1.63±0.1</p> <p>Land Pattern: 1.0 x 1.23, 1.63±0.1</p> <p>Pad Connections: Pad 1 : OE Pad 2 : Ground Pad 3 : Output Pad 4 : Supply Voltage</p>
[H32 ; H_32]	[H53 ; H_53]
<p>Top View: 3.2±0.2 x 2.5±0.2</p> <p>Side View: 1.0±0.1</p> <p>Bottom View: 0.7±0.1, 1.6, 2.2</p> <p>Land Pattern: 1.2 x 1.6, 2.2</p> <p>Pad Connections: Pad 1 : OE Pad 2 : Ground Pad 3 : Output Pad 4 : Supply Voltage</p>	<p>Top View: 5.0±0.1 x 3.2±0.1</p> <p>Side View: 1.2±0.1</p> <p>Bottom View: 1.2±0.1, 2.2, 2.54</p> <p>Land Pattern: 1.6 x 2.5, 2.54</p> <p>Pad Connections: Pad 1 : OE Pad 2 : Ground Pad 3 : Output Pad 4 : Supply Voltage</p>
[SWO ; H_57]	
<p>Top View: 7.0±0.2 x 5.0±0.2</p> <p>Side View: 1.4±0.1</p> <p>Bottom View: 1.4±0.1, 3.7, 5.08</p> <p>Land Pattern: 2.0 x 4.2, 5.08</p> <p>Pad Connections: Pad 1 : OE Pad 2 : Ground Pad 3 : Output Pad 4 : Supply Voltage</p>	

Part Number Format and Examples

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

Examples	(1)	3	SWO	-	D	T	-	25.000
	(2)	3	HY32	-	K50	T	-	24.000
	(3)	18	HA32	-	B	T	-	32.768K
	(4)	3	HJ22	-	E	T	-	49.152

Ex (1) : 3SWO - DT - 25.000 [3.3V , H seires 7050 type , ±25ppm from -40°C to +85°C , OE Function , 25.000MHz]

Ex (2) : 3HY32 - K50T - 24.000 [3.3V , HY seires 3225 type , ±50ppm from -40°C to +125°C , OE Function , 24.000MHz]

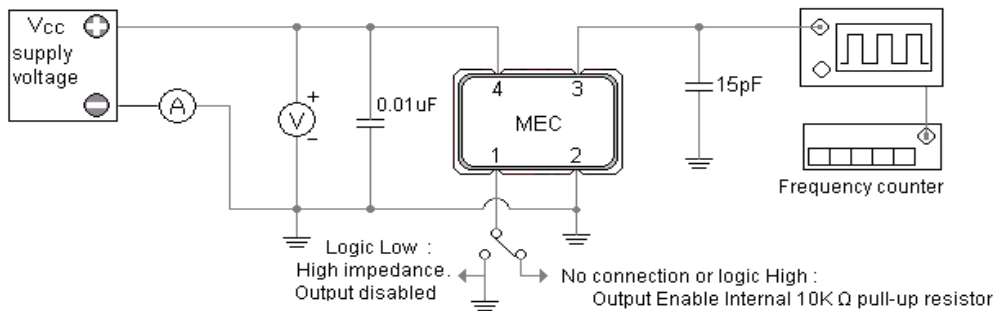
Ex (3) : 18HA32 - BT - 32.768K [1.8V , HA seires 3225 type , ±50ppm from -10°C to +70°C , OE Function , 32.768KHz]

Ex (4) : 3HJ22 - ET - 49.152 [3.3V , HJ seires 2520 type , ±50ppm from -40°C to +85°C , OE Function , 49.152 MHz]

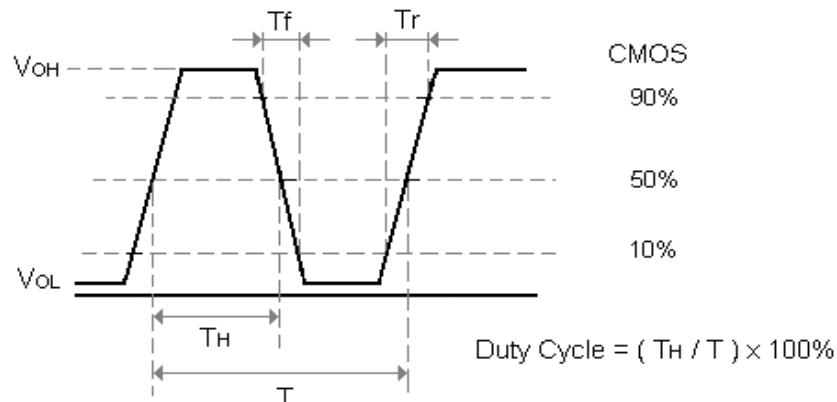
[1]	Supply voltage " 10 " for +1.0V ; " 12 " for +1.2V ; " 18 " for +1.8V ; " 25 " for +2.5V ; " 3 " for +3.3V ; " 5 " for +5.0V	
[2]	Holder Type	
[3]	-10°C ~ 70 °C	" A " ± 25ppm ; " B " ± 50ppm ; " C " ± 100ppm ; If non-standard please enter the desired stability after " C " , example " C15 " : represents ±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 " , example " I30 " : represents ± 30ppm over -40 to +85°C
[4]	" T " for OE Function , Leave this space blank if no connection on pad 1.	
[5]	Frequency in MHz	

Test Circuit & Test Waveform

H ; H_ - series CMOS Test Circuit

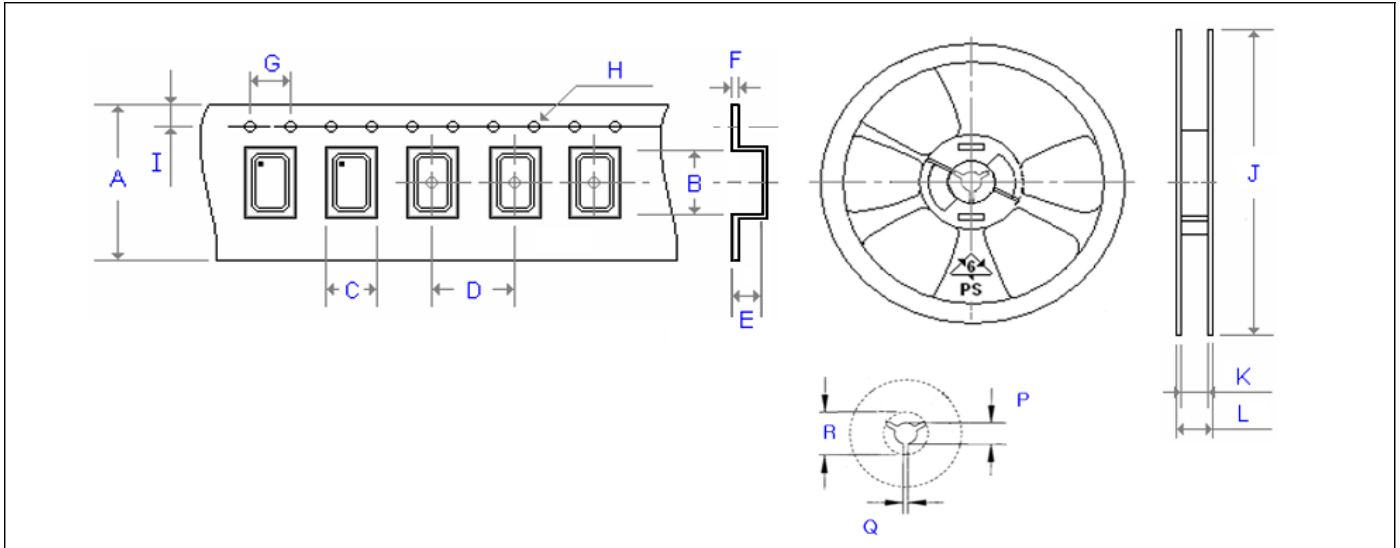


CMOS Output Waveform



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	∅ 1.50	1.75	3000
H_22	8.00	2.80	2.25	4.00	1.10	0.30	4.00	∅ 1.50	1.75	3000
H_32	8.00	3.40	2.70	4.00	1.40	0.25	4.00	∅ 1.50	1.75	3000
H_53	12.00	5.30	3.60	8.00	1.40	0.30	4.00	∅ 1.50	1.75	1000
H_57	16.00	7.30	5.30	8.00	1.90	0.32	4.00	∅ 1.50	1.75	1000
SWO	16.00	7.20	5.40	8.00	1.80	0.32	4.00	∅ 1.50	1.75	1000
H_226	8.00	2.80	2.25	4.00	1.10	0.30	4.00	∅ 1.50	1.75	3000
H_326	8.00	3.40	2.70	4.00	1.40	0.25	4.00	∅ 1.50	1.75	3000
H_536	12.00	5.30	3.60	8.00	1.40	0.30	4.00	∅ 1.50	1.75	1000
H_576	16.00	7.30	5.30	8.00	1.90	0.32	4.00	∅ 1.50	1.75	1000
H_328	8.00	3.40	2.70	4.00	1.40	0.25	4.00	∅ 1.50	1.75	3000
H_538	12.00	5.40	3.60	8.00	1.70	0.30	4.00	∅ 1.50	1.75	1000
H_578	16.00	7.30	5.30	8.00	1.90	0.32	4.00	∅ 1.50	1.75	1000
H_43	24.00	11.80	10.00	16.00	5.00	0.30	4.00	∅ 1.50	1.75	500

Reel Dimensions (unit : mm) ±2mm

	J	K	L	P	Q	R	pcs / reel
H21	180.00	9.00	12.00	13.00	2.50	20.20	3000
H_22	180.00	8.40	11.40	13.00	2.50	20.20	3000
H_32	180.00	9.00	12.00	13.00	2.50	20.20	3000
H_53	180.00	13.00	16.00	13.00	2.50	20.20	1000
H_57	180.00	17.20	19.30	13.00	2.50	20.20	1000
SWO	180.00	17.20	19.30	13.00	2.50	20.20	1000
H_226	180.00	8.40	11.40	13.00	2.50	20.20	3000
H_326	180.00	9.00	12.00	13.00	2.50	20.20	3000
H_536	180.00	13.00	16.00	13.00	2.50	20.20	1000
H_576	180.00	17.20	19.30	13.00	2.50	20.20	1000
H_328	180.00	8.00	12.00	13.00	2.50	20.20	3000
H_538	180.00	13.00	16.00	13.00	2.50	20.20	1000
H_578	180.00	17.20	19.30	13.00	2.50	20.20	1000
H_43	330.00	24.50	29.10	13.00	2.50	20.20	500