

HJ _ _

Ultra low phase noise

RMS Phase Jitter 48 fsec

SMD

CMOS

1.8 V

2.5 V

3.3 V

Min.

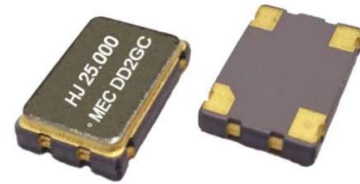
20 MHz

Max.

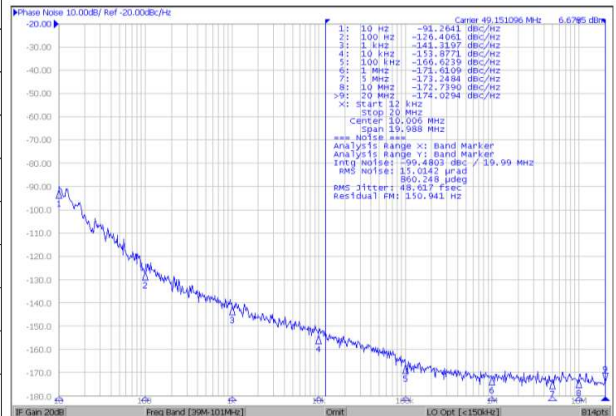
50 MHz

Features

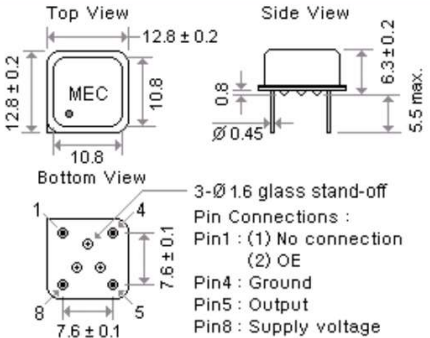
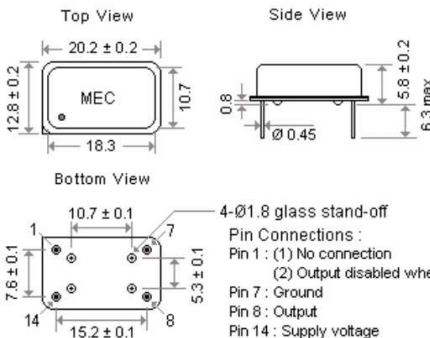
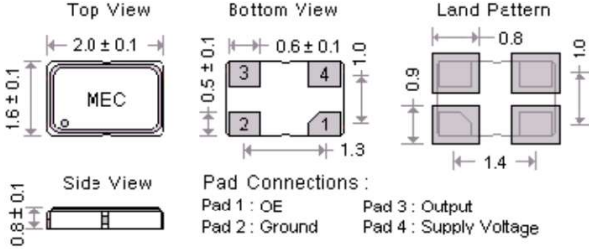
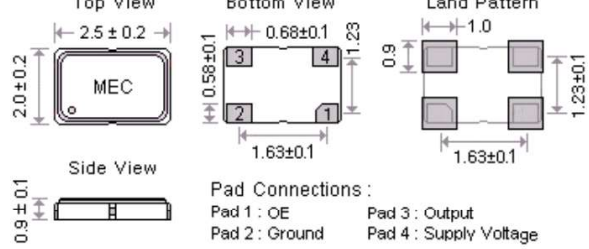
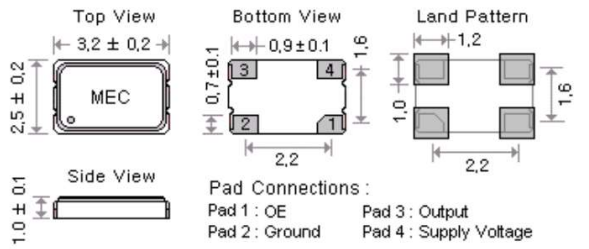
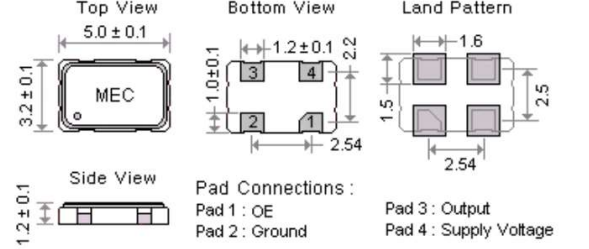
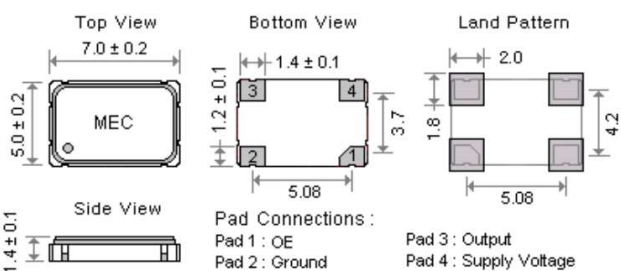
- The HJ series is ultra low phase noise crystal oscillators.
- Compared with standard oscillator, Mercury's HJ series has much better phase noise and jitter. HJ series with output frequency 49.152MHz has phase jitter 48 fsec (RMS, 12 KHz to 20 MHz) when V_{DD} at 3.3V.

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		
Dimemsions	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 ± 5%		+2.5 V ± 10%			+3.3 V ± 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 % ↔ 90 % of V _{DD}								
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 " 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				
Supply Voltage vs Freq. Sensitivity	± 1.0 ppm (max.)								
Output Load	15 pF								
Start-up Time	0.8 msec (typ.) ; 5.0 msec (max.)								
Duty Cycle	50% ± 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 Ta=+25°C	± 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]
 Top View Side View Bottom View 3-Ø1.6 glass stand-off Pin Connections : Pin1 : (1) No connection (2) OE Pin4 : Ground Pin5 : Output Pin8 : Supply voltage	 Top View Side View Bottom View 4-Ø1.8 glass stand-off Pin Connections : Pin1 : (1) No connection (2) Output disabled when low Pin7 : Ground Pin8 : Output Pin14 : Supply voltage
[H21]	[H22 ; H_22]
 Top View Bottom View Land Pattern Side View Pad Connections : Pad 1 : OE Pad 2 : Ground Pad 3 : Output Pad 4 : Supply Voltage	 Top View Bottom View Land Pattern Side View Pad Connections : Pad 1 : OE Pad 2 : Ground Pad 3 : Output Pad 4 : Supply Voltage
[H32 ; H_32]	[H53 ; H_53]
 Top View Bottom View Land Pattern Side View Pad Connections : Pad 1 : OE Pad 2 : Ground Pad 3 : Output Pad 4 : Supply Voltage	 Top View Bottom View Land Pattern Side View Pad Connections : Pad 1 : OE Pad 2 : Ground Pad 3 : Output Pad 4 : Supply Voltage
[SWO ; H_57]	
 Top View Bottom View Land Pattern Side View Pad Connections : Pad 1 : OE Pad 2 : Ground Pad 3 : Output Pad 4 : Supply Voltage	

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 , $\pm 25\text{ppm}$ from -40°C to $+85^{\circ}\text{C}$, OE Function , 25.000MHz]

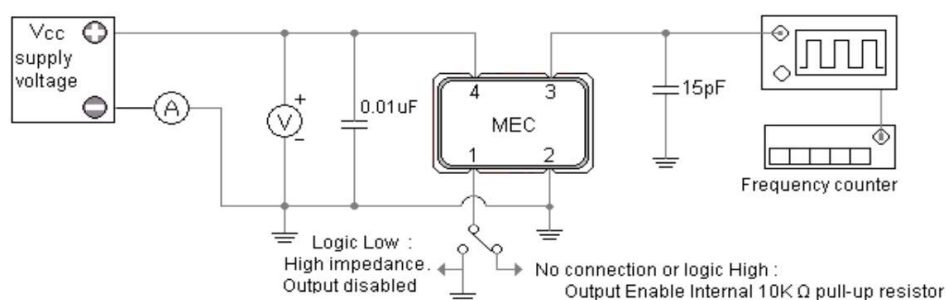
Ex (2) : 3HY32 - K50T - 24.000 [3.3V , HY seires 3225 type , $\pm 50\text{ppm}$ from -40°C to $+125^{\circ}\text{C}$, OE Function , 24.000MHz]

Ex (3) : 18HA32 - BT - 32.768K [1.8V , HA seires 3225 type , $\pm 50\text{ppm}$ from -10°C to $+70^{\circ}\text{C}$, OE Function , 32.768KHz]

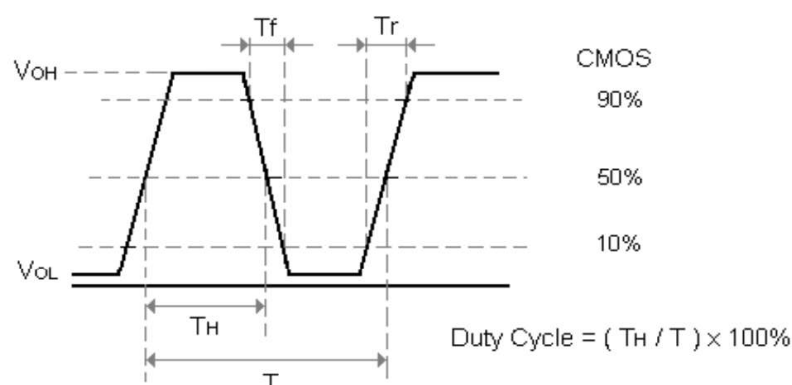
Ex (4) : 3HJ22 - ET - 49.152 [3.3V , HJ seires 2520 type , $\pm 50\text{ppm}$ from -40°C to $+85^{\circ}\text{C}$, OE Function , 49.152 MHz]

[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]	$-10^{\circ}\text{C} \sim 70^{\circ}\text{C}$	" A " $\pm 25\text{ppm}$; " B " $\pm 50\text{ppm}$; " C " $\pm 100\text{ppm}$; If non-standard please enter the desired stability after " C " , example " C15 " : represents $\pm 15\text{ppm}$ over -10 to $+70^{\circ}\text{C}$
	$-40^{\circ}\text{C} \sim 85^{\circ}\text{C}$	" D " $\pm 25\text{ppm}$; " E " $\pm 50\text{ppm}$; " F " $\pm 100\text{ppm}$; If non-standard please enter the desired stability after " I " , example " I30 " : represents $\pm 30\text{ppm}$ over -40 to $+85^{\circ}\text{C}$
[4]	" T " for OE Function , Leave this space blank if no connection on pad 1.	
[5]	Frequency in MHz	

Test Circuit & Test Waveform

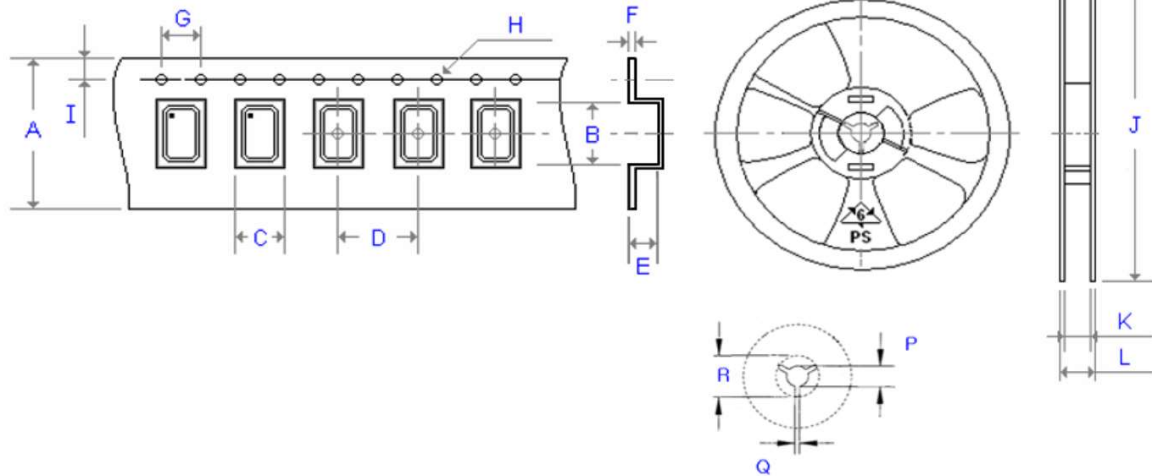
H ; H₋ - series CMOS Test Circuit

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	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_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	0.32	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	12.00	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