

Surface Mount type

H21	H22	H32	H53	SWO
2.0 * 1.6 * 0.8	2.5 * 2.0 * 0.9	3.2 * 2.5 * 1.0	5.0 * 3.2 * 1.2	7.0 * 5.0 * 1.4

CMOS

1.8 V

3.3 V

Min.

Max.

2.5 V

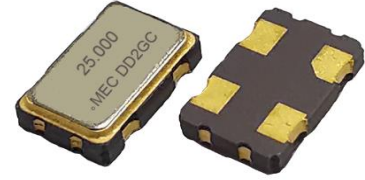
5.0 V

50 KHz

160 MHz

Applications

- CPU , Graphics , Multimedia A / V clocks
- MPEG / DVD / HDTV clocks
- Laser engine pixel / set - top clocks
- SONET / SDH / ATM clocks
- Fast Ethernet and Gigabit Ethernet clocks
- NTSC / PAL encoder / decoder clocks
- PLL / synthesizer clocks
- Fibre channel and ADSL clocks

General Specifications [Ta = +25°C , V_{DD} = at specified voltage , Load : 15 pF]

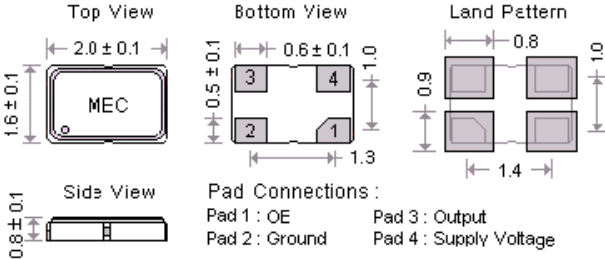
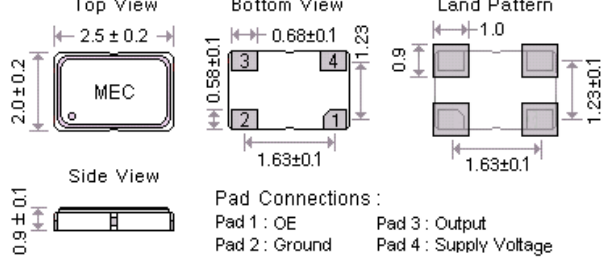
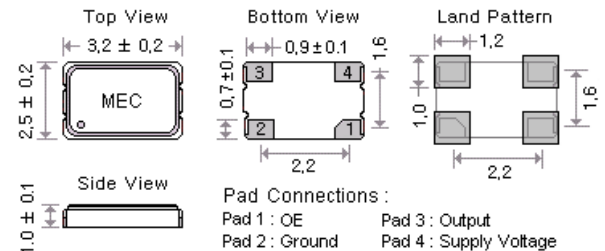
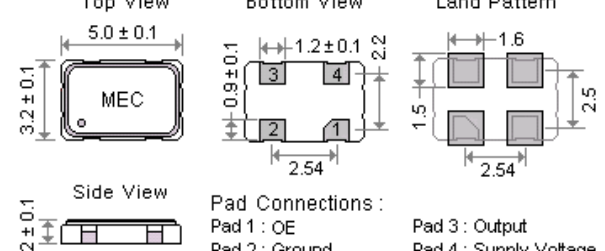
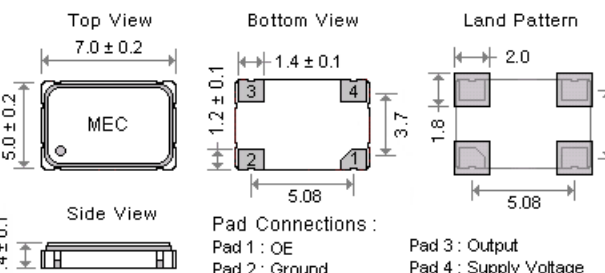
Model	" H21 " ; " H22 " ; " H32 " ; " H53 " and " SWO " series				
Type	" H21 " series	" H22 " series	" H32 " series	" H53 " series	" SWO " series
Dimensions	2.0 x 1.6 x 0.8 mm	2.5 x 2.0 x 0.9 mm	3.2 x 2.5 x 1.0 mm	5.0 x 3.2 x 1.2 mm	7.0 x 5.0 x 1.4 mm
Available Frequency Range by Voltage	1.8 V	1 MHz ~ 60 MHz	0.0625 MHz ~ 160 MHz	0.0625 MHz ~ 160 MHz	0.05 MHz ~ 160 MHz
	2.5 V				
	3.3 V				
	5.0 V	----	1 MHz ~ 50 MHz	1 MHz ~ 50 MHz	0.05 MHz ~ 135 MHz

Supply Voltage (V _{DD})		+1.8 V ± 10%	+2.5 V ± 10%	+3.3 V ± 10%	+5.0 V ± 10%
		code is " 18 "	code is " 25 "	code is " 3 "	code is " 5 "
Output Logic " High " , " 1 "		1.62 V (min.)	2.25 V (min.)	2.97 V (min.)	4.5 V (min.)
Output Logic " Low " , " 0 "		0.18 V (max.)	0.25 V (max.)	0.33 V (max.)	0.5 V (max.)
Current Consumption	< 25 MHz	5 mA (max.)	5 mA (max.)	5 mA (max.)	5 mA (max.)
	25 ~ 50 MHz	8 mA (max.)	10 mA (max.)	12 mA (max.)	16 mA (max.)
	51 ~ 100 MHz	10 mA (max.)	15 mA (max.)	30 mA (max.)	30 mA (max.)
	101 ~ 160 MHz	15 mA (max.)	20 mA (max.)	40 mA (max.)	40 mA (max.)
Rise Time (Tr) / Fall Time (Tf)		6 nsec. (max.)			
		Measured between 10% ↔ 90% of wave form (CL = 15pF)			

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 " For example : " C20 " ± 20 ppm over -20°C to +70°C ; " F30 " ± 30 ppm over -40°C to +85°C
	Commercial (-20°C to +70°C)	A	B	C	
	Industrial (-40°C to +85°C)	D	E	F	

Output Load	15 pF ; (30 pF and 50 pF load are also available for +3.3V and +5.0V V _{DD})
Duty Cycle	Standard: 50% ± 10% ; Option: 50% ± 5%. Please add "-S" at the end of the part number for ± 5% .
Start-up Time	1.0 ~ 32.0 MHz : 5 msec. (max.) ; 32.1 ~ 160.0 MHz : 10 msec. (max.)
Storage Temperature	-55°C to +125°C
Aging at Ta=+25°C	± 3 ppm per year (max.)
Output Enable / Disable Function	70% of V _{DD} (min.) to enable output.
	30% of V _{DD} (max.) to disable output.
	Disable current : 10 uA max. for OE ≤ 0.3V

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

[H21]	[H22 ; H_22]
 Top View Bottom View Land Pattern Side View Pad Connections : Pad 1 : OE Pad 3 : Output Pad 2 : Ground Pad 4 : Supply Voltage	 Top View Bottom View Land Pattern Side View Pad Connections : Pad 1 : OE Pad 3 : Output Pad 2 : Ground Pad 4 : Supply Voltage
[H32 ; H_32]	[H53 ; H_53]
 Top View Bottom View Land Pattern Side View Pad Connections : Pad 1 : OE Pad 3 : Output Pad 2 : Ground Pad 4 : Supply Voltage	 Top View Bottom View Land Pattern Side View Pad Connections : Pad 1 : OE Pad 3 : Output Pad 2 : Ground Pad 4 : Supply Voltage
[SWO ; H_57]	
 Top View Bottom View Land Pattern Side View Pad Connections : Pad 1 : OE Pad 3 : Output Pad 2 : Ground Pad 4 : Supply Voltage	

Thru - Hole

H8

12.8 * 12.8 * 6.3

H14

20.2 * 12.8 * 5.8

CMOS

1.8 V

2.5 V

3.3 V

5.0 V

Min.

50 KHz

Max.

160 MHz

Applications

- CPU , Graphics , Multimedia A / V clocks
- Fast Ethernet and Gigabit Ethernet clocks
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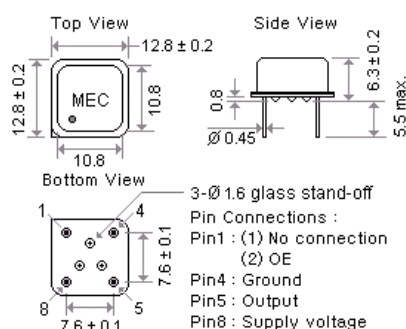


General Specifications [Ta = +25°C]

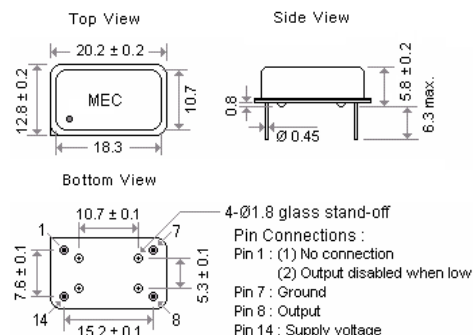
Type	Thru - Hole type			
Model (Dimensions)	H8 (12.8 * 12.8 * 6.3 mm)		H14 (20.2 * 12.8 * 5.8 mm)	
Supply Voltage (V _{DD})	+ 1.8 V ± 10%		+ 2.5 V ± 10%	
	code is " 18 "		code is " 25 "	
Frequency Range	0.05 ~ 160 MHz		0.05 ~ 160 MHz	
Output Logic " High " , " 1 "	1.62 V (min.)		2.25 V (min.)	
Output Logic " Low " , " 0 "	0.18 V (max.)		0.33 V (max.)	
Current Consumption	< 25 MHz	5 mA (max.)	5 mA (max.)	5 mA (max.)
	50 MHz	8 mA (max.)	10 mA (max.)	12 mA (max.)
	100 MHz	10 mA (max.)	15 mA (max.)	30 mA (max.)
	160 MHz	15 mA (max.)	20 mA (max.)	40 mA (max.)
Disable Current	10 uA (max.) at OE ≤ 0.3V			
Frequency Stability Codes	Frequency Stability over Operating Temperature Range	± 25 ppm	± 50 ppm	± 100 ppm
	Commercial (-20°C to +70°C)	A	B	C
	Industrial (-40°C to +85°C)	D	E	F
If non-standard , please enter the desired stability after the " C " or " F "				
For example : " C20 " ± 20 ppm over -20°C to +70°C ; " F30 " ± 30 ppm over -40°C to +85°C				
Output Load	15 pF (max.) ; 30 pF load for frequencies up to 70 MHz ; Contact Mercury for 50 pF load			
Rise Time (Tr)	10 nsec.(max.) ; 3 nsec.(typ.) . Measured between 10% to 90% waveform (CL=15pF)			
Fall Time (Tf)	10 nsec.(max.) ; 3 nsec.(typ.) . Measured between 10% to 90% waveform (CL=15pF)			
Duty Cycle	50% ± 10 % of waveform [50% ± 5% is also available , add " S " at the end of the part number]			
Start - Up Time	10 msec. (max.) ; 5 msec. (typ.)			
Storage Temperature	-55°C to +125°C			
Aging at Ta=+25°C	± 5.0 ppm per year (max.)			
Output Enable / Disable Function on pin1	70% of V _{DD} (min.) to enable output.			
	30% of V _{DD} (max.) to disable output.			
	Add " T " in part number for OE option			

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

[H8 ; H_8]



[H14 ; H_14]



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	H22	-	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]

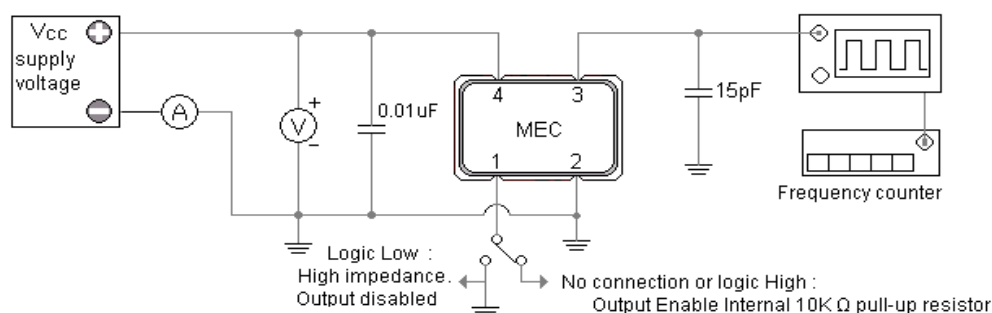
Ex (2) : 3HY32 - K50T - 24.000 [3.3V , HY seires 3225 type , ±50ppm from -40°C to +125°C , OE Function , 24.000MHz]

Ex (3) : 18HA32 - BT - 32.768K [1.8V , HA seires 3225 type , ±50ppm from -20°C to +70°C , OE Function , 32.768KHz]

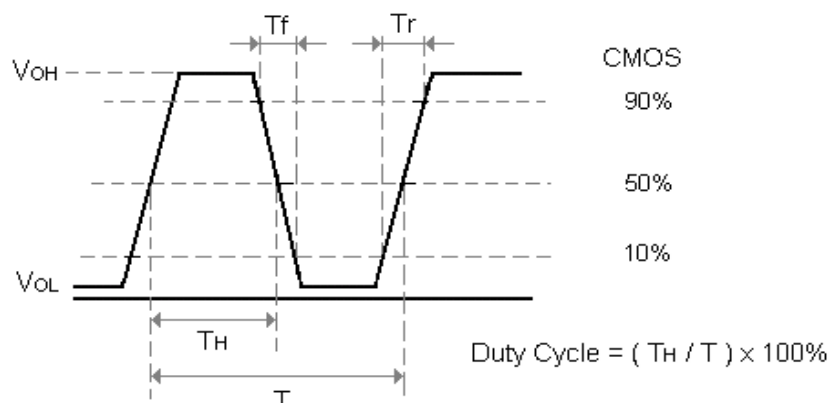
Ex (4) : 3H22 - ET - 49.152 [3.3V , H seires 2520 type , ±50ppm from -40°C to +85°C , OE Function , 49.152 MHz]

[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]	-20°C ~ 70°C	" A " ± 25ppm ; " B " ± 50ppm ; " C " ± 100ppm ;	
		If non-standard please enter the desired stability after " C " , 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 " , example " F30 " : 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

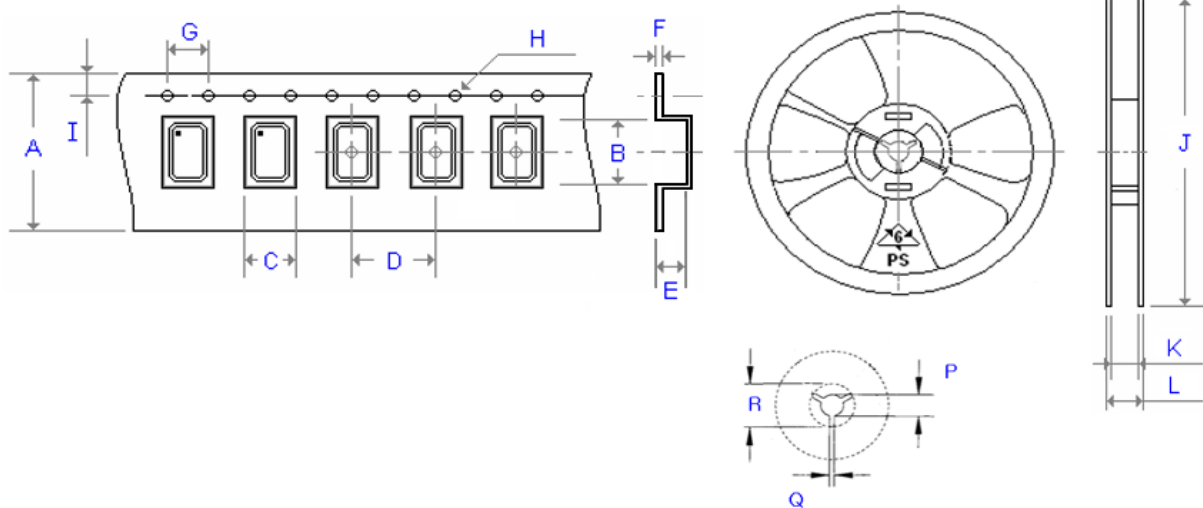
H ; H₋ - series CMOS Test Circuit

CMOS Output Waveform



Emboss Taping and Reel Specifications

[Crystal Oscillator Units]



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

	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	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_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	0.30	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
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) $+2.0 / -0.0\text{mm}$

	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