

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

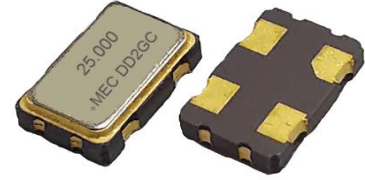
5.0 V

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]

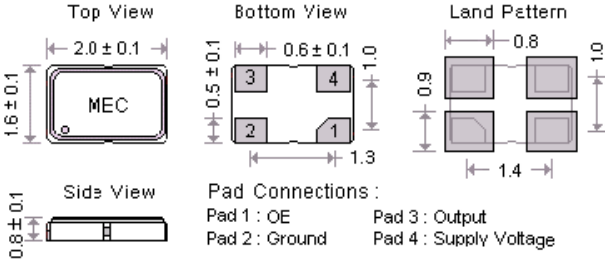
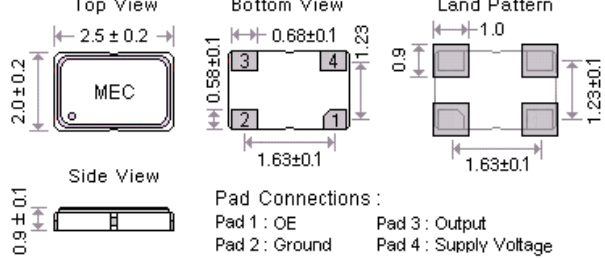
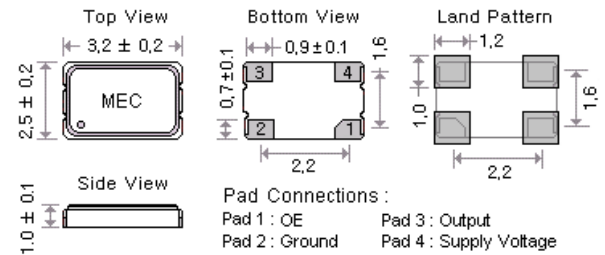
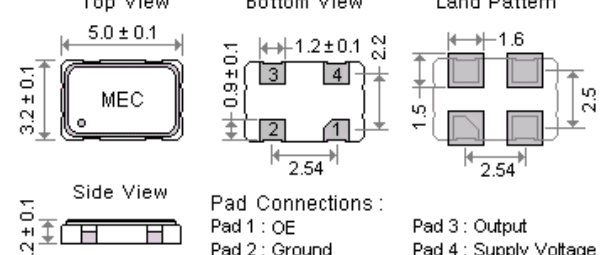
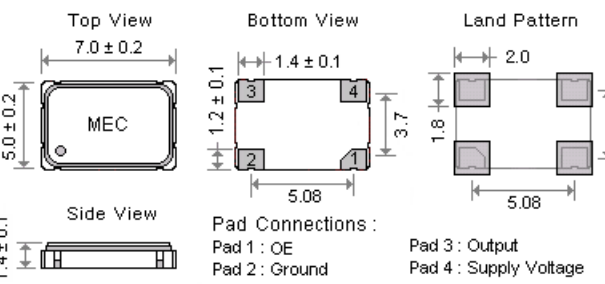
Model	" H21 " ; " H22 " ; " H32 " ; " H53 " and " SWO " series				
Type	" H21 " series	" H22 " series	" H32 " series	" H53 " series	" SWO " series
Dimensions	2.0 x 1.6 x 0.8 mm	2.5 x 2.0 x 0.9 mm	3.2 x 2.5 x 1.0 mm	5.0 x 3.2 x 1.2 mm	7.0 x 5.0 x 1.4 mm
Available Frequency Range by Voltage	1.8 V	1 MHz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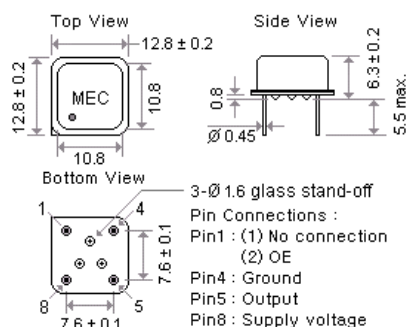


General Specifications [Ta = +25°C]

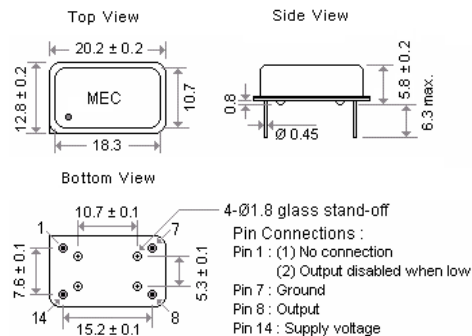
Type		Thru - Hole type			
Model (Dimensions)		H8 (12.8 * 12.8 * 6.3 mm)		H14 (20.2 * 12.8 * 5.8 mm)	
Supply Voltage (V _{DD})		+ 1.8 V ± 10%	+ 2.5 V ± 10%	+ 3.3 V ± 10%	+ 5.0 V ± 10%
		code is " 18 "	code is " 25 "	code is " 3 "	code is " 5 "
Frequency Range		0.05 ~ 160 MHz	0.05 ~ 160 MHz	0.05 ~ 160 MHz	0.05 ~ 135 MHz
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.)
	50 MHz	8 mA (max.)	10 mA (max.)	12 mA (max.)	16 mA (max.)
	100 MHz	10 mA (max.)	15 mA (max.)	30 mA (max.)	30 mA (max.)
	160 MHz	15 mA (max.)	20 mA (max.)	40 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]

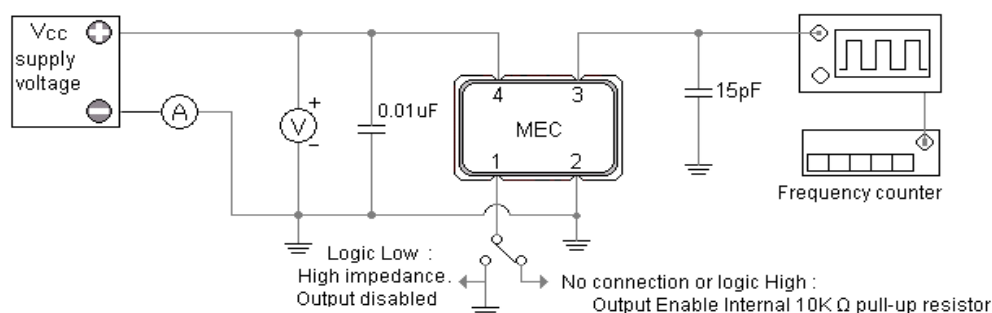
Ex (2) : 3HY32 - K50T - 24.000 [3.3V , HY seires 3225 type , ±50ppm from -40°C to +125°C , OE Function , 24.000MHz]

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

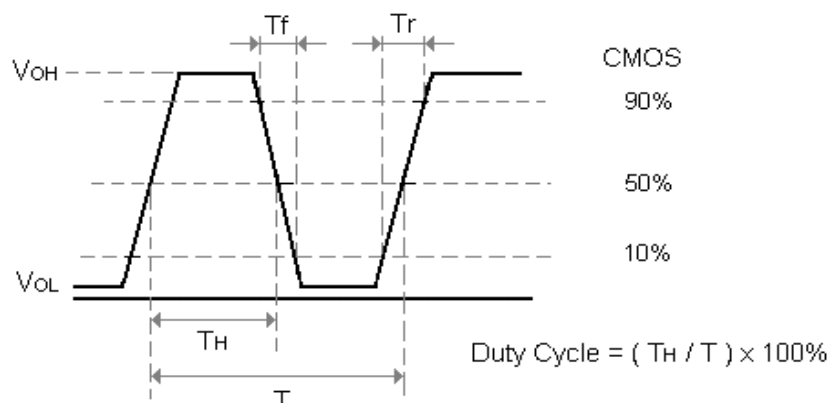
Ex (4) : 3H22 - ET - 49.152 [3.3V , H seires 2520 type , ±50ppm from -40°C to +85°C , OE Function , 49.152 MHz]

[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

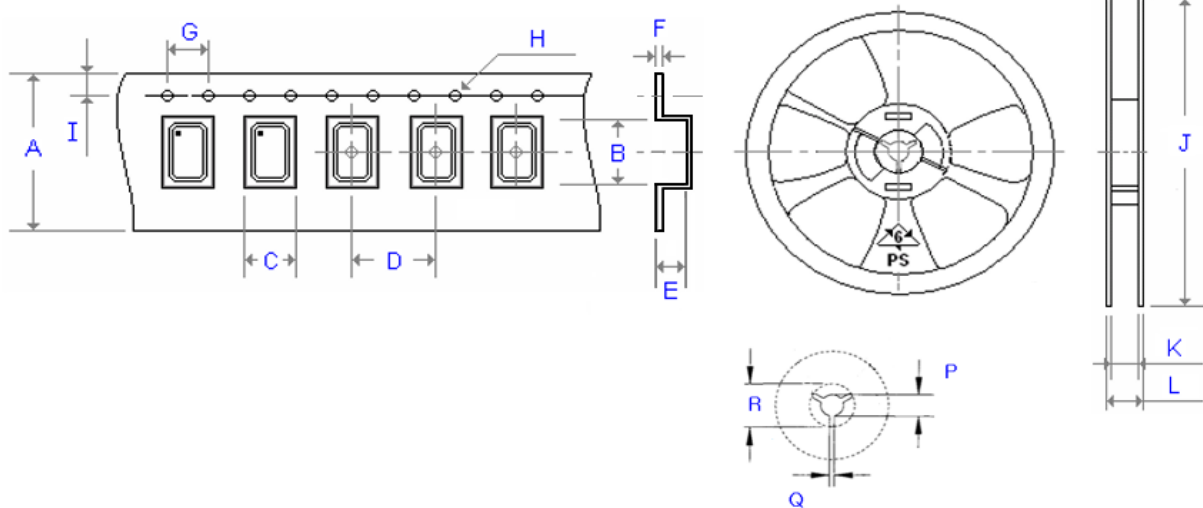
H ; H₋ - series CMOS Test Circuit

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