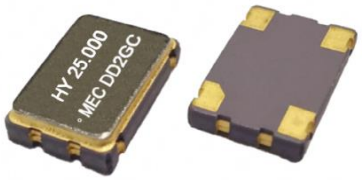
Crystal Oscillators [Wide Operating Temperature] — CMOS Output

HY _ _	Wide Operating Temperature	SMD	CMOS	1.8 V	2.5 V	3.3 V	Min.	Max.
	Over - 40 °C to + 125 °C						1.25 MHz	50.0 MHz

Features

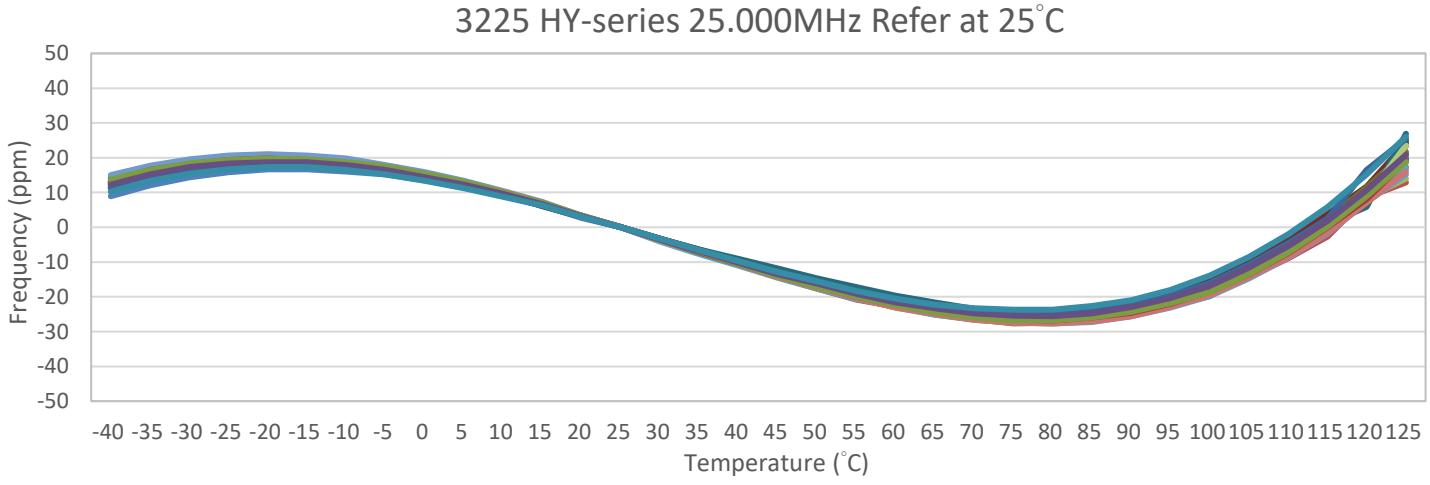
- Femtosecond RMS phase jitter. 150 fs typical (12 KHz ~ 5 MHz)
- Superior phase noise: -155 dBc/Hz at 10 KHz and -160 dBc/Hz at 100 KHz offset
- Wide Operating Temperature range from -40 °C to +125 °C



General specifications of all available packages , at Ta=+25°C , CL=15pF

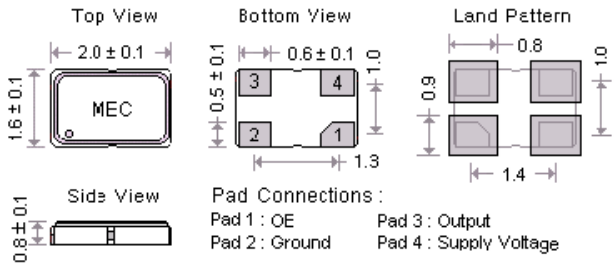
Model [Output Logic]	" HY " series [CMOS]			
Type	HY22	HY32	HY53	HY57
Dimensions	2.5 * 2.0 * 0.9 mm	3.2 * 2.5 * 1.0 mm	5.0 * 3.2 * 1.2 mm	7.0 * 5.0 * 1.4 mm

Available Frequency Range		1.25 ~ 50.0 MHz						
Supply Voltage (V_{DD})		+1.8 V ± 10%		+2.5 V ± 10%		+3.3 V ± 10%		
Supply Voltage Code		" 18 "		" 25 "		" 3 "		
Current Consumption [15pF load]	1.25 ~ 19.99 MHz	2.0 mA (max.)		3.0 mA (max.)		4.0 mA (max.)		
	20.0 ~ 50.00 MHz	4.0 mA (max.)		5.0 mA (max.)		6.0 mA (max.)		
Frequency Stability Codes	Frequency Stability over	± 25 ppm	± 50 ppm	± 100 ppm	If non-standard , please enter the desired stability after the " K " For example : " K40 " ± 40 ppm over -40°C to +125°C			
	Car Grade (-40°C to +125°C)	---	*K50*	*K100*				
Rise Time (Tr) / Fall Time (Tf)	10 nsec. (max.)							
	Measured between 10% ⟷ 90% of waveform (CL = 15pF)							
Output Load	15 pF							
Start-up Time	5.0 msec. (max.)							
Duty Cycle	Standard: 50% ± 10% ; Option: 50% ± 5%. Please add "-S" at the end of the part number for ± 5% .							
Output Enable / Disable Function	70% of V_{DD} (min.) to Enable Output.							
	30% of V_{DD} (max.) to Disable Output.							
Phase Jitter (RMS) [26 MHz , 3.3V]	150 fsec (typ.) [12 KHz to 5 MHz integated]							
SSB Phase Noise [26 MHz , 3.3V]	Offset	10 Hz	100 Hz	1 KHz	10 KHz	100KHz	1 MHz	5 MHz
	dBc / Hz (typ.)	-94	-127	-142	-156	-161	-163	-163
Storage Temperature	-65°C to +150°C							
Aging at Ta=+25ºC	± 2 ppm (max.) for first year							

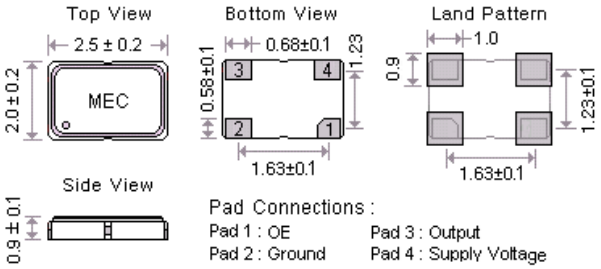


Outline Dimensions (Unit : mm) , Suggested pad Layout for SMDs

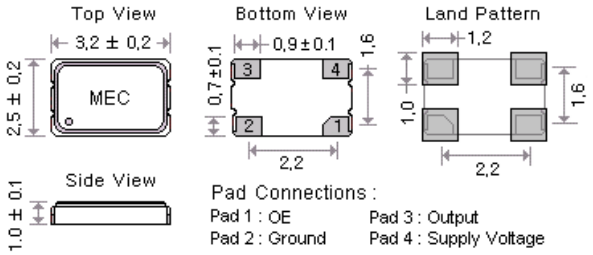
[H21]



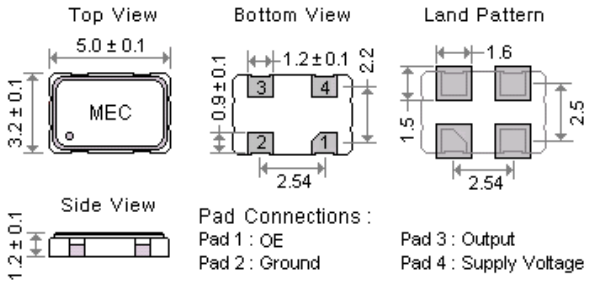
[H22 ; H_22]



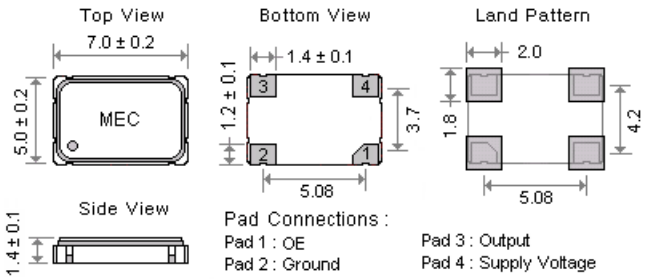
[H32 ; H_32]



[H53 ; H_53]



[SWO ; H_57]



Part Number Format and Examples

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

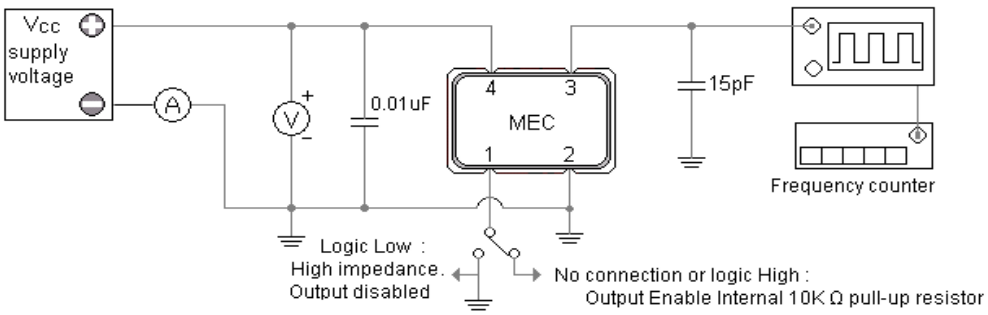
Ex (3) : 18HA32 - BT - 32.768K [1.8V , HA seires 3225 type , ±50ppm from -20°C to +70°C , OE Function , 32.768KHz]

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

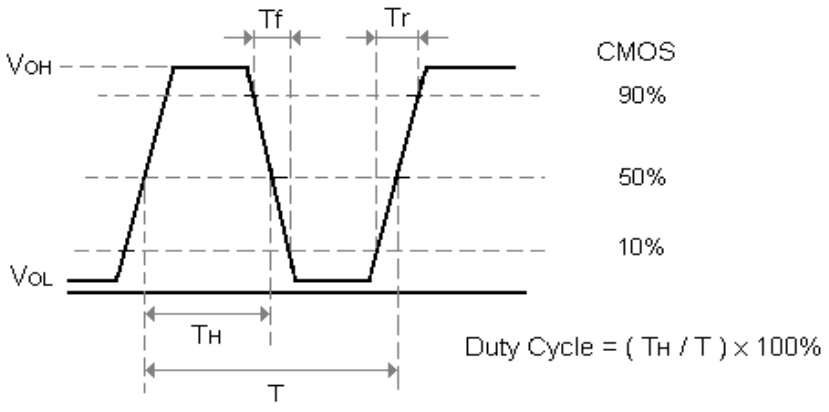
[1]	Supply voltage " 10 " for +1.0V ; " 12 " for +1.2V ; " 18 " for +1.8V ; " 25 " for +2.5V ; " 3 " for +3.3V ; " 5 " for +5.0V	
[2]	Holder Type	
[3]	-20°C ~ 70°C	" A " ± 25ppm ; " B " ± 50ppm ; " C " ± 100ppm ;
		If non-standard please enter the desired stability after " C " , example " C15 " : represents ±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

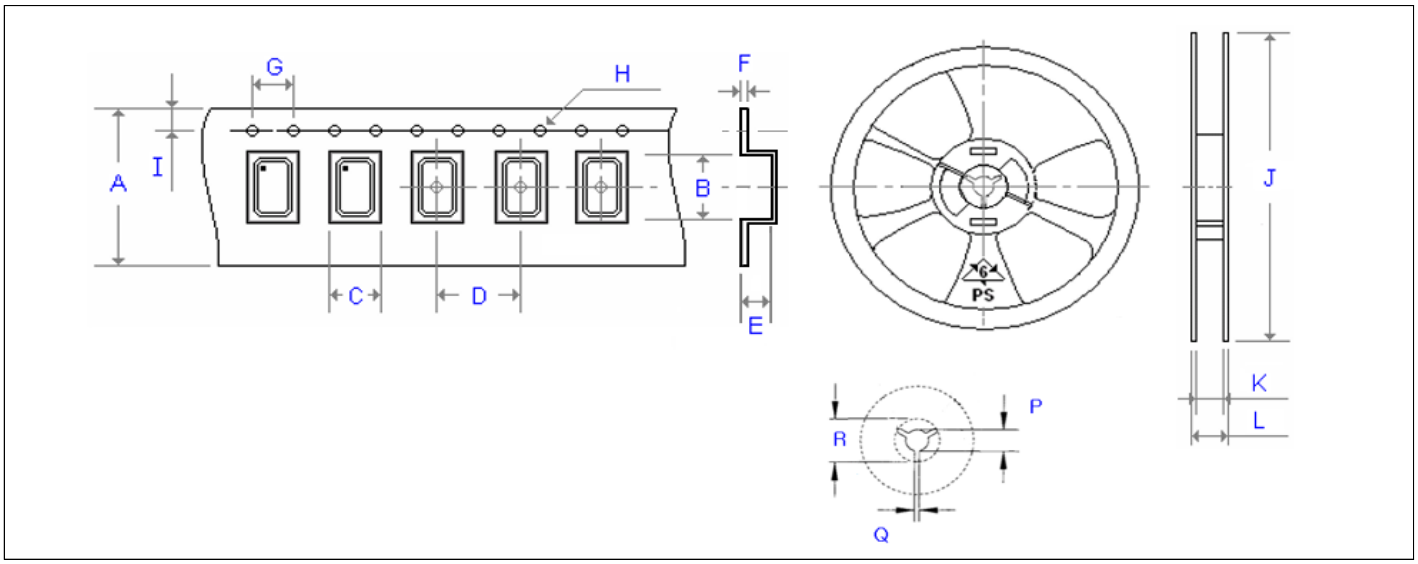


CMOS Output Waveform



Emboss Taping and Reel Specifications

[Crystal Oscillator Units]



Carrier Type Dimensions (unit : mm) ±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 _ 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 / -0.0mm

	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 _ 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