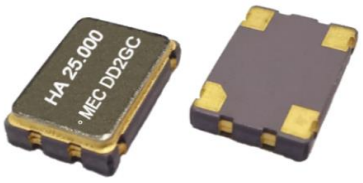
Crystal Oscillators [32.768 KHz , 27.3 ~ 100.0 KHz]

CMOS Output

HA _ _	32.768 KHz uA Current Consumption	SMD	CMOS	1.8 V / 2.5 V / 3.3 V / 5.0 V	Min. 27.3 KHz	Max. 100.0 KHz

Features

- Features an AT-Cut crystal for high frequency stability, while providing a low micro Amp (μA) current consumption that would normally only be available from an X-Cut tuning fork crystal
- 32.768 KHz is popular for Real Time Clocks and other timing applications
- For even tighter frequency stability (± 5 ppm over -40 to 85 °C) and lower current consumption (1.2 uA at 3.3V) , please contact Mercury



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

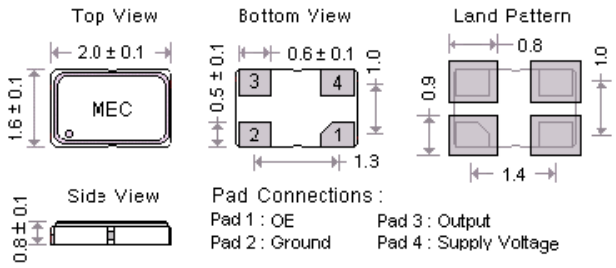
Type	" HA " series [SMD Type]			
Model	**HA22**	**HA32**	**HA53**	**HA57**
Dimensions	2.5 * 2.0 * 0.9 mm	3.2 * 2.5 * 1.0 mm	5.0 * 3.2 * 1.2 mm	7.0 * 5.0 * 1.4 mm
Frequency Output Range	32.768 KHz (standard)			
	27.3 KHz ~ 100 KHz	27.3 KHz ~ 100 KHz	27.3 KHz ~ 100 KHz	27.3 KHz ~ 52 KHz
Supply Voltage	1.8 V ± 10% Voltage code is " 18 "	2.5 V ± 10% Voltage code is " 25 "	3.3 V ± 10% Voltage code is " 3 "	5.0 V ± 10% Voltage code is " 5 "
Current Consumption (32.768 KHz , Load 15pF)	32 uA (typ.) 50 uA (max.)	32 uA (typ.) 50 uA (max.)	33 uA (typ.) 50 uA (max.)	36 uA (typ.) 60 uA (max.)
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.)
Rise Time (Tr) / Fall Time (Tf) (10 % ⟷ 90 % waveform)	20 nsec (max.)	20 nsec (max.)	12 nsec (max.)	12 nsec (max.)

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*	

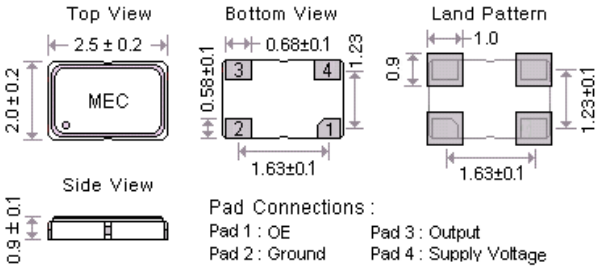
Output Load	15 pF
Start-up Time	1.0 msec. (typ.) ; 5.0 msec. (max.)
Duty Cycle	50% ± 5%
Output Enable / Disable Function	70% of V_{DD} (min.) to enable output.
	30% of V_{DD} (max.) to disable output.
	Disable current : 3 uA (max.) for OE ≦ 0.3V
Storage Temperature	-55°C to +125°C
Aging at Ta=+25ºC	± 3 ppm (max.) first year ; ± 2 ppm (max.) per year thereafter

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

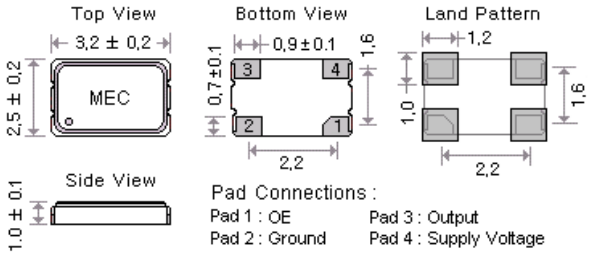
[H21]



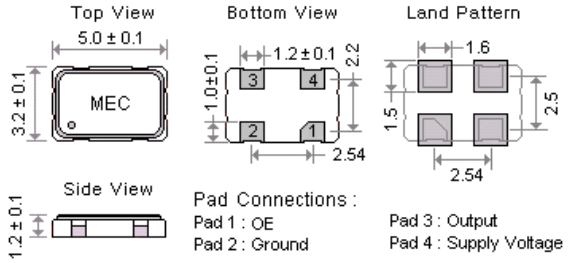
[H22 ; H_22]



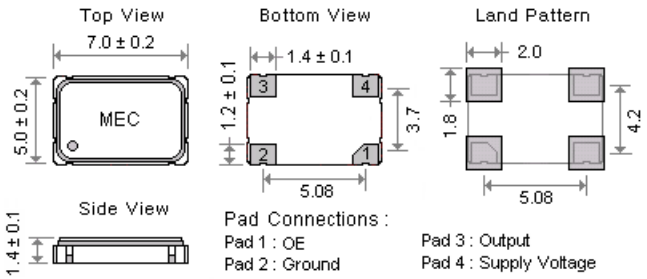
[H32 ; H_32]



[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]

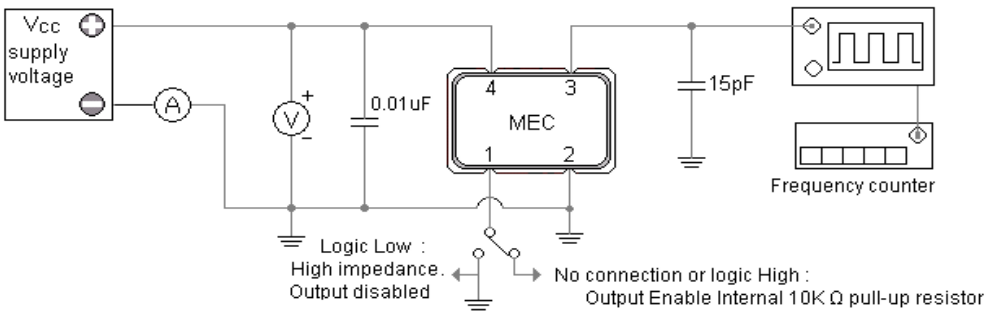
Ex (3) : 18HA32 - BT - 32.768K [1.8V , HA seires 3225 type , ±50ppm from -20°C to +70°C , OE Function , 32.768KHz]

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

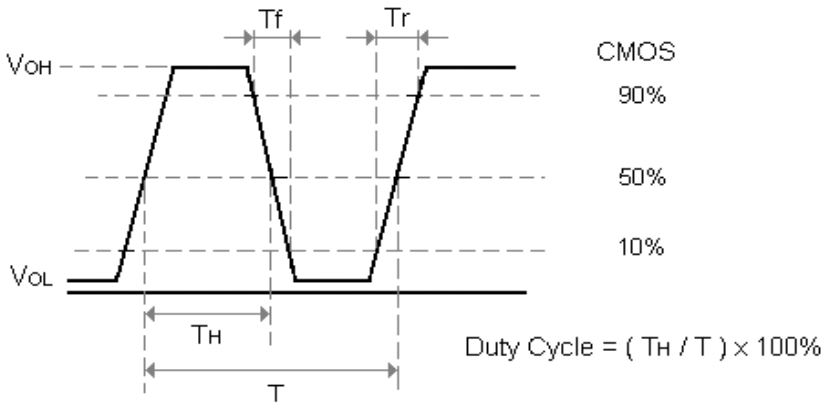
[1]	Supply voltage " 10 " for +1.0V ; " 12 " for +1.2V ; " 18 " for +1.8V ; " 25 " for +2.5V ; " 3 " for +3.3V ; " 5 " for +5.0V	
[2]	Holder Type	
[3]	-20°C ~ 70°C	" A " ± 25ppm ; " B " ± 50ppm ; " C " ± 100ppm ;
		If non-standard please enter the desired stability after " C " , example " C15 " : represents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

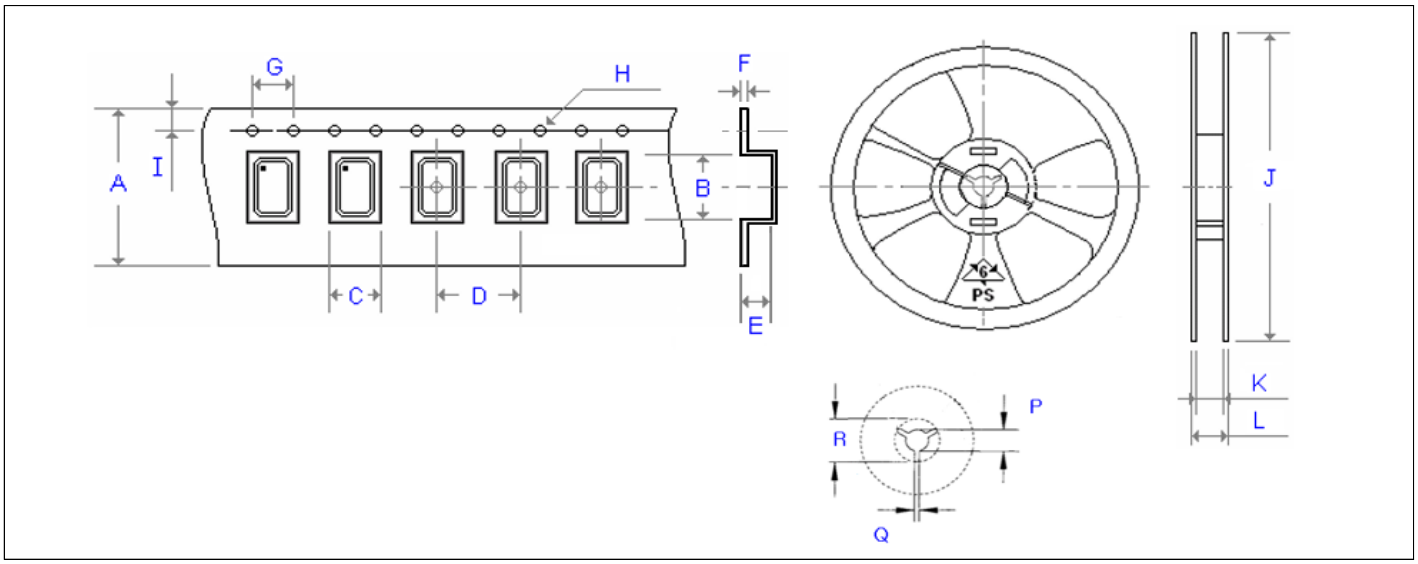


CMOS Output Waveform



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