

HA _ _

32.768 KHz

uA Current Consumption

SMD

CMOS

1.8 V

2.5 V

Min.

Max.

3.3 V

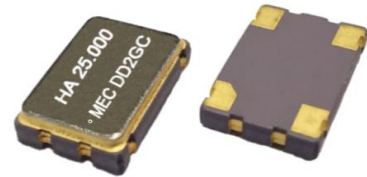
5.0 V

27.3 KHz

100.0 KHz

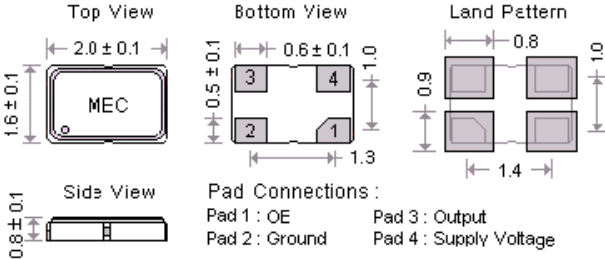
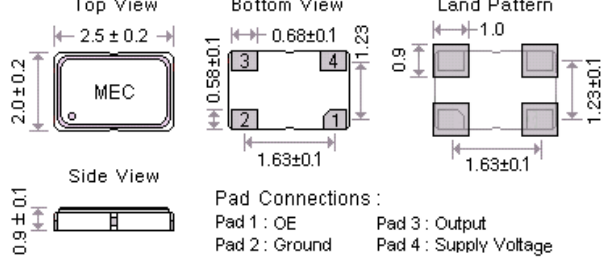
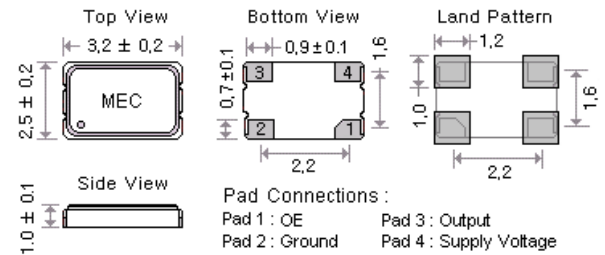
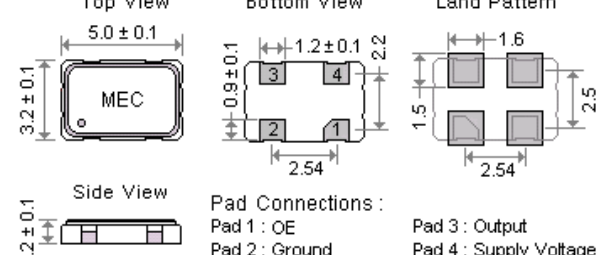
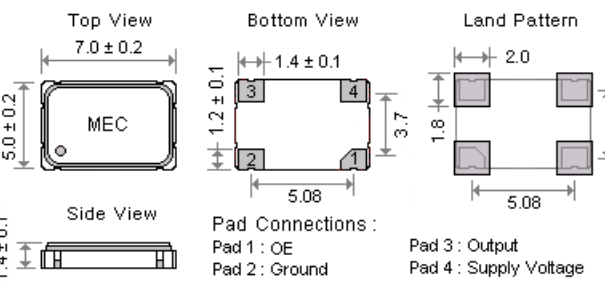
Features

- Features an AT-Cut crystal for high frequency stability, while providing a low micro Amp (μ A) 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 $T_a=+25^{\circ}\text{C}$, $CL=15\text{pF}$

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%	2.5 V ± 10%	3.3 V ± 10%	5.0 V ± 10%	
	Voltage code is " 18 "	Voltage code is " 25 "	Voltage code is " 3 "	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 "
	Commercial (-20°C to +70°C)	A	B	C	For example : " C20 " ± 20 ppm over -20°C to +70°C ;
	Industrial (-40°C to +85°C)	D	E	F	" F30 " ± 30 ppm over -40°C to +85°C
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=+25°C	± 3 ppm (max.) first year ; ± 2 ppm (max.) per year thereafter				

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	

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]

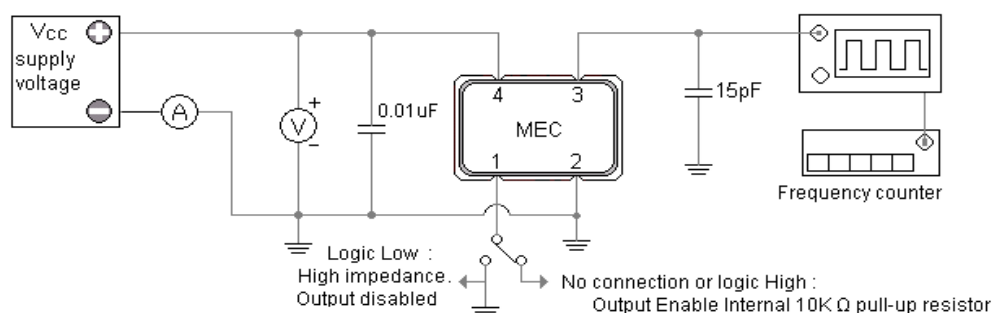
Ex (2) : 3HY32 - K50T - 24.000 [3.3V , HY seires 3225 type , ±50ppm from -40°C to +125°C , OE Function , 24.000MHz]

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

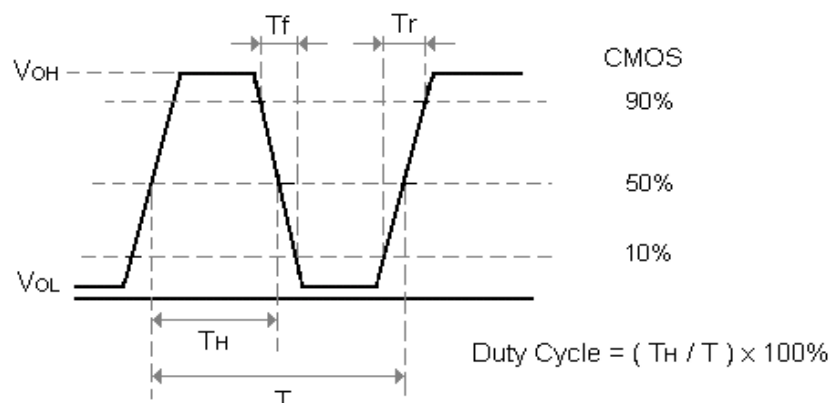
Ex (4) : 3H22 - ET - 49.152 [3.3V , H seires 2520 type , ±50ppm from -40°C to +85°C , OE Function , 49.152 MHz]

[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

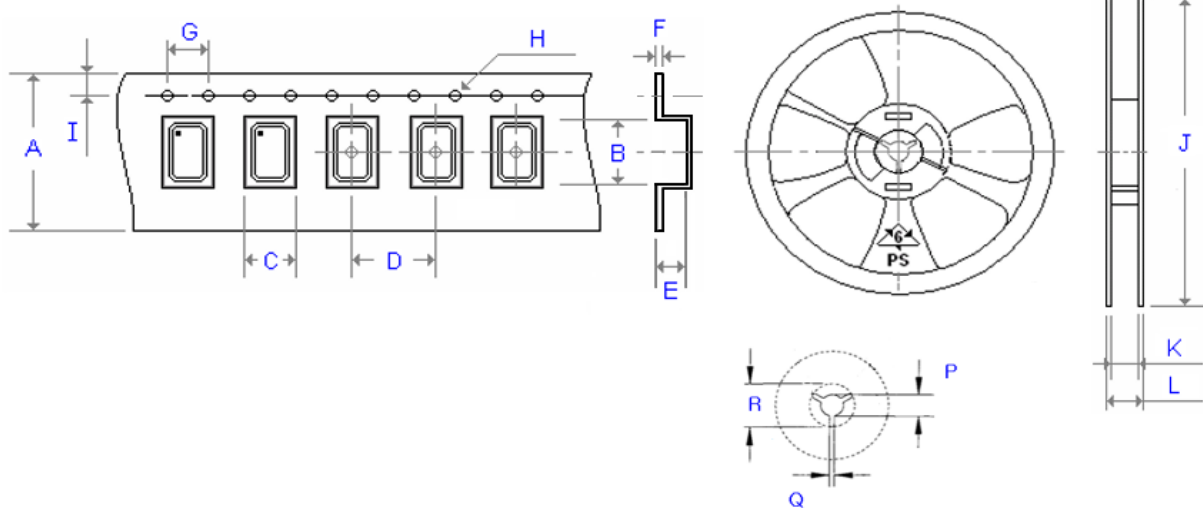
H ; H₋ - series CMOS Test Circuit

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	$\varnothing 1.50$	1.75	3000
H_22	8.00	2.80	2.25	4.00	1.10	0.30	4.00	$\varnothing 1.50$	1.75	3000
H_32	8.00	3.40	2.70	4.00	1.40	0.25	4.00	$\varnothing 1.50$	1.75	3000
H_53	12.00	5.30	3.60	8.00	1.40	0.30	4.00	$\varnothing 1.50$	1.75	1000
H_57	16.00	7.30	5.30	8.00	1.90	0.30	4.00	$\varnothing 1.50$	1.75	1000
SWO	16.00	7.20	5.40	8.00	1.80	0.30	4.00	$\varnothing 1.50$	1.75	1000
H_216	8.00	2.30	1.90	4.00	0.90	0.25	4.00	$\varnothing 1.50$	1.75	3000
H_226	8.00	2.80	2.25	4.00	1.10	0.30	4.00	$\varnothing 1.50$	1.75	3000
H_326	8.00	3.40	2.70	4.00	1.40	0.25	4.00	$\varnothing 1.50$	1.75	3000
H_536	12.00	5.30	3.60	8.00	1.40	0.30	4.00	$\varnothing 1.50$	1.75	1000
H_576	16.00	7.30	5.30	8.00	1.90	0.30	4.00	$\varnothing 1.50$	1.75	1000
H_328	8.00	3.40	2.70	4.00	1.40	0.25	4.00	$\varnothing 1.50$	1.75	3000
H_538	12.00	5.40	3.60	8.00	1.70	0.30	4.00	$\varnothing 1.50$	1.75	1000
H_578	16.00	7.30	5.30	8.00	1.90	0.30	4.00	$\varnothing 1.50$	1.75	1000
H_43	24.00	11.80	10.00	16.00	5.00	0.30	4.00	$\varnothing 1.50$	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