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

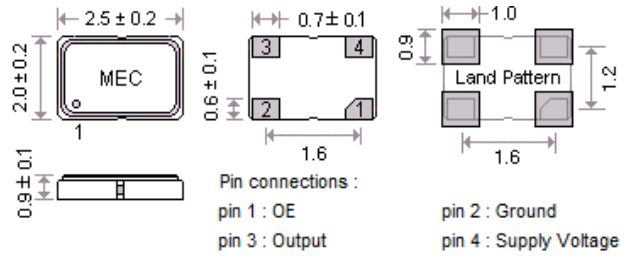
Model [Output Logic]	" HA " series [CMOS]			
Type	HA22	HA32	HA53	HA57
Dimensions	2.5 * 2.0 * 0.9 mm	3.2 * 2.5 * 1.0 mm	5.0 * 3.2 * 1.2 mm	7.0 * 5.0 * 1.4 mm
Frequency Output Range	32.768 KHz (standard)			
	27.3 KHz ~ 100 KHz			
Supply Voltage V_{DD}	1.8 V_{DD} ± 10%	2.5 V_{DD} ± 10%	3.3 V_{DD} ± 10%	5.0 V_{DD} ± 10%
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.)

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 " I " For example : " C20 " ± 20 ppm over -10°C to +70°C ; " I30 " ± 30 ppm over -40°C to +85°C
	Commercial (*-10°C to +70°C*)	*A*	*B*	*C*	
	Industrial (*-40°C to +85°C*)	*D*	*E*	*F*	

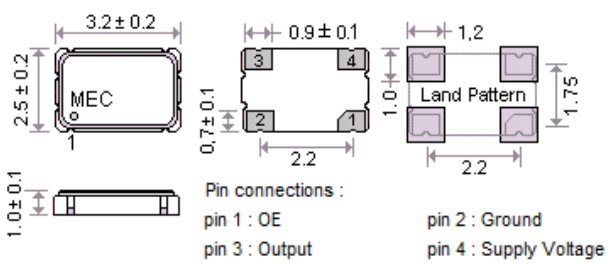
Rise Time (Tr) / Fall Time (Tf) (10 % ⟷ 90 % waveform)	12 nS (max.)
Load	15 pF
Start-up Time	1.0 m sec. (typical) ; 5.0 m sec. (max.)
Duty Cycle	50% ± 5%
Output Enable / Disable Function	70% of V_{DD} (min.) to enable output.
	30% of V_{DD} (max.) to disable output.
Storage Temperature	-55°C to + 125°C
Aging at Ta=+25ºC	± 3 ppm max. first year ; ± 2 ppm max. per year thereafter

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

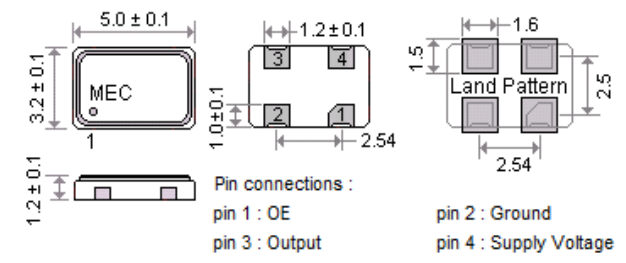
[HA22]



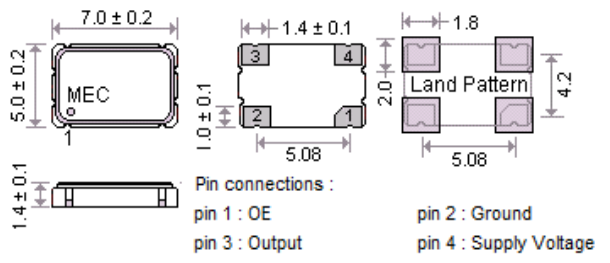
[HA32]



[HA53]



[HA57]



Part Number Format and Examples

[1]	[2]		[3]	[4]		[5]
Supply Voltage	Holder Type	-	Frequency Stability	T	-	Center Frequency

Examples	(1)	18	HA32	-	B	T	-	32.768K
	(2)	5	HA57	-	C30		-	38.400K
	(3)	3	HA53	-	E	T	-	27.300K

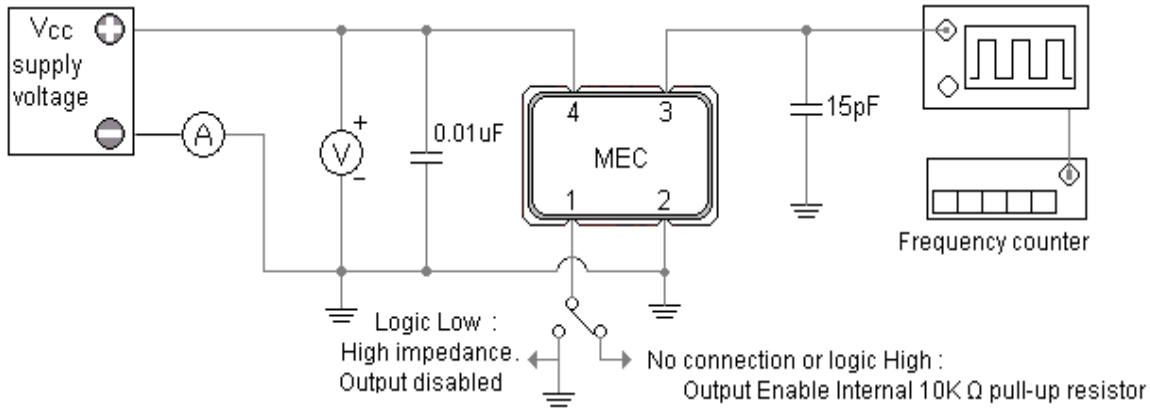
Ex (1) : 18HA32 - BT - 32.768K [1.8V , HA 3225 type , ±50ppm from -10°C to 70°C , Output Enable , 32.768KHz]

Ex (2) : 5HA57 - C30 - 38.400K [5.0V , HA 7050 type , ±30ppm from -10°C to 70°C , 38.400KHz]

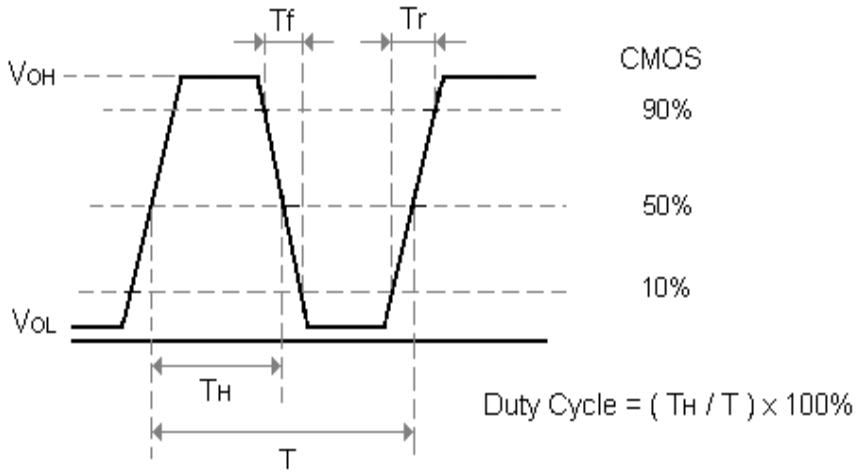
Ex (3) : 3HA53 - ET - 27.300K [3.3V , HA 5032 type , ±50ppm from -40°C to 85°C , Output Enable , 27.300KHz]

[1]	Supply voltage , " 18 " for +1.8V ;" 25 " for +2.5V ; " 3 " for +3.3V ; " 5 " for +5.0V	
[2]	Holder Type	
[3]	-10°C ~ 70 °C	" A " ± 25ppm ; " B " ± 50ppm ; " C " ± 100ppm ;
		If non-standard please enter the desired stability after " C " , example " C15 " : represents ±15ppm over -10 to +70°C
	-40°C ~ 85 °C	" D " ± 25ppm ; " E " ± 50ppm ; " F " ± 100ppm ;
		If non-standard please enter the desired stability after " I " , example " I30 " : represents ± 30ppm over -40 to +85°C
[4]	" T " for Output Enble , Leave this space blank if no connection on pin 1	
[5]	Frequency code : K for KHz	

CMOS Square Wave Test Circuit

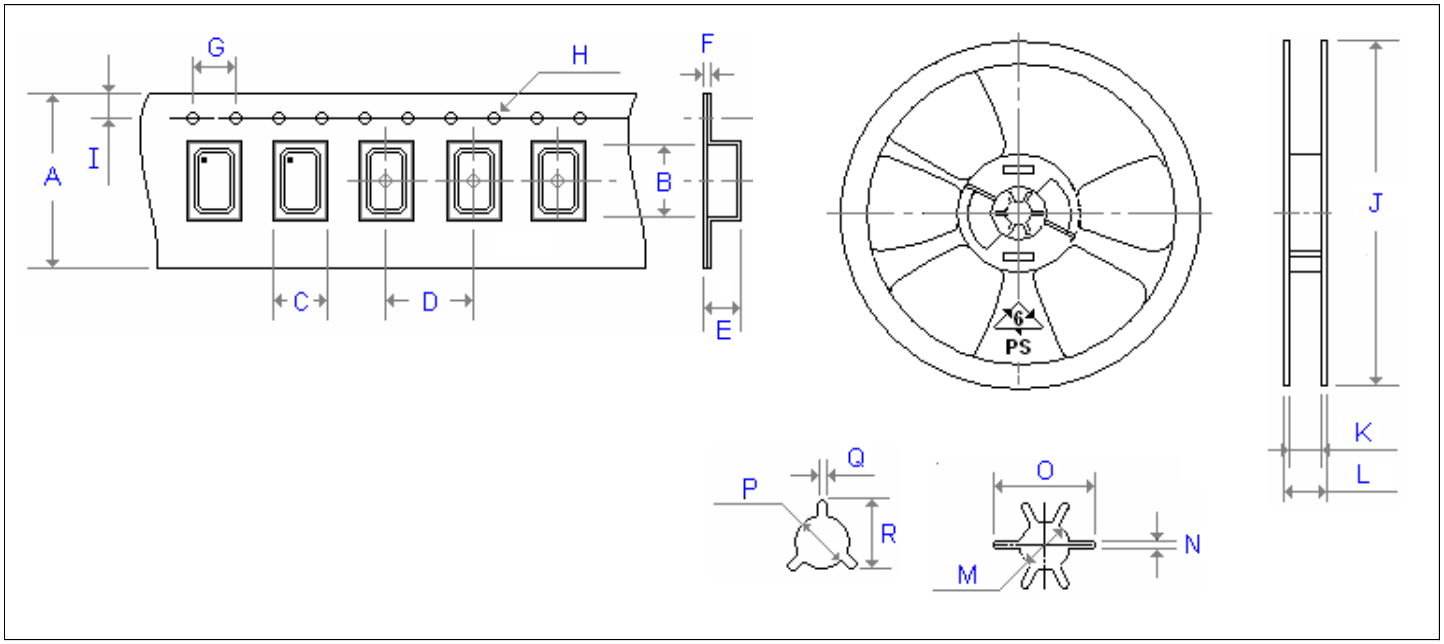


CMOS Output Waveform



Emboss Taping and Reel Specifications

[Crystal Oscillator Units]



Carrier Type Dimensions (unit : mm)

	A	B	C	D	E	F	G	H	I	pcs / reel
H_22	8.0	2.8	2.3	4.0	1.1	0.3	4.0	Ø 1.50	1.75	3000
H_32	8.0	3.4	2.7	4.0	1.4	0.3	4.0	Ø 1.50	1.75	3000
H_53	12.0	5.3	3.6	8.0	1.4	0.3	4.0	Ø 1.55	1.75	1000
H_57	16.0	7.3	5.3	8.0	1.9	0.3	4.0	Ø 1.55	1.75	1000
SWO	16.0	7.2	5.4	8.0	1.8	0.3	4.0	Ø 1.55	1.75	1000
H_576	16.0	7.2	5.4	8.0	1.8	0.3	4.0	Ø 1.55	1.75	1000
HP_576	16.0	7.2	5.4	8.0	1.8	0.3	4.0	Ø 1.55	1.75	1000
HD_576	16.0	7.2	5.4	8.0	1.8	0.3	4.0	Ø 1.55	1.75	1000
H_42	24.0	12.4	10.3	16.0	5.1	0.3	4.0	Ø 1.55	1.75	500
H_43	24.0	12.4	10.3	16.0	5.1	0.3	4.0	Ø 1.55	1.75	500

Reel Dimensions (unit : mm)

	J	K	L	M	N	O	P	Q	R	pcs / reel
H_22	180.0	9.0	12.0	-	-	-	13.2	2.1	-	3000
H_32	180.0	9.0	12.0	-	-	-	13.2	2.1	-	3000
H_53	180.0	13.0	16.0	-	-	-	13.2	2.5	-	1000
H_57	180.0	17.2	19.3	-	-	-	13.3	2.2	22.0	1000
SWO	180.0	17.2	19.3	-	-	-	13.3	2.2	22.0	1000
H_576	180.0	17.2	19.3	-	-	-	13.3	2.2	22.0	1000
HP_576	180.0	17.2	19.3	-	-	-	13.3	2.2	22.0	1000
HD_576	180.0	17.2	19.3	-	-	-	13.3	2.2	22.0	1000
H_42	330.0	30.0	25.0	-	-	-	13.4	2.5	19.5	500
H_43	330.0	30.0	25.0	-	-	-	13.4	2.5	19.5	500