EMI Reduction Spread Spectrum Clock Oscillators

HM _ D	D Group	SMD	CMOS	1.8V	2.5V	3.3V	1.8V ~ 3.3V	2.5V ~ 3.3V	Min.	Max.
									1 MHz	160 MHz

- Reduce electromagnetic interference (EMI) by 18 dB (typ.) at 100 MHz , C2.0 , 3.3V
- Operates with +1.8V to +3.3V supply voltage
- Reduced system complexity.



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

Group	D Group			
Type	HM22	HM32	HM53	HM572
Dimemsions	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

Supply Voltage (V_{DD}) ±10% Voltage code		1.8 V	2.5 V	3.3 V	+1.8 V ~ +3.3 V	+2.5 V ~ +3.3 V
		" 18 "	" 25 "	" 3 "	" 18V3 "	" 25V3 "
Frequency Range		1 ~ 125 MHz	1 ~ 160 MHz	1 ~ 160 MHz	1 ~ 125 MHz	1 ~ 160 MHz
Output Logic " High " , " 1 "		1.62 V (min.)	2.25 V (min.)	2.97 V (min.)	V_{DD} * 90% (min.)	V_{DD} * 90% (min.)
Output Logic " Low " , " 0 "		0.18 V (max.)	0.25 V (max.)	0.33 V (max.)	V_{DD} * 10% (max.)	V_{DD} * 10% (max.)
Current Consumption	1 ~ 60MHz	12 mA (max.)	13 mA (max.)	14 mA (max.)	14 mA (max.)	14 mA (max.)
	< 60 ~ 125MHz	15 mA (max.)	18 mA (max.)	19 mA (max.)	19 mA (max.)	19 mA (max.)
	< 125 ~ 160MHz	--	22 mA (max.)	24 mA (max.)	--	24 mA (max.)

Spread Type	Total%	Down Spread (code) (*1)	Center Spread (code)
Spread Percentage	4.0%	--	±2.0% (C2.0)
	3.0%	--	±1.5% (C1.5)
	2.0%	-2.0% (D2.0)	±1.0% (C1.0)
	1.5%	-1.5% (D1.5)	--
	1.0%	-1.0% (D1.0)	±0.5% (C0.5)
	0.5%	-0.5% (D0.5)	±0.25% (C0.25)
	0.25%	-0.25% (D0.25)	±0.125% (C0.125)
	0.125%	-0.125% (D0.125)	±0.0625% (C0.0625)

EMI Reduction	18 dB (typ.) , 100 MHz at C2.0 , 3.3 V		
	12 dB (typ.) , 100 MHz at C0.5 , 3.3 V		
	5 dB (typ.) , 100 MHz at C0.0625 , 3.3 V		
Modulation Carrier Freq. (Dither rate)	24.8 KHz (min.) ; 33.6 KHz (max.) Frequency dependent . Call for details		
Frequency Stability Code (exclude modulation)	Frequency Stability over Operating Temperature Range	± 50 ppm	from -40°C to +85°C (Code is " E ")
			from -40°C to +105°C (Code is " H ")
Rise Time (Tr) / Fall Time (Tf)	10 nsec. (max.)		
	Measured between 10% ←→ 90% waveform		
Duty Cycle	50% ± 5%		
Output Waveform	CMOS		
Output Load	15pF		
Start-up Time	6 msec. (typ.) ; 10 msec. (max.)		
Storage Temperature	- 55°C to + 150°C		
Aging at Ta = +25°C	± 3ppm per year (max.)		
Output Enable Function	Enable	When 80% (min.) of V_{DD} to Enable Output. Enable Time : 5.0 msec. (max.)	
	Disable	When 20% (max.) of V_{DD} to Disable Output. Disable current : 1 mA (typ.) ; Disable time : 1 usec. (max.)	

Note * 1 : Spread Type Down Spread Under development

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Part Number Format and Example

[1]	[2]	-	[3]	[4]	-	[5]	[6]	-	[7]
Supply Voltage	Holder Type		Frequency Stability	OE Function		Center Frequency	Group Type		Spread type Percentage
Examples (1)	18V3	HM22	-	E	T	-	20.000	D	-	C1.0
(2)	18	HM572	-	H	T	-	125.000	D	-	D0.25

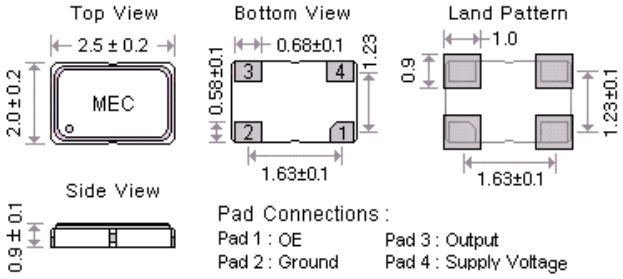
Ex (1) : 18V3HM22 - ET - 20.000D - C1.0 [+1.8 ~ +3.3V, HM22 type, ±50ppm from -40°C to +85°C, OE Function, 20.000MHz, D Group, 1.0% center spread]

Ex (2) : 18HM572 - HT - 125.000D - D0.25 [+1.8V, HM572 type, ±50ppm from -40°C to +105°C, OE Function, 125.000MHz, D Group, 0.25% down spread]

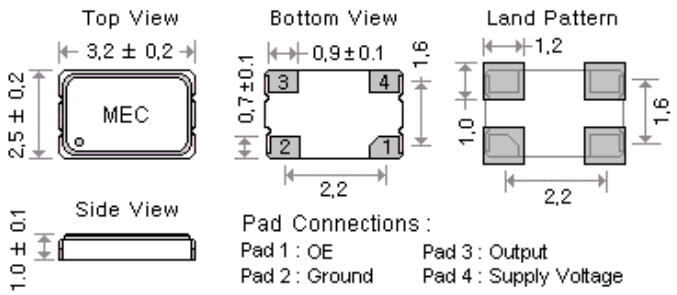
[1]	Supply voltage code : " 18 " for +1.8V , " 25 " for +2.5V , " 3 " for +3.3V , " 18V3 " for +1.8 ~ +3.3V ±10% , " 25V3 " for +2.5 ~ +3.3V ±10%
[2]	Holder Type (HM22 , HM32 , HM53 , HM572)
[3]	Frequency Stability Code : " E " ± 50ppm at -40°C to +85°C , " H " ± 50ppm at -40°C to +105°C
[4]	" T " for OE Function
[5]	Frequency in MHz
[6]	Group " D "
[7]	Spread type & percentage ; " C " for center spread , " D " for down spread
	Please refer to page 1 for the Spread Percentage code options ; Spread Type Down Spread Under development

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

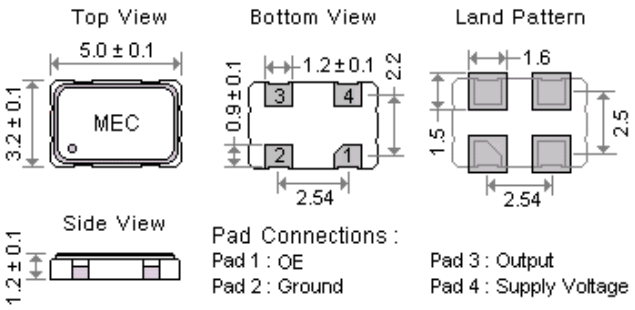
[HM22]



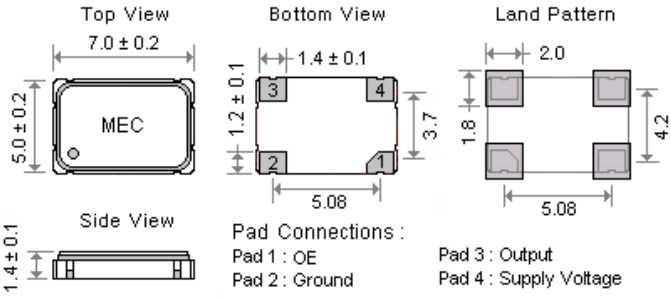
[HM32]



[HM53]

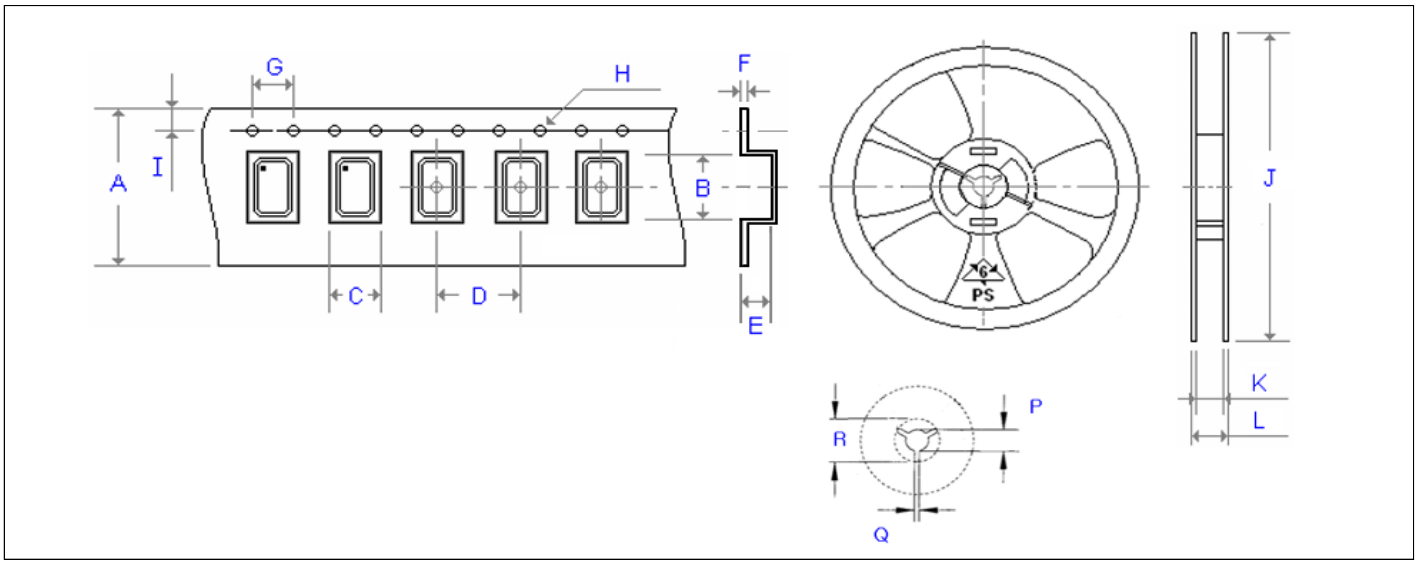


[HM572]



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

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