

# Crystal Embedded Buffer Oscillator [ CMOS ]

CMOS output

HW \_\_

4 outputs with identical frequency

SMD

CMOS

2.5 V

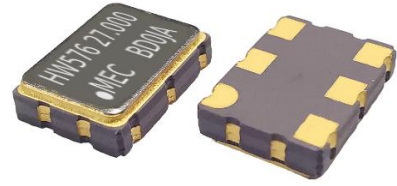
3.3 V

Min.  
10 MHz

Max.  
40 MHz

## Features

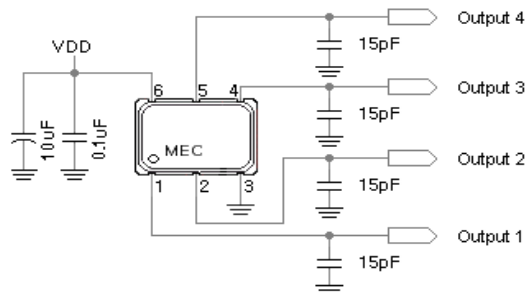
- 4 output perform the same frequency stability
- 4 output perform the same signal phase
- Low phase noise



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

Model [ Output Logic ]	" HW " series [ CMOS ]							
Type	HW326		HW536			HW576		
Dimensions	3.2 * 2.5 * 1.0 mm		5.0 * 3.2 * 1.2 mm			7.0 * 5.0 * 1.7 mm		
Frequency Range	16.0 ~ 40.0 MHz		10.0 ~ 40.0 MHz			10.0 ~ 40.0 MHz		
Outputs	4		4			4		
Supply Voltage ( V <sub>DD</sub> )	+2.5 V ± 5%				+3.3 V ± 5%			
	Voltage code is " 25 "				Voltage code is " 3 "			
Current Consumption With 4 Output Load	8 mA ( typ. ) 18 mA ( max. )		10 mA ( typ. ) 20 mA ( max. )					
Output Logic " High " , " 1 "	2.25 V ( min. )				2.97 V ( min. )			
Output Logic " Low " , " 0 "	0.25 V ( max. )				0.33 V ( max. )			
Rise Time ( Tr ) / Fall Time ( Tf )	1.0 nsec. ( typ. ) ; 10.0 nsec. ( max. )							
	Measured between 10 % ↔ 90 % of V <sub>DD</sub>							
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 " represents . 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				
Output Load	15 pF ; Please connect 15pF load to unused output pads.							
Start-up Time	1.0 msec ( typ. ) ; 5.0 msec ( max. )							
Duty Cycle	50% ± 10%							
Storage Temperature	-50°C to + 150°C							
Aging at Ta=+25°C	± 3 ppm ( max. ) first year							
RMS Jitter [ 12 kHz ~ 20 MHz ]	0.1 psec ( typ. ) ; 0.5 psec ( max. )							
Phase Noise [ 25MHz , 3.3V ]	Offset	10 Hz	100 Hz	1 KHz	10 KHz	100 KHz	1 MHz	10 MHz
	dBc/Hz (typ.)	-82	-115	-141	-153	-165	-166	-168

## HW-series Test Circuit



### Part Number Format and Examples

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

Examples	(1)	25	HW326	-	A	-	16.000
	(2)	3	HW536	-	E	-	25.000
	(3)	3	HW576	-	D	-	32.000

Ex (1) : 25HW326 - A - 16.000 [ 2.5V , HW-series , HW326 type , ±25ppm from -10°C to 70°C , 16.000 MHz ]

Ex (2) : 3HW536 - E - 25.000 [ 3.3V , HW-series , HW536 type , ±50ppm from -40°C to 85°C , 25.000 MHz ]

Ex (3) : 3HW576 - D - 32.000 [ 3.3V , HW-series , HW576 type , ±25ppm from -40°C to 85°C , 32.000 MHz ]

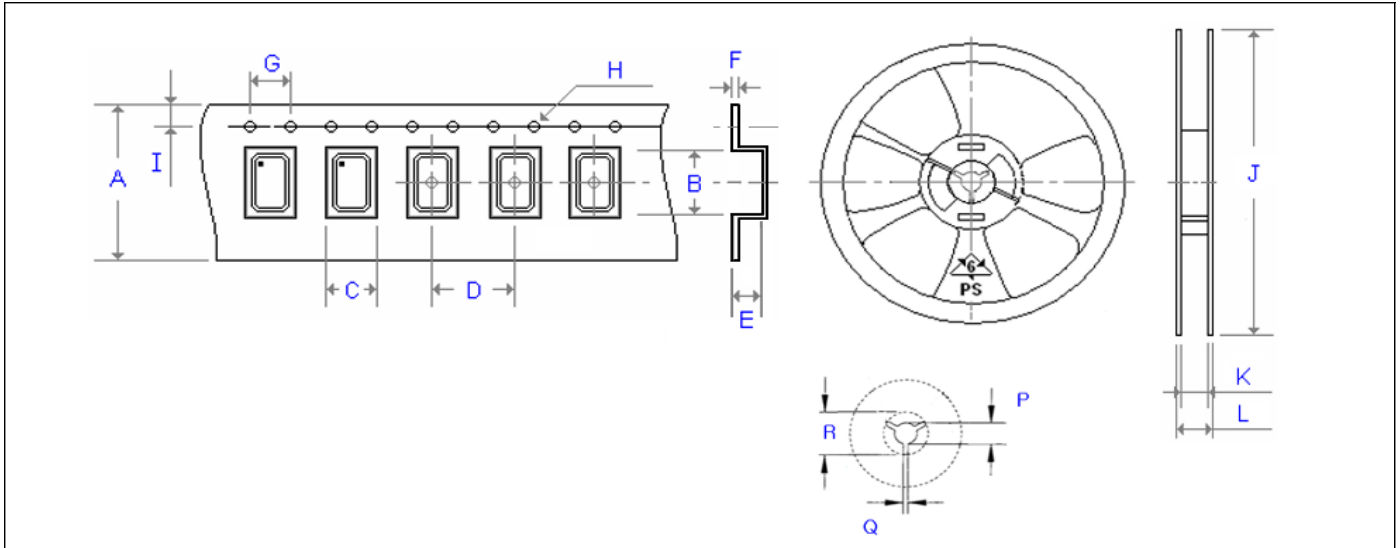
[1]	Supply voltage : " 25 " for +2.5V ; " 3 " for +3.3V
[2]	Holder Type
[3]	-10°C ~ 70 °C " A " ± 25ppm ; " B " ± 50ppm ; " C " ± 100ppm ; If non-standard please enter the desired stability after " C " , example " C15 " : represents ±15ppm over -10 to +70°C
	-40°C ~ 85 °C " D " ± 25ppm ; " E " ± 50ppm ; " F " ± 100ppm ; If non-standard please enter the desired stability after " I " , example " I30 " : represents ± 30ppm over -40 to +85°C
[4]	Frequency in MHz

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

[ HW576 ]	[ HW536 ]
[ HW326 ]	

# 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	∅ 1.50	1.75	3000
H_22	8.00	2.80	2.25	4.00	1.10	0.30	4.00	∅ 1.50	1.75	3000
H_32	8.00	3.40	2.70	4.00	1.40	0.25	4.00	∅ 1.50	1.75	3000
H_53	12.00	5.30	3.60	8.00	1.40	0.30	4.00	∅ 1.50	1.75	1000
H_57	16.00	7.30	5.30	8.00	1.90	0.32	4.00	∅ 1.50	1.75	1000
SWO	16.00	7.20	5.40	8.00	1.80	0.32	4.00	∅ 1.50	1.75	1000
H_226	8.00	2.80	2.25	4.00	1.10	0.30	4.00	∅ 1.50	1.75	3000
H_326	8.00	3.40	2.70	4.00	1.40	0.25	4.00	∅ 1.50	1.75	3000
H_536	12.00	5.30	3.60	8.00	1.40	0.30	4.00	∅ 1.50	1.75	1000
H_576	16.00	7.30	5.30	8.00	1.90	0.32	4.00	∅ 1.50	1.75	1000
H_328	8.00	3.40	2.70	4.00	1.40	0.25	4.00	∅ 1.50	1.75	3000
H_538	12.00	5.40	3.60	8.00	1.70	0.30	4.00	∅ 1.50	1.75	1000
H_578	16.00	7.30	5.30	8.00	1.90	0.32	4.00	∅ 1.50	1.75	1000
H_43	24.00	11.80	10.00	16.00	5.00	0.30	4.00	∅ 1.50	1.75	500

Reel Dimensions ( unit : mm ) ±2mm

	J	K	L	P	Q	R	pcs / reel
H21	180.00	9.00	12.00	13.00	2.50	20.20	3000
H_22	180.00	8.40	11.40	13.00	2.50	20.20	3000
H_32	180.00	9.00	12.00	13.00	2.50	20.20	3000
H_53	180.00	13.00	16.00	13.00	2.50	20.20	1000
H_57	180.00	17.20	19.30	13.00	2.50	20.20	1000
SWO	180.00	17.20	19.30	13.00	2.50	20.20	1000
H_226	180.00	8.40	11.40	13.00	2.50	20.20	3000
H_326	180.00	9.00	12.00	13.00	2.50	20.20	3000
H_536	180.00	13.00	16.00	13.00	2.50	20.20	1000
H_576	180.00	17.20	19.30	13.00	2.50	20.20	1000
H_328	180.00	8.00	12.00	13.00	2.50	20.20	3000
H_538	180.00	13.00	16.00	13.00	2.50	20.20	1000
H_578	180.00	17.20	19.30	13.00	2.50	20.20	1000
H_43	330.00	24.50	29.10	13.00	2.50	20.20	500