

Low Supply Voltage Crystal Oscillators

CMOS Output

HU _ _

Low Supply Voltage

SMD

CMOS

1.0 V

1.2 V

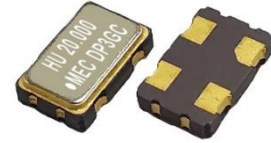
Min.
0.625 MHz

Max.
50 MHz

Features

- Low 1.0V to 1.2V supply voltage
- Low current consumption
- 2.5 x 2.0 mm small size package

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



Model [Output Logic]		"HU " series [CMOS]							
Type		HU22		HU32		HU53		HU57	
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	
Frequency Range		0.625 ~ 50.0 MHz							
Supply Voltage (V _{DD})		+1.0 V ± 5%				+1.2 V ± 5%			
		Voltage code is " 10 "				Voltage code is " 12 "			
Current Consumption		1.0 mA (typ.) ; 3.0 mA (max.)				1.3 mA (typ.) ; 3.0 mA (max.)			
Current With Output Disable		10 uA (max.)				10 uA (max.)			
Output Logic " High " , " 1 "		0.8 V (min.)				0.96 V (min.)			
Output Logic " Low " , " 0 "		0.2 V (max.)				0.24 V (max.)			
Rise Time (Tr) / Fall Time (Tf)		8.0 nsec. (max.)				6.0 nsec. (max.)			
		Measured between 20 % ↔ 80 % of V _{DD}							
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		
Supply Voltage vs Freq. Sensitivity		± 1.0 ppm (max.)							
Output Load		15 pF							
Start-up Time		0.8 msec (typ.) ; 5.0 msec (max.)							
Duty Cycle		50% ± 5%							
Output Enable / Disable Function on pin1		70% of V _{DD} (min.) to enable output.							
		30% of V _{DD} (max.) to disable output.							
Enable / Disable Time		Enable : 5.0 msec. (max.)							
		Disable : 100 nsec. (max.)							
Storage Temperature		-55°C to +150°C							
Aging at Ta=+25°C		± 3 ppm (max.) first year							
RMS Jitter [12 kHz ~ 20 MHz]		0.75 ps (typ.)							
SSB Phase Noise	Offset	10 Hz	100 Hz	1 KHz	10 KHz	100 KHz	1 MHz	5 MHz	20 MHz
25.000MHz [1.0V]	dBc/Hz (typ.)	-75	-107	-128	-138	-141	-149	-153	---
50.000MHz [1.2V]	dBc/Hz (typ.)	-83	-112	-136	-140	-147	-155	-155	-156

Part Number Format and Examples

		[1]	[2]	-	[3]	[4]	-	[5]
		Supply Voltage	Holder Type		Frequency Stability	OE Function		Center Frequency
Examples	(1)	10	HU57	-	D	T	-	25.000
	(2)	10	HU32	-	A	T	-	24.000
	(3)	12	HU22	-	E	T	-	32.000

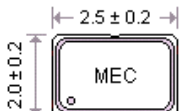
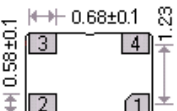
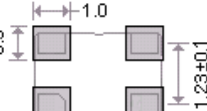
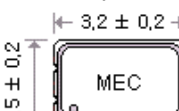
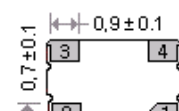
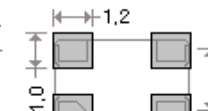
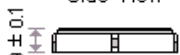
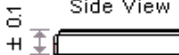
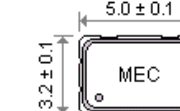
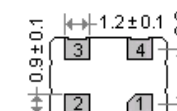
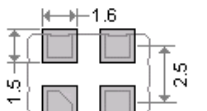
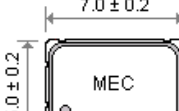
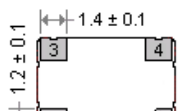
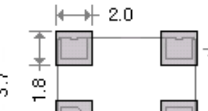
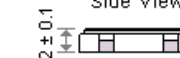
Ex (1) : 10HU57 - DT - 25.000 [1.0V, HU seires 7050 type, $\pm 25\text{ppm}$ from -40°C to $+85^{\circ}\text{C}$, OE Function, 25.000MHz]

Ex (2) : 10HU32 - AT - 24.000 [1.0V, HU seires 3225 type, $\pm 25\text{ppm}$ from -20°C to $+70^{\circ}\text{C}$, OE Function, 24.000MHz]

Ex (3) : 12HU22 - ET - 32.000 [1.2V, HU seires 2520 type, $\pm 50\text{ppm}$ from -40°C to $+85^{\circ}\text{C}$, OE Function, 32.000MHz]

[1]	Supply voltage " 10 " for +1.0V ; " 12 " for +1.2V		
[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		

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

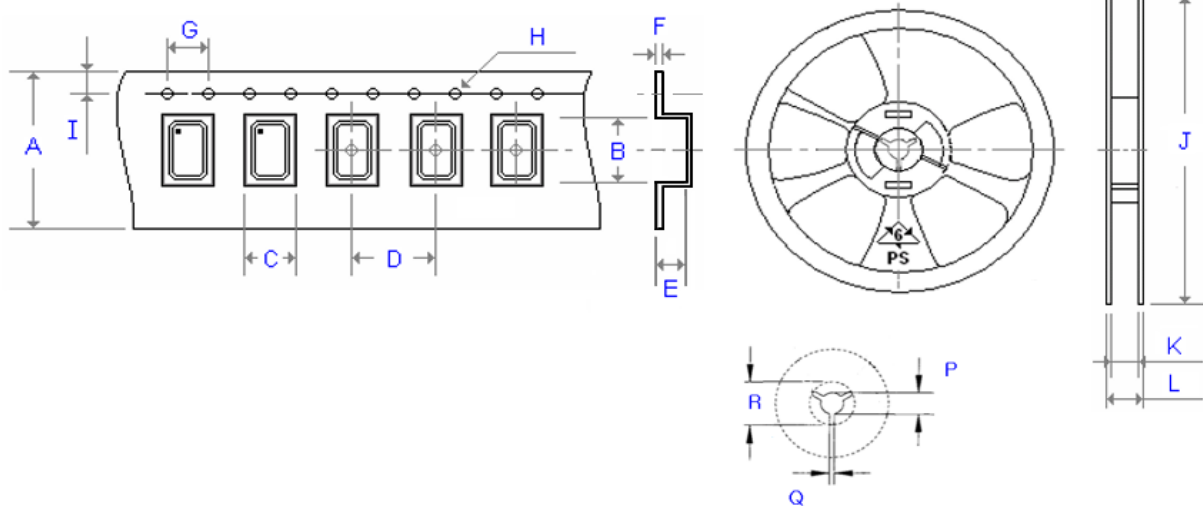
[HU22]				[HU32]			
Top View 	Bottom View 	Land Pattern 	Top View 	Bottom View 	Land Pattern 		
Side View 	Pad Connections : Pad 1 : OE Pad 3 : Output Pad 2 : Ground Pad 4 : Supply Voltage			Side View 	Pad Connections : Pad 1 : OE Pad 3 : Output Pad 2 : Ground Pad 4 : Supply Voltage		
[HU53]				[HU57]			
Top View 	Bottom View 	Land Pattern 	Top View 	Bottom View 	Land Pattern 		
Side View 	Pad Connections : Pad 1 : OE Pad 3 : Output Pad 2 : Ground Pad 4 : Supply Voltage			Side View 	Pad Connections : Pad 1 : OE Pad 3 : Output Pad 2 : Ground Pad 4 : Supply Voltage		

Test Circuit & Test Waveform

H ; H_ - series CMOS Test Circuit		CMOS Output Waveform	
Logic Low : High impedance . Output disabled No connection or logic High : Output Enable Internal 10K Ω pull-up resistor		Duty Cycle : (T_H / T) $\times$ 100%	

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	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) $+2.0 / -0.0\text{mm}$

	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