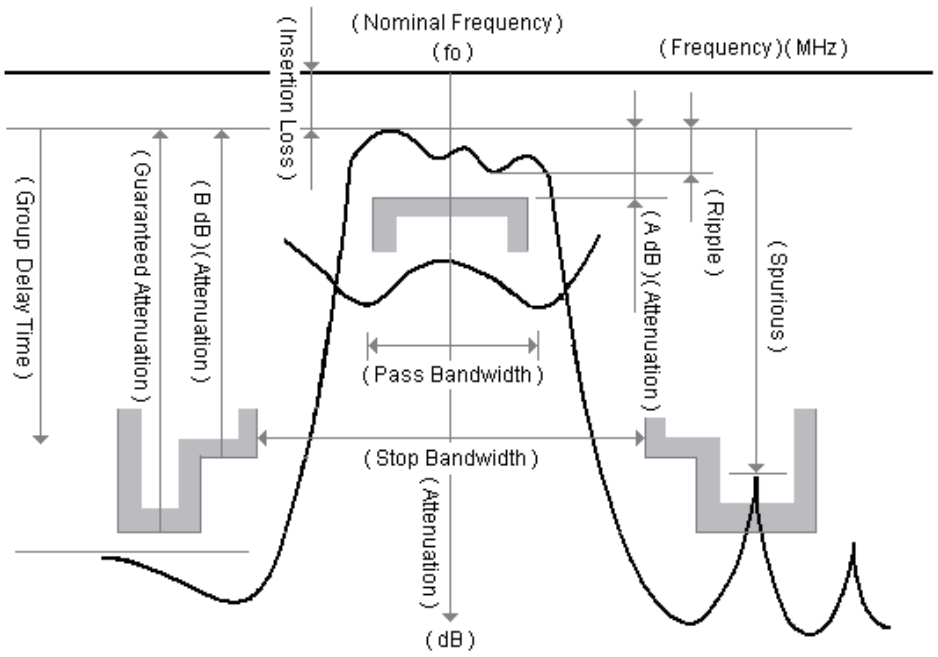
M. C. F. [Monolithic Crystal Filters]

M.C.F. (Monolithic Crystal Filters) features high quality quartz resonators with sharp cutoff characteristics, low loss , good inter-modulation and a high stability over a wide temperature range .
Consider applying band pass filters to communication systems .

Characteristic diagram and terms of crystal filters



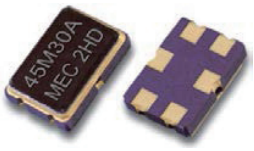
● Nominal Frequency :	This is the nominal value of the center frequency (fo) and is used as the reference frequency of related standards.
● Pass Bandwidth :	This is the frequency interval in which the relative attenuation (the attenuation from the minimum insertion loss) is equal to the specified value "A dB" (Usually 3dB).
● Insertion Loss :	This is the difference of attenuation when a filter is and isn't inserted. The minimum insertion loss is the minimum value of insertion loss and becomes as the reference level of attenuati characteristics specification. The constant loss is the insertion loss at the nominal frequency.
● Ripple :	This is the maximum value of the difference between the peak value of attenuation in the pass band and the minimum insertion loss.
● Stop Bandwidth :	This is the frequency interval in which the relative attenuation is equal to the specified value "B dB".
● Guaranteed Attenuation :	This is the relative attenuation guaranteed in the specified range within attenuation band scope.
● Spurious Response :	This is the value of relative attenuation generated by the secondary vibration in the specified range within attenuation band scope.
● Group Delay Time :	This is the difference between the maximum and the minimum value of the group delay in the specified range of the pass band.
● Terminating Impedance :	This is the impedance value terminated to the input and the output side of filter and is indicated by the resistance portion and the parallel capacity portion including the floating capacity.

M. C. F. [Monolithic Crystal Filters]

MQ	Surface Mount	Fund.	21.4 MHz	21.7 MHz	45.0 MHz	2 poles
7.0 * 5.0 * 1.3 mm	4 poles in one package					4 poles

Features

● Specifically designed for mobile, wireless communications pagers, cellular and cordless phones.



Surface Mount Type [Q series (21.400 , 21.700 , 45.000 MHz)]

Frequency (MHz)	Model	No. of poles	Pass Bandwidth		Stop Bandwidth		Ripple	Insertion Loss	Guaranteed Attenuation		Terminating Impedance	
			dB	kHz (min.)	dB	kHz (max.)	dB (max.)	dB (max.)	dB	kHz	ohms // pF	Cc (pF)
21.400	**21MQ7.5A**	2	3	± 3.75	20	± 18	1.0	2.0	70	-910	850 // 6.0	
	21MQ15A	2	3	± 7.5	18	± 25	0.5	1.5	70	-910	1500 // 2.5	
	21MQ15B	4	3	± 7.5	40	± 25	1.0	3.0	70	-910	1800 // 0.35	5.0
	21MQ30A	2	3	± 15	15	± 50	1.5	2.0	60	-910	2500 // 0	
21.700	**21.7MQ15A**	2	3	± 7.5	18	± 28	1.0	2.0	70	-910	1500 // 2.5	
	21.7MQ15B	4	3	± 7.5	40	± 25	1.0	3.0	70	-910	1750 // 0.35	5.0
	21.7MQ30A	2	3	± 15	15	± 50	1.5	2.0	50	-910	2500 // 0	
45.000	**45MQ7.5A**	2	3	± 3.75								
	45MQ7.5B	4	3	± 3.75								
	45MQ15A	2	3	± 7.5	15	± 25	1.0	2.0	70	-910	560 // 6.0	
	45MQ15B	4	3	± 7.5	30	± 25	1.0	3.0	80	-910	600 // 2.3	7.5
	45MQ30A	2	3	± 15	15	± 60	1.0	2.0	70	-910	1200 // 1.8	
	45MQ30B	4	3	± 15	30	± 40	1.0	3.0	70	-910	1200 // 1.0	2.5

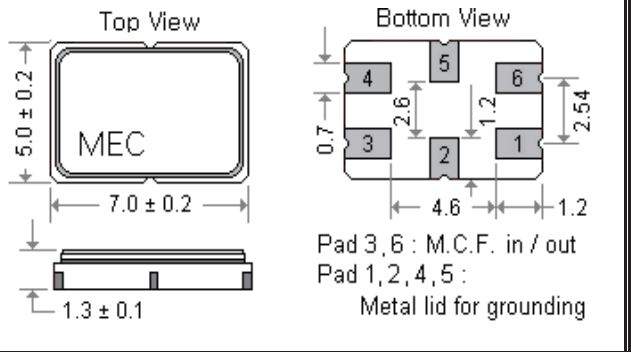
(Operating Temperature Range : -20°C to +70°C ; Storage Temperature Range : -40°C to +85°C)

Part Number Format and Example

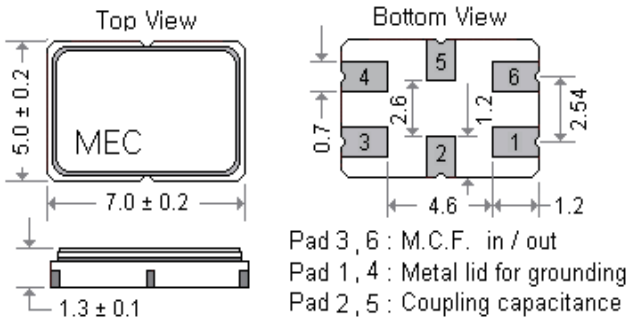
[1] Center Freq. Code M	[2] Package Q	[3] Band width	[4] Poles code

[1]	Freq. code : " 21 " for 21.400MHz , " 21.7 " for 21.700MHz , " 45 " for 45.000MHz ,	[2]	" Q " series for (7.0 * 5.0 * 1.3mm) package
[3]	Pass band width (3dB) (min.) * 2 [" 7.5 " for ± 3.75 kHz , " 15 " for ± 7.5 kHz , " 30 " for ± 15 kHz]		
[4]	No. of poles [" A " for 2 poles] [" B " for 4 poles]		

2 poles Outline Dimensions (Unit : mm)



4 poles Outline Dimensions (Unit : mm)



Mercury www.mercury-crystal.com ■Taiwan : Tel:(+886)-2-2406-2779 / sales-tw@mercury-crystal.com

■ USA: Tel: (+1)-909-466-0427 / sales-us@mercury-crystal.com ■ China: Tel: (+86)-512-5763-8100 / sales-cn@mercury-crystal.com

M. C. F. [Monolithic Crystal Filters]

49T [11.5 * 4.5 * 11.2 mm]

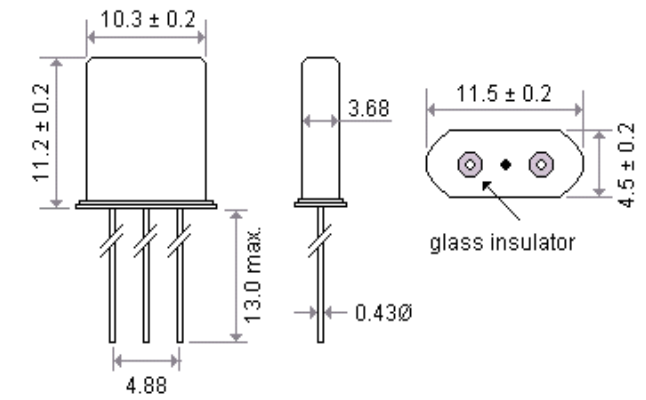
Dip Type | Jacket Type | Fundumental | 10.7 MHz | 10.8 MHz | 2 poles | 4 poles | 6 poles | 8 poles

Thru - Hole Type (standard frequency 10.700 MHz) ; available frequency range (10.695 ~ 10.800 MHz)

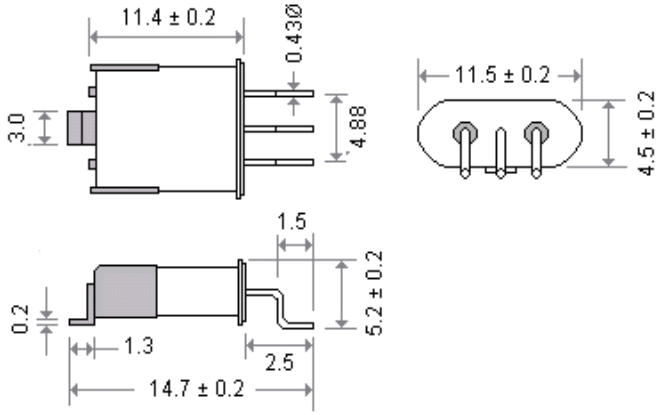
Channel Spacing (kHz)	Model	No. of poles	Pass Bandwidth		Stop Bandwidth		Ripple	Insertion Loss	Guaranteed Attenuation		Terminating Impedance	Package	
			dB	kHz (min.)	dB	kHz (max.)	dB (max.)	dB (max.)	dB	kHz	ohms // pF	Tandem set	One package
12.5	**10M7.5A**	2	3	± 3.75	20	± 18	0.5	1.5	35	±300 ~ ±1000	1.8K // 5.0	49T	
	10M7.5B	4	3	± 3.75	40	± 14	1.0	2.5	65	±300 ~ ±1000	1.8K // 4.5	49T a pair	
	10M7.5C	6	3	± 3.75	45	± 8.75	2.0	3.5	65	±12.5 ~ ±300	1.8K // 3.5	49T 3 pcs	L1
	10M7.5D	8	3	± 3.75	65	± 8.75	2.0	4.0	90	±12.5 ~ ±300	1.8K // 3.5	49T 4 pcs	L2
20.0	**10M12A**	2	3	± 6.0	18	± 25	0.5	2.0	35	±300 ~ ±1000	2.5K // 2.5	49T	
	10M12B	4	3	± 6.0	40	± 20	1.0	2.5	65	±300 ~ ±1000	2.5K // 1.5	49T a pair	
	10M12C	6	3	± 6.0	45	± 15	2.0	4.0	65	±20 ~ ±300	2.5K // 1.5	49T 3 pcs	L1
	10M12D	8	3	± 6.0	65	± 15	2.0	2.0	90	±20 ~ ±300	2.5K // 1.5	49T 4 pcs	L2
25.0	**10M15A**	2	3	± 7.5	18	± 25	0.5	1.5	35	±300 ~ ±1000	3.0K // 2.0	49T	
	10M15B	4	3	± 7.5	40	± 25	1.0	2.5	55	±300 ~ ±1000	3.0K // 1.5	49T a pair	
	10M15C	6	3	± 7.5	45	± 18	2.0	3.0	65	±25 ~ ±300	3.3K // 1.5	49T 3 pcs	L1
	10M15D	8	3	± 7.5	65	± 18	2.0	4.0	90	±25 ~ ±300	3.3K // 1.5	49T 4 pcs	L2
50.0	**10M30A**	2	3	± 15	15	± 50	0.5	1.5	30	±300 ~ ±1000	5.0K // 0	49T	
	10M30B	4	3	± 15	30	± 40	1.0	2.5	30	±300 ~ ±1000	5.5K // -1.0	49T a pair	
	10M30C	6	3	± 15	60	± 45	2.0	3.0	65	±45 ~ ±300	5.5K // -1.0	49T 3 pcs	L1
	10M30D	8	3	± 15	60	± 30	2.0	3.5	90	±50 ~ ±300	5.5K // -1.0	49T 4 pcs	L2

Part Number Format and Example

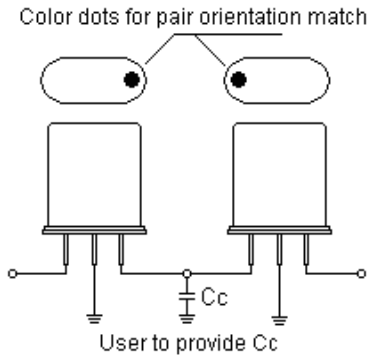
49T



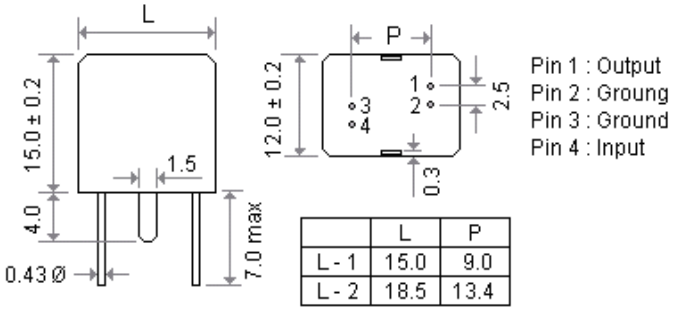
49TMJ



4 pole M.C.F. (Paired packages , Tandem set)



(L - 1) , (L - 2) - - - One Package Type



	L	P
L - 1	15.0	9.0
L - 2	18.5	13.4

Mercury www.mercury-crystal.com ■Taiwan : Tel:(+886)-2-2406-2779 / sales-tw@mercury-crystal.com
■ USA: Tel: (+1)-909-466-0427 / sales-us@mercury-crystal.com ■ China: Tel: (+86)-512-5763-8100 / sales-cn@mercury-crystal.com

M. C. F. [Monolithic Crystal Filters]

U1	U5	Dip Type	Fund.	21.4 MHz	45.0 MHz	2 poles	4 poles	6 poles	8 poles
[7.8 * 3.1 * 8.0 mm]	[7.8 * 3.1 * 6.0 mm]	Jacket Type							

Thru - Hole Type (standard frequency 10.700 MHz) ; available frequency range (10.695 ~ 10.800 MHz)

Channel Spacing (kHz)	Model	No. of poles	Pass Bandwidth		Stop Bandwidth		Ripple	Insertion Loss	Guaranteed Attenuation		Terminating Impedance	Package	
			dB	kHz (min.)	dB	kHz (max.)	dB (max.)	dB (max.)	dB	kHz	ohms // pF	Tandem set	One package
12.5	**21M7.5A**	2	3	± 3.75	20	± 18	0.5	1.5	35	±300 ~ ±1000	850 // 6.0	U-1 , U-5	
	21M7.5B	4	3	± 3.75	40	± 15	1.0	2.5	65	±300 ~ ±1000	850 // 5.0	a pair (U -1,U-5)	
	21M7.5C	6	3	± 3.75	45	± 8.75	2.0	3.0	65	±12.5 ~ ±300	850 // 5.0	3 pcs	S1
	21M7.5D	8	3	± 3.75	65	± 8.75	2.0	4.0	90	±12.5 ~ ±300	850 // 5.0	4 pcs	S2
20.0	**21M12A**	2	3	± 6.0	20	± 25	0.5	1.5	35	±300 ~ ±1000	1.2K // 3.0	U-1 , U-5	
	21M12B	4	3	± 6.0	40	± 20	1.0	2.5	65	±300 ~ ±1000	1.2K // 2.5	a pair (U -1,U-5)	
	21M12C	6	3	± 6.0	45	± 15	2.0	3.0	65	±20 ~ ±300	1.2K // 2.5	3 pcs	S1
	21M12D	8	3	± 6.0	65	± 15	2.0	4.0	90	±20 ~ ±300	1.2K // 2.5	4 pcs	S2
25.0	**21M15A**	2	3	± 7.5	18	± 25	0.5	1.5	35	±300 ~ ±1000	1.5K // 2.0	U-1 , U-5	
	21M15B	4	3	± 7.5	40	± 25	1.0	2.5	65	±300 ~ ±1000	1.5K // 2.0	a pair (U -1,U-5)	
	21M15C	6	3	± 7.5	45	± 18	2.0	3.0	65	±25 ~ ±300	1.5K // 2.0	3 pcs	S1
	21M15D	8	3	± 7.5	65	± 18	2.0	4.0	90	±25 ~ ±300	1.5K // 2.0	4 pcs	S2
50.0	**21M30A**	2	3	± 15	15	± 45	0.5	1.5	35	±300 ~ ±1000	1.5K // 1.0	U-1 , U-5	
	21M30B	4	3	± 15	40	± 50	1.0	2.5	65	±300 ~ ±1000	2.2K // 0.5	a pair (U -1,U-5)	
	21M30C	6	3	± 15	45	± 35	2.0	3.0	65	±45 ~ ±300	2.2K // 0.5	3 pcs	S1
	21M30D	8	3	± 15	65	± 35	2.0	4.0	90	±50 ~ ±300	2.2K // 0.5	4 pcs	S2

Thru - Hole Type [standard frequency 45.000 MHz(Fundamental mode)] ; available frequency range (45.000 ~ 45.100 MHz)

Channel Spacing (kHz)	Model	No. of poles	Pass Bandwidth		Stop Bandwidth		Ripple	Insertion Loss	Guaranteed Attenuation		Terminating Impedance	Package Type	
			dB	kHz (min.)	dB	kHz (max.)	dB (max.)	dB (max.)	dB	kHz	ohms // pF		
12.5	**45M7.5A**	2	3	± 3.75	10	± 12.5	1.0	2.0	65	±300 ~ ±1000	200 // 4.0	U5	U1
	45M7.5B	4	3	± 3.75	30	± 12.5	1.0	4.0	80	±300 ~ ±1000	350 // 6.5	U5 a pair	U1 a pair
25.0	**45M15A**	2	3	± 7.5	15	± 25	1.0	2.0	35	±300 ~ ±1000	650 // 3.0	U5	U1
	45M15B	4	3	± 7.5	30	± 25	1.0	3.0	80	±300 ~ ±1000	650 // 3.0	U5 a pair	U1 a pair
50.0	**45M30A**	2	3	± 15	15	± 60	1.5	2.5	35	±300 ~ ±1000	1.2K // 0	U5	U1
	45M30B	4	3	± 15	30	± 50	1.0	3.0	80	±300 ~ ±1000	1.2K // 0.7	U5 a pair	U1 a pair

Mercury www.mercury-crystal.com ■Taiwan : Tel:(+886)-2-2406-2779 / sales-tw@mercury-crystal.com
■USA: Tel: (+1)-909-466-0427 / sales-us@mercury-crystal.com ■China: Tel: (+86)-512-5763-8100 / sales-cn@mercury-crystal.com

M. C. F. [Monolithic Crystal Filters]

Part Number Format and Example

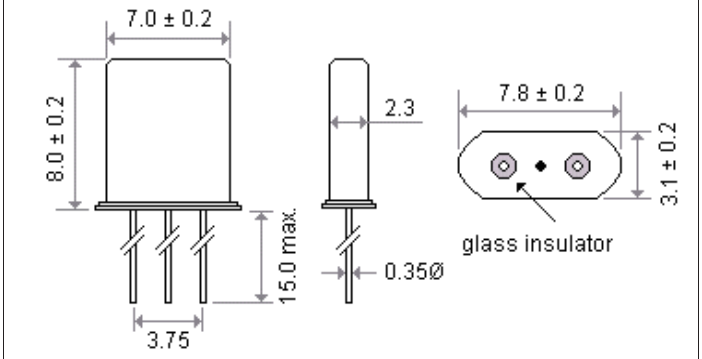
SMD Type Part Number Format			
[1]	[2]	[3]	[4]
Frequency Code	MQ	Width Code	Poles Code
Examples 45	MQ	30	A

Dip Type Part Number Format				
[1]	[2]	[3]	[4]	[5]
Frequency Code	M	Width Code	Poles Code	Holder Type
Examples 21.7	M	7.5	D	U5SM

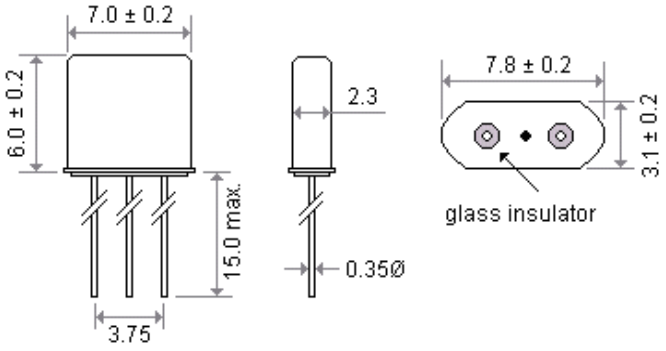
[1]	Freq. code : " 10 " for 10.700MHz , " 21 " for 21.400MHz , " 21.7 " for 21.700MHz , " 45 " for 45.000MHz ,
	Freq. code : If none standard freq. please show freqency with one decimal point .
[2]	" M " Dip Type series , " MQ " SMD Type (7.0 * 5.0 * 1.3 mm)
[3]	Pass band width (3dB) (min.)
	" 7.5 " for ± 3.75kHz , " 15 " for ± 7.5kHz , " 20 " for ± 10kHz , " 30 " for ± 15kHz ,
[4]	No. of poles
	" A " for 2 poles , " B " for 4 poles , " C " for 6 poles , " D " for 8 poles
[5]	Dip type holder type
[6]	Standard operating temperature range is -20°C to 70°C ,
	If non-standard please enter the desired temp. range after " / " , for example " / -30+70 " : -30°C to 70°C

Package Dimensions (unit : mm)

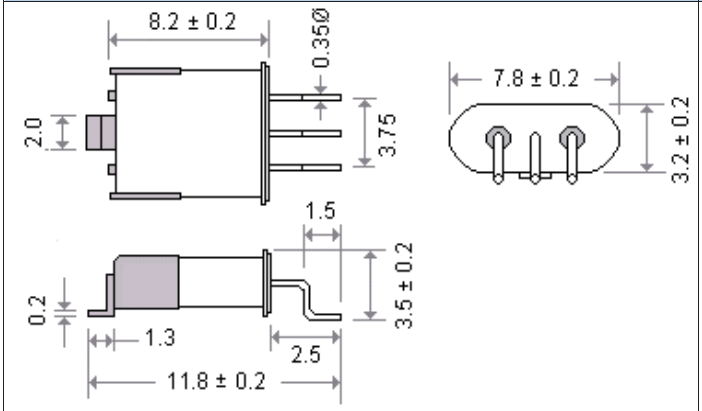
[U1]



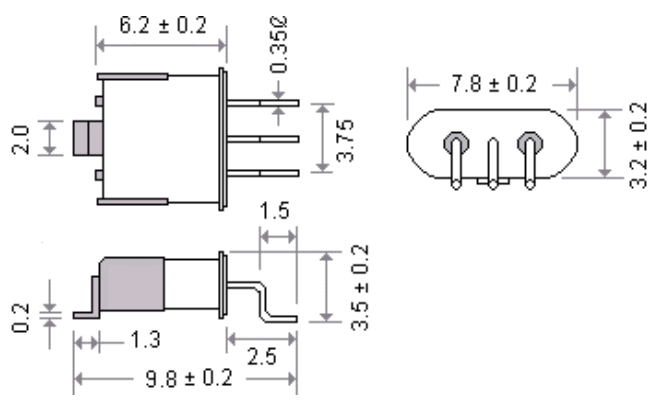
[U5]



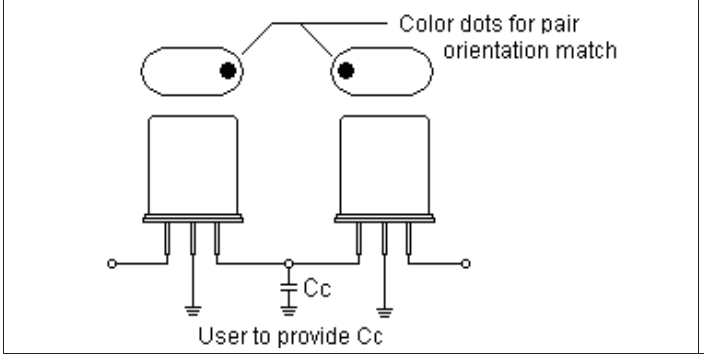
[U1MJ]



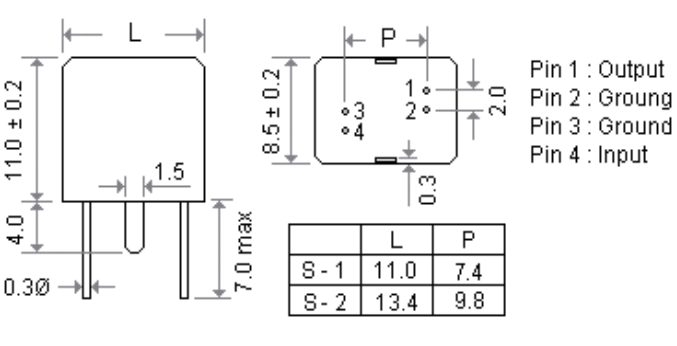
[U5MJ]



4 pole M.C.F. (paired packages)



[S - 1] , [S - 2]



	L	P
S - 1	11.0	7.4
S - 2	13.4	9.8

Mercury www.mercury-crystal.com ■Taiwan : Tel:(+886)-2-2406-2779 / sales-tw@mercury-crystal.com

■USA: Tel: (+1)-909-466-0427 / sales-us@mercury-crystal.com ■China: Tel: (+86)-512-5763-8100 / sales-cn@mercury-crystal.com

Part Number Formats and Product Marking Rules

Quartz Crystals

Holder Type

SMD type :	X11	X21	X22	X32	X42	MJ	MF	MQ	M49	ML49	MP5	MP4	MP25	MP24
Dip type :	H49	HUS	HUSL	U1	U5	T38	T26							
Jacket type :	H49MJ	49TMJ	U1MJ	U5MJ	T26MJ									
Gull wing :	H49SM	49TSM	U1SM	U5SM	T26SM									

Part Number Format

	[1] Holder Type	-	[2] Center Freq.	-	[3] CL	-	[4] Freq . Tolerance	/	[5] Freq. Stability	[6] Operating Temp. Range Code	/	[7] Special ESR
Example (1)	H49	-	40.000A3	-	12	-	30	/	30	X		
(2)	X32	-	26.000	-	16		30	/	30	X	/	20R
(3)	MJ	-	12.000	-	20	-	10	/	10	W		
(4)	M49	-	24.000	-	18	-	20	/	30	H	/	15R

Ex (1) : H49 - 40.000A3 - 12 [49/U type , 40.000MHz , AT-cut 3rd overtone , 12pF , ±30ppm (25°C) , ±30ppm (-10°C to 60°C)]

Ex (2) : X32 - 26.000 - 16 / 20R [X32 type , 26.000MHz , 16pF , ±30ppm (25°C) , ±30ppm (-10°C to 60°C) , 20 Ω]

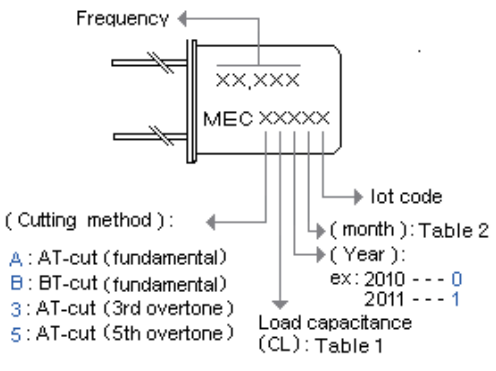
Ex (3) : MJ - 12.000 - 20 - 10 / 10 W [MJ type , 12.000MHz , 20pF , ±10ppm (25°C) , ±10ppm (0°C to 50°C)]

Ex (4) : M49 - 24.000 - 18 - 20 / 30 Y4 [M49 type , 24.000MHz , 18pF , ±20ppm (25°C) , ±30ppm (-30°C to 85°C) , 15 Ω]

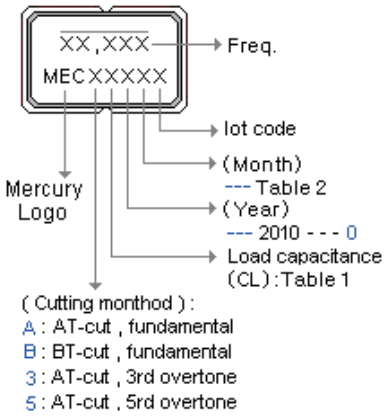
[1]	Holder Type											
[2]	Center frequency . Please add " A3 , A5 or B " after the " Freq. in MHz " for the quartz cut other options .											
	Blank : AT-cut fund. mode ; A3 : AT-cut 3rd overtone ; A5 : AT-cut 5th overtone ; B : BT-cut fund. mode											
[3]	Load Capacitance (CL) : series (spec. code is " S ") or											
	Parallel (If parallel , please specify CL value , typical CL ranges from 8 to 32 pF)											
	Available Options " V " = Vinyl sleeve around holder , " K " = 3rd lead at bottom center , " R " = On reel											
	" G " = 3rd lead at top center , " I " = Teflon insulator at bottom											
[4]	Calibration tolerance value : freq. tolerance value (at 25°C) , industrial temp. range											
[5]	Frequency Stability , industrial temp. range											
[6]	Temp. Range Options	W	0°C ~ +50°C	X	-10°C ~ +60°C	Y	-20°C ~ +70°C	F	-30°C ~ +70°C	G	-10°C ~ +80°C	
		H	-30°C ~ +85°C	I	-40°C ~ +85°C	J	-40°C ~ +90°C	K	-40°C ~ +105°C	M	-55°C ~ +105°C	
		N	-55°C ~ +125°C	Z	Customized							
[7]	If non-standard please enter the desired ESR (Equivalent Series Resistance) after " / " , for example " 20R " : 20Ω											

Production Marking Rules

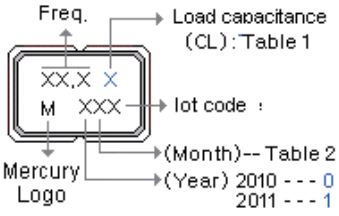
General X'tal package type marking rules



MQ , MF , MJ , X42 marking rules



X22 , X32 marking rules



X21 marking rules

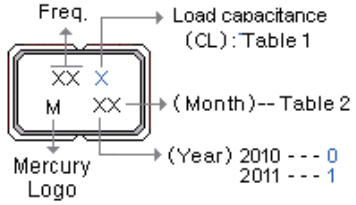


Table 1	CL	< 10	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	>34	Series
	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	a	b

Table 2	Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
	Code	A	B	C	D	E	F	G	H	I	J	K	L

Mercury www.mercury-crystal.com ■Taiwan : Tel:(+886)-2-2406-2779 / sales-tw@mercury-crystal.com

■USA: Tel: (+1)-909-466-0427 / sales-us@mercury-crystal.com ■China: Tel: (+86)-512-5763-8100 / sales-cn@mercury-crystal.com

Part Number Formats and Product Marking Rules

Crystal Oscillators

Holder Type

Output Wave / Output Logic	Product Series	Supply Voltage	SMD types	Thru-Hole types
Square Wave CMOS	SWO	1.8 / 2.5 / 3.3 / 5.0	SWO	x x = 8,14
	H x x	1.8 / 2.5 / 3.3 / 5.0	x x = 42 , 43 , 53 , 32 , 22	
	HC x x	1.8 / 2.5 / 3.3	x x = 57 , 53 , 32	
	H x x	1.8 / 2.5 / 3.3 / 5.0	x x = 42 , 43 , 53 , 32 , 22	
	HC x x	1.8 / 2.5 / 3.3	x x = 57 , 53 , 32	
	HY x x	1.8 / 2.5 / 3.3 / 5.0	x x = 57 , 53	
	LPO x x x	3.3 / 5.0	- - - - -	
	HTQF x x x	3.3 / 5.0	x x = 5761 , 5361 , 3261	
	HTQN x x x	3.3 / 5.0	x x = 5761 , 5361 , 3261	

x x = package code

Output Wave / Output Logic	Product Series	Supply Voltage	SMD types	Thru-Hole types
Square Wave LVPECL	HPK x x	2.5 / 3.3	x x x = 5761 , 5361, 3261	- - - - -
	HPQF x x	2.5 / 3.3		
	HPQN x x	2.5 / 3.3		
Square Wave LVDS	HDK x x	2.5 / 3.3	x x x = 5761 , 5361, 3261	
	HDQF x x	2.5 / 3.3		
	HDQN x x	2.5 / 3.3		
True Sine	HS x x	3.3 / 5.0	- - - - -	x x = 14

x x = package code

Part Number Format

[1] Supply Voltage	[2] Holder Type	-	[3] Frequency Stability	[4] T	-	[5] Center Frequency
EX. (1) 5	H14	-	C30		-	10.000
(2) 3	HDQN5761	-	E		-	156.250

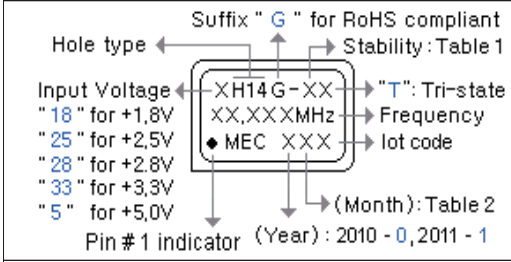
Ex (1) : 5H14 - C30 - 10.000 [5.0V , H14 type , ±30ppm from -10°C to 70°C , 10.000MHz]

Ex (2) : 3HDQN5761 - E - 156.250 [3.3V , HDQN5761 type , Tri-state on pin 1 , RoHS , ±50ppm from -40°C to 85°C , 156.250MHz]

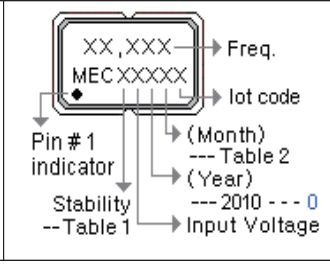
[1]	Supply voltage , " 1 " for +1.0V ;" 12 " for +1.2V ; " 18 " for +1.8V ;" 25 " for +2.5V ; " 28 " for +2.8V ; " 3 " for +3.3V ; " 5 " for +5.0V	
[2]	Holder Type	
[3]	-10°C ~ 70 °C	" A " ± 25ppm ; " B " ± 50ppm ; " C " ± 100ppm ;
		If non-standard please enter the desired stability after " C " , for 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 " , for example " I20 " : represents ±20ppm over -40 to +85°C
[4]	" T " for Tri-state , Leave this space blank if no connection on pin 1 or pad 1 .	
[5]	Frequency in MHz (Assigned by Mercury if customer spec , Ex (1) : S ---- duty cycle ± 5% ,Ex : " - S " (2) : 50p ---- output load 50pF , Ex : " - 50p ")	

Production Marking Rules

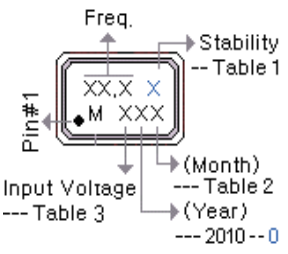
H8 , H14 , LPO14 , H42 , H43



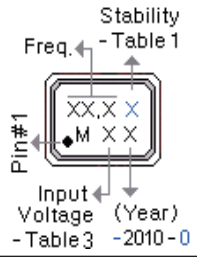
SWO , H53 marking rules



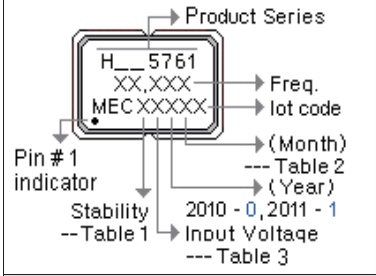
H32 marking rules



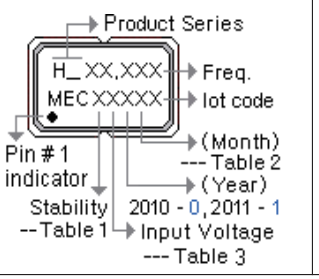
H22 marking rules



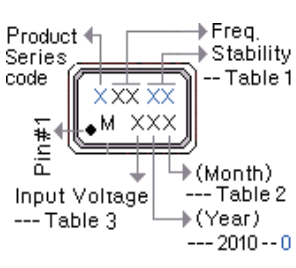
HP_ 5761 , HD_ 5761 , HCK5761
H_QF5761 , H_QN5761 , HG5761



H (A , B , C , J , Y) 57
H (A , B , C , J , Y) 53



H (B , C , J) 32



HA32 - 32.768 KHz

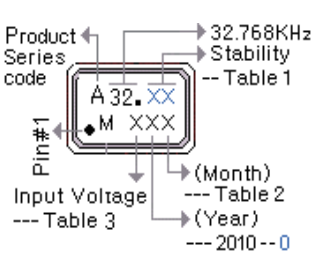


Table 1	-10°C ~ 70 °C	" A " ± 25ppm ; " B " ± 50ppm ; " C " ± 100ppm ;
		If non-standard please enter the desired stability after " C " , for example " C10 " : ± 10ppm
	-40°C ~ 85 °C	" D " ± 25ppm ; " E " ± 50ppm ; " F " ± 100ppm ;
		If non-standard please enter the desired stability after " I " , for example " I10 " : ± 10ppm

Table 2	Month	1	2	3	4	5	6	7	8	9	10	11	12
	Code	A	B	C	D	E	F	G	H	I	J	K	L

Table 3	Input Voltage	Tri - State	5.0 V	3.3 V	2.8 V	2.5 V	1.8 V	1.5 V	1.2 V	1.0 V
			B	D	F	H	J	L	N	P

Mercury www.mercury-crystal.com ■Taiwan : Tel:(+886)-2-2406-2779 / sales-tw@mercury-crystal.com

■ USA: Tel: (+1)-909-466-0427 / sales-us@mercury-crystal.com ■ China: Tel: (+86)-512-5763-8100 / sales-cn@mercury-crystal.com

Part Number Formats and Product Marking Rules

Spread Spectrum Low EMI Clock Oscillators

Holder Type

Type	SMD types	Wave form
HM x x	x x = 43 , 53 , 57 , 572	square wave

x x = package code

Part Number Format

[1]	[2]	-	[3]	[4]	-	[5]	[6]	-	[7]
Supply Voltage	Holder Type		Frequency Stability	T		Center Frequency	Group Type		Spread type Percentage
Examples (1)	3	H M 57	-	B	T	-	10.000	R	-	C1.5
(2)	3	H M 53	-	F	T	-	75.000	Y	-	D1.0
(2)	3	H M 14	-	C30		-	100.000	P	-	D3.0

Ex (1) : 3HM57 - BT - 10.000R - C1.5 [3.3V , HM57 type , ±50ppm from -10°C to 70°C , Tri-state , 10.000MHz , R group , Center Spread 1.5%]

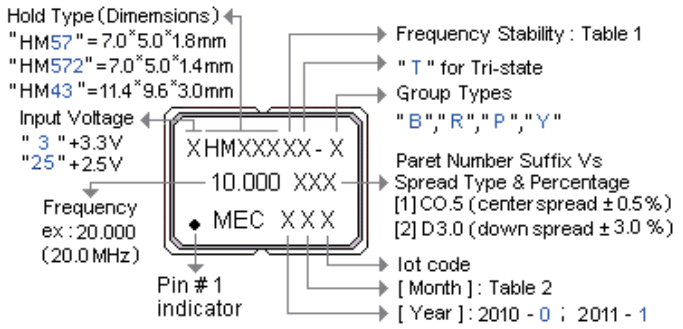
Ex (2) : 3HM53 - FT - 75.000Y - D1.0 [3.3V , HM57 type , ±100ppm from -40°C to 85°C , Tri-state , 75.000MHz , Y group , Down Spread 1.0%]

Ex (3) : 3HM14 - C30 - 100.000P - D3.0 [3.3V , HM14 type , ±30ppm from -10°C to 70°C , 100.000MHz , P group , Down Spread 3.0%]

[1]	Supply voltage , " 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 " , for 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 " , for example " I20 " : represents ±20ppm over -40 to +85°C
[4]	" T " for Tri-state , Leave this space blank if no connection on pin 1 or pad 1 .	
[5]	Frequency in MHz	
[6]	Group " B " , " R " , " P " or " Y "	
[7]	Spread type & percentage ; " C " for center spread , " D " for down spread	

Production Marking Rules

HM57 , HM572 , HM43



HM53

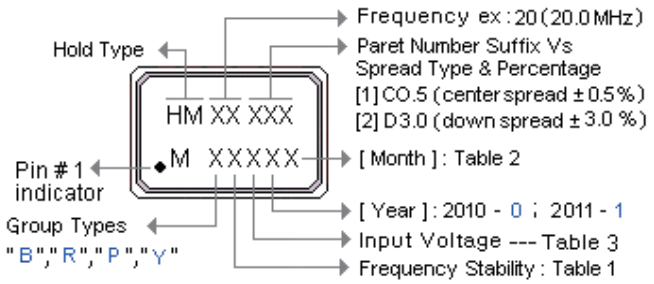


Table 1	-10°C ~ 70 °C	" A " ± 25ppm ; " B " ± 50ppm ; " C " ± 100ppm ;
		If non-standard please enter the desired stability after " C " , Ex : " C15 " : represents ±15ppm over -10 to +70°C
	-40°C ~ 85 °C	" D " ± 25ppm ; " E " ± 50ppm ; " F " ± 100ppm ;
		If non-standard please enter the desired stability after " I " , Ex : " I20 " : represents ±20ppm over -40 to +85°C

Table 2	Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
	Code	A	B	C	D	E	F	G	H	I	J	K	L

Table 3	Input Voltage	Tri - State	3.3 V	2.5 V
			D	H

Part Number Formats and Product Marking Rules

[VCXO] Voltage Controlled Crystal Oscillators

Holder Type

Output Wave	Type	Supply Voltage	SMD types	Thru-Hole
CMOS	G x x	1.8 / 2.5 3.3 / 5.0	x x = 324 , 326 x x = 534, 536, 576	x x = 8 , 14
	GTQF x x	2.5 / 3.3	x x = 326 , 536, 576	- - - - -
	GTQN x x			
	GCTQN x x			
True Sine	GS x x	3.3 / 5.0	- - - - -	x x = 14

Output Wave	Type	Supply Voltage	SMD types	Thru-Hole
LVPECL	GPQF x x	2.5 / 3.3	x x = 326 , 536, 576	- - - - -
	GPQN x x			
	GCPQF x x			
LVDS	GDQF x x	2.5 / 3.3	x x = 326 , 536, 576	- - - - -
	GDQN x x			
	GCDQN x x			

x x = package code

Part Number Format

	[1] Supply Voltage	[2] Holder Type	-	[3] Frequency Stability	-	[4] Pulling Range	[5] Range Code	-	[6] Center Frequency
Ex. (1)	18	G14	-	B	-	80	N	-	35.328
(2)	3	GTQF576	-	C20	-	150	M	-	200.000

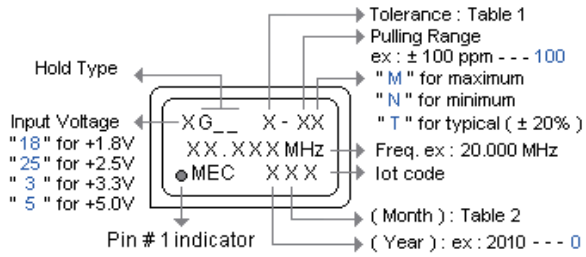
Ex (1) : 18G14 - B - 80N - 35.328 [1.8V , G14 type , ±50ppm from -10°C to 70°C , Pulling : ±80ppm (min.) , 35.328MHz ,]

Ex (2) : 3GTQF576 - C20 - 150M - 200.000 [3.3V , GTQF576 type , ±10ppm from -10°C to 70°C , , Pulling : ±150ppm (max.) , 200.000MHz]

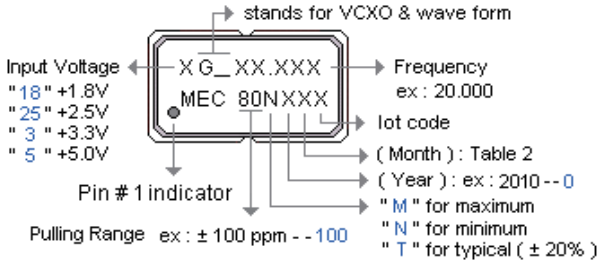
[1]	Supply voltage , " 18 " for +1.8V ; " 25 " for +2.5V ; " 3 " for +3.3V ; " 5 " for +5.0V	
[2]	Holder Type	
[3]	-10°C ~ 70 °C	" A " ± 25ppm ; " B " ± 50ppm ; " C " ± 100ppm ;
		If non-standard please enter the desired stability after " C " , for example " C15 " : represents ±15ppm over -10 to +70°C
	-40°C ~ 85 °C	" D " ± 25ppm ; " E " ± 50ppm ; " F " ± 100ppm ;
		If non-standard please enter the desired stability after " I " , for example " I20 " : represents ±20ppm over -40 to +85°C
[4]	Freqency Pulling Range	
[5]	Pulling Range Code	" M " stands for maximum ; " N " stands for minimum ; " T " stands for typical (tolerance is ± 20%)
[6]	Center Frequency in MHz	

Production Marking Rules

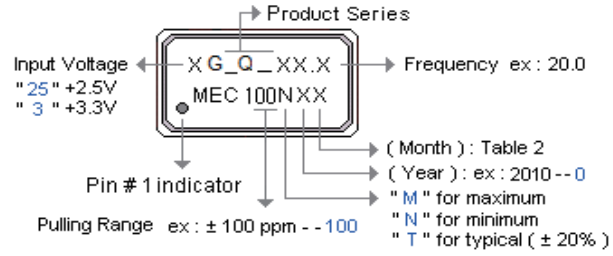
G_8 , G_14 , G_42 , G_43 , G_62 , G_63



G_534 , G_536 , G_576



G_QF , G_QN



G_324 , G_326

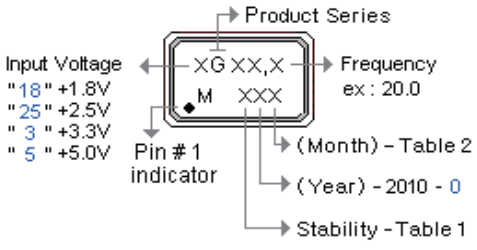


Table 1	-10°C ~ 70 °C [Commercial]	" A " ± 25ppm ; " B " ± 50ppm ; " C " ± 100ppm ;
		If non-standard please enter the desired stability after " C " , Ex : " C15 " : represents ±15ppm over -10 to +70°C
	-40°C ~ 85 °C [Industrial]	" D " ± 25ppm ; " E " ± 50ppm ; " F " ± 100ppm ;
		If non-standard please enter the desired stability after " I " , Ex : " I20 " : represents ±20ppm over -40 to +85°C

Table 2	Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
	Code	A	B	C	D	E	F	G	H	I	J	K	L

Mercury www.mercury-crystal.com ■Taiwan : Tel:(+886)-2-2406-2779 / sales-tw@mercury-crystal.com

■USA: Tel: (+1)-909-466-0427 / sales-us@mercury-crystal.com ■China: Tel: (+86)-512-5763-8100 / sales-cn@mercury-crystal.com

Part Number Formats and Product Marking Rules

[TCXO vs VCTCXO] Temperature Compensated Crystal Oscillators

Holder Type

Wave Form	TCXO	VCTCXO	SMD types	Thru-Hole types	Gull Wing types
Clipped Sine Wave	M x x S	VM x x S	X X = 42 , 32 , 53 , 57 , 62	X X = 8 , 9 , 14 , 15 , 39	X X = 47
CMOS output	M x x T	VM x x T	X X = 42 , 53 , 57 , 62		
	ML x x T	VML x x T			
	ME32	- - - - -	3.2 * 2.5 * 1.3 mm	- - - - -	- - - - -
CMOS output LVPECL output LVDS output	MQN326 _ MQN576 _	- - - - -	3.2 * 2.5 * 1.4 mm 7.0 * 5.0 * 2.5 mm	- - -	- - -

x x = package code

Part Number Format

[1]	[2]	[3]		[4]		[5]		[6]
Holder Type	Output Wave	Supply Voltage	-	Center Frequency	-	Frequency Stability	/	Operating Temp. Range
Examples (1)	VM39	T	5	-	10.000	-	1.5	/	-20+70
(2)	M 53	S	3	-	20.000	-	2.5	/	-30+75
(2)	MQN576	P	33	-	155.520	-	1.0	/	0+50

Ex (1) : VM39T5 - 10.000 - 1.5 / -20+70 [VCTCXO , VM39 type , CMOS output , 5.0V , 10.000MHz , ±1.5ppm from -20°C to 70°C]

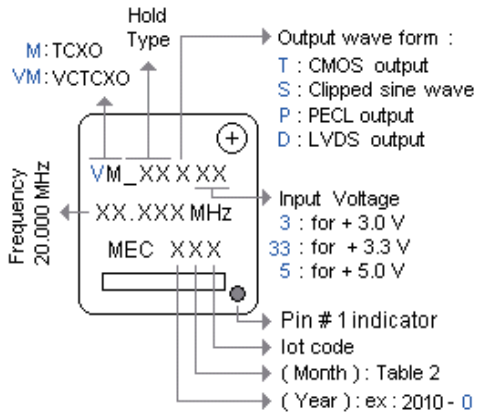
Ex (2) : M53S3 - 20.000 - 2.5 / -30+75 [TCXO , M53 type , Clipped Sine W ave , 3.0V , 20.000MHz , ±2.5ppm from -30°C to 75°C]

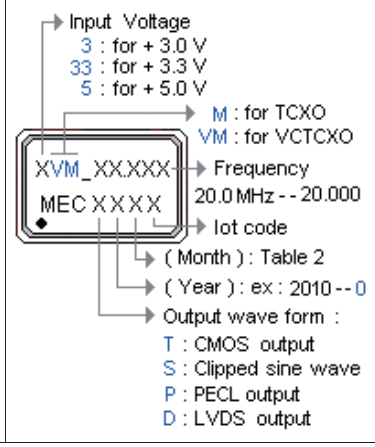
Ex (3) : MQN576P33 - 155.520 -1.0 / 0+50 [TCXO , MQN576 type , PECL differential , 3.3V , 155.520MHz , ±1.0ppm from 0°C to 50°C]

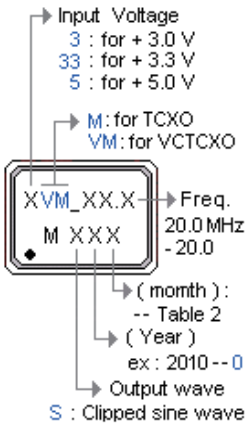
[1]	Holder Type
	" M " stands for TCXO , " VM " stands for VCTCXO
[2]	" S " stands for Clipped Sine Wave ; " T " stands for CMOS output ; " D " stands for LVDS differential ; " P " stands for PECL differential
	ex 1 : M43T --- TCXO , M43 pcakage , CMOS output
[3]	Supply voltage , " 28 " stands for +2.8V ; " 3 " stands for +3.0V ; " 33 " stands for +3.3V ; " 5 " stands for +5.0V
[4]	Center Frequency in MHz
[5]	Frequency stability in ± _ ppm ; ex 1 : ± 2.5ppm --- 2.5 , ex 2 : ± 1.0ppm --- 1.0
[6]	Operating temperature range in °C
	ex 1 : -10 °C to 60°C ----- -10+60 ; ex 2 : -20 °C to 70°C ----- -20+70 ; ex 3 : -40 °C to 85°C ----- -40+85

Production Marking Rules

General (VC)TCXO pcakage types marking rules	(V)M53_ , (V)M57_ , (V)M576_	(V) M32S	(V) M22S







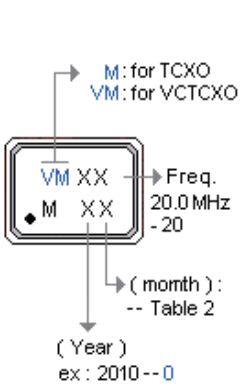


Table 2	Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
	Code	A	B	C	D	E	F	G	H	I	J	K	L

Mercury www.mercury-crystal.com ■Taiwan : Tel:(+886)-2-2406-2779 / sales-tw@mercury-crystal.com

■ USA: Tel: (+1)-909-466-0427 / sales-us@mercury-crystal.com ■ China: Tel: (+86)-512-5763-8100 / sales-cn@mercury-crystal.com

Part Number Formats and Product Marking Rules

[OCXO] Oven Controlled Crystal Oscillators

Holder Type

Type	Thru-Hole types	Gull Wing types	Wave Form
OC x x	x x = 13 , 14 , 18 , 32	x x = 24	Square Wave ; True Sine Wave ; Clipped Sine Wave

Part Number Format

[1]	[2]	[3]		[6]		[7]		[8]
Holder Type	Output Wave	Supply Voltage	-	Center Frequency	-	Frequency Stability	/	Operating Temp. Range

Examples	(1)	OC12	E	3	-	10.000	-	200	0+70
	(2)	OC18	E	12	-	100.000	-	100	-30+70
	(3)	OC51	S	3	-	10.000	-	30	-20+70
	(4)	OC14	T	5	-	5.000	-	10	-40+85

Ex (1) : OC12E3 - 10.000 - 200 / 0+70 [OC12 type , True Sine wave , 3.3V , 10.000MHz , ± 200ppb from 0°C to 70°C]
Ex (2) : OC18E12 - 100.000 - 100 / -30+70 [OC18 type , True Sine wave , 12V , 100.000MHz , ± 100ppb from -30°C to 70°C]
Ex (3) : OC51S3 - 10.000 - 30 / -20+70 [OC51 type , Clipped Sine Wave , 3.3V , 10.000MHz , ± 30 ppb from -20°C to 70°C]
Ex (4) : OC14T5 - 5.000 - 10 / -40+85 [OC14 type , Square Wave , 5.0V , 5.000MHz , ± 10 ppb from -40°C to 85°C]

[1]	Holder Type
	" OC_ _ " stands for OCXO ,
[2]	" T " stands for Square Wave , " E " stands for True Sine Wave , " S " stands for Clipped Sine Wave
	ex 1 : OC14T, OC14 package,Square Wave output ; ex 2 : OC18E, OC18 package,True Sine wave ; ex 3 : OC51S, OC51 package,Clipped Sine Wave
[3]	Supply voltage , " 3 " for 3.3V D.C , " 5 " for 5.0V D.C , " 12 " for 12V D.C
[4]	Center Frequency in MHz
[5]	Frequency stability in ± _ ppb ; ex 1 : ±200ppb ---200 , ex 2 : ± 30ppb ---30 , ex 3 : ± 5ppb --- 5
[6]	Operating temperature range in °C
	ex 1 : 0 °C to 70°C ----- 0+70 ; ex 2 : -30 °C to 70°C ----- -30+70 ; ex 3 : -40 °C to 85°C ----- -40+85

Production Marking Rules

General OCXO package types marking rules

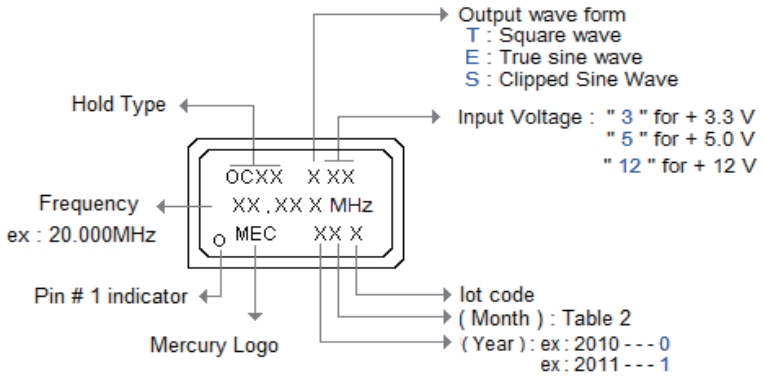


Table 2	Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
	Code	A	B	C	D	E	F	G	H	I	J	K	L

Part Number Formats and Product Marking Rules

[M. C. F.] Monolithic Crystal Filters

Holder Type

SMD Types :	MQ						
Dip Types :	49T	U1	U5	S1	S2	L1	L2
Jacket Types :	49TMJ	U1MJ	U5MJ				
Gull Wing Types :	49TSM	U1SM	U5SM				

SMD Type (7.0 * 5.0 * 1.3 mm) Part Number Format

[1]	[2]	[3]	[4]
Frequency Code	MQ	Width Code	Poles Code
Examples 45	MQ	30	A

Ex : 45MQ30A [45.000MHz , SMD type MQ series (7.0 * 5.0 * 1.3 mm) , Passband : ±15KHz , 2poles]

Dip Type Part Number Format

[1]	[2]	[3]	[4]	[5]
Frequency Code	M	Width Code	Poles Code	Holder Type
Examples 21.7	M	7.5	D	U5SM

Ex : 21.7M7.5DU5SM [21.700MHz , Passband : ±3.75KHz , 8poles , RoHS compliant , Dip type (UM - 5 type , Gull Wing)]

[1]	Freq. code : " 10 " for 10.700MHz , " 21 " for 21.400MHz , " 21.7 " for 21.700MHz , " 45 " for 45.000MHz ,
	Freq. code : If none standard freq. please show freqency with one decimal point .
[2]	" M " Dip Type series , " MQ " SMD Type (7.0 * 5.0 * 1.3 mm)
[3]	Pass band width (3dB) (min.)
	" 7.5 " for ± 3.75kHz , " 15 " for ± 7.5kHz , " 20 " for ± 10kHz , " 30 " for ± 15kHz ,
[4]	No. of poles
	" A " for 2 poles , " B " for 4 poles , " C " for 6 poles , " D " for 8 poles
[5]	Dip type holder type
[6]	Standard operating temperature range is -20°C to 70°C ,
	If non-standard please enter the desired temp. range after " / " , for example " / -30+70 " : -30°C to 70°C

Production Marking Rules

General MCF package types marking rules

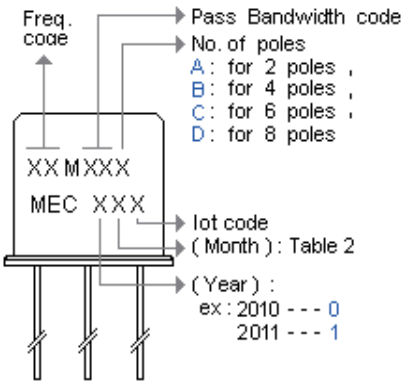
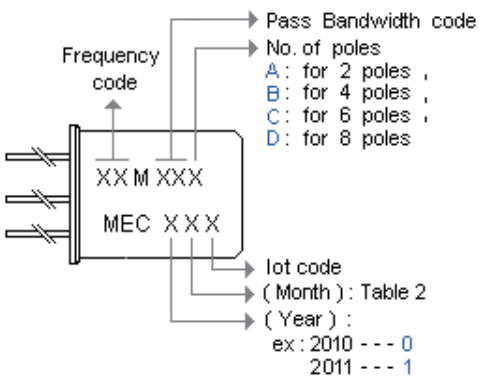
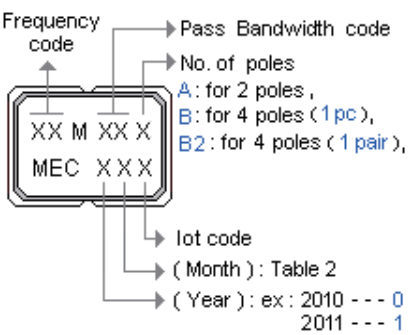
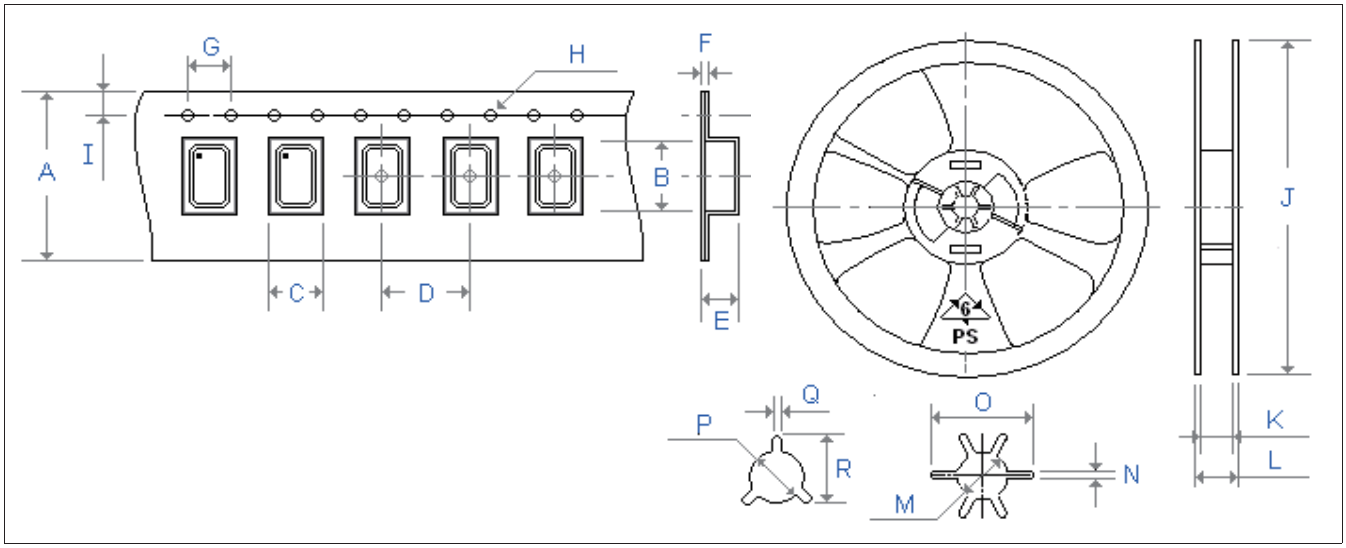
U5 series	U1 , 49T series	MQ series
		

Table 2 :	Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
	Code	A	B	C	D	E	F	G	H	I	J	K	L

Emboss Taping and Reel Specifications

[Crystal Units]	[M . C . F . Units]



Carrier Type Dimensions (unit : mm)

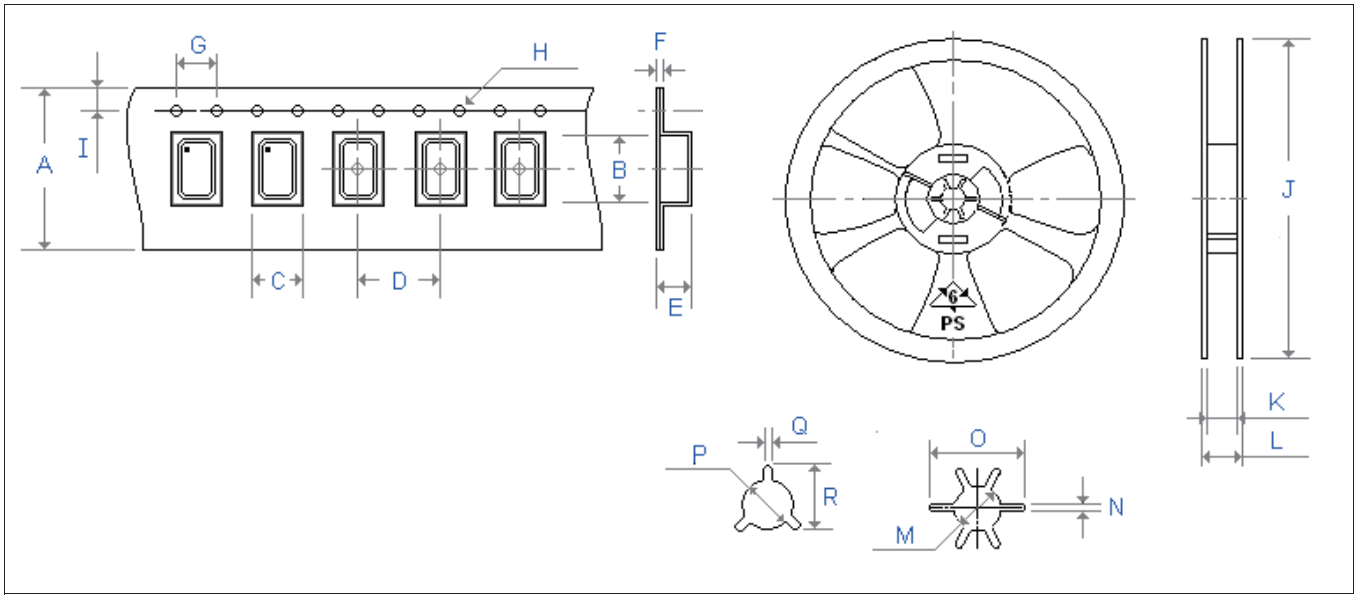
	A	B	C	D	E	F	G	H	I	pcs / reel
X11	8.0	1.8	1.4	4.0	0.5	0.3	4.0	Ø 1.55	1.75	3000
X21	8.0	2.3	1.9	4.0	0.6	0.2	4.0	Ø 1.50	1.75	3000
X22	8.0	2.7	2.3	4.0	1.2	0.3	4.0	Ø 1.50	1.75	3000
X32	8.0	3.4	2.7	4.0	1.4	0.3	4.0	Ø 1.55	1.75	3000
X42	12.0	4.3	2.8	8.0	1.0	0.3	4.0	Ø 1.55	1.75	1000
X2012	8.0	2.5	2.0	4.0	1.0	0.3	4.0	Ø 1.55	1.75	3000
X3215	12.0	3.4	1.7	4.0	0.9	0.3	4.0	Ø 1.55	1.75	3000
MJ	12.0	5.3	3.6	8.0	1.4	0.3	4.0	Ø 1.55	1.75	1000
MF	16.0	6.3	3.8	8.0	1.4	0.3	4.0	Ø 1.50	1.75	1000
MQ	16.0	7.2	5.4	8.0	1.8	0.3	4.0	Ø 1.55	1.75	1000
M49	24.0	15.0	5.0	12.0	4.3	0.4	4.0	Ø 1.55	1.75	1000
ML49	24.0	14.8	5.0	12.0	3.5	0.4	4.0	Ø 1.55	1.75	1000
MP4 (24)	24.0	13.3	5.1	12.0	4.2	0.5	4.0	Ø 1.55	1.75	1000
MP5 (25)	24.0	13.4	5.1	12.0	5.2	0.5	4.0	Ø 1.55	1.75	1000

Reel Dimensions (unit : mm)

	J	K	L	M	N	O	P	Q	R	pcs / reel
X11	180.0	8.4	9.0	13.0	2.2	22.0	-	-	-	3000
X21	180.0	8.4	9.0	13.0	2.2	22.0	-	-	-	3000
X22	180.0	8.4	11.4	13.0	2.2	22.0	-	-	-	3000
X32	180.0	10.9	11.4	13.0	2.2	22.0	-	-	-	3000
X42	180.0	12.4	18.4	13.0	2.2	22.0	-	-	-	1000
X2012	180.0	8.0	9.0	13.0	2.2	22.0	-	-	-	3000
X3215	180.0	12.0	13.0	13.0	2.2	22.0	-	-	-	3000
MJ	180.0	13.0	16.0	-	-	-	13.2	1.5	19.5	1000
MF	180.0	16.5	19.6	-	-	-	13.4	1.5	19.5	1000
MQ	180.0	18.9	19.2	-	-	-	13.4	2.5	19.5	1000
M49	330.0	25.0	30.0	-	-	-	13.4	2.5	19.5	1000
ML49	330.0	25.0	30.0	-	-	-	13.4	2.5	19.5	1000
MP4 (24)	330.0	25.0	30.0	-	-	-	13.4	2.5	19.5	1000
MP5 (25)	330.0	25.0	30.0	-	-	-	13.4	2.5	19.5	1000

Emboss Taping and Reel Specifications

[Crystal Oscillator Units]



Carrier Type Dimensions (unit : mm)

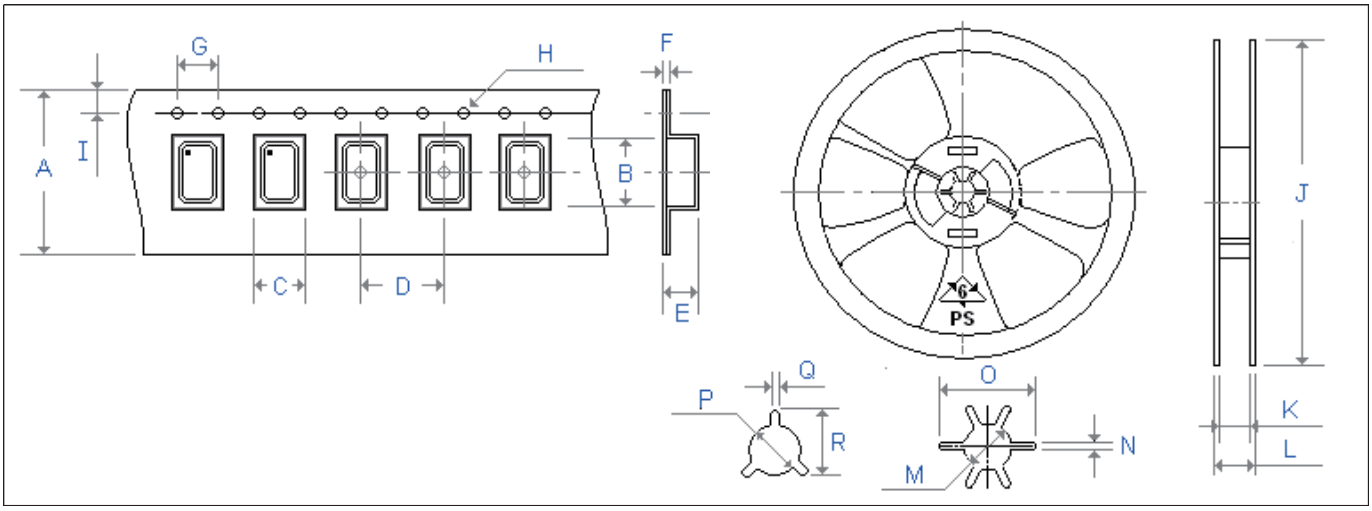
	A	B	C	D	E	F	G	H	I	pcs / reel
H_22	8.0	2.7	2.3	4.0	1.2	0.3	4.0	Ø 1.55	1.75	3000
H_32	8.0	3.4	2.7	4.0	1.4	0.3	4.0	Ø 1.55	1.75	3000
H_53	12.0	5.3	3.6	8.0	1.4	0.3	4.0	Ø 1.55	1.75	1000
H_57	16.0	7.2	5.4	8.0	1.8	0.3	4.0	Ø 1.55	1.75	1000
SWO	16.0	7.2	5.4	8.0	1.8	0.3	4.0	Ø 1.55	1.75	1000
H _576	16.0	7.2	5.4	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	2.2	22.0	-	-	-	3000
H_32	180.0	10.9	11.4	13.2	2.2	22.0	-	-	-	3000
H_53	180.0	13.0	16.0	-	-	-	13.2	2.5	19.5	1000
H_57	180.0	16.5	19.6	-	-	-	13.4	2.5	19.5	1000
SWO	180.0	18.9	19.2	-	-	-	13.4	2.5	19.5	1000
H _576	180.0	18.9	19.2	-	-	-	13.4	2.5	19.5	1000
HP_576	180.0	18.9	19.2	-	-	-	13.4	2.5	19.5	1000
HD_576	180.0	18.9	19.2	-	-	-	13.4	2.5	19.5	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

Emboss Taping and Reel Specifications

[VCXO]	[(VC)TCXO]



Carrier Type Dimensions (unit : mm)

	A	B	C	D	E	F	G	H	I	pcs / reel
G_324 (6)	8.0	3.4	2.7	4.0	1.4	0.25	4.0	Ø 1.55	1.75	3000
G_534	12.0	5.3	3.6	8.0	1.4	0.3	4.0	Ø 1.55	1.75	1000
G_576	16.0	7.2	5.4	8.0	1.8	0.3	4.0	Ø 1.55	1.75	1000
G_42	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
G_44	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
G_62	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
G_64	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
(V)M_22	8.0	2.7	2.3	4.0	1.2	0.3	4.0	Ø 1.55	1.75	3000
(V)M_32	8.0	3.4	2.7	4.0	1.4	0.25	4.0	Ø 1.55	1.75	3000
(V)MQ_326	12.0	3.6	2.9	4.0	1.7	0.25	4.0	Ø 1.55	1.75	3000
(V)M_53	12.0	5.3	3.6	8.0	1.4	0.3	4.0	Ø 1.55	1.75	1000
(V)M_57	16.0	7.2	5.4	8.0	1.8	0.3	4.0	Ø 1.55	1.75	1000
(V)M_42	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
(V)M_43	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
(V)M_62	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
(V)M_63	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500

Reel Dimensions (unit : mm)

	J	K	L	P	Q	R	pcs / reel
G_324 (6)	180.0	12.8	17.0	13.4	2.5	19.5	3000
G_534	180.0	13.0	16.0	13.2	2.5	19.5	1000
G_576	180.0	16.5	19.6	13.4	2.5	19.5	1000
G_42	330.0	30.0	25.0	13.4	2.5	19.5	500
G_44	330.0	30.0	25.0	13.4	2.5	19.5	500
G_62	330.0	30.0	25.0	13.4	2.5	19.5	500
G_64	330.0	30.0	25.0	13.4	2.5	19.5	500
(V)M_22	180.0	9.0	12.0	13.2	2.5	19.5	3000
(V)M_32	180.0	12.8	17.0	13.4	2.5	19.5	3000
(V)MQ_326	180.0	14.9	17.0	15.4	2.5	19.5	3000
(V)M_53	180.0	13.0	16.0	13.2	2.5	19.5	1000
(V)M_57	180.0	16.5	19.6	13.4	2.5	19.5	1000
(V)M_42	330.0	30.0	25.0	13.4	2.5	19.5	500
(V)M_43	330.0	30.0	25.0	13.4	2.5	19.5	500
(V)M_62	330.0	30.0	25.0	13.4	2.5	19.5	500
(V)M_63	330.0	30.0	25.0	13.4	2.5	19.5	500