

MCF (MONOLITHIC CRYSTAL FILTER) features high quality quartz resonators such as sharp cutoff characteristics, low loss, good inter-modulation and high stability over wide temperature range. Consideration in applying band pass filters to communication systems.

TECHNICAL TERMS

INSERTION LOSS:

The loss at center frequency, normally expressed in dB, resulting from the insertion of a device in a transmission system.

FLAT LOSS:

The insertion loss at the frequency of minimum loss within the pass band.

ATTENUATION:

The loss of a filter at a given frequency measured in dB.

PASSBAND (BW):

The range of frequencies attenuated less than a specified value, typically 3 or 6 dB.

CENTER FREQUENCY (F_0):

FRACTIONAL BANDWIDTH:

The ratio of the pass band to the center frequency.

REFERENCE FREQUENCY:

A specified frequency, typically the minimum loss point or F_0 , from which all attenuation measurements are made.

RIPPLE:

The amplitude difference, in dB, between the maximum pass band peak and maximum pass band valley are defined by a surrounding change in slope, I.E. sign of the amplitude response.

ATTENUATION:

The output of a filter at a given frequency relative to the defined insertion loss reference.

STOPBAND:

The range of frequencies attenuated greater than some specified minimum level of attenuation.

TRANSITION BAND (Bwt):

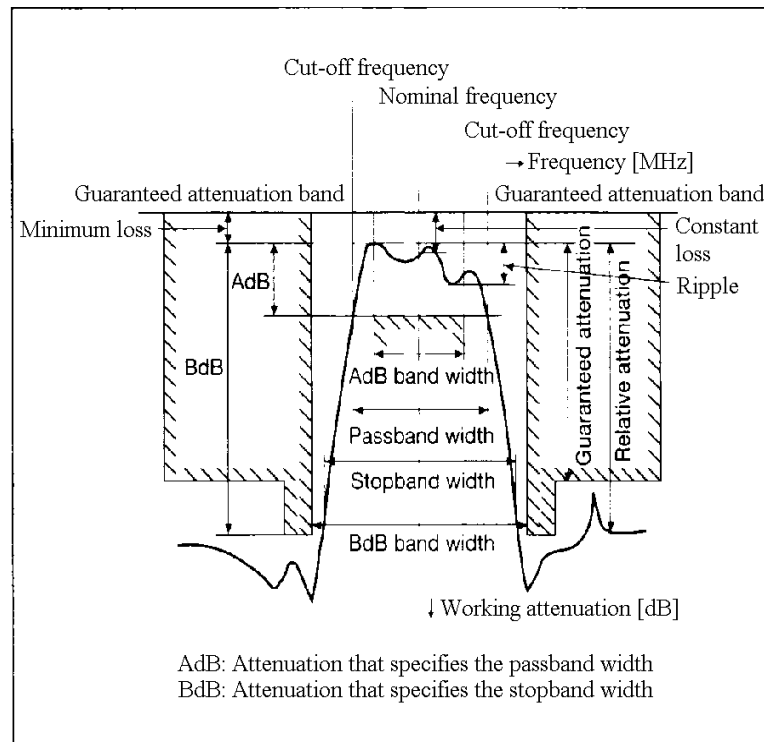
The range of frequencies differentially attenuated between the pass band and stop band limits.

SHAPE FACTOR:

The ratio of the bandwidth at some point within the transition region typically 60 dB, to the specified pass band bandwidth.

SPURIOUS ATTENUATION:

The specified minimum level of attenuation received by all non harmonic related resonance of each crystal; resonator within the filter network.



MERCURY www.mercury-crystal.com

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MCF 10.7 MHz Family

Operating Temperature Range: -10 to +70°C

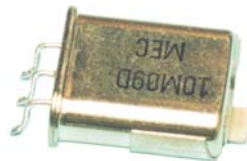
Channel Spacing (kHz)	Model	No. of Poles	Pass Band Width (min.)	Stop Band Width (max.)		Ripple	Insertion Loss	Guaranteed Attenuation	Terminating Impedance (ohms // pF)	Package
			dB kHz	dB kHz	dB kHz	dB max	dB max	dB (fo ± kHz)		
12.5	10M07A	2	3 ±3.75	20 ±18	- -	0.5	1.5	35 +300 to +1000 50 -200 to -1000	1.8K // 5.0	HC49T
	10M07B	4	3 ±3.75	40 ±14	- -	1.0	2.5	65 +300 to +1000 80 -200 to -1000	1.8K // 4.5 Zc: 11.0 pF	HC49Tx2 (a pair)
	10M07C	6	3 ±3.75	45 ±8.75	65 ±12.5	2.0	3.5	65 12.5 to 300	1.8K // 3.5	L-1
	10M07D	8	3 ±3.75	65 ±8.75	90 ±12.5	2.0	4.0	90 12.5 to 300	1.8K // 3.5	L-2
20	10M09A	2	3 ±6.0	18 ±23	- -	0.5	2.0	35 +300 to +1000 40 -200 to -1000	2.5K // 2.5	HC49T
	10M09B	4	3 ±6.0	40 ±20	- -	1.0	2.5	65 +300 to +1000 80 -200 to -1000	2.5K // 1.5 Zc: 6.0 pF	HC49Tx2 (a pair)
	10M09C	6	3 ±6.0	45 ±14	60 ±20	2.0	3.0	65 20 to 300	2.8K // 1.0	L-1
	10M09D	8	3 ±6.0	65 ±14	90 ±20	2.0	4.0	90 20 to 300	2.8K // 1.0	L-2
25	10M15A	2	3 ±7.5	18 ±25	- -	0.5	2.0	35 +300 to +1000 40 -200 to -1000	3.0K // 2.0	HC49T
	10M15B	4	3 ±7.5	40 ±25	- -	1.0	2.5	55 +300 to +1000 80 -200 to -1000	3.0K // 2.0 Zc: 5.0 pF	HC49Tx2 (a pair)
	10M15C	6	3 ±7.5	45 ±17.5	65 ±25	2.0	3.0	65 25 to 300	3.0K // 1.5	L-1
	10M15D	8	3 ±7.5	70 ±17.5	90 ±25	2.0	4.0	90 25 to 300	3.0K // 1.5	L-2
	10M15E	10	3 ±7.5	75 ±15	90 ±20	2.0	4.5	90 20 to 300	3.0K // 1.5	L-3
50	10M30A	2	3 ±15	15 ±50	- -	0.5	1.5	30 +300 to +1000 40 -300 to -1000	5.0K // 0	HC49T
	10M30B	4	3 ±15	30 ±40	- -	1.0	2.5	30 40 to 300	5.5K // -1.0 Zc: 0.5 pF	HC49Tx2 (a pair)
	10M30C	6	3 ±15	60 ±45	- -	2.0	3.0	60 45 to 300	5.5K // -1.0	L-1
	10M30D	8	3 ±15	60 ±30	80 ±40	2.0	3.5	90 50 to 300	5.5K // -1.0	L-2

If SMD bent lead package required please add "MJ" at the end of the part number. For example: 10M07AU1-MJ
Zc: Coupling capacitance including stray capacitances

HC-49/T



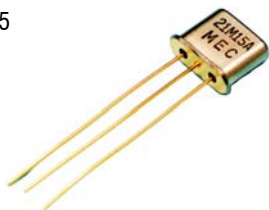
49TMJ



UM-1 (4 poles)



UM-5



U1SM



U5SM





MCF 21.4 MHz Family

Operating Temperature Range: -10 to +70°C

Channel Spacing (kHz)	Model	No. of Poles	Pass Band Width (min.)	Stop Band Width (max.)		Ripple	Insertion Loss	Guaranteed Attenuation	Terminating Impedance ohms// pF	Package
			dB KHz	dB kHz	dB kHz	dB max	dB max	dB (fo ±kHz)		
12.5	21M07AU1	2	3 ±3.75	20 ±18	- -	0.5	1.5	35 +350 to +1000 50 -200 to -1000	850 // 6	UM-1
	21M07BU1	4	3 ±3.75	40 ±40	- -	1.0	2.0	65 +350 to +1000 80 -200 to -1000	850 // 5 Zc: 16 pF	UM-1 x2 (a pair)
	21M07AU5	2	3 ±3.75	20 ±18	- -	0.5	1.5	35 +350 to +1000 50 -200 to -1000	850 // 6	UM-5
	21M07BU5	4	3 ±3.75	40 ±40	- -	1.0	2.0	65 +350 to +1000 80 -200 to -1000	850 // 5 Zc: 16 pF	UM-5 x2 (a pair)
	21M07C	6	3 ±3.75	45 ±8.75	65 ±12.5	2.0	3.0	65 +12.5 to +300	850 // 5	S-1
	21M07D	8	3 ±3.75	65 ±9	90 ±12.5	2.0	4.0	90 +12.5 to +300	850 // 5	S-1
	21M07E	10	3 ±3.75	75 ±8.75	90 ±10.5	2.0	4.5	90 +12.5 to +300	850 // 5	S-2
20	21M12AU1	2	3 ±6	20 ±25	- -	0.5	1.5	35 +350 to +1000 50 -200 to -1000	1.2K // 3.0	UM-1
	21M12BU1	4	3 ±6	40 ±20	- -	1.0	2.0	65 +350 to +1000 80 -200 to -1000	1.2K // 2.5 Zc: 10.5 pF	UM-1 (a pair)
	21M12AU5	2	3 ±6	20 ±25	- -	0.5	1.5	35 +350 to +1000 50 -200 to -1000	1.2K // 3.0	UM-5
	21M12BU5	4	3 ±6	40 ±20	- -	1.0	2.0	65 +350 to +1000 80 -200 to -1000	1.2K // 2.5 Zc: 10.5 pF	UM-5 (a pair)
	21M12C	6	3 ±6	45 ±14	65 ±20	2.0	3.0	65 +20 to +300	1.2K // 2.5	S-1
	21M12D	8	3 ±6	65 ±14	90 ±20	2.0	4.0	90 +20 to +300	1.2K // 2.5	S-1
25	21M15AU1	2	3 ±7.5	18 ±25	- -	0.5	1.5	35 +350 ~ +1000 50 -200 ~ -1000	1.5K // 2.5	UM-1
	21M15BU1	4	3 ±7.5	40 ±25	- -	1.0	2.0	65 +350 to +1000 80 -200 to -1000	1.5K // 2.0 Zc: 8 pF	UM-1 (a pair)
	21M15AU5	2	3 ±7.5	18 ±25	- -	0.5	1.5	35 +350 ~ +1000 50 -200 ~ -1000	1.5K // 2.5	UM-5
	21M15BU5	4	3 ±7.5	40 ±25	- -	1.0	2.0	65 +350 to +1000 80 -200 to -1000	1.5K // 2.0 Zc: 8 pF	UM-5 (a pair)
	21M15C	6	3 ±7.5	45 ±17.5	65 ±25	2.0	2.5	65 +25 to +300	1.5K // 2.0	S-1
	21M15D	8	3 ±7.5	65 ±17.5	90 ±25	2.0	3.0	90 +25 to +300	1.5K // 2.0	S-1
	21M15E	10	3 ±7.5	75 ±17.5	90 ±20	2.0	4.0	90 +18 to +300	1.5K // 2.0	S-2
50	21M30AU1	2	3 ±15	15 ±45	- -	0.5	1.5	35 +300 to +1000 45 -300 to -1000	1.5K // 1.0	UM-1
	21M30BU1	4	3 ±15	40 ±50	- -	1.0	2.0	65 +350 to +1000 80 -250 to -1000	2.0K // 0.5 Zc: 3 pF	UM-1 (a pair)
	21M30AU5	2	3 ±15	15 ±45	- -	0.5	1.5	35 +300 to +1000 45 -300 to -1000	1.5K // 1.0	UM-5
	21M30BU5	4	3 ±15	40 ±50	- -	1.0	2.0	65 +350 to +1000 80 -250 to -1000	2.0K // 0.5 Zc: 3 pF	UM-5 (a pair)
	21M30C	6	3 ±15	45 ±35	65 ±50	2.0	2.5	65 +50 to +300	2.2K // 0.5	S-1
	21M30D	8	3 ±15	70 ±35	90 ±50	2.0	3.5	90 +50 to +1000	2.2K // 0.5	S-1

If SMD bent lead package required please add "MJ" at the end of the part number. For example: 21M07AU1-MJ
Zc: Coupling capacitance including stray capacitances



MCF 45 MHz Fundamental mode Family

Operating Temperature Range: -10 to +70°C

Channel Spacing KHz	Model	No. of Poles	Pass Band Width (min)		Stop Band Width (max.)		Ripple	Insertion Loss	Guaranteed Attenuation	Terminating Impedance	Package
			dB	kHz	dB	kHz	dB max	dB max	dB (fo ±kHz)	(ohms // pF)	
12.5	45M7.5AU1	2	3	±3.75	10	±12.5	1.0	2.0	65 -910	200 // 4	UM-1
	45M7.5BU1	4	3	±3.75	30	±12.5	1.0	4.0	90 ±900 ~ ±1000	350 // 6.5 Zc: 18 pF	UM-1x2 (a pair)
25	45M15AU1	2	3	±7.5	15	±25	1.0	2.0	35 +900 ~ +1000 65 -900 ~ -1000	650 // 3.0	UM-1
	45M15BU1	4	3	±7.5	30	±25	1.0	3.0	90 ±900 ~ ± 1000	650 // 3.0 Zc: 9 pF	UM-1x2 (a pair)
50	45M30AU1	2	3	±15	15	±60	1.5	2.5	35 +900 ~ +1000 65 -900 ~ -1000	1200 // 0	UM-1
	45M30BU1	4	3	±15	30	±50	1.0	3.0	80 ±900 ~ ±1000	1200 // 0.7 Zc: 3.5 pF	UM-1x2 (a pair)
12.5	45M7.5AU5	2	3	±3.75	10	±12.5	1.0	2.0	65 -910	200 // 4	UM-5
	45M7.5BU5	4	3	±3.75	30	±12.5	1.0	4.0	90 ±900 ~ ±1000	350 // 6.5 Zc: 18 pF	UM-5x2 (a pair)
25	45M15AU5	2	3	±7.5	15	±25	1.0	2.0	35 900 ~ +1000 65 -900 ~ -1000	650 // 3.0	UM-5
	45M15BU5	4	3	±7.5	30	±25	1.0	3.0	90 ±900 ~ ± 1000	650 // 3.0 Zc: 9 pF	UM-5x2 (a pair)
50	45M30AU5	2	3	±15	15	±60	1.5	2.5	35 +900 ~ +1000 65 -900 ~ -1000	1200 // 0	UM-5
	45M30BU5	4	3	±15	30	±50	1.0	3.0	80 ±900 ~ ±1000	1200 // 0.7 Zc: 3.5 pF	UM-5x2 (a pair)

If SMD bent lead package required please add "MJ" at the end of the part number. For example: 45M7.5AU1-MJ

MCF 45 MHz 3rd Overtone Mode Family

Operating Temperature Range: -10 to +70°C

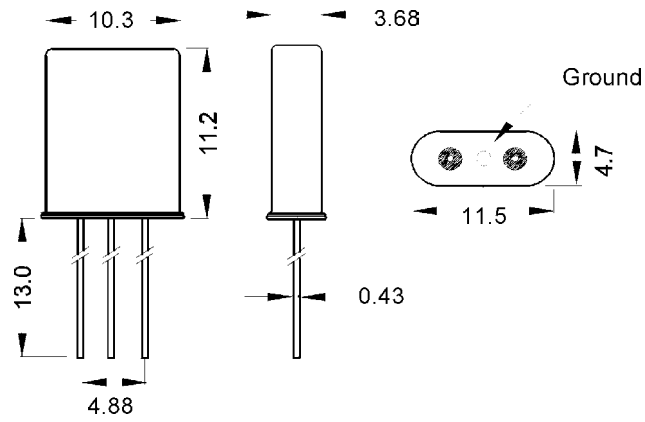
Channel Spacing kHz	Model	No. of Poles	Pass Band Width (min)		Stop Band Width (max)		Ripple	Insertion Loss	Guaranteed Attenuation	Terminating Impedance	Package
			dB	kHz	dB	kHz	dB max	dB max	dB (fo ±kHz)	(ohms // pF)	
12.5	T45M7.5AU1	2	3	±3.75	10	±12.5	1.0	2.0	35 ±910	2000 // -0.4	UM-1
	T45M7.5BU1	4	3	±3.75	30	±12.5	1.0	4.0	75 ±910	3000 // -0.3 Zc: 0 pF	UM-1x2 (a pair)
25	T45M15AU1	2	3	±7.5	15	±25	1.0	2.0	35 ±910	4000 // -0.7	UM-1
	T45M15BU1	4	3	±7.5	30	±25	1.0	4.0	75 ±910	4000 // -0.8 Zc: -1.0 pF	UM-1x2 (a pair)
12.5	T45M7.5AU5	2	3	±3.75	10	±12.5	1.0	2.0	35 ±910	2000 // -0.4	UM-5
	T45M7.5BU5	4	3	±3.75	30	±12.5	1.0	4.0	75 ±910	3000 // -0.3 Zc: 0 pF	UM-5x2 (a pair)
25	T45M15AU5	2	3	±7.5	15	±25	1.0	2.0	35 ±910	4000 // -0.7	UM-5
	T45M15BU5	4	3	±7.5	30	±25	1.0	4.0	75 ±910	4000 // -0.8 Zc: -1.0 pF	UM-5x2 (a pair)

If SMD bent lead package required please add "MJ" at the end of the part number. For example: T45M7.5AU1-MJ

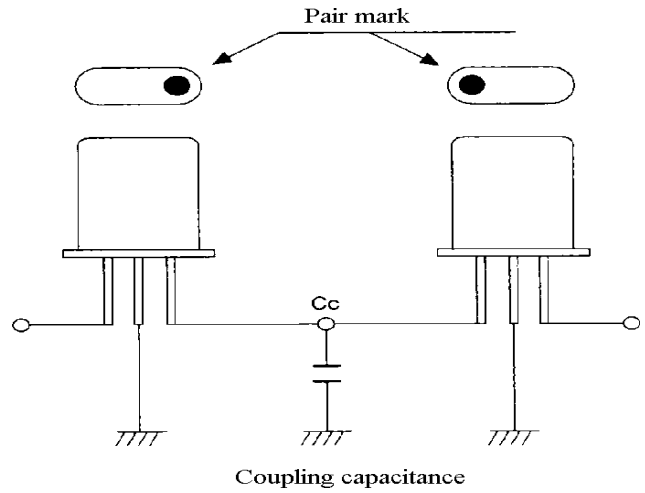
Zc: Coupling capacitance including stray capacitances

PACKAGE DIMENSIONS (mm)

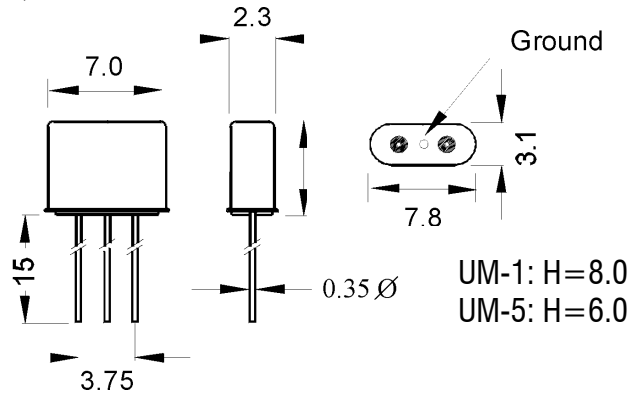
HC-49/T



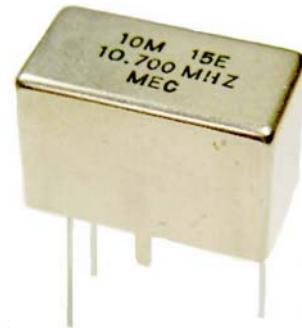
4 pole MCF (paired packages)



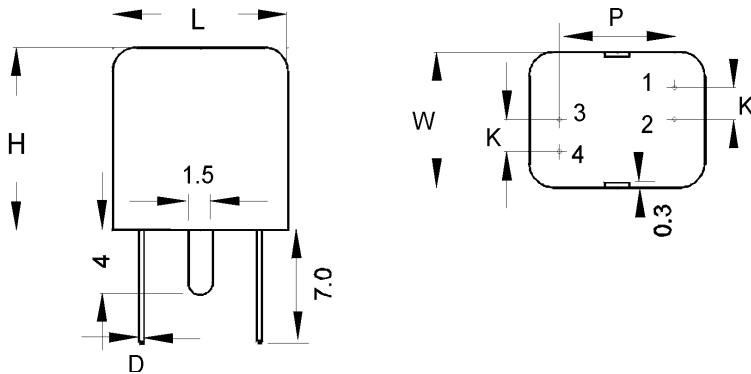
UM-1, UM-5



L-3



S-1, S-2, L-1, L-2 and L-3



	L	W	H	P	K	D ^φ
S-1	11.0	8.5	11.5	7.4	2.0	0.3
S-2	13.4	8.5	11.5	9.8	2.0	0.3
L-1	15.0	12.0	15.0	9.0	2.5	0.43
L-2	18.5	12.0	15.0	13.4	2.5	0.43
L-3	23.0	12.0	15.0	17.8	2.5	0.43

Pin #1: output
Pin #3: ground

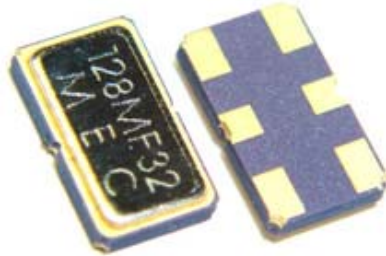
Pin #2: ground
Pin #4: input

Monolithic Crystal Filters

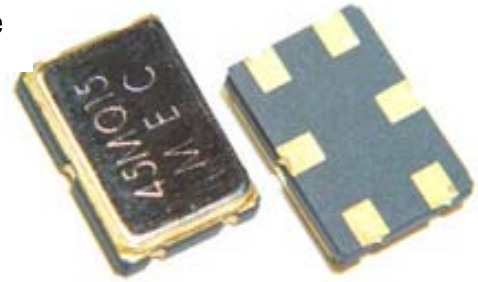


MERCURY
Since 1973

"F" package
6 x 3.5 x 1.2



"Q" package
5 x 7 x 1.3



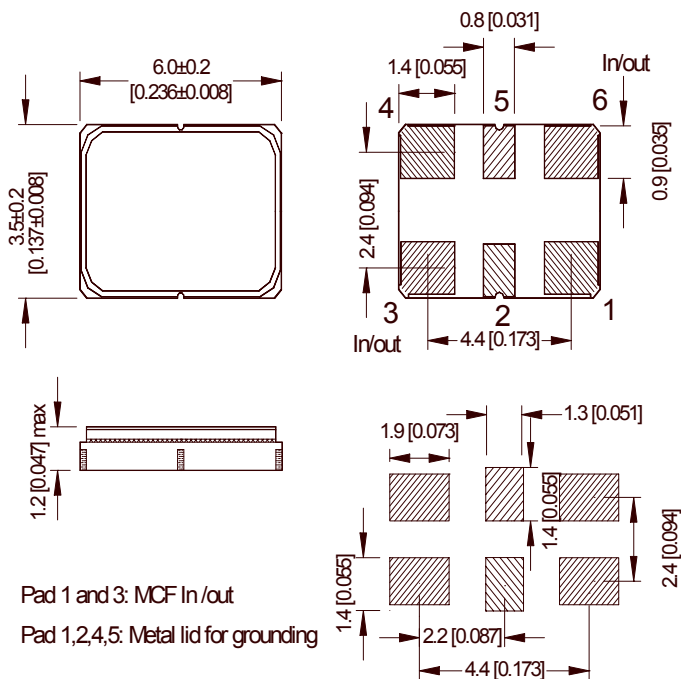
Operating Temperature Range: -30 to +80°C

Nominal Frequency (MHz)	Model	Pass Band Width		Stop Band Width		No. of poles	Guaranteed Attenuation		Ripple dB max	Insertion Loss dB max	Terminating Impedance (ohm // pF)	Package
		dB	kHz	dB	kHz		dB	kHz				
21.4	21MF15	3	±7.5	18	±25	2	70	-910	1.0	2.0	1.5K // 2.5	F
	21MQ15	3	±7.5	18	±25	2	70	-910	0.5	1.5	1.5K // 2.5	Q
21.7	217MQ7	3	±3.5	16	±125	2	70	-910	1.0	2.0	1.5K // 6.0	Q
45	45MF15	3	±7.5	14	±25	2	70	-910	0.5	2.5	550 // 3.0	F
	45MF30	3	±15	15	±50	2	70	-910	1.0	2.0	1.2K // 1.5	F
	45MQ7	3	±3.75	20	±25	2	70	-910	1.0	2.0	350 // 6.0	Q
	45MQ12	3	±6.0	15	±25	2	70	-910	1.0	2.0	550 // 5.0	Q
	45MQ15	3	±7.5	15	±25	2	70	-910	1.0	2.0	560 // 6.0	Q
	45MQ30	3	±15	15	±60	2	70	-910	1.0	2.0	1.2K // 1.8	Q
128.55	128MF32	3	±16.1	20	±57.6	3	73	-900	1.2	2.2	950 // -1.6	F

Package Dimensions and Suggested Pad Layout:

Unit mm [inches]

Package: "F"



Package: "Q"

