

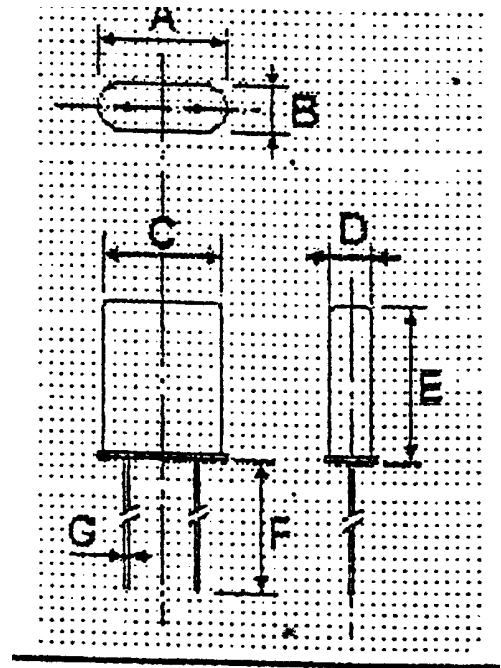
## Specification of Quartz Crystal

PARAMETER	SPEDIFICATION
Nominal Freq.	21.145MHz
Holder	UM-1 (Size See Picture)
Freq. Tolerance	+/- 20ppm at 25 +/- 2 degree C
Temperature Stability	Fs +/- 15ppm,referenced to 25C-20 to+60C
Operating Range	-20C to +60C
Equivalent Res.Rs	25 ohms MAX
Mode of Oscillation	fund
Shunt Capacitance Co	5 PF MAX
Load Capacitance CL	20 PF
Storage Range	-40 to +90C
Drive Level DL	10 uW +/-0.1uW
Aging	+/- 3ppm per year
Insulation	500 Mohm MAX (at DC100V +/-15V)
Leakage Test	No continuous air bubbles from can in the warm 80C in 5 minutes
Shock Test	Freq. shift +/-5PPM & Res.+/- 15% after test (dropping from 75cm height 3 times on wood)
Measurement	KH1200 PI-Net. Crystal Measurement System
Marking	TEK Nominal freq.

Dimension:

UNIT: mm

Code	Size
A	7.75+/-0.10
B	3.05+/-0.10
C	6.90+/-0.05
D	2.20+/-0.05
E	7.80+/-0.10
F	13.32+/-0.5
G	0.35+/-0.05



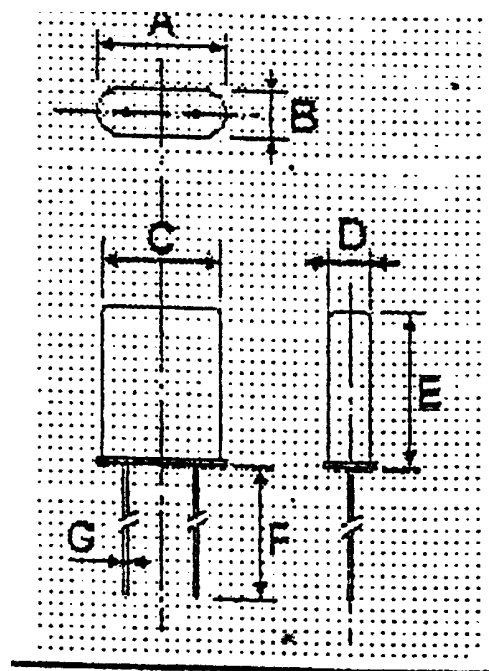
## Specification of Quartz Crystal

PARAMETER	SPEDIFICATION
Nominal Freq.	12.800MHz
Holder	UM-1 (Size See Picture)
Freq. Tolerance	+/- 5ppm at 25 +/- 2 degree C
Temperature Stability	Fs+/-5ppm,referenced to 25C; -20 to+60C
Operating Range	-20C to +60C
Equivalent Res.Rs	25 ohms MAX
Mode of Oscillation	fund
Shunt Capacitance Co	5 PF MAX
Load Capacitance CL	12 PF
Storage Range	-40 to +90C
Drive Level DL	10 uW +/-0.1uW
Aging	+/- 3ppm per year
Insulation	500 Mohm MAX (at DC100V +/-15V)
Leakage Test	No continuous air bubbles from can in the warm 80C in 5 minutes
Shock Test	Freq. shift +/-5PPM & Res.+/- 15% after test (dropping from 75cm height 3 times on wood)
Measurement	KH1200 PI-Net. Crystal Measurement System
Mrking	TEK Nominal freq.

Dimension:

UNIT: mm

Code	Size
A	7.75+/-0.10
B	3.05+/-0.10
C	6.90+/-0.05
D	2.20+/-0.05
E	7.80+/-0.10
F	13.32+/-0.5
G	0.35+/-0.05



## SPECIFICATION OF QUARTZ CRYSTAL

1	Frequency	69.3125MHZ
2	Holder type	UM-1
3	Frequency Tolerance at 25C	+/-5PPM
4	Temperature Drift	+/-5PPM
5	Operating Temperature Range	-20℃~+60℃
6	Locd Capacitance	15pf
7	Mode of Oscillation	3rd overtone
8	Equivalent Series Resistance	30 ohm max 10uW
9	Shunt Capacitance	7pf max
10	Drive leve	10uW
11	Aging/year	+/-3ppm
12	Motional Capacitance	<1.5nF

## SPECIFICATION OF QUARTZ CRYSTAL

1	Nominal Frequency	17.9MHZ
2	Case type	UM-1
3	Mode of oscillation	Fundamental Frequency
4	Number of poles	4 poles
5	Passband width	$\geq \pm 7.5\text{KHZ}$ (at 18dB)
6	Stopband width	$\leq \pm 25\text{KHZ}$ (at 18dB)
7	Attenuation guaranteed	65dB min( $f_0 + 350 \sim +1000\text{KHZ}$ ) 80dB min( $f_0 - 200 \sim +1000\text{KHZ}$ )
8	Ripple	1.0dB max
9	Insertion loss	2.5dB max
10	Terminating Impedance	$1600\ \Omega // 2\text{pf}$
11	Operating temperature range	$-30^{\circ}\text{C} \sim +70^{\circ}\text{C}$
Remarks:		

## SPECIFICATION OF MONOLITHIC FILTER

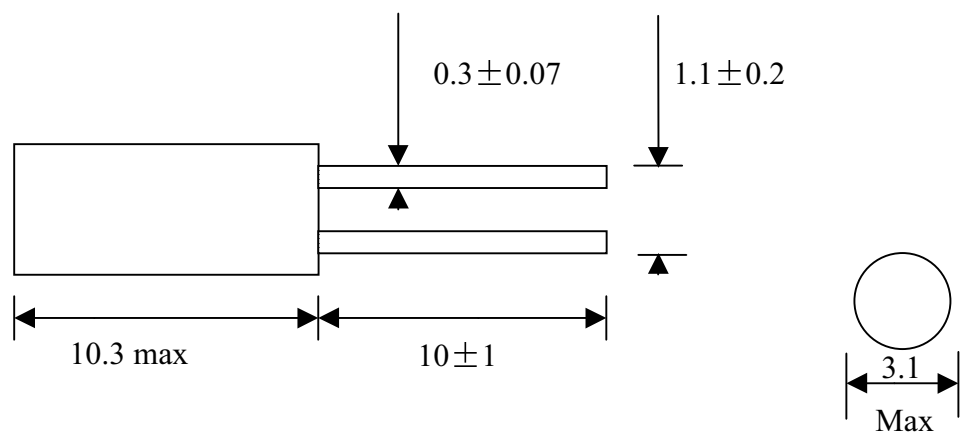
1	Nominal Frequency	21.600MHz
2	Case type	UM-1
3	Mode of oscillation	Fundamental Freg
4	Number of poles	4 poles
5	Passband width	$\geq \pm 7.5\text{KHz}$ (at 3dB)
6	Stopband width	$\leq \pm 25\text{KHz}$ (at 40dB)
7	Attenuation guaranteed	65dB min ( $f_0 + 350 \sim +1\text{MHz}$ ) 50dB min ( $f_0 - 200 \sim -1\text{MHz}$ )
8	Ripple	1.0dB max
9	Insertion loss	2.5dB max
10	Terminating Impedance	$1600\ \Omega // 2\text{pt} \pm 0.5\text{pf}$
11	Operating temperature range	$-30^\circ\text{C} \sim +70^\circ\text{C}$
Remarks: Coupling Capacitor $C_j = 8\text{pt}$		

## Specification of Quartz Crystal

PARAMETER	SPEDIFICATION
Nominal Freq.	18.355MHz
Holder	UM-1
Freq. Tolerance	+/- 20ppm at 25 +/- 2 degree C
Temperature Stability	Fs +/- 20ppm,referenced to 25C
Operating Range	-20°C to +60°C
Equivalent Res.Rs	25 ohms MAX
Mode of Oscillation	fund
Shunt Capacitance Co	5 PF MAX
Load Capacitance CL	20PF
Storage Range	-40°C to +90°C
Drive Level DL	10 uW +/-0.1uW
Aging	+/- 3ppm per year
Insulation	500 Mohm MAX (at DC100V +/-15V)
Leakage Test	No continuous air bubbles from can in the warm 80C in 5 minutes
Shock Test	Freq. shift +/-5PPM & Res.+/- 15% after test (dropping from 75cm height 3 times on wood)
Measurement	KH1200 PI-Net. Crystal Measurement System
Marking	TEK Nominal freq.

## Specification of Quartz Crystal

PARAMETER	SPEDIFICATION
Nominal Freq.	8.388608 MHz
Frequency Tolernce	+/-30 PPM at 25Deg C
Load Capacttance	16pf
Drive Level	100 Uw Max
Series Resistance	150 ohm Max
Qfactor	40000 Min
Turnoyer Iemperaturs	25Deg C +/-5Deg C
Paraboric Curyature Constant	$\pm 30$ PPM Max
Insulation Resist Rance	500 Mohms min at 100v DC
Operattng Temp Rance	-20Deg C to +60Deg C
Storace Temp Rance	-20Deg C to 170Deg C
Shunt Capacttance	5PF +/- 0.3PF
Capacttance Ratto	700 MAX



# SPECIFICATION OF CERAMIC FILTER

## LT455FW

1. THIS SPECIFICATION SHALL COVER THE CHARACTERISTICS OF CERAMIC FILTER WITH 455KHz, INTENDED FOR USE IN TRANSCEIVERS, ETC.
2. PART NUMBER : LT455FW
3. ELECTRICAL SPECIFICATIONS
  - A. CENTRE FREQUENCY ( $f_o$ ) : 455KHz  $\pm$  1.5KHz. MAX.
  - B. BAND WIDTH AT 6 dB :  $\pm$  6.0 KHz MIN. (TO 455KHz)
  - C. BAND WIDTH AT 50 dB :  $\pm$  12.5 KHz MAX. (TO 455KHz)
  - D. STOP BAND ATTENUATION : 40 dB MIN. (AT  $f_o \pm 100$ KHz)
  - E. RIPPLE : 2.0dB MAX. (AT  $f_o \pm 1.0$ KHz)
  - F. INSERTION LOSS : 6.0 dB MAX (AT THE SMALLEST LOSS)
  - G. TEMPERATURE COEFFICIENT OF CENTER FREQUENCY :  $\pm 50$ PPM/ $^{\circ}$ C Max. (-20 TO +80 $^{\circ}$ C)
  - H. INPUT/OUTPUT IMPEDANCE : 2K $\Omega$

NOTE: A) CENTER FREQUENCY SHALL BE DEFINED AS THE CENTRAL VALUE OF THE BAND WITH AT 6 dB

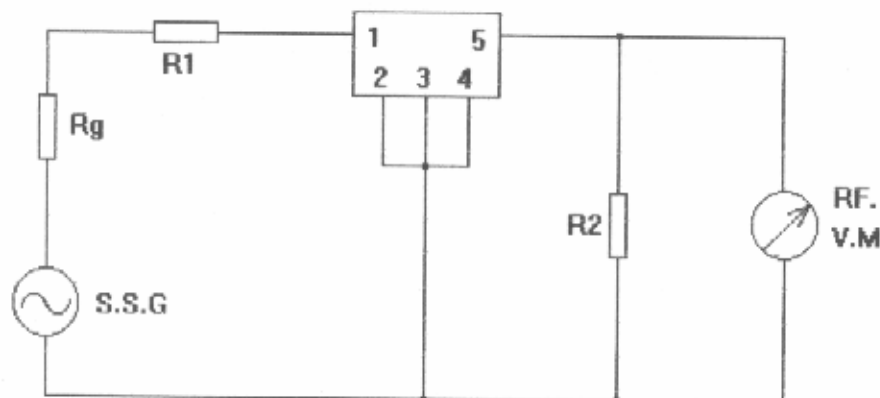
B) TEMPERATURE COEFFICIENT OF CENTER FREQUENCY SHALL BE DEFINED AS THE AVERAGE OF THE CENTRAL FREQUENCY.

### 4. MEASUREMENT

#### A. ENVIRONMENTAL CONDITION

MEASUREMENT SHALL BE CARRIED OUT AT THE REFERENCE TEMPERATURE OF 25 $^{\circ}$ C  $\pm$  2 $^{\circ}$ C. IT SHALL BE POSSIBLY DONE AT 5 $^{\circ}$ C TO 35 $^{\circ}$ C UNLESS IT IS QUESTIONABLE.

#### B. MEASURING CIRCUIT



$R_g + R_1 = R_2 = \text{Input/Output Impedance}$

#S.S.G.

(STANDARD SIGNAL GENERATION)

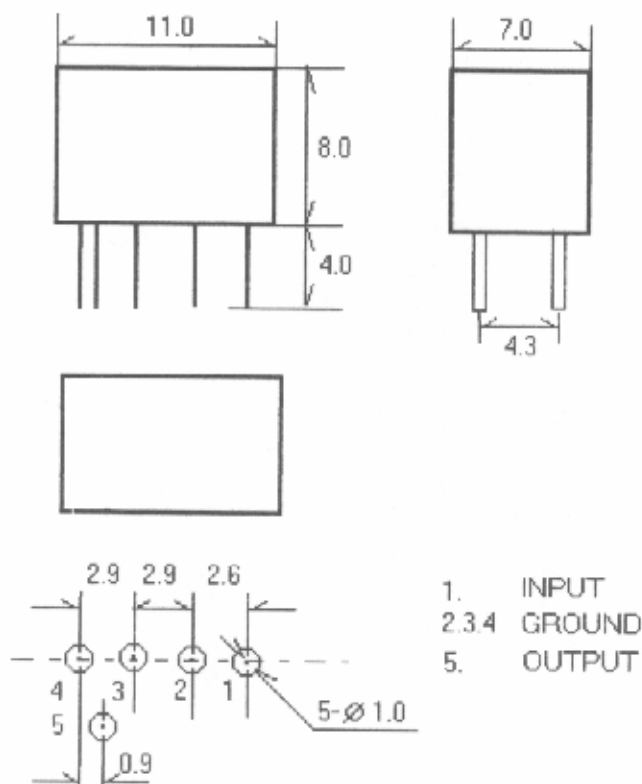


R.F.V.M. (RADIO FREQUENCY VOLTAGE METER)

$R_g + R_1 + R_2 = 1.5K \Omega$

$C < 50 \text{ PF}$

5. DIMENSIONS(mm)



6. ENVIRONMENTAL CHARACTERISTICS

6-1 HIGH TEMPERATURE EXPOSURE

SUBJECT THE FILTER TO  $+80^{\circ}\text{C}$  FOR 96 HOURS. THEN RELEASE THE FILTER INTO THE SPECIFICATIONS IN TABLE 1.

6-2 MOISURE

KEEP THE FILTER AT  $40^{\circ}\text{C}$  AND 95% RH FOR 96 HOURS. THEN RELEASE THE FILTER INTO THE ROOM CONDITIONS FOR 1 TO 2 HOURS PRIOR TO THE MEASUREMENT. IT SHALL FULFILL THE SPECIFICATIONS IN TABLE 1.

6-3 LOW TEMPERATURE EXPOSURE

SUBJECT THE FILTER TO  $-20^{\circ}\text{C}$  FOR 96 HOURS. THEN RELEASE THE FILTER INTO THE ROOM CONDITIONS FOR 1 TO 2 HOURS PRIOR TO THE MEASUREMENT. IT SHALL FULFILL THE SPECIFICATIONS IN TABLE 1.

6-4 TEMPERATURE CYCLING

SUBJECT THE FILTER TO A LOW TEMPERATURE OF  $-55^{\circ}\text{C}$  FOR 30 MINUTES. FOLLOWING BY A HIGH TEMPERATURE OF  $+85^{\circ}\text{C}$  FOR 30

MINUTES. THEN RELEASE THE FILTER INTO THE ROOM CONDITIONS FOR 1 TO 2 HOURS PRIOR TO THE MESUREMENT. IT SHALL MEET THE SPECIFICATIONS IN TABLE 1.

6-5 RESISTANCE TO SOLDER HEAT

DIP THE FILTER TERMINALS NO CLOSER THAN 1.5mm INTO THE SOLDER BATH AT  $270^{\circ}\text{C} \pm 10^{\circ}\text{C}$  FOR  $10 \pm 1$  SEC. THEN RELEASE THE FILTER INTO THE ROOM CONDITIONS FOR 1 TO 2 HOURS. THE FILTER SHALL MEET THE SPECIFICATIONS IN TABLE 1.

6-6 MECHANICAL SHOCK

DROP THE FILTER RANDOMLY ONTO THE CONCRETE FLOOR FROM THE HEIGHT OF 30cm 3 TIMES. THE FILTER SHALL FULFILL THE SPECIFICATIONS IN TABLE 1.

6-7 VIBRATION

SUBJECT THE FILTER TO THE VIBRATION FOR 1 HOUR EACH IN X,Y AND Z AXES WITH THE AMPLITUDE OF 1.5 mm AT 10 TO 55 Hz. THE FILTER SHALL FULFILL THE SPECIFICATIONS IN TABLE 1.

6-8 LEAD FATIGUE

6-8-1 PULLING TEST

WEIGHT ALONG WITH THE DIRECTION OF LEAD WITHOUT AN SHOCK 3 KG. THE FILTER SHALL SATISFY ALL THE INITIAL CHARACTERISTICS.

6-8-2 BENDING TEST

LEAD SHALL BE SUBJECT TO WITHSTAND AGAINST  $90^{\circ}\text{C}$  BENDING IN THE DERECTION OF THICKNESS. THIS OPERATION SHALL BE DONE TOWARD BOTH DIRECTION. THE FILTER SHALL SHOW NO EVIDENCE OF DAMAGE AND SHALL SATISFY ALL THE INITIAL ELECTRICAL CHARACTERISTICS.

TABLE 1

ITEM	SPECIFICATION
CENTRE FREQUENCY( $f_o$ )	$455 \pm 1.5$ KHz Max
BAND WIDTH(6 dB)	$\pm 6.0$ KHz Min
SELECTIVITY(50dB)	$\pm 12.5$ KHz Max
STOP BAND ATTENUATION	40 dB Min
RIPPLE	2.0 dB Max
INSERTION LOSS	6.0 dB Max