

Introduction to Quartz Crystal

1. Crystal ?

2.

3.

4.

5. .

6.

7.

2.

2-1 CRYSTAL UNIT

TV, VCR AV , , , PC
, , PCS
HC-49/U, HC-49/US, UM-1, UM-4, UM-5 Ceramic Package Type
가 가 .

2-2 OSCILLATOR

PC
14 DIP, 8 DIP Type Miniature Type, Ceramic Package Type

2-3 VCXO

Oscillator
가 가 .
, PLL
14 DIP 8 DIP Type .

2-4 TCXO

가
Thermistor
가 , PCS

2-5 DTCXO

TCXO 가
IC.
가
TCXO 가
TCXO 가 Package size 가

2-6 OCXO

12V, 24V, 30V
Clock source, Time standard,

3.3Volt 가 5Volt 가 가 Oven 가

2-7 MCF / FILTER

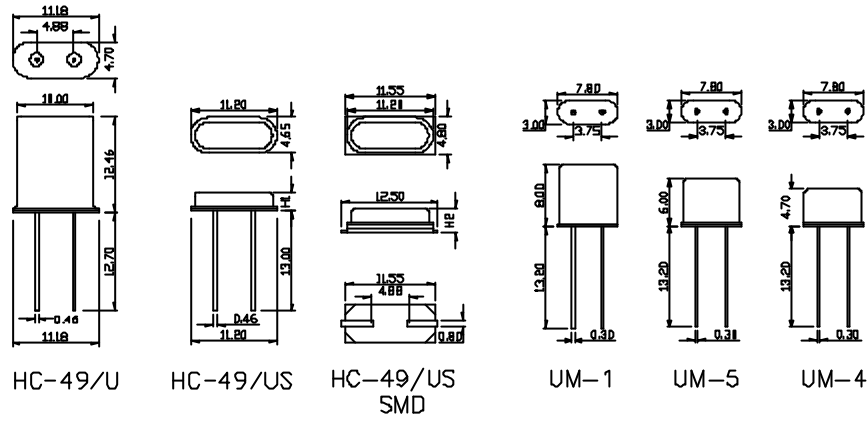
가
CB Transceiver 가 Codeless Phone MCF 가

2-8 SAW device

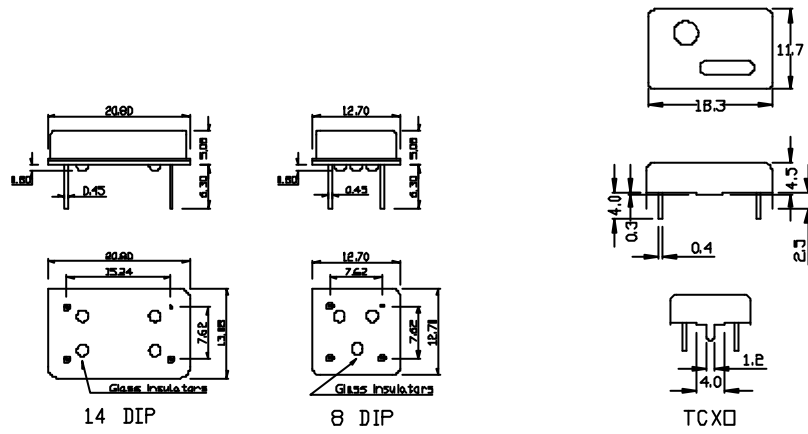
IF filter 1~2 가 70%가 TV, VTR , PCS 가

3.

3-1 HC-49/U, HC-49/US, UM Series



3-2 OSCILLATOR (14 DIP, 8DIP), TCXO



4.

- Watch & Clocks
- VCR & Video camera
- Audio 가
- DVD
- Digital systems
- Color TV TV HDTV
- Computer (Board, Graphic card, Sound card, Hard disk, MODEM, CD-ROM etc.)
- Pager, Cellular phone, PCS
- GIS, GPS Navigation systems
- , , ATM , SONET
- TV, , 가
RF

5. .

5-1

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5-2

< 5-1>

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	1994	1995	1996	('94/'96)
	132,423	156,093	184,034	17.9 %
	208,333	282,015	381,848	35.4 %

5-3

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- .
- .

6.

6-1

35% 17%가 가 , 가 ,

(TCXO),

(VCXO)

20%가 가

, , , ,

가가

95

가

96

가

가

가

,

21

IC.

,

가

TCXO

LG

97

SAW device

,

,

,

가 , 가

가 가 가

6-2

102 VCO(63.4%), SAW device(59.8%), PLL synthesizer(58.4%), TCXO(45.5%), Duplexer(43.6%) 가 가

< 6-1>

(n=102)

		(%)	
SAW device	61	59.8	2
Circulator	17	16.7	12
Isolator	28	27.5	10
	7	6.9	13
Antenna	40	39.2	6
Di Electric filter	36	35.3	7
VCO	65	63.4	1
TCXO	46	45.5	4
Duplexer	44	43.6	5
Mixer	32	31.7	8
PLL synthesizer	60	58.4	3
LNB	27	26.7	11
Tuner	28	27.7	9

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2000 ,

(

6-3

가

< 6-2>

	가				()
SAW device	2.32	2.63	2.48	2.23	2.61
VCO	2.61	2.55	2.38	2.18	2.18
PLL synthesizer	2.44	2.61	2.46	2.17	2.39
TCXO	2.51	2.63	2.44	2.17	2.21
Antenna	2.49	2.49	2.37	2.15	2.14
Duplexer	2.32	2.68	2.43	2.15	2.34

2000 ,

(

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6-4

가

2

가

< 6-4>

		가		
		(100)		
			20	
	Holder		70	
	Can		25	,
가			80	
			90	Mask
	SMD		10	

			50	
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1997 (

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7.

Crystal Unit - X-tal
 Oscillator - 가
 VCXO - Voltage Controlled Crystal Oscillator
 TCXO - Temperature Compensated Crystal Oscillator
 VCTCXO (Voltage Controlled & Temperature Compensated Crystal Oscillator) -

DTCXO - Digitally Temperature Compensated Crystal Oscillator

OCXO - Oven Controlled Crystal Oscillator

Filter -

MCF - Monolithic Crystal Filter

BAW - Bulk Acoustic Wave

SAW - Surface Acoustic Wave

PPM (Part Per Million) -

Thermistor - 가

RC - Capacitor Resister

가 Transistor

Q factor -

GIS - Geographic Information Systems

GPS (Global Positioning Systems) - Nano Second

Timing Source 가

ISDN - Integrated Service Digital Network

SONET - Synchronous Optical NETWORK

ATM - Asynchronous Transfer Mode

PLL - Phase Locked Loop

CB Transceiver - Citizen Band Transceiver

Codeless Phone - 가

I F - Intermediate Frequency

Piezo electricity -

LNB - Low Noise Block

Reactance -

PCS - Personal Communications Services