

This product represents our selection of low profile resistance weld type quartz crystals.

- OPTIONS:**
- extended temperature range
  - tighter tolerances
  - mylar spacer
  - 3rd in line lead base
  - radial tape and reel (1,000 pcs)

## FEATURES

- Cost effective
- Excellent aging
- Wide frequency range
- Low profile
- Excellent reliability
- “AT strip” blank technology

## PART NUMBERING GUIDE *“EXAMPLE”*

ECS	FREQUENCY (16.0000 MHz)	LOAD CAPACITANCE*	PACKAGE TYPE**	3RD IN LINE LEAD
ECS	- 160	- 20	- 4	- 3IL

\* Load capacitance (xx=xx pF, S= series resonance), \*\* Package Type examples (4= 4mm max. height, 4M= 3.5mm max. height, 4L=2.5mm max. height)  
 Note: See Product Selection Guide for additional options.

## OPERATING CONDITIONS/ELECTRICAL CHARACTERISTICS

PARAMETERS	CONDITIONS	MINIMUM	MAXIMUM	UNITS
FREQUENCY RANGE	$f_0$	3.57	70.000	MHz
FREQUENCY TOLERANCE	@ +25°C	-50	+50	PPM
FREQUENCY STABILITY, ref @ 25°C	Ta = -10°C ~ +70°C	-50	+50	PPM
OPERATING TEMPERATURE	T <sub>OPR</sub>	-10	+70	°C
STORAGE TEMPERATURE	T <sub>STG</sub>	-30	+85	°C
SHUNT CAPACITANCE	C <sub>0</sub>		7.0	pF
LOAD CAPACITANCE	C <sub>L</sub> (Customer Specified)	10.0	Series	pF
DRIVE LEVEL	3.570 ~ 70.000MHz		.5	mW
AGING (FIRST YEAR)	@ +25°C	-5.0	+5.0	PPM

## EQUIVALENT SERIES RESISTANCE / MODE OF OSCILLATION

FREQUENCY RANGE (MHz)	MODE	MAX ESR Ω	FREQUENCY RANGE (MHz)	MODE	MAX ESR Ω
3.570 ~ 4.000	Fundamental	200	9.000 ~ 13.000	Fundamental	60
4.000 ~ 5.000	Fundamental	150	13.000 ~ 20.000	Fundamental	40
5.000 ~ 6.000	Fundamental	120	20.000 ~ 30.000	Fundamental	30
6.000 ~ 7.000	Fundamental	100	27.000 ~ 70.000	3rd O/T	100
7.000 ~ 9.000	Fundamental	80			

## PACKAGE DIMENSIONS (mm)

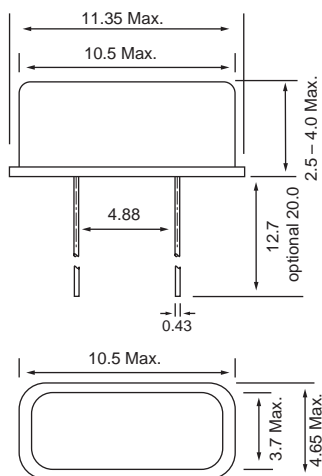


Figure 1) HC-49US - Top and Side views

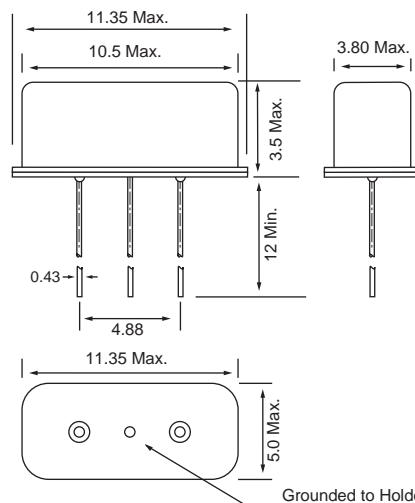


Figure 2) HC-49US - 3rd In Line Lead Base - Side & Bottom View

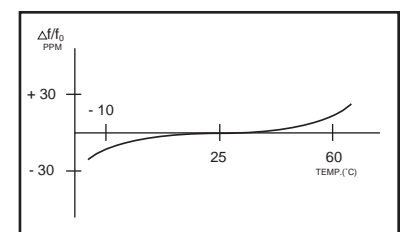


Figure 3) Frequency vs Temperature Curve