PRECISION DEVICES INCORPORATED has established itself as a true leader in the production of the low profile surface mount crystals. PDI has developed equipment to produce these crystals throughout the SMD process. All crystals are 100% solder dipped after the lead prep process. These crystals are lead formed and 100% electrically tested prior to the taping process. Performance is the top priority, and the LP-9000 series crystals offer long term reliability for mechanical and electrical characteristics.

APPLICATIONS:

LAN/MOBILE COMM/MICROCONTROLLERS/MODEM CHIPSETS/ PERSONAL COMPUTERS/DISC DRIVES/VIDEO

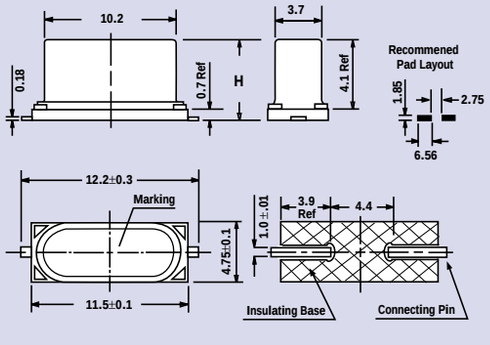
Typical Electrical Characteristics

Frequency Range : 3.2 MHz to 100.0 MHz
Calibration Tolerance @ 25˚c : ± 50 ppm
Operating Temp Range : -20˚c to +70˚c
Calibration Tolerance over Temp Range : ± 50 ppm
Co (Shunt Capacitance) : 7.0 pf Max
Aging : ± 3 ppm/year
Drive Level : 100 µW typical

Frequency Tolerance
A = ±10 ppm
B = ±25 ppm
C = ±50 ppm
D= ±100 ppm
S= SPECIAL

Operating Temp Range
A. 0˚C to 70˚C
B. -20˚C to 70˚C
C. -30˚C to 80˚C
D. -40˚C to 85˚C
E. -55˚C to 105˚C
S. SPECIAL

Package # L1-L5 (LP-9000 SMD)



HEIGHT	L1	L2	L3	L4	L5
H	2.67	3.15	3.68	4.20	5.18

SERIES RESISTANCE

3.2-3.499 MHz	Fund	300 ohms
3.5-4.999 MHz	Fund	150 ohms
5.0-5.999 MHz	Fund	120 ohms
6.000-6.999 MHz	Fund	100 ohms
7.000-8.999 MHz	Fund	80 ohms
9.000-12.999 MHz	Fund	60 ohms
13.00-19.999 MHz	Fund	40 ohms
20.00-29.999 MHz	Fund	30 ohms
30.00-35.00 MHz	Fund	30 ohms
24.0-80.00 MHz	3rd Overtone	60 ohms
60.0-100.0 MHz	5th Overtone	80 ohms

CRYSTAL UNITS

CRYSTALS FOR CHIPSET APPLICATIONS

PDI has worked hard to develop relationships with all manufacturers of Chipsets. We provide a complete line of crystal products in standard and SMD packages. Many crystals are specified by a Chipset manufacturer and it is our intent to have these manufacturers recommend PDI as a source for these devices. Crystals are used in applications such as ISDN, Ethernet, Modem, Audio, Sonet, DSP, Video, T1, Transceivers, Microprocessors, Communications, Microcontrollers, PLL, Clock Generators, Wireless LAN, and Gigabyte transceivers. It is difficult to list specifications for certain Chipsets due to the continuous changing technology. Special applications require certain crystal frequencies with standard and non-standard electrical characteristics. Current Chipsets and frequencies are listed for reference.

Typical Electrical Characteristics

Frequency Range : 1.0 MHz to 350.0 MHz
Calibration Tolerance @ 25˚C : ± 50 ppm
Operating Temp Range : -20˚c to +70˚c
Calibration Tolerance over Temp Range : ± 50 ppm
Co (Shunt Capacitance) : 7.0 pf Max
Aging : ± 2ppm/year
Drive Level : 100 µW
C_L (Load Capacitance) : Specified

RECOMMENDED PACKAGES

HA	C1	C9	L4
HAG	C6	L1	L5
U1	C7	L2	P2
T9	C8	L3	U3

TYPICAL CHIPSETS AND FREQUENCIES

Clock Generators	Modem Chipsets	Micro Controllers	T1 Transceivers	DSP Digital Signal Processing
12.28800 MHz	23.040 MHz	1.8432 MHz	6.176 MHz	4.0000 MHz
13.50000 MHz	28.224 MHz	4.0000 MHz	8.192 MHz	36.864 MHz
14.31818 MHz	35.321 MHz	8.0000 MHz	12.352 MHz	80.000 MHz
16.00000 MHz	40.320 MHz	10.0000 MHz	16.384 MHz	
16.66000 MHz	56.448 MHz	11.0592 MHz	20.480 MHz	
27.00000 MHz		16.0000 MHz		
		24.0000 MHz		

CRYSTAL UNITS

HF INVERTED MESA

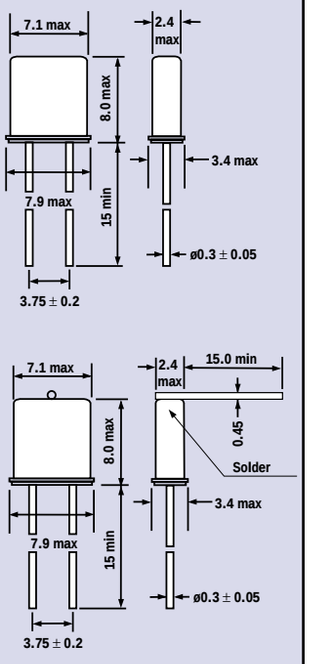
PRECISION DEVICES INCORPORATED now offers high frequency fundamentals and tight tolerance crystals. These crystals are used for oscillators and crystal filters and provide wide pullability and excellent spurious suppression. Using the latest state of the art etching techniques, PDI can provide you with fundamental frequencies up to 350.00 MHz. This allows fewer components in oscillator designs and much more flexibility. Excellent for Sonet applications and High Speed Microprocessor design.

Typical Electrical Characteristics

Frequency Range : 30.0 KHz to 350.0 MHz
Operating Temp Range : -40˚C to +85˚C
Calibration Tolerance : ±15 ppm
Calibration Tolerance
over Operating Temp Range: ±25 ppm
Aging : ±2ppm/year
Drive Level : 100 µW
Package : UM-1

Frequency Tolerance	Operating Temperature Range	Frequency Tolerance over Temp Range
A = ±5 ppm	1. 0˚C to 50˚C	a. ± 10 ppm
B = ±10 ppm	2. 0˚C to 70˚C	b. ± 15 ppm
C = ±15 ppm	3. -20˚C to 70˚C	c. ± 25 ppm
D= ±25 ppm	4. -40˚C to 85˚C	d. ± 50 ppm
	5. -55˚C to 105˚C	

Package # U1 (UM-1)



HIGH FREQUENCY FUNDAMENTAL STANDARD CRYSTALS

Nominal Frequency (MHz)	Frequency Tolerance	Operating Temp Range	Part Number
38.880	±10 ppm	-40˚c to +85˚c	9462
44.736	±15 ppm	-20˚c to +70˚c	9463
51.840	±10ppm	-40˚c to +85˚c	9464
52.192	±15ppm	-20˚c to +70˚c	9465
77.760	±10ppm	-40˚c to +85˚c	9466
80.000	±25ppm	-20˚c to +70˚c	9467
100.000	±25ppm	-20˚c to +70˚c	9468
139.264	±15ppm	-40˚c to +85˚c	9469
140.000	±15ppm	-40˚c to +85˚c	9470
155.520	±15ppm	-20˚c to +70˚c	9471
200.000	±25ppm	-20˚c to +70˚c	9472
225.000	±25ppm	-20˚c to +70˚c	9473
233.000	±25ppm	-20˚c to +70˚c	9474
250.000	±25ppm	-20˚c to +70˚c	9475
300.000	±25ppm	-20˚c to +70˚c	9476

Other frequencies available upon request