Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!
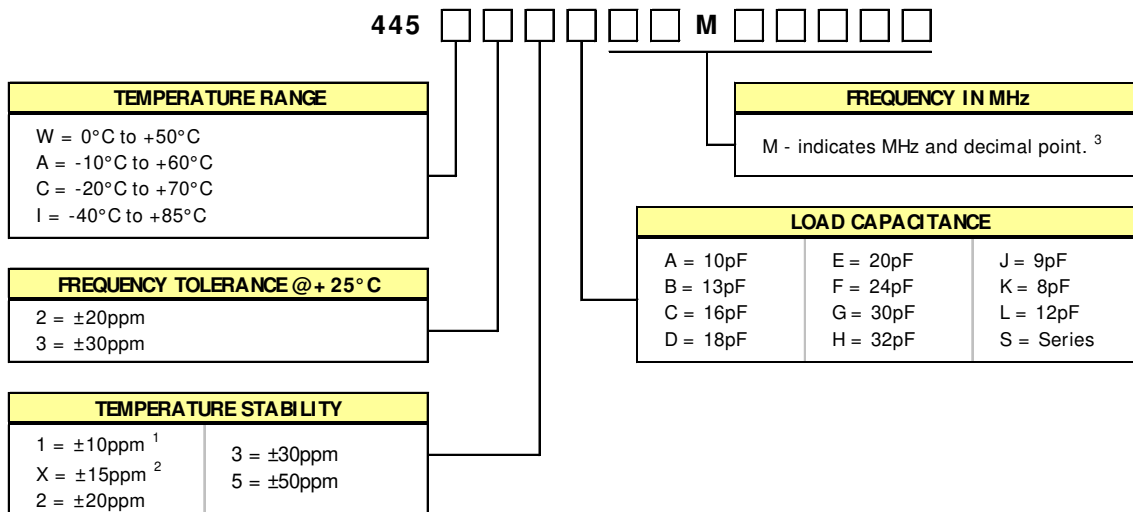

Contact us

FEATURES

- **Standard 5.0mm x 3.2mm Glass Seal Package**
- **Fundamental Crystal Design**
- **Frequency Range 8 – 50MHz**
- **Frequency Tolerance, ± 20ppm Standard** [other tolerances available]
- **Frequency Stability, ± 30ppm Standard** [other stabilities available]
- **Operating Temperature to -40°C to +85°C**
- **Tape & Reel Packaging Standard, EIA-481**
- **RoHS Compliant in Accordance with EU Directive 2011/65/EU**
    - Lead-Free Termination Finish
    - Exemption 7(c)-I, Electrical and electronic components containing lead [Pb] in glass

APPLICATIONS

Model 445 is a low cost device used in a wide range of commercial applications including notebooks, computer peripherals, audio visual, Bluetooth and USB interfaces, PDAs, and automotive electronics.

ORDERING INFORMATION

445 ☐ ☐ ☐ ☐ ☐ M ☐ ☐ ☐ ☐ ☐

TEMPERATURE RANGE
W = 0°C to +50°C
A = -10°C to +60°C
C = -20°C to +70°C
I = -40°C to +85°C

FREQUENCY TOLERANCE @ +25°C
2 = ±20ppm
3 = ±30ppm

TEMPERATURE STABILITY	
1 = ±10ppm [1]	3 = ±30ppm
X = ±15ppm [2]	5 = ±50ppm
2 = ±20ppm	

FREQUENCY IN MHz
M - indicates MHz and decimal point. [3]

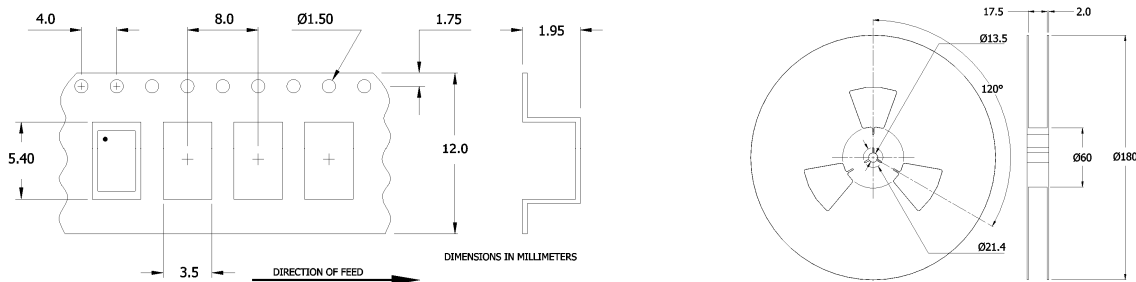| LOAD CAPACITANCE		
A = 10pF	E = 20pF	J = 9pF
B = 13pF	F = 24pF	K = 8pF
C = 16pF	G = 30pF	L = 12pF
D = 18pF	H = 32pF	S = Series

1. Only available with temperature range codes "W" and "A".
2. Only available with temperature range codes "W", "A" and "C".
3. Frequency is recorded with two leading digits before the 'M' and 5 significant digits after the 'M' [including zeros].

Not all performance combinations and frequencies may be available.
Contact your local CTS Representative or CTS Customer Service for availability.

PACKAGING INFORMATION   [For Reference]

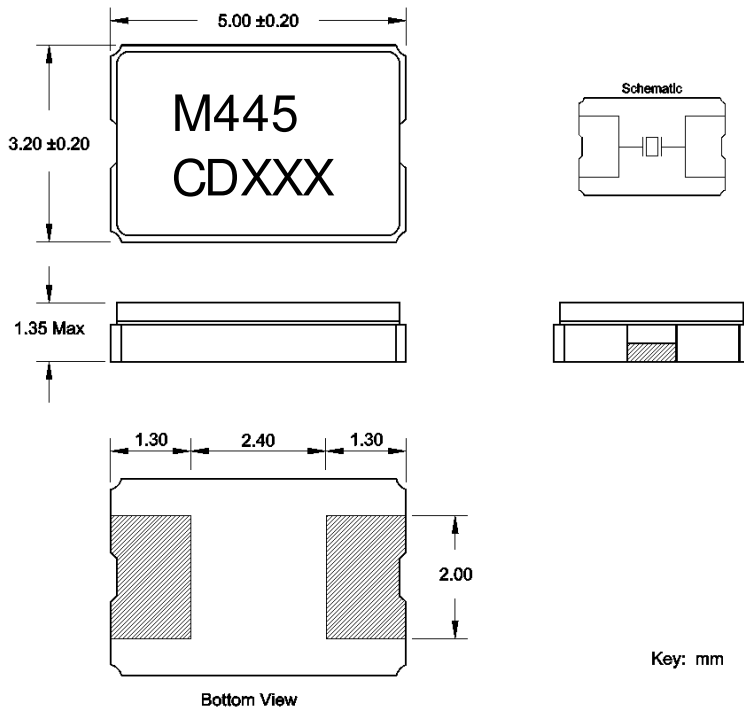Factory may package reels in quantities of 1k pcs. or 3k pcs. Reel size is 180mm.

4.0   8.0   Ø1.50   1.75   1.95

5.40   12.0

3.5   DIRECTION OF FEED

DIMENSIONS IN MILLIMETERS

17.5   2.0
Ø13.5
120°
Ø60   Ø180
Ø21.4

ELECTRICAL CHARACTERISTICS

PARAMETER	VALUE	
Frequency Range	8MHz to 50MHz	
Operating Mode	Fundamental	
Crystal Cut	AT-Cut	
Frequency Tolerance @ +25°C	±20ppm, ±30ppm	
Frequency Stability Tolerance [Operating Temperature Range, Referenced to 25°C Reading]	±10ppm, ±15ppm, ±20ppm, ±30ppm, ±50ppm	
Operating Temperature Ranges	0°C to +50°C	-10°C to +60°C
	-20°C to +70°C	-40°C to +85°C
Equivalent Series Resistance [Maximum]	8MHz - <12MHz	100 Ohms
	12MHz - <16MHz	50 Ohms
	16MHz - <30MHz	40 Ohms
	30MHz - <50MHz	30 Ohms
Load Capacitance or Resonance Mode	See Ordering Information	
Shunt Capacitance [C_0]	5.0pF Typical, 7.0pF Maximum	
Drive Level	10µW Min., 100µW Typ., 300µW Max.	
Aging @ +25°C	±3ppm/yr Typical	
Storage Temperature Range	-40°C to +85°C	

The left side of the table is labeled vertically: ELECTRICAL PARAMETERS

MECHANICAL SPECIFICATIONS

PACKAGE DRAWING

5.00 ±0.20
3.20 ±0.20
M445
CDXXX
1.35 Max
Schematic
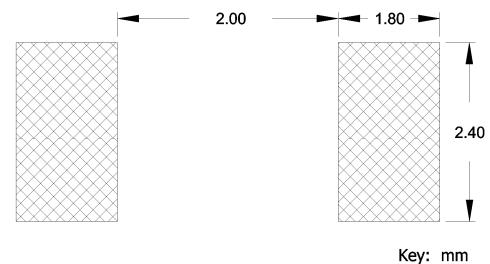1.30 2.40 1.30
2.00
Bottom View

MARKING INFORMATION
1. M445 - CTS Model Series.
2. C – CTS.
3. D – Date code. See Table I for codes.
4. XXX – Frequency code.
   Reference CTS document 016-1454-0.

NOTES
1. Complete CTS part number, frequency value, date code and manufacturing site code information must appear on reel and carton labels.
2. JEDEC termination code (e4). Barrier plating is nickel [Ni] with gold [Au] flash plate.
3. Reflow conditions per JEDEC J-STD-020; 260°C maximum, 10 seconds.
4. MSL – 1.

SUGGESTED SOLDER PAD GEOMETRY

2.00 1.80
2.40
Key: mm

TABLE I – DATE CODE

YEAR					MONTH											
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2001	2005	2009	2013	2017	A	B	C	D	E	F	G	H	J	K	L	M
2002	2006	2010	2014	2018	N	P	Q	R	S	T	U	V	W	X	Y	Z
2003	2007	2011	2015	2019	a	b	c	d	e	f	g	h	j	k	l	m
2004	2008	2012	2016	2020	n	p	q	r	s	t	u	v	w	x	y	z