



**FEATURES**

- **Standard 1.6mm x 1.2mm Seam Weld Package**
- **Fundamental Crystal Design**
- Frequency Range 24 – 80 MHz
- Frequency Tolerance,  $\pm 20$ ppm Standard
- Frequency Stability,  $\pm 20$ ppm Standard
- Operating Temperature to  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Tape & Reel Packaging Standard, EIA-481
- **RoHS/Green Compliant [6/6]**



**APPLICATIONS**

Model 416 is a low cost device used in a wide range of commercial applications including wearable and handheld electronics, notebooks, computer peripherals, Bluetooth and USB interfaces.

**ORDERING INFORMATION**



1] Check temperature range code availability with factory.

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

**PACKAGING INFORMATION [Reference]**

Device quantity is 1k pieces minimum and 3k pieces maximum per 180mm reel.



**ELECTRICAL CHARACTERISTICS**

ELECTRICAL PARAMETERS	PARAMETER	VALUE	
	Frequency Range	24 MHz to 80 MHz	
	Operating Mode	Fundamental	
	Crystal Cut	AT-Cut	
	Frequency Tolerance @ +25°C	±20 ppm, Standard	
	Frequency Stability Tolerance [Operating Temperature Range, Referenced to 25°C Reading]	±20 ppm, Standard	
	Operating Temperature Ranges	-10°C to +60°C -20°C to +70°C	-40°C to +85°C
	Equivalent Series Resistance [Maximum]	24 MHz - < 40 MHz	200 Ohms
		40 MHz - 80 MHz	100 Ohms
	Load Capacitance	See Ordering Information	
	Shunt Capacitance (C <sub>0</sub> )	3.0 pF Typical, 5.0 pF Maximum	
	Drive Level	10 µW Typ., 100 µW Max.	
	Aging @ +25°C	±3 ppm/yr Typical	
	Insulation Resistance	500M Ohms @ DC 100V	
	Storage Temperature Range	-40°C to +90°C	

**MECHANICAL SPECIFICATIONS**

**PACKAGE DRAWING**



**MARKING INFORMATION**

1. M416 - CTS Model Series.
2. D – Date code. See Table I for codes.
3. XXX – Frequency code. Reference CTS document 016-1454-01.

**NOTES**

1. Complete CTS part number, frequency value, date code and manufacturing site code information must appear on reel and carton labels.
2. Terminations #2, #4 and the metal lid are connected internally. End user may connect these pins to circuit ground.
3. Termination pads (e4); barrier plating is nickel [Ni] with gold [Au] flash plate.
4. Reflow conditions per JEDEC J-STD-020; 260°C maximum, 10 seconds.
5. MSL = 1.

**SUGGESTED SOLDER PAD GEOMETRY**



**TABLE I – DATE CODE**

YEAR		MONTH					JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
		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		

# Mouser Electronics

Authorized Distributor

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## CTS:

[416F40022CKR](#) [416F52022IKR](#) [416F26022CKR](#) [416F32022IKR](#) [416F48022CKR](#) [416F27022CKR](#) [416F32022CKR](#)  
[416F36022IKR](#) [416F44022CKR](#) [416F36022CKR](#) [416F40022IKR](#) [416F30022CKR](#) [416F52022CKR](#) [416F24022IKR](#)  
[416F26022IKR](#) [416F48022IKR](#) [416F26025CSR](#) [416F26023CDR](#) [416F440X3CDR](#) [416F440XXCAR](#)  
[416F440X3CLR](#) [416F440XXAAR](#) [416F440X3ALR](#) [416F25022ITR](#) [416F27025ASR](#) [416F27025ATR](#) [416F37012IKR](#)  
[416F37012ISR](#) [416F440X3ASR](#) [416F25013CSR](#) [416F25013ILR](#) [416F25022ATR](#) [416F44022CSR](#) [416F44013ILR](#)  
[416F44033AAR](#) [416F440X2CLR](#) [416F44025CTR](#) [416F44033ISR](#) [416F44023CSR](#) [416F44023IDR](#) [416F44035ISR](#)  
[416F440X2CAR](#) [416F440X2IDR](#) [416F44022ADR](#) [416F44022AKR](#) [416F44023ADR](#) [416F440X3ADR](#) [416F44023CLR](#)  
[416F44033ASR](#) [416F440X2IAR](#) [416F44033IKR](#) [416F44035IKR](#) [416F44033ATR](#) [416F44033ILR](#) [416F406X2IAR](#)  
[416F440X2ILR](#) [416F440X3ILR](#) [416F44022ALR](#) [416F44023ILR](#) [416F44025ALR](#) [416F40635CKR](#) [416F40635ISR](#)  
[416F44012AAR](#) [416F44023AKR](#) [416F44025AAR](#) [416F406XXADR](#) [416F44011AKR](#) [416F44012ATR](#)  
[416F406X2ADR](#) [416F406X2ATR](#) [416F406XXCTR](#) [416F406X3ADR](#) [416F40635AKR](#) [416F406X3CLR](#)  
[416F4401XATR](#) [416F44022ASR](#) [416F44022CTR](#) [416F44013IAR](#) [416F4401XCAR](#) [416F4401XAAR](#) [416F40625CTR](#)  
[416F44012IDR](#) [416F440XXCTR](#) [416F40623CDR](#) [416F40625CAR](#) [416F440X3IKR](#) [416F440XXAKR](#)  
[416F32023AAR](#) [416F40633CKR](#) [416F40635ALR](#) [416F406X2AAR](#) [416F406X2ALR](#) [416F32013ITR](#) [416F32013CLR](#)  
[416F3201XADR](#) [416F3201XAKR](#) [416F3201XASR](#) [416F406X2CSR](#) [416F406X3CDR](#) [416F40623CAR](#)