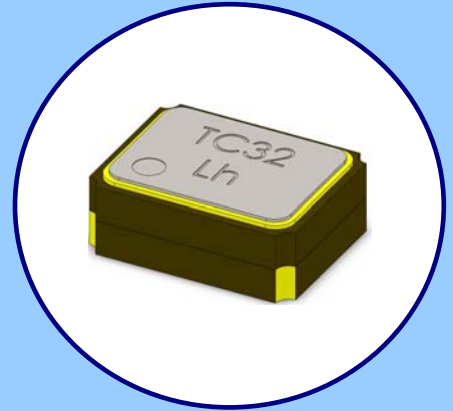




## FEATURES

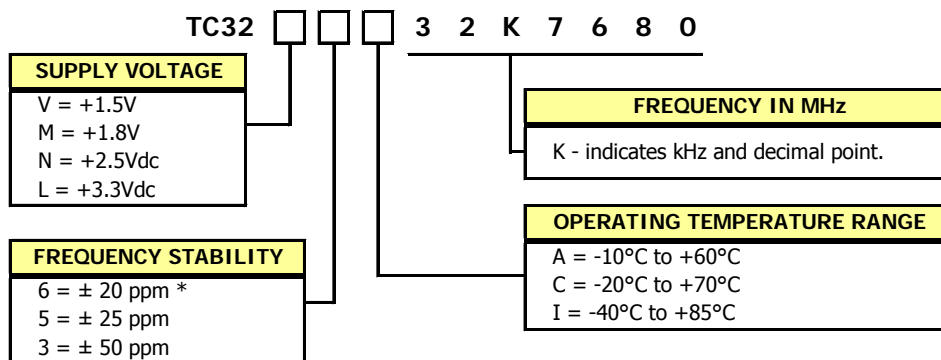
- **32.7680 kHz Frequency Reference**
- **Package Size 3.2mm x 2.5mm**
- **Fundamental Crystal Design**
- **Hermetic Ceramic Package**
- Frequency Stability,  $\pm 50$  ppm Standard
- Operating Temperature,  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  Standard
- Tape & Reel Packaging, EAI-418
- **RoHS/Green Compliant (6/6)**



## APPLICATIONS

Model TC32 is ideal for use in a wide range of communication equipment, measurement equipment, industrial applications, automotive electronics, wireless communications, PDAs, mobile phones and notebooks.

## ORDERING INFORMATION



\* Temperature codes A and C.

Example Part Numbers:

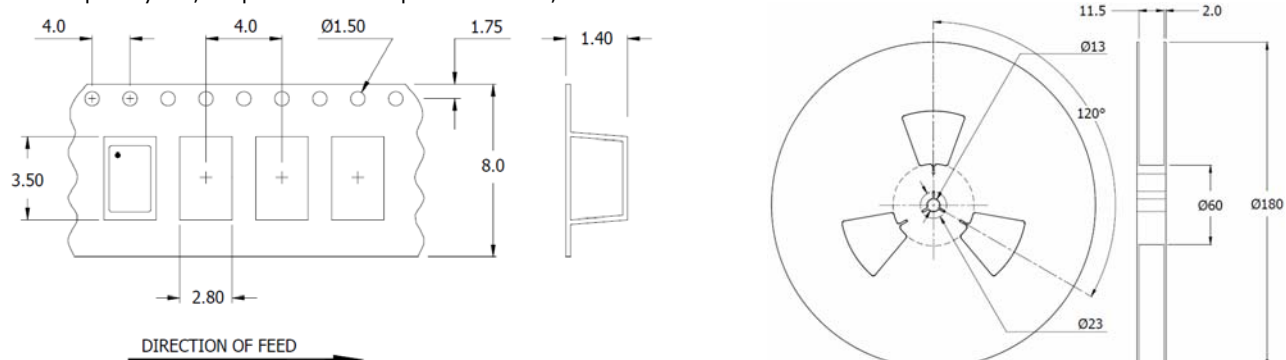
TC32L3I32K7680

TC32L5I32K7680

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

## PACKAGING INFORMATION [Reference Only]

Device quantity is 1,000 pieces minimum per 180mm reel, EIA-418 standard.

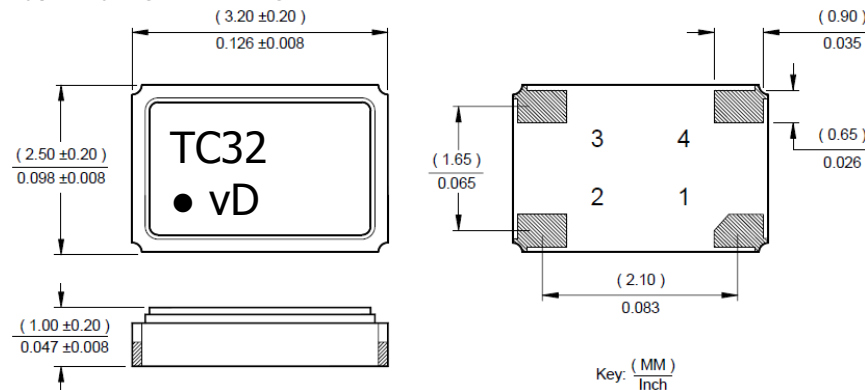


## ELECTRICAL CHARACTERISTICS

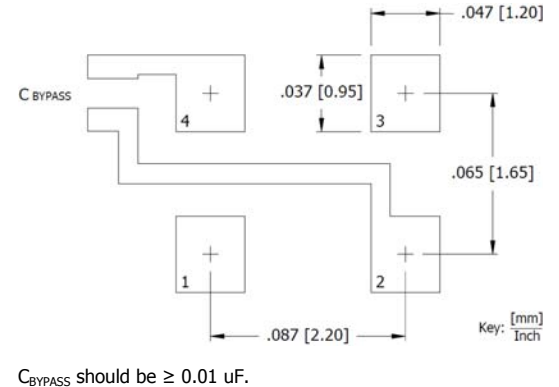
ELECTRICAL PARAMETERS	PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
	Frequency	$f_0$			32.7680		kHz
	Operating Mode	-		AT Fundamental			-
	Output Type			CMOS			
	Supply Voltage		$\pm 10\%$	1.5, 1.8, 2.5, 3.3			V
	Current			-	-	3.0	mA
	Frequency Stability		See Ordering Information	20, 25, 50			ppm
	Operating Temperature Range	$T_A$		-10 -20 -40	- - -	+60 +70 +85	$^{\circ}\text{C}$
	Load Capacitance	$C_L$	CMOS	-	15	-	pF
	Voltage Level [ $V_{OH}$ ]			$0.9V_{CC}$	-	-	V
	Voltage Level [ $V_{OL}$ ]			-	-	$0.1V_{CC}$	V
	Rise and Fall Time	$T_{rr}, T_f$		-	-	50	ns
	Symmetry			45	-	55	%
	Start-up Time			-	5.0	10	ms
	Tri-State Voltage [ $V_{OL}$ ]			$0.7V_{CC}$	-	-	V
	Tri-State Voltage [ $V_{OH}$ ]			-	-	$0.3V_{CC}$	V
	Aging	$\Delta f/f_0$	@+25 $^{\circ}\text{C}$ , 1st year	-	3.0	5.0	$\pm$ ppm
	Storage Temperature Range	$T_{STR}$		-55	-	+125	$^{\circ}\text{C}$

## MECHANICAL SPECIFICATIONS

### TC32 PACKAGE DRAWING



### SUGGESTED SOLDER PAD GEOMETRY



### MARKING INFORMATION

- TC32 – CTS Model Series.
- – Pin 1 identifier.
- v – Voltage code.  
[L=3.3V, N=2.5V, M=1.8V, V=1.5V]
- D – Date code. See Table I for codes.

Complete CTS part number, frequency value, date code and manufacturing site code information must appear on reel and carton labels.

### NOTES

- Termination pads (e4); barrier plating is nickel [Ni] with gold [Au] flash plate.
- Reflow conditions per JEDEC J-STD-020; 260 $^{\circ}\text{C}$  maximum, 20 seconds.
- MSL = 1.

### PIN ASSIGNMENTS

PIN	SYMBOL	DESCRIPTION
1	EOH	Enable Input
2	GND	Circuit & Package Ground
3	Output	RF Output
4	$V_{CC}$	Supply Voltage

TABLE I – DATE CODE

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