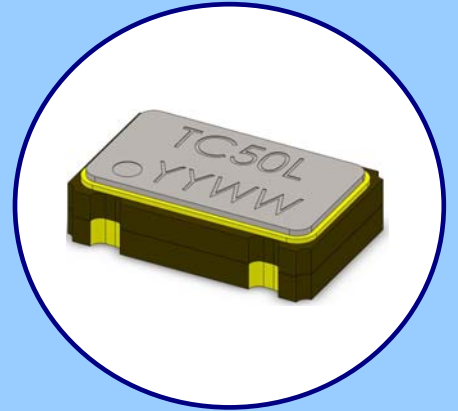


### FEATURES

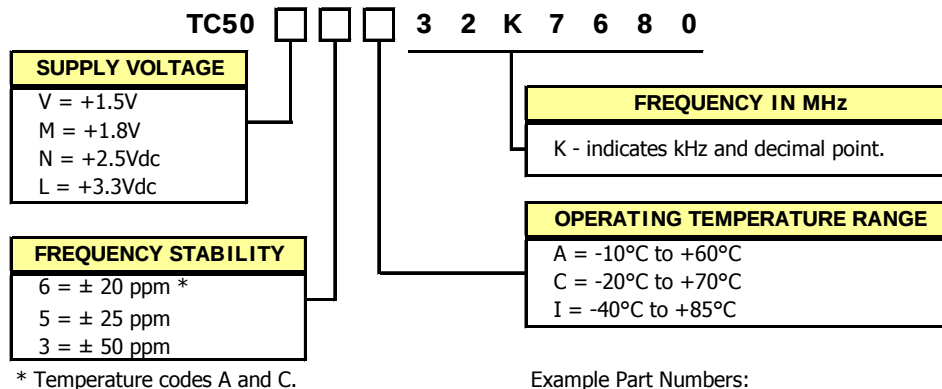
- **32.7680 kHz Frequency Reference**
- **Package Size 5.0mm x 3.2mm**
- **Fundamental Crystal Design**
- **Hermetic Ceramic Package**
- Frequency Stability,  $\pm 50$  ppm Standard
- Operating Temperature,  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  Standard
- Tape & Reel Packaging, EAI-418
- **RoHS/Green Compliant [6/6]**



### APPLICATIONS

Model TC50 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



Example Part Numbers:

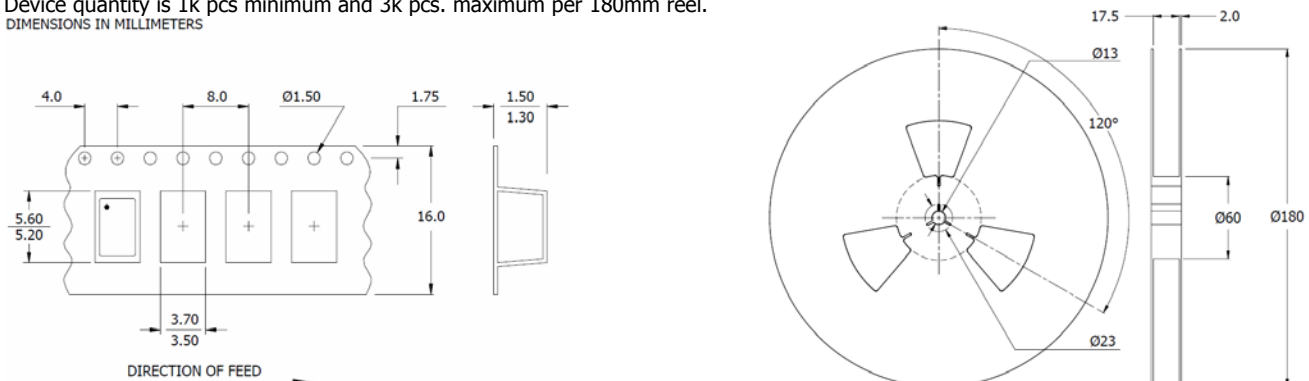
TC50L3I32K7680

TC50L5I32K7680

**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 1k pcs minimum and 3k pcs. maximum per 180mm reel.  
DIMENSIONS IN MILLIMETERS

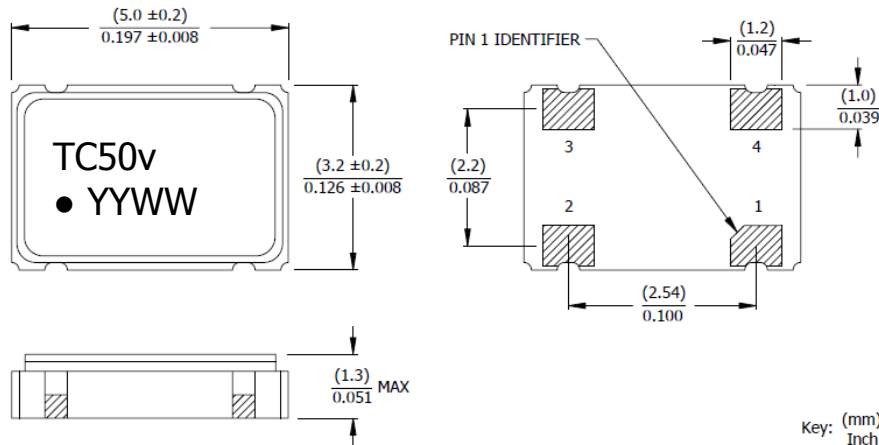


## ELECTRICAL CHARACTERISTICS

| PARAMETER                   | SYMBOL         | CONDITIONS                       | MIN                | TYP     | MAX         | UNIT  |
|-----------------------------|----------------|----------------------------------|--------------------|---------|-------------|-------|
| Frequency                   | $f_o$          | -                                |                    | 32.7680 |             | kHz   |
| Operating Mode              | -              | -                                | AT Fundamental     |         |             | -     |
| Output Type                 | -              | -                                | HCMOS              |         |             | -     |
| Supply Voltage              | $V_{CC}$       | $\pm 10\%$                       | 1.5, 1.8, 2.5, 3.3 |         |             | V     |
| Current                     | $I_{CC}$       | 15pF Load                        | -                  | -       | 3.0         | mA    |
| Frequency Stability         | $\Delta f/f_o$ | See Ordering Information         | 20, 25, 50         |         |             | ppm   |
| Operating Temperature Range | $T_A$          | -                                | -10                | -       | +60         | °C    |
|                             |                |                                  | -20                | -       | +70         |       |
|                             |                |                                  | -40                | -       | +85         |       |
| Load Capacitance            | $C_L$          | CMOS                             | -                  | 15      | -           | pF    |
| Output Voltage Levels       |                |                                  |                    |         |             |       |
| Logic '1' Level             | $V_{OH}$       | CMOS Load                        | $0.9V_{CC}$        | -       | -           | V     |
| Logic '0' Level             | $V_{OL}$       | CMOS Load                        | -                  | -       | $0.1V_{CC}$ |       |
| Rise and Fall Time          | $T_r, T_f$     | -                                | -                  | 50      | 200         | ns    |
| Output Duty Cycle           | SYM            | @ 50% Level                      | 45                 | -       | 55          | %     |
| Start-up Time               | $T_S$          | Application of $V_{CC}$          | -                  | 5.0     | 10          | ms    |
| Enable Function             |                |                                  |                    |         |             |       |
| Enable Input Voltage        | $V_{IH}$       | Pin 1 Logic '1', Output Enabled  | $0.7V_{CC}$        | -       | -           | V     |
| Disable Input Voltage       | $V_{IL}$       | Pin 1 Logic '0', Output Disabled | -                  | -       | $0.3V_{CC}$ |       |
| Aging                       | $\Delta f/f_o$ | @ +25°C, 1st year                | -                  | 3.0     | 5.0         | ± ppm |
| Storage Temperature Range   | $T_{STR}$      | -                                | -55                | -       | +125        | °C    |

## MECHANICAL SPECIFICATIONS

### TC50 PACKAGE DRAWING



### MARKING INFORMATION

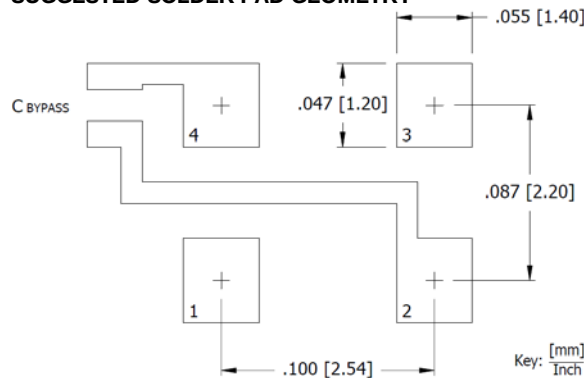
- TC50 – CTS Model Series.
- v – Voltage code.  
[L=3.3V, N=2.5V, M=1.8V, V=1.5V]
- – Pin 1 identifier.
- YYWW – Date code, YY – year, WW – week.

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°C maximum, 20 seconds.
- MSL = 1.

### SUGGESTED SOLDER PAD GEOMETRY



$C_{BYPASS}$  should be  $\geq 0.01 \mu F$ .

### PIN ASSIGNMENTS

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