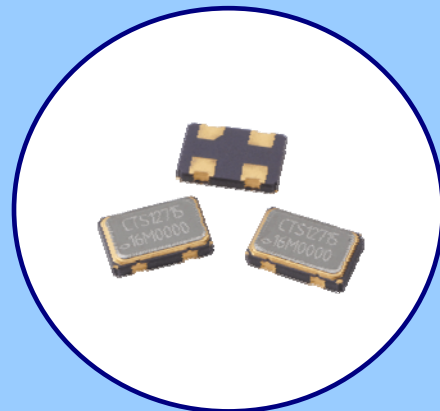


### FEATURES

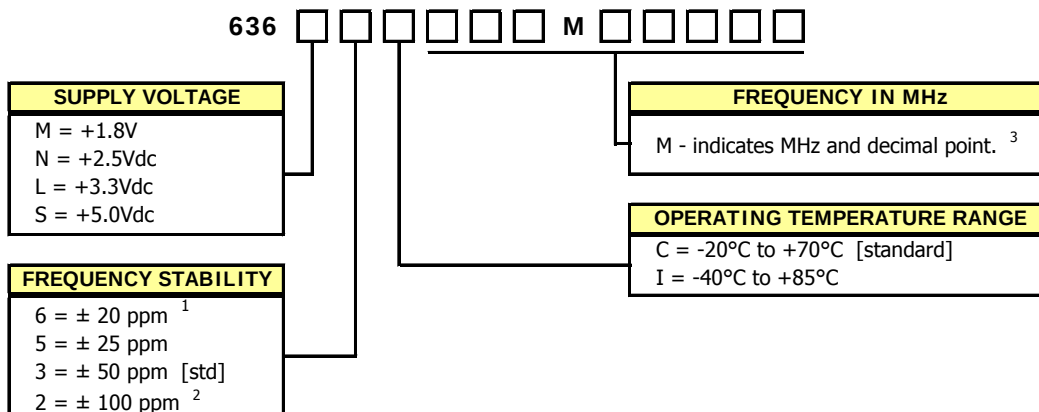
- Standard 5.0mm x 3.2mm 4-Pad Surface Mount Package
- HCMOS/TTL Compatible Output
- Fundamental and 3<sup>rd</sup> Overtone Crystal Designs
- Frequency Range 1 – 160 MHz
- Frequency Stability  $\pm 50$  ppm Standard,  $\pm 25$  ppm and  $\pm 20$  ppm Available
- Operating Voltages +1.8Vdc, +2.5Vdc, +3.3Vdc or +5.0Vdc
- Operating Temperature to -40°C to +85°C
- Output Enable Standard
- Tape & Reel Packaging Standard, EIA-418
- **RoHS/Green Compliant [6/6]**



### APPLICATIONS

Model 636 is ideal for applications; such as digital video, networking equipment, broadband access, Ethernet/Gigabit Ethernet, microprocessors/DSP/FPGA, storage area networks, computers and peripherals, cameras and other portable devices to name a few.

### ORDERING INFORMATION



1] Consult factory for 6I Stability/Temperature availability.

2] -40°C to +85°C Only.

3] Frequency is recorded with three leading significant digits before the 'M' and 5 significant digits after the 'M' (including zeros).

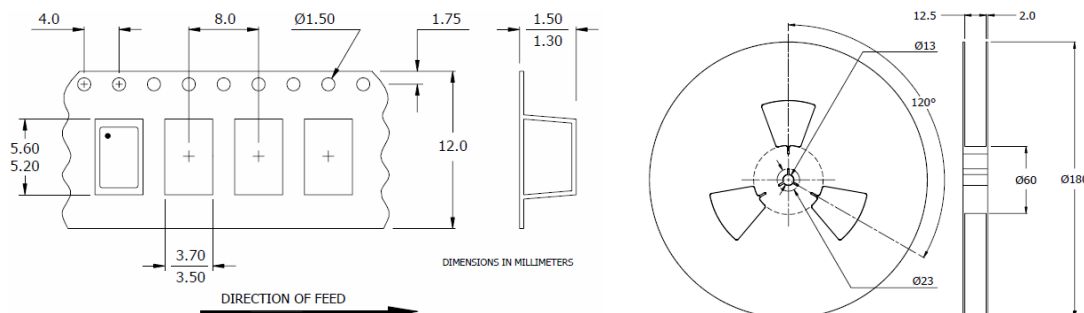
[Ex. 3.579545 MHz, code as 003M57954; 14.31818 MHz, code as 014M31818; 125 MHz, code as 125M00000]

**Not all performance combinations and frequencies may be available.**

**Contact your local CTS Representative or CTS Customer Service for availability.**

### PACKAGING INFORMATION [Reference]

Factory may package reels in quantities of 1k pcs. or 3k pcs. Reel size is 180mm. **12mm tape width.**



**ELECTRICAL CHARACTERISTICS**

| ELECTRICAL PARAMETERS | PARAMETER                                                                | SYMBOL         | CONDITIONS                                                                                                                                 | MIN                          | TYP                        | MAX                                | UNIT     |
|-----------------------|--------------------------------------------------------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|----------------------------|------------------------------------|----------|
|                       | Maximum Supply Voltage                                                   | $V_{CC}$       | -                                                                                                                                          | -0.5                         | -                          | 7.0                                | V        |
|                       | Storage Temperature                                                      | $T_{STG}$      | -                                                                                                                                          | -55                          | -                          | 125                                | °C       |
|                       | Frequency Range                                                          | $f_0$          | -                                                                                                                                          | 1.0                          | -                          | 160                                | MHz      |
|                       | Frequency Stability<br>[See Note 1 and Ordering Information]             | $\Delta f/f_0$ | -                                                                                                                                          | -                            | -                          | 20, 25, 50 or 100                  | ± ppm    |
|                       | Aging                                                                    | $\Delta f/f_0$ | -                                                                                                                                          | -                            | -                          | 3                                  | ± ppm/yr |
|                       | Operating Temperature<br>Commercial<br>Industrial                        | $T_A$          | -                                                                                                                                          | -20<br>-40                   | 25                         | 70<br>85                           | °C       |
|                       | Supply Voltage<br>Model 636M<br>Model 636N<br>Model 636L<br>Model 636S   | $V_{CC}$       | ± 10 %                                                                                                                                     | 1.62<br>2.25<br>2.97<br>4.50 | 1.8<br>2.5<br>3.3<br>5.0   | 1.98<br>2.75<br>3.63<br>5.50       | V        |
|                       | Supply Current<br>Model 636M<br>[+1.8V]                                  | $I_{CC}$       | $C_L = 15pF$<br>1.0 MHz to 34.999 MHz<br>35 MHz to 60 MHz<br>60.001 MHz to 99.999 MHz<br>100 MHz to 106.250 MHz<br>106.251 MHz to 160 MHz  | -<br>-<br>-<br>-<br>-<br>-   | -<br>-<br>-<br>-<br>-<br>- | 8<br>15<br>25<br>35<br>35<br>35    | mA       |
|                       | Model 636N<br>[+2.5V]                                                    |                | 1.0 MHz to 34.999 MHz<br>35 MHz to 60 MHz<br>60.001 MHz to 99.999 MHz<br>100 MHz to 106.250 MHz<br>106.251 MHz to 160 MHz                  | -<br>-<br>-<br>-<br>-        | -<br>-<br>-<br>-<br>-      | 10<br>20<br>30<br>40<br>40         |          |
|                       | Model 636L<br>[+3.3V]                                                    |                | 1.0 MHz to 34.999 MHz<br>35 MHz to 60 MHz<br>60.001 MHz to 99.999 MHz<br>100 MHz to 106.250 MHz<br>106.251 MHz to 160 MHz                  | -<br>-<br>-<br>-<br>-        | -<br>-<br>-<br>-<br>-      | 16<br>25<br>40<br>50<br>50         |          |
|                       | Model 636S<br>[+5.0]                                                     |                | 1.0 MHz to 34.999 MHz<br>35 MHz to 60 MHz<br>60.001 MHz to 99.999 MHz<br>100 MHz to 106.250 MHz                                            | -<br>-<br>-<br>-             | -<br>-<br>-<br>-           | 25<br>50<br>60<br>80               |          |
|                       | Output Load<br>Model 636M<br>Model 636N & 636L<br>Model 636S             |                | 1.0 MHz to 160 MHz<br>1.0 MHz to 50 MHz<br>50.001 MHz to 160 MHz<br>1.0 MHz to 50 MHz<br>50.001 MHz to 80 MHz<br>80.001 MHz to 106.250 MHz | -<br>-<br>-<br>-<br>-<br>-   | -<br>-<br>-<br>-<br>-<br>- | 15<br>30<br>15<br>50<br>30<br>15   |          |
|                       | Output Voltage Levels<br>Logic '1' Level<br>Logic '0' Level              |                | $V_{OH}$ CMOS Load<br>$V_{OL}$ CMOS Load                                                                                                   | 90% $V_{CC}$<br>-            | -<br>-                     | -<br>10% $V_{CC}$                  |          |
|                       | Output Current<br>Logic '1' Level (M,N,L,S)<br>Logic '0' Level (M,N,L,S) |                | $I_{OH}$ $V_{OH} = 90\%V_{CC}$<br>$I_{OL}$ $V_{OL} = 10\%V_{CC}$                                                                           | -<br>-                       | -<br>-                     | -2, -4, -8, -16<br>+2, +4, +8, +16 |          |
|                       | Output Duty Cycle                                                        |                | SYM @ 50% Level                                                                                                                            | 45                           | -                          | 55                                 |          |
|                       | Rise and Fall Time<br>Model 636M, 636N & 636L                            |                | @ 10% - 90% Levels, $C_L = 15pF$<br>1.0 MHz to 50 MHz<br>50.001 MHz to 125 MHz<br>125.001 MHz to 160 MHz                                   | -<br>-<br>-                  | 6<br>3<br>1.5              | 10<br>5<br>2.5                     |          |
|                       | Model 636S                                                               |                | 1.0 MHz to 20 MHz<br>20.001 MHz to 50 MHz<br>50.001 MHz to 106.250 MHz                                                                     | -<br>-<br>-                  | 6<br>3<br>1.5              | 8<br>5<br>2                        |          |
|                       | Start Up Time                                                            |                | $T_S$ Application of $V_{CC}$                                                                                                              | -                            | 5                          | 10                                 |          |
|                       | Period Jitter, Pk-Pk                                                     |                | -                                                                                                                                          | -                            | -                          | 100                                |          |
|                       | Period Jitter, RMS                                                       |                | -                                                                                                                                          | -                            | -                          | 25                                 |          |
|                       | Phase Jitter, RMS                                                        |                | -                                                                                                                                          | -                            | -                          | 1                                  |          |
|                       |                                                                          |                | Bandwidth 12 kHz - 20 MHz                                                                                                                  | -                            | -                          |                                    |          |

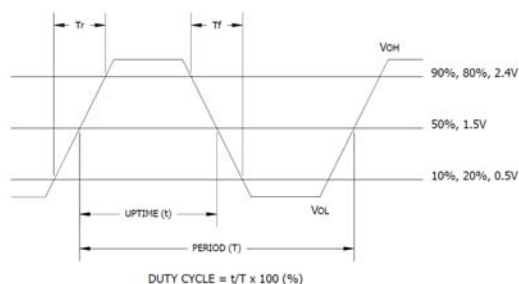
Notes:

1. Inclusive of initial tolerance at time of shipment, changes in supply voltage, load, temperature and aging.

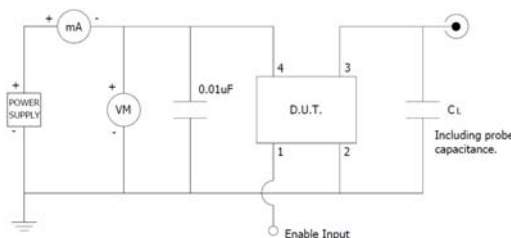
## ELECTRICAL CHARACTERISTICS

|                       | PARAMETER                | SYMBOL    | CONDITIONS                       | MIN  | TYP | MAX | UNIT    |
|-----------------------|--------------------------|-----------|----------------------------------|------|-----|-----|---------|
| ELECTRICAL PARAMETERS | Enable Function          |           |                                  |      |     |     |         |
|                       | Enable Input Voltage     |           |                                  |      |     |     |         |
|                       | Model 636M               | $V_{IH}$  | Pin 1 Logic '1', Output Enabled  | 1.26 | -   | -   | V       |
|                       | Model 636N               |           | Pin 1 Logic '1', Output Enabled  | 1.75 | -   | -   |         |
|                       | Model 636L               |           | Pin 1 Logic '1', Output Enabled  | 2.0  | -   | -   |         |
|                       | Model 636S               |           | Pin 1 Logic '1', Output Enabled  | 4.0  | -   | -   |         |
|                       | Disable Input Voltage    |           |                                  |      |     |     |         |
|                       | Model 636M, 636N, 636L   | $V_{IL}$  | Pin 1 Logic '0', Output Disabled | -    | -   | 0.3 |         |
|                       | Model 636S               |           | Pin 1 Logic '0', Output Disabled | -    | -   | 0.8 |         |
|                       | Enable Time (M, N, L, S) | $T_{PLZ}$ | Pin 1 Logic '1'                  | -    | -   | 10  | ms      |
|                       | Standby Current          | $I_{ST}$  | Pin 1 Logic '0', Output Disabled | -    | -   | 10  | $\mu A$ |

### LVC MOS OUTPUT WAVEFORM



### TEST CIRCUIT, CMOS LOAD

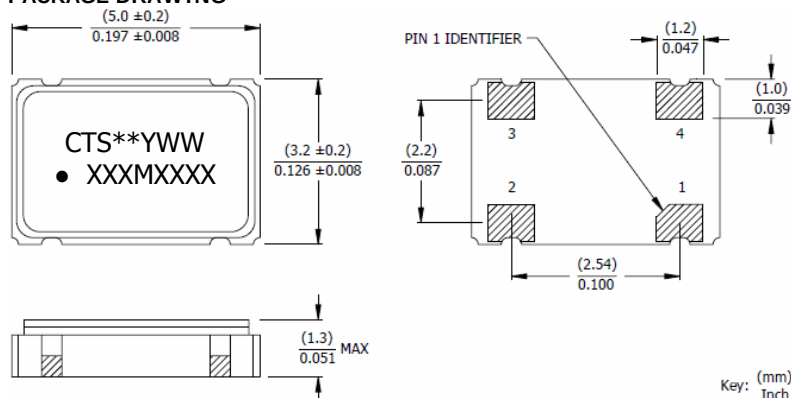


### ENABLE TRUTH TABLE

| PIN 1     | PIN 3     |
|-----------|-----------|
| Logic '1' | Output    |
| Open      | Output    |
| Logic '0' | High Imp. |

## MECHANICAL SPECIFICATIONS

### PACKAGE DRAWING



### MARKING INFORMATION

- \*\* - Manufacturing Site Code.
- YWW - Date code, Y - year, WW - week.
- XXXMXXXX - Frequency is marked with only leading significant digits before the 'M' and 4 digits after the 'M' [including zeros].  
Ex. XXXMXXXX [62M5000]  
XXXMXXXX [155M5200]

### 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.

### D.U.T. PIN ASSIGNMENTS

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

### SUGGESTED SOLDER PAD GEOMETRY

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

