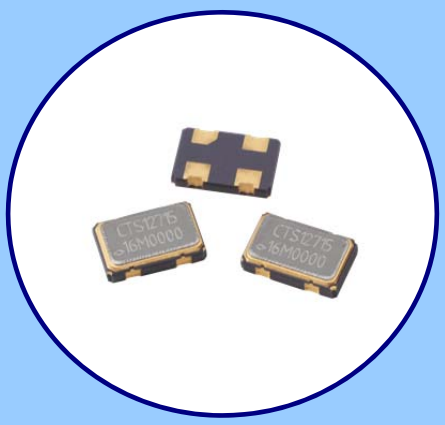
Model 636

HCMOS/TTL Clock Oscillator

FEATURES

- **Standard 5.0mm x 3.2mm 4-Pad Surface Mount Package**
- **HCMOS/TTL Compatible Output**
- **Fundamental and 3rd Overtone Crystal Designs**
- Frequency Range 1 – 160MHz
- Frequency Stability ±50ppm Standard, ±25ppm and ±20ppm 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

636 □ □ □ □ □ □ M □ □ □ □ □

SUPPLY VOLTAGE
- M = +1.8V
- N = +2.5Vdc
- L = +3.3Vdc
- S = +5.0Vdc

FREQUENCY STABILITY
- 6 = ± 20 ppm [1]
- 5 = ± 25 ppm
- 3 = ± 50 ppm [std]
- 2 = ± 100 ppm [2]

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

OPERATING TEMPERATURE RANGE
- C = -20°C to +70°C [standard]
- I = -40°C to +85°C

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

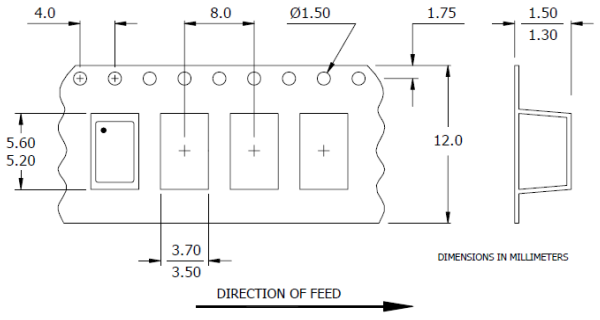
2] -40°C to +85°C Only.

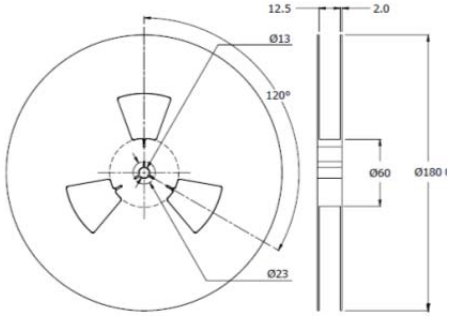
3] Frequency is recorded with three leading significant digits before the 'M' and 5 significant digits after the 'M' (including zeros).
[Ex. 3.579545 MHz, code as 003M57954; 14.31818 MHz, code as 014M31818; 125 MHz, code as 125M00000]

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

	PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
ELECTRICAL PARAMETERS	Maximum Supply Voltage	V_{CC}	-	-0.5	-	7.0	V
	Storage Temperature	T_{STG}	-	-55	-	125	°C
	Frequency Range	f_O	-	1.0	-	160	MHz
	Frequency Stability [See Note 1and Ordering Information]	$\Delta f/f_O$	-	-	-	20,25, 50 or 100	±ppm
	Aging	$\Delta f/f_O$	-	-	-	3	±ppm/yr
	Operating Temperature Commercial Industrial	T_A	-	 -20 -40	 25	 70 85	°C
	Supply Voltage Model 636M Model 636N Model 636L Model 636S	V_{CC}	± 10 %	 1.62 2.25 2.97 4.50	 1.8 2.5 3.3 5.0	 1.98 2.75 3.63 5.50	V
	Supply Current Model 636M [+18V]	I_{CC}	C_L = 15pF 1.0MHz to 34.999MHz 35MHz to 60MHz 60.001MHz to 99.999MHz 100MHz to 106.250MHz 106.251MHz to 160MHz	 - - - - -	 - - - - -	 5 12 18 20 30	mA
	Model 636N [+2.5V]		1.0MHz to 34.999MHz 35MHz to 60MHz 60.001MHz to 99.999MHz 100MHz to 106.250MHz 106.251MHz to 160MHz	- - - - -	- - - - -	5 18 25 30 35	
	Model 636L [+3.3V]		1.0MHz to 34.999MHz 35MHz to 60MHz 60.001MHz to 99.999MHz 100MHz to 106.250MHz 106.251MHz to 160MHz	- - - - -	- - - - -	6 20 30 35 40	
	Model 636S [+5.0]		1.0MHz to 34.999MHz 35MHz to 60MHz 60.001MHz to 99.999MHz 100MHz to 106.250MHz	- - - -	- - - -	12 30 45 50	
	Output Load Model 636M	C_L	 1.0MHz to 160MHz	 -	 -	 15	pF
	Model 636N & 636L		1.0MHz to 50MHz 50.001MHz to 160MHz	- 	- 	30 15	
	Model 636S		1.0MHz to 50MHz 50.001MHz to 80MHz 80.001MHz to 106.250MHz	-	-	50 30 15	
	Output Voltage Levels Logic '1' Level Logic '0' Level	 V_{OH} V_{OL}	 CMOS Load CMOS Load	 90%V_{CC} -	 - -	 - 10%V_{CC}	V
	Output Current Logic '1' Level [M,N,L,S] Logic '0' Level [M,N,L,S]	 I_{OH} I_{OL}	 V_{OH} = 90%V_{CC} V_{OL} = 10%V_{CC}	 - -	 - -	 -2, -4, -8, -16 +2, +4, +8, +16	mA
	Output Duty Cycle	SYM	@ 50% Level	45	-	55	%
	Rise and Fall Time Model 636M, 636N & 636L	T_R, T_F	@ 10% - 90% Levels, C_L = 15pF 1.0MHz to 50MHz 50.001MHz to 125MHz 125.001MHz to 160MHz	 - - -	 - - -	 5 4 2	ns
	Model 636S		1.0MHz to 20MHz 20.001MHz to 50MHz 50.001MHz to 106.250MHz	- - -	- - -	5 4 2	
	Start Up Time	T_S	Application of V_{CC}	-	-	3	ms
	Period Jitter, Pk-Pk	pjpk-pk	-	-	-	50	ps
	Period Jitter, RMS	pjrms	-	-	-	12	
	Phase Jitter, RMS	tjrms	Bandwidth 12kHz - 20MHz	-	0.5	1	

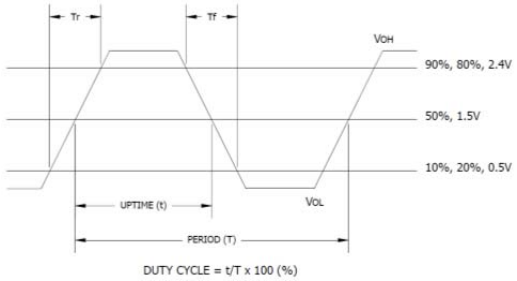
Notes:

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

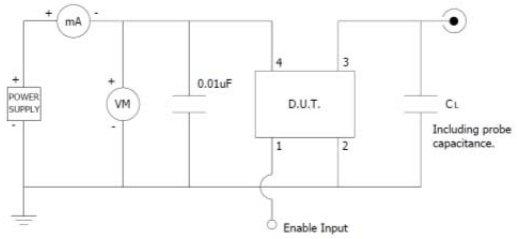
ELECTRICAL CHARACTERISTICS

	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	µA

LVCMOS OUTPUT WAVEFORM



TEST CIRCUIT, CMOS LOAD

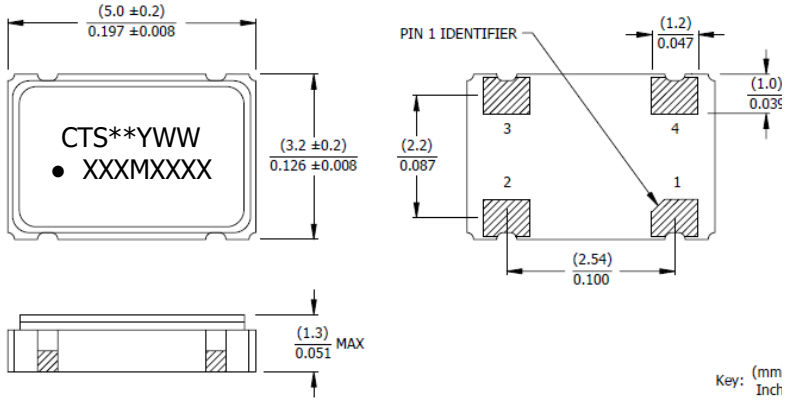


ENABLE TRUTH TABLE

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

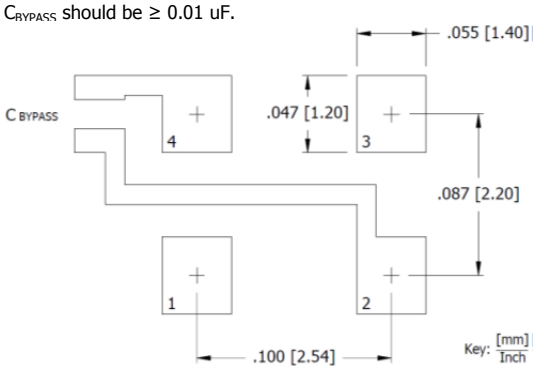
MECHANICAL SPECIFICATIONS

PACKAGE DRAWING



SUGGESTED SOLDER PAD GEOMETRY

C_{BYPASS} should be ≥ 0.01 uF.



MARKING INFORMATION

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

NOTES

1. JEDEC termination code (e4). Barrier-plating is nickel [Ni] with gold [Au] flash plate.
2. Reflow conditions per JEDEC J-STD-020, +260°C maximum, 20 seconds.
3. 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