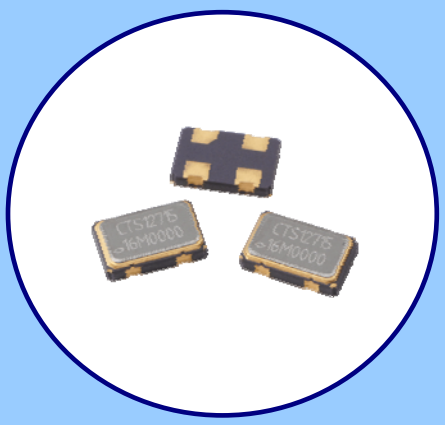
Model 636

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 – 160 MHz
- Frequency Stability ±50 ppm Standard, ±25 ppm and ±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 Available
- **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 IN MHz
M - indicates MHz and decimal point. [2]

OPERATING TEMPERATURE RANGE
C = -20°C to +70°C (standard)
I = -40°C to +85°C

FREQUENCY STABILITY
6 = ± 20 ppm [1]
5 = ± 25 ppm
3 = ± 50 ppm [standard]
2 = ± 100 ppm [-40°C to +85°C Only]

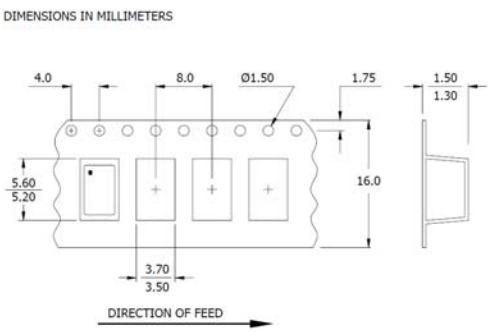
1] 6I Stability/Temperature combination is not available.

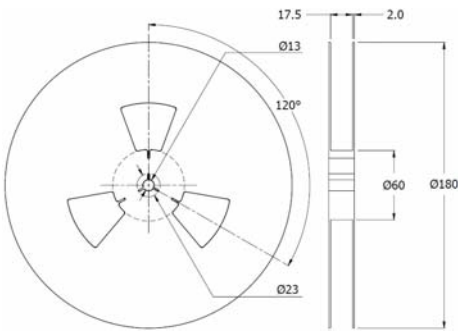
2] Frequency is recorded with three leading significant digits before the 'M' and 5 significant digits after the 'M' (including zeros).
[Ex. XXXMXXXXX, (0004M00000 (014M31818) (125M00000)]

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

PACKAGING INFORMATION

Device quantity is 3,000 pieces maximum per reel.





ELECTRICAL CHARACTERISTICS

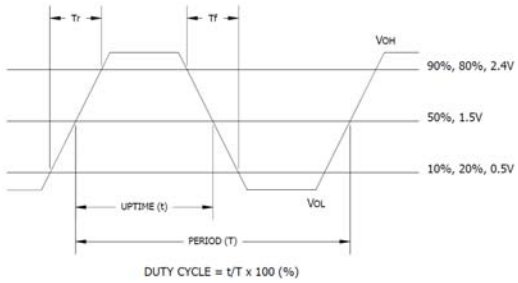
	PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
ELECTRICAL PARAMETERS	Maximum Supply Voltage	V_{CC}	-	-0.5	-	7.0	V
	Storage Temperature	T_{STG}	-	-55	-	125	°C
	Frequency Range	f_O	-	1.0	-	160	MHz
	Frequency Stability [See Note 1 and Ordering Information]	$\Delta f/f_O$	-	-	-	20,25, 50 or 100	± ppm
	Aging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

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

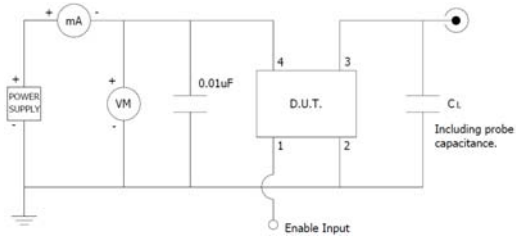
ELECTRICAL CHARACTERISTICS

	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

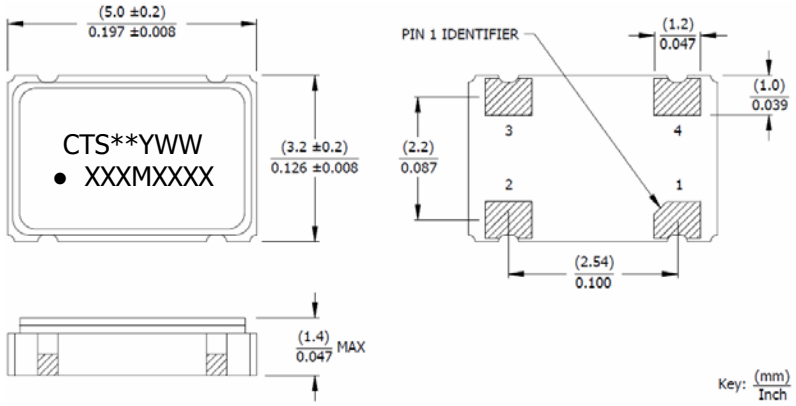


ENABLE TRUTH TABLE

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

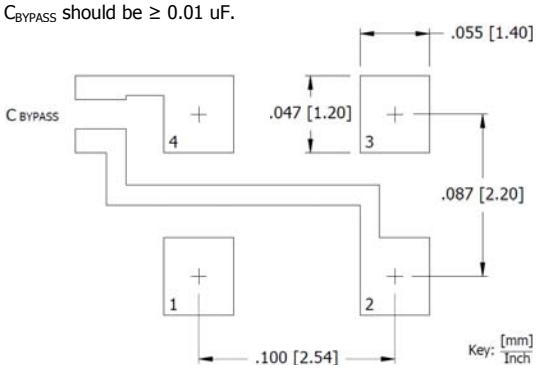
MECHANICAL SPECIFICATIONS

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. Termination pads (e4). Barrier-plating is nickel (Ni) with gold (Au) flash plate.
2. Reflow conditions per JEDEC J-STD-020, 260°C maximum.
3. Moisture Sensitivity Level 1 per JEDEC J-STD-020.

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

LifeElectronics
Живое партнерство

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