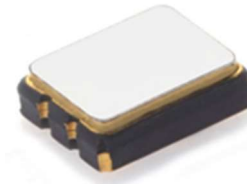




# Model 357 HCMOS VCXO

## Features

- Ceramic Surface Mount Package
- Low Phase Jitter Performance
- Fundamental Crystal Design
- Frequency Range 1.5 – 122.88MHz \*
- +3.3V or +5.0V Operation
- Output Enable Standard
- Tape and Reel Packaging, EIA-481



Part Dimensions:  
7.0 x 5.0 x 2.0mm • 178.462 mg

## Standard Frequencies

\* Check with factory for availability of uncommon frequencies.

## Applications

- Broadcast Video Systems
- Storage Area Networking
- Test and Measurement
- Ethernet/GbE/SyncE
- Broadband Access
- Phase-Locked Loop
- Networking Equipment
- Fiber Channel

## Description

CTS Model 357 is a low-cost, high-performance voltage-controlled oscillator supporting HCMOS output. M357 has excellent stability and low phase jitter performance.

## Ordering Information

Model	Supply Voltage	Absolute Pull Range	Frequency Stability	Temperature Range	Frequency Code
357	L	B	3	I	XXXMXXXX

Code	Voltage
L	+3.3V, Pin 2 Enable
S	+5.0V, Pin 2 Enable
V	+3.3V, Pin 5 Enable
W	+5.0V, Pin 5 Enable

Code	Stability
3	±50ppm
5	±25ppm
6	±20ppm <sup>1</sup>

Code	Frequency
Product Frequency Code <sup>2</sup>	

Code	APR
B	±50ppm
C	±80ppm
D	±100ppm <sup>3</sup>

Code	Temp. Range
C	-20°C to +70°C
I	-40°C to +85°C

Notes:

- 1] Only available with "C" temperature range.
- 2] Frequency is recorded with 3 leading digits before and 4 significant digits after the "M" [including zeroes].  
[Ex. 3.579545MHz = 003M5795; 14.31818MHz = 014M3181; 25MHz = 025M0000; 125MHz = 125M0000]
- 3] Consult factory for availability.

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

This product is specified for use only in standard commercial applications. Supplier disclaims all express and implied warranties and liability in connection with any use of this product in any non-commercial applications or in any application that may expose the product to conditions that are outside of the tolerances provided in its specification.



## Electrical Specifications

### Operating Conditions

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Maximum Supply Voltage	V <sub>CC</sub>	-	-0.5	-	7.0	V
Maximum Control Voltage	V <sub>C</sub>	-	-0.5	-	V <sub>CC</sub>	V
Supply Voltage	V <sub>CC</sub>	±10%	2.97 4.5	3.3 5.0	3.63 5.5	V
Supply Current		Typical @ C <sub>L</sub> = 15 pF, V <sub>CC</sub> = +3.3V, T <sub>A</sub> = +25°C				
		1.5MHz to <20MHz	-	5	20	
	I <sub>CC</sub>	20MHz to <40MHz	-	8	30	mA
		40MHz to <60MHz	-	10	40	
		60MHz to 122.88MHz	-	12	45	
Output Load	C <sub>L</sub>	-	-	-	15	pF
Operating Temperature	T <sub>A</sub>	-	-20 -40	+25	+70 +85	°C
Storage Temperature	T <sub>STG</sub>	-	-55	-	+125	°C

### Frequency Stability

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Frequency Range	f <sub>0</sub>	-		1.5 - 122.88		MHz
Frequency Stability [Note 1]	Δf/f <sub>0</sub>	±20ppm stability, -20°C to +70°C only		20, 25, or 50		±ppm
Absolute Pull Range [Note 2]	APR	-	50, 80, 100	-	-	±ppm
Aging	Δf/f <sub>25</sub>	First Year @ +25°C, nominal V <sub>CC</sub> and V <sub>C</sub>	-3	-	3	ppm

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

2.] Minimum guaranteed frequency shift from f<sub>0</sub> over variations in temperature, aging, power supply and load.

### Output Parameters

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Output Type	-	-		HCMOS		-
Output Voltage Levels	V <sub>OH</sub> V <sub>OL</sub>	Logic '1' Level, CMOS Load Logic '0' Level, CMOS Load	0.9V <sub>CC</sub> -	- -	- 0.1V <sub>CC</sub>	V
Output Duty Cycle	SYM	@ 50% Level	45	-	55	%
Rise and Fall Time	T <sub>R</sub> , T <sub>F</sub>	@ 10%/90% Levels	-	3.5	5.0	ns
Start Up Time	T <sub>S</sub>	Application of V <sub>CC</sub>	-	-	10	ms
Enable Function		Standby				
Enable Input Voltage	V <sub>IH</sub>	Pin 2 or Pin 5 Logic '1', Output Enabled	0.7V <sub>CC</sub>	-	-	V
Disable Input Voltage	V <sub>IL</sub>	Pin 2 or Pin 5 Logic '0', Output Standby	-	-	0.3V <sub>CC</sub>	V
Standby Current	I <sub>STB</sub>	Pin 2 or Pin 5 Logic '0', Output Standby	-	-	10	μA
Enable Time	T <sub>PLZ</sub>	Pin 2 or Pin 5 Logic '1'	-	-	2	ms
Phase Jitter, RMS	t <sub>jrms</sub>	Bandwidth 12kHz - 20MHz	-	0.5	1	ps
Phase Noise	-	See Typical Plots	-	-	-	-

## Electrical Specifications

### Control Voltage

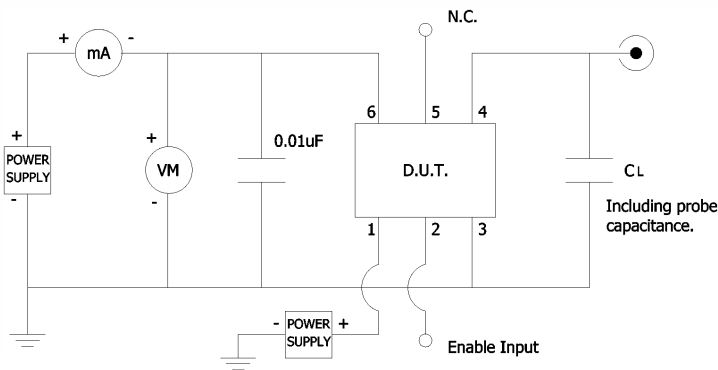
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Control Voltage	$V_c$	$V_{CC} = +3.3V$	0.30	1.65	3.00	V
		$V_{CC} = +5.0V$	0.50	2.50	4.50	V
Frequency Deviation	$\Delta f/f_0$	25°C at Time of Shipment, over $V_c$ range		135		ppm
Linearity	L	Best Straight Line Fit	-	5	10	%
Gain Transfer	$K_v$	Pull Sensitivity; @ +1.65V, +25°C	-	65	-	ppm/V
Input Impedance	$Z_{Vc}$	-	100	-	-	kOhms
Modulation Roll-off	-	@ -3dB	10	-	-	kHz
Transfer Function	-	-		Positive		-

### Enable Truth Table

Pin 2	Pin 4
Logic '1'	Output Enabled
Open	Output Enabled
Logic '0'	Output Disabled, High Impedance

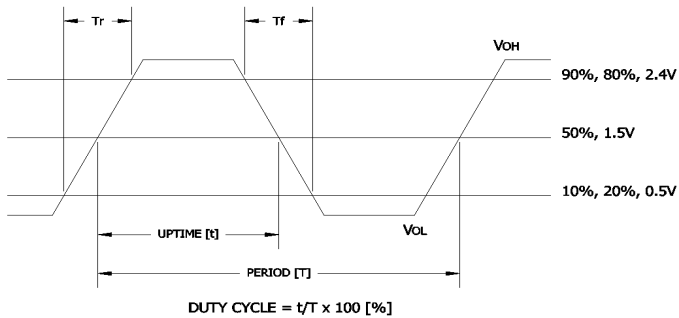
### Test Circuit

HCMOS



### Output Waveform

HCMOS

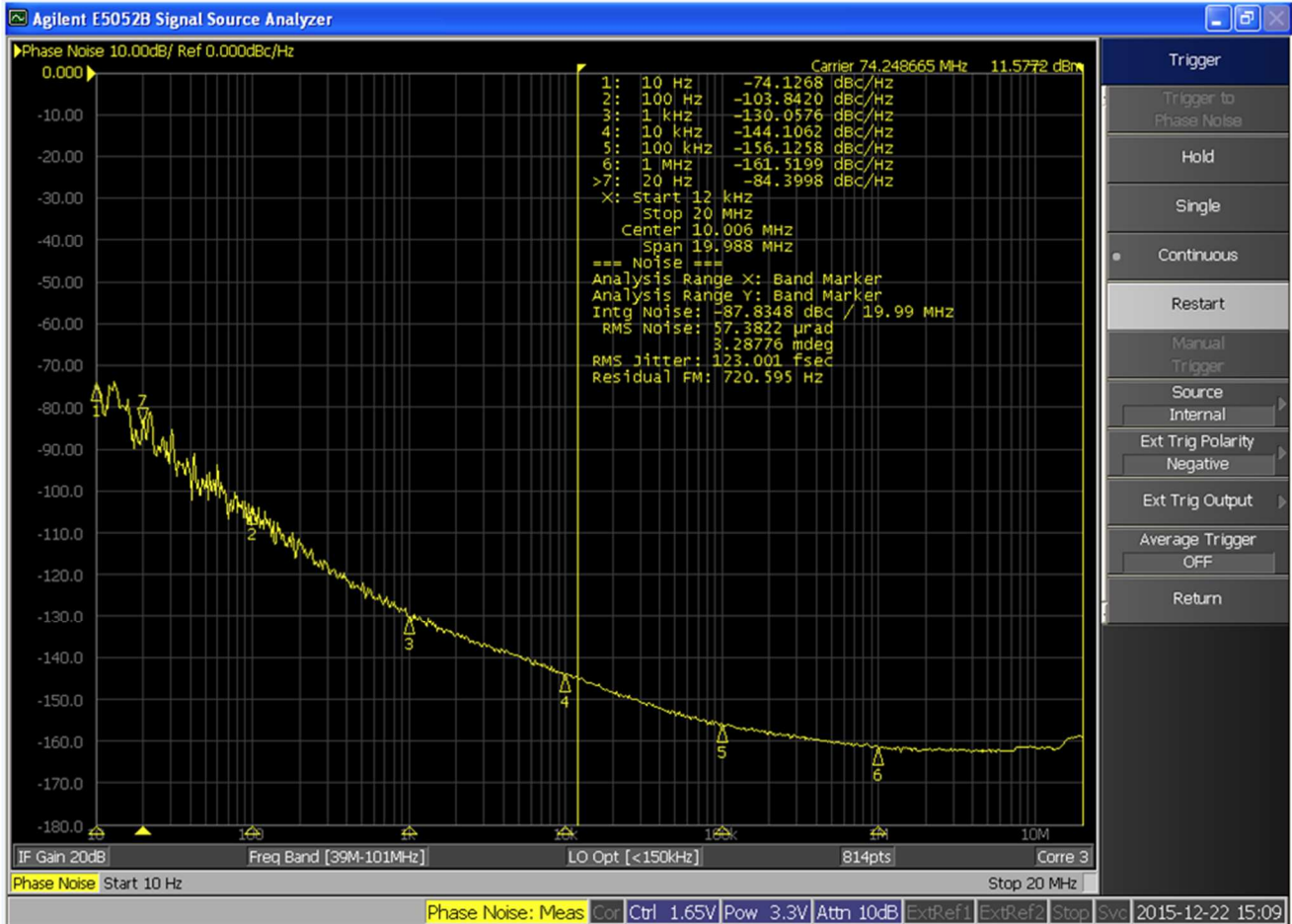


## Electrical Specifications

### Performance Data

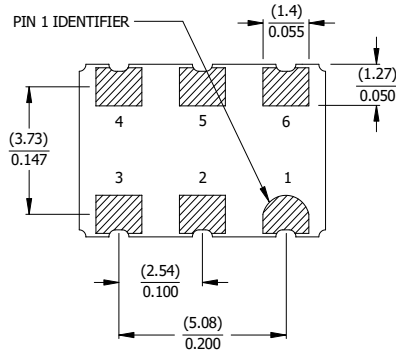
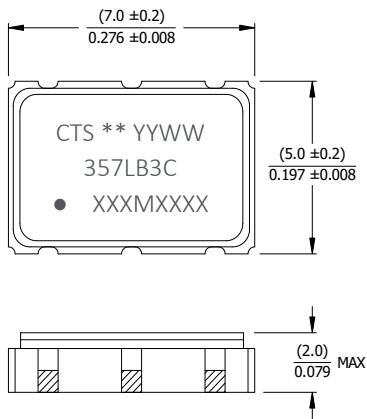
#### Phase Noise [typical]

74.25MHz, HCMOS,  $V_{CC} = +3.3V$ ,  $V_C = +1.65V$ ,  $T_A = +25^\circ C$



## Mechanical Specifications

### Package Drawing

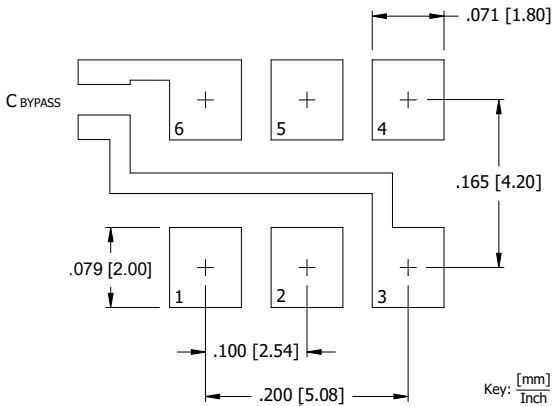


Key:  $\frac{(\text{mm})}{\text{Inch}}$

### Marking Information

- \*\* - Manufacturing Site Code.
- YYWW – Date code, YY – year, WW – week.
- Truncated CTS part number.
- XXXMXXXX - Frequency marked with 4 significant digits after the 'M'.

### Recommended Pad Layout



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

### Notes

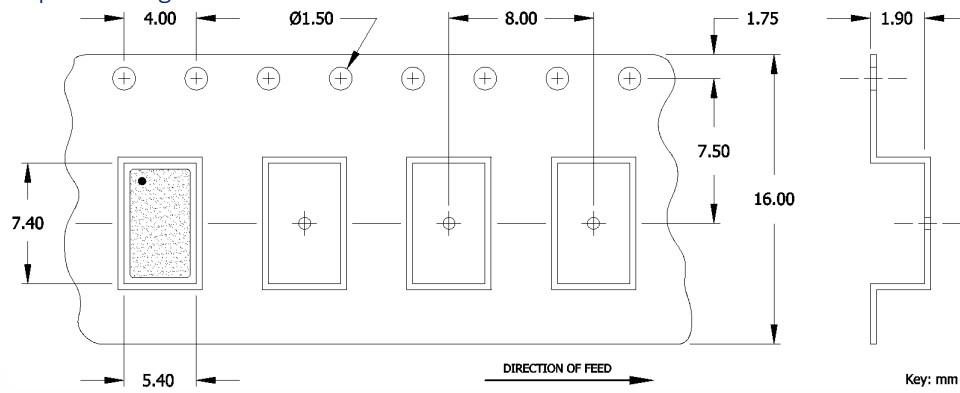
- JEDEC termination code (e4). Barrier-plating is nickel [Ni] with gold [Au] flash plate.
- Reflow conditions per JEDEC J-STD-020; +260°C maximum, 20 seconds.
- MSL = 1.

### Pin Assignments

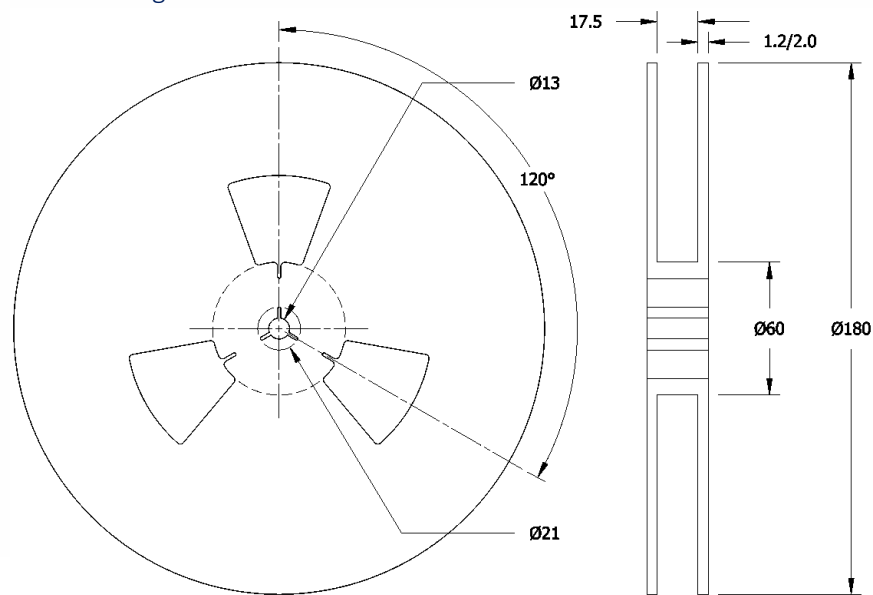
Pin	Symbol	Function
1	$V_C$	Voltage Control
2	EOH	Enable [standby]
3	GND	Circuit & Package Ground
4	Output	RF Output
5	N.C.	No Connect
6	$V_{CC}$	Supply Voltage

### Packaging - Tape and Reel

#### Tape Drawing



#### Reel Drawing



#### Notes

1. Device quantity is 1k pieces maximum per 180mm reel.
2. Complete CTS part number, frequency value and date code information must appear on reel and carton labels.

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Authorized Distributor

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