Model CA70
AUTOMOTIVE GRADE HCMOS CLOCK
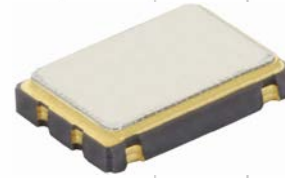
Features

- AEC-Q200 Compliant
- Ceramic Surface Mount Package
- Operating Temperature Ranges to -55°C to +125°C
- Fundamental and 3rd Overtone Crystal Designs
- Frequency Range 1.25 – 156.25MHz
- +1.8V, +2.5V, +3.3V Operation; +5.0V Limited Availability
- Output Enable Standard
- Tape and Reel Packaging, EIA-418

Part Dimensions:
7.0 × 5.0 × 1.8mm • 160.7885mg

Standard Frequencies

* See Page 6 for common frequencies.
Check with factory for availability of frequencies not listed and for +5.0V operation.

Applications

- Automotive Electronics
- Mobile Multimedia/Infotainment
- Audio/Video Systems
- Wireless Communication
- Medical Electronics
- Commercial Military & Aerospace

Description

CTS Model CA70 is a low cost, small size, Clock Oscillator [XO] developed for use in automotive electronics operating over extended temperature ranges. CA70 has an HCMOS/TTL compatible output, offers excellent stability and low jitter/phase noise performance.

Ordering Information

Model	Output Type	Frequency Code [MHz]	Frequency Stability	Temperature Range	Supply Voltage	Packaging
CA 70	C	XXX or XXXX	3	G	3	T

Code	Package Size
70	7.0x5.0mm

Code	Frequency
	Product Frequency Code [1]

Code	Temp. Range
I	-40°C to +85°C [2]
G	-40°C to +105°C [3]
H	-40°C to +125°C [4]
N	-40°C to +150°C [5]
P	-55°C to +105°C [5]
M	-55°C to +125°C [5]

Code	Packing
T	1k pcs./reel

Code	Output
C	HCMOS

Code	Stability
5	±25ppm
4	±30ppm
3	±50ppm
2	±100ppm
7	±150ppm

Code	Voltage
M	+1.8Vdc
N	+2.5Vdc
L	+3.3Vdc
S	+5.0Vdc

Notes:
1] Refer to document 016-1454-0, Frequency Code Tables. 3-digits for frequencies <100MHz, 4-digits for frequencies 100MHz or greater.
2] Available with all stability codes.
3] Available with stability codes 4, 3, 2 and 7.
4] Available with stability codes 3, 2 and 7.
5] Stability codes 2 and 7. Contact factory for availability. Not available with voltage code "S".

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

Electrical Specifications

Operating Conditions

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Maximum Supply Voltage	V_{CC}	V_{CC} +1.8V to +3.3V	-0.5	-	4.0	V
Supply Voltage	V_{CC}	±5%	1.710	1.8	1.890	V
			2.375	2.5	2.665	
			3.135	3.3	3.465	
			4.750	5.0	5.250	
Supply Current	I_{CC}	Typical @ Nominal Vcc, C_L = 15 pF, T_A = +25°C				mA
		@ +1.8V	-	15	25	
		@ +2.5V	-	20	30	
		@ +3.3V	-	35	40	
		@ +5.0V	-	35	55	
Output Load	C_L	-	-	-	15	pF
Operating Temperature	T_A	-	-40	+25	+85	°C
			-40		+105	
			-40		+125	
			-40		+150	
			-55		+105	
			-55		+125	
Storage Temperature	T_{STG}	-	-55	-	+125	°C

Frequency Stability

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Frequency Range	f_O	-		1.25 - 156.25		MHz
Frequency Stability [Note 1]	$\Delta f/f_O$	-		25, 30, 50, 100 or 150		±ppm
Aging	$\Delta f/f_{25}$	First Year @ +25°C, nominal V_{CC}	-5	-	5	ppm

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

Output Parameters

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Output Type	-	-		HCMOS		-
Output Voltage Levels	V_{OH}	Logic '1' Level, CMOS Load	$0.9V_{CC}$	-	-	V
	V_{OL}	Logic '0' Level, CMOS Load	-	-	$0.1V_{CC}$	
Output Current Levels	I_{OH}	V_{OH} = 90%V_{CC} [1.8V, 2.5V, 3.3V, 5.0V]	-	-	-4, -4, -8, -16	mA
	I_{OL}	V_{OL} = 10%V_{CC} [1.8V, 2.5V, 3.3V, 5.0V]	-	-	+4, +4, +8, +16	
Output Duty Cycle	SYM	@ 50% Level	45	-	55	%
Rise and Fall Time [Note 2]	T_R, T_F	@ 10%/90% Levels, Nominal V_{CC}, C_L = 15pF				ns
		@ +1.8V	-	4	5	
		@ +2.5V	-	4	5	
		@ +3.3V	-	7	10	
		@ +5.0V	-	7	10	
Start Up Time	T_S	Application of V_{CC}	-	2	5	ms

2.] Parameters are worst case and account for comprehensive range of product specification. Performance may vary by application and must be validated by end user.
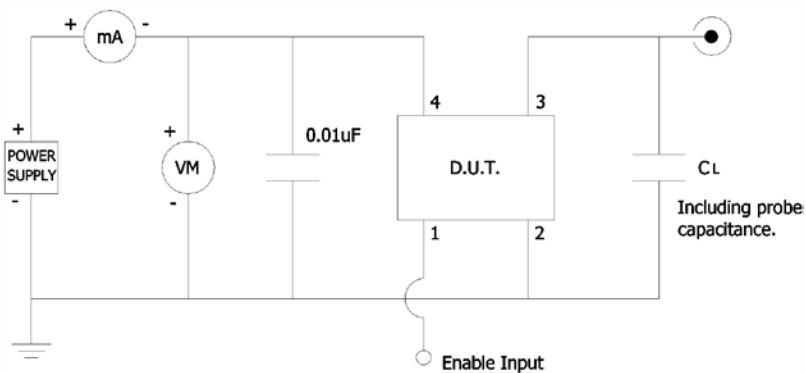
Electrical Specifications

Output Parameters

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Enable Function		Standby				
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 Standby	-	-	$0.3V_{CC}$	V
Enable Current	I_{STB}	Pin 1 Logic '0', Output Standby	-	-	10	µA
Enable Time	T_{PLZ}	Pin 1 Logic '1'	-	-	5	ms
Phase Jitter, RMS	tjrms	Bandwidth 12 kHz - 20 MHz	-	0.5	< 1	ps

Enable Truth Table

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

Test Circuit
HCMOS

Output Waveform
HCMOS
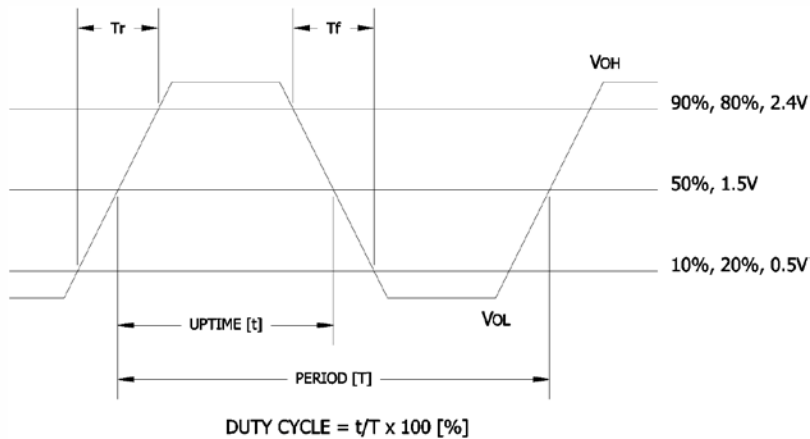
Mechanical Specifications

Package Drawing

CTS**YYWW
CA70STV
● XXXX

7.00 ±0.15
5.00 ±0.15
1.40 Max.

1.40
1.20
2.60
5.08

Key: mm

Recommended Pad Layout

C BYPASS

1.8
2.0
4.20
5.08

Key: mm

Pin Assignments

Pin	Symbol	Function
1	EOH	Enable
2	GND	Circuit & Package
3	Output	RF Output
4	V$_{CC}$	Supply Voltage
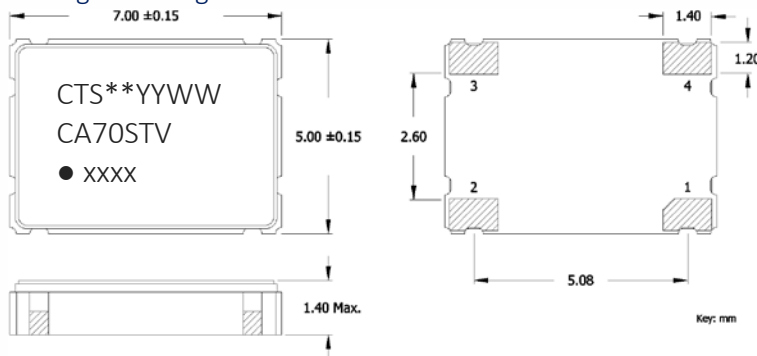
Marking Information

1. ** – Manufacturing Site Code.
2. YYWW – Date Code, YY = year, WW = week.
3. CA70 – CTS model.
4. ST – Frequency stability/temperature code.
   [Refer to Ordering Information]
5. V – Voltage code. M = 1.8V, N = 2.5V, L = 3.3V, S = 5.0V.
3. ● – Pin 1 identifier.
4. xxxx – Frequency Code; 3-digits for frequencies <100MHz, 4-digits for frequencies 100MHz or greater.

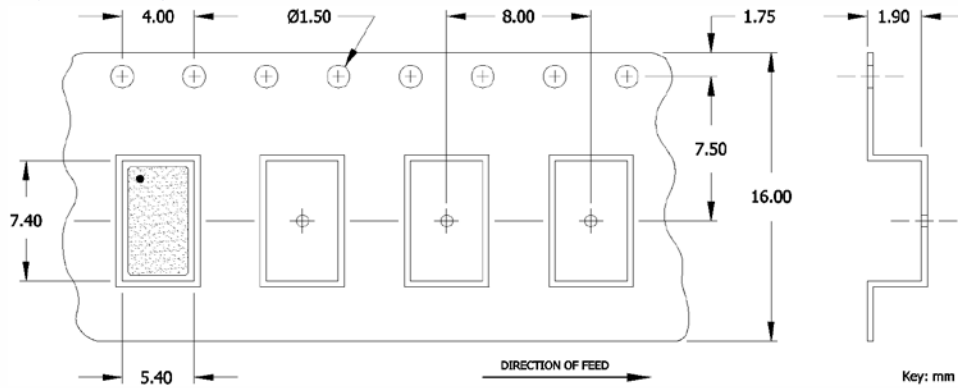[See document 016-1454-0, Frequency Code Tables.]
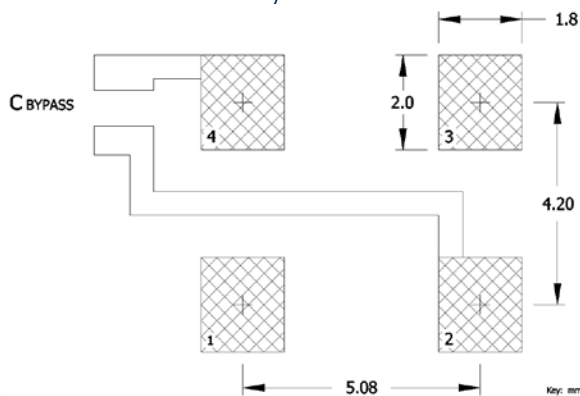
Notes

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, 20 seconds.
3. MSL = 1.

Packaging - Tape and Reel
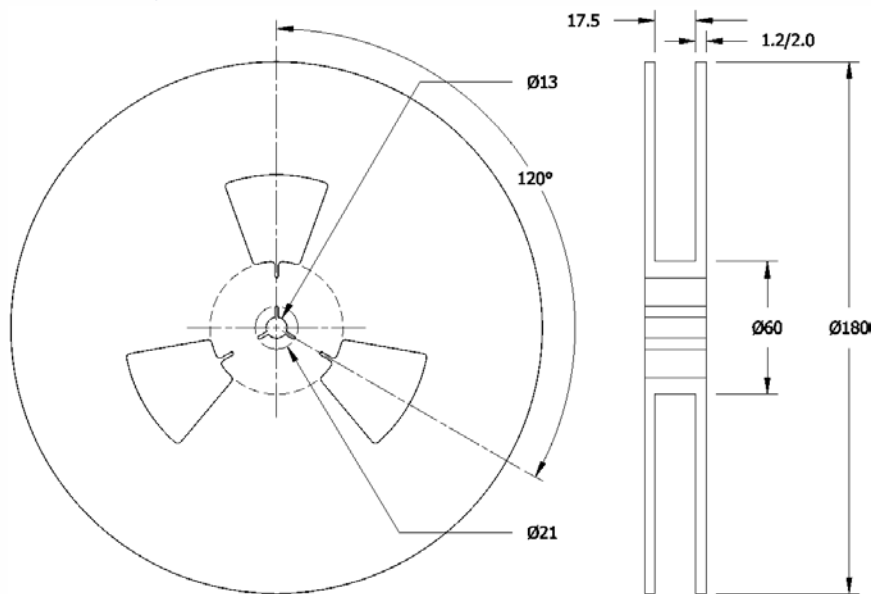
Tape Drawing

DIRECTION OF FEED

Key: mm

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.

Addendum

Common Frequencies Available – MHz

FREQUENCY	FREQUENCY CODE	FREQUENCY	FREQUENCY CODE	FREQUENCY	FREQUENCY CODE	FREQUENCY	FREQUENCY CODE
4.000000	040	24.000000	240	40.000000	400		
8.000000	080	24.576000	24C	48.000000	480		
10.000000	100	25.000000	250	50.000000	500		
12.000000	120	26.000000	260	100.000000	1000		
12.288000	122	27.000000	270	125.000000	1250		
14.318180	143	30.000000	300	156.250000	1562		
14.745600	147	32.000000	320				
16.000000	160	33.333000	33E				
20.000000	200	37.400000	374				
22.118400	221	38.400000	384				

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

CTS:

CA70C24C3HMT CA70C24C4GNT CA70C24C7PNT CA70C2502MNT CA70C2507PLT CA70C2602MLT
CA70C2602NNT CA70C2605IMT CA70C2607MLT CA70C2702GLT CA70C2702NNT CA70C2707PMT
CA70C3003GMT CA70C3003INT CA70C3005INT CA70C3007NNT CA70C3203HMT CA70C12502PNT
CA70C12503GNT CA70C12505IMT CA70C1432HLT CA70C1432MLT CA70C1437MLT CA70C1472NLT
CA70C15622PMT CA70C1603HMT CA70C1603HNT CA70C1607MNT CA70C2002NLT CA70C1474IMT
CA70C1477PLT CA70C1477PNT CA70C15625IMT CA70C1602GMT CA70C2007PLT CA70C2212PLT
CA70C2402GMT CA70C2402GNT CA70C2407HNT CA70C24C3IMT CA70C24C3INT CA70C24C7NLT
CA70C2502PLT CA70C2504IMT CA70C2603GLT CA70C3004ILT CA70C3004INT CA70C3007PNT
CA70C3202PNT CA70C33E2HLT CA70C33E2HMT CA70C3842PMT CA70C3845ILT CA70C4003ILT
CA70C4007MMT CA70C4804GMT CA70C4807PMT CA70C5002PMT CA70C5005ILT CA70C5005IMT
CA70C3742HLT CA70C3747HLT CA70C3747MLT CA70C3842HNT CA70C3842MMT CA70C3843INT
CA70C3847MNT CA70C4803GNT CA70C4807HNT CA70C5002MLT CA70C3202NNT CA70C3203HLT
CA70C33E2GNT CA70C33E4ILT CA70C3742HNT CA70C3745ILT CA70C3842GMT CA70C3843GNT
CA70C3844GNT CA70C4007PLT CA70C4802NNT CA70C2217NNT CA70C2217PMT CA70C2405INT
CA70C2503GLT CA70C2504GNT CA70C2507NMT CA70C2607MNT CA70C2703HLT CA70C3002HNT
CA70C3002MMT CA70C3005ILT CA70C3007NLT CA70C3202NMT CA70C3202PLT CA70C33E2GMT
CA70C33E2NMT CA70C33E7HLT CA70C3742MLT CA70C3742PMT