

Model TT32

HCMOS TCXO @ 32.768kHz



Features

- 32.768kHz Frequency Reference
- Low Power Consumption, 3.7uA Maximum @ +3.3V
- Ceramic Surface Mount Package
- Fundamental Crystal Design
- +1.8V, +2.5V, +3.0V or +3.3V Operating Voltage
- Stability ±5ppm
- Operating Temperature Range -40°C to +85°C
- Tape and Reel Packaging, EIA-481

Part Dimensions:
3.28 x 2.50 x 1.40mm • 22.66mg

Applications

▪ Real Time Clock Reference	▪ GPS Receivers	▪ Industrial Controls & Automation
▪ Smart Metering	▪ Data Loggers	▪ Wireless Communications
▪ Portable Electronics	▪ Telematics	▪ Medical Devices
▪ Timing Synchronization	▪ Battery Powered Applications	▪ IoT

Description

CTS Model TT32 is a low cost, small size, HCMOS Temperature Compensated Crystal Oscillator [TCXO] operating at 32.768kHz. Employing IC technology that delivers low current consumption, TT32 provides a Real Time Clock reference with excellent stability and low phase noise/jitter performance.

Ordering Information

Model	Supply Voltage	Frequency Code [MHz]	Frequency Stability ¹	Temperature Range	Frequency Tuning	Packaging
TT32	L	327K	50	I	T	R
	Code Voltage		Code Stability		Code Frequency Deviation	
	M +1.8Vdc		50 ±5.0ppm		T TCXO [No Voltage Control]	
	N +2.5Vdc					
	R +3.0Vdc					
	L +3.3Vdc					
		Code Frequency		Code Temp. Range		Code Packing
		Frequency = 32.768kHz		I -40°C to +85°C		R 3k pcs./reel

Notes:

1] Frequency vs. Temperature only.

**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 _{CC}	-	-0.5	-	4.0	V
			1.71	1.8	1.89	
Supply Voltage	V _{CC}	±5%	2.38	2.5	2.63	V
			2.85	3.0	3.15	
			3.14	3.3	3.47	
Supply Current	I _{CC}	V _{CC} = +3.3V	-	2.0	3.7	uA
Output Load	C _L	-	-	-	15	pF
Operating Temperature	T _A	-	-40	+25	+85	°C
Storage Temperature	T _{STG}	-	-55	-	+125	°C

Frequency Stability

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Frequency	f ₀	-		32.768		kHz
Frequency Stability						
Initial Calibration		Calibration @ +25°C, At Time of Shipment	-1.5	-	1.5	ppm
Temperature Only	Δf/f ₂₅	-40°C to +85°C	-5.0	-	5.0	ppm
Voltage Coefficient	Δf/f ₂₅	Supply Voltage, ±5%	-0.2	-	0.2	ppm
Load Coefficient	Δf/f ₂₅	Load, ±10%	-0.2	-	0.2	ppm
Reflow Shift	Δf/f ₂₅	1 Reflow Measured After 24 Hours	-1.0	-	1.0	ppm
Aging	Δf/f ₂₅	1st Year, @ +25°C and Nominal V _{CC}	-3.0	-	3.0	ppm
Timing Error	f ₀ @ +25°C	Error Over Time	±0.432sec/day; ±12.960sec/month; ±2.628min/year			

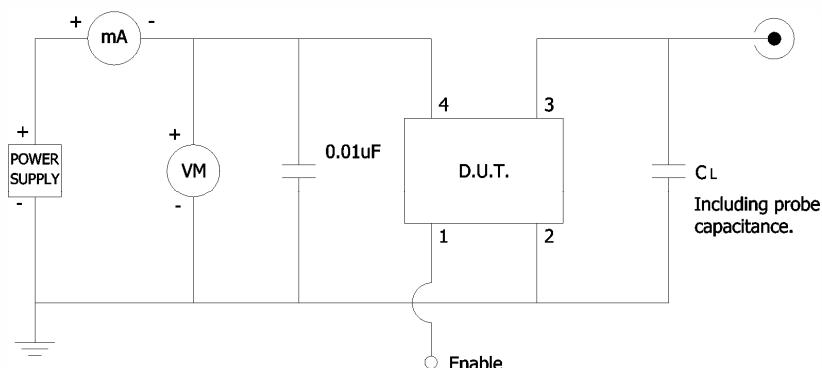
Output Parameters

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Output Type	-	-		HCMOS		-
Output Voltage Levels	V _{OH} V _{OL}	Logic '1' Level, CMOS Load Logic '0' Level, CMOS Load	V _{CC} -0.4 -	- -	- 0.4	V
Output Duty Cycle	SYM	@ 50% Level	40	-	60	%
Rise and Fall Time	T _R , T _F	@ 20%/80% Levels	-	-	100	ns
Start Up Time	T _S	@ +25°C Over -40°C to +85°C	-	-	1 3	sec
Enable Function						
Enable Input Voltage	V _{IH}	Pin 1 Logic '1', Output Enabled	0.8V _{CC}	-	-	V
Disable Input Voltage	V _{IL}	Pin 1 Logic '0', Output Disabled	-	-	0.2V _{CC}	V
Disable Current	I _{STB}	Pin 1 Logic '0', Output Disabled	-	1	-	µA
Enable Time	T _{PLZ}	Pin 1 Logic '1'	-	1	-	ms

Electrical Specifications

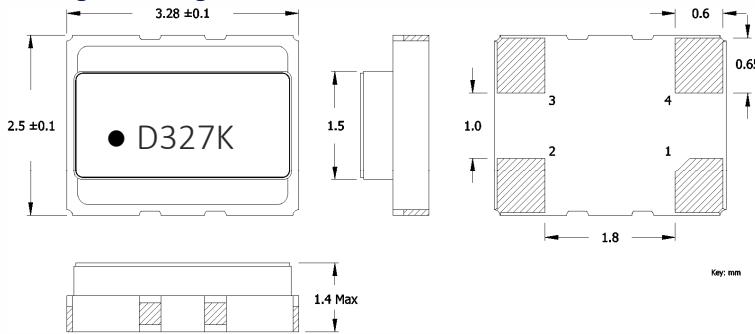
Test Circuit

HCMOS

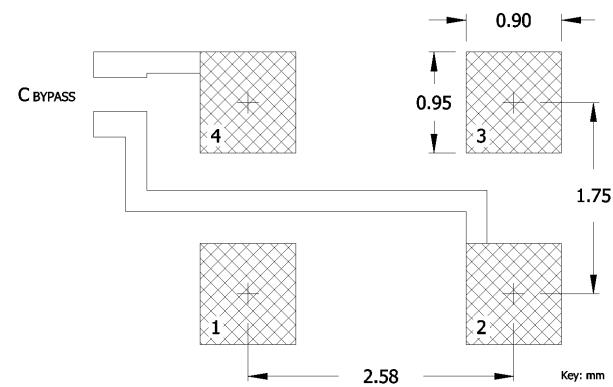


Mechanical Specifications

Package Drawing



Recommended Pad Layout



Marking Information

Option 1 - CTS Preferred

- – Pin 1 identifier.
- D – Date Code. See Table I for codes.
- 327K – Frequency Code, 327K = 32.768kHz.
[See document 016-1454-0, Frequency Code Tables.]



Option 2 - CTS Acceptable

- 32.768 – nominal frequency value.
- – Pin 1 identifier.
- KHz – frequency units of measure.



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.

Mechanical Specifications

Pin Assignments

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

Notes

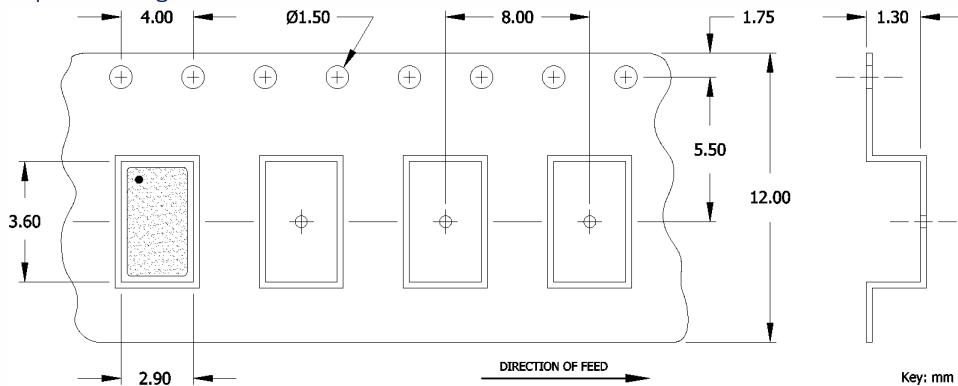
- DO NOT leave Pin 1 open.

Table I - Date Code, Beginning year 2021

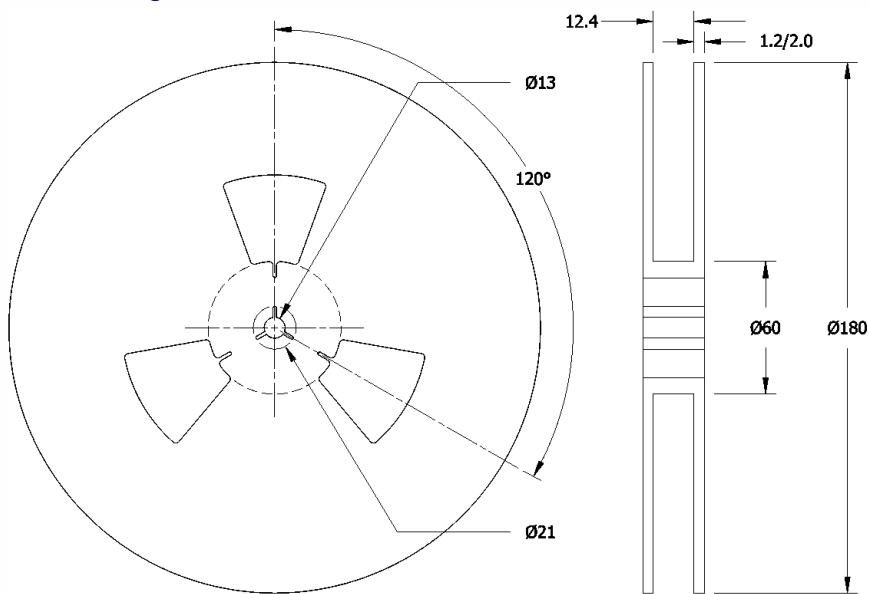
MONTH		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
YEAR													
2021	2025	2029	2033	2037	A	B	C	D	E	F	G	H	J
2022	2026	2030	2034	2038	N	P	Q	R	S	T	U	V	W
2023	2027	2031	2035	2039	a	b	c	d	e	f	g	h	j
2024	2028	2032	2036	2040	n	p	q	r	s	t	u	v	w
												x	y
													z

Packaging - Tape and Reel

Tape Drawing



Reel Drawing



Notes

1. Device quantity is 3k pieces per 180mm reel.
2. Complete CTS part number, frequency value and date code information must appear on reel and carton labels.

Mouser Electronics

Authorized Distributor

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

CTS:

[TT32N327K50ITR](#) [TT32M327K50ITR](#) [TT32L327K50ITR](#) [TT32R327K50ITR](#)