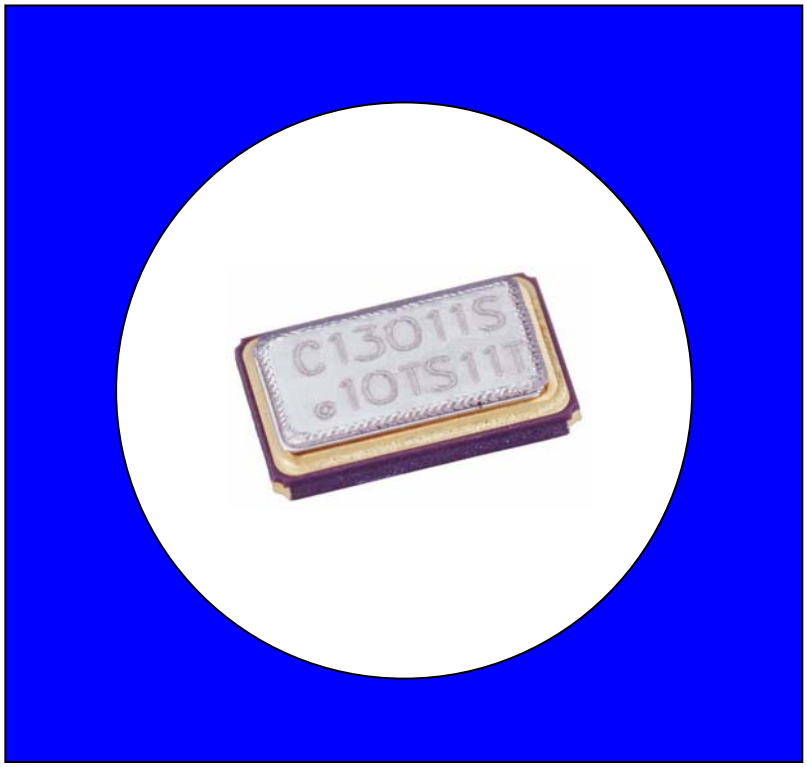
Model 532

Temperature Compensated Crystal Oscillator

FEATURES

- 5.0x3.2mm Surface Mount Footprint
- **Clipped Sinewave Output**
- Standard Frequencies;
  13 MHz, 16.8 MHz, 19.2 MHz, 19.44 MHz,
  19.68 MHz, 19.8 MHz, 26 MHz
- Frequency Stability ±2.5 ppm
- +2.7Vdc ~ +3.3Vdc Operation
- Optional Voltage Control for Frequency Tuning
- Operating Temperature –30°C to +85°C
- Tape & Reel Packaging
- **RoHS/Green Compliant (6/6)**



DESCRIPTION

The Model 532 is a Temperature Compensated Crystal Oscillator (TCXO) offering reduced size, low power consumption and enhanced frequency stability. The M532 is the perfect choice for today's compact or portable wireless communications applications that require tight frequency control.

ORDERING INFORMATION

532 □ □ □ □ □ □ M □ □ □ □

SUPPLY VOLTAGE
Y = +2.7Vdc
T = +2.8Vdc
R = +3.0Vdc
L = +3.3Vdc

FREQUENCY IN MHz
M - indicates MHz and decimal point. Frequency is recorded with minimum 4 significant digits to the right of the "M".

FREQUENCY STABILITY *
25 = ± 2.5 ppm
* Frequency vs. Temperature

AFC RANGE
S = ± 7 ppm to ± 16 ppm (V_C = 1.5Vdc ± 1.0Vdc)
T = TCXO (no AFC)

OPERATING TEMPERATURE RANGE
D = -30°C to +85°C

Consult factory for other options that may be available. Example Part Number: 532L25DS19M4400

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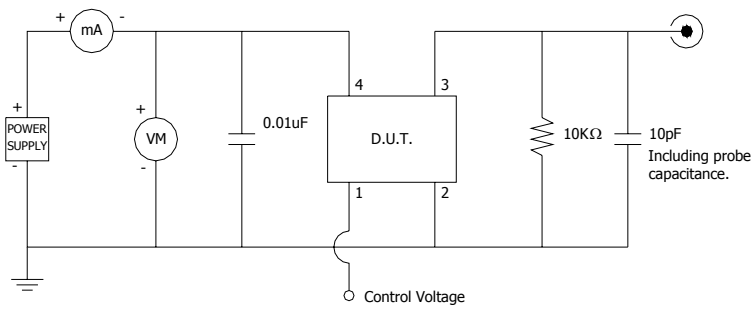
ELECTRICAL CHARACTERISTICS

	PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Absolute Maximums	Standard Frequencies	f_O	-	13, 16.8, 19.2, 19.44, 19.68, 19.8, 26			MHz
	Storage Temperature	T_{STG}	-	-40	-	85	°C
	Operating Temperature	T_A	-	-30		85	°C
	Frequency Stability						
	vs. Temperature	$\Delta f/f_O$	-30°C to 85°C	-	-	2.5	± ppm
	vs. Supply Voltage		5% change	-	-	0.2	
	vs. Load		10% change	-	-	0.3	
	vs. Aging		1st year	-	-	1.0	
	vs. Aging		10 year	-	-	8.0	
	Supply Voltage						
	Order Code 'Y'	V_{CC}	±5%	2.57	2.7	2.84	V
	Order Code 'T'			2.66	2.8	2.94	
	Order Code 'R'			2.85	3.0	3.15	
	Order Code 'L'			3.14	3.3	3.47	
	Supply Current	I_{CC}	-	-	-	2.5	mA
	Pulling Range, AFC	-	V_C = 1.5V ±1.0V	7 - 16			± ppm
Waveform Parameters	Output Load	R_L // C_L	-	10 kOhm // 10 pF			
	Control Voltage	V_C	-	0.5	1.5	2.5	V
	Output Voltage Levels	V_O	Clipped Sinewave	0.8	1.2	-	Vp-p
	V_C Input Impedance	Z_{VC}	-	1.0	-	-	MOhm
	Start Up Time	T_S	-	-	3	5	ms
	Harmonics	-	-	-	-	-5	dBc
	Phase Noise (Note 1)	-	Typical @ f_O = 13 MHz				dBc/Hz
			@100 Hz	-	-115	-	
			@1 kHz	-	-135	-	
			@10 kHz	-	-148	-	

Notes:

1. Phase Noise performance may vary based on output frequency.

TEST CIRCUIT, R_L / / C_L LOAD



D.U.T. PIN ASSIGNMENTS

PIN	SYMBOL	DESCRIPTION
1	V_C	Control Voltage *
2	GND	Circuit & Package Ground
3	Output	Clipped Sine Wave Output
4	V_{CC}	Supply Voltage

* If "No AFC" is selected, connect Pin 1 to ground.

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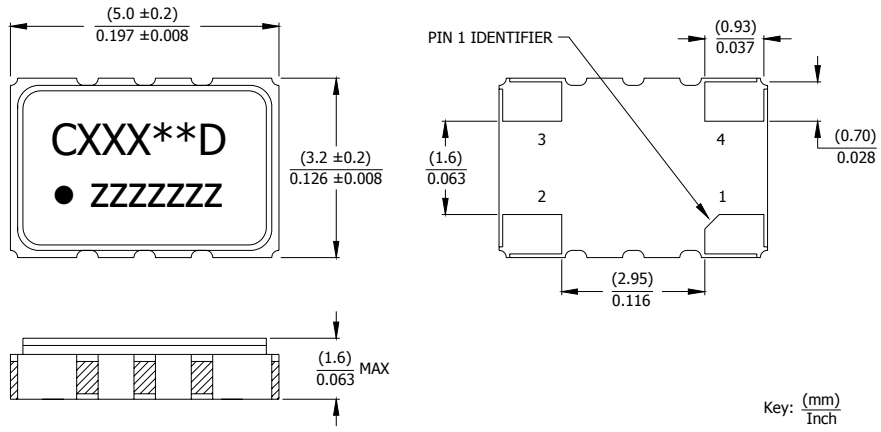
Model 532
5.0x3.2mm Ceramic Package
Clipped Sinewave TCXO

MECHANICAL SPECIFICATIONS

PACKAGE DRAWING



NOTES

1. DO NOT make connections to non-labeled pins. Castellation pins may have internal connections used in the manufacturing process.
2. Termination pads (e4), barrier-plating is nickel (Ni) with gold (Au) flash plate.
3. Reflow conditions per JEDEC J-STD-020.

MARKING INFORMATION

1. C – CTS.
2. XXX – Frequency code, see Table I for codes.
3. ** - Manufacturing Site code.
4. D – Date code, see Table II for codes.
5. ● – Pin 1 identifier.
6. zzzzzzz – Reference code used in manufacturing process.

TABLE I - FREQUENCY CODING

Not all frequency values may be available for this model family.
Consult factory for available frequencies.

FREQUENCY	MARKING CODE	FREQUENCY	MARKING CODE
10.000 MHz	100	19.680 MHz	196
10.240 MHz	102	19.800 MHz	198
12.000 MHz	120	19.998 MHz	199
12.800 MHz	128	20.000 MHz	200
13.000 MHz	130	20.480 MHz	204
13.500 MHz	135	24.000 MHz	240
14.400 MHz	144	25.000 MHz	250
15.360 MHz	153	26.000 MHz	260
16.000 MHz	160	32.000 MHz	320
16.800 MHz	168	32.512 MHz	325
18.000 MHz	180	32.768 MHz	327
19.200 MHz	192	38.880 MHz	388
19.440 MHz	194		

SUGGESTED SOLDER PAD GEOMETRY

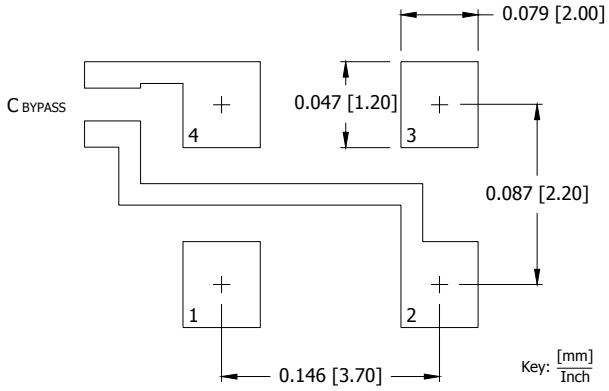


TABLE II – DATE CODE

YEAR \ MONTH					JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2001	2005	2009	2013	2017	A	B	C	D	E	F	G	H	J	K	L	M
2002	2006	2010	2014	2018	N	P	Q	R	S	T	U	V	W	X	Y	Z
2003	2007	2011	2015	2019	a	b	c	d	e	f	g	h	j	k	l	m
2004	2008	2012	2016	2020	n	p	q	r	s	t	u	v	w	x	y	z

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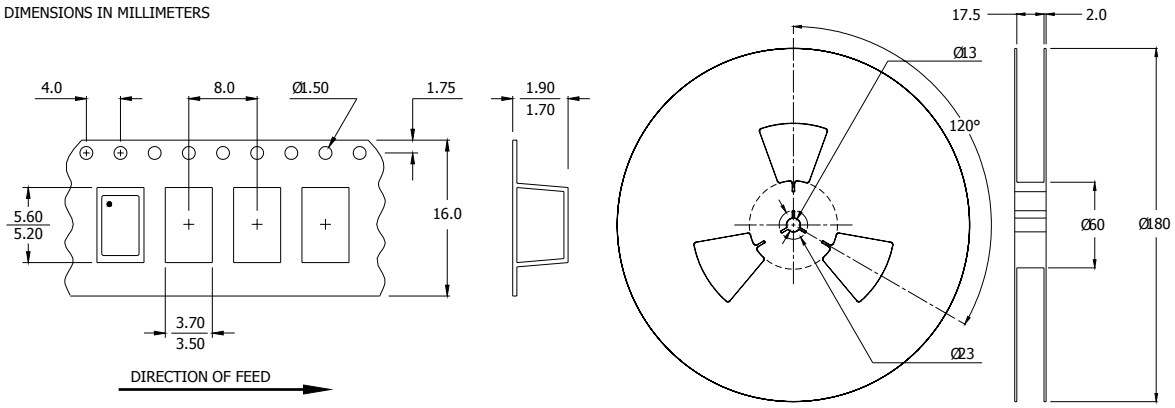
TAPE AND REEL INFORMATION



Device quantity is 1,000 pieces minimum per 180mm reel.

ENVIRONMENTAL SPECIFICATIONS

Temperature Cycle:	200 cycles from –55°C to +125°C, 10 minute dwell at each temperature, 1 minute transfer time between temperatures.
Mechanical Shock:	1,500g's, 0.5mS duration, ½ sinewave, 3 shocks each direction along 3 mutually perpendicular planes (18 total shocks).
Sinusoidal Vibration:	0.06 inches double amplitude, 10 to 55 Hz and 20g's, 55 to 2,000 Hz, 3 cycles each in 3 mutually perpendicular planes (9 times total).
Gross Leak:	No leak shall appear while immersed in an FC40 or equivalent liquid at +125°C for 20 seconds.
Fine Leak:	Mass spectrometer leak rates less than $2x10^{-8}$ ATM cc/sec air equivalent.
Resistance to Solder Heat:	Product must survive 3 reflows of +260°C peak, 10 seconds maximum.
Temperature and Humidity:	85°C, 85% R.H., full bias, 500 hours.
High Temperature Operating Bias:	2,000 hours at +125°C, maximum bias, disregarding frequency shift.
Frequency Aging:	1,000 hours at +85°C, full bias, less than ±1 ppm shift.
Moisture Sensitivity Level:	Level 1 per JEDEC J-STD-020.

QUALITY AND RELIABILITY

Quality systems meet or exceed the requirements of ISO 9000:2000 standards.