

## FEATURES

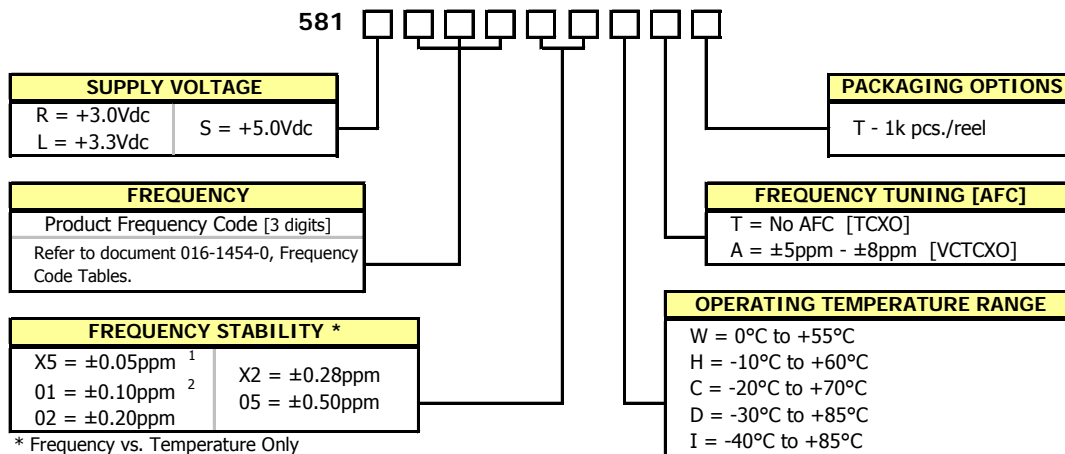
- HCMOS Output
- Optional Voltage Control for Frequency Tuning [VCTCXO]
- 5.0mm x 3.2mm Surface Mount Package
- Frequency Range 5 – 52 MHz
- Fundamental Crystal Design
- Operating Voltage, +3.3Vdc or +5.0Vdc
- Overall Frequency Stability  $\pm 4.6$ ppm
- Operating Temperature to -40°C to +85°C
- Tape & Reel Packaging Standard, EIA-418
- RoHS/Green Compliant [6/6]



## APPLICATIONS

The Model 581 is a quartz based analog TCXO with a HCMOS output and optional frequency tuning. M581 is suitable for applications requiring Stratum 3 performance such as base stations, small cells, 1588 and Synchronous Ethernet timing, wireless communications, test and measurement.

## ORDERING INFORMATION

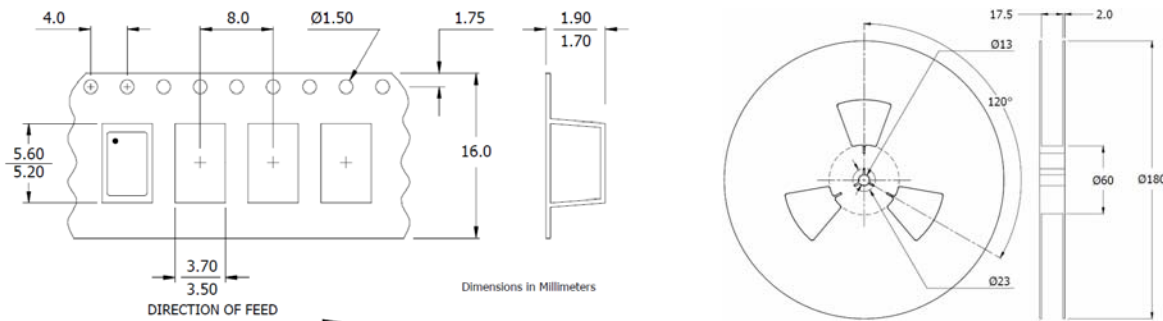


- 1] Only available with temperature range codes "W" and "H".  
2] Only available with temperature range codes "W", "H" and "C".

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

## PACKAGING INFORMATION [reference]

Device quantity is 1k pcs. maximum per 180mm reel.

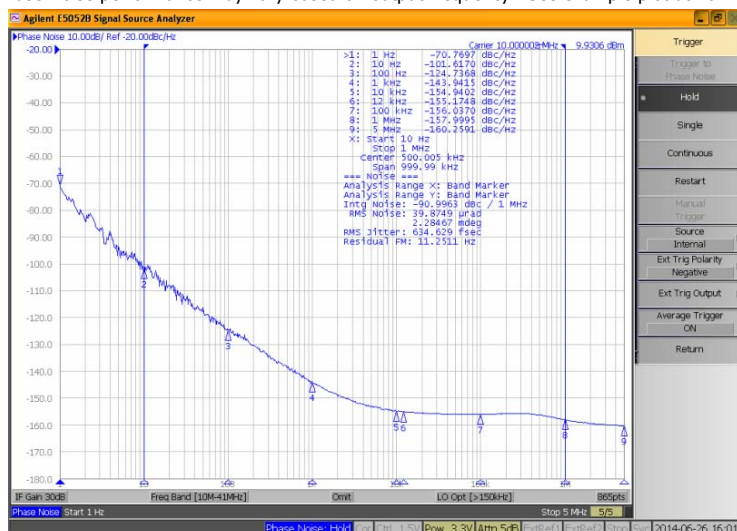


# ELECTRICAL CHARACTERISTICS

ELECTRICAL PARAMETERS	PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
	Maximum Supply Voltage	$V_{CC}$	-	-0.6	-	6.0	V
	Maximum Control Voltage	$V_C$	-	-0.5	-	$V_{CC}$	V
	Storage Temperature	$T_{STG}$	-	-40	-	+100	°C
	Operating Temperature	$T_A$	-	-20	+25	+70	°C
	Order Code 'C'			-40		+85	
	Order Code 'I'						
	Frequency Range	$f_O$	-	5	-	52	MHz
	Supply Voltage	$V_{CC}$	$\pm 5\%$	2.85	3.0	3.15	V
	Order Code 'R'			3.14	3.3	3.47	
	Order Code 'L'			4.75	5.0	5.25	
	Order Code 'S'						
	Supply Current	$I_{CC}$	-	-	-	6.0	mA
	Frequency Stability	$\Delta f/f_O$	Reference to $f_O$ , Including 20 years aging @ +25°C, at time of shipment	-	-	4.60	$\pm$ ppm
	Overall Frequency Stability			-	-	1.00	
	vs. Initial Calibration			-	-	0.28	
	vs. Operating Temperature <sup>1</sup>			-	-	0.20	
	vs. Supply Voltage			-	-	0.20	
	vs. Load			-	-	3.00	
	vs. Aging	$\Delta f/f_{25}$	$\pm 5\%$ change @ +25°C $\pm 5\%$ change 20 years @ +40°C	-	-	0.40	
	Holdover			-	-		
	Control Voltage	$V_C$	-	0.5	1.5	2.5	V
	Frequency Tuning [VCTCXO Only]	-	$V_C = 1.5V \pm 1.0V$ , monotonic positive	5 - 8			$\pm$ ppm
	$V_C$ Input Impedance	$ZV_C$	-	100	-	-	kOhm
	Output Waveform		HCMOS				
	Output Voltage Levels						
	Logic '1' Level	$V_{OH}$	HCMOS Load	$0.9 \cdot V_{CC}$	-	-	V
	Logic '0' Level	$V_{OL}$	HCMOS Load	-	-	$0.1 \cdot V_{CC}$	
	Output Load	$C_L$	-	-	-	15	pF
	Rise and Fall Time	$T_{R,F}$	@ 20% - 80% Levels	-	3.0	6.0	ns
	Output Duty Cycle	SYM	@ 50% Level	45	-	55	%
	Start Up Time	$T_S$	-	-	-	2	ms
	Phase Noise <sup>2</sup>	-	-				dBc/Hz

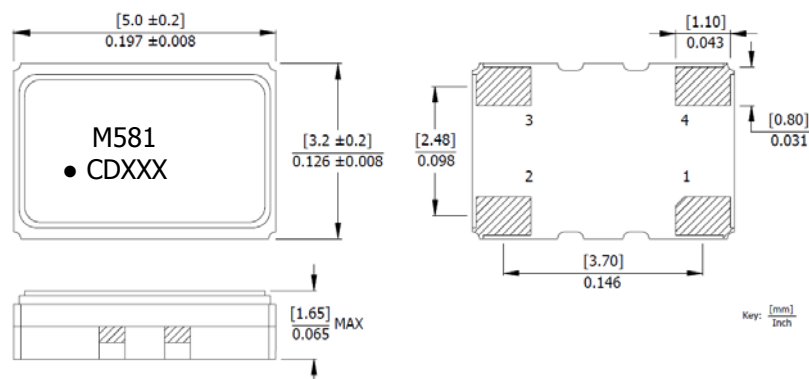
Notes:

- See Ordering Information for stability options.
- Phase Noise performance may vary based on output frequency. See example plot at 10MHz below.



## MECHANICAL SPECIFICATIONS

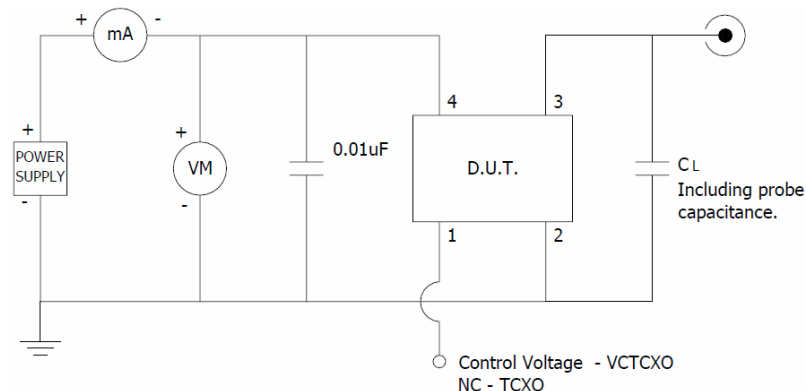
### PACKAGE DRAWING



### D.U.T. PIN ASSIGNMENTS

PIN	SYMBOL	DESCRIPTION
1	V <sub>C</sub>	Control Voltage – VCTCXO NC - TCXO
2	GND	Circuit & Package Ground
3	Output	HCMOS Output
4	V <sub>CC</sub>	Supply Voltage

### TEST CIRCUIT – HCMOS LOAD



### MARKING INFORMATION

1. M581 – CTS Model Series.
  2. ● – Pin 1 identifier.
  3. C – CTS identifier.
  4. D – Date code. See Table II for codes.
  5. xxx – Frequency Code.
- Refer to document 016-1454-0, Frequency Code Tables.

## NOTES

1. DO NOT make connections to non-labeled pins. Castellations 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, 260°C maximum.
4. MSL = 1.

## SUGGESTED SOLDER PAD GEOMETRY

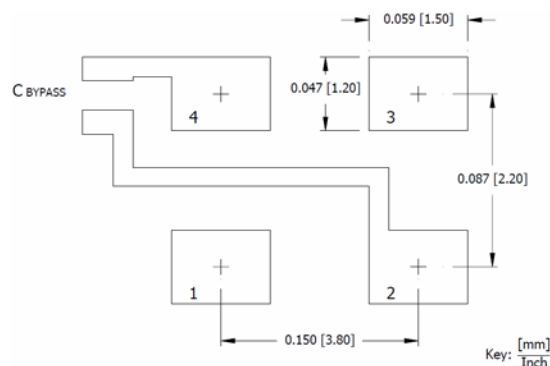


TABLE II – DATE CODE

MONTH YEAR					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

# Mouser Electronics

Authorized Distributor

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

## CTS:

[581L128X2ITT](#) [581L307X2ITT](#) [581L200X2ITT](#) [581L400X2ITT](#) [581L260X2CTT](#) [581L260X2IAT](#) [581L260X2ITT](#)  
[581L400X2CAT](#) [581L400X2CTT](#) [581L400X2IAT](#) [581L192X2IAT](#) [581L192X2ITT](#) [581L200X2CAT](#) [581L200X2CTT](#)  
[581L200X2IAT](#) [581L260X2CAT](#) [581L163X2CAT](#) [581L163X2CTT](#) [581L163X2IAT](#) [581L163X2ITT](#) [581L192X2CAT](#)  
[581L192X2CTT](#) [581L100X2CAT](#) [581L100X2CTT](#) [581L100X2IAT](#) [581L100X2ITT](#)