Model 581

Stratum 3 Performance

Temperature Compensated Crystal Oscillator

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 ±4.6ppm
- 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

581 □ □ □ □ □ □ □ □ □

SUPPLY VOLTAGE

R = +3.0Vdc	S = +5.0Vdc
L = +3.3Vdc	

FREQUENCY

Product Frequency Code [3 digits]

Refer to document 016-1454-0, Frequency Code Tables.

FREQUENCY STABILITY *

X5 = ±0.05ppm [1]	X2 = ±0.28ppm
01 = ±0.10ppm [2]	05 = ±0.50ppm
02 = ±0.20ppm	

* Frequency vs. Temperature Only

PACKAGING OPTIONS

T - 1k pcs./reel

FREQUENCY TUNING [AFC]

T = No AFC [TCXO]
A = ±5ppm - ±8ppm [VCTCXO]

OPERATING TEMPERATURE RANGE

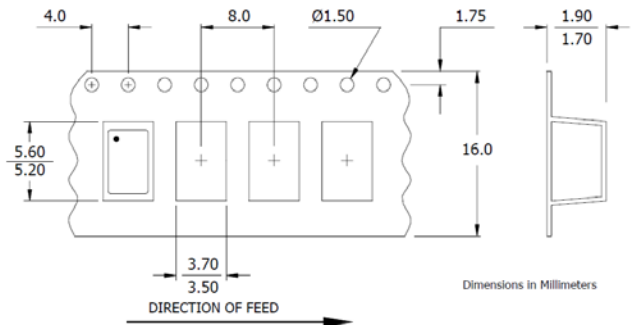
W = 0°C to +55°C
H = -10°C to +60°C
C = -20°C to +70°C
D = -30°C to +85°C
I = -40°C to +85°C

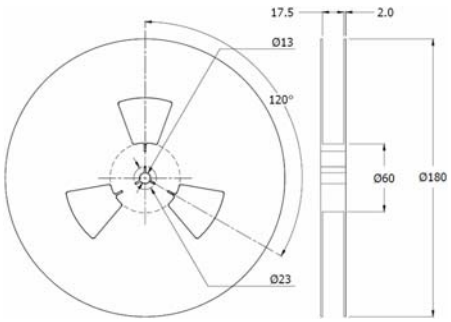
1] Only available with temperature range codes "W" and "H".
2] Only available with temperature range codes "W", "H" and "C".

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.



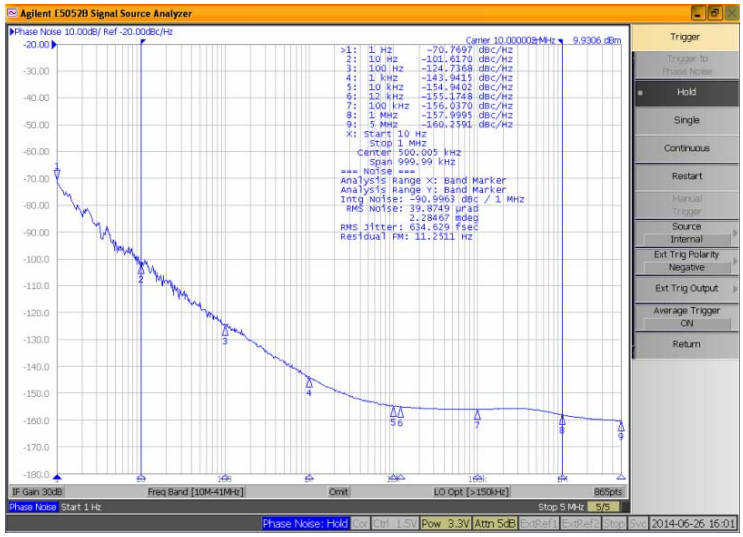


ELECTRICAL CHARACTERISTICS

	PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
ELECTRICAL PARAMETERS	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	-		+25		°C
	Order Code 'C'			-20		+70	
	Order Code 'I'			-40		+85	
	Frequency Range	f_O	-	5	-	52	MHz
	Supply Voltage	V_{CC}	±5%				V
	Order Code 'R'			2.85	3.0	3.15	
	Order Code 'L'			3.14	3.3	3.47	
	Order Code 'S'			4.75	5.0	5.25	
	Supply Current	I_{CC}		-	-	6.0	mA
	Frequency Stability						± ppm
	Overall Frequency Stability	$\Delta f/f_O$	Reference to f_O, Including 20 years aging	-	-	4.60	
	vs. Initial Calibration		@ +25°C, at time of shipment	-	-	1.00	
	vs. Operating Temperature [1]	$\Delta f/f_{25}$	[Fmax. - Fmin.]/2, over -40°C to +85°C	-	-	0.28	
	vs. Supply Voltage		±5% change @ +25°C	-	-	0.20	
	vs. Load		±5% change	-	-	0.20	
	vs. Aging		20 years @ +40°C	-	-	3.00	
	Holdover	$\Delta f/f_O$	[Fmax. - Fmin.]/2, over 24 hours	-	-	0.40	
	Control Voltage	V_C	-	0.5	1.5	2.5	V
	Frequency Tuning [VCTCXO Only]	-	V_C = 1.5V ±1.0V, monotonic positive		5 - 8		± ppm
	V_C Input Impedance	ZV_C	-	100	-	-	kOhm
	Output Waveform		HCMOS				
	Output Voltage Levels						V
	Logic '1' Level	V_{OH}	HCMOS Load	0.9*V_{CC}	-	-	
	Logic '0' Level	V_{OL}	HCMOS Load	-	-	0.1*V_{CC}	
	Output Load	C_L	-	-	-	15	pF
	Rise and Fall Time	T_R, T_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 [2]	-	-				dBc/Hz

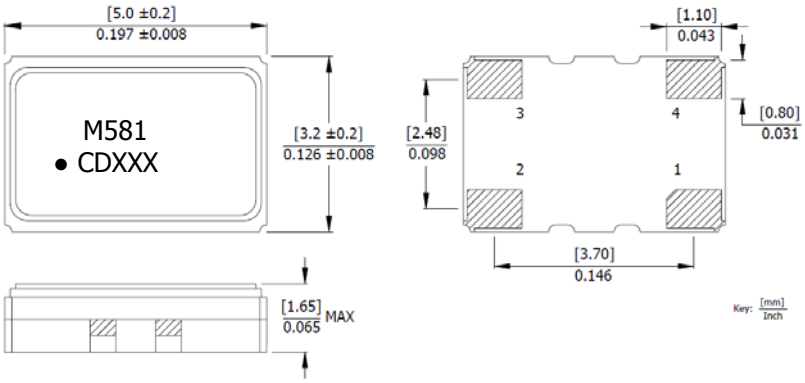
Notes:

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



MECHANICAL SPECIFICATIONS

PACKAGE DRAWING



MARKING INFORMATION

1. M581 – CTS Model Series.
2. ● – Pin 1 identifier.
3. C – CTS identifier.4.
4. D – Date code. See Table II for codes.
5. xxx – Frequency Code.

Refer to document 016-1454-0, Frequency Code Tables.

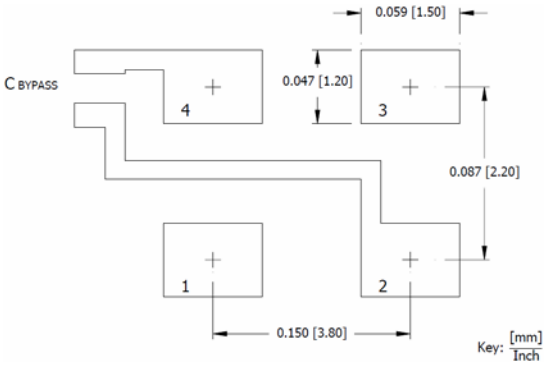
NOTES

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

D.U.T. PIN ASSIGNMENTS

PIN	SYMBOL	DESCRIPTION
1	V_C	Control Voltage – VCTCXO
		NC - TCXO
2	GND	Circuit & Package Ground
3	Output	HCMOS Output
4	V_{CC}	Supply Voltage

SUGGESTED SOLDER PAD GEOMETRY



TEST CIRCUIT – HCMOS LOAD

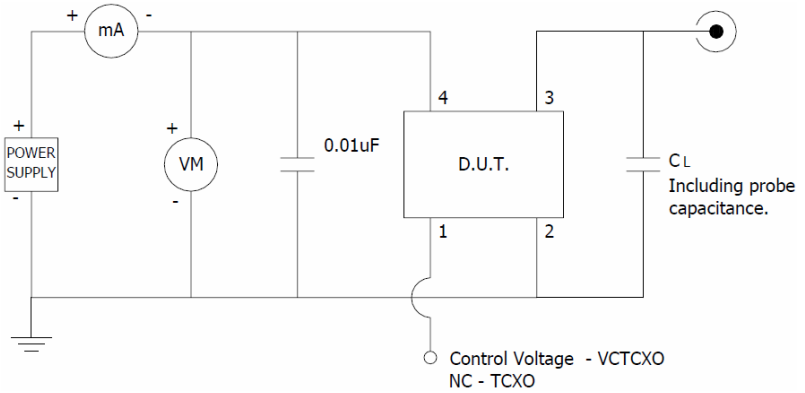


TABLE II – DATE CODE

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