

► Features

Temperature Compensated Crystal Oscillator

3.3V, 2.8V Operation

VCTCXO option available

HCMOS Output or Clipped Sine output

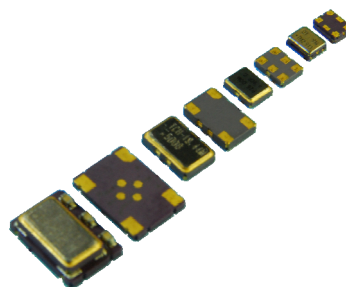
AT-Cut Crystal

Fund Oscillation Mode.

-20to70°C, -30to85°C OPT Range.

Low RMS Phase Jitter

RoHS Compliant (pb-Free)



Dimensions(mm)

5.0 x 7.0 x 1.8max

5.0 x 3.2 x 1.5max

3.2 x 2.5 x 1.2max

2.5 x 2.0 x 1.0max

► Typical Applications

Base Station

Test Equipment

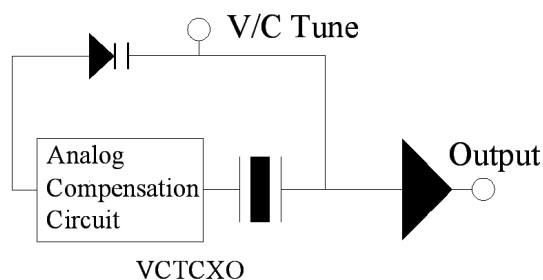
Any application requiring an VCTCXO,TCXO

Cellular Telephony

Wireless Communication

GPS System

► Block Diagram



Vc must be applied to Pin #1 on VCTCXO's

Absolute Maximum Ratings *(For user guidelines only)*

Parameter	Maximum Value	Units	Condition
Supply voltage(Vdd)	5	Vdc	
Operating Temperature	-30 to 85	°C	
Storage Temperature	-50 to 120	°C	Max
ESD Sensitivity	1	kV	HBM

Supply Voltage & Consumption.

Parameter	Value	Units	Condition
Supply Voltage(Vdd)	3.3V ±5%	DC	
Current Consumption	5	mA Max	Clipped sine
	30	mA Max	CMOS

Supply Voltage(Vdd)	2.8V \pm 5%	DC	
Current Consumption	5	mA Max	Clipped sine
	20	mA Max	CMOS
Start up Time(Ts)	5	mS	Max

Frequency Tuning(Vc) - Option

Parameter	Typical Value	Units	Condition
Vc. Turning Range	0 to 2.8	V	Vdd 2.8V
	0.3 to 3.0	V	Vdd 3.3V
Electrical Tuning	\pm 8	ppM min	Standard ¹
Linearity	\pm 10.0	%	Max
NorminalCenterVoltage	50%of Vdd ¹	V	
Input impedance	10	Kohm	Min
Tuning slope	Positive		

¹ Other Tuning Range is also available on customer specification.

Frequency Stabilities¹

Parameter	Typical Value	Units	Condition
Vs. Temperature ²	\pm 1.0	ppM max	0to70°C
	\pm 2.5	ppM max	-30to85°C
Vs. Calibration @25°C	\pm 1.0	Ppm max	\pm 2°C
Vs. Vdd	\pm 0.2	ppm max	\pm 5% of Vdd
Vs. Load	\pm 0.2	ppM max	\pm 5% change
Aging 1 st year	\pm 1.0	ppM max	

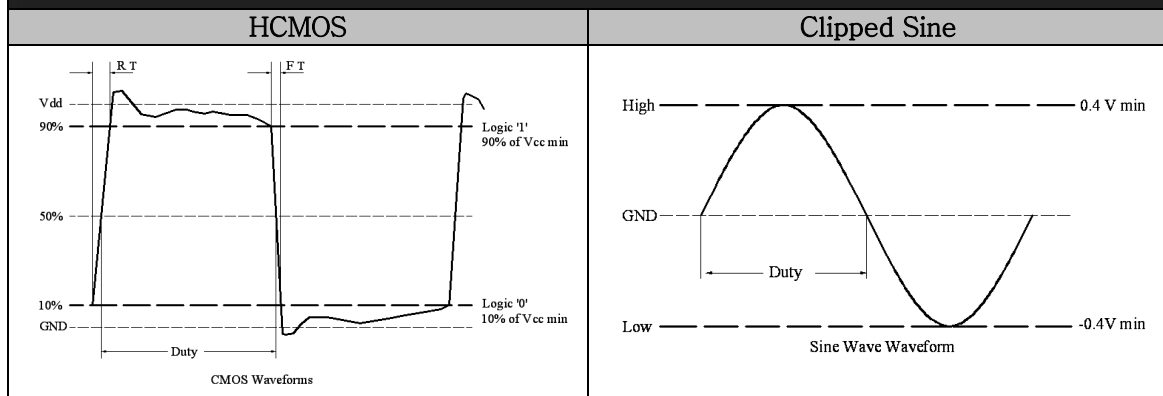
¹ Vc. condition is 50% of Vdd.
² Other Stability and Temperature range available.

RF output¹

Parameter		Typical Value	Units	Condition
HCMOS	Output Load	15	pF	
	Output Voltage(VOH)	90% of Vdd	V min	
	(VOL)	10% of Vdd	V max	
	Rise(Tr),Fall(Tf) time	5	nS max	10to 90%
	Symmetry	50±10	%	50% of Vdd
SINE	Output Load	10	Kohm	
	Output Power	0.8	Vpp min	10Kohm//10pF

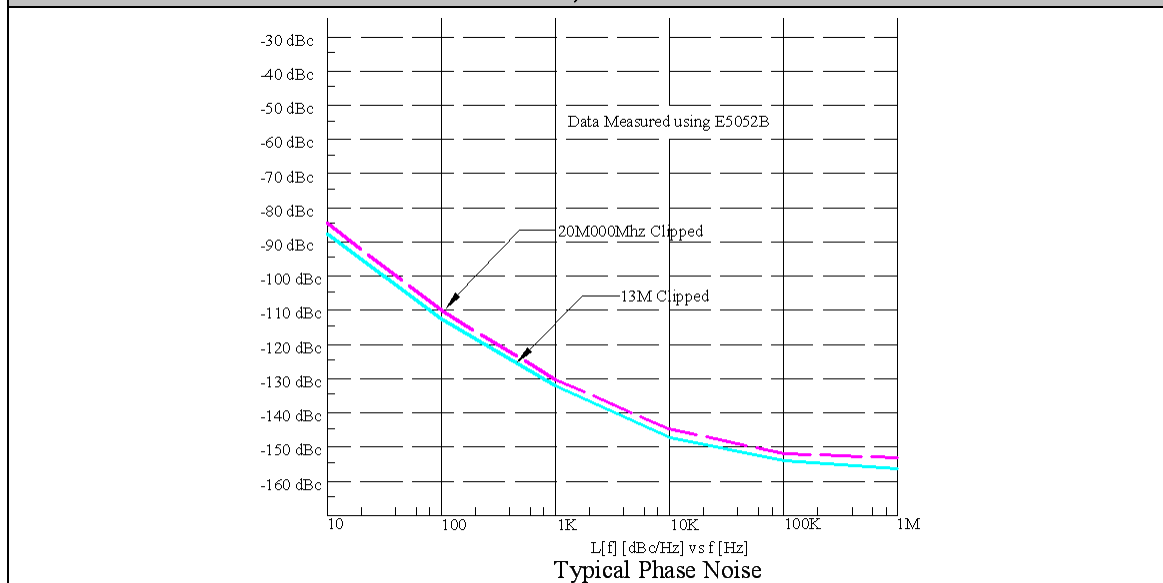
¹ About Test Condition Refer to Wave Form

Wave Form

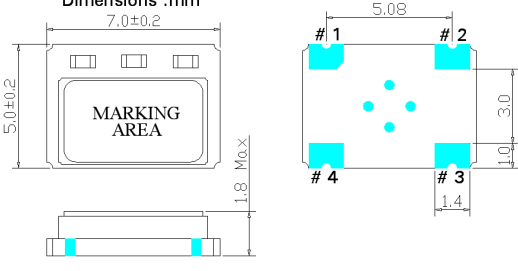
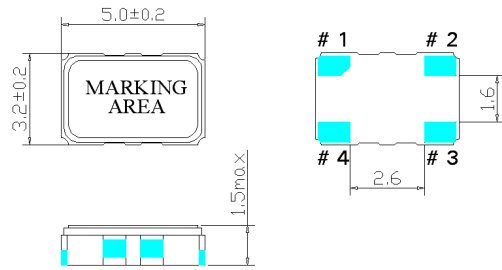
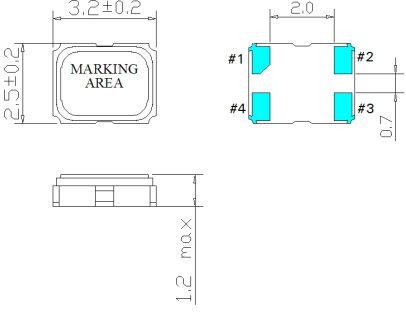


Phase Noise

iTCD33 13M000, iTCD33 20M000



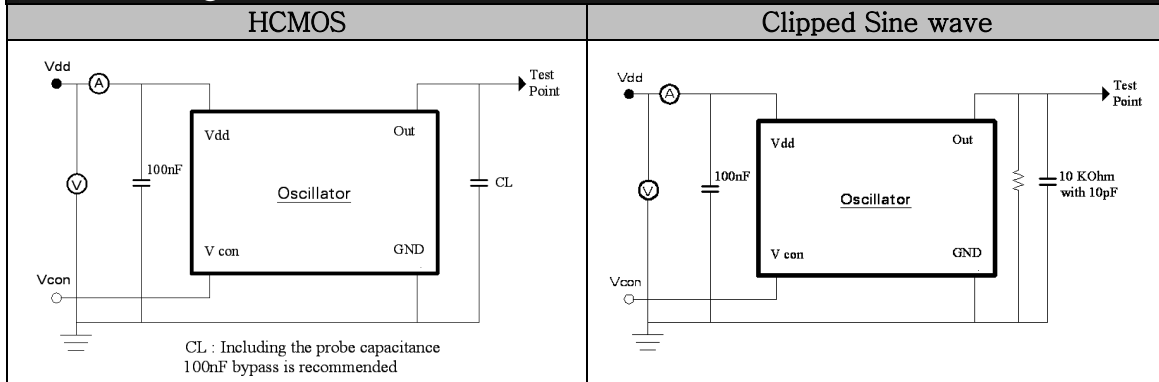
Mechanical Dimensions

D7 Ceramic 5mm x 7mm for Sine		D5 Ceramic 5mm x 7mm for Sine	
<p>iD7_T Dimensions :mm</p> 		<p>iD5_T Dimensions :mm</p> 	
Code:D7	5.0 x 7.0 x 1.8max	Code : D5	3.2 x .5.0 x 1.5max
D3 Ceramic 2.5mm x 3.2mm for Sine		Pin Connections	
<p>iD3_T Dimensions :mm</p> 		<p>Pin1 : Voltage Control(Vc) or N/C Pin2 : Ground Pin3 : Output Pin4 : supply voltage(Vdd)</p>	
Code:D3	2.5 x 3.2 x 1.2max		

Marking

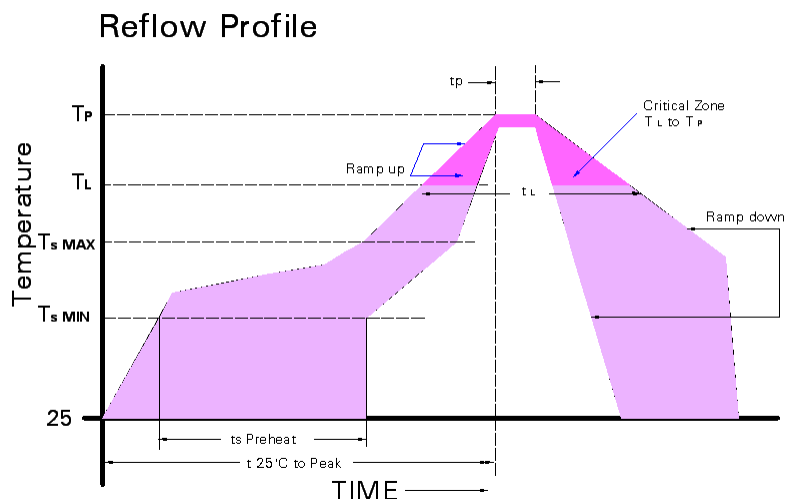
20.000Mhz	-Frequency
iTCD33-C25	-Part No.
● IMT wwyy	-week/year

Load Configuration



Note : Recommend to add 100nF bypass Capacitors at V_{dd} and V_c

Recommended Reflow Profile



Note: Temperatures refer to body of device.

Oscillators must be on the top side of the PCB during the reflow process.

T _s max to T _L (Ramp-up rate)	3°C/second max
Preheat -Temperature Min(T _s min)	150°C
-Temperature Typical(T _s TYP)	175°C
-Temperature Max(T _s Max)	200°C
-Time(t _s)	60-180 Seconds
Ramp-up Rate(T _L to T _P)	3°C/Second max
Time Maintained Above-Temperature(T _L)	217°C
-Time(t _L)	60-150 Seconds
Peak Temperature(T _p)	250°C Max for 10 seconds Max
Target Peak Temperature(T _p Target)	240°C
Time within 5°C of actual peak(t _p)	20-40 seconds
Ramp-down Rate	6°C/second max
Time 25°C to peak Temperature	8 minutes max

Part Numbering Guide & Code ...iTC33-C25-13M000-T
iTHD3(HCMOS)¹
iTC33 (Clipped Sinewave)

Logic	Supply voltage	Operating Temperature	Stability	Frequency	Packaging Option
iTHD3	3	C	25	13M000	T
C: SINE H: HCMOS L: LVDS	3:3.3V 2:2.8V	B: 0...70°C C:-20...70°C D:-30...85°C	10: ±1.0ppM 25: ±2.5ppM 30: ±3.0ppM	13.000Mhz	T: Tape & Reel B: Bulk

Above example, TCXO, C/S output, 3.2 x 2.5 package, 3.3V, -20to 70°C Temperature range, Temp Stability ±2.5ppM, at 13.000Mhz.

iWHD3 (HCMOS)²
iWC33 (Clipped Sinewave)

Logic	Supply voltage	Operating Temperature	Stability	Frequency	Packaging Option
iWHD3	3	C	25	13M000	T
C: SINE H: HCMOS L: LVDS	3:3.3V 2:2.8V	B: 0...70°C C:-20...70°C D:-30...85°C	10: ±1.0ppM 25: ±2.5ppM 30: ±3.0ppM	13.000Mhz	T: Tape & Reel B: Bulk

Above example, VCTCXO, C/S output, 3.2 x 2.5 package, 3.3V, -20to 70°C Temperature range, Temp Stability ±2.5ppM, at 13.000Mhz.

¹ iT meaning a Temperature Compensation Crystal Oscillator.

² iW meaning a Voltage Controlled TCXO, has EFC.