

3.2mm x 2.5mm Ceramic SMD Package, CMOS TCXO Oscillator

I540 Series

Product Features:

- CMOS Output
- Small Footprint SMD Package
- Low Input Current
- Tight Temperature Stability over a wide Temperature Range
- Five Supply Voltage Options, 2.5V, 3.0V, 3.3V, 5.0V, or 2V to 5.5V (Continuous)
- RoHS and REACH Compliant

Typical Applications:

- Real Time Clock Source
- Metering
- Industrial Control
- High Accuracy System Clock

ELECTRICAL SPECIFICATIONS

Frequency Range	32.768kHz	
Frequency Stability vs. Frequency Tolerance	±3.0ppm Maximum	At 25°C ±2°C, Vdd=3.0Vdc
Frequency Stability vs. Temperature	±3.8ppm Maximum ±5.0ppm Maximum ±7.0ppm Maximum	Inclusive to Operating Temperature Range
Frequency Stability vs. Input Voltage	±1.0ppm/Volt Maximum	Vdd=2.0Vdc to 5.5Vdc
Frequency Stability vs. Aging	±1ppm/Year Maximum	At 25°C, First Year
Operating Temperature Range	-10°C to +60°C -40°C to +85°C -40°C to +105°C	
Supply Voltage (Vdd)	2.5Vdc 3.0Vdc 3.3Vdc 5.0Vdc 2.0Vdc to 5.5Vdc Continuous	
Input Current	1.5µA Typical, 4.5µA Maximum (No Load)	Vdd=3.0Vdc, P1=Vdd
Output Voltage Logic High	80% of Vdd Minimum	IOH = -50µA
Output Voltage Logic Low	20% of Vdd Maximum	IOL = +50µA
Rise / Fall Time	70nSec Maximum	Measured from 20% to 80% of waveform
Duty Cycle	50 ±10(%)	Measured at 50% of waveform
Output Drive Capability	15pF Maximum	
Output Logic Type	CMOS	
Pin 1 Connection	Tri-State (High Impedance)	
Input Voltage Logic High	90% of Vdd Minimum to Enable Output	
Input Voltage Logic Low	10% of Vdd Maximum to Disable Output (High Impedance)	
Standby Current	0.6µA Typical, 2.0µA Maximum	Vdd=3.0Vdc, Pin1=Ground
Startup Time	0.1 Sec Typical, 3.0 Sec Maximum	

NOTES:

- All minimum and maximum limits are specified over temperature at Vdd=3.0Vdc and with 15pF output load unless otherwise stated.
- A 0.1µF bypass capacitor is recommended between Vdd (pad 8) and GND (pad 4) to minimize power supply noise.

ABSOLUTE MAXIMUM LIMITS

Storage Temperature Range	-40°C to +105°C
Supply Voltage Range	-0.3Vdc to Vdd +0.3Vdc
Electrostatic Discharge	1500V Maximum
Solder Temperature	260°C Maximum
Junction Temperature	150°C Maximum

NOTE: Stresses beyond those listed above may cause permanent damage to the device. These are stress ratings only. The functional operation of the device at those or any other conditions beyond those indicated under "Electrical Specifications" is not implied. Exposure to conditions outside the specified operating conditions for any extended period of time may adversely impact device reliability and result in failures not covered by warranty.

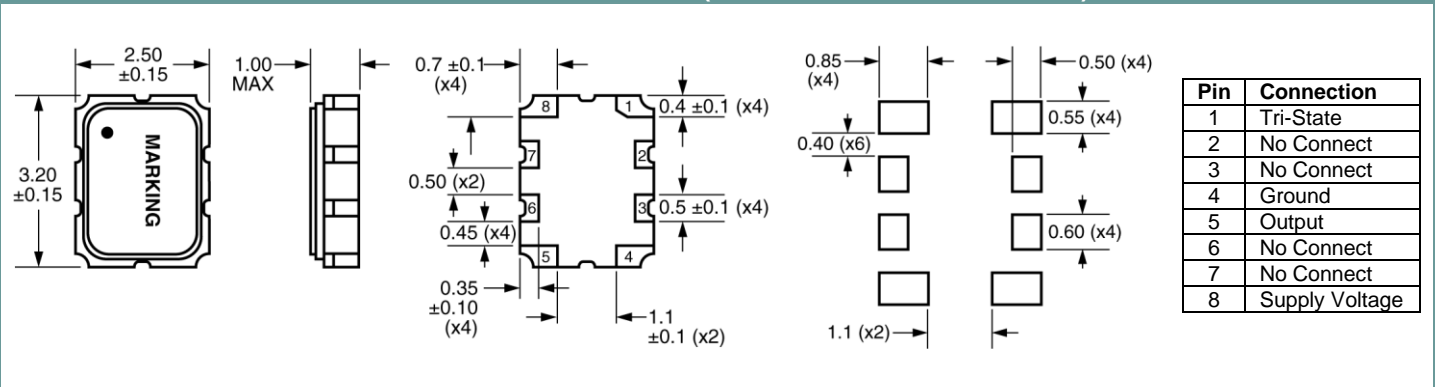
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ENVIRONMENTAL SPECIFICATIONS

ESD Susceptibility	MIL-STD-883, Method 3015, Class 1, HBM: 1500V
Fine Leak	MIL-STD-883, Method 1014, Condition A
Flammability	UL94-V0
Gross Leak	MIL-STD-883, Method 1014, Condition C
Mechanical Shock	MIL-STD-883, Method 2002
Moisture Resistance	MIL-STD-883, Method 1004
Moisture Sensitivity	J-STD-020, MSL 2
Resistance to Soldering Heat	MIL-STD-202, Method 210, Condition K
Resistance to Solvents	MIL-STD-202, Method 215
Solderability	MIL-STD-883, Method 2003
Temperature Cycling	MIL-STD-883, Method 1010, Condition B
Vibration	MIL-STD-883, Method 2007, Condition A

MECHANICAL & SOLDER PAD LAYOUT DIMENSIONS (All Dimensions in Millimeters)



PART NUMBER GUIDE

Series	Operating Temperature Range	Frequency Stability	Supply Voltage	Pin 1 Connection	Frequency
I540	A = -10°C to +60°C	G = ±3.8ppm *	6 = 2.5Vdc	H = Tri-State (High Impedance)	32.768kHz
	2 = -40°C to +85°C	J = ±5.0ppm **	7 = 3.0Vdc		
	E = -40°C to +105°C	K = ±7.0ppm	3 = 3.3Vdc		
			5 = 5.0Vdc		
			8 = 2.0Vdc to 5.5Vdc		

Sample Part Number: I540-2J7H-32.768kHz

- NOTES:**
- * Only available with Operating Temperature Range option A
 - ** Only available with Operating Temperature Range option A and 2
 - Please consult with Sales Department for any other parameters or options.

MARKING

Line 1: Date Code
Line 2: Frequency
Pin 1 Dot

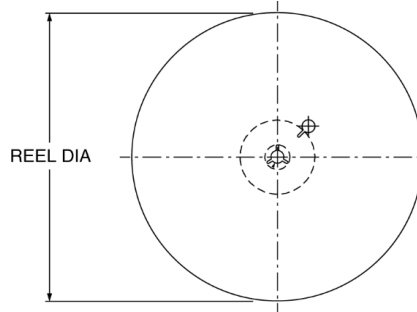
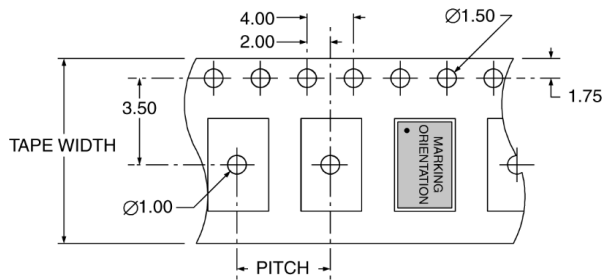
PACKAGE INFORMATION

Termination = e4 (Au over Ni over W base metallization)
Terminal Plating Thickness:
Gold (0.3µm to 1.0µm), Nickel (1.27µm to 8.89µm)

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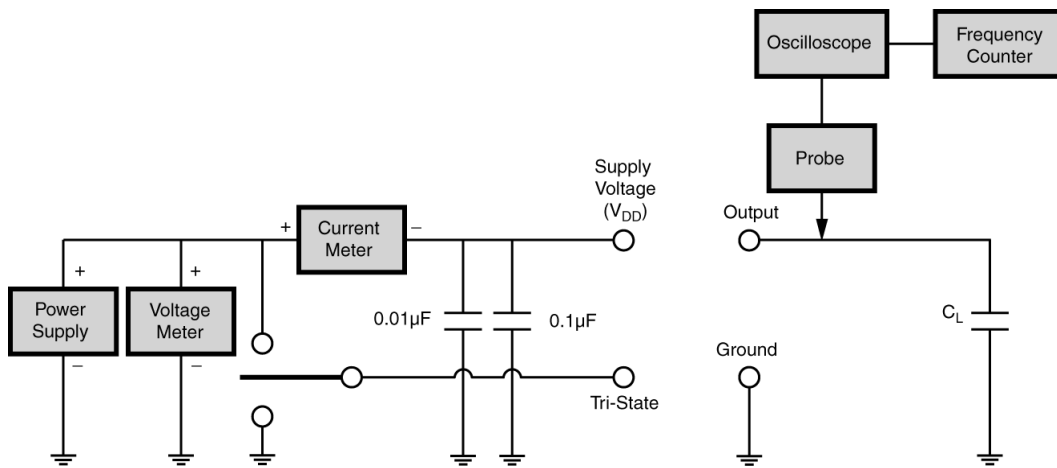
TAPE & REEL DIMENSIONS



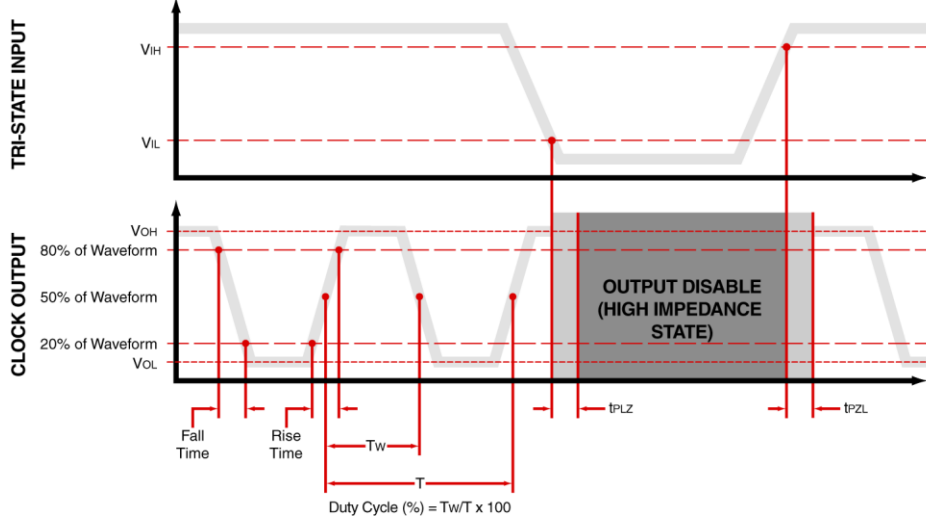
PITCH	4.00
TAPE WIDTH	8.00
REEL DIA	180
QTY PER REEL	2,000

All Dimensions in Millimeters

TEST CIRCUIT: Tri-State Option



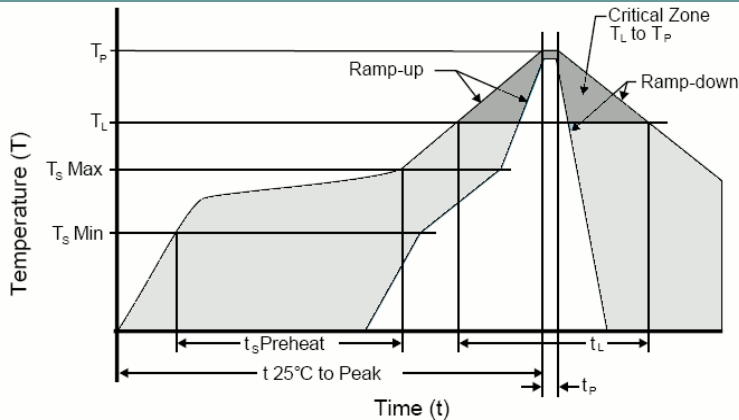
WAVEFORM: Tri-State Option



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SOLDER REFLOW PROFILE



Units are backward compatible with +240°C reflow process

Ts max to T_L (Ramp-up Rate)	3°C / second max
Preheat	
Temperature min (T_s min)	150°C
Temperature typ (T_s typ)	175°C
Temperature max (T_s max)	200°C
Time (T_s)	60 to 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 to 150 seconds
Peak Temperature (T_p)	260°C max for 10 seconds
Time within 5°C to Peak Temperature (T_p)	20 to 40 seconds
Ramp-down Rate	6°C / second max
Time 25°C to Peak Temperature	8 minute max
Moisture Sensitivity Level (MSL)	Level 2

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