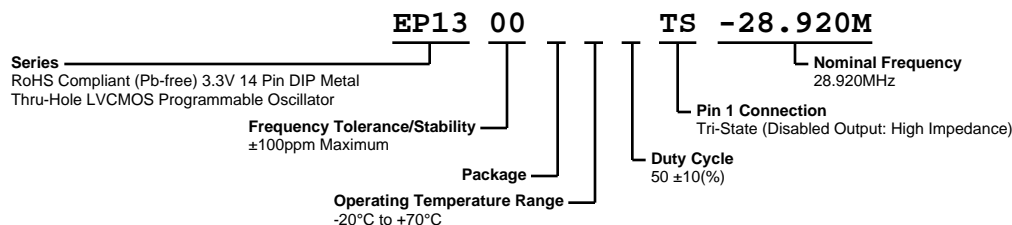


# EP1300TS-28.920M



**ECLIPTEK**<sup>®</sup>  
CORPORATION



## ELECTRICAL SPECIFICATIONS

<b>Nominal Frequency</b>	28.920MHz
<b>Frequency Tolerance/Stability</b>	±100ppm Maximum (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, First Year Aging at 25°C, Shock, and Vibration)
<b>Aging at 25°C</b>	±5ppm/year Maximum
<b>Operating Temperature Range</b>	-20°C to +70°C
<b>Supply Voltage</b>	3.3Vdc ±0.3Vdc
<b>Input Current</b>	28mA Maximum (Unloaded)
<b>Output Voltage Logic High (Voh)</b>	Vdd-0.4Vdc Minimum (IOH = -8mA)
<b>Output Voltage Logic Low (Vol)</b>	0.4Vdc Maximum (IOL = +8mA)
<b>Rise/Fall Time</b>	4nSec Maximum (Measured at 20% to 80% of waveform)
<b>Duty Cycle</b>	50 ±10(%) (Measured at 50% of waveform)
<b>Load Drive Capability</b>	30pF Maximum
<b>Output Logic Type</b>	CMOS
<b>Pin 1 Connection</b>	Tri-State (Disabled Output: High Impedance)
<b>Pin 1 Input Voltage (Vih and Vil)</b>	70% of Vdd Minimum to enable output, 20% of Vdd Maximum to disable output, No Connect to enable output.
<b>Standby Current</b>	20µA Maximum (Pin 1 = Ground)
<b>Disable Current</b>	16mA Maximum (Pin 1 = Ground)
<b>Peak to Peak Jitter (tPK)</b>	100pSec Maximum, 60pSec Typical
<b>RMS Period Jitter (tRMS)</b>	13pSec Maximum, 10pSec Typical
<b>Start Up Time</b>	10mSec Maximum
<b>Storage Temperature Range</b>	-55°C to +125°C

## ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

<b>Fine Leak Test</b>	MIL-STD-883, Method 1014, Condition A
<b>Gross Leak Test</b>	MIL-STD-883, Method 1014, Condition C
<b>Lead Integrity</b>	MIL-STD-883, Method 2004
<b>Mechanical Shock</b>	MIL-STD-202, Method 213, Condition C
<b>Resistance to Soldering Heat</b>	MIL-STD-202, Method 210
<b>Resistance to Solvents</b>	MIL-STD-202, Method 215
<b>Solderability</b>	MIL-STD-883, Method 2003
<b>Temperature Cycling</b>	MIL-STD-883, Method 1010
<b>Vibration</b>	MIL-STD-883, Method 2007, Condition A

# EP1300TS-28.920M

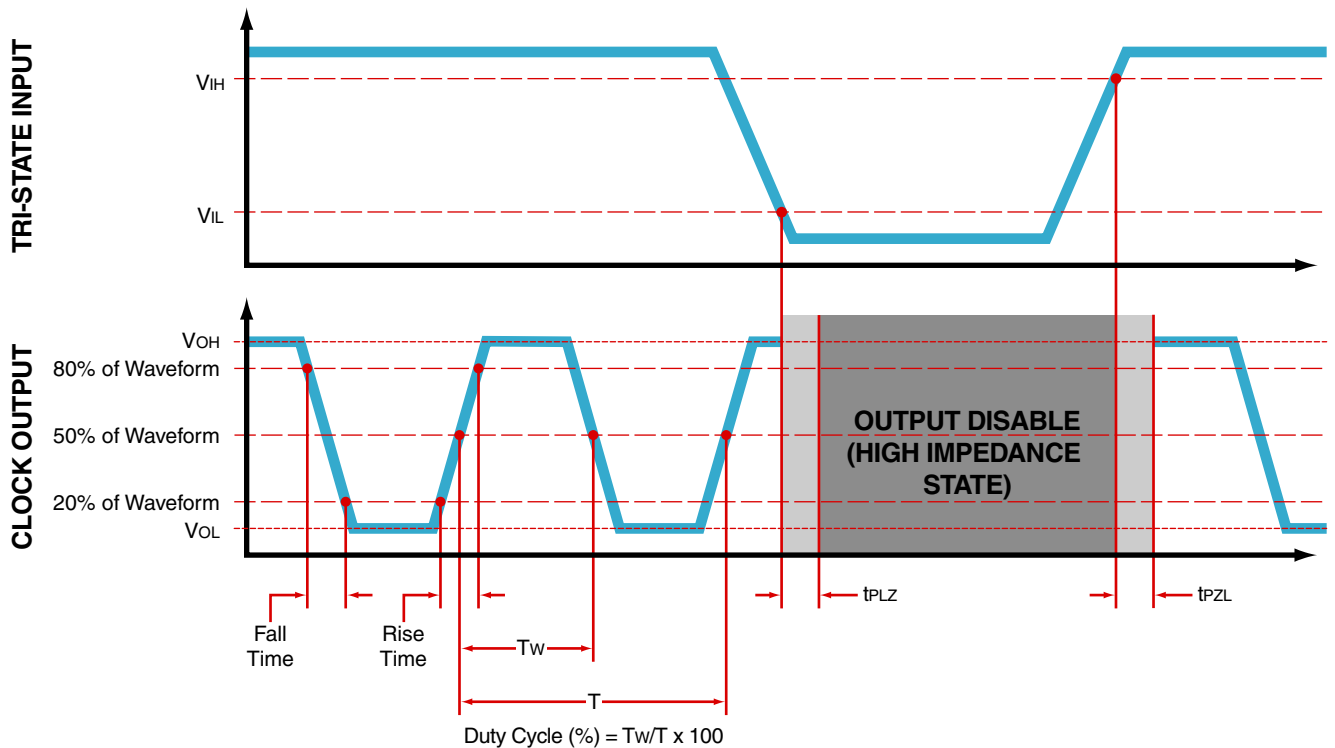
## MECHANICAL DIMENSIONS (all dimensions in millimeters)



PIN	CONNECTION
1	Tri-State (High Impedance)
7	Ground/Case Ground
8	Output
14	Supply Voltage

LINE	MARKING
1	<b>ECLIPTEK</b>
2	<b>EP13TS</b> EP13=Product Series
3	<b>28.920M</b>
4	<b>XXYZZ</b> XX=Ecliptek Manufacturing Code Y=Last Digit of the Year ZZ=Week of the Year

## OUTPUT WAVEFORM & TIMING DIAGRAM



# EP1300TS-28.920M

## Test Circuit for CMOS Output

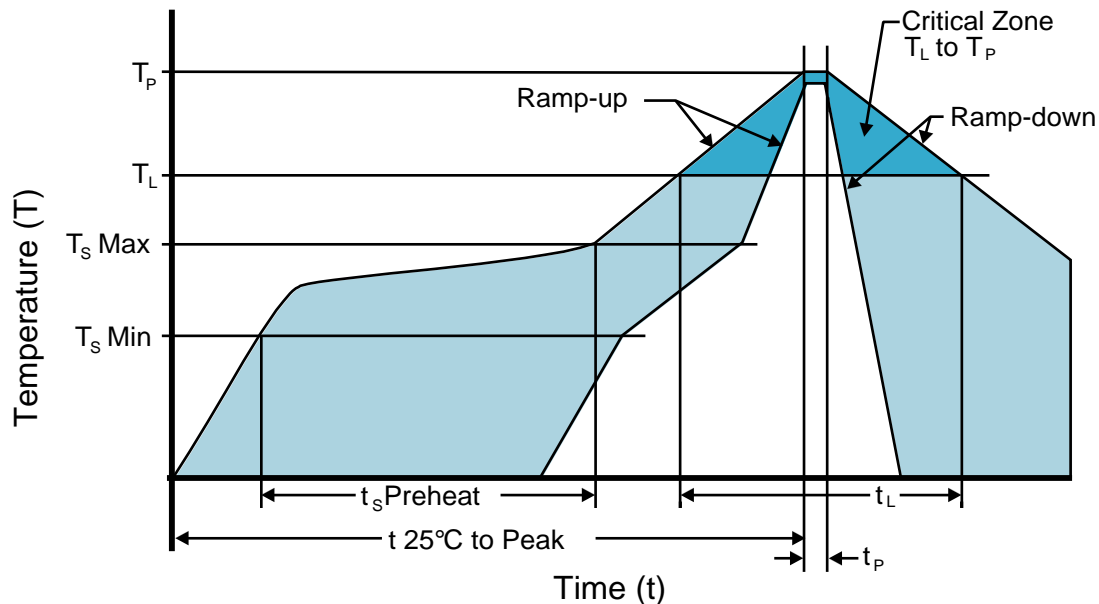


Note 1: An external  $0.1\mu\text{F}$  low frequency tantalum bypass capacitor in parallel with a  $0.01\mu\text{F}$  high frequency ceramic bypass capacitor close to the package ground and  $V_{DD}$  pin is required.

Note 2: A low capacitance ( $<12\text{pF}$ ), 10X attenuation factor, high impedance ( $>10\text{Mohms}$ ), and high bandwidth ( $>300\text{MHz}$ ) passive probe is recommended.

Note 3: Capacitance value  $C_L$  includes sum of all probe and fixture capacitance.

## Recommended Solder Reflow Methods



### High Temperature Solder Bath (Wave Solder)

<b><math>T_s</math> MAX to <math>T_L</math> (Ramp-up Rate)</b>	3°C/second Maximum
<b>Preheat</b>	
- Temperature Minimum ( $T_s$ MIN)	150°C
- Temperature Typical ( $T_s$ TYP)	175°C
- Temperature Maximum ( $T_s$ MAX)	200°C
- Time ( $t_s$ MIN)	60 - 180 Seconds
<b>Ramp-up Rate (<math>T_L</math> to <math>T_p</math>)</b>	3°C/second Maximum
<b>Time Maintained Above:</b>	
- Temperature ( $T_L$ )	217°C
- Time ( $t_L$ )	60 - 150 Seconds
<b>Peak Temperature (<math>T_p</math>)</b>	260°C Maximum for 10 Seconds Maximum
<b>Target Peak Temperature (<math>T_p</math> Target)</b>	250°C +0/-5°C
<b>Time within 5°C of actual peak (<math>t_p</math>)</b>	20 - 40 seconds
<b>Ramp-down Rate</b>	6°C/second Maximum
<b>Time 25°C to Peak Temperature (t)</b>	8 minutes Maximum
<b>Moisture Sensitivity Level</b>	Level 1
<b>Additional Notes</b>	Temperatures shown are applied to back of PCB board and device leads only. Do not use this method for product with the Gull Wing option.

## Recommended Solder Reflow Methods



### Low Temperature Infrared/Convection 185°C

<b><math>T_s</math> MAX to <math>T_L</math> (Ramp-up Rate)</b>	5°C/second Maximum
<b>Preheat</b>	
- Temperature Minimum ( $T_s$ MIN)	N/A
- Temperature Typical ( $T_s$ TYP)	150°C
- Temperature Maximum ( $T_s$ MAX)	N/A
- Time ( $t_s$ MIN)	60 - 120 Seconds
<b>Ramp-up Rate (<math>T_L</math> to <math>T_p</math>)</b>	5°C/second Maximum
<b>Time Maintained Above:</b>	
- Temperature ( $T_L$ )	150°C
- Time ( $t_L$ )	200 Seconds Maximum
<b>Peak Temperature (<math>T_p</math>)</b>	185°C Maximum
<b>Target Peak Temperature (<math>T_p</math> Target)</b>	185°C Maximum 2 Times
<b>Time within 5°C of actual peak (<math>t_p</math>)</b>	10 seconds Maximum 2 Times
<b>Ramp-down Rate</b>	5°C/second Maximum
<b>Time 25°C to Peak Temperature (t)</b>	N/A
<b>Moisture Sensitivity Level</b>	Level 1
<b>Additional Notes</b>	Temperatures shown are applied to body of device. Use this method only for product with the Gull Wing option.

## Recommended Solder Reflow Methods



### Low Temperature Solder Bath (Wave Solder)

<b>T<sub>S</sub> MAX to T<sub>L</sub> (Ramp-up Rate)</b>	5°C/second Maximum
<b>Preheat</b>	
- Temperature Minimum (T <sub>S</sub> MIN)	N/A
- Temperature Typical (T <sub>S</sub> TYP)	150°C
- Temperature Maximum (T <sub>S</sub> MAX)	N/A
- Time (t <sub>s</sub> MIN)	30 - 60 Seconds
<b>Ramp-up Rate (T<sub>L</sub> to T<sub>P</sub>)</b>	5°C/second Maximum
<b>Time Maintained Above:</b>	
- Temperature (T <sub>L</sub> )	150°C
- Time (t <sub>L</sub> )	200 Seconds Maximum
<b>Peak Temperature (T<sub>P</sub>)</b>	245°C Maximum
<b>Target Peak Temperature (T<sub>P</sub> Target)</b>	245°C Maximum 1 Time / 235°C Maximum 2 Times
<b>Time within 5°C of actual peak (t<sub>p</sub>)</b>	5 seconds Maximum 1 Time / 15 seconds Maximum 2 Times
<b>Ramp-down Rate</b>	5°C/second Maximum
<b>Time 25°C to Peak Temperature (t)</b>	N/A
<b>Moisture Sensitivity Level</b>	Level 1
<b>Additional Notes</b>	Temperatures shown are applied to back of PCB board and device leads only. Do not use this method for product with the Gull Wing option.

### Low Temperature Manual Soldering

185°C Maximum for 10 seconds Maximum, 2 times Maximum. (Temperatures listed are applied to device leads only. This method can be utilized with both Gull Wing and Non-Gull Wing devices.)

### High Temperature Manual Soldering

260°C Maximum for 5 seconds Maximum, 2 times Maximum. (Temperatures listed are applied to device leads only. This method can be utilized with both Gull Wing and Non-Gull Wing devices.)