

# EC3600ETTS-4.000M TR



## ELECTRICAL SPECIFICATIONS

<b>Nominal Frequency</b>	4.000MHz
<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>Operating Temperature Range</b>	-40°C to +85°C
<b>Supply Voltage</b>	3.3Vdc ±10%
<b>Input Current</b>	8mA Maximum
<b>Output Voltage Logic High (Voh)</b>	90% of Vdd Minimum ((IOH = -4mA))
<b>Output Voltage Logic Low (Vol)</b>	10% of Vdd Maximum ((IOL = +4mA))
<b>Rise/Fall Time</b>	6nSec Maximum (Measured at 20% to 80% of waveform)
<b>Duty Cycle</b>	50 ±10(%) (Measured at 50% of waveform)
<b>Load Drive Capability</b>	15pF Maximum
<b>Output Logic Type</b>	CMOS
<b>Pin 1 Connection</b>	Tri-State (High Impedance)
<b>Tri-State Input Voltage (Vih and Vil)</b>	90% of Vdd Minimum or No Connect to Enable Output, 10% of Vdd Maximum to Disable Output (High Impedance)
<b>Standby Current</b>	10µA Maximum (Disabled Output: High Impedance)
<b>RMS Phase Jitter</b>	1pSec Maximum (12kHz to 20MHz offset frequency)
<b>Start Up Time</b>	10mSec Maximum
<b>Storage Temperature Range</b>	-55°C to +125°C

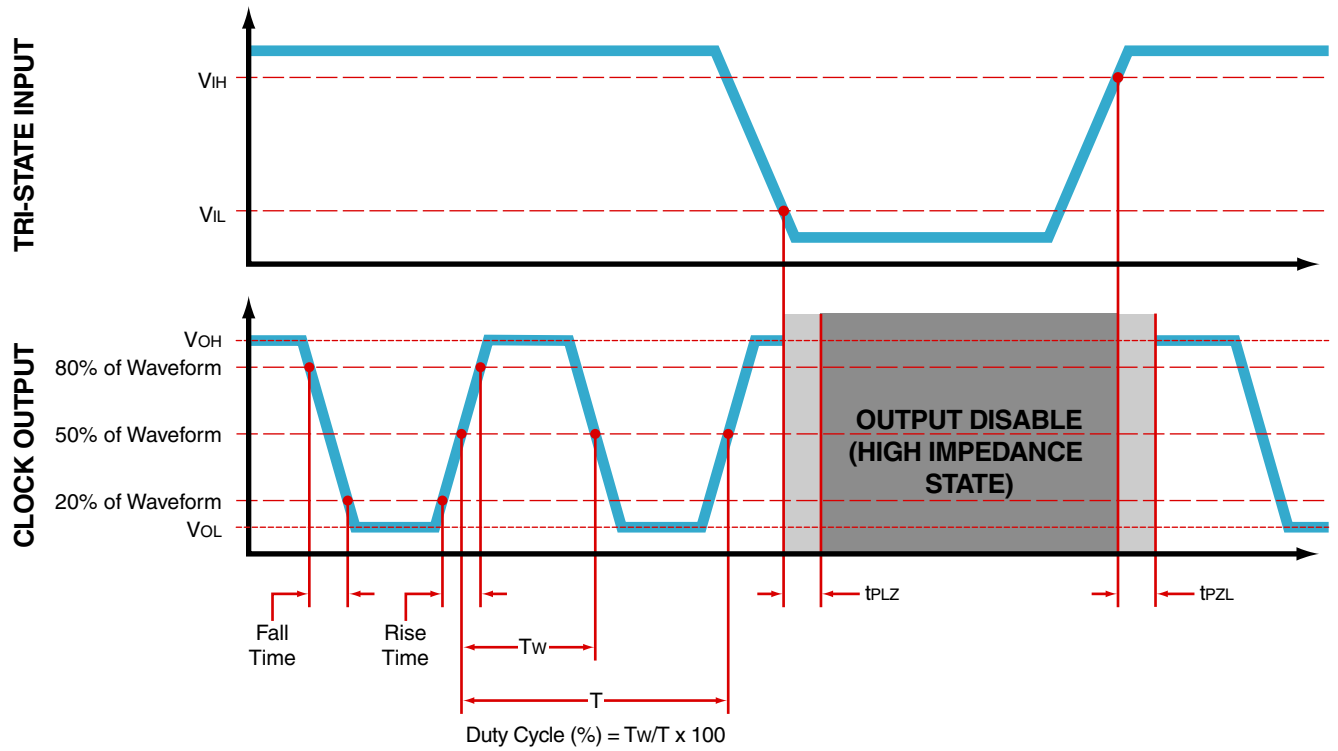
## ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

<b>ESD Susceptibility</b>	MIL-STD-883, Method 3015, Class 1, HBM: 1500V
<b>Fine Leak Test</b>	MIL-STD-883, Method 1014, Condition A
<b>Flammability</b>	UL94-V0
<b>Gross Leak Test</b>	MIL-STD-883, Method 1014, Condition C
<b>Mechanical Shock</b>	MIL-STD-883, Method 2002, Condition B
<b>Moisture Resistance</b>	MIL-STD-883, Method 1004
<b>Moisture Sensitivity</b>	J-STD-020, MSL 1
<b>Resistance to Soldering Heat</b>	MIL-STD-202, Method 210, Condition K
<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, Condition B
<b>Vibration</b>	MIL-STD-883, Method 2007, Condition A



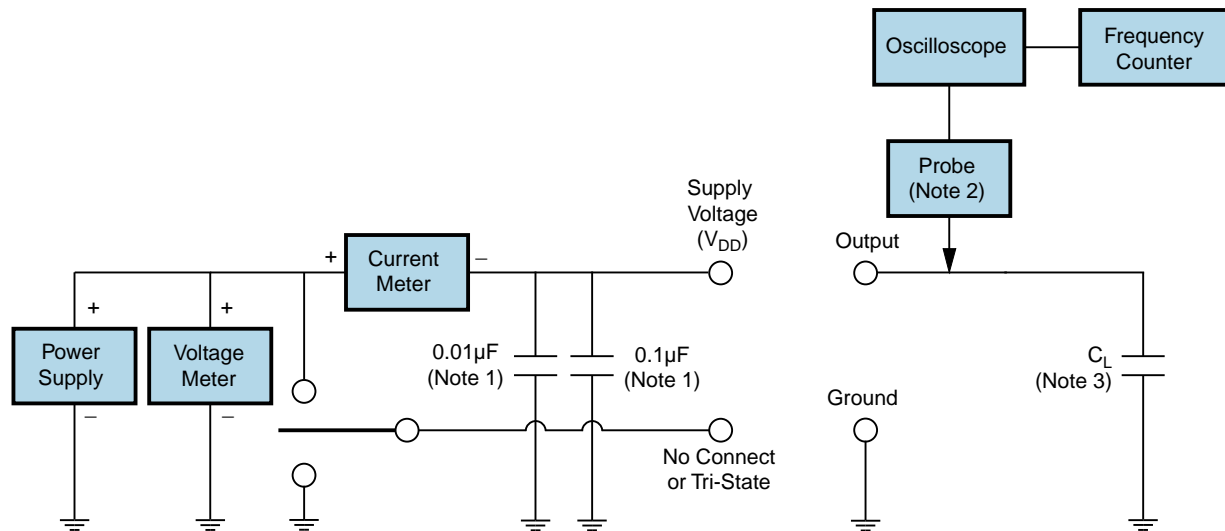
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## OUTPUT WAVEFORM & TIMING DIAGRAM



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## 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.

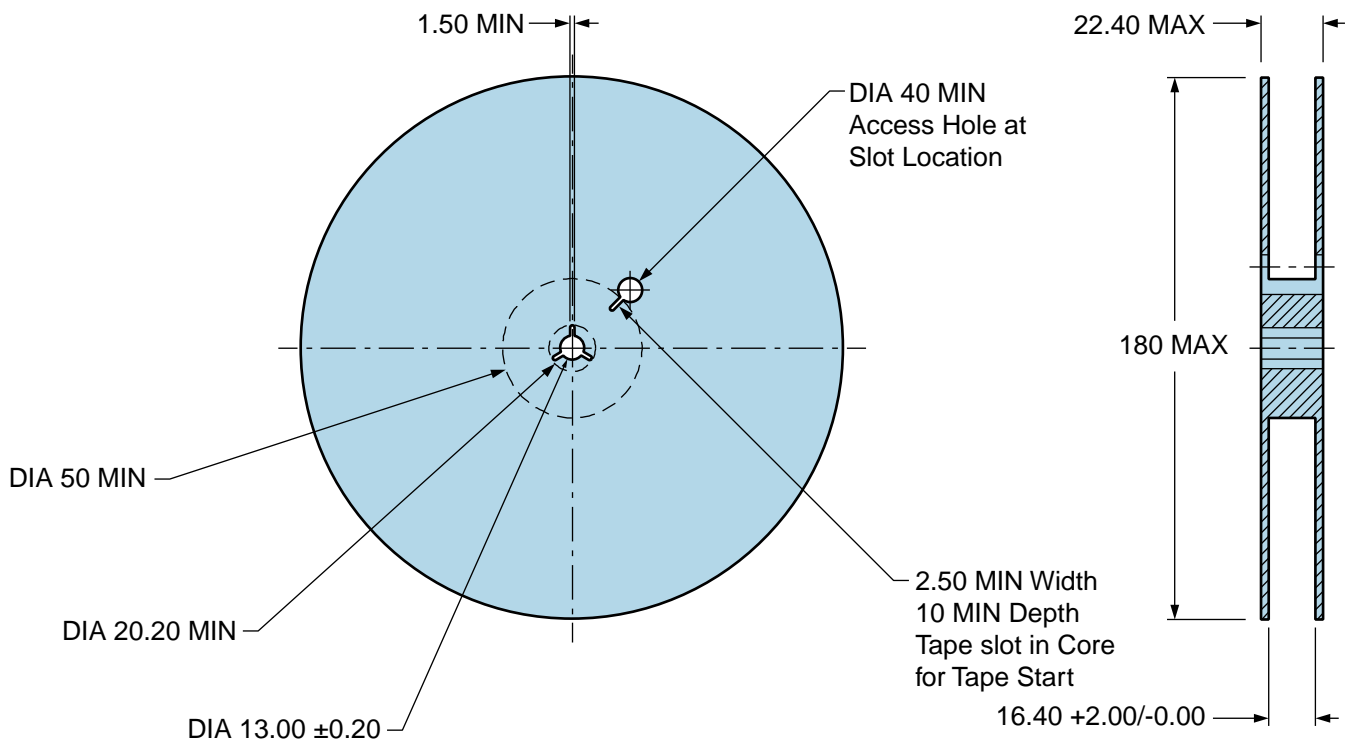
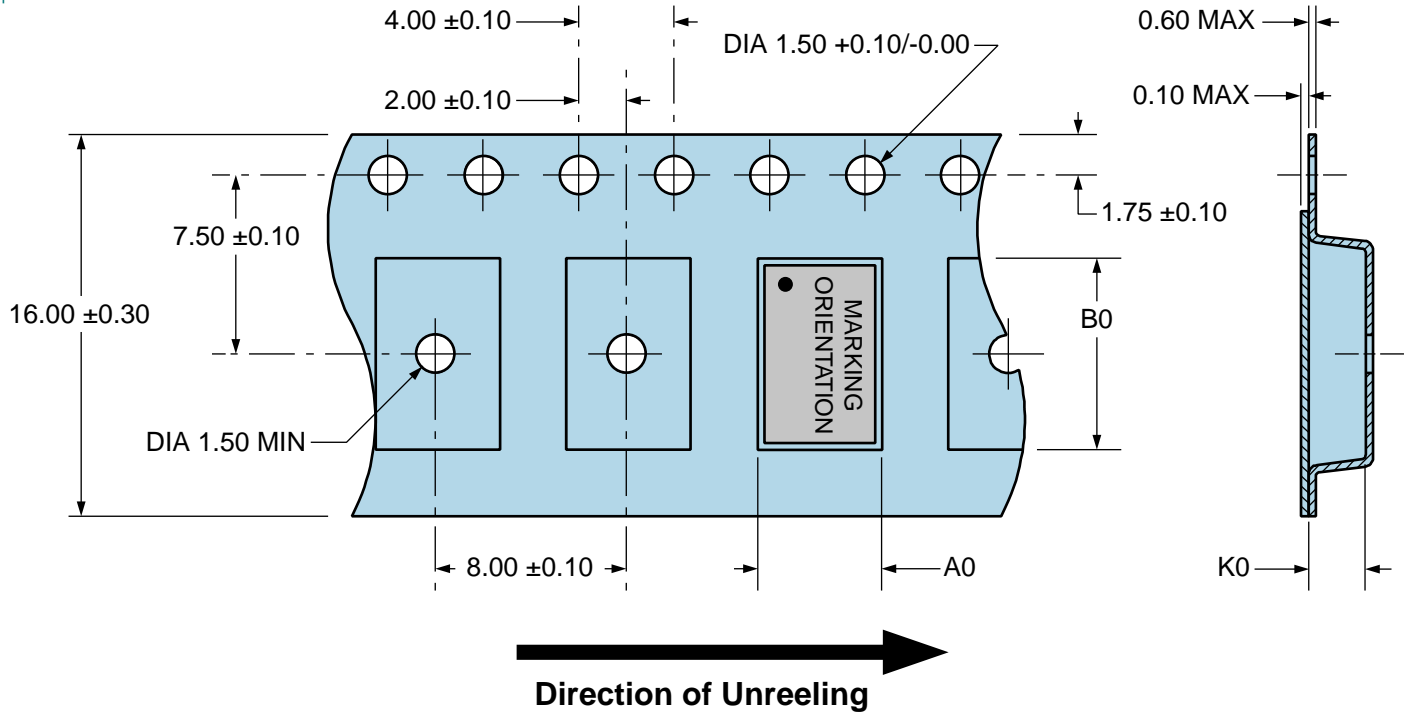
Note 2: A low capacitance ( $<12\text{pF}$ ), 10X attenuation factor, high impedance ( $>10\text{Mohms}$ ), and high bandwidth ( $>300\text{MHz}$ ) passive probe is recommended.

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

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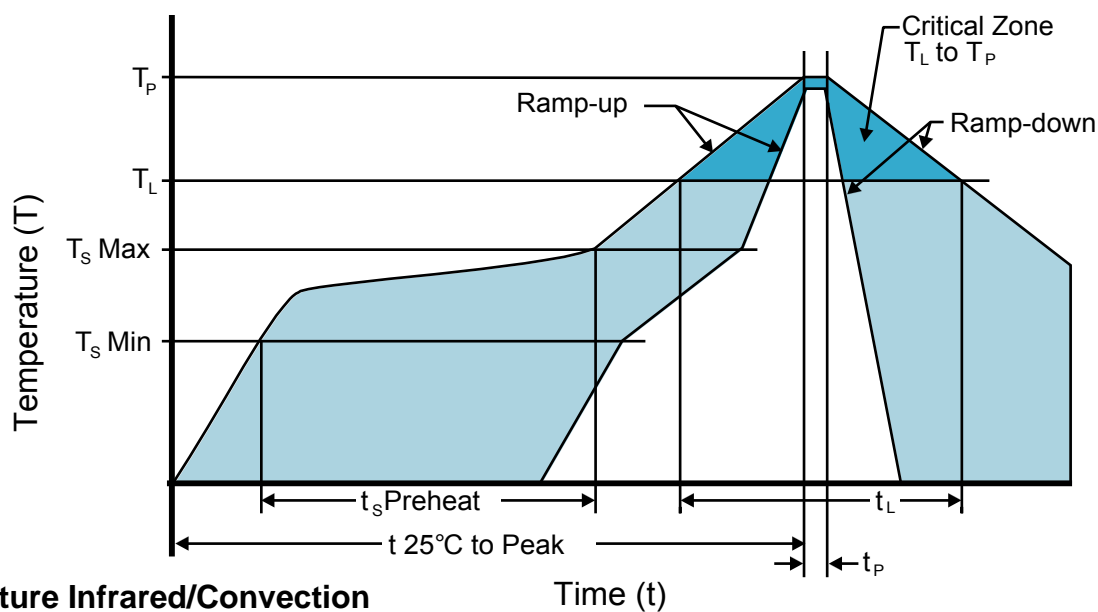
## Tape & Reel Dimensions

Quantity Per Reel: 1,000 units  
 All Dimensions in Millimeters  
 Compliant to EIA-481



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## Recommended Solder Reflow Methods

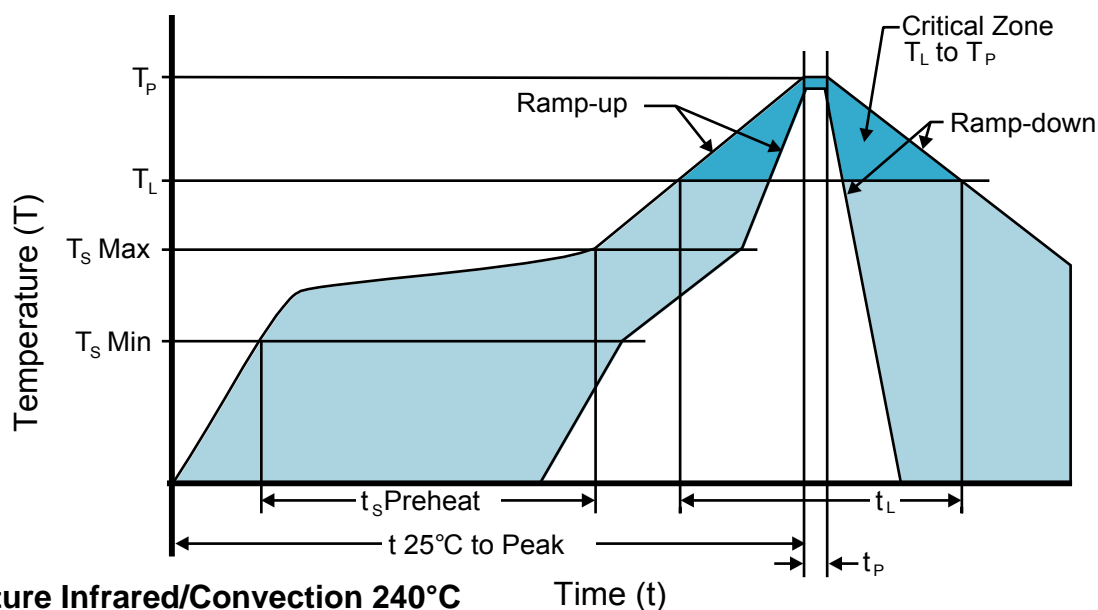


### High Temperature Infrared/Convection

<b>Ts MAX to Tl (Ramp-up Rate)</b>	3°C/second Maximum
<b>Preheat</b>	
- Temperature Minimum (Ts MIN)	150°C
- Temperature Typical (Ts TYP)	175°C
- Temperature Maximum (Ts MAX)	200°C
- Time (ts MIN)	60 - 180 Seconds
<b>Ramp-up Rate (Tl to Tp)</b>	3°C/second Maximum
<b>Time Maintained Above:</b>	
- Temperature (Tl)	217°C
- Time (tL)	60 - 150 Seconds
<b>Peak Temperature (Tp)</b>	260°C Maximum for 10 Seconds Maximum
<b>Target Peak Temperature (Tp Target)</b>	250°C +0/-5°C
<b>Time within 5°C of actual peak (tp)</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

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## Recommended Solder Reflow Methods



### Low Temperature Infrared/Convection 240°C

$T_s$  MAX to  $T_L$  (Ramp-up Rate) 5°C/second Maximum

#### Preheat

- 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

Ramp-up Rate ( $T_L$  to  $T_P$ ) 5°C/second Maximum

#### Time Maintained Above:

- Temperature ( $T_L$ ) 150°C  
 - Time ( $t_L$ ) 200 Seconds Maximum

Peak Temperature ( $T_P$ ) 240°C Maximum

Target Peak Temperature ( $T_P$  Target) 240°C Maximum 2 Times / 230°C Maximum 1 Time

Time within 5°C of actual peak ( $t_p$ ) 10 seconds Maximum 2 Times / 80 seconds Maximum 1 Time

Ramp-down Rate 5°C/second Maximum

Time 25°C to Peak Temperature (t) N/A

Moisture Sensitivity Level Level 1

### Low Temperature Manual Soldering

185°C Maximum for 10 seconds Maximum, 2 times Maximum.

### High Temperature Manual Soldering

260°C Maximum for 5 seconds Maximum, 2 times Maximum.