EC2600TS-48.000M

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CORPORATION

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EC26 00      TS -48.000M
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Series
RoHS Compliant (Pb-free) 3.3V 4 Pad 5mm x 7mm
Ceramic SMD LVCMOS Oscillator

Nominal Frequency
48.000MHz

Pin 1 Connection
Tri-State (High Impedance)

Frequency Tolerance/Stability
±100ppm Maximum

Duty Cycle
50 ±10(%)

Operating Temperature Range
-10°C to +70°C

ELECTRICAL SPECIFICATIONS

Nominal Frequency	48.000MHz
Frequency Tolerance/Stability	±100ppm Maximum (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Ouput Load Change, First Year Aging at 25°C, Shock, and Vibration)
Operating Temperature Range	-10°C to +70°C
Supply Voltage	3.3Vdc ±10%
Input Current	18mA Maximum
Output Voltage Logic High (Voh)	90% of Vdd Minimum (IOH=-8mA)
Output Voltage Logic Low (Vol)	10% of Vdd Maximum (IOL=+8mA)
Rise/Fall Time	3nSec Maximum (Measured at 20% to 80% of waveform)
Duty Cycle	50 ±10(%) (Measured at 50% of waveform)
Load Drive Capability	15pF Maximum
Output Logic Type	CMOS
Pin 1 Connection	Tri-State (High Impedance)
Tri-State Input Voltage (Vih and Vil)	+0.7Vdd Minimum or No Connect to Enable Output, +0.3Vdd Maximum to Disable Output (High Impedance)
Standby Current	10µA Maximum (Disabled Output: High Impedance)
RMS Phase Jitter	1pSec Maximum (12kHz to 20MHz offset frequency)
Start Up Time	10mSec Maximum
Storage Temperature Range	-55°C to +125°C

ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

ESD Susceptibility	MIL-STD-883, Method 3015, Class 1, HBM: 1500V
Fine Leak Test	MIL-STD-883, Method 1014, Condition A
Flammability	UL94-V0
Gross Leak Test	MIL-STD-883, Method 1014, Condition C
Mechanical Shock	MIL-STD-883, Method 2002, Condition B
Moisture Resistance	MIL-STD-883, Method 1004
Moisture Sensitivity	J-STD-020, MSL 1
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

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MECHANICAL DIMENSIONS (all dimensions in millimeters)

7.00 ±0.15

5.00 ±0.15

MARKING ORIENTATION

1.6 +0.2/-0.5

5.08 ±0.15

3

4

2

1

2.60 ±0.15

1.2 ±0.2

1.4 ±01

3.68 ±0.15

PIN	CONNECTION
1	Tri-State
2	Ground/Case Ground
3	Output
4	Supply Voltage

LINE	MARKING
1	**ECLIPTEK**
2	**48.000M**
3	**XXYZZ** *XX=Ecliptek Manufacturing Code* *Y=Last Digit of the Year* *ZZ=Week of the Year*

Suggested Solder Pad Layout

All Dimensions in Millimeters

2.0 (X4)

2.2 (X4)

Solder Land (X4)

2.88

1.81

All Tolerances are ±0.1

OUTPUT WAVEFORM & TIMING DIAGRAM

TRI-STATE INPUT

V_{IH}

V_{IL}

CLOCK OUTPUT

V_{OH}
80% of Waveform
50% of Waveform
20% of Waveform
V_{OL}

OUTPUT DISABLE (HIGH IMPEDANCE STATE)

t_{PLZ}

t_{PZL}

Fall Time

Rise Time

T_W

T

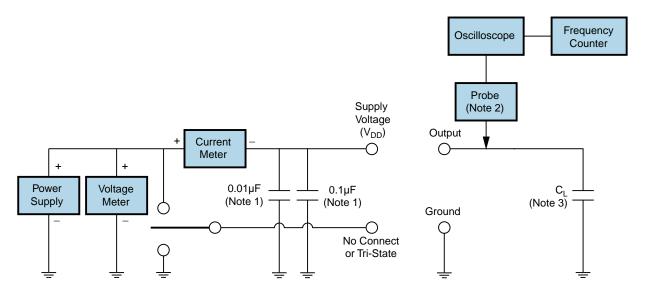Duty Cycle (%) = T_W/T x 100

Test Circuit for CMOS Output

Supply Voltage (V_{DD})

+ Current Meter −

Power Supply +

Voltage Meter +

0.01µF (Note 1)

0.1µF (Note 1)

No Connect or Tri-State

Oscilloscope

Frequency Counter

Probe (Note 2)

Output

Ground

C_L (Note 3)

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

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

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

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Recommended Solder Reflow Methods

High Temperature Infrared/Convection

T$_S$ MAX to T$_L$ (Ramp-up Rate)	3°C/second Maximum
Preheat	
- 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
Ramp-up Rate (T$_L$ to T$_P$)	3°C/second Maximum
Time Maintained Above:	
- Temperature (T$_L$)	217°C
- Time (t$_L$)	60 - 150 Seconds
Peak Temperature (T$_P$)	260°C Maximum for 10 Seconds Maximum
Target Peak Temperature (T$_P$ Target)	250°C +0/-5°C
Time within 5°C of actual peak (t$_p$)	20 - 40 seconds
Ramp-down Rate	6°C/second Maximum
Time 25°C to Peak Temperature (t)	8 minutes Maximum
Moisture Sensitivity Level	Level 1
Additional Notes	Temperatures shown are applied to body of device.

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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 1 Time / 230°C Maximum 2 Times
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
Additional Notes	Temperatures shown are applied to body of device.

Low Temperature Manual Soldering

185°C Maximum for 10 seconds Maximum, 2 times Maximum. (Temperatures shown are applied to body of device.)

High Temperature Manual Soldering

260°C Maximum for 5 seconds Maximum, 2 times Maximum. (Temperatures shown are applied to body of device.)