

EP1145HSETTSL-48.636M [↗](#)

Lead Free  COMPLIANT	EU RoHS 2011/65 COMPLIANT	REACH 144 SVHC COMPLIANT
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ITEM DESCRIPTION

Quartz Crystal Clock Oscillators XO (SPXO) HCMOS/TTL (CMOS) 5.0Vdc 8 Pin DIP Metal Thru-Hole 48.636MHz \pm 50ppm - 40°C to +85°C

ELECTRICAL SPECIFICATIONS

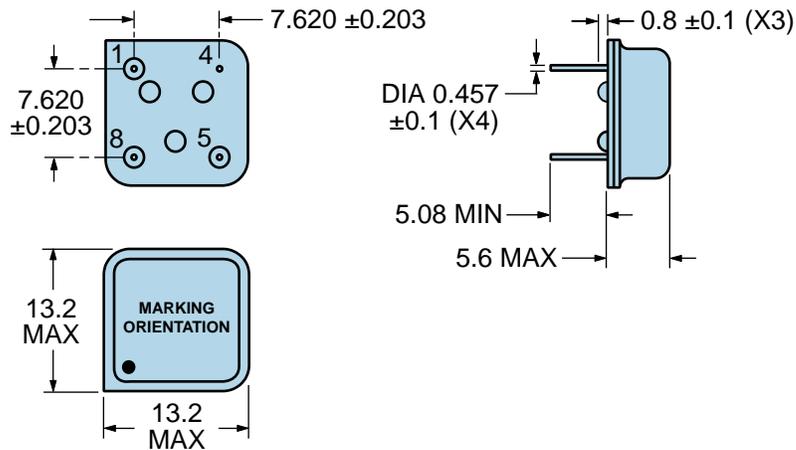
Nominal Frequency	48.636MHz
Frequency Tolerance/Stability	\pm 50ppm Maximum (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, First Year Aging at 25°C, Shock, and Vibration)
Aging at 25°C	\pm 5ppm/year Maximum
Operating Temperature Range	-40°C to +85°C
Supply Voltage	5.0Vdc \pm 10%
Input Current	45mA Maximum (Unloaded)
Output Voltage Logic High (Voh)	2.4Vdc Minimum (IOH=-16mA)
Output Voltage Logic Low (Vol)	0.4Vdc Maximum (IOL=+16mA)
Rise/Fall Time	4nSec Maximum (Measured at 0.8Vdc to 2.0Vdc)
Duty Cycle	50 \pm 10(%) (Measured at 1.4Vdc with TTL Load; Measured at 50% of waveform with HCMOS Load)
Load Drive Capability	5TTL Load Maximum
Output Logic Type	TTL
Pin 1 Connection	Tri-State (Disabled Output: High Impedance)
Pin 1 Input Voltage (Vih and Vil)	+2.0Vdc Minimum to enable output, +0.8Vdc Maximum to disable output, No Connect to enable output.
Disable Current	30mA Maximum (Pin 1 = Ground)
Standby Current	50 μ A Maximum (Pin 1 = Ground)
Peak to Peak Jitter (tPK)	100pSec Maximum, 50pSec Typical
RMS Period Jitter (tRMS)	13pSec Maximum, 8pSec Typical
Start Up Time	10mSec Maximum
Storage Temperature Range	-55°C to +125°C

ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

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

EP1145HSETTSL-48.636M [↗](#)

MECHANICAL DIMENSIONS (all dimensions in millimeters)

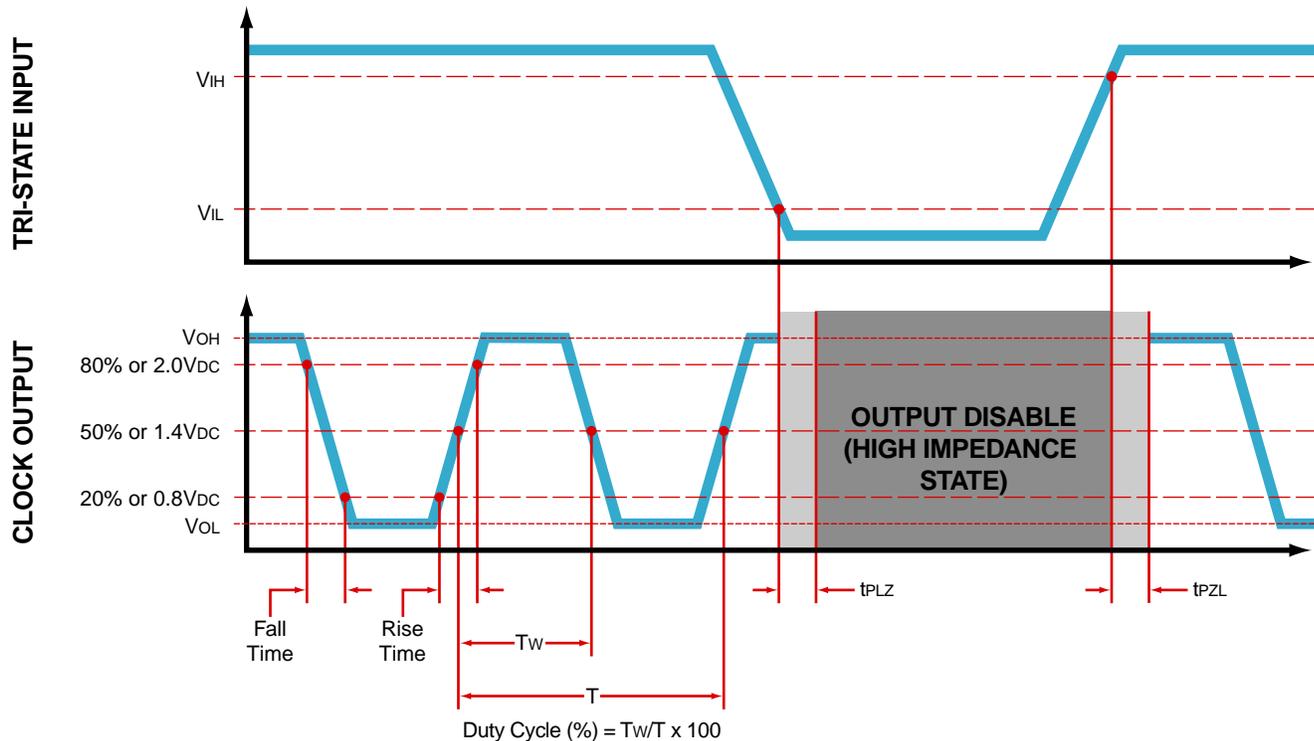


PIN	CONNECTION
1	Tri-State (High Impedance)
4	Case/Ground
5	Output
8	Supply Voltage

LINE	MARKING
1	ECLIPTEK
2	EP11TS <i>EP11=Product Series</i>
3	48.636M
4	XXYZZ <i>XX=Ecliptek Manufacturing Code</i> <i>Y=Last Digit of the Year</i> <i>ZZ=Week of the Year</i>

EP1145HSETTSL-48.636M

OUTPUT WAVEFORM & TIMING DIAGRAM

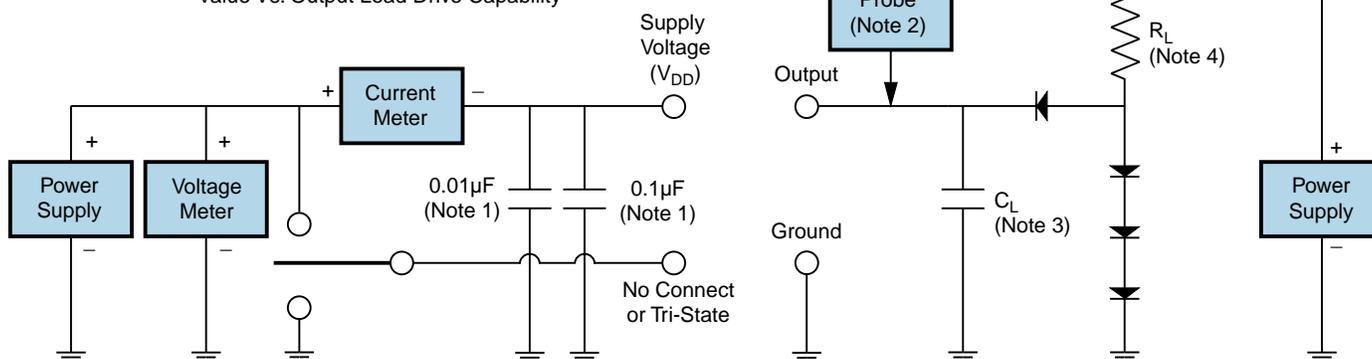


EP1145HSETTSL-48.636M

Test Circuit for TTL Output

Output Load Drive Capability	R_L Value (Ohms)	C_L Value (pF)
10TTL	390	15
5TTL	780	15
2TTL	1100	6
10LSTTL	2000	15
1TTL	2200	3

Table 1: R_L Resistance Value and C_L Capacitance Value Vs. Output Load Drive Capability



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.

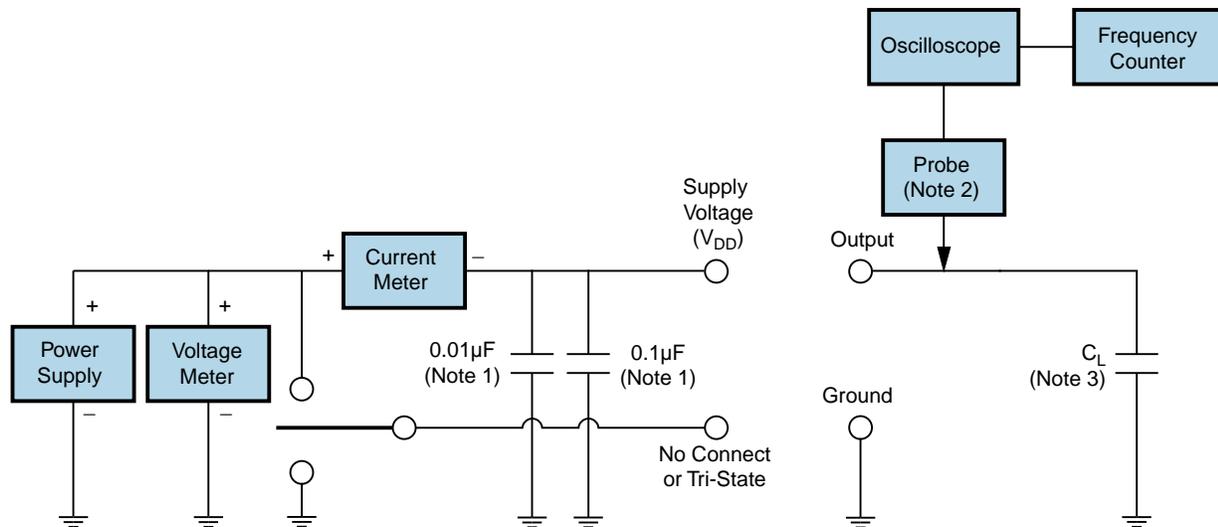
Note 3: Capacitance value C_L includes sum of all probe and fixture capacitance.

Note 4: Resistance value R_L is shown in Table 1. See applicable specification sheet for 'Load Drive Capability'.

Note 5: All diodes are MMBD7000, MMBD914, or equivalent.

EP1145HSETTSL-48.636M

Test Circuit for CMOS Output



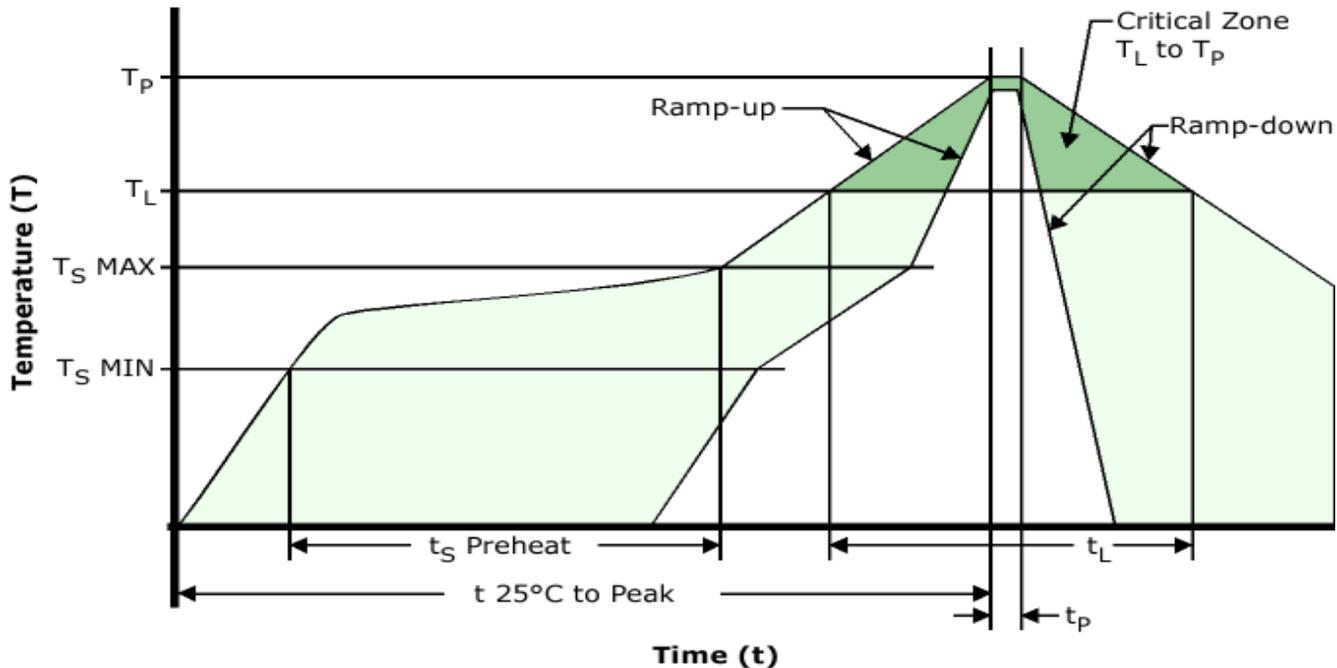
Note 1: An external $0.1\mu\text{F}$ low frequency tantalum bypass capacitor in parallel with a $0.01\mu\text{F}$ high frequency ceramic bypass capacitor close to the package ground and V_{DD} pin is required.

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.

EP1145HSETTSL-48.636M [↗](#)

Recommended Solder Reflow Methods



High Temperature Solder Bath (Wave Solder)

Ts MAX to TL (Ramp-up Rate) 3°C/Second Maximum

Preheat

- Temperature Minimum (Ts MIN) 150°C
- Temperature Typical (Ts TYP) 175°C
- Temperature Maximum (Ts MAX) 200°C
- Time (ts MIN) 60 - 180 Seconds

Ramp-up Rate (TL to TP) 3°C/Second Maximum

Time Maintained Above:

- Temperature (TL) 217°C
- Time (tL) 60 - 150 Seconds

Peak Temperature (TP) 260°C Maximum for 10 Seconds Maximum

Target Peak Temperature (TP Target) 250°C +0/-5°C

Time within 5°C of actual peak (tp) 20 - 40 Seconds

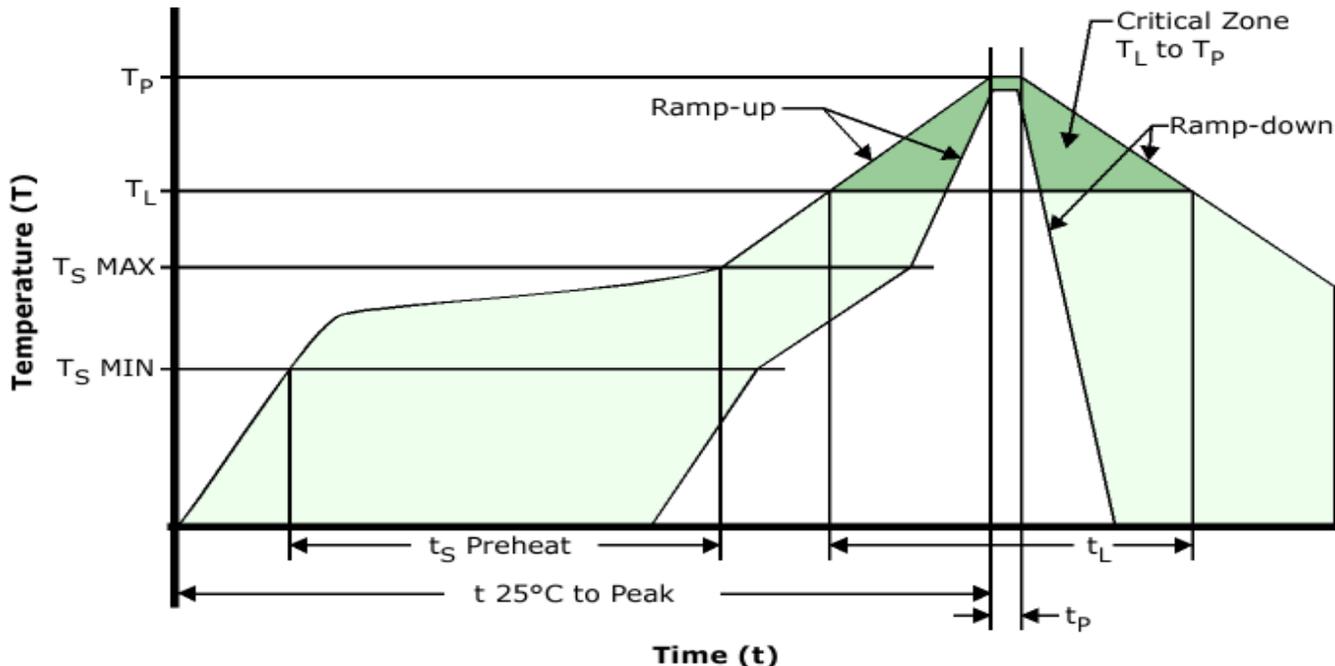
Ramp-down Rate 6°C/Second Maximum

Time 25°C to Peak Temperature (t) 8 Minutes Maximum

Moisture Sensitivity Level Level 1

EP1145HSETTSL-48.636M [↗](#)

Recommended Solder Reflow Methods



Low Temperature Infrared/Convection 185°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) 185°C Maximum

Target Peak Temperature (T_P Target) 185°C Maximum 2 Times

Time within 5°C of actual peak (t_p) 10 Seconds Maximum 2 Times

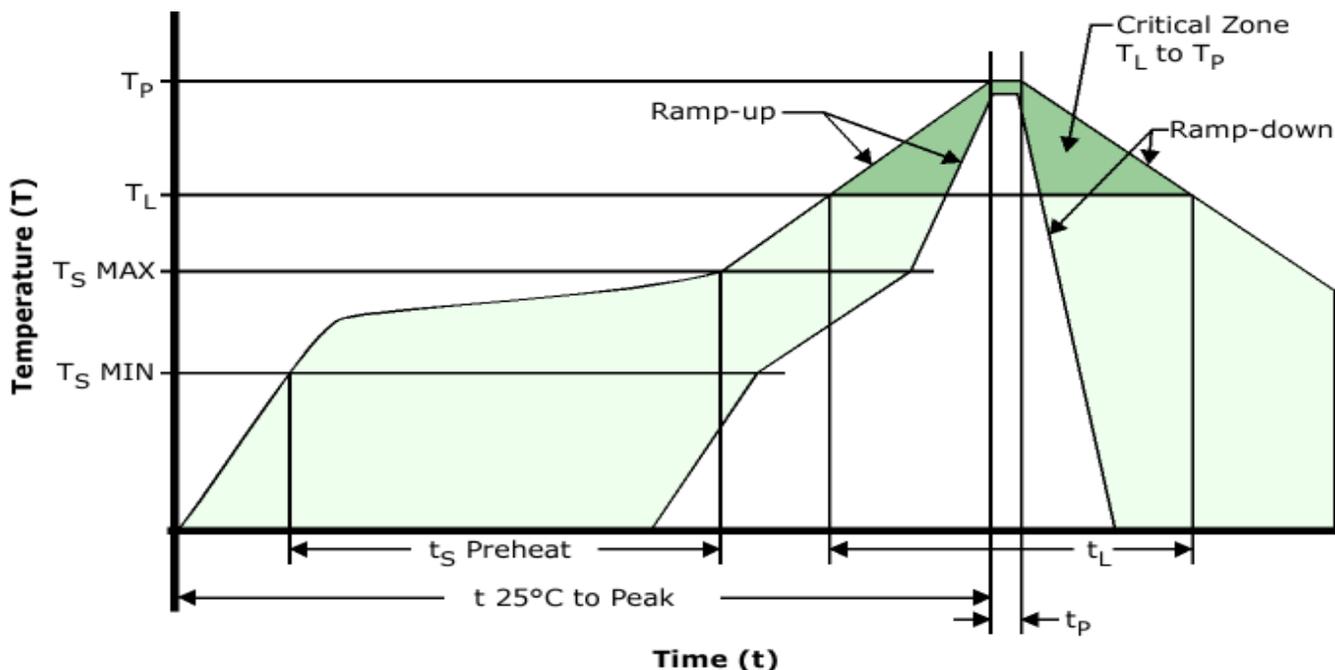
Ramp-down Rate 5°C/Second Maximum

Time 25°C to Peak Temperature (t) N/A

Moisture Sensitivity Level Level 1

EP1145HSETTSL-48.636M [↗](#)

Recommended Solder Reflow Methods



Low Temperature Solder Bath (Wave Solder)

$T_S \text{ MAX}$ to T_L (Ramp-up Rate)	5°C/Second Maximum
Preheat	
- Temperature Minimum ($T_S \text{ MIN}$)	N/A
- Temperature Typical ($T_S \text{ TYP}$)	150°C
- Temperature Maximum ($T_S \text{ MAX}$)	N/A
- Time ($t_s \text{ MIN}$)	30 - 60 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)	245°C Maximum
Target Peak Temperature ($T_P \text{ Target}$)	245°C Maximum 1 Time / 235°C Maximum 2 Times
Time within 5°C of actual peak (t_p)	5 Seconds Maximum 1 Time / 15 Seconds Maximum 2 Times
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.