WINSOURCE
ELECTRONICS

THE DATASHEET OF

EH2500TS-24.000M

ABRACON

Engineering/Process Change Notice

ECN/PCN No.: 4457

For Manufacturer

Product Description: Ceramic SMD Crystal Oscillator	**Abracon Part Number / Part Series:** EH25 Series	☐ Documentation only ☒ ECN ☒ EOL	☒ Series ☐ Part Number
Affected Revision: Rev. G 06/08/2012	**New Revision:** EOL	**Application:**	☐ Safety ☒ Non-Safety

Prior to Change:
ACTIVE

After Change:
EOL

Cause/Reason for Change:
Discontinuation of manufacturing capability

Change Plan

Effective Date: 11/15/2022	**Additional Remarks:** N/A

Change Declaration:
N/A

Issued Date: 11/15/22	**Issued By:** *Conor Healey*	**Issued Department:** Engineering
Approval: *Thomas Culhane* Engineering Director	**Approval:** *Reuben Quintanilla* Quality Director	**Approval:** *Ying Huang* Purchasing Director

For Abracon EOL only

Last Time Buy (if applicable): 02-15-2023 Based upon material availability, contact Abracon for details	**Alternate Part Number / Part Series:** ASL, FO7HH

Additional Approval:	**Additional Approval:**	**Additional Approval:**

Customer Approval (If Applicable)

Qualification Status:

☐ Approved ☐ Not accepted

Note: It is considered approved if there is no feedback from the customer 1 month after ECN/PCN is released.

Customer Part Number:	**Customer Project:**

Company Name:	**Company Representative:**	**Representative Signature:**

Customer Remarks:

REGULATORY COMPLIANCE

Lead Free Pb COMPLIANT

EU RoHS 2011/65 + 2015/863 COMPLIANT

China RoHS COMPLIANT

REACH SVHC COMPLIANT

DRC CONFLICT FREE

ITEM DESCRIPTION

Quartz Crystal Clock Oscillators XO (SPXO) HCMOS/TTL (CMOS) 5.0Vdc 4 Pad 5.0mm x 7.0mm Ceramic Surface Mount (SMD)

ELECTRICAL SPECIFICATIONS

Nominal Frequency	1MHz to 155.52MHz
Frequency Tolerance/Stability	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 ±100ppm Maximum ±20ppm Maximum ±25ppm Maximum ±50ppm Maximum
Aging at 25°C	±5ppm/year Maximum
Operating Temperature Range	0°C to +70°C -40°C to +85°C
Supply Voltage	5.0Vdc ±10%
Input Current	No Load 50mA Maximum
Output Voltage Logic High (V_{Oh})	IOH= -16mA 2.4Vdc Minimum with TTL Load, Vdd-0.4Vdc Minimum with HCMOS Load
Output Voltage Logic Low (V_{Ol})	IOL= +16mA 0.4Vdc Maximum with TTL Load, 0.5Vdc Maximum with HCMOS Load
Rise/Fall Time	Measured at 0.8Vdc to 2.0Vdc with TTL Load; Measured at 20% to 80% of waveform with HCMOS Load 6nSec Maximum over Nominal Frequency of 1MHz to 70MHz 4nSec Maximum over Nominal Frequency of 70.000001MHz to 155.52MHz
Duty Cycle	50 ±10 (%) (Measured at 1.4Vdc with TTL Load; Measured at 50% of waveform with HCMOS Load over Nominal Frequency range of 1MHz to 70MHz; Measured at 50% of waveform with TTL Load or with HCMOS Load over Nominal Frequency range of 70.000001MHz to 155.52MHz) 50 ±5 (%) (Measured at 50% of waveform with TTL Load or with HCMOS Load)
Load Drive Capability	10TTL Load or 50pF HCMOS Load Maximum over Nominal Frequency of 1MHz to 70MHz 5TTL Load or 15pF HCMOS Load Maximum over Nominal Frequency of 70.000001MHz to 155.52MHz
Output Logic Type	CMOS
Pin 1 Connection	Tri-State (High Impedance)
Tri-State Input Voltage (Vih and Vil)	+2.2Vdc Minimum to enable output, +0.8Vdc Maximum to disable output (High Impedance), No Connect to enable output.
Absolute Clock Jitter	±250pSec Maximum, ±100pSec Typical
One Sigma Clock Period Jitter	±50pSec Maximum, ±30pSec Typical
Start Up Time	10mSec Maximum
Storage Temperature Range	-55°C to +125°C

PART NUMBERING GUIDE

EH25 45 ET T TS -70.000M TR

Series
Quartz Crystal Clock Oscillators XO (SPXO)
HCMOS/TTL (CMOS) 5.0Vdc 4 Pad 5.0mm x 7.0mm
Ceramic Surface Mount (SMD)

Frequency Tolerance/Stability
00 = ±100ppm Maximum
20 = ±20ppm Maximum
25 = ±25ppm Maximum
45 = ±50ppm Maximum

Operating Temperature Range
Blank = 0°C to +70°C
ET = -40°C to +85°C

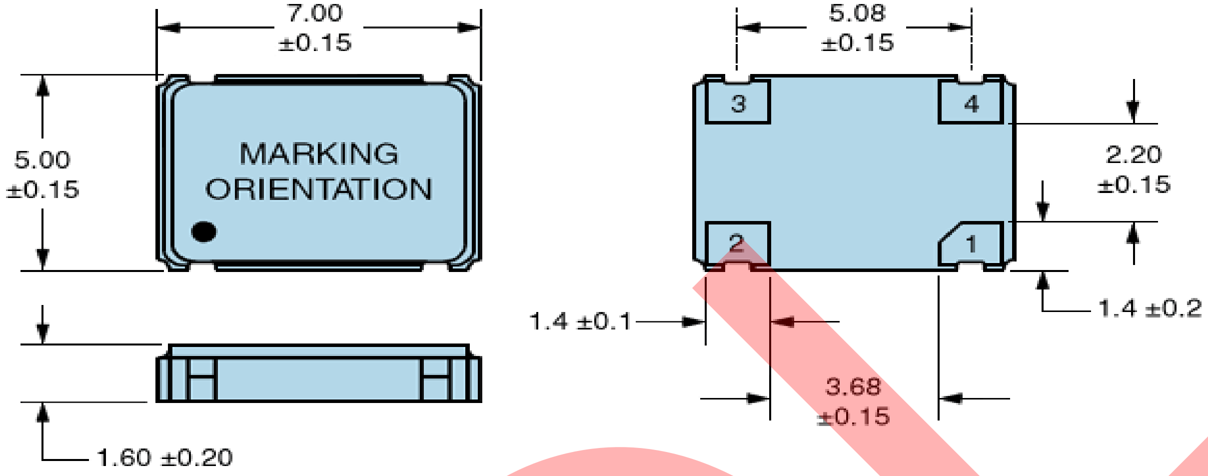
Duty Cycle
Blank = 50 ±10 (%)
T = 50 ±5 (%)

Pin 1 Connection
TS = Tri-State (High Impedance)

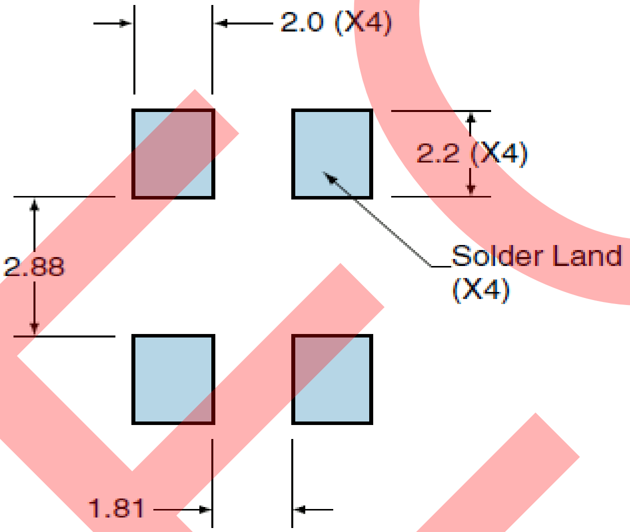
Nominal Frequency

Packaging Options
Blank = Bulk (Cut Tape)
TR = Tape & Reel

MECHANICAL DIMENSIONS



SUGGESTED SOLDER PAD LAYOUT

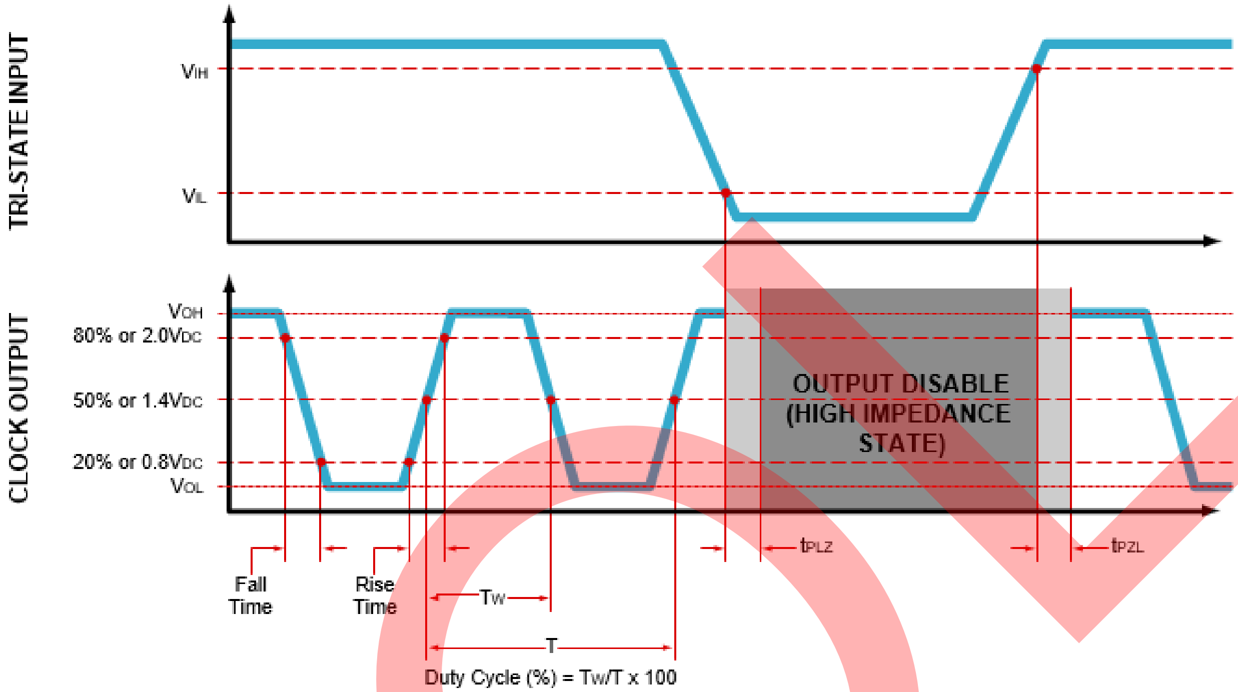


PIN	CONNECTION
1	Tri-State
2	Ground
3	Output
4	Supply Voltage

All Tolerances are ±0.1

All Dimensions in Millimeters

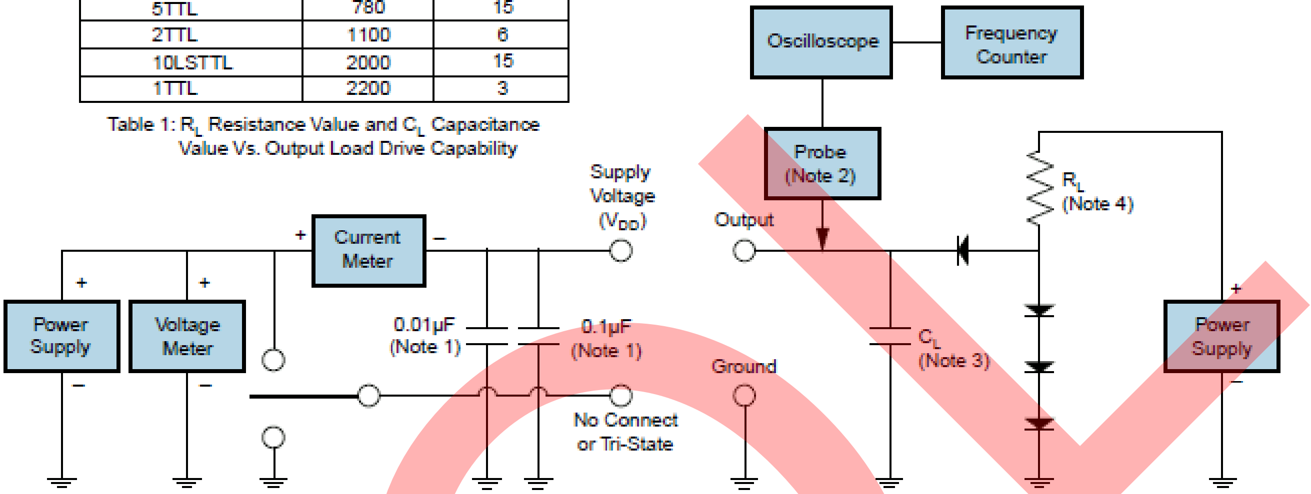
OUTPUT WAVEFORM & TIMING DIAGRAM



TEST CIRCUIT FOR TTL OUTPUT

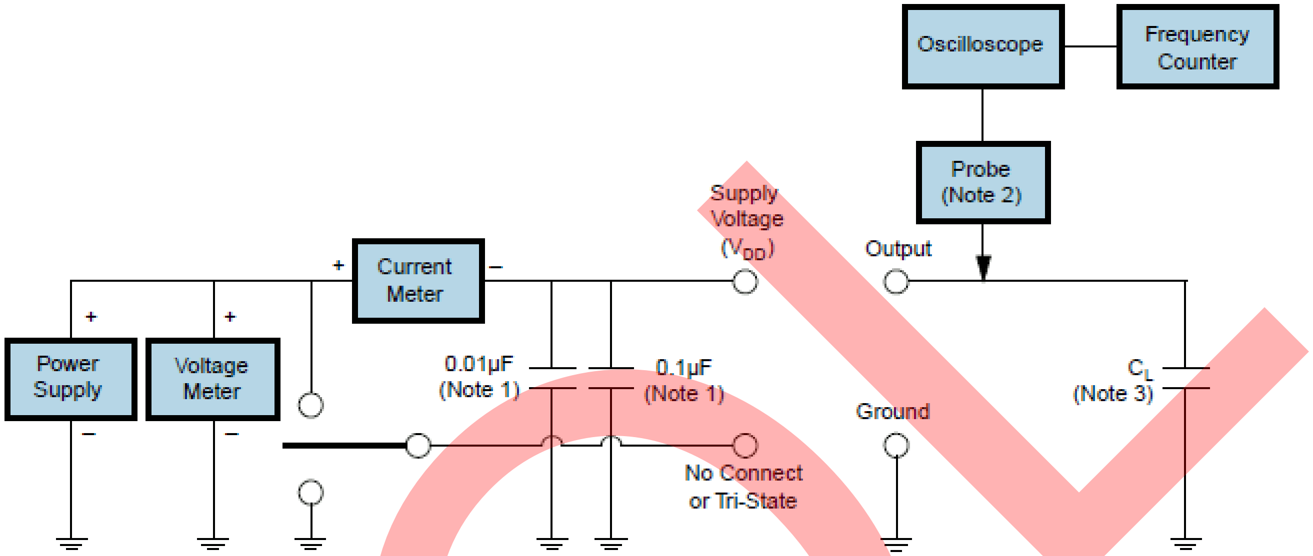
Output Load Drive Capability	R_L Value (Ohms)	C_L Value (pF)
10TTL	390	15
5TTL	780	15
2TTL	1100	6
10LSTTL	2000	15
1TTL	2200	3

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 attentuation 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 â€˜Load Drive Capabilityâ€™.
Note 5: All diodes are MMBD7000, MMBD914, or equivalent.

TEST CIRCUIT FOR CMOS OUTPUT



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 attentuation factor, high impedance (>10Mohms), and high bandwidth (>300MHz) passive Probe is recommended.

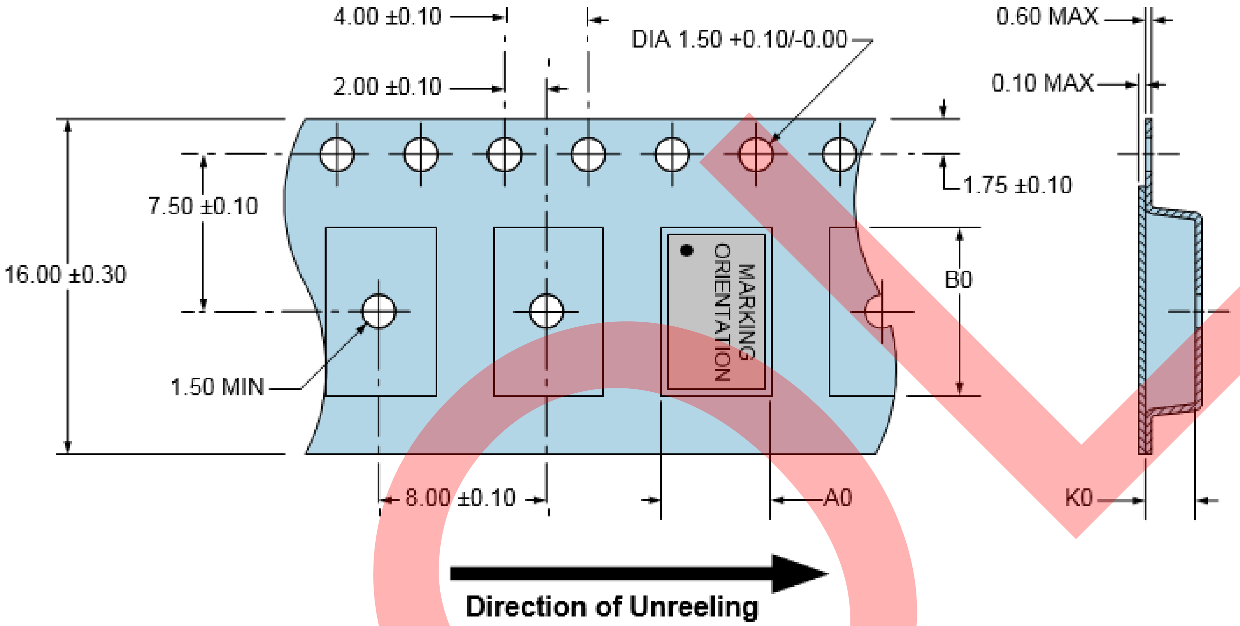
Note 3: Capacitance value C_L includes sum of all probe and fixture capacitance.

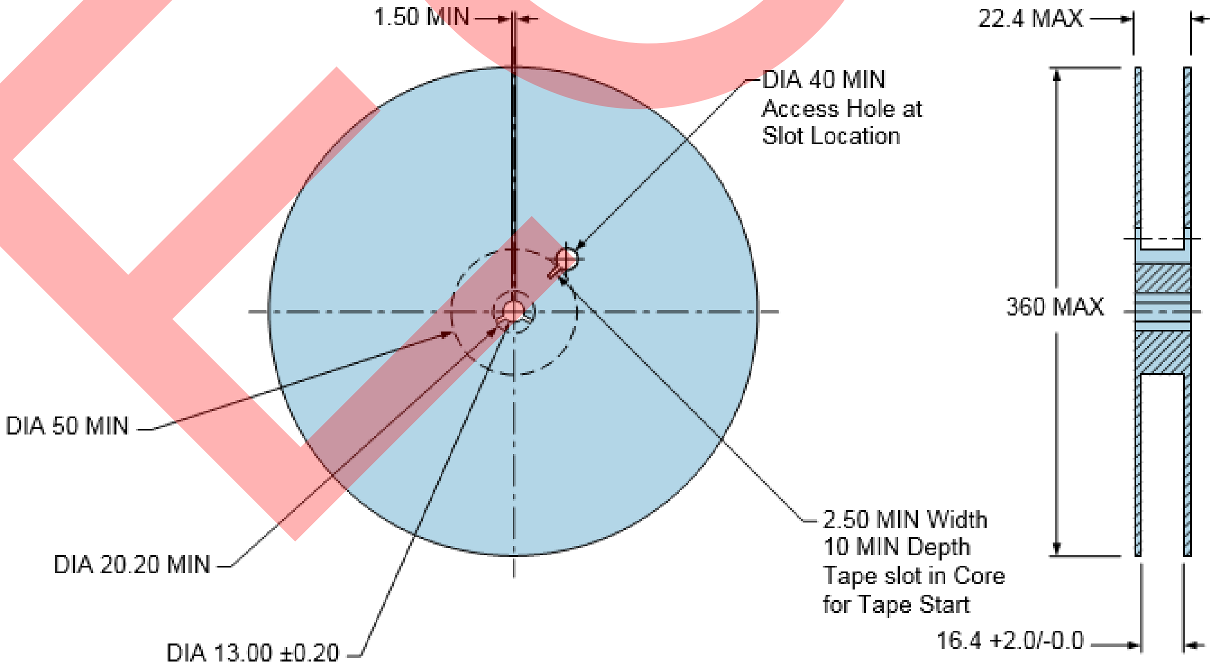
TAPE & REEL DIMENSIONS

Quantity per Reel: 1,000 Units

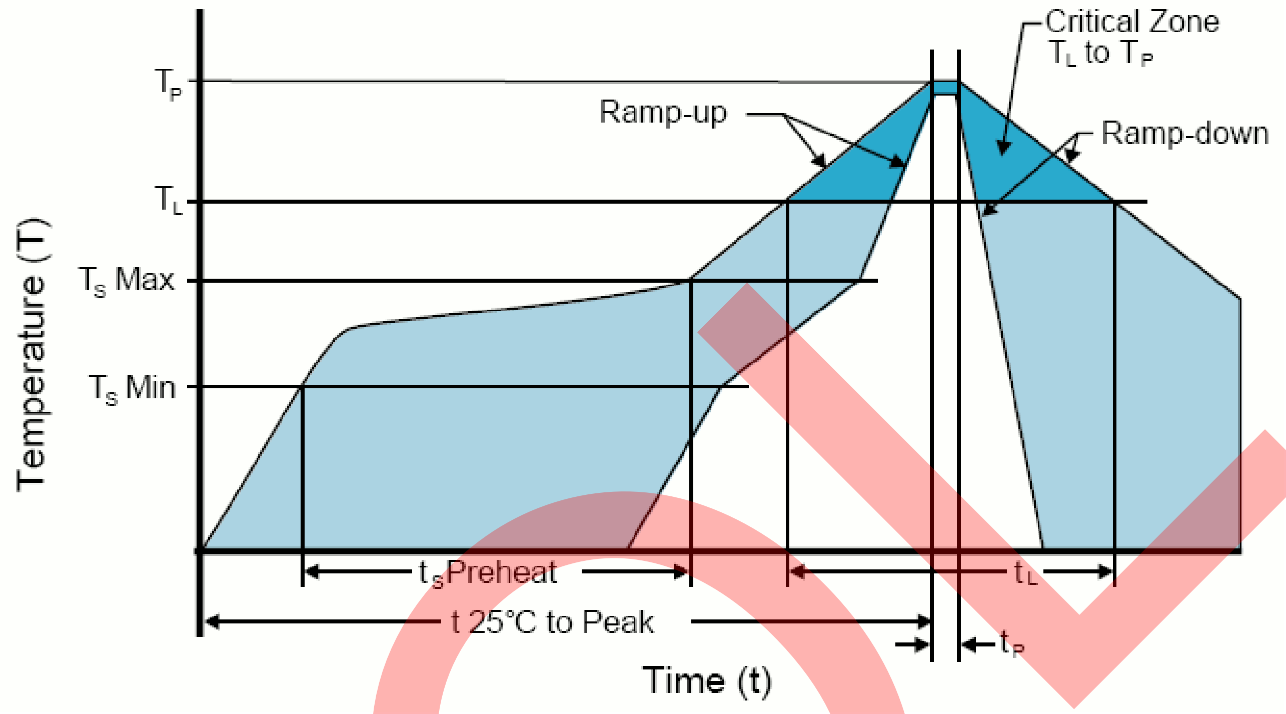
All Dimensions in Millimeters

Compliant to EIA-481





RECOMMENDED SOLDER REFLOW METHOD

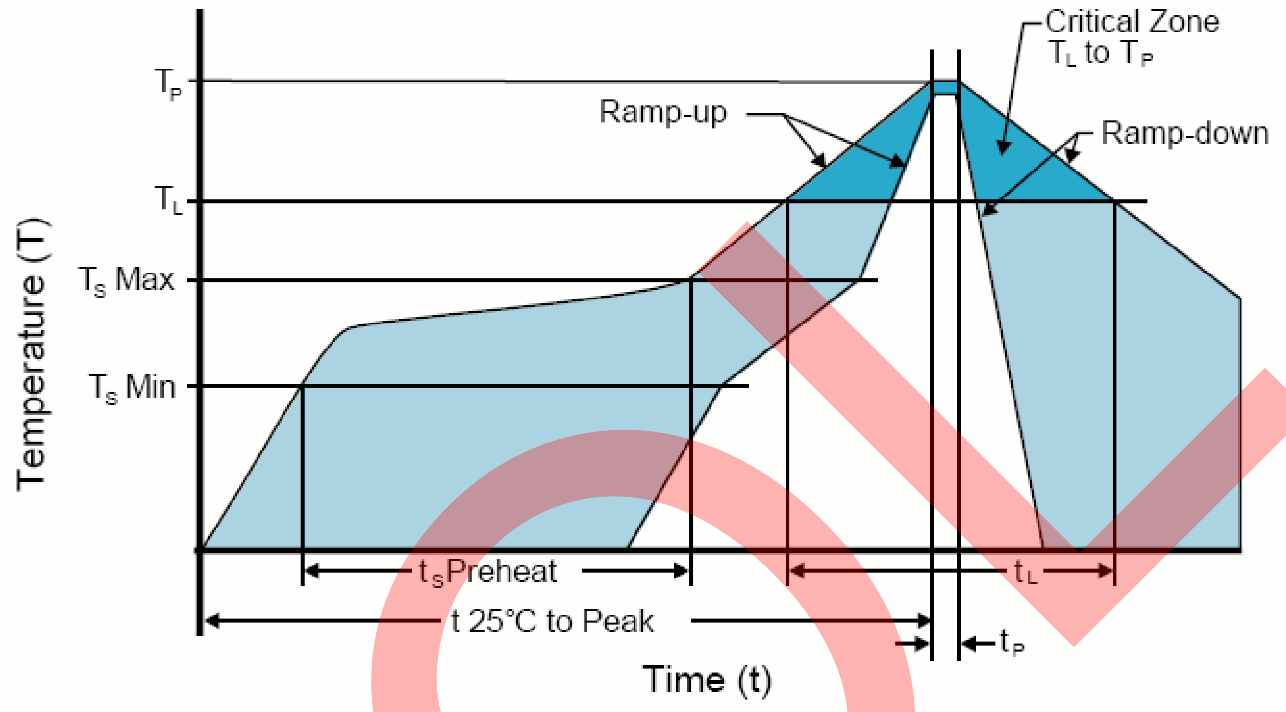


HIGH TEMPERATURE INFRARED/CONVECTION	
T_S MAX to T_L (Ramp-up Rate)	3°C/Second Maximum
Preheat **- Temperature Minimum (T_S MIN)** **- Temperature Typical (T_S TYP)** **- Temperature Maximum(T_S MAX)** **- Time (t_S MIN)**	150°C 175°C 200°C 60 - 180 Seconds
Ramp-up Rate (T_L to T_P)	3°C/Second Maximum
Time Maintained Above: **- Temperature (T_L)** **- Time (t_L)**	217°C 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.

High Temperature Manual Soldering

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

RECOMMENDED SOLDER REFLOW METHOD



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)** **- Temperature Typical (T_s TYP)** **- Temperature Maximum(T_s MAX)** **- Time (t_s MIN)**	N/A 150°C N/A 60 - 120 Seconds
Ramp-up Rate (T_L to T_P)	5°C/Second Maximum
Time Maintained Above: **- Temperature (T_L)** **- Time (t_L)**	150°C 200Seconds Maximum
Peak Temperature (T_P)	240°C
Target Peak Temperature(T_P Target)	240°C Maximum 2 Times/230˚C Maximum 1Time
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.)