

# EP1300ETPD-19.659M

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## REGULATORY COMPLIANCE (Data Sheet downloaded on May 3, 2017)



◀ Click badges to download compliance docs

Regulatory Compliance standards are subject to updates by governing bodies. Click the badges to download the latest compliance docs for this part number directly from Ecliptek.



## ITEM DESCRIPTION

Quartz Crystal Clock Oscillators XO (SPXO) LVCMOS (CMOS) 3.3Vdc 14 Pin DIP Metal Thru-Hole 19.659MHz ±100ppm -40°C to +85°C

## ELECTRICAL SPECIFICATIONS

|                                   |                                                                                                                                                                                                                                   |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nominal Frequency                 | 19.659MHz                                                                                                                                                                                                                         |
| Frequency Tolerance/Stability     | ±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) |
| Aging at 25°C                     | ±5ppm/year Maximum                                                                                                                                                                                                                |
| Operating Temperature Range       | -40°C to +85°C                                                                                                                                                                                                                    |
| Supply Voltage                    | 3.3Vdc ±10%                                                                                                                                                                                                                       |
| Input Current                     | 28mA Maximum (Unloaded)                                                                                                                                                                                                           |
| Output Voltage Logic High (Voh)   | Vdd-0.4Vdc Minimum (IOH = -8mA)                                                                                                                                                                                                   |
| Output Voltage Logic Low (Vol)    | 0.4Vdc Maximum (IOL = +8mA)                                                                                                                                                                                                       |
| Rise/Fall Time                    | 4nSec Maximum (Measured at 20% to 80% of waveform)                                                                                                                                                                                |
| Duty Cycle                        | 50 ±10(%) (Measured at 50% of waveform)                                                                                                                                                                                           |
| Load Drive Capability             | 30pF Maximum                                                                                                                                                                                                                      |
| Output Logic Type                 | CMOS                                                                                                                                                                                                                              |
| Pin 1 Connection                  | Power Down (Disable Output: Logic Low)                                                                                                                                                                                            |
| Pin 1 Input Voltage (Vih and Vil) | 70% of Vdd Minimum to enable output, 20% of Vdd Maximum to disable output, No Connect to enable output.                                                                                                                           |
| Disable Current                   | 16mA Maximum (Pin 1 = Ground)                                                                                                                                                                                                     |
| Standby Current                   | 20µA Maximum (Pin 1 = Ground)                                                                                                                                                                                                     |
| Peak to Peak Jitter (tPK)         | 100pSec Maximum, 60pSec Typical                                                                                                                                                                                                   |
| RMS Period Jitter (tRMS)          | 13pSec Maximum, 10pSec Typical                                                                                                                                                                                                    |
| Start Up Time                     | 10mSec Maximum                                                                                                                                                                                                                    |
| Storage Temperature Range         | -55°C to +125°C                                                                                                                                                                                                                   |

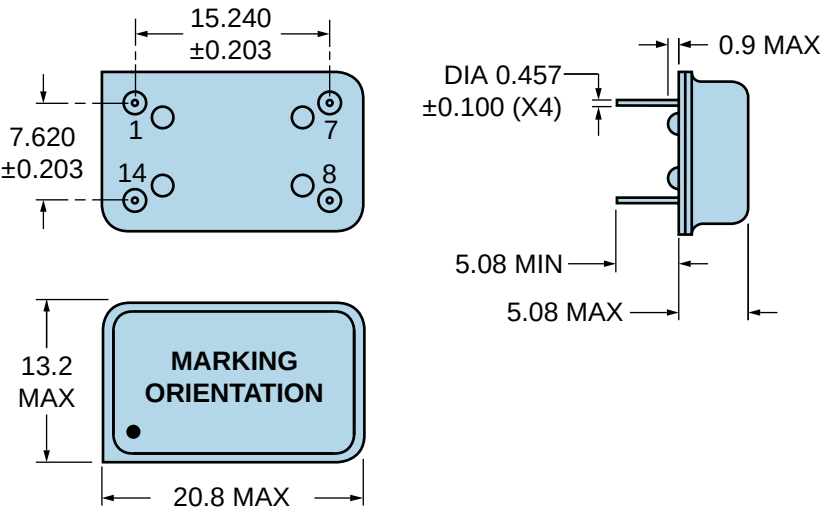
## ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

|                              |                                       |
|------------------------------|---------------------------------------|
| 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 |

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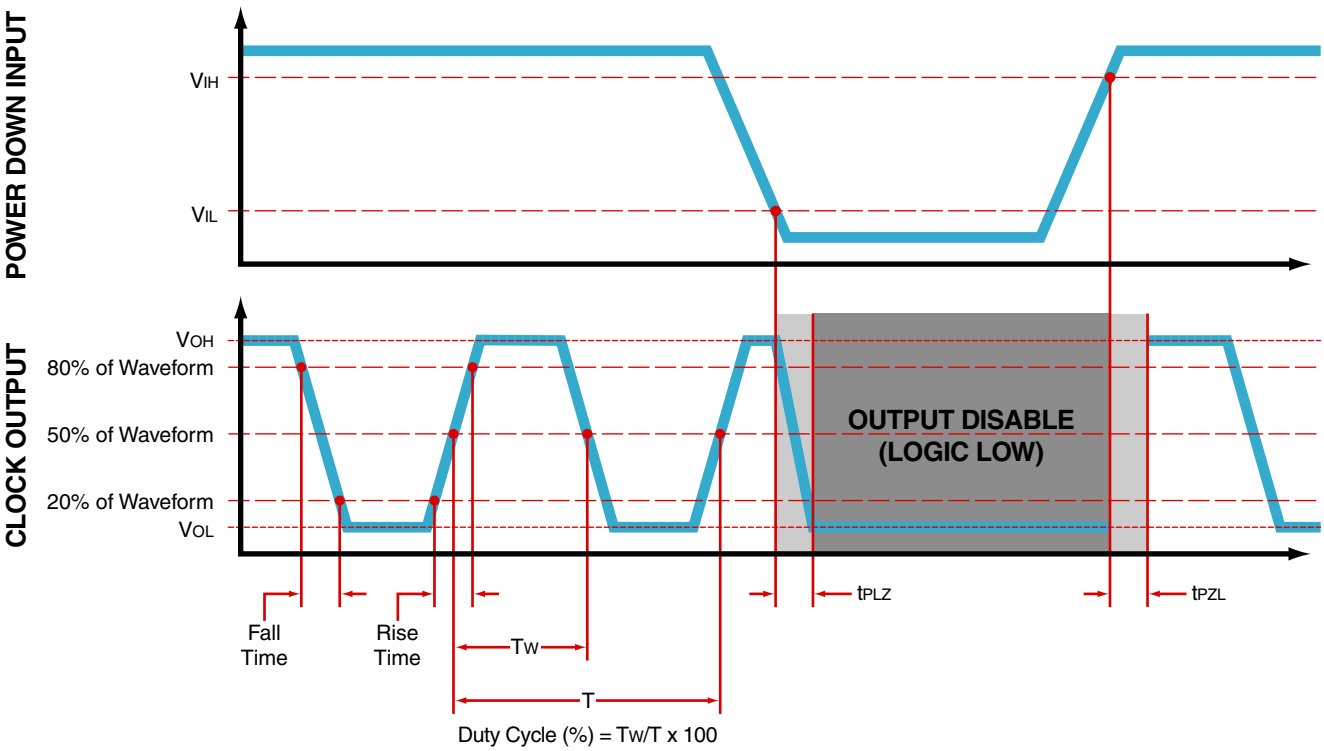
MECHANICAL DIMENSIONS (all dimensions in millimeters)

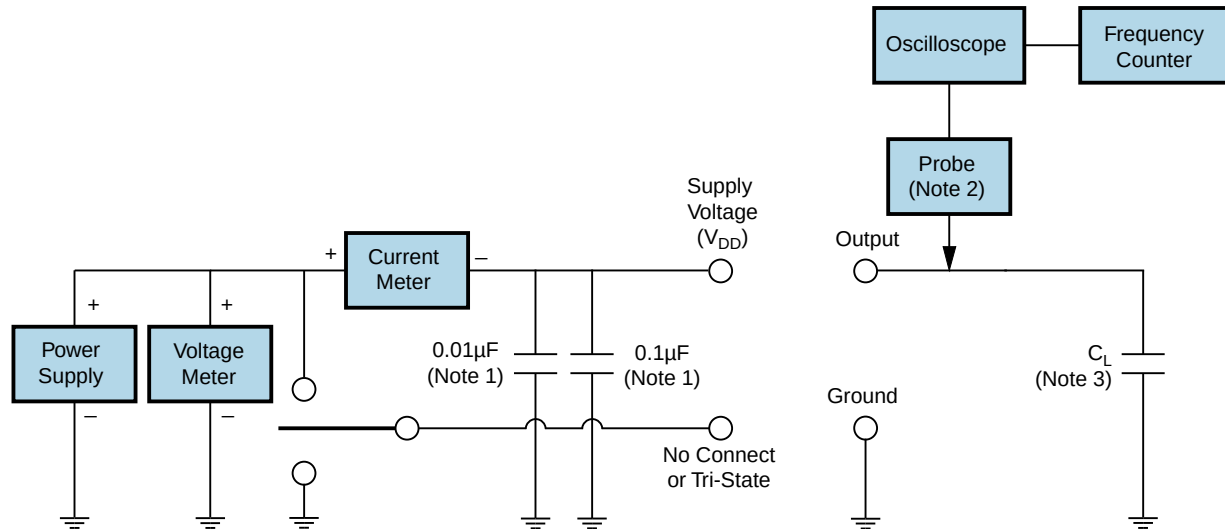


| PIN | CONNECTION             |
|-----|------------------------|
| 1   | Power Down (Logic Low) |
| 7   | Ground/Case Ground     |
| 8   | Output                 |
| 14  | Supply Voltage         |

| LINE | MARKING                                                                                     |
|------|---------------------------------------------------------------------------------------------|
| 1    | ECLIPTEK                                                                                    |
| 2    | EP13PD<br>EP13=Product Series                                                               |
| 3    | 19.659M                                                                                     |
| 4    | XXYYZZ<br>XX=Ecliptek Manufacturing Code<br>Y=Last Digit of the Year<br>ZZ=Week of the Year |

OUTPUT WAVEFORM & TIMING DIAGRAM



**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.

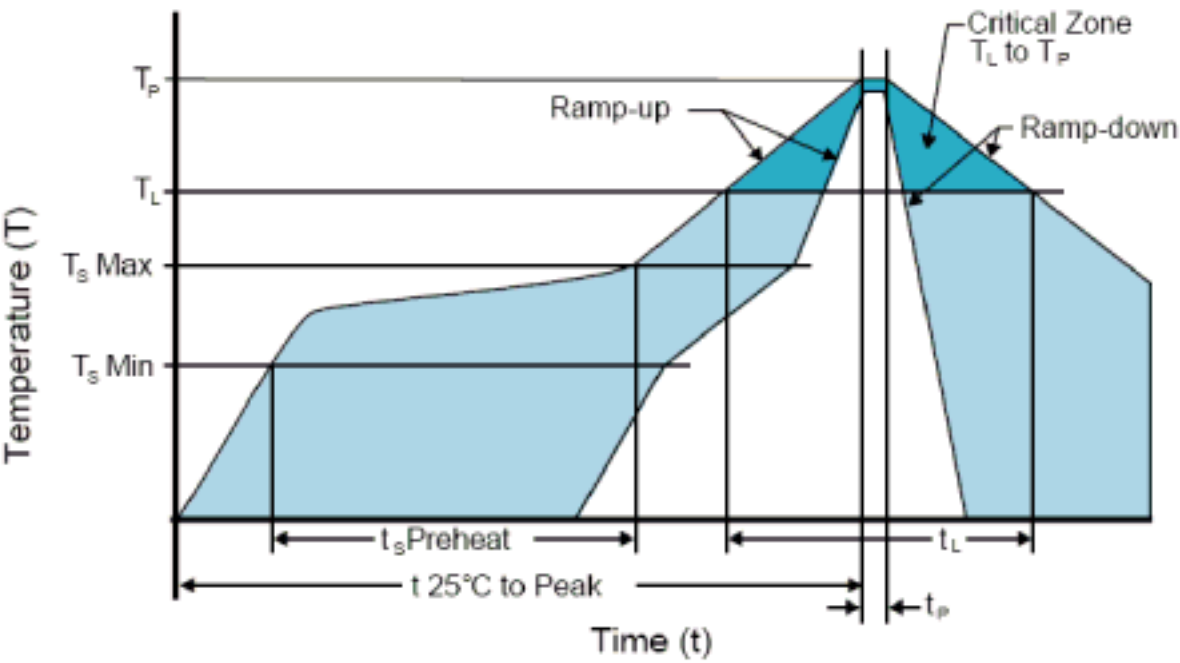
Note 2: A low capacitance ( $<12\text{pF}$ ), 10X attenuation factor, high impedance ( $>10\text{Mohms}$ ), and high bandwidth ( $>300\text{MHz}$ ) passive probe is recommended.

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

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Recommended Solder Reflow Methods



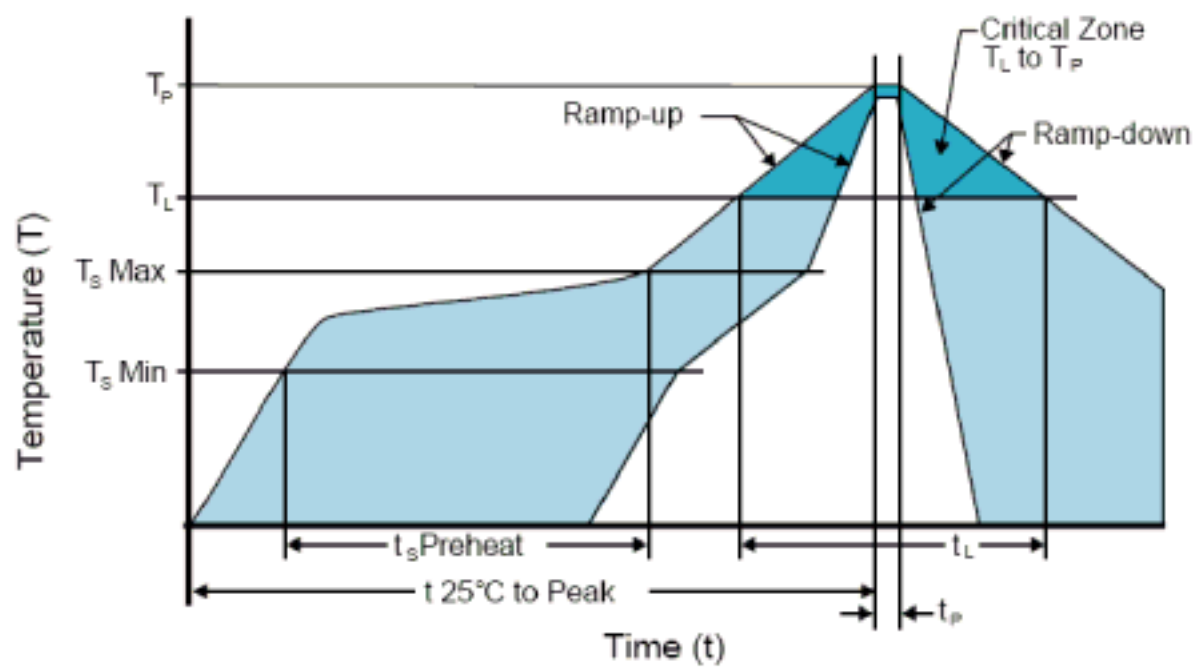
High Temperature Solder Bath (Wave Solder)

|                                     |                                                                                                                                          |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 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                                                                                                                                  |
| Additional Notes                    | 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. |

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Recommended Solder Reflow Methods



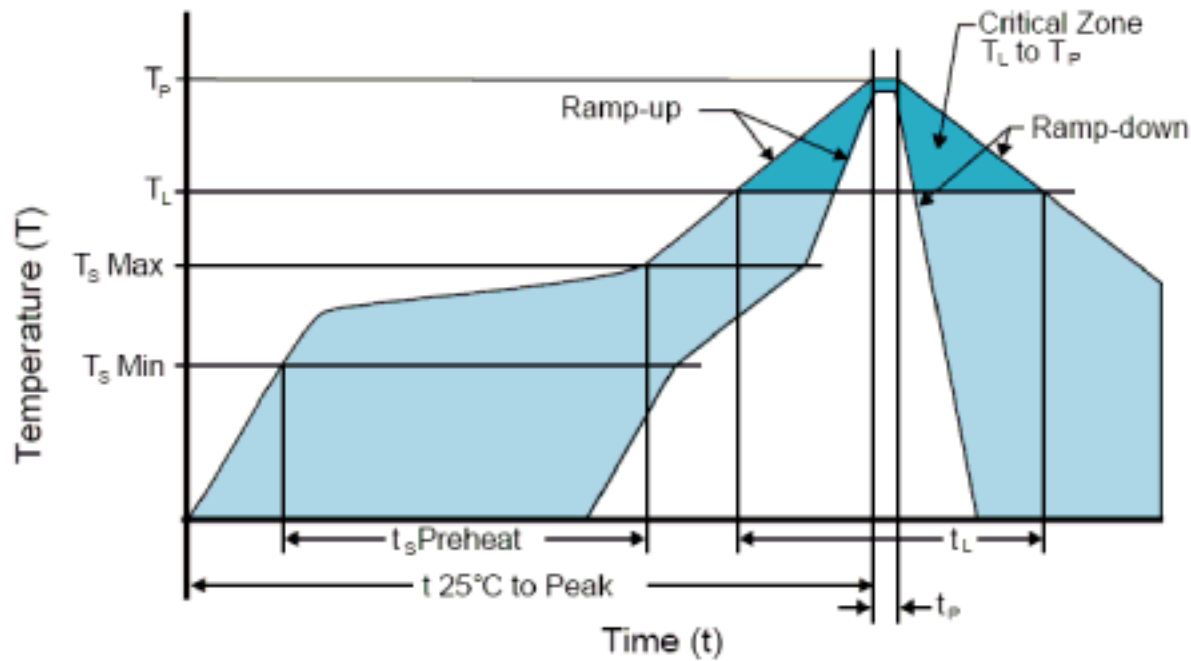
Low Temperature Infrared/Convection 185°C

|                                     |                                                                                                               |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Ts MAX to Tl (Ramp-up Rate)         | 5°C/Second Maximum                                                                                            |
| Preheat                             |                                                                                                               |
| - Temperature Minimum (Ts MIN)      | N/A                                                                                                           |
| - Temperature Typical (Ts TYP)      | 150°C                                                                                                         |
| - Temperature Maximum (Ts MAX)      | N/A                                                                                                           |
| - Time (ts MIN)                     | 60 - 120 Seconds                                                                                              |
| Ramp-up Rate (Tl to Tp)             | 5°C/Second Maximum                                                                                            |
| Time Maintained Above:              |                                                                                                               |
| - Temperature (Tl)                  | 150°C                                                                                                         |
| - Time (tL)                         | 200 Seconds Maximum                                                                                           |
| Peak Temperature (Tp)               | 185°C Maximum                                                                                                 |
| Target Peak Temperature (Tp Target) | 185°C Maximum 2 Times                                                                                         |
| Time within 5°C of actual peak (tp) | 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                                                                                                       |
| Additional Notes                    | Temperatures shown are applied to body of device. Use this method only for product with the Gull Wing option. |

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Recommended Solder Reflow Methods



Low Temperature Solder Bath (Wave Solder)

|                                     |                                                                                                                                          |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| TS MAX to TL (Ramp-up Rate)         | 5°C/Second Maximum                                                                                                                       |
| Preheat                             |                                                                                                                                          |
| - Temperature Minimum (TS MIN)      | N/A                                                                                                                                      |
| - Temperature Typical (TS TYP)      | 150°C                                                                                                                                    |
| - Temperature Maximum (TS MAX)      | N/A                                                                                                                                      |
| - Time (ts MIN)                     | 30 - 60 Seconds                                                                                                                          |
| Ramp-up Rate (TL to TP)             | 5°C/Second Maximum                                                                                                                       |
| Time Maintained Above:              |                                                                                                                                          |
| - Temperature (TL)                  | 150°C                                                                                                                                    |
| - Time (tL)                         | 200 Seconds Maximum                                                                                                                      |
| Peak Temperature (TP)               | 245°C Maximum                                                                                                                            |
| Target Peak Temperature (TP Target) | 245°C Maximum 1 Time / 235°C Maximum 2 Times                                                                                             |
| Time within 5°C of actual peak (tp) | 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                                                                                                                                  |
| Additional Notes                    | 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.)