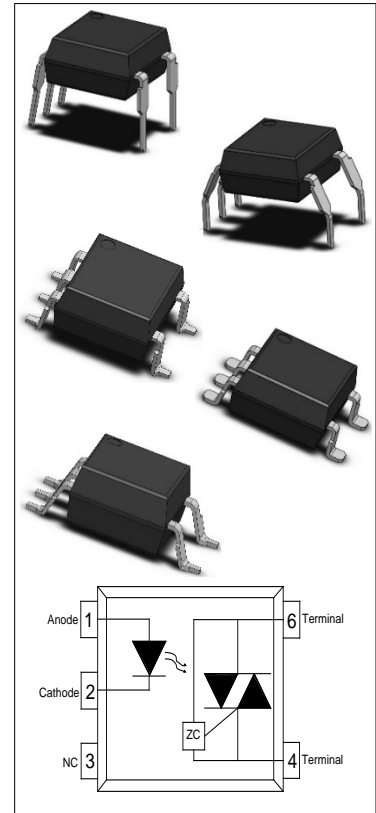


JOC308XD5 Series

Rev.A.1.1

DESCRIPTION:

The JOC308XD5 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a monolithic silicon zero-crossing photo triac in a plastic DIP5 package with different lead forming options. The products are widely used in solenoid/valve controls, lighting controls, motor controls, temperature controls, static AC power switches, solid state relays, interfacing microprocessors up to 265 V_{AC} peripherals.



MAIN FEATURES

- High isolation 5000 VRMS
- DC input with zero-crossing photo triac output
- Operating temperature range -55 °C to 100 °C
- REACH & RoHS compliance
- HBM: H3A ; MM: M4
- CQC approved
- VDE approved
- UL approved

ABSOLUTE MAXIMUM RATINGS (Temperature=25°C)

| Parameter | | Symbol | Value | Unit |
|-----------|---|----------------------|-------|-------|
| Input | Forward Current | I _F | 60 | mA |
| | Reverse Voltage | V _R | 6 | V |
| | Junction Temperature | T _j | 125 | °C |
| | Input Power Dissipation | P _I | 100 | mW |
| | Power Dissipation Derating (T _a ≥ 25°C) | Δ P _D /°C | -1.33 | mW/°C |
| Output | Off-state Output Terminal Voltage | V _{OFF} | 800 | V |
| | Peak On-state Current (100μs pulse, 120 pps) | I _{TP} | 2 | A |
| | On-state RMS Current | I _{T(RMS)} | 100 | mA |
| | Peak Repetitive Surge Current (P _W =10 ms) | I _{TSM} | 1 | A |
| | Junction Temperature | T _j | 125 | °C |
| | Output Power Dissipation | P _O | 250 | mW |

| | | | | |
|-------------------------|---|-------------------------------|-------------------|----------------------|
| | Power Dissipation Derating ($T_a \geq 25^\circ\text{C}$) | $\Delta P_D / ^\circ\text{C}$ | -3.33 | mW/ $^\circ\text{C}$ |
| Total Power Dissipation | | P_{tot} | 350 | mW |
| Isolation Voltage | | V_{iso} | 5000 ^① | V _{rms} |
| Operating Temperature | | T_{opr} | -55~100 | $^\circ\text{C}$ |
| Storage Temperature | | T_{stg} | -55~125 | $^\circ\text{C}$ |
| Soldering Temperature | | T_{sol} | 260 ^② | $^\circ\text{C}$ |

NOTE1: AC for 1minute, R.H.=40~60%

NOTE2: For 10 seconds

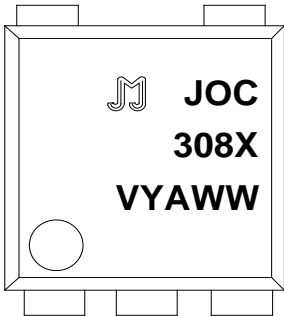
ELECTRICAL CHARACTERISTICS (Temperature=25 $^\circ\text{C}$)

| Parameter | | Symbol | Condition | Min. | Typ. | Max. | Unit |
|-------------------------------|--|---|--|-------------------|-----------|------------------|------------------|
| Input | Forward Voltage | V_F | $I_F=10\text{mA}$ | - | 1.27 | 2.2 | V |
| | Reverse Current | I_R | $V_R=6\text{V}$ | - | - | 1 | μA |
| | Input Capacitance | C_{in} | $V=0, f=1\text{kHz}$ | - | 10 | - | pF |
| Output | Peak Off-state Current, Either Direction | I_{OFF} | $V_{\text{OFF}}=800\text{V}, I_F=0$ | - | - | 100 ^③ | nA |
| | Peak On-state Voltage, Either Direction | V_{TM} | $I_{\text{TM}}=100\text{mA}$ | - | 1.7 | 2.5 | V |
| | Critical Rate of Rise of Off-state voltage | dV/dt | $V_{\text{PEAK}}=800\text{V}, I_F=0$ | 1000 ^④ | - | - | V/ μs |
| Transfer Characteristics | LED Trigger Current | JOC3081D5 | Terminal Voltage=3V $I_{\text{TM}}=100\text{mA}$ | - | - | 15 | mA |
| | | JOC3082D5 | | - | - | 10 | |
| | | JOC3083D5 | | - | - | 5 | |
| | Holding Current | I_H | $I_{\text{TM}}=2\text{mA}, I_F=\text{Rated } I_{\text{FT}}$ | - | 250 | - | μA |
| | Isolation Resistance | R_{ISO} | DC500V 40~60%R.H. | 10^{12} | 10^{14} | - | Ω |
| | Floating Capacitance | C_{IO} | $V=0, f=1\text{MHz}$ | - | 10 | - | pF |
| Response Time | t_{on} | $V_D=6\text{V}, R_L=100\Omega, I_F=20\text{mA}$ | - | 15 | 50 | μs | |
| Zero-crossing Characteristics | Inhibit Voltage | V_{IH} | $I_F=\text{Rated } I_{\text{FT}}$ | - | - | 20 | V |
| | Leakage in Inhibited State | $I_{\text{OFF}2}$ | $I_F=\text{Rated } I_{\text{FT}}, V_{\text{OFF}}=\text{Rated } V_{\text{OFF}}$ | - | - | 2 | mA |

NOTE3: Test voltage must be applied within dV/dt ratings.

NOTE4: Refer to Fig.14 & Fig.15

ORDERING AND MARKING INFORMATION

| MARKING INFORMATION | | | |
|---|-----------------|---|-------------------------------------|
|  | | JOC : Company Abbr. 308X : Part Number & Rank VYAWW : LOT NO. | |
| ORDERING INFORMATION | | | |
| JOC308XD5(Y)(Z)-GV | | | |
| JOC – Company Abbr. 308X – Part Number (1/2/3) D5 – DIP5 Package Y – Lead Form Option (M/S/SL/SLM/None) Z – Tape and Reel Option (T1) G – Green Option (G or None) V – VDE Option (V or None) | | | |
| Packing Quantity | | | |
| Option | Quantity | Quantity – Inner box | Quantity –Outer box |
| None/M | 65 Units/Tube | 32 Tubes/Inner box | 10 Inner box/Outer box =20.8k Units |
| S(T1) | 1000 Units/Reel | 3 Reels/Inner box | 5 Inner box/Outer box =15k Units |
| SL(T1) | 1000 Units/Reel | 3 Reels/Inner box | 5 Inner box/Outer box =15k Units |
| SLM(T1) | 1000 Units/Reel | 2 Reels/Inner box | 5 Inner box/Outer box =10k Units |

Characteristics Curves

FIG.1: Forward Current vs. Ambient Temperature

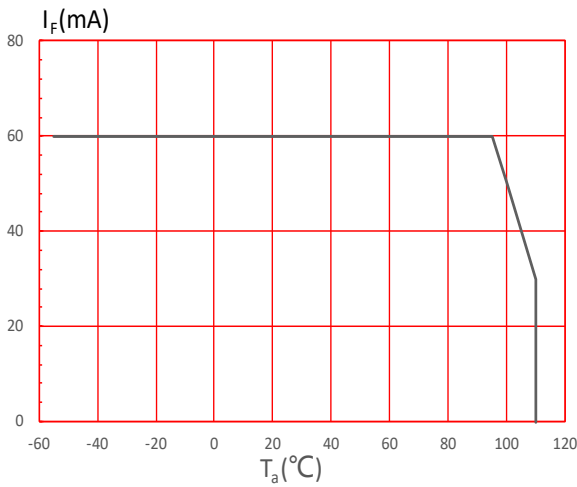


FIG.2: On-state Terminal Current vs. Ambient Temperature

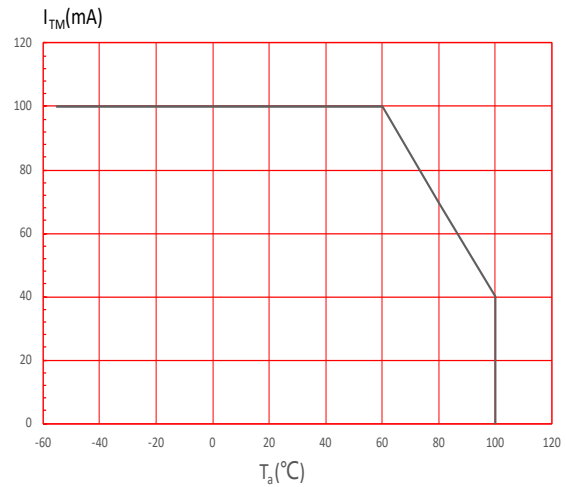


FIG.3: Forward Current vs. Forward Voltage

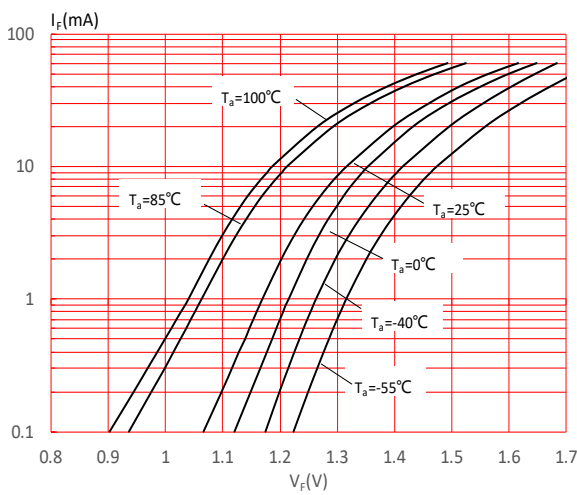


FIG.4: Normalized Off-state Terminal Current vs. Ambient Temperature

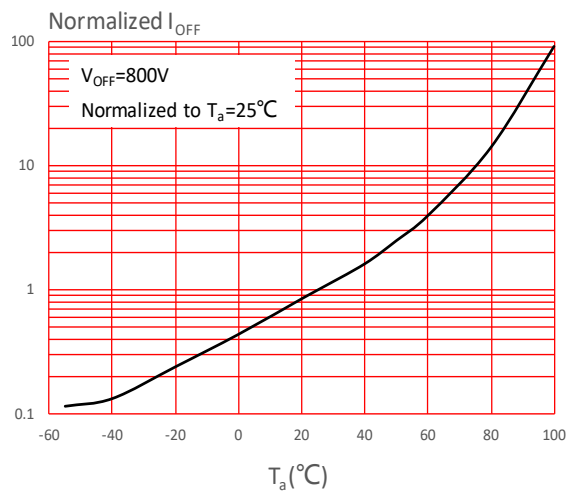


FIG.5: Normalized Off-state Terminal Voltage vs. Ambient Temperature

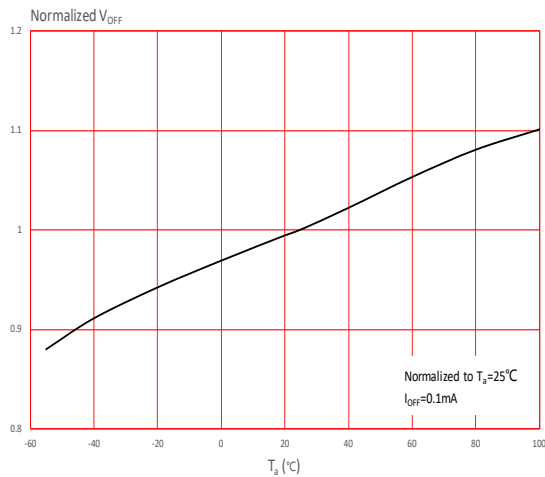


FIG.6: Normalized Trigger Current vs. Ambient Temperature

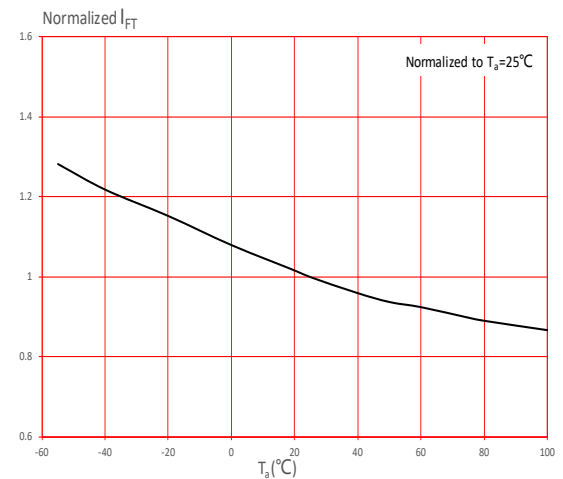


FIG.7: Normalized On-state Terminal Voltage vs. Ambient Temperature

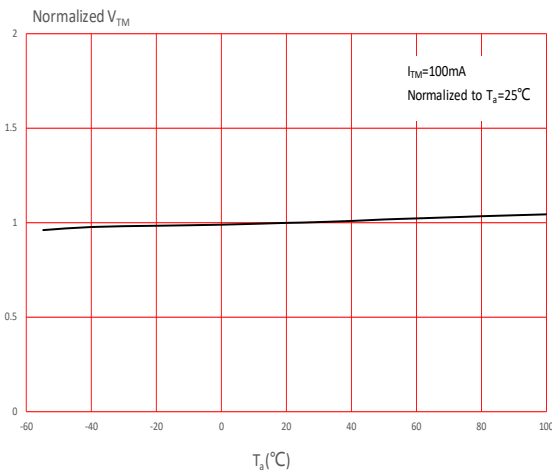


FIG.8: On-state Terminal Voltage vs. On-state Terminal Current

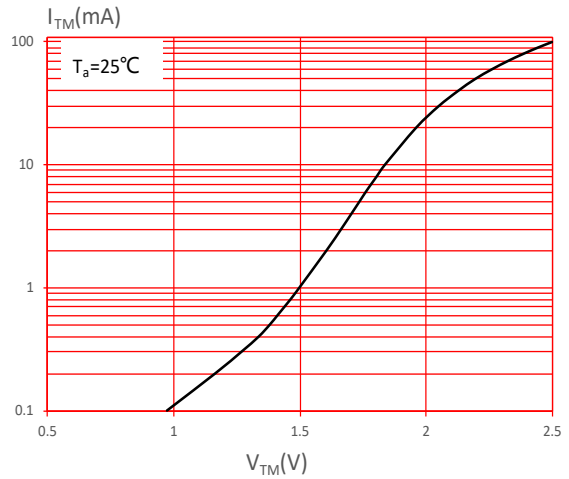


FIG.9: Normalized Holding Current vs. Ambient Temperature

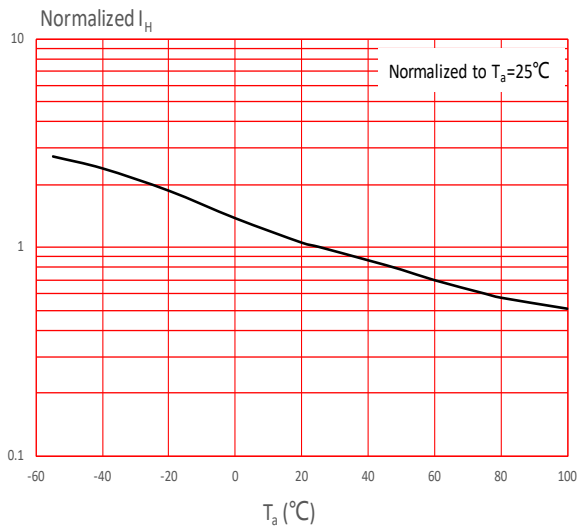


FIG.10: Normalized Leakage in Inhibit State vs. Ambient Temperature

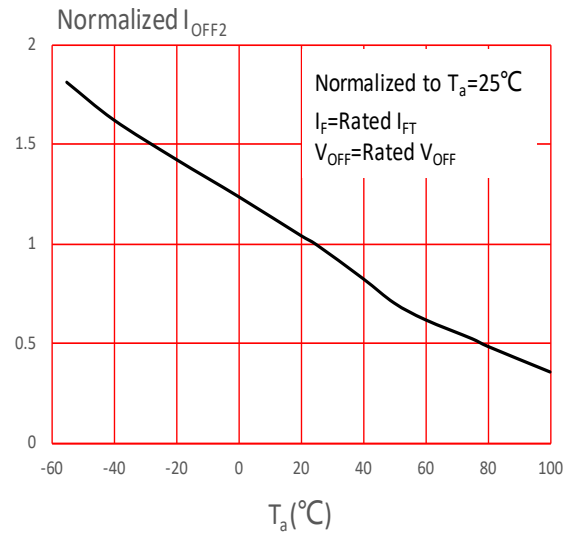
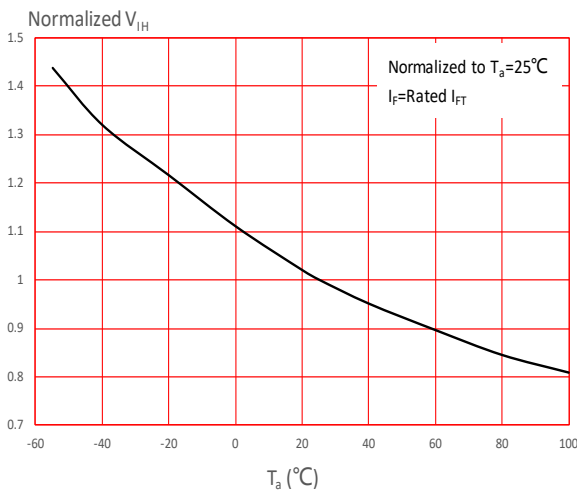


FIG.11: Normalized Inhibit Voltage vs. Ambient Temperature



TEST CIRCUITS

FIG.12: Test Circuits of Turn On Time

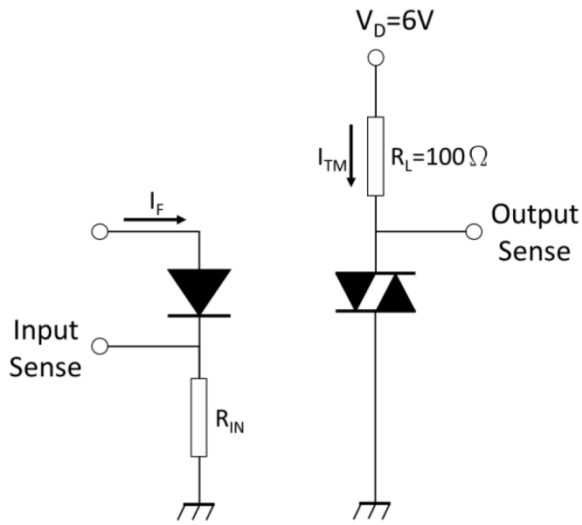


FIG.13: Waveforms of Turn On Time



Fig.14: Test Circuits of dV/dt

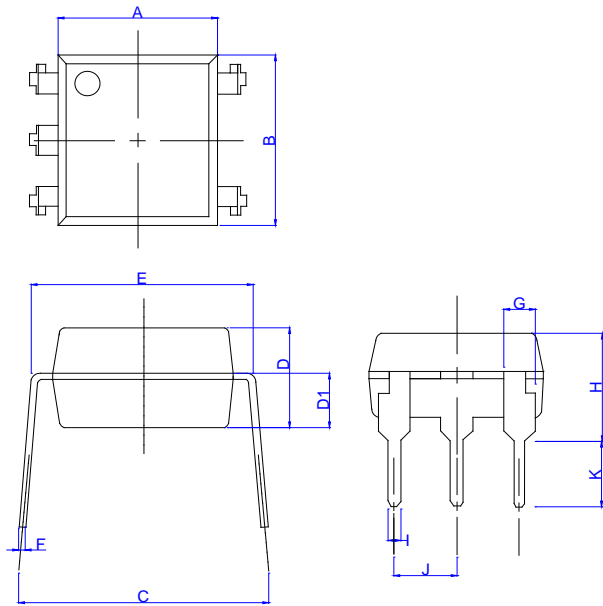


Fig.15: Waveforms of dV/dt



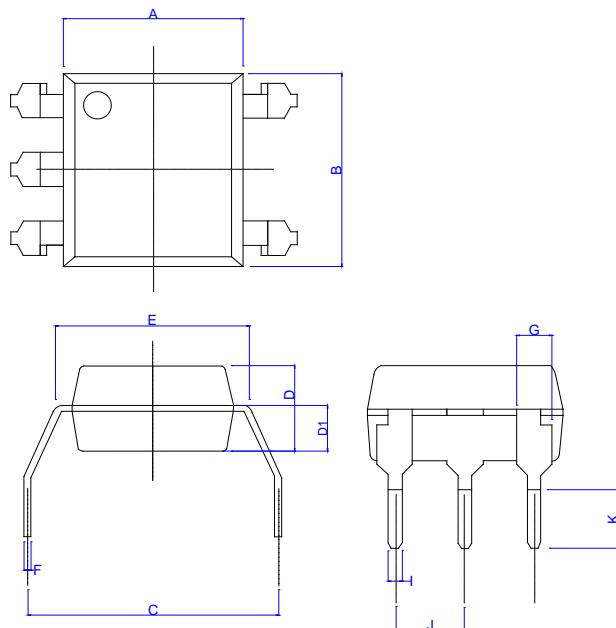
Package Dimension (Unit: mm)

Standard DIP Type:



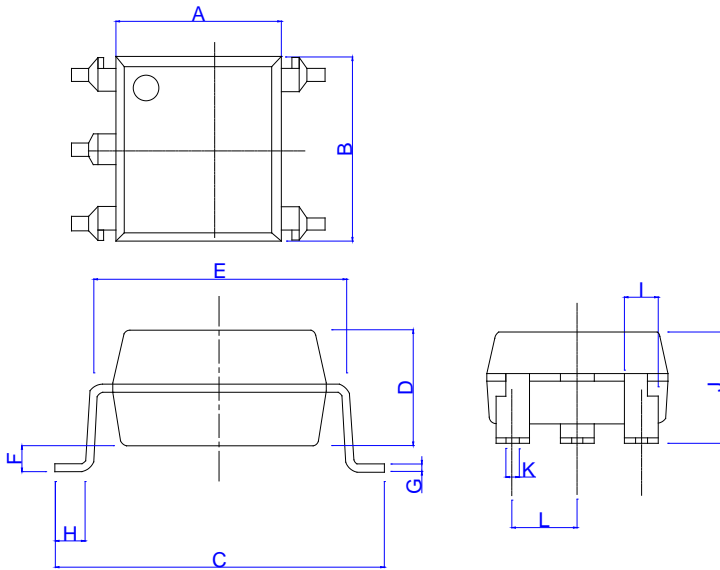
| Ref. | Dimensions | | | | | |
|------|-------------|------|-------|--------|------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 6.00 | | 7.00 | 0.237 | | 0.277 |
| B | 6.62 | | 7.62 | 0.262 | | 0.301 |
| C | 7.62 | | 10.16 | 0.301 | | 0.402 |
| D | 3.00 | | 4.00 | 0.119 | | 0.158 |
| D1 | 1.55 | | 1.95 | 0.061 | | 0.077 |
| E | 7.32 | | 7.92 | 0.289 | | 0.313 |
| F | 0.16 | | 0.36 | 0.006 | | 0.014 |
| G | 0.90 | | 1.50 | 0.036 | | 0.059 |
| H | 3.50 | | 4.50 | 0.138 | | 0.178 |
| I | 0.40 | | 0.60 | 0.016 | | 0.024 |
| J | 2.29 | | 2.79 | 0.091 | | 0.110 |
| K | 2.40 | | 3.40 | 0.095 | | 0.134 |

Option M Type:



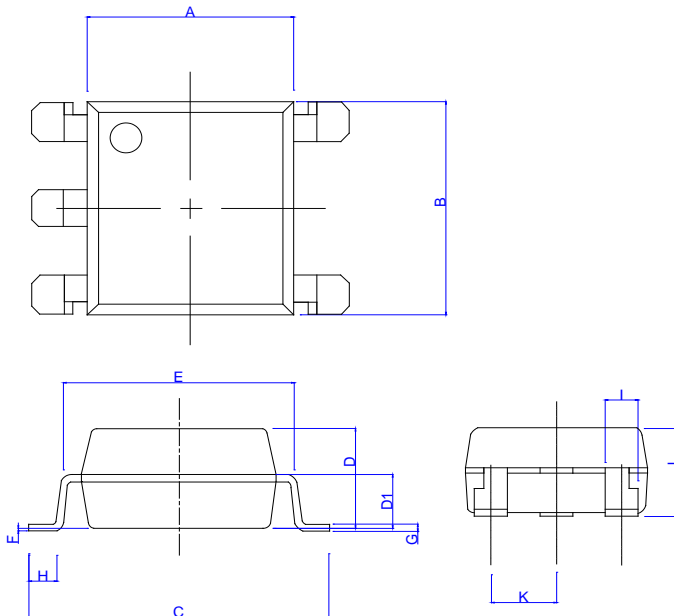
| Ref. | Dimensions | | | | | |
|------|-------------|------|-------|--------|------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 6.00 | | 7.00 | 0.237 | | 0.277 |
| B | 6.82 | | 7.42 | 0.270 | | 0.293 |
| C | 9.66 | | 10.66 | 0.382 | | 0.421 |
| D | 3.00 | | 4.00 | 0.119 | | 0.158 |
| D1 | 1.55 | | 1.95 | 0.061 | | 0.077 |
| E | 7.32 | | 7.92 | 0.289 | | 0.313 |
| F | 0.16 | | 0.36 | 0.006 | | 0.014 |
| G | 0.90 | | 1.50 | 0.036 | | 0.059 |
| I | 0.40 | | 0.60 | 0.016 | | 0.024 |
| J | 2.29 | | 2.79 | 0.091 | | 0.110 |
| K | 2.50 | | | 0.099 | | |

Option S Type:



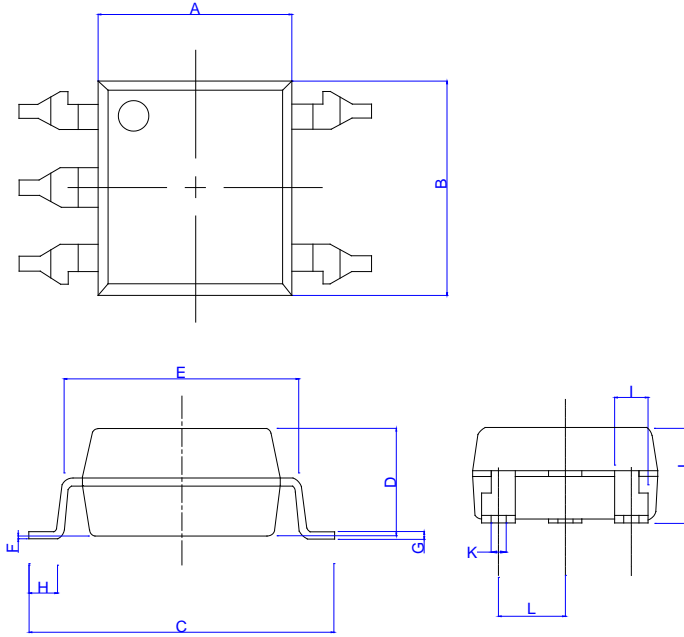
| Ref. | Dimensions | | | | | |
|------|-------------|------|-------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 6.30 | | 6.70 | 0.249 | | 0.265 |
| B | 6.92 | | 7.32 | 0.274 | | 0.289 |
| C | 9.85 | | 10.45 | 0.389 | | 0.413 |
| D | 3.30 | | 3.70 | 0.130 | | 0.146 |
| E | 7.32 | | 7.92 | 0.289 | | 0.313 |
| F | | 0.80 | | | 0.032 | |
| G | | 0.25 | | | 0.010 | |
| H | | 0.80 | | | 0.032 | |
| I | 1.20 | | 1.40 | 0.047 | | 0.055 |
| J | 4.00 | | 4.60 | 0.158 | | 0.182 |
| K | | 0.50 | | | 0.020 | |
| L | | 2.54 | | | 0.100 | |

Option SL Type:



| Ref. | Dimensions | | | | | |
|------|-------------|------|-------|--------|------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 6.00 | | 7.00 | 0.237 | | 0.277 |
| B | 6.62 | | 7.62 | 0.262 | | 0.301 |
| C | 9.50 | | 10.00 | 0.375 | | 0.395 |
| D | 3.00 | | 4.00 | 0.119 | | 0.158 |
| D1 | 1.55 | | 1.95 | 0.061 | | 0.077 |
| E | 7.32 | | 7.92 | 0.289 | | 0.313 |
| F | 0.10 | | 0.65 | 0.004 | | 0.026 |
| G | 0.16 | | 0.36 | 0.006 | | 0.014 |
| H | 1.00 | | 1.40 | 0.047 | | 0.055 |
| I | 0.90 | | 1.50 | 0.036 | | 0.059 |
| J | 3.35 | | 4.35 | 0.132 | | 0.172 |
| K | 2.29 | | 2.79 | 0.091 | | 0.110 |

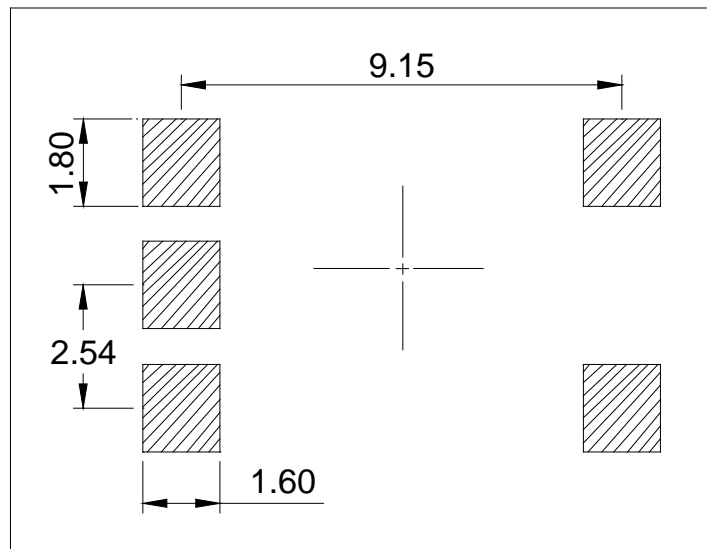
Option SLM Type:



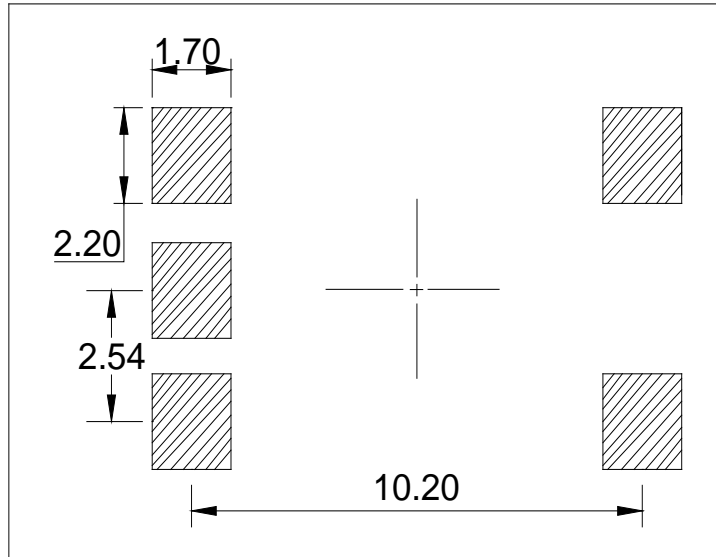
| Ref. | Dimensions | | | | | |
|------|-------------|------|-------|--------|------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 6.30 | | 6.70 | 0.248 | | 0.264 |
| B | 6.92 | | 7.32 | 0.272 | | 0.288 |
| C | 11.60 | | 12.10 | 0.457 | | 0.476 |
| D | 3.30 | | 3.70 | 0.130 | | 0.146 |
| E | 7.32 | | 7.92 | 0.288 | | 0.312 |
| F | 0.00 | | 0.30 | 0.000 | | 0.012 |
| G | 0.20 | | 0.30 | 0.008 | | 0.012 |
| H | 0.50 | | 0.90 | 0.020 | | 0.035 |
| I | 1.10 | | 1.30 | 0.043 | | 0.051 |
| J | 3.45 | | 3.85 | 0.136 | | 0.152 |
| K | 0.45 | | 0.55 | 0.018 | | 0.022 |
| L | 2.34 | | 2.74 | 0.092 | | 0.108 |

RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

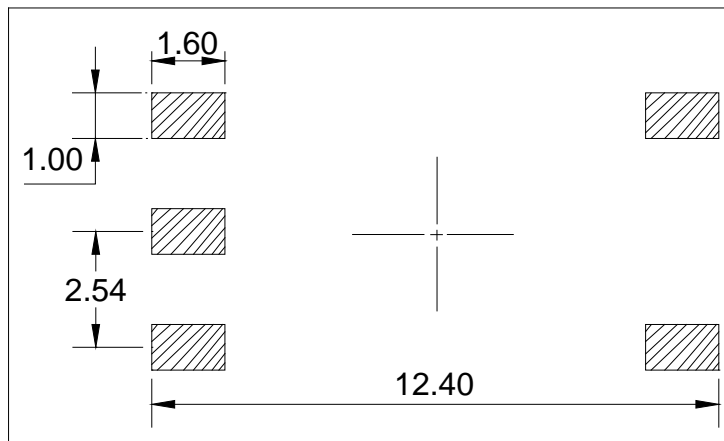
Option S



Option SL

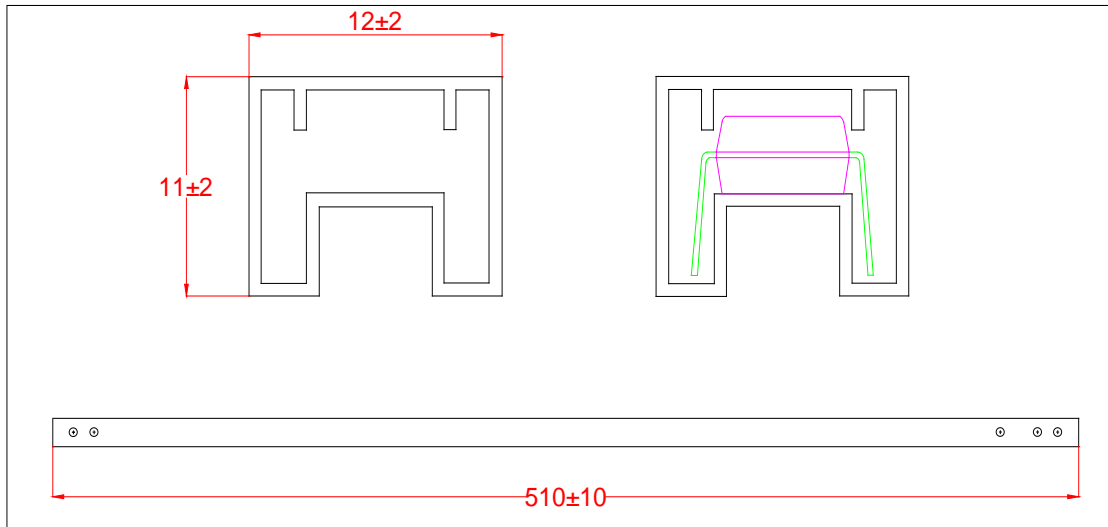


Option SLM

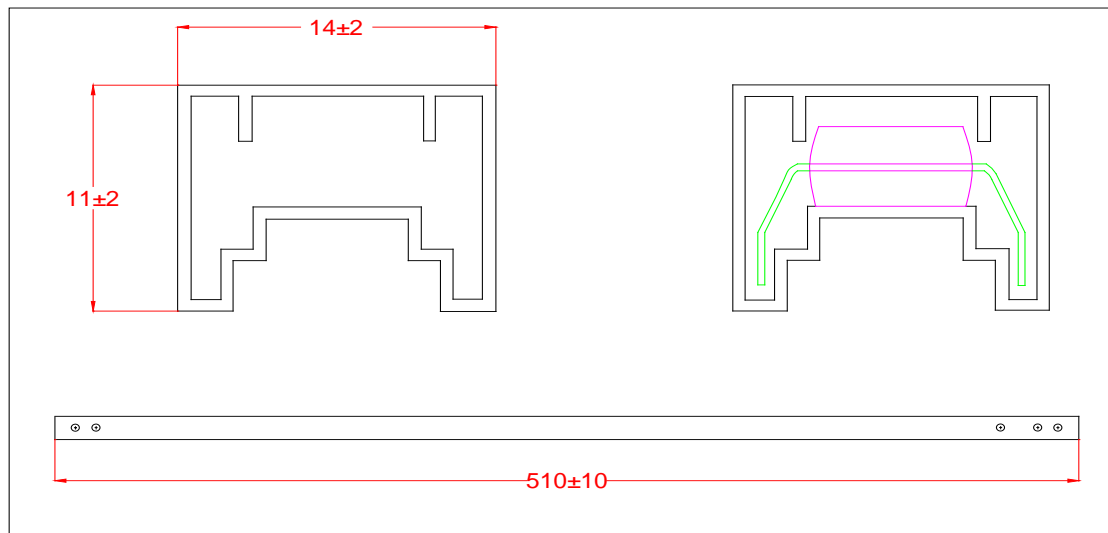


TUBE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

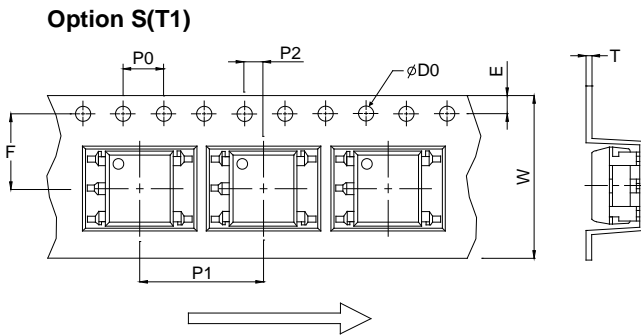
Standard DIP



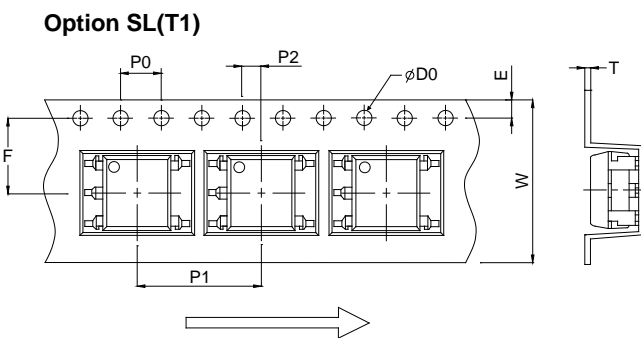
Option M



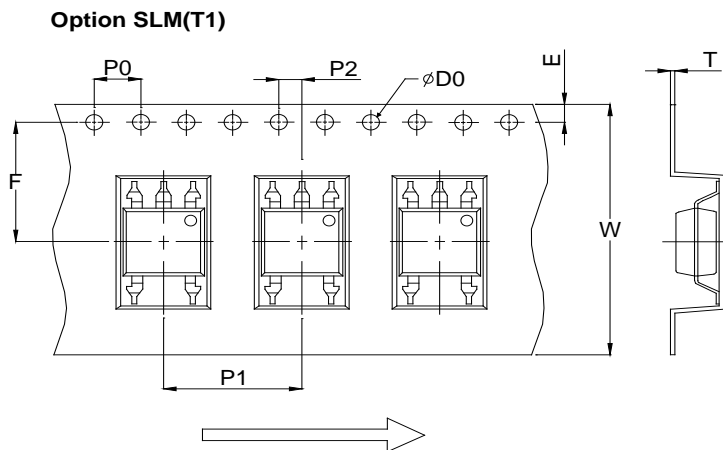
CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)



| Ref. | Dimensions | | | | | |
|------|-------------|-------|-------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| D0 | | 1.50 | 1.65 | | 0.059 | 0.065 |
| P0 | 3.90 | 4.00 | 4.10 | 0.154 | 0.157 | 0.161 |
| P1 | 11.90 | 12.00 | 12.10 | 0.469 | 0.472 | 0.476 |
| P2 | 1.90 | 2.00 | 2.10 | 0.075 | 0.079 | 0.083 |
| E | 1.65 | 1.75 | 1.85 | 0.065 | 0.069 | 0.073 |
| F | 7.40 | 7.50 | 7.60 | 0.291 | 0.295 | 0.299 |
| T | 0.25 | 0.35 | 0.45 | 0.010 | 0.014 | 0.018 |
| W | 15.70 | 16.00 | 16.30 | 0.618 | 0.630 | 0.642 |

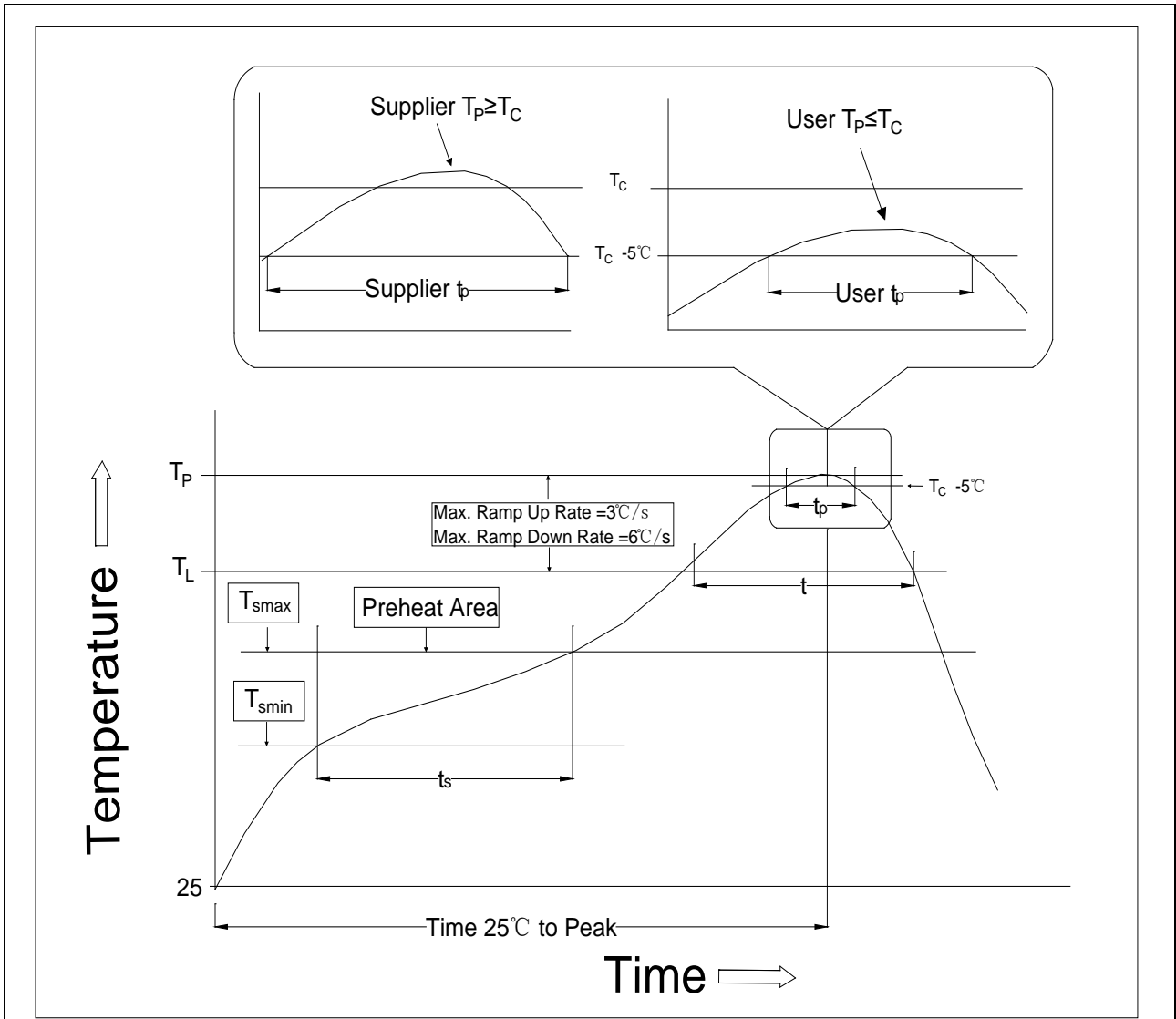


| Ref. | Dimensions | | | | | |
|------|-------------|-------|-------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| D0 | | 1.50 | 1.60 | | 0.059 | 0.063 |
| P0 | 3.90 | 4.00 | 4.10 | 0.154 | 0.157 | 0.161 |
| P1 | 11.90 | 12.00 | 12.10 | 0.469 | 0.472 | 0.476 |
| P2 | 1.90 | 2.00 | 2.10 | 0.075 | 0.079 | 0.083 |
| E | 1.65 | 1.75 | 1.85 | 0.065 | 0.069 | 0.073 |
| F | 7.40 | 7.50 | 7.60 | 0.291 | 0.295 | 0.299 |
| T | 0.35 | 0.40 | 0.45 | 0.014 | 0.016 | 0.018 |
| W | 15.70 | 16.00 | 16.30 | 0.618 | 0.630 | 0.642 |



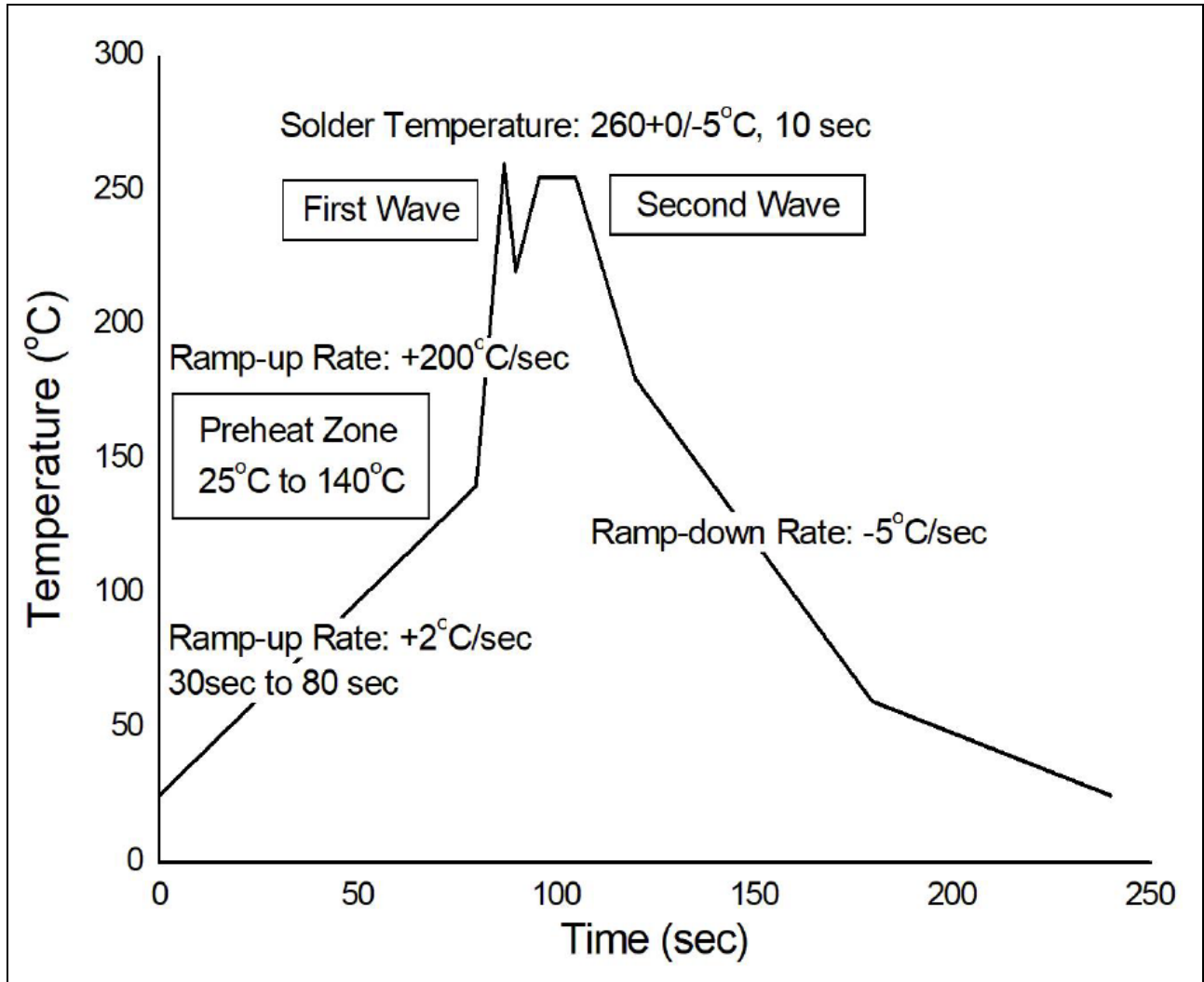
| Ref. | Dimensions | | | | | |
|------|-------------|-------|-------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| D0 | | 1.50 | 1.60 | | 0.059 | 0.063 |
| P0 | 3.90 | 4.00 | 4.10 | 0.154 | 0.157 | 0.161 |
| P1 | 11.90 | 12.00 | 12.10 | 0.469 | 0.472 | 0.476 |
| P2 | 1.90 | 2.00 | 2.10 | 0.075 | 0.079 | 0.083 |
| E | 1.65 | 1.75 | 1.85 | 0.065 | 0.069 | 0.073 |
| F | 11.45 | 11.50 | 11.55 | 0.451 | 0.453 | 0.455 |
| T | 0.35 | 0.40 | 0.45 | 0.014 | 0.016 | 0.018 |
| W | 23.70 | 24.00 | 24.30 | 0.933 | 0.945 | 0.957 |

REFLOW INFORMATION



| Profile Feature | Sn-Pb Assembly Profile | Pb-Free Assembly Profile |
|---|------------------------|--------------------------|
| Temperature Min. (T _{smin}) | 100 | 150°C |
| Temperature Max. (T _{smax}) | 150 | 200°C |
| Time (t _s) from (T _{smin} to T _{smax}) | 60-120 seconds | 60-120 seconds |
| Ramp-up Rate (t _L to t _P) | 3°C/second max. | 3°C/second max. |
| Liquidus Temperature (T _L) | 183°C | 217°C |
| Time (t _L) Maintained Above (T _L) | 60-150 seconds | 60-150 seconds |
| Peak Body Package Temperature | 235°C+0°C/-5°C | 260°C+0°C/-5°C |
| Time (t _P) within 5°C of 260°C | 20 seconds | 30 seconds |
| Ramp-down Rate (T _P to T _L) | 6°C/second max. | 6°C/second max. |
| Time 25°C to Peak Temperature | 6 minutes max. | 8 minutes max. |

WAVE SOLDERING



HAND SOLDERING BY SOLDERING IRON

| | |
|-----------------------|---------|
| Soldering Temperature | 360±5°C |
| Soldering Time | 3s max. |

Document Revision History

| Date | Revision | Changes |
|-------------|----------|-------------------|
| Apr.2, 2025 | A.1.0 | Last update |
| Nov.6, 2025 | A.1.1 | Add S&SLM package |

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