



## JOC303XD5 Series

Rev.A.1.1

### DESCRIPTION:

The JOC303XD5 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a monolithic silicon zero-cross 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 120 V<sub>AC</sub> peripherals.

### MAIN FEATURES

High isolation 5000 VRMS

DC input with zero-cross photo triac output

Operating temperature range -55 °C to 100 °C

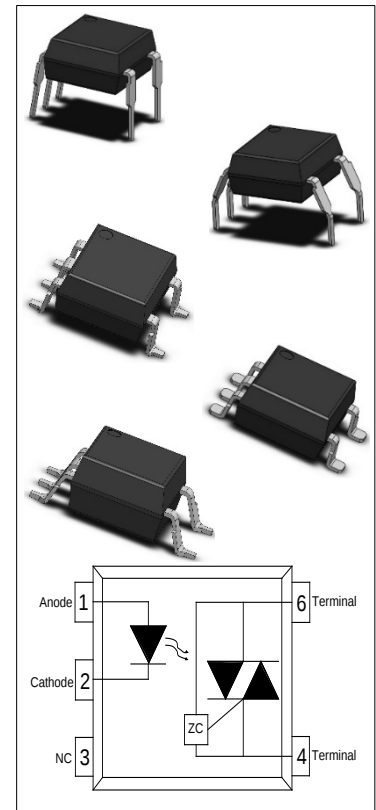
REACH & RoHS compliance

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 ( $T_a \geq 25^\circ\text{C}$ ) | $\Delta P_D/^\circ\text{C}$ | -1.33 | mW/°C |
| Output    | Off-state Output Terminal Voltage                          | $V_{OFF}$                   | 250   | 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<br>( $T_a \geq 25^\circ\text{C}$ ) | $\Delta P_D/^\circ\text{C}$ | -3.33             | mW/ $^\circ\text{C}$ |
| Total Power Dissipation |                                                               | $P_{\text{tot}}$            | 350               | mW                   |
| Isolation Voltage       |                                                               | $V_{\text{iso}}$            | 5000 <sup>①</sup> | V <sub>rms</sub>     |
| Operating Temperature   |                                                               | $T_{\text{opr}}$            | -55~100           | $^\circ\text{C}$     |
| Storage Temperature     |                                                               | $T_{\text{stg}}$            | -55~125           | $^\circ\text{C}$     |
| Soldering Temperature   |                                                               | $T_{\text{sol}}$            | 260 <sup>②</sup>  | $^\circ\text{C}$     |

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

**NOTE2:** For 10 seconds

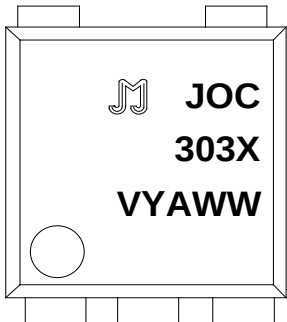
### ELECTRICAL CHARACTERISTICS (Temperature=25 $^\circ\text{C}$ )

| 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                | $\mu\text{A}$    |
|                               | Input Capacitance                          |           | $C_{\text{in}}$   | $V=0, f=1\text{kHz}$                                                           | -                 | 10        | -                | pF               |
| Output                        | Peak Off-state Current, Either Direction   |           | $I_{\text{OFF}}$  | $V_{\text{OFF}}=250\text{V}, I_F=0$                                            | -                 | -         | 100 <sup>③</sup> | nA               |
|                               | Peak On-state Voltage, Either Direction    |           | $V_{\text{TM}}$   | $I_{\text{TM}}=100\text{mA}$                                                   | -                 | 1.7       | 2.5              | V                |
|                               | Critical Rate of Rise of Off-state voltage |           | dV/dt             | $V_{\text{PEAK}}=250\text{V}, I_F=0$                                           | 1000 <sup>④</sup> | -         | -                | V/ $\mu\text{s}$ |
| Transfer Characteristics      | LED Trigger Current                        | JOC3031D5 | $I_{\text{FT}}$   | Terminal Voltage=3V<br>$I_{\text{TM}}=100\text{mA}$                            | -                 | -         | 15               | mA               |
|                               |                                            | JOC3032D5 |                   |                                                                                | -                 | -         | 10               |                  |
|                               |                                            | JOC3033D5 |                   |                                                                                | -                 | -         | 5                |                  |
|                               | Holding Current                            |           | $I_H$             | $I_{\text{TM}}=2\text{mA}, I_F=\text{Rated } I_{\text{FT}}$                    | -                 | 250       | -                | $\mu\text{A}$    |
|                               | Isolation Resistance                       |           | $R_{\text{ISO}}$  | DC500V<br>40~60%R.H.                                                           | $10^{12}$         | $10^{14}$ | -                | $\Omega$         |
|                               | Floating Capacitance                       |           | $C_{\text{IO}}$   | $V=0, f=1\text{MHz}$                                                           | -                 | 10        | -                | pF               |
|                               | Response Time                              |           | $t_{\text{on}}$   | $V_D=6\text{V}, R_L=100\Omega, I_F=20\text{mA}$                                | -                 | 15        | 50               | $\mu\text{s}$    |
| Zero-crossing Characteristics | Inhibit Voltage                            |           | $V_{\text{IH}}$   | $I_F=\text{Rated } I_{\text{FT}}$                                              | -                 | -         | 20               | V                |
|                               | Leakage in Inhibited State                 |           | $I_{\text{OFF2}}$ | $I_F=\text{Rated } I_{\text{FT}}, V_{\text{OFF}}=\text{Rated } V_{\text{OFF}}$ | -                 | -         | 1                | mA               |

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

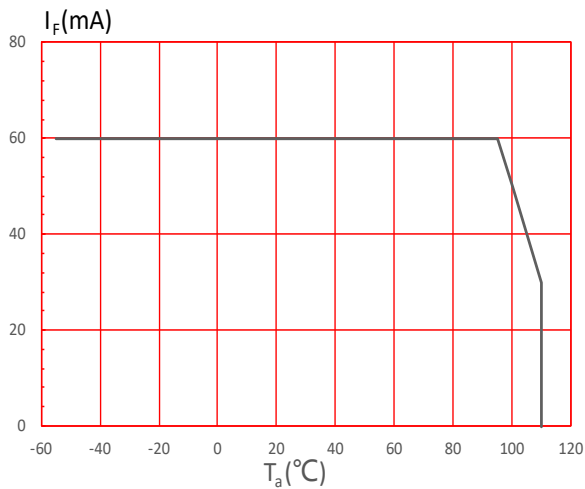
**NOTE4:** Refer to Fig.14 & Fig.15

## ORDERING AND MARKING INFORMATION

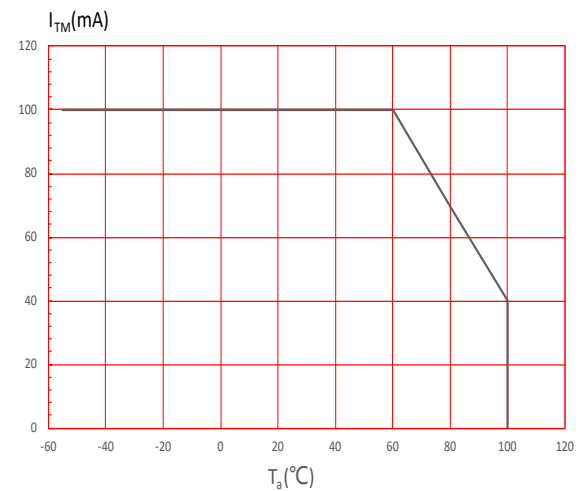
| MARKING INFORMATION                                                                                                                                                                                                                                                        |                 |                                                                                                                                                                                          |                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
|                                                                                                                                                                                           |                 | <div>JOC : Company Abbr.</div> <div>303X : Part Number &amp; Rank</div> <div>V : VDE Option</div> <div>Y : Fiscal Year</div> <div>A : Manufacturing Code</div> <div>WW : Work Week</div> |                                     |
| ORDERING INFORMATION                                                                                                                                                                                                                                                       |                 |                                                                                                                                                                                          |                                     |
| JOC303XD5(Y)(Z)-GV                                                                                                                                                                                                                                                         |                 |                                                                                                                                                                                          |                                     |
| <div>JOC – Company Abbr.</div> <div>303X – Part Number (1/2/3)</div> <div>D5 – DIP5 Package</div> <div>Y – Lead Form Option (M/S/SL/SLM/None)</div> <div>Z – Tape and Reel Option (T1)</div> <div>G – Green Option (G or None)</div> <div>V – VDE Option (V or None)</div> |                 |                                                                                                                                                                                          |                                     |
| 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

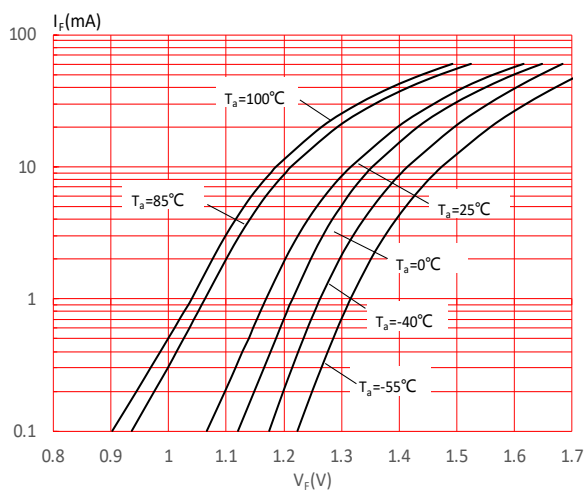
**FIG.1:** Forward Current vs. Ambient Temperature



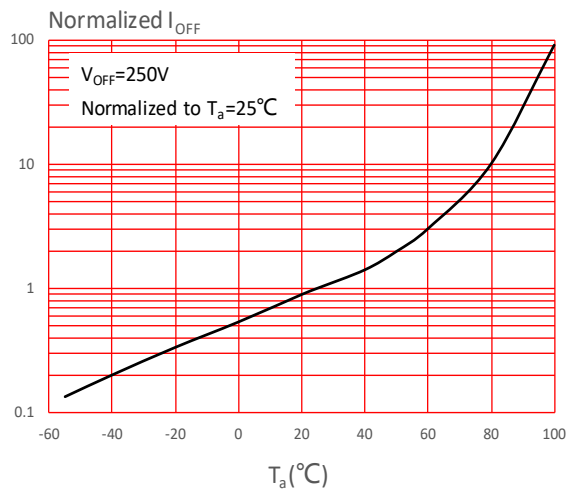
**FIG.2:** On-state Terminal Current vs. Ambient Temperature



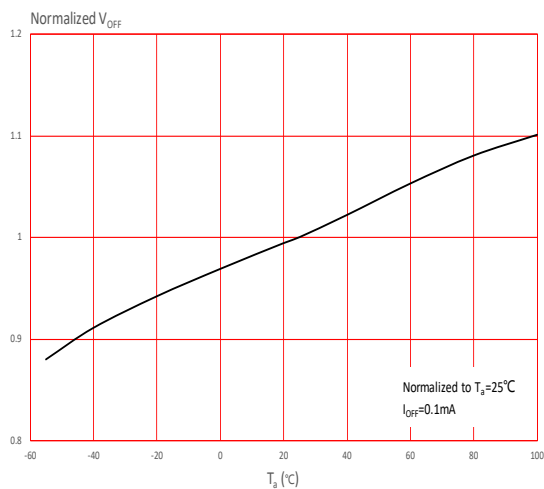
**FIG.3:** Forward Current vs. Forward Voltage



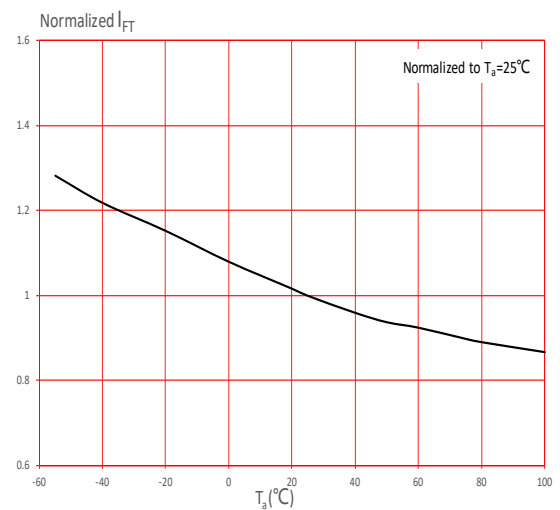
**FIG.4:** Normalized Off-state Terminal Current vs. Ambient Temperature

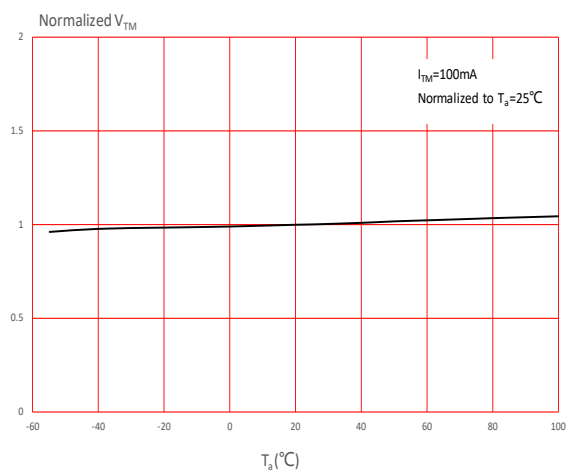
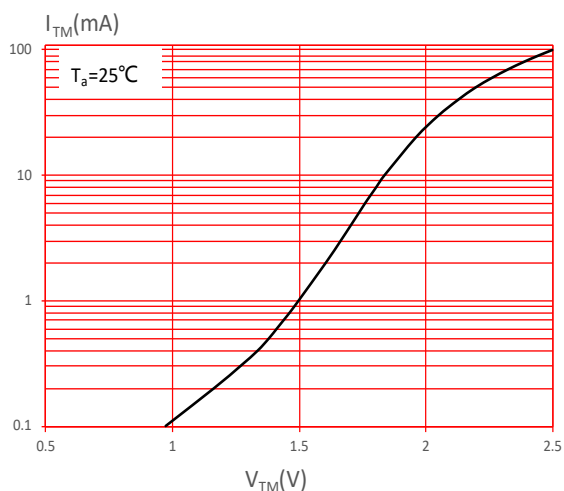
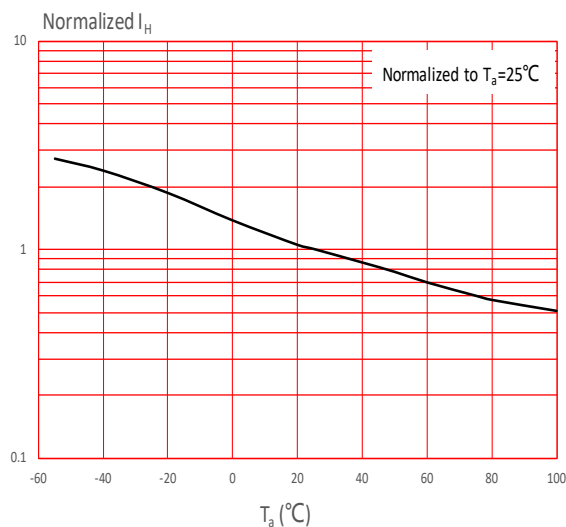
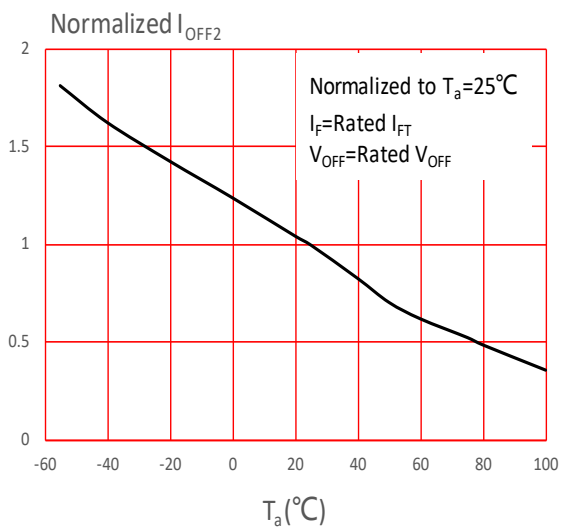
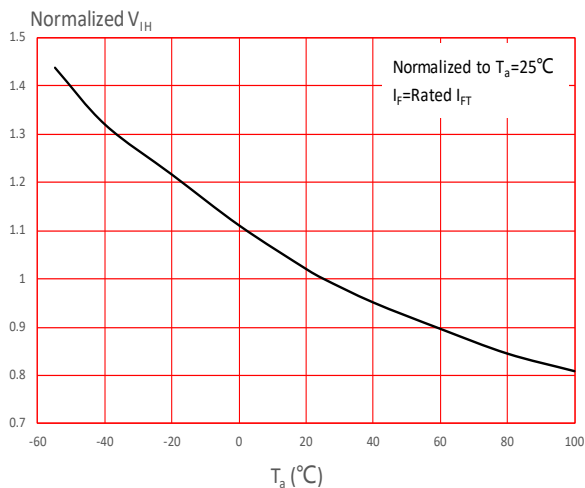


**FIG.5:** Normalized Off-state Terminal Voltage vs. Ambient Temperature



**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

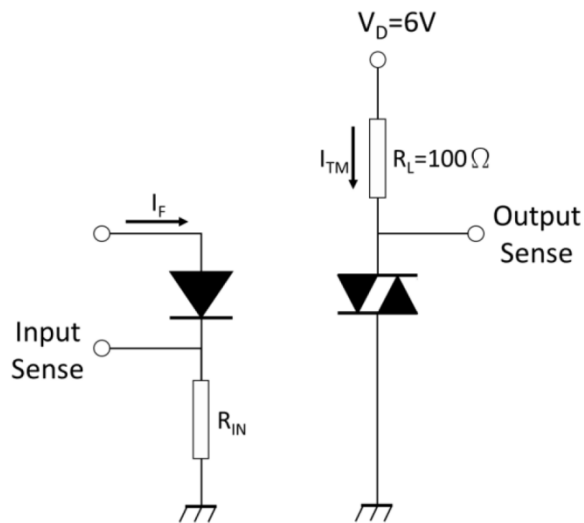


FIG.13: Waveforms of Turn On Time

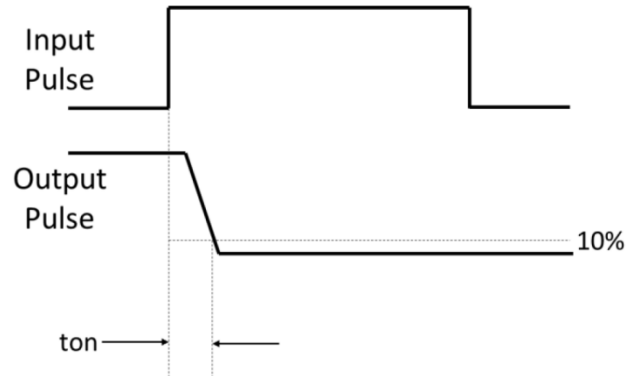


Fig.14: Test Circuits of dV/dt

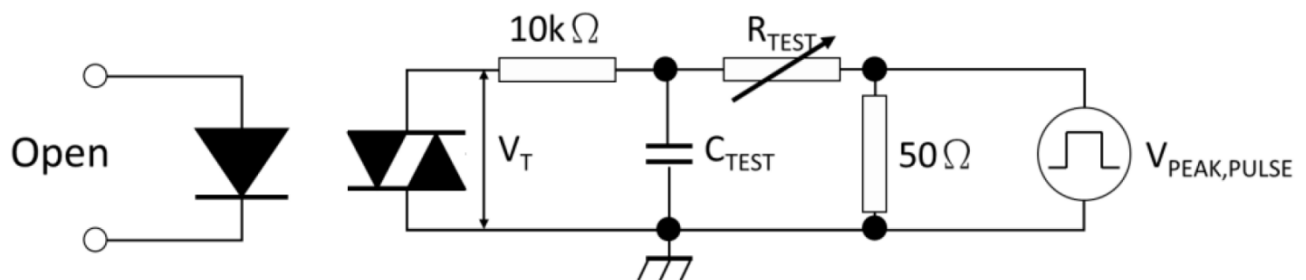
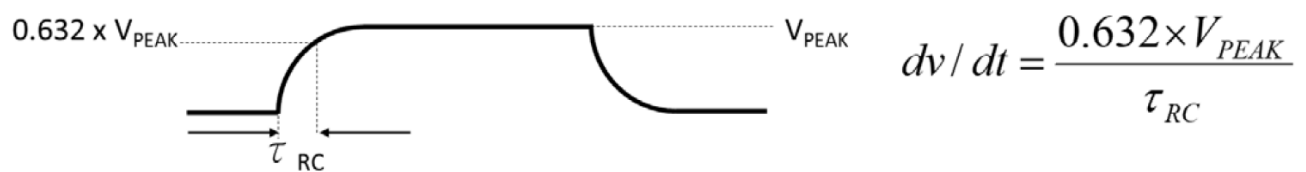
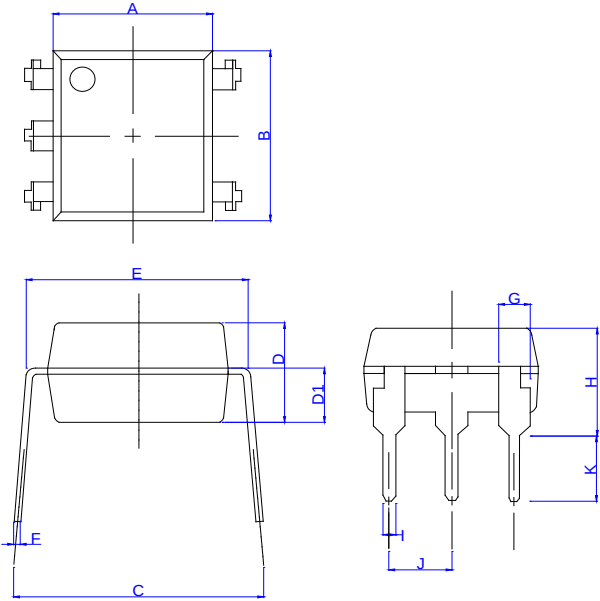


Fig.15: Waveforms of dV/dt



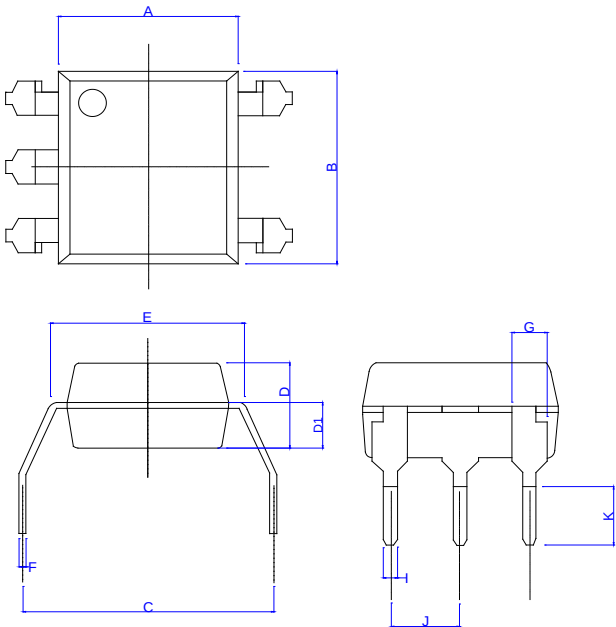
Package Dimension (Unit: mm)

Standard DIP Type:



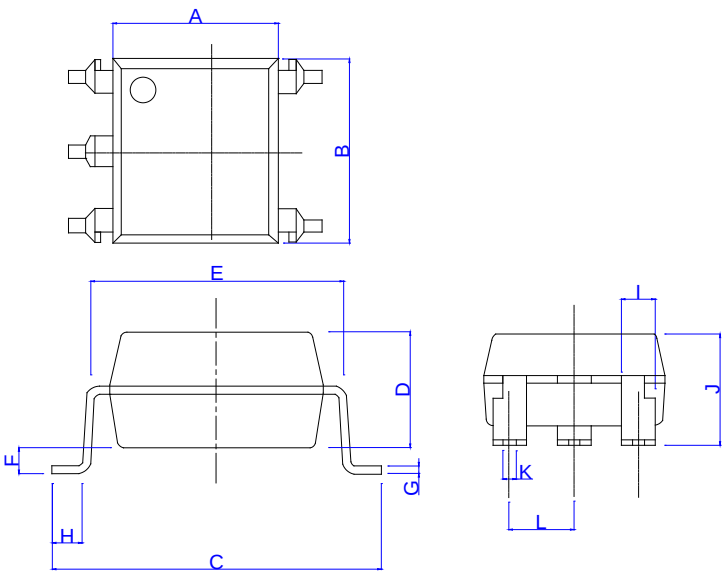
| Ref. | Dimensions  |      |       |        |      |       |
|------|-------------|------|-------|--------|------|-------|
|      | Millimeters |      |       | Inches |      |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ. | Max.  |
| A    | 6.00        |      | 7.00  | 0.237  |      | 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:



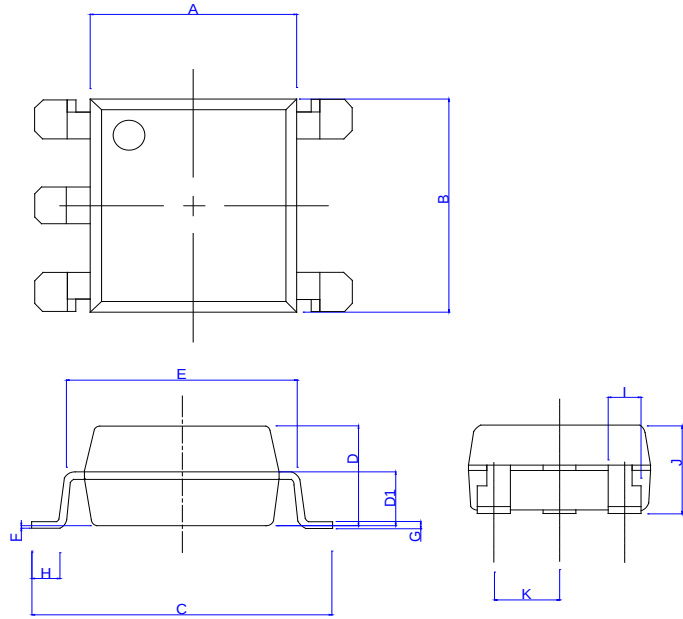
| Ref. | Dimensions  |      |       |        |      |       |
|------|-------------|------|-------|--------|------|-------|
|      | Millimeters |      |       | Inches |      |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ. | Max.  |
| A    | 6.00        |      | 7.00  | 0.237  |      | 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:



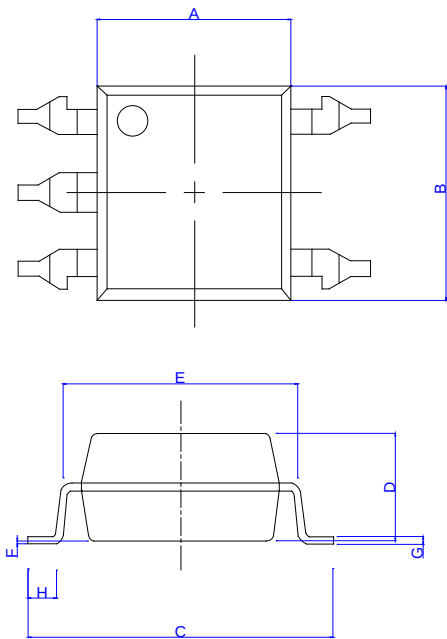
| Ref. | Dimensions  |      |       |        |       |       |
|------|-------------|------|-------|--------|-------|-------|
|      | Millimeters |      |       | Inches |       |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ.  | Max.  |
| A    | 6.30        |      | 6.70  | 0.249  |       | 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 |

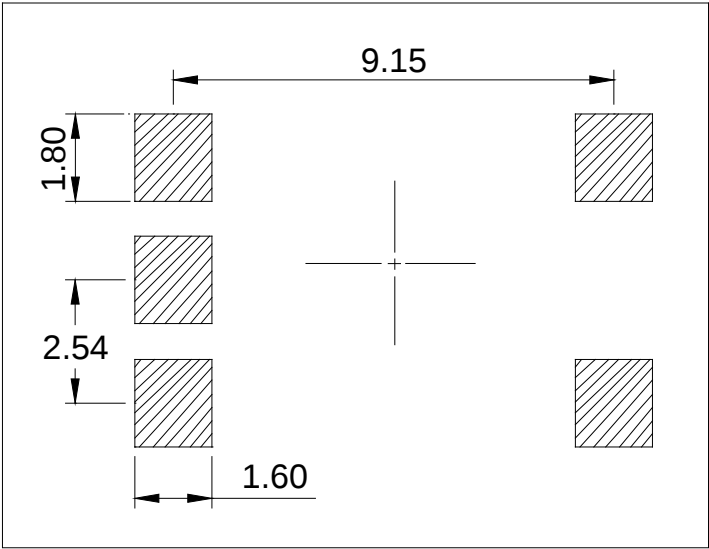
Option SLM Type:



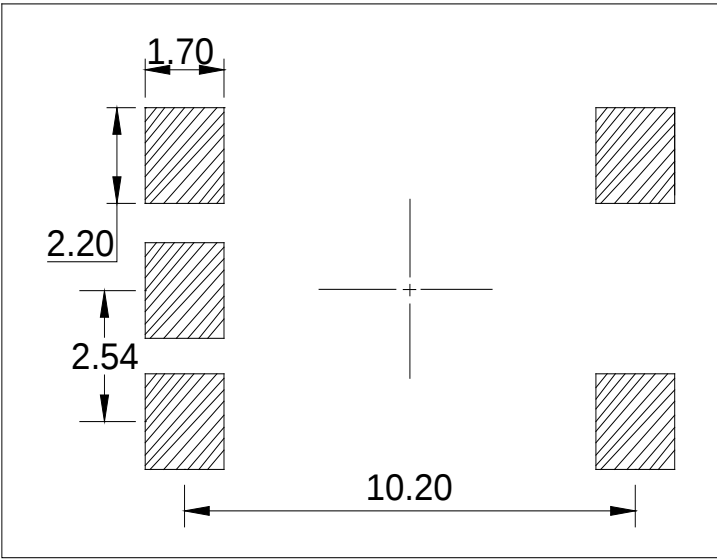
| Ref. | Dimensions  |      |       |        |      |       |
|------|-------------|------|-------|--------|------|-------|
|      | Millimeters |      |       | Inches |      |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ. | Max.  |
| A    | 6.30        |      | 6.70  | 0.248  |      | 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)

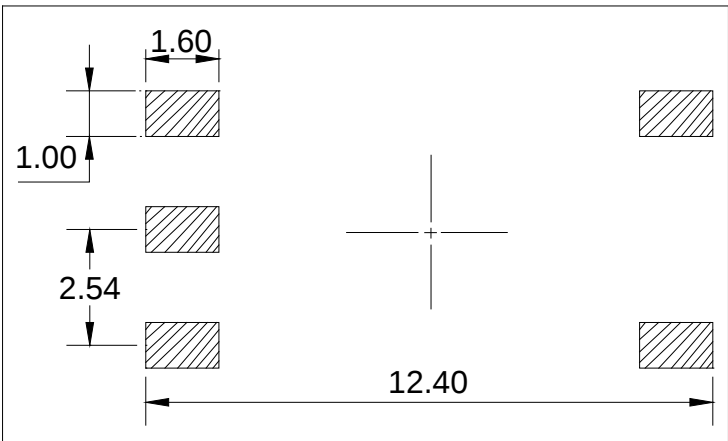
Option S



Option SL

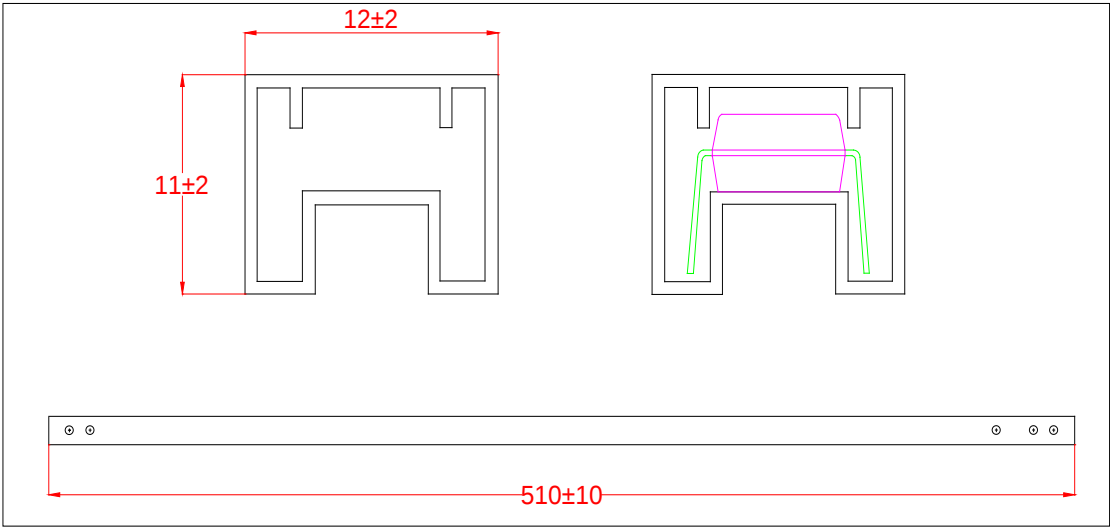


Option SLM

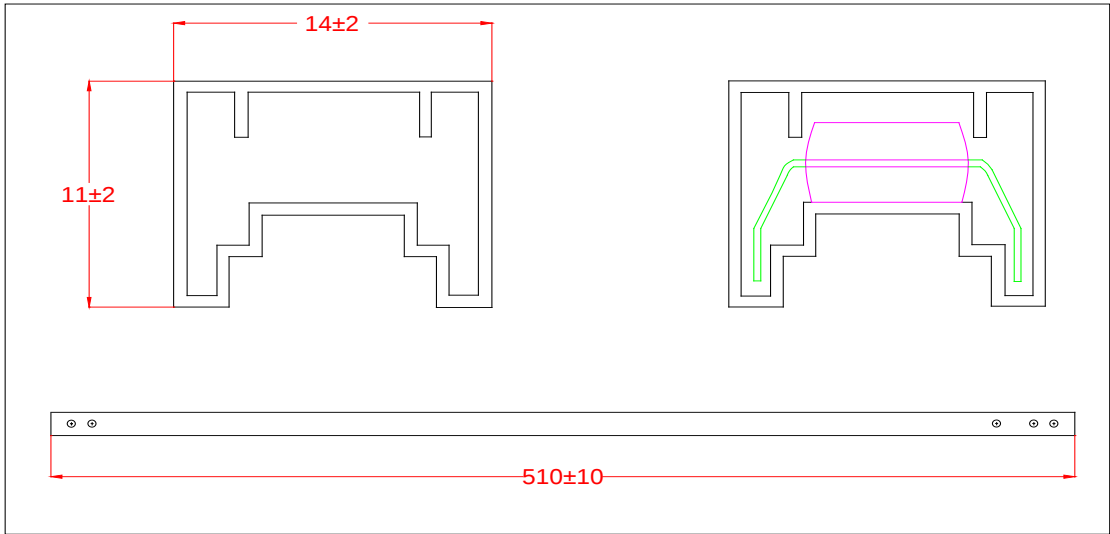


TUBE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Standard DIP

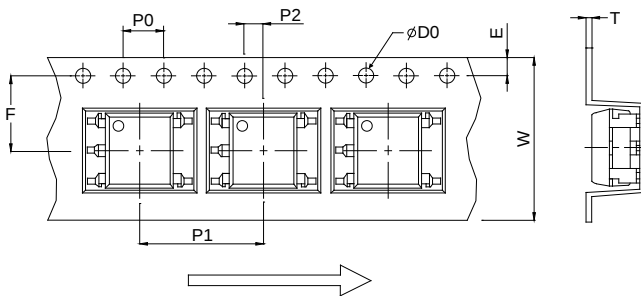


Option M



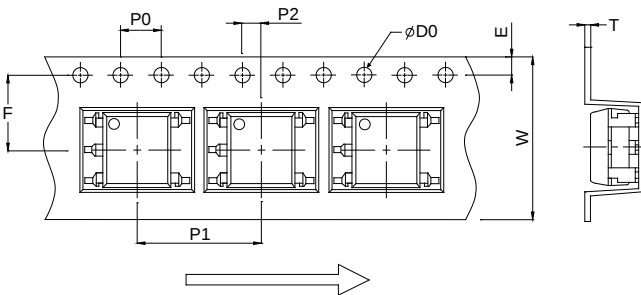
CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S(T1)



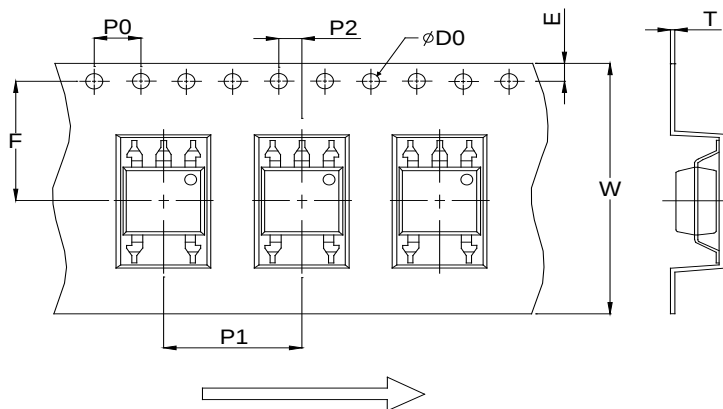
| Ref. | Dimensions  |       |       |        |       |       |
|------|-------------|-------|-------|--------|-------|-------|
|      | Millimeters |       |       | Inches |       |       |
|      | Min.        | Typ.  | Max.  | Min.   | Typ.  | Max.  |
| D0   |             | 1.50  | 1.65  |        | 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 |

Option SL(T1)



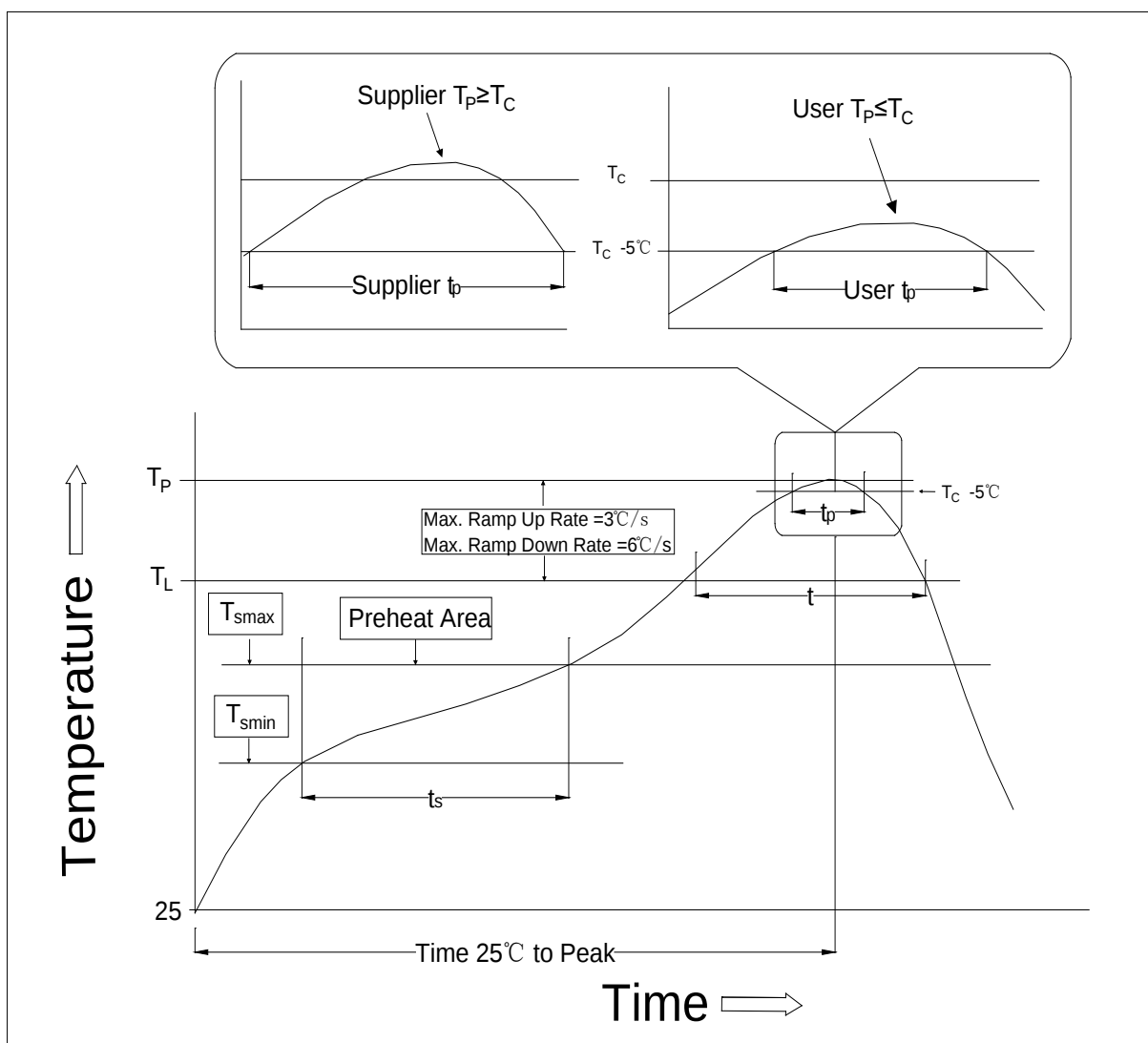
| Ref. | Dimensions  |       |       |        |       |       |
|------|-------------|-------|-------|--------|-------|-------|
|      | Millimeters |       |       | Inches |       |       |
|      | Min.        | Typ.  | Max.  | Min.   | Typ.  | Max.  |
| D0   |             | 1.50  | 1.60  |        | 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 |

Option SLM(T1)



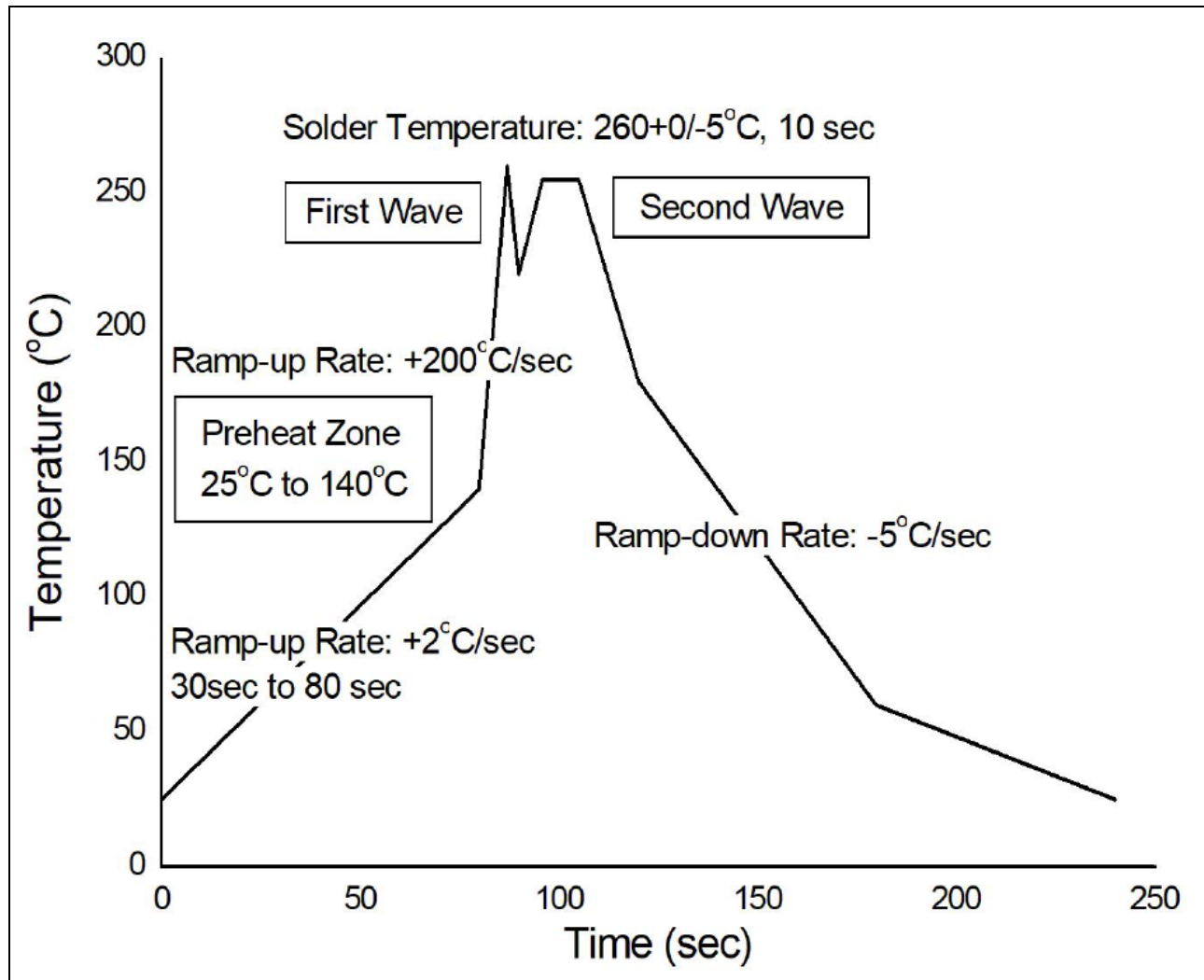
| Ref. | Dimensions  |       |       |        |       |       |
|------|-------------|-------|-------|--------|-------|-------|
|      | Millimeters |       |       | Inches |       |       |
|      | Min.        | Typ.  | Max.  | Min.   | Typ.  | Max.  |
| D0   |             | 1.50  | 1.60  |        | 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 |

Information furnished in this document is believed to be accurate and reliable. However, Jiangsu JieJie Microelectronics Co., Ltd. assumes no responsibility for the consequences of use without consideration for such information nor use beyond it. Information mentioned in this document is subject to change without notice, apart from that when an agreement is signed, Jiangsu JieJie complies with the agreement.

Products and information provided in this document have no infringement of patents. Jiangsu JieJie assumes no responsibility for any infringement of other rights of third parties which may result from the use of such products and information. This document supersedes and replaces all information previously supplied.



is a registered trademark of Jiangsu JieJie Microelectronics Co., Ltd.

Copyright © 2025 Jiangsu JieJie Microelectronics Co., Ltd. All rights reserved.