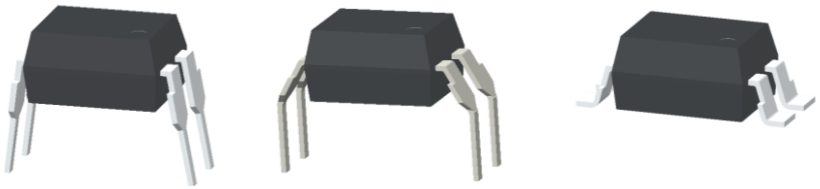
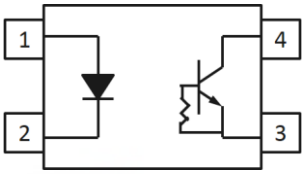
DATASHEET

# 4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER
# EL2514-G Series



Schematic




Pin Configuration
1. Anode
2. Cathode
3. Emitter
4. Collector

## Features:

- Halogens free.
  (Br < 900ppm, Cl < 900ppm, Br+Cl < 1500ppm)
- Current transfer ratio(CTR: 50~200% at $I_F$ = 5mA, $V_{CE}$ = 5V, $T_A$ =25°C)
- High isolation voltage between input and output (Viso = 5000Vrms)
- High-Speed switching ($t_{on}$≦25 μs at $I_F$=5mA,$V_{CC}$=5V,$R_L$=5kΩ, $T_A$ =25°C)
  ($t_{off}$≦25 μs at $I_F$=5mA,$V_{CC}$=5V,$R_L$=5kΩ, $T_A$ =25°C)
- Creepage distance > 7.62mm
- Operating temperature up to +110°C
- Compact small outline package
- Compliance with EU REACH
- The product itself will remain within RoHS compliant version
- UL and cUL (No.E214129)
- VDE approved (No.132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

## Description

The EL2514-G series of devices each consist of an infrared emitting diodes, optically coupled to a phototransistor detector. The EL2514-G has enabled relatively high switching speed with high load resistor of several kΩ.
They are packaged in a 4-pin DIP package and available in wide-lead spacing and SMD option.

## Applications

- Programmable controllers
- System appliances, measuring instruments
- Electronic electricity meter
- Telecommunication equipments
- Power supply

## Absolute Maximum Ratings (Ta=25℃)

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Input | Forward Current | $I_F$ | 50 | mA |
| | Peak Forward Current (1μs, pulse) | $I_{FP}$ | 0.5 | A |
| | Reverse Voltage | $V_R$ | 6 | V |
| Output | Collector Current | $I_C$ | 20 | mA |
| | Collector-Emitter Voltage | $V_{CEO}$ | 40 | V |
| | Emitter-Collector Voltage | $V_{ECO}$ | 0.45 | V |
| Total Power Dissipation | | $P_{TOT}$ | 200 | mW |
| Isolation Voltage*1 | | $V_{ISO}$ | 5000 | Vrms |
| Operating Temperature | | $T_{OPR}$ | -55 to +110 | °C |
| Storage Temperature | | $T_{STG}$ | -55 to +125 | °C |
| Soldering Temperature*2 | | $T_{SOL}$ | 260 | °C |

Notes:
*1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 are shorted together, and pins 3, 4 are shorted together.
*2 For 10 seconds

## Recommended Operating Conditions

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Input Current | $I_F$ | 5 | 6 | 7 | mA |

## Electro-Optical Characteristics (Ta=25℃ unless specified otherwise)

### Input

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| Forward Voltage | $V_F$ | - | 1.2 | 1.4 | V | $I_F$ = 20mA |
| Reverse Current | $I_R$ | - | - | 10 | μA | $V_R$ = 4V |
| Input Capacitance | $C_{in}$ | - | 30 | 250 | pF | V = 0, f = 1kHz |

### Output

| Parameter | Symbol | Min | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| Collector-Emitter Dark Current | $I_{CEO}$ | - | - | 100 | nA | $V_{CE}$ = 10V, $I_F$ = 0mA |
| Collector-Emitter Breakdown Voltage | $BV_{CEO}$ | 40 | - | - | V | $I_C$ = 0.1mA |
| Emitter-Collector Breakdown Voltage | $BV_{ECO}$ | 0.45 | - | - | V | $I_E$ = 0.1mA |

### Transfer Characteristics

| Parameter | Symbol | Min | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| Current Transfer Ratio | CTR | 50 | - | 200 | % | $I_F$ = 5mA ,$V_{CE}$ = 5V |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | - | - | 0.35 | V | $I_F$ = 5mA ,$I_C$ = 0.4mA |
| Isolation Resistance | $R_{IO}$ | $5\times10^{10}$ | - | - | Ω | $V_{IO}$ = 500Vdc, 40~60% R.H. |
| Floating Capacitance | $C_{IO}$ | - | 0.6 | 1.0 | pF | $V_{IO}$ = 0, f = 1MHz |
| Turn-on Time | $t_{on}$ | - | - | 25 | μs | $V_{CC}$ = 5V, $I_F$ = 5mA, $R_L$ = 5kΩ |
| Turn-off Time | $t_{off}$ | - | - | 25 | μs | |

* Typical values at $T_a$ = 25°C

## Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs. Forward Voltage

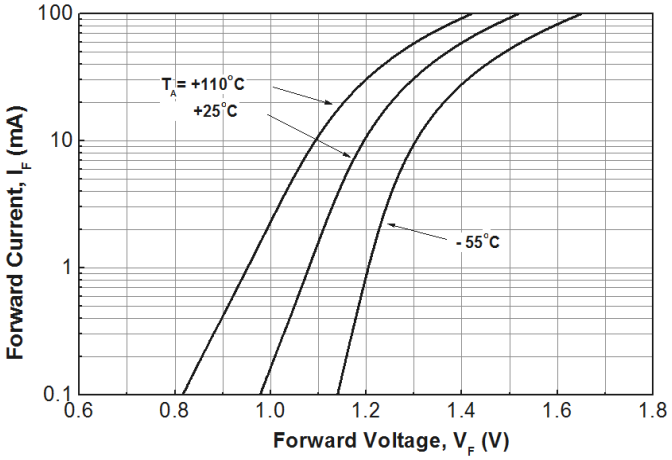



Figure 2. Current Transfer Ratio vs Forward Current

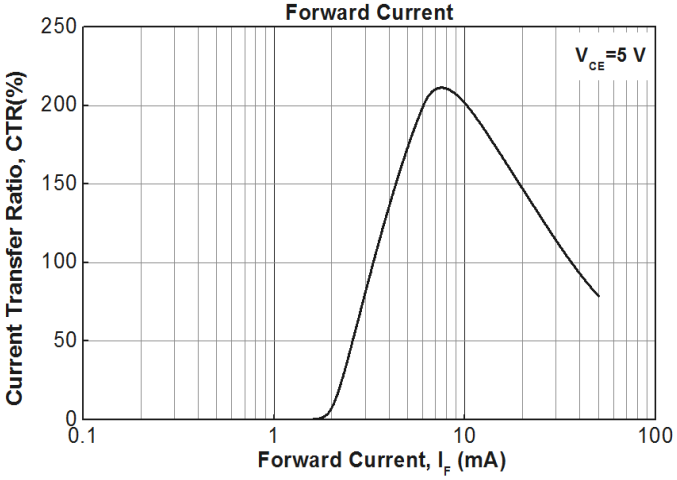



Figure 3. Current Transfer Ratio vs Ambient Temperature

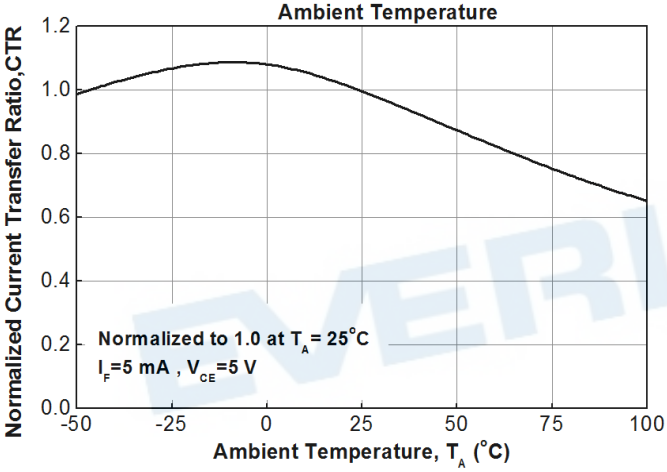



Figure 4. Dark Current vs Ambient Temperature

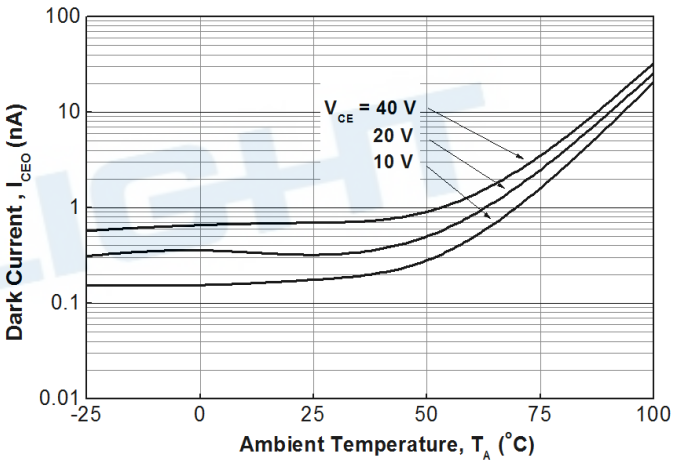



Figure 5. Collector Current vs Collector Saturation Voltage

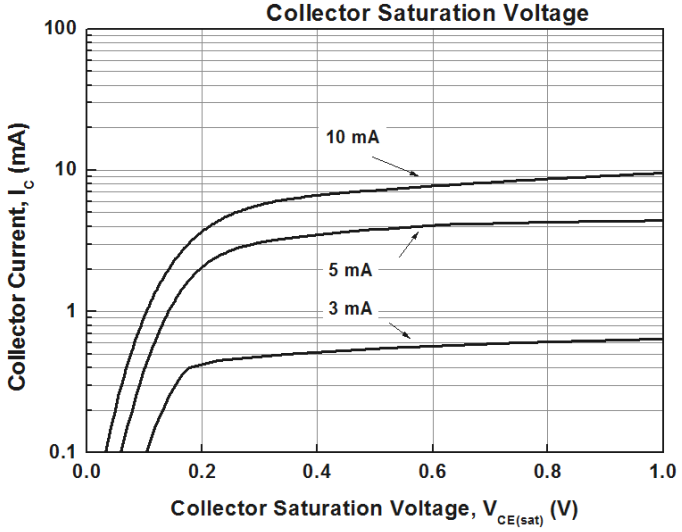
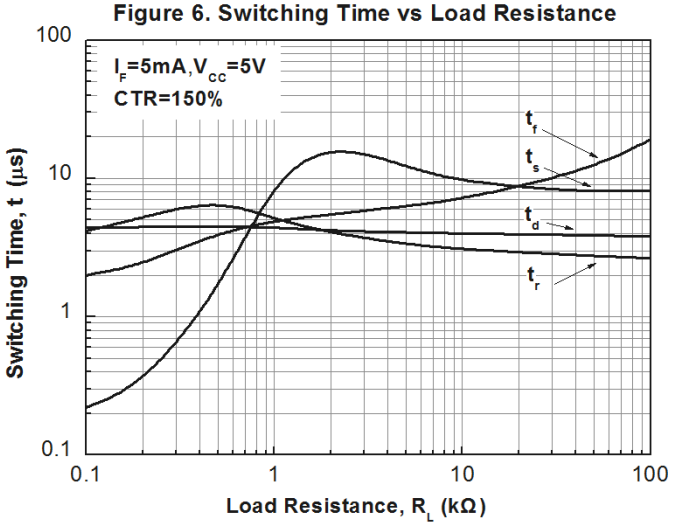



Figure 6. Switching Time vs Load Resistance



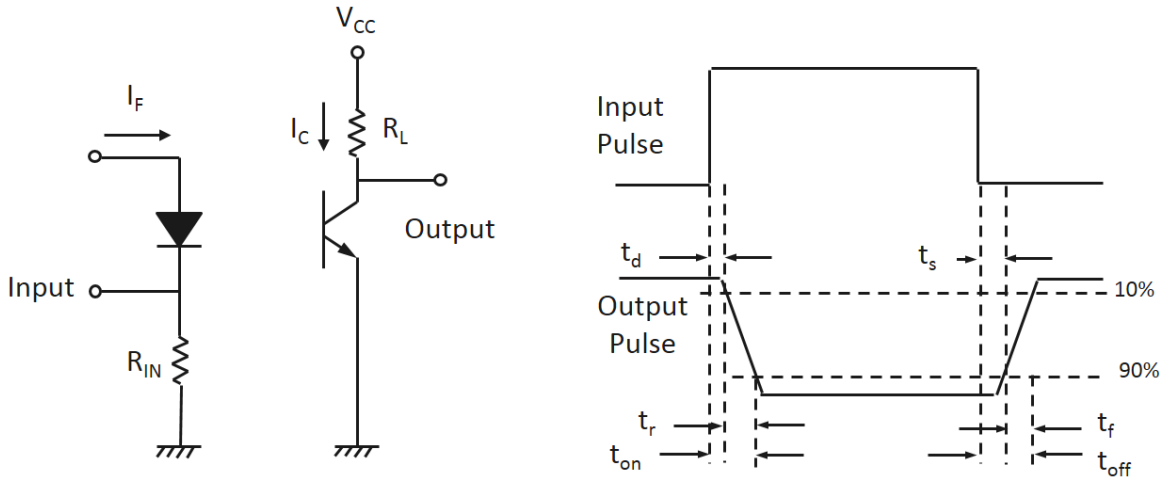



**Figure 7. Switching Time Test Circuit & Waveforms**

## Order Information

### Part Number

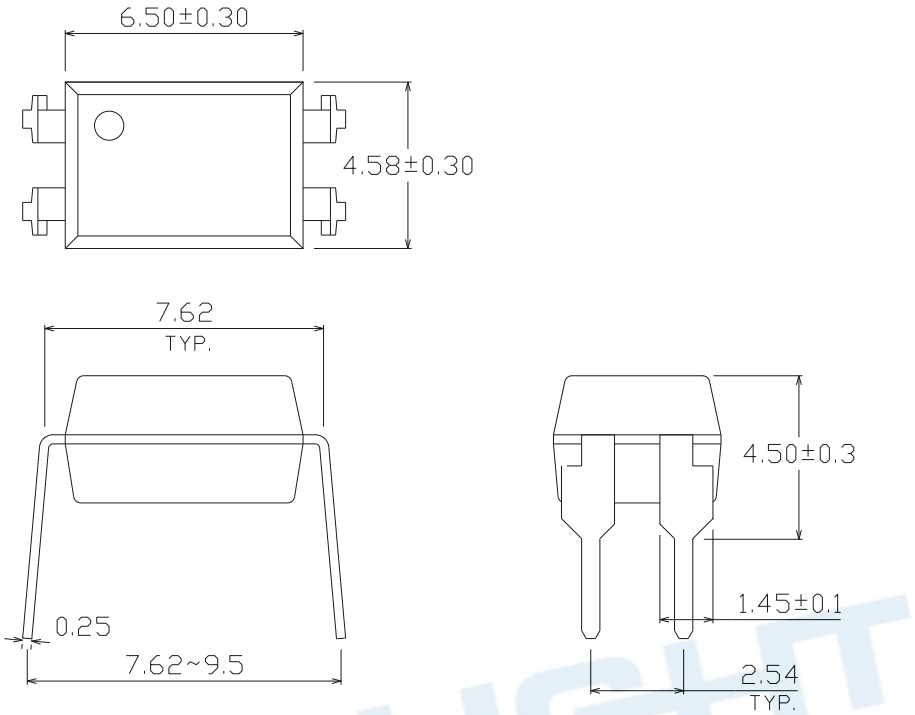
# EL2514X(Y)-VG

**Note**
X = Lead form option (S1, S2, M or none)
Y = Tape and reel option (TU, TD or none)
V = VDE safety (optional)
G = Halogens free

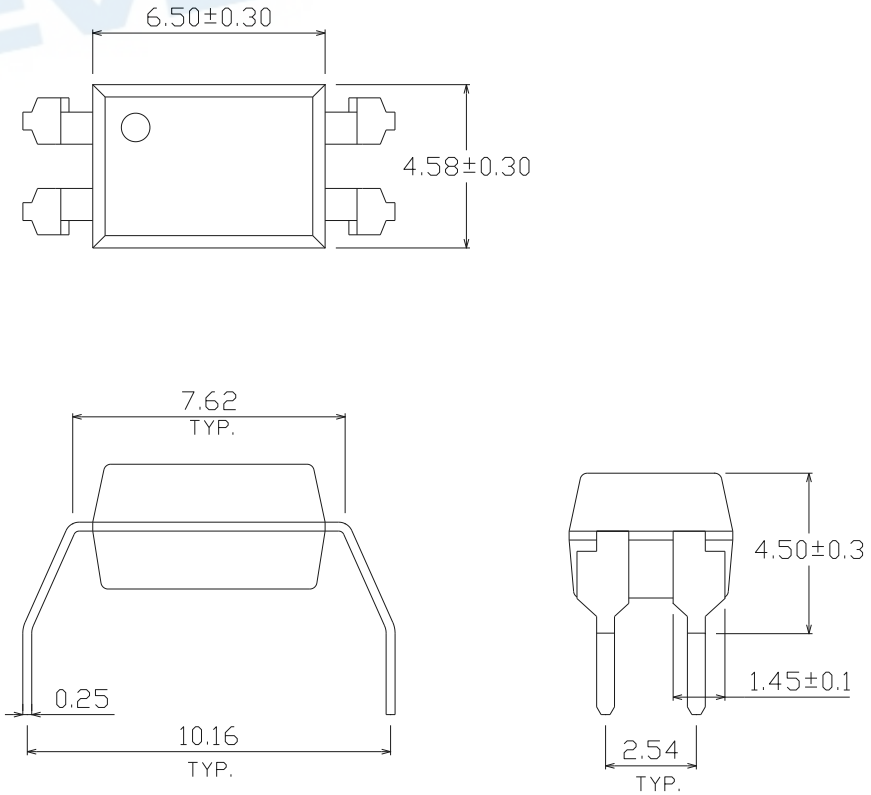
| Option | Description | Packing quantity |
|---|---|---|
| None | Standard DIP-4 | 100 units per tube |
| M | Wide lead bend (0.4 inch spacing) | 100 units per tube |
| S1 (TU) | Surface mount lead form (low profile) + TU tape & reel option | 1500 units per reel |
| S1 (TD) | Surface mount lead form (low profile) + TD tape & reel option | 1500 units per reel |
| S2 (TU) | Surface mount lead form (low profile) + TU tape & reel option | 2000 units per reel |
| S2 (TD) | Surface mount lead form (low profile) + TD tape & reel option | 2000 units per reel |

## Package Dimension (Dimensions in mm)

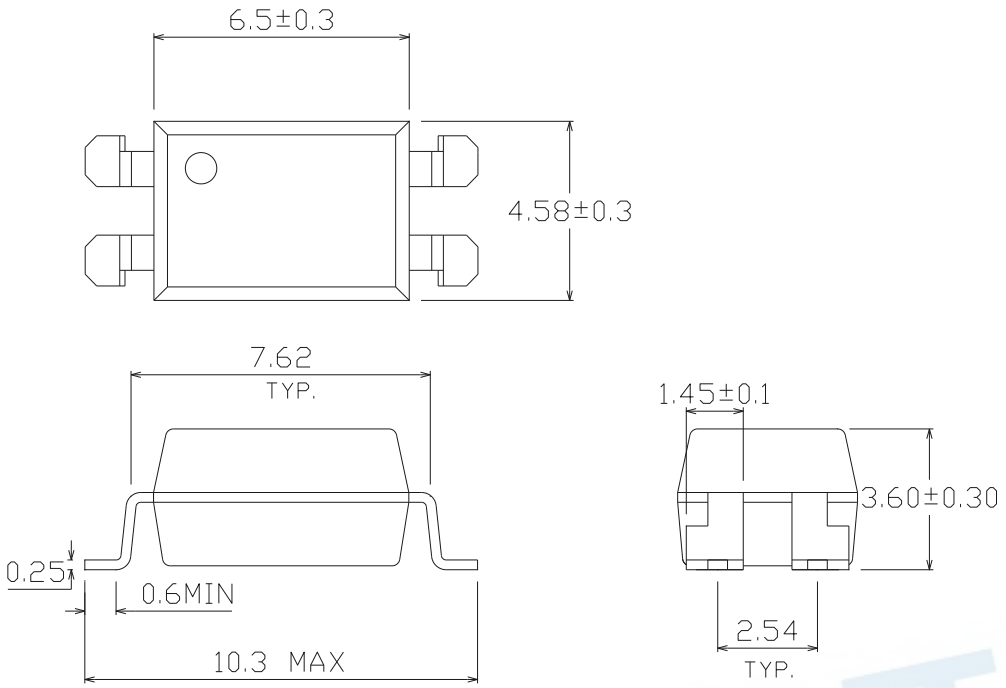
### Standard DIP Type



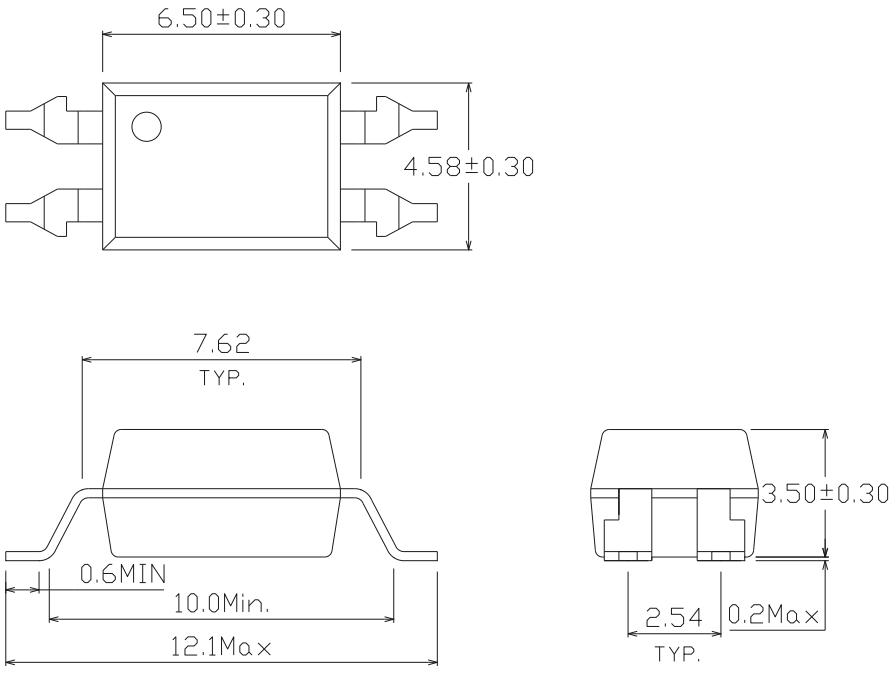

### Option M Type



**Option S1 Type**

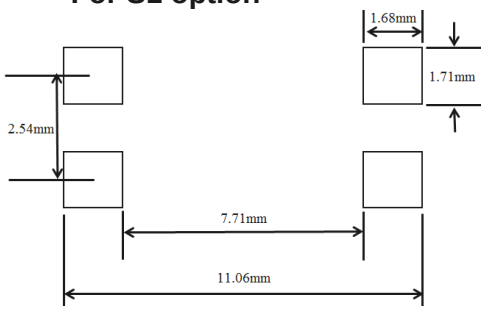



**Option S2 Type**

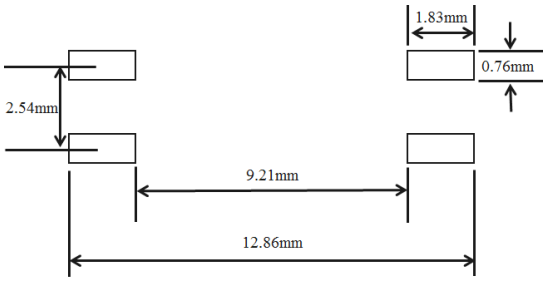


## Recommended pad layout for surface mount leadform

**For S1 option**



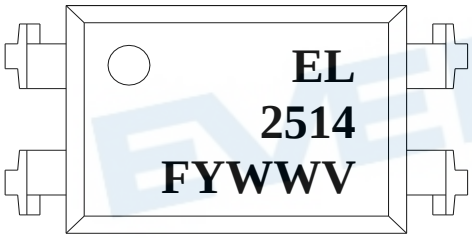

**For S2 option**




**Notes**

Suggested pad dimension is just for reference only.
Please modify the pad dimension based on individual need.

## Device Marking

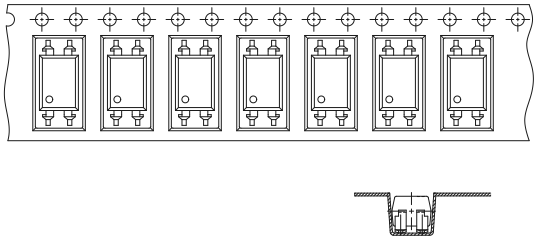



**Notes**

| | |
|---|---|
| EL | denotes EVERLIGHT |
| 2514 | denotes Device Number |
| F | denotes Factory Code (G: China and Green part) |
| Y | denotes 1 digit Year code |
| WW | denotes 2 digit Week code |
| V | denotes VDE (optional) |

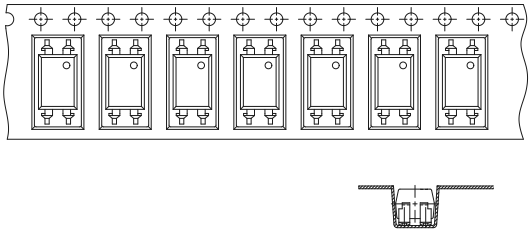
## Tape & Reel Packing Specifications

**Option TD**



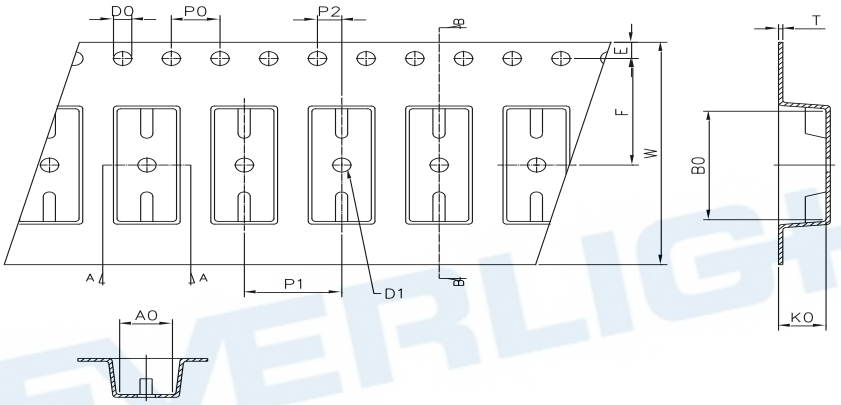
Direction of feed from reel

**Option TU**



Direction of feed from reel

## Tape dimensions

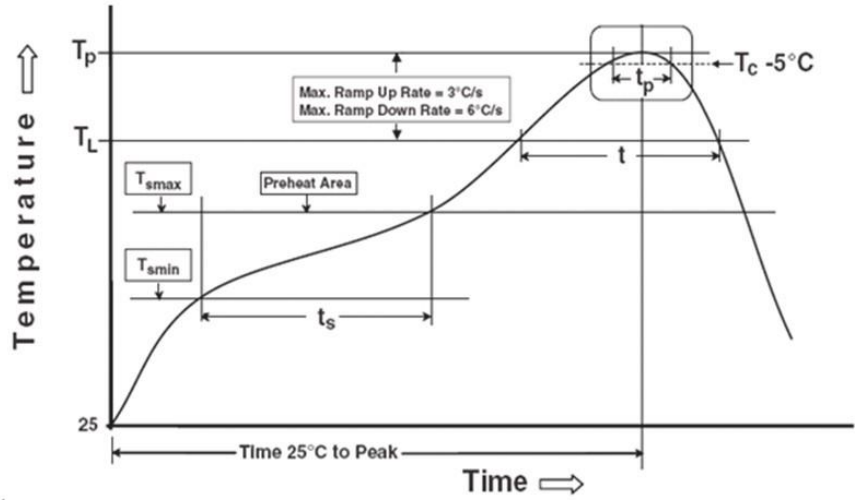



| Dimension No. | Ao | Bo | Do | D1 | E | F |
|---|---|---|---|---|---|---|
| Dimension (mm) S1 | 4.90±0.1 | 10.40±0.1 | 1.5±0.1 | 1.50±0.1 | 1.75±0.1 | 7.50±0.1 |
| Dimension (mm) S2 | 4.88±0.1 | 12.55±0.1 | 1.5±0.1 | 1.50±0.1 | 1.75±0.1 | 11.5±0.1 |
| Dimension No. | **Po** | **P1** | **P2** | **t** | **W** | **Ko** |
| Dimension (mm) S1 | 4.00±0.1 | 8.00±0.1 | 2.00±0.1 | 0.40±0.1 | 16.00±0.3 | 4.60±0.1 |
| Dimension (mm) S2 | 4.00±0.1 | 8.00±0.1 | 2.00±0.1 | 0.40±0.1 | 24.00±0.3 | 4.00±0.1 |

## Precautions for Use

1. Soldering Condition

1.1 (A) Maximum Body Case Temperature Profile for evaluation of Reflow Profile




| Note: | Reference: IPC/JEDEC J-STD-020D |
|---|---|
| **Preheat** | |
| Temperature min ($T_{smin}$) | 150 °C |
| Temperature max ($T_{smax}$) | 200°C |
| Time (Tsmin to Tsmax) (ts) | 60-120 seconds |
| Average ramp-up rate (Tsmax to Tp) | 3 °C/second max |
| **Other** | |
| Liquidus Temperature ($T_L$) | 217 °C |
| Time above Liquidus Temperature ($t_L$) | 60-100 sec |
| Peak Temperature ($T_P$) | 260°C |
| Time within 5 °C of Actual Peak Temperature: $T_P$ - 5°C | 30 s |
| Ramp- Down Rate from Peak Temperature | 6°C /second max. |
| Time 25°C to peak temperature | 8 minutes max. |
| Reflow times | 3 times |

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