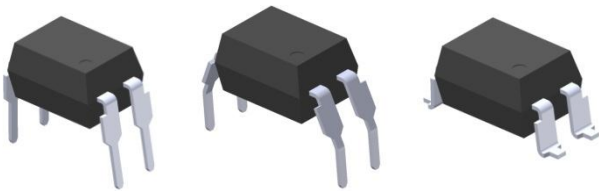
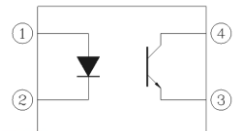


## 4 PIN DIP LOW INPUT PHOTOTRANSISTOR PHOTOCOUPLER EL8171-G Series



Schematic



Pin Configuration

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

### Features:

- Current transfer ratio (CTR: 100~350% at  $I_F = 0.5\text{mA}$ ,  $V_{CE} = 5\text{V}$ )
- High isolation voltage between input and output (Viso = 5000Vrms)
- Creepage distance > 7.62 mm
- Operating temperature up to +100°C
- Compliance with EU REACH
- Compliance Halogen Free (Br < 900ppm, Cl < 900ppm, Br+Cl < 1500ppm)
- The product itself will remain within RoHS compliant version
- UL and cUL approved (No. E214129)
- VDE approved (No. 132249)
- CQC approved

### Description

The EL8171-G series of devices each consist of an infrared emitting diodes, optically coupled to a phototransistor detector with green compound.

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
- Telecommunication equipments
- Home appliances, such as fan heaters, etc.
- Signal transmission between circuits of different potentials and impedances

**Absolute Maximum Ratings (Ta=25°C)**

	Parameter	Symbol	Rating	Unit
Input	Forward current	$I_F$	10	mA
	Reverse voltage	$V_R$	6	V
	Power dissipation	$P_D$	20	mW
Output	Power dissipation	$P_C$	150	mW
	Collector current	$I_C$	50	mA
	Collector-Emitter voltage	$V_{CEO}$	70	V
	Emitter-Collector voltage	$V_{ECO}$	6	V
Total power dissipation		$P_{TOT}$	170	mW
Isolation voltage *1		$V_{ISO}$	5000	V rms
Operating temperature		$T_{OPR}$	-30 ~ +100	°C
Storage temperature		$T_{STG}$	-55 ~ +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

**Electro-Optical Characteristics (Ta=25°C unless specified otherwise)**

**Input**

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Forward Voltage	$V_F$	-	1.2	1.4	V	$I_F = 10\text{mA}$
Reverse Current	$I_R$	-	-	10	$\mu\text{A}$	$V_R = 4\text{V}$
Input capacitance	$C_{in}$	-	-	250	pF	$V = 0, f = 1\text{kHz}$

**Output**

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Collector-Emitter dark current	$I_{CEO}$	-	-	100	nA	$V_{CE} = 20\text{V}, I_F = 0\text{mA}$
Collector-Emitter breakdown voltage	$BV_{CEO}$	70	-	-	V	$I_C = 0.1\text{mA}$
Emitter-Collector breakdown voltage	$BV_{ECO}$	6	-	-	V	$I_E = 0.1\text{mA}$

**Transfer Characteristics**

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Current Transfer ratio	CTR	100	-	350	%	$I_F = 0.5\text{mA}, V_{CE} = 5\text{V}$
Collector-Emitter saturation voltage	$V_{CE(sat)}$	-	--	0.2	V	$I_F = 10\text{mA}, I_C = 1\text{mA}$
Isolation resistance	$R_{IO}$	$5 \times 10^{10}$	-	-	$\Omega$	$V_{IO} = 500\text{Vdc}, 40\text{--}60\% \text{ R.H.}$
Floating capacitance	$C_{IO}$	-	-	1.0	pF	$V_{IO} = 0, f = 1\text{MHz}$
Cut-off frequency	$f_c$	-	80	-	kHz	$V_{CE} = 5\text{V}, I_C = 2\text{mA}$ $R_L = 100\Omega, -3\text{dB}$
Rise time	$t_r$	-	-	18	$\mu\text{s}$	$V_{CE} = 2\text{V}, I_C = 2\text{mA},$ $R_L = 100\Omega$
Fall time	$t_f$	-	-	18	$\mu\text{s}$	$R_L = 100\Omega$

\* Typical values at  $T_a = 25^\circ\text{C}$

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

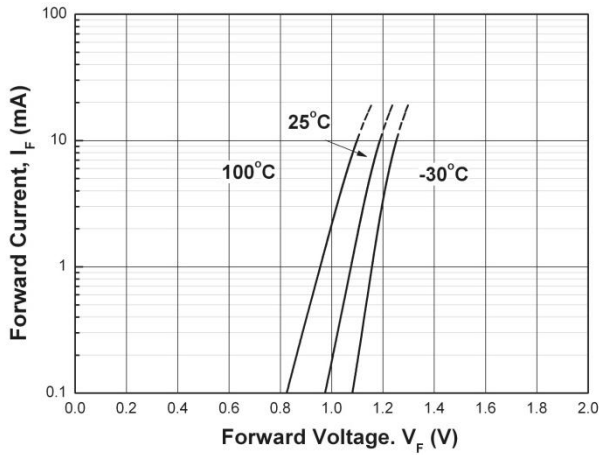


Figure 2. Normalized Current Transfer Ratio vs Forward Current

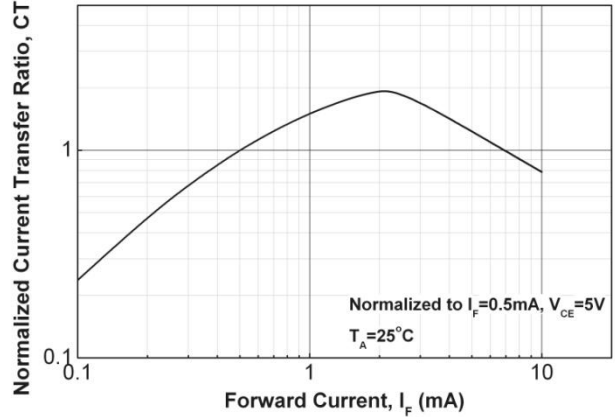


Figure 3. Current Transfer Ratio vs Ambient Temperature

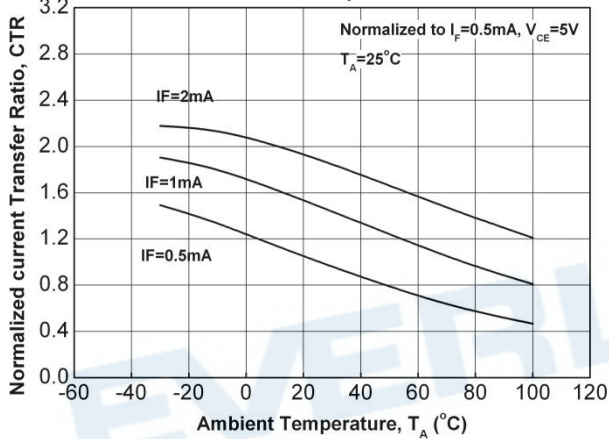


Figure 4. Dark Current vs Ambient Temperature

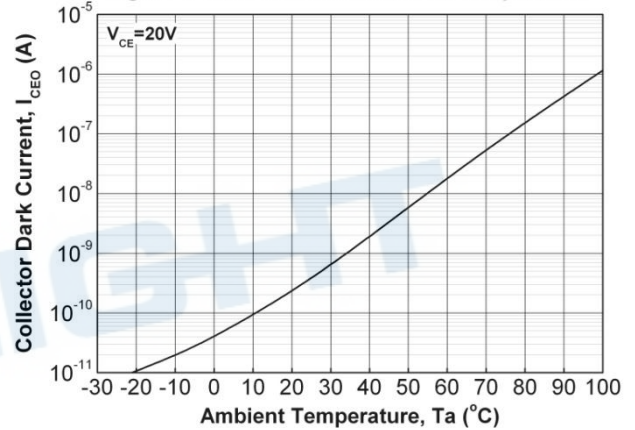


Figure 5. Collector Current vs. Collector Emitter Voltage

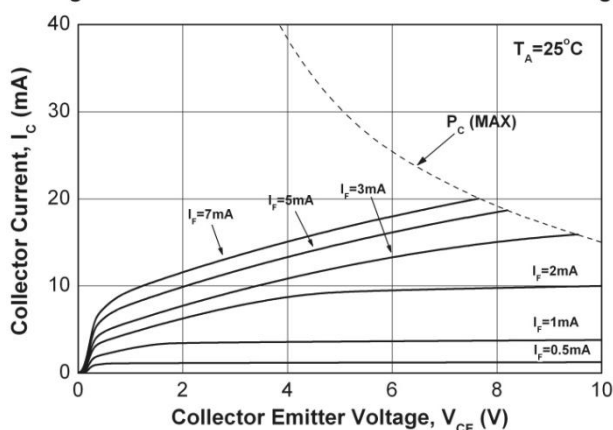
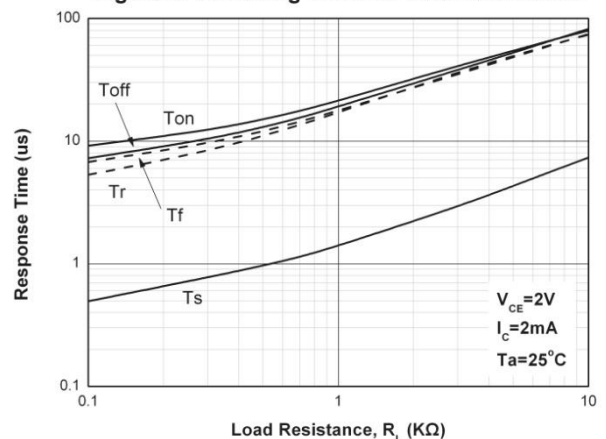


Figure 6. Switching Time vs. Load Resistance



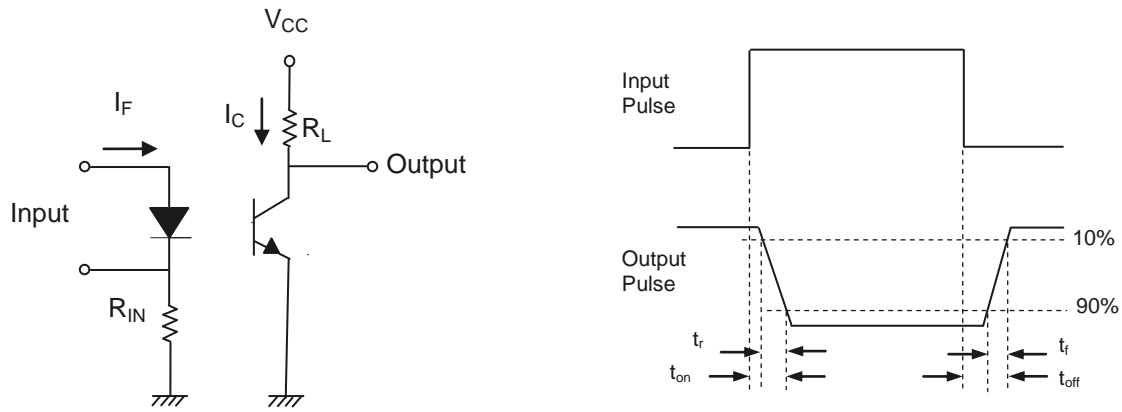


Figure 7. Switching Time Test Circuit & Waveforms

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**Order Information**

**Part Number**

**EL8171X(Z)-VG**

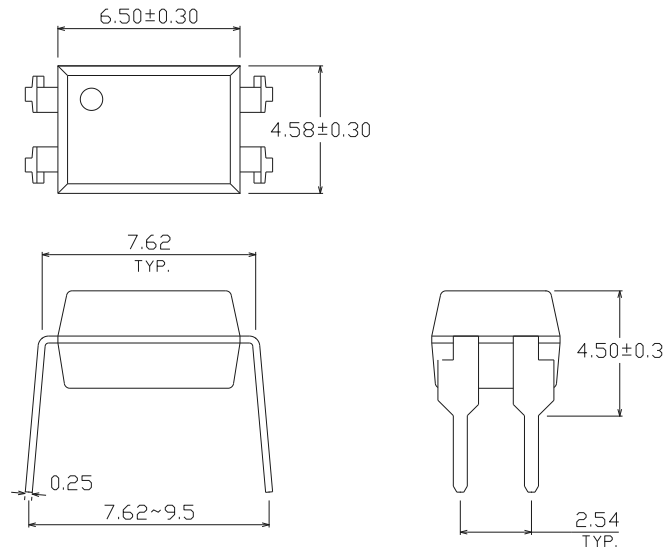
**Note**

- X = Lead form option (S, S1, M or none)
- Z = Tape and reel option (TA, TB ,TU, TD or none)
- V = VDE safety (optional)
- G = Halogens free

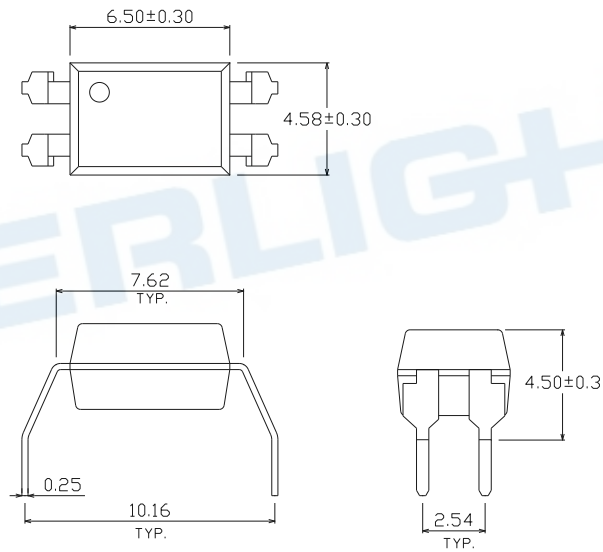
Option	Description	Packing quantity
None	Standard DIP-4	100 units per tube
M	Wide lead bend (0.4 inch spacing)	100 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount lead form (low profile) + TA tape & reel option	1000 units per reel
S1 (TB)	Surface mount lead form (low profile) + TB tape & reel option	1000 units per reel
S (TU)	Surface mount lead form + TU tape & reel option	1500 units per reel
S (TD)	Surface mount lead form + TD tape & reel option	1500 units per reel
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

Package Dimension (Dimensions in mm)

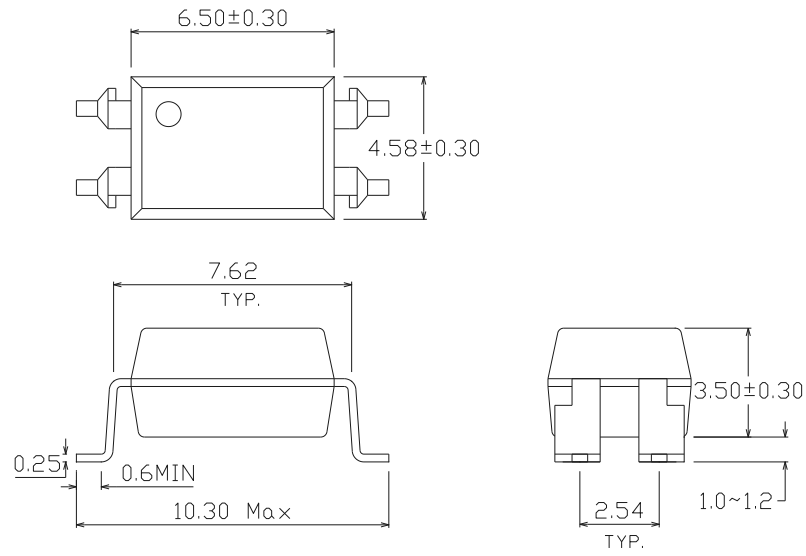
Standard DIP Type



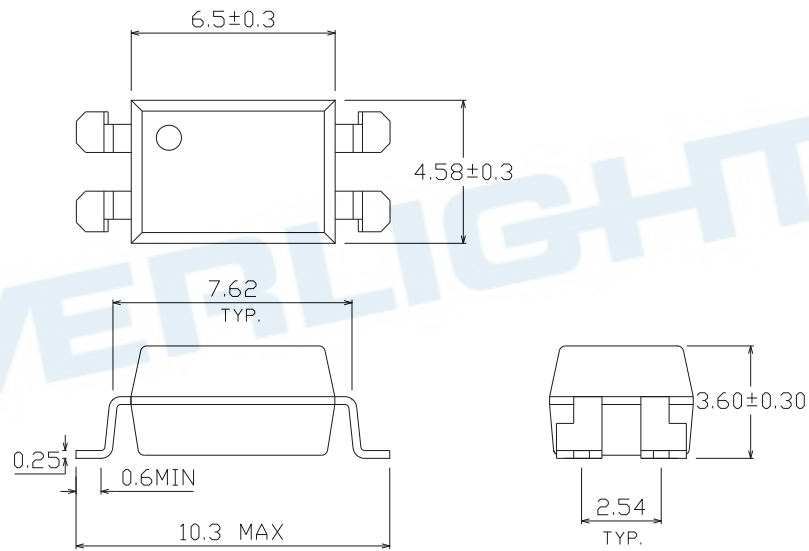
Option M Type



Option S Type

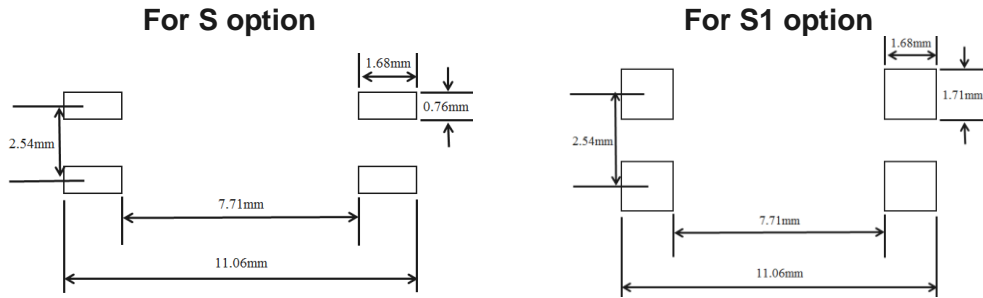


Option S1 Type





### Recommended pad layout for surface mount leadform



### Notes

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

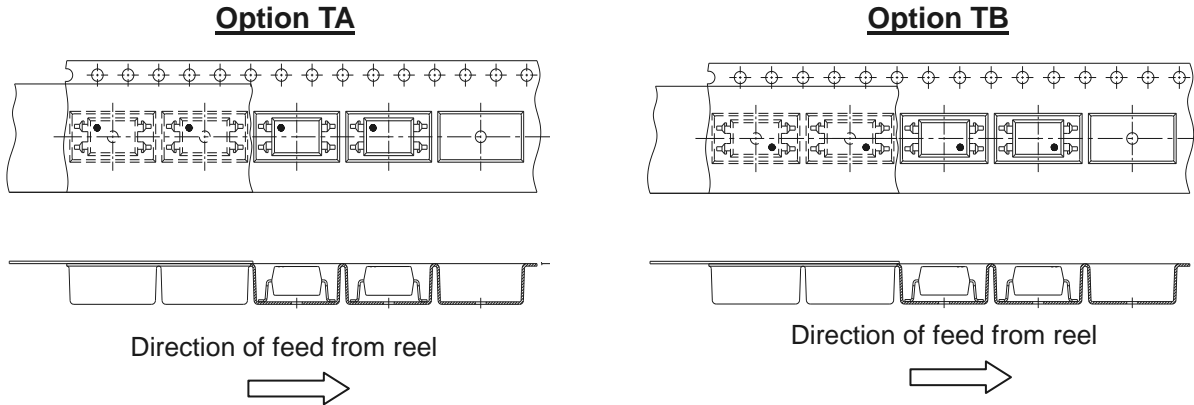
### Device Marking



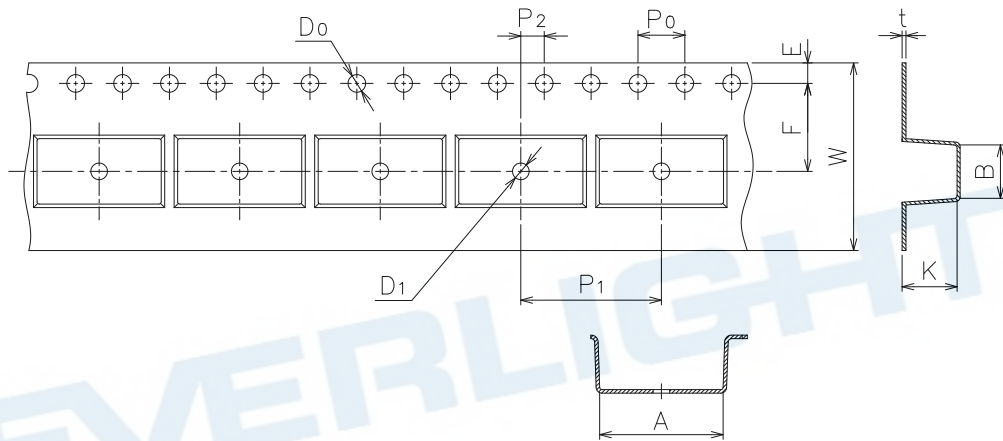
### Notes

EL denotes EVERLIGHT  
8171 denotes Device Number  
G denotes Green part  
Y denotes 1 digit Year code  
WW denotes 2 digit Week code  
V denotes VDE optional

**Tape & Reel Packing Specifications**



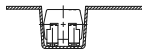
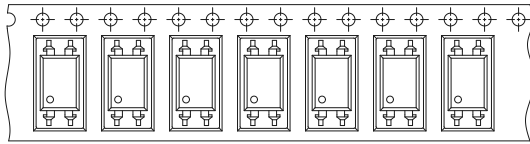
**Tape dimensions**



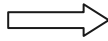
Dimension No.	<b>A</b>	<b>B</b>	<b>Do</b>	<b>D1</b>	<b>E</b>	<b>F</b>
Dimension (mm) S	10.7±0.1	4.65±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.5±0.1
Dimension (mm) S1	10.7±0.1	4.65±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.5±0.1
Dimension No.	<b>P0</b>	<b>P1</b>	<b>P2</b>	<b>t</b>	<b>W</b>	<b>K</b>
Dimension (mm) S	4.0±0.1	12.0±0.1	2.0±0.1	0.4±0.1	16.0±0.3	4.75±0.1
Dimension (mm) S1	4.0±0.1	12.0±0.1	2.0±0.1	0.4±0.1	16.0±0.3	3.90±0.1

**Tape & Reel Packing Specifications**

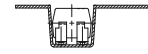
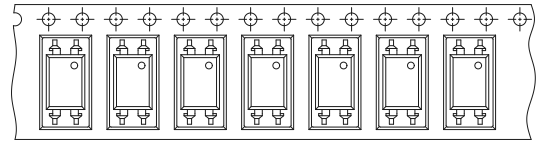
**Option TD**



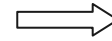
Direction of feed from reel



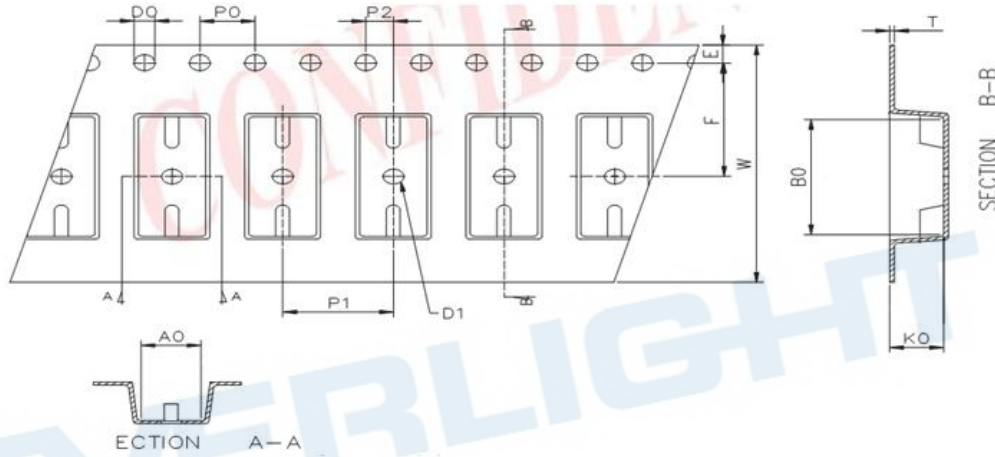
**Option TU**



Direction of feed from reel



**Tape dimensions**

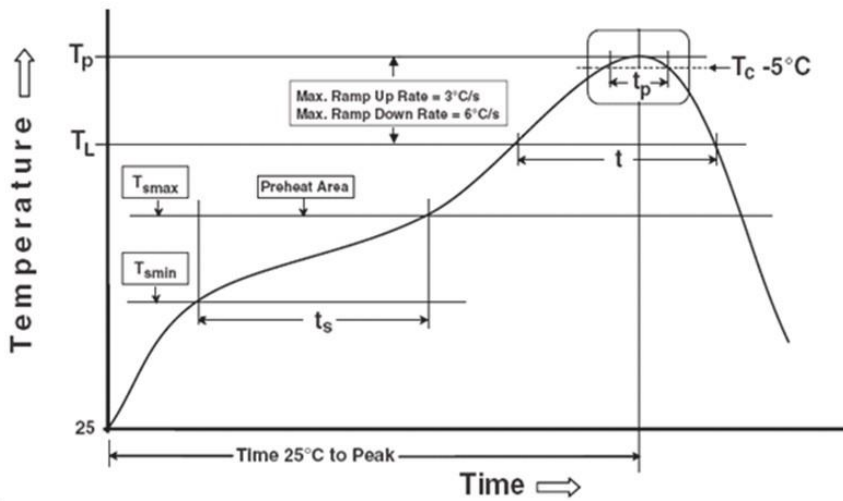


Dimension No.	<b>Ao</b>	<b>Bo</b>	<b>Do</b>	<b>D1</b>	<b>E</b>	<b>F</b>
Dimension(mm)	4.90±0.1	10.40±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.50±0.1
Dimension No.	<b>Po</b>	<b>P1</b>	<b>P2</b>	<b>t</b>	<b>W</b>	<b>Ko</b>
Dimension(mm)	4.00±0.1	8.00±0.1	2.00±0.1	0.40±0.1	16.00±0.3	4.60±0.1

## 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 ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )	60-120 seconds
Average ramp-up rate ( $T_{smax}$ to $T_p$ )	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: $T_p - 5^\circ\text{C}$	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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