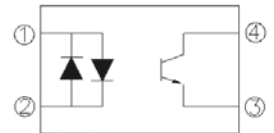


## 4 PIN SOP PHOTOTRANSISTOR PHOTOCOUPLER AC INPUT PHOTOCOUPLE EL354N-G Series



Schematic



### Pin Configuration

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

### Features

- Halogens free  
(Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm)
- Current transfer ratio  
(CTR: Min. 20% at  $I_F = \pm 1\text{mA}$  ,  $V_{CE} = 5\text{V}$ )
- High isolation voltage between input and output (Viso=3750 V rms)
- Compact small outline package
- Pb free
- Compliance with EU REACH
- The product itself will remain within RoHS compliant version
- UL and cUL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

### Description

The EL354N-G series of devices each consist of two infrared emitting diode, connected in inverse parallel, optically coupled to a phototransistor detector.

They are packaged in a 4-pin small outline package.

### Applications

- AC line monitor
- Programmable controllers
- Telephone line interface
- Unknown polarity DC sensor

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

	Parameter	Symbol	Rating	Unit
Input	Forward current	I <sub>F</sub>	±50	mA
	Peak forward current (1us, pulse)	I <sub>FP</sub>	1	A
	Power dissipation Derating factor (above T <sub>a</sub> = 90 °C)	P <sub>D</sub>	70	mW
Output	Power dissipation Derating factor (above T <sub>a</sub> = 70 °C)	P <sub>C</sub>	150 3.7	mW mW/°C
	Collector-Emitter voltage	V <sub>CEO</sub>	80	V
	Emitter-Collector voltage	V <sub>ECO</sub>	6	V
Total Power Dissipation		P <sub>TOT</sub>	200	mW
Isolation Voltage*1		V <sub>ISO</sub>	3750	Vrms
Operating temperature		T <sub>OPR</sub>	-55 ~ +100	°C
Storage temperature		T <sub>STG</sub>	-55 ~ +125	°C
Soldering Temperature*2		T <sub>SOL</sub>	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	$I_F = \pm 20\text{mA}$
Input capacitance	$C_{in}$	-	50	250	pF	$V = 0, f = 1\text{KHz}$

Note: Reverse Voltage(VR) Condition is applied to IR test only The device is not designed for reverse operation

**Output**

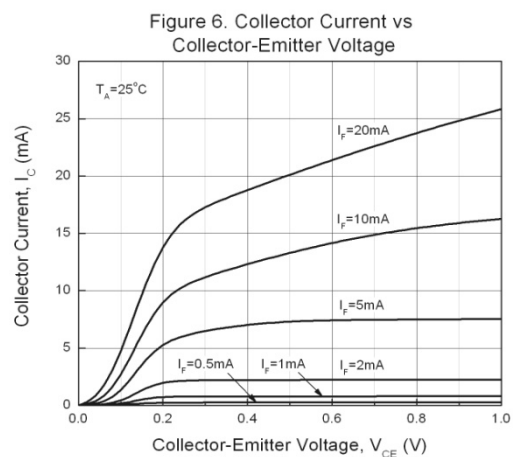
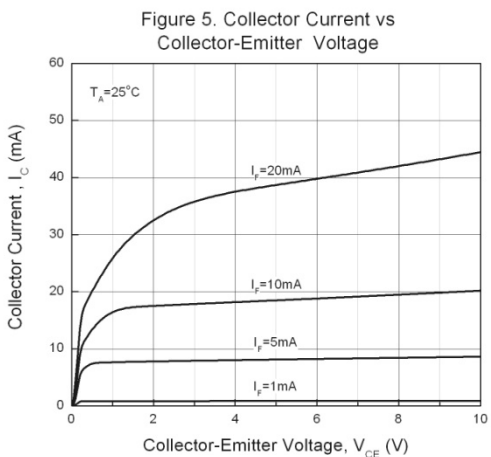
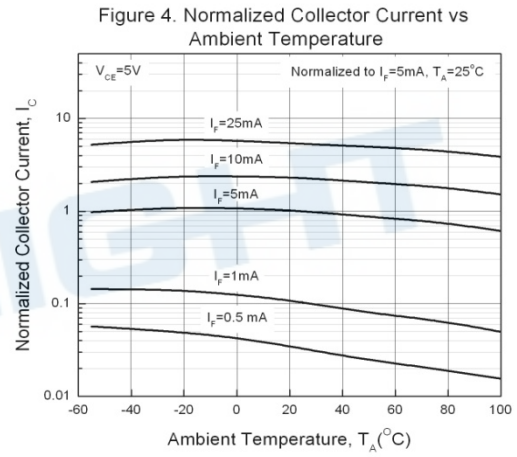
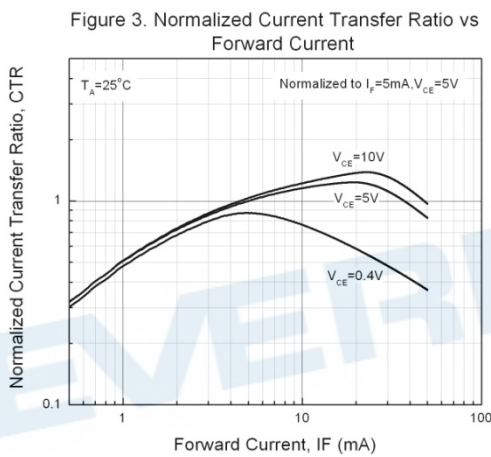
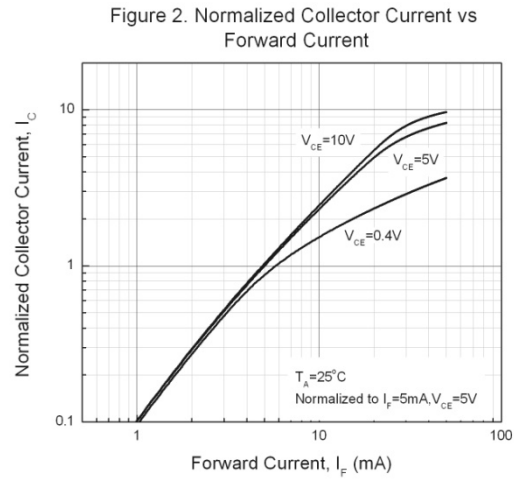
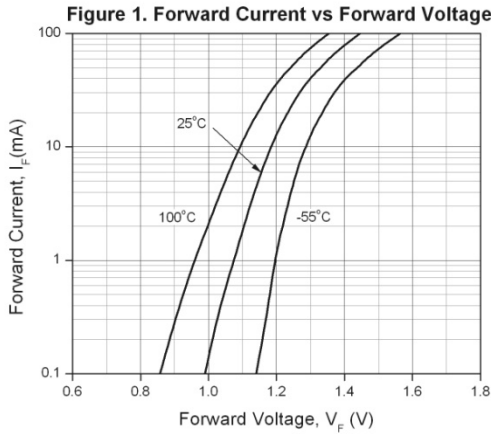
Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Collector-Emitter dark current	$I_{CEO}$	-	-	100	nA	$V_{CE} = 20\text{V}, I_F = 0\text{mA}$
Collector-Emitter breakdown voltage	$BV_{CEO}$	80	-	-	V	$I_C = 0.1\text{mA}$
Emitter-Collector breakdown voltage	$BV_{ECO}$	7	-	-	V	$I_E = 0.1\text{mA}$

**Transfer Characteristics (Ta=25°C unless specified otherwise)**

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer ratio	EL354N EL354NA CTR	20 50	- -	300 150	%	$I_F = \pm 1\text{mA}, V_{CE} = 5\text{V}$
Collector-Emitter saturation voltage	$V_{CE(sat)}$	-	0.1	0.2	V	$I_F = \pm 20\text{mA}, I_C = 1\text{mA}$
Isolation resistance	$R_{IO}$	$5 \times 10^{10}$	$10^{11}$	-	$\Omega$	$V_{IO} = 500\text{Vdc}, 40\sim 60\%R.H$
Cut-off frequency	$f_c$	-	80	-	kHz	$V_{CE} = 5\text{V}, I_C = 2\text{mA}, R_L = 100\Omega, -3\text{dB}$
Floating capacitance	$C_{IO}$	-	0.6	1.0	pF	$V_{IO} = 0, f = 1\text{MHz}$
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	$\mu\text{s}$	

\* Typical values at Ta = 25°C

Typical Electro-Optical Characteristics Curves



Note: The graphs shown in this datasheet are representing typical data only and do not show guaranteed values

Figure 7. Collector Dark Current vs Ambient Temperature

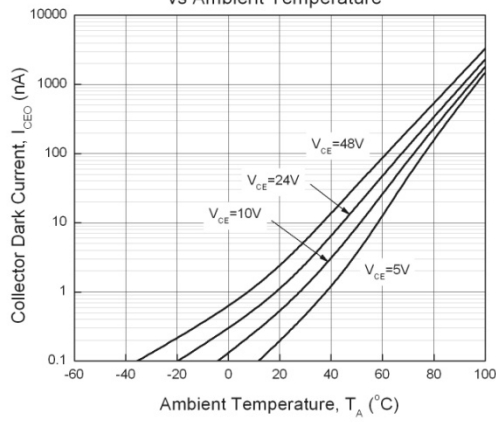


Figure 8. Switching Time vs Load Resistance

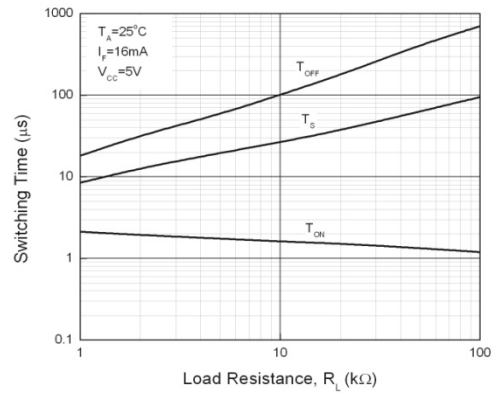
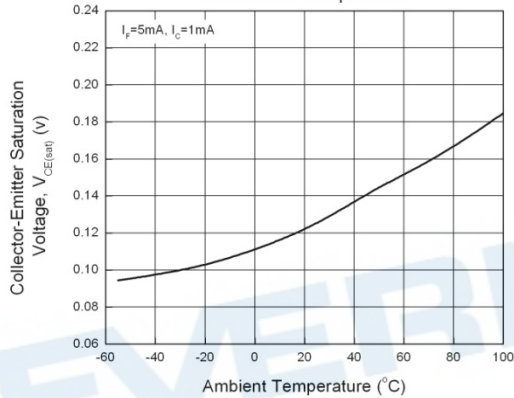


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature



Note: The graphs shown in this datasheet are representing typical data only and do not show guaranteed values

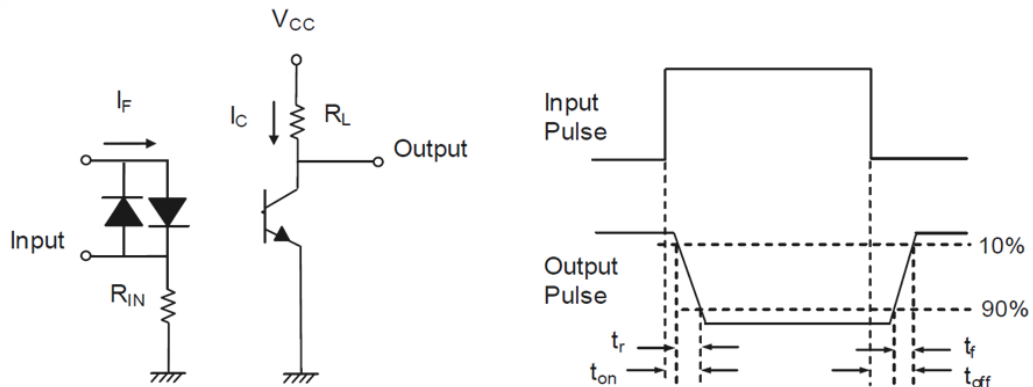


Figure 10. Switching Time Test Circuit & Waveforms

## Order Information

### Part Number

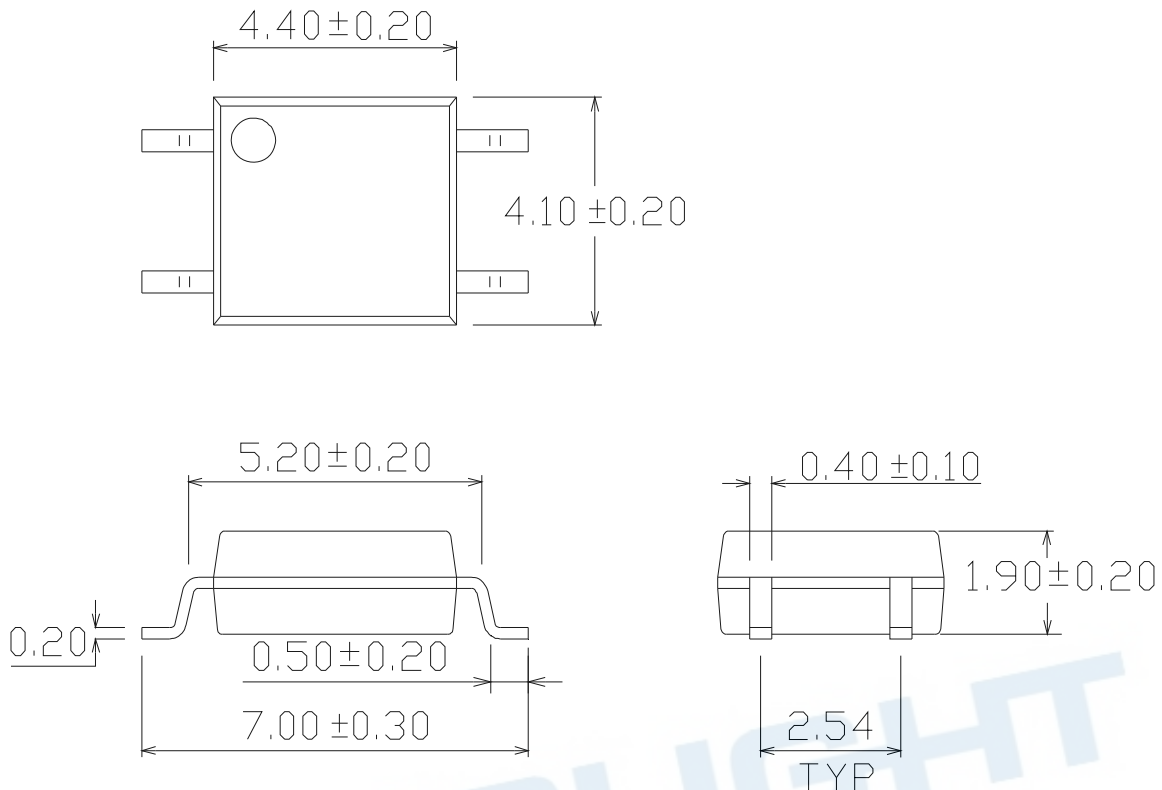
**EL354N(X)(Y)-VG**

### Notes

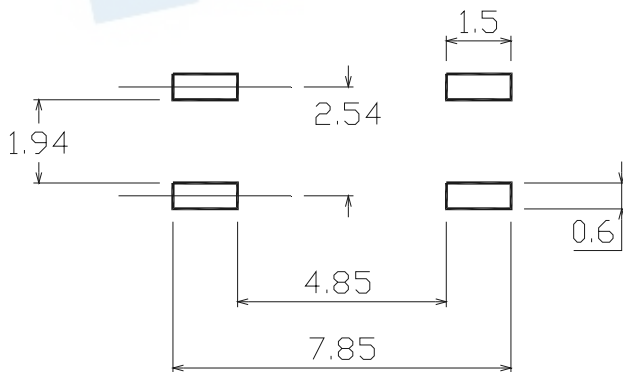
- X = CTR Rank option (A, or none)
- Y = Tape and reel option (TA, TB, or none).
- V = VDE (option)
- G = Halogens free

Option	Description	Packing quantity
None	Standard SMD option	100 units per tube
-V	Standard SMD option + VDE	100 units per tube
(TA)	TA Tape & reel option	3500 units per reel
(TB)	TB Tape & reel option	3500 units per reel
(TA)-V	TA Tape & reel option + VDE	3500 units per reel
(TB)-V	TB Tape & reel option + VDE	3500 units per reel

Package Dimension (Dimensions in mm)



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
354N	denotes Device Number
R	denotes CTR Rank (A or none)
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE approved (optional)


EVERLIGHT



Label form



**EVERLIGHT**
11 → 月份



客戶料號 ← CPN: XXXXXXXXXXXX 測試區
  → RoHS標示

億光料號 ← P/N: XXXXXXXXXXXX
  → 安規標示

億光品名 ← EL817M(C)-VG
   



生產周別 ← D/C: YWWX      CAT: X      QTY: 000000
   
      REF: XXXX       → 包裝數量


生產序號 ← LOT NO: Y151130XXXXXXXXXX
   


標籤識別碼 ← REFERENCE: BTPyyMMddXXXXX
   

 → QR Code


產地 ← MADE IN XXXXXX

OR


RoHS 標示
   

**EVERLIGHT**
5 → 月份



客戶料號 ← CPN: XXXXXXXXXXXX 測試區
  → 安規標示


客戶品名 ← XXXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX-XXXXXX



億光料號 ← P/N: XXXXXXXXXXXX
   


億光品名 ← XXXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX-XXXXXX

生產序號 ← LOT NO: Y150516XXX-XXXXXXXXXX-XXXXXXXXXX
   


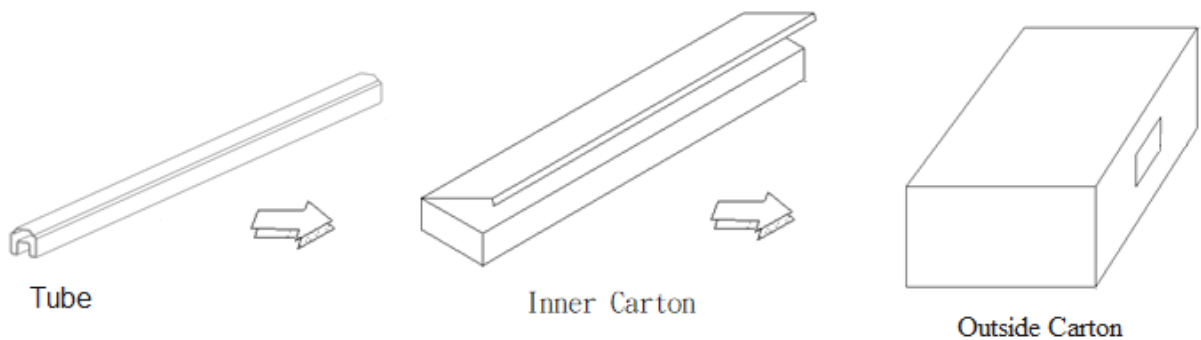
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CTR等級 ← CAT: XXXXXXXXXXXX      REF: XXXXXXXXXXXX
   


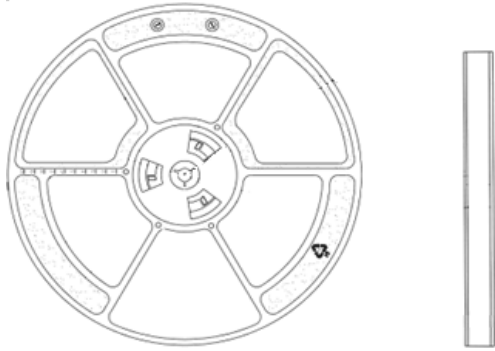
標籤識別碼 ← REFERENCE: BTPYYMMDDXXXXX
   

 → QR Code

MSL等級 ← MSL-XX      MADE IN XXXXXX
   
↓
  
 產地

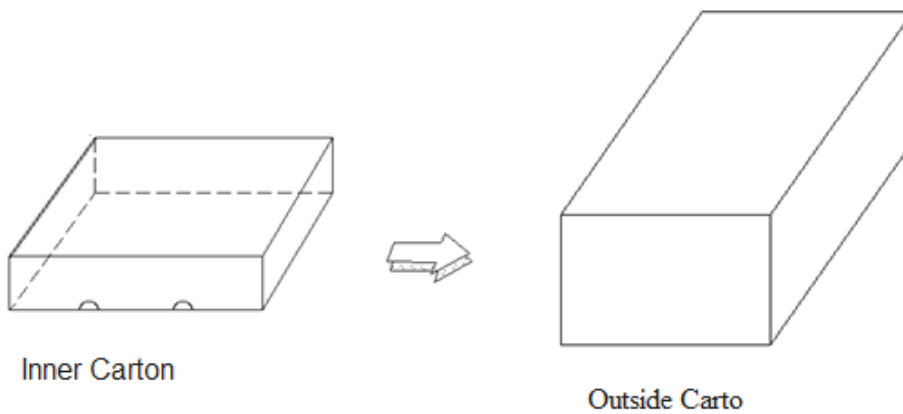
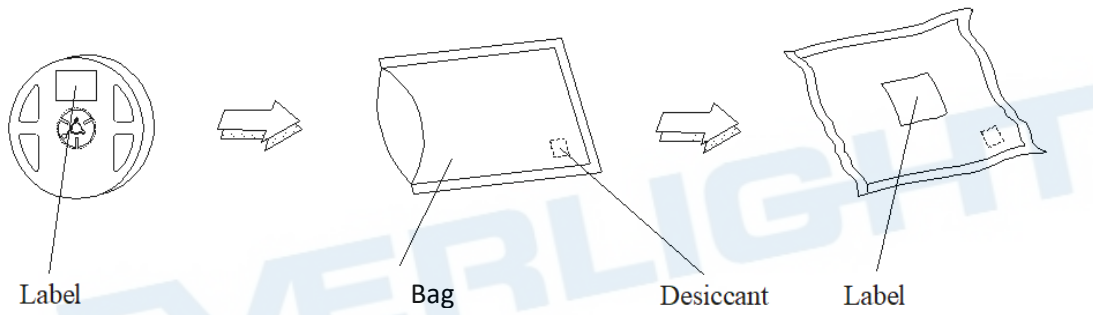
TUBE Dimension



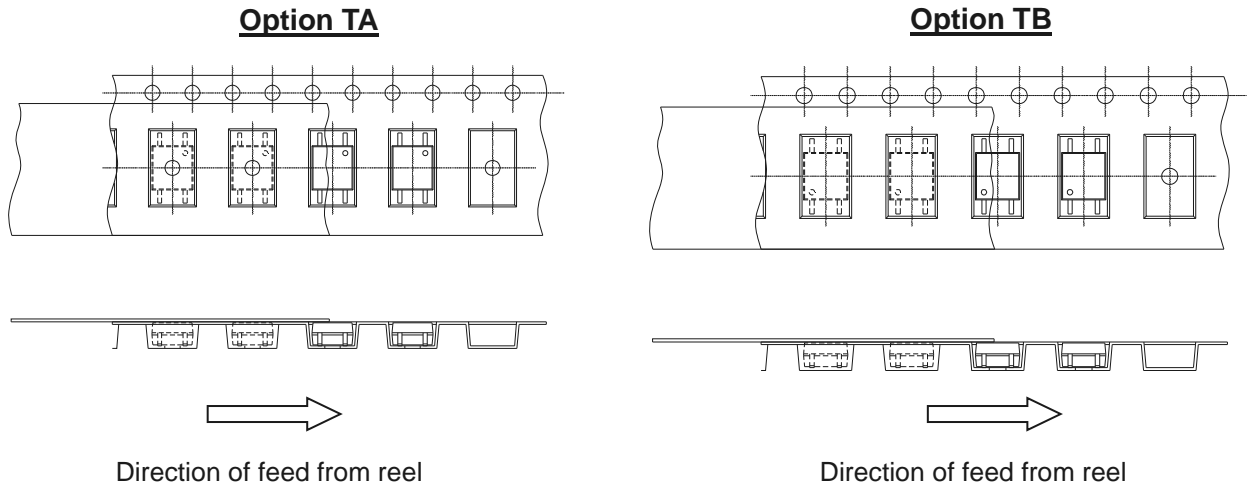
### Reel Dimension



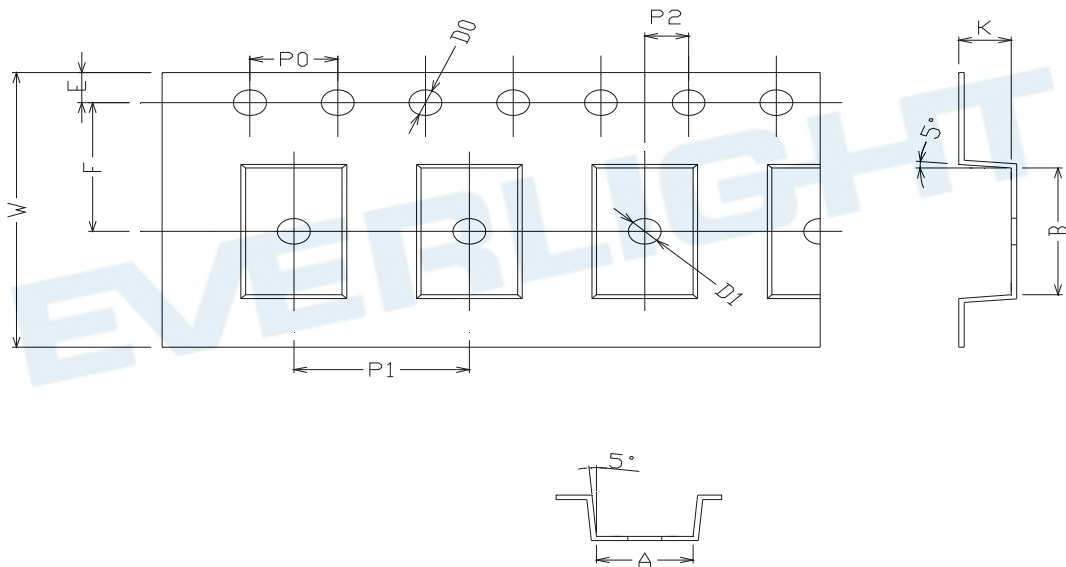
### Moisture Resistant Packaging



**Tape & Reel Packing Specifications**



**Tape dimensions**

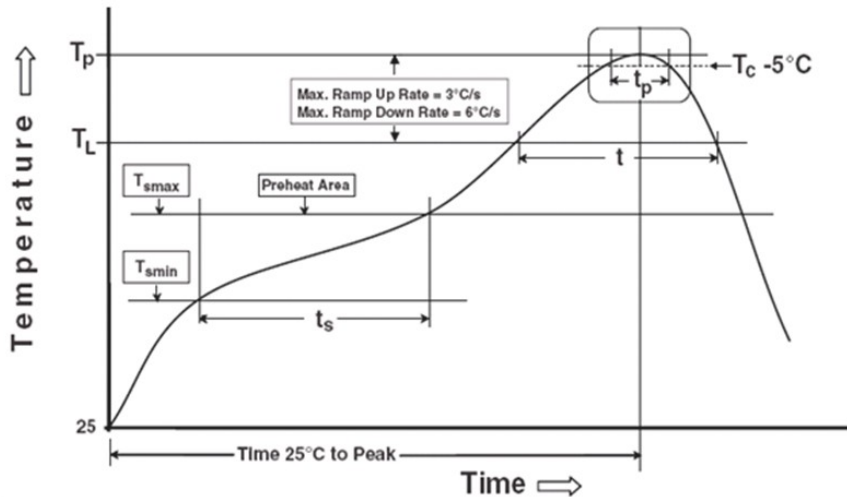


Dimension No.	<b>A</b>	<b>B</b>	<b>Do</b>	<b>D1</b>	<b>E</b>	<b>F</b>
Dimension (mm)	4.4 ± 0.1	7.6 ± 0.1	1.5 + 0.1/-0	1.5 ± 0.1	1.75 ± 0.1	7.5 ± 0.05
Dimension No.	<b>Po</b>	<b>P1</b>	<b>P2</b>	<b>t</b>	<b>W</b>	<b>K</b>
Dimension (mm)	4.0 ± 0.05	8.0 ± 0.1	2.0 ± 0.05	0.25 ± 0.03	16.0 ± 0.2	2.4 ± 0.1

## Precautions for Use

### 1. Soldering Condition

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



Notes

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

## Precautions for General Storage

- Avoid storage locations where devices may be exposed to moisture or direct sunlight.
- Follow the precautions printed on the packing label of the device for transportation and storage.
- Keep the storage location temperature and humidity within a range of 5°C to 35°C and 20 % to 60 %, respectively.
- Do not store the products in locations with poisonous gases (especially corrosive gases) or in dusty conditions.
- Store the products in locations with minimal temperature fluctuations. Rapid temperature changes during storage can cause condensation, resulting in lead oxidation or corrosion, which will deteriorate the solderability of the leads.
- When restoring devices after removal from their packing, use anti-static containers.
- Do not allow loads to be applied directly to devices while they are in storage.
- If devices have been stored for more than two years under normal storage conditions, it is recommended that you check the leads for ease of soldering prior to use.

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