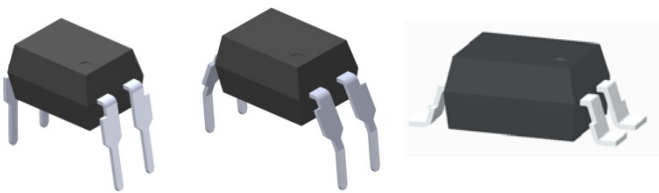
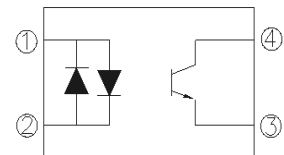


## 4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER AC INPUT PHOTOCOUPLER EL814 Series



Schematic



Pin Configuration

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

### Features

- Compliance Halogens Free  
(Br < 900 ppm, Cl < 900 ppm, Br+Cl < 1500 ppm)
- AC input response
- 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 = 5000 V rms )
- Wide Operating temperature range -55~110°C
- High collector-emitter voltage  $V_{CEO} = 80\text{V}$
- Compact dual-in-line package
- Pb free
- The product itself will remain within RoHS compliant version
- Compliance with EU REACH
- UL and cUL approved
- VDE approved
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

### Description

The EL814 Series of devices each consist of two infrared emitting diodes, connected in inverse parallel, optically coupled to a phototransistor detector. They are packaged in a 4-pin DIP package and available in side-lead spacing and SMD option.

### 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 (t = 10μs)	I <sub>FM</sub>	1	A
	Power dissipation	P <sub>D</sub>	100	mW
Output	Power dissipation	P <sub>C</sub>	150	mW
	Collector current	I <sub>C</sub>	50	mA
	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>	5000	V rms
Operating Temperature		T <sub>OPR</sub>	-55 to 110	°C
Storage Temperature		T <sub>STG</sub>	-55 to 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	$V = 0, f = 1\text{KHz}$

**Output**

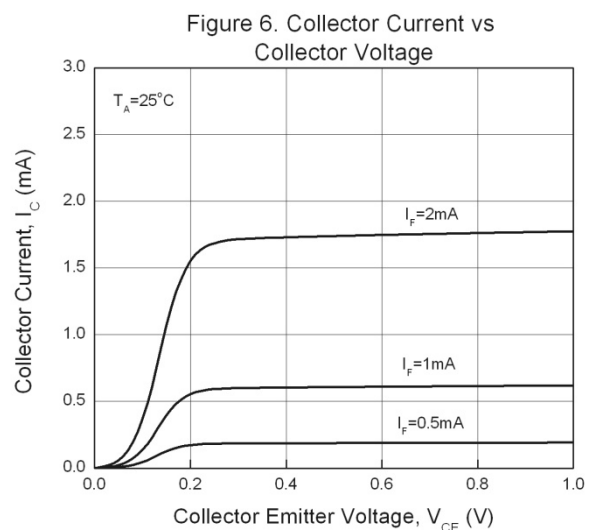
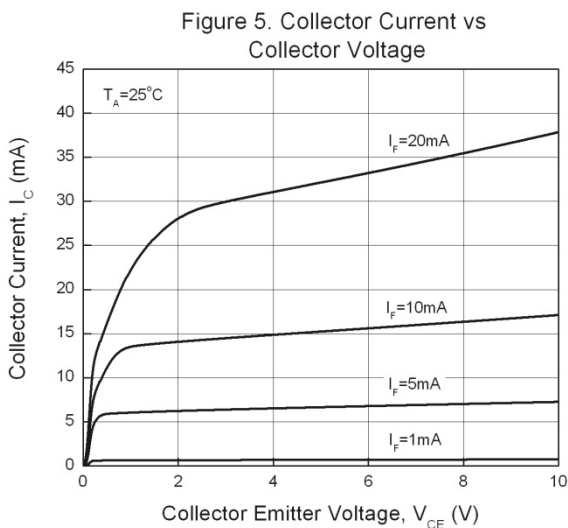
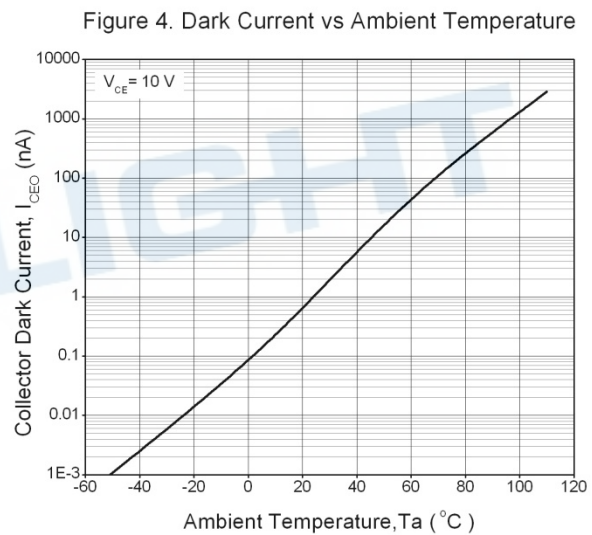
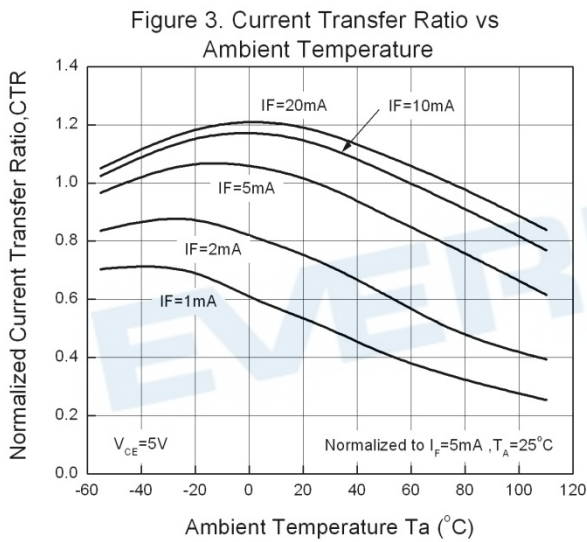
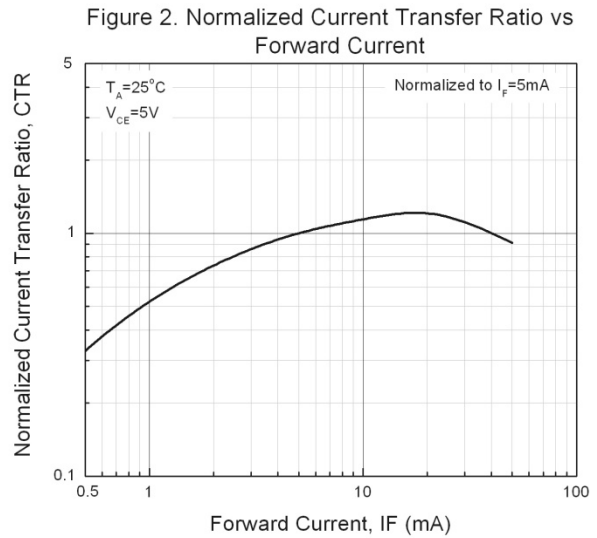
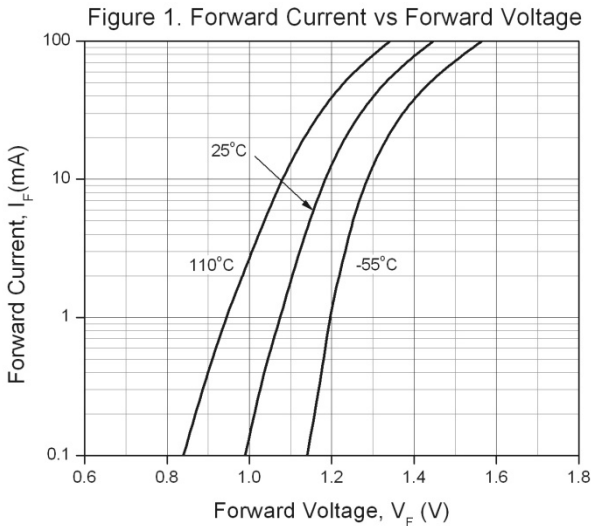
Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Collector-Emitter dark current	$I_{CEO}$	-	-	100	nA	$V_{CE} = 20\text{V}, I_F = 0\text{mA}$
Collector-Emitter breakdown voltage	$BV_{CEO}$	80	-	-	V	$I_C = 0.1\text{mA}$
Emitter-Collector breakdown voltage	$BV_{ECO}$	6	-	-	V	$I_E = 0.1\text{mA}$

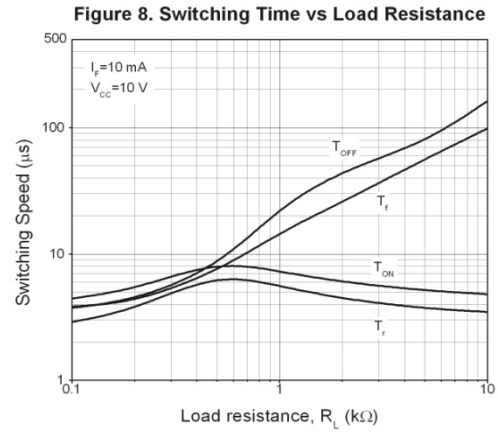
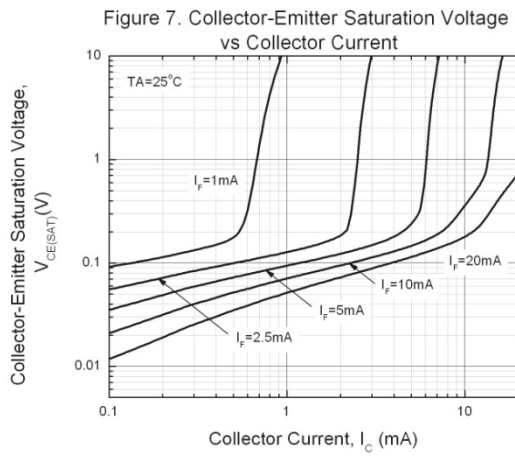
**Transfer Characteristics**

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer ratio	EL814	20	-	300	%	$I_F = \pm 1\text{mA}, V_{CE} = 5\text{V}$
	EL814A	50	-	150		
Collector current	EL814	0.2	-	3	mA	$I_F = \pm 1\text{mA}, V_{CE} = 5\text{V}$
	EL814A	0.5	-	1.5		
CTR Symmetry		0.5	-	2.0	-	$I_F = \pm 1\text{mA}, V_{CE} = 5\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$	-	0.05	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  $T_a = 25^\circ\text{C}$

Typical Electro-Optical Characteristics Curves





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

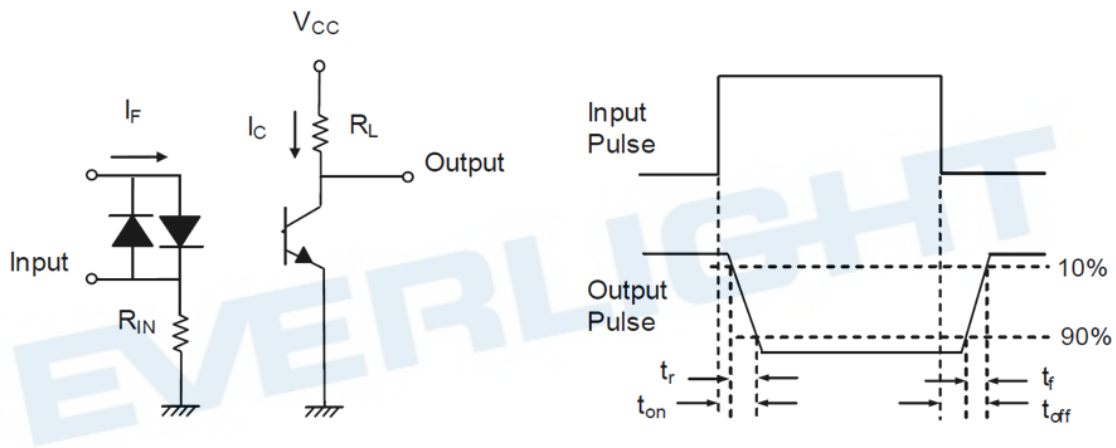


Figure 9. Switching Time Test Circuit & Waveforms

**Order Information**

**Part Number**

**EL814X(Y)(Z)-V**

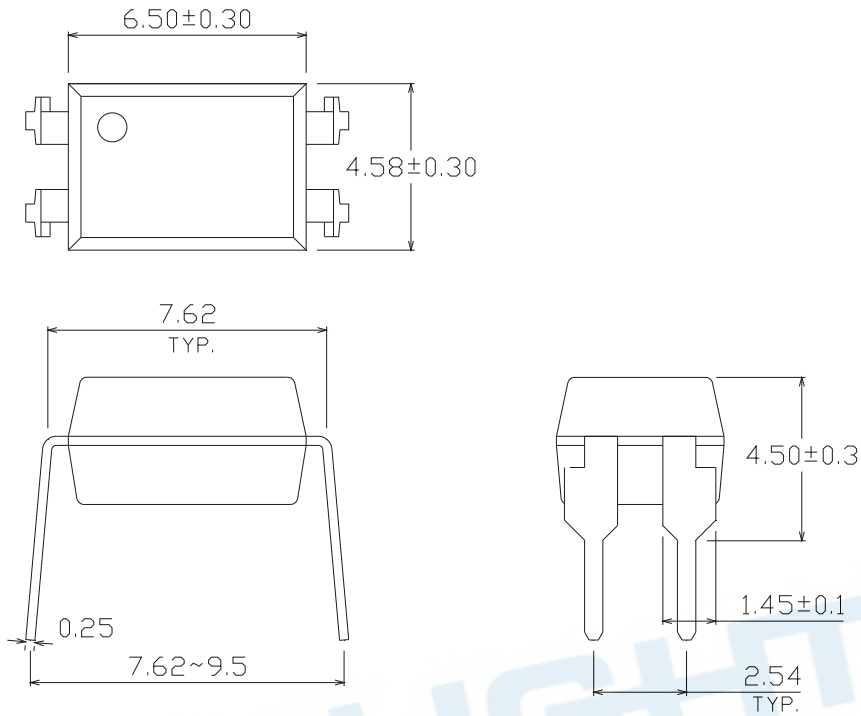
**Notes**

- X = Lead form option (S, S1, M or none)
- Y = CTR Rank (A or none)
- Z = Tape and reel option (TA, TB, TU, TD or none)
- V = VDE safety (optional)

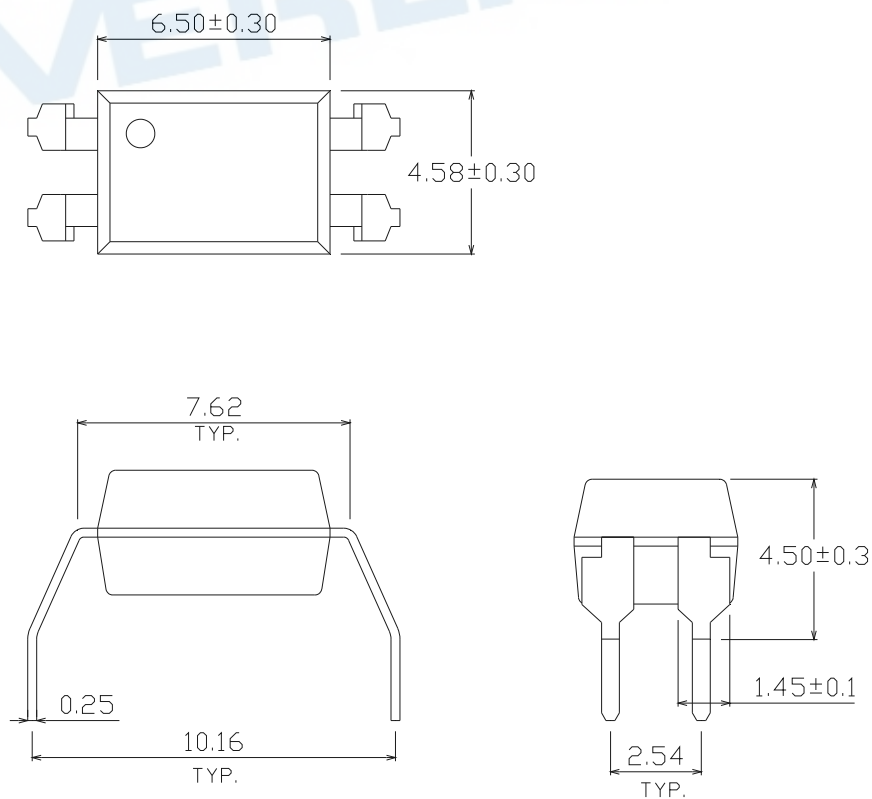
Option	Description	Packing quantity
None	Standard DIP-4	100 units per tube
M	Wide lead bend (0.4 inch spacing)	100 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount 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	2000 units per reel
S1 (TD)	Surface mount lead form (low profile) + TD tape & reel option	2000 units per reel

Package Dimension (Dimensions in mm)

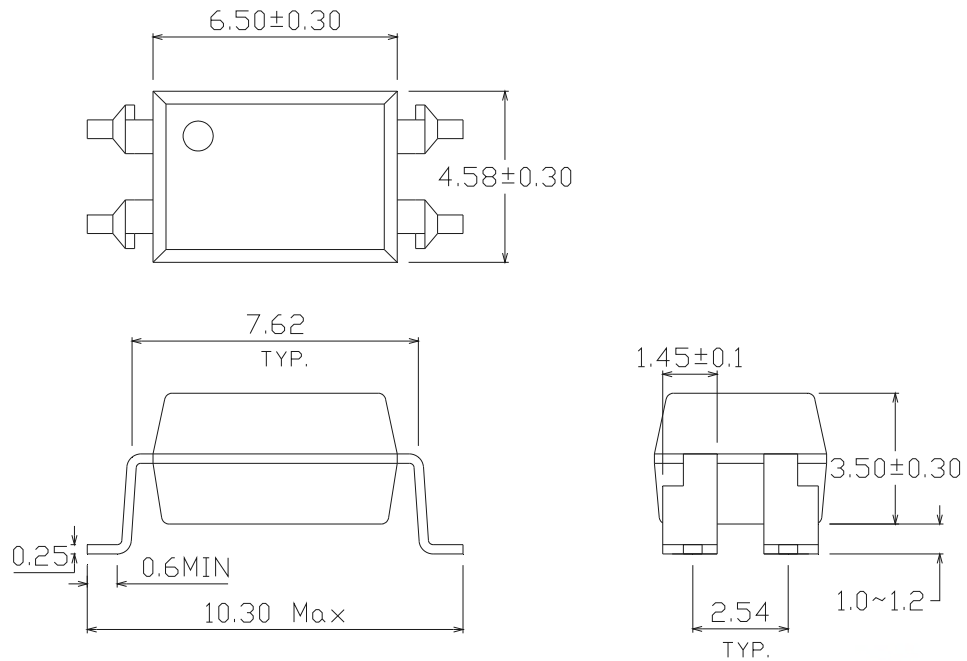
Standard DIP Type



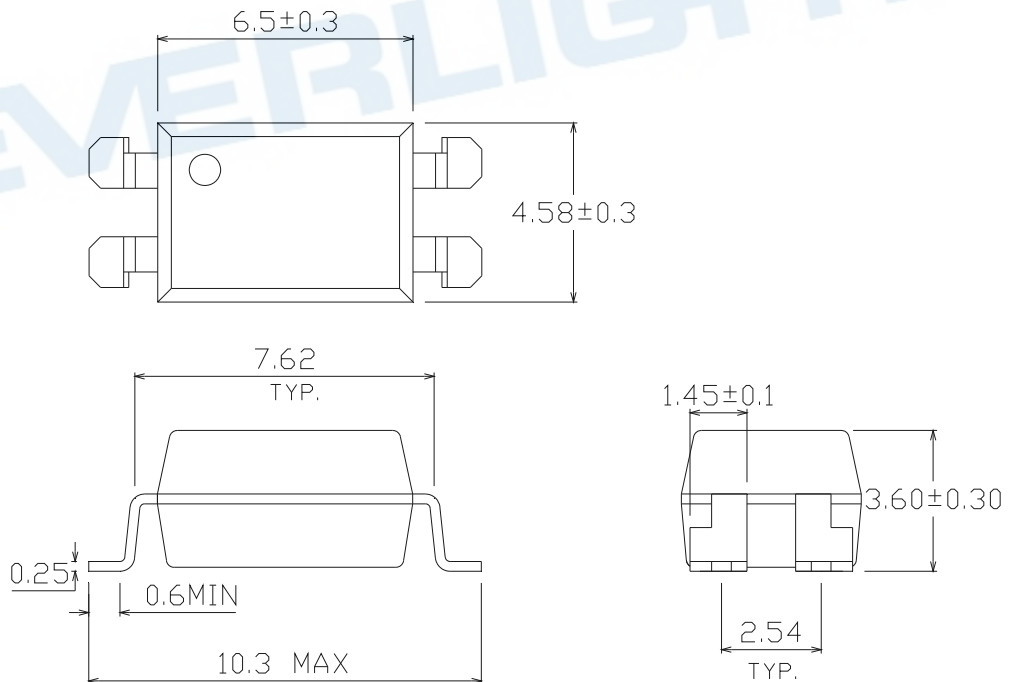
Option M Type



Option S Type

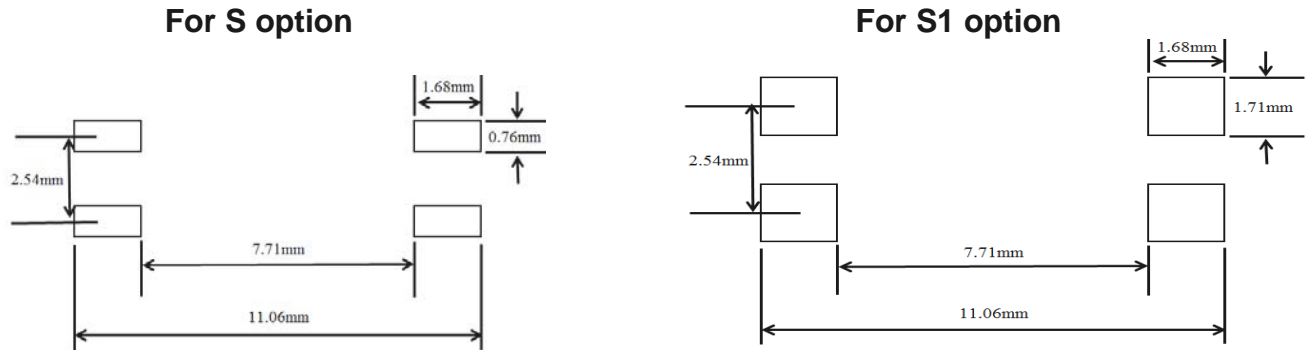


Option S1 Type





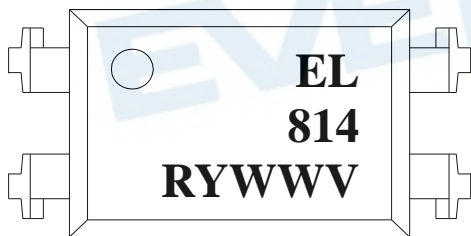
Recommended pad layout for surface mount leadform



Notes

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


Device Marking





Notes


- EL denotes EVERLIGHT
- 814 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 (optional)


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
  → 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-XXXXXXXX-XXXXXXXX-XXXXXXXX-XXXXXX


億光料號 ← P/N: XXXXXXXXXXXX


億光品名 ← XXXXXXXXXXX-XXXXXXXX-XXXXXXXX-XXXXXX

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

包裝數量 ← QTY: 0123456789      HUE: XXXXXXXXXXXX
 

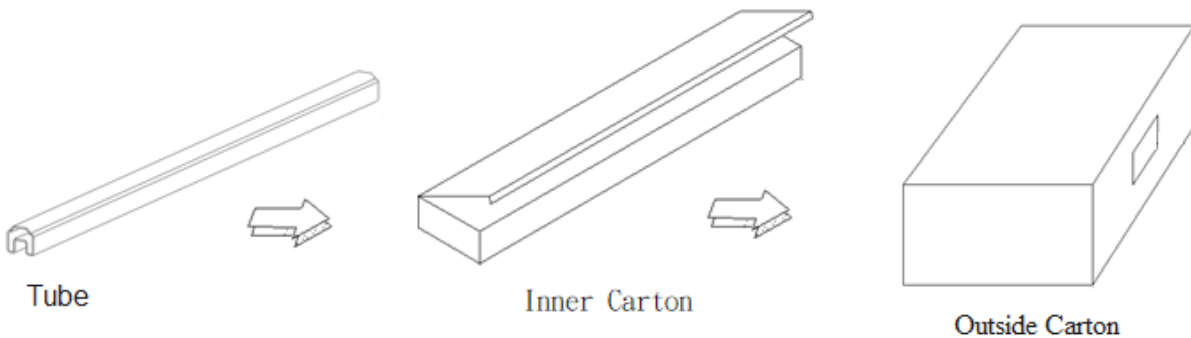
CTR等級 ← CAT: XXXXXXXXXXX      REF: XXXXXXXXXXXX
 

標籤識別碼 ← REFERENCE: BTPYYMMDDXXXXX
  → QR Code

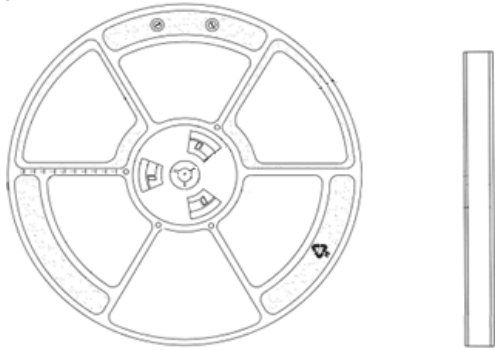
MSL等級 ← MSL-XX      MADE IN XXXXXX
 

↓  
產地

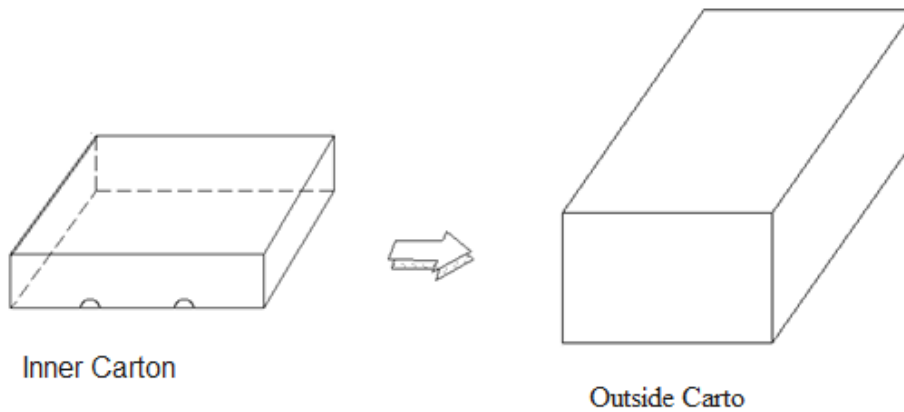
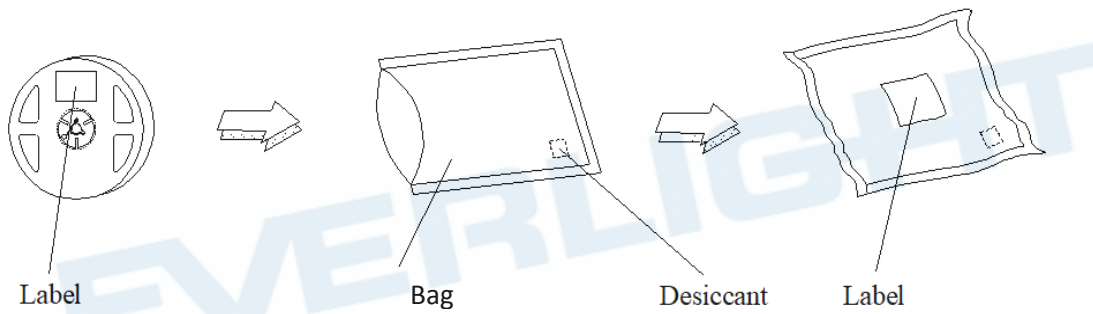
TUBE Dimension



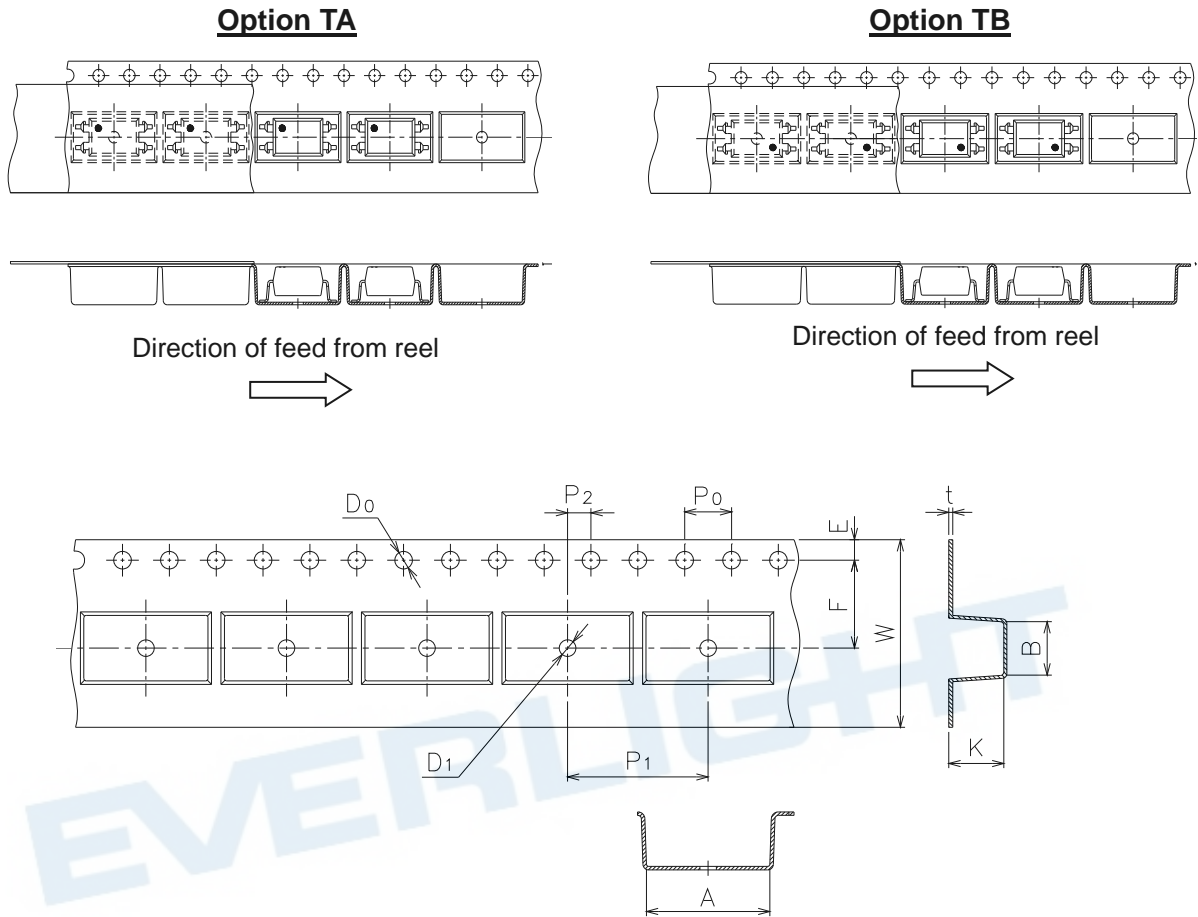
### Reel Dimension



### Moisture Resistant Packaging

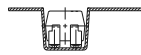
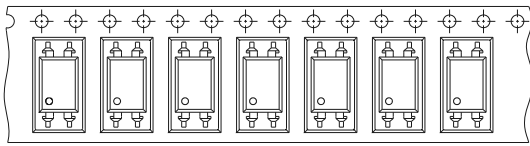


Tape & Reel Packing Specifications

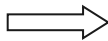


Dimension No.	<b>A</b>	<b>B</b>	<b>Do</b>	<b>D1</b>	<b>E</b>	<b>F</b>
Dimension (mm) S	10.7±0.1	4.65±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.5±0.1
Dimension (mm) S1	10.7±0.1	4.65±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.5±0.1
Dimension No.	<b>Po</b>	<b>P1</b>	<b>P2</b>	<b>t</b>	<b>W</b>	<b>K</b>
Dimension (mm) S	4.0±0.1	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

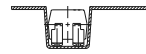
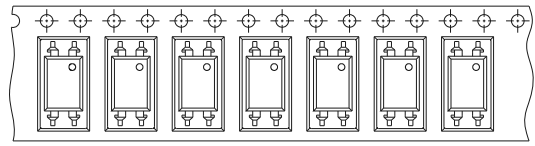
**Option TD**



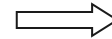
Direction of feed from reel



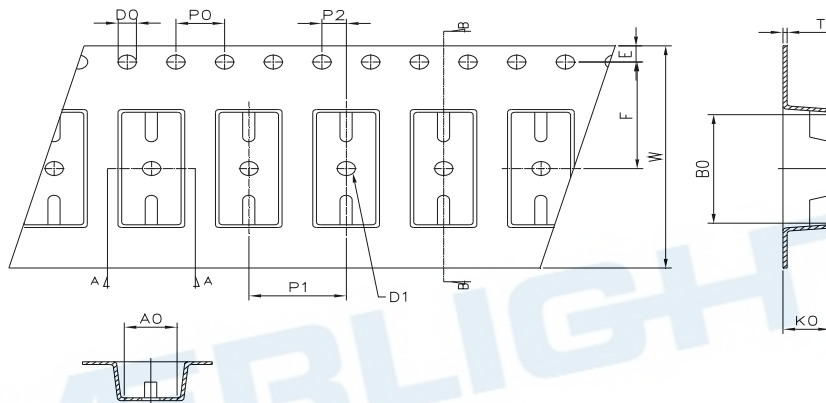
**Option TU**



Direction of feed from reel



**Tape dimensions**

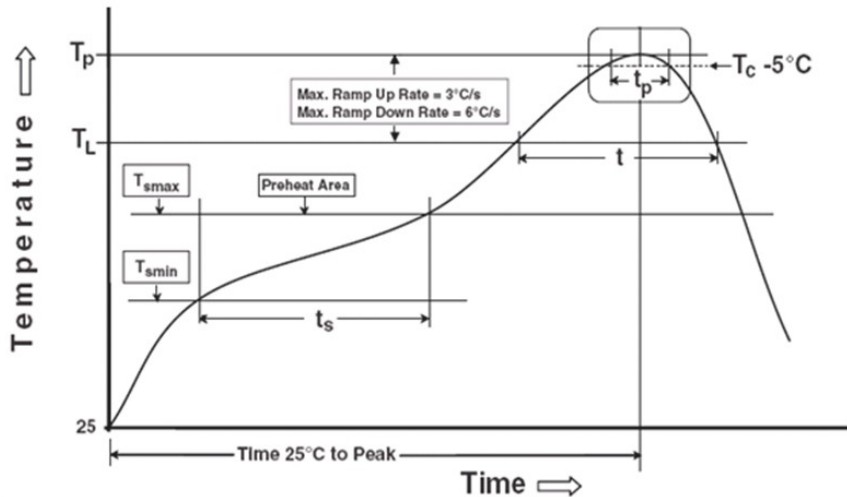


Dimension No.	<b>Ao</b>	<b>Bo</b>	<b>Do</b>	<b>D1</b>	<b>E</b>	<b>F</b>
Dimension (mm) S	4.90±0.1	10.40±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.50±0.1
Dimension (mm) S1	4.90±0.1	10.40±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.50±0.1
Dimension No.	<b>Po</b>	<b>P1</b>	<b>P2</b>	<b>t</b>	<b>W</b>	<b>Ko</b>
Dimension (mm) S	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) S1	4.00±0.1	8.00±0.1	2.00±0.1	0.40±0.1	16.00±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



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.

EVERLIGHT

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