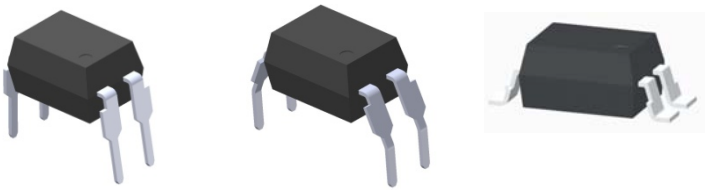
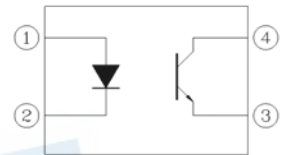


4 PIN DIP HIGH VOLTAGE PHOTOTRANSISTOR PHOTOCOUPLER EL851 Series



Schematic



Pin Configuration

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

Features:

- Compliance Halogens Free (Only copper leadframe)
(Br < 900 ppm, Cl < 900 ppm, Br+Cl < 1500 ppm)
- High collector- emitter voltage ($V_{CEO} = 350V$)
- Current transfer ratio
(CTR: 50~600% at $I_F = 5mA$, $V_{CE} = 5V$)
- High isolation voltage between input and output ($V_{iso} = 5000 V_{rms}$)
- Compact dual-in-line package
- The product itself will remain within RoHS compliant version
- Compliance with EU REACH
- Pb free
- UL and cUL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

Description

The EL851 series devices consist an infrared emitting diodes, optically coupled to a phototransistor detector.

The devices are in a 4-pin DIP package and available in wide-lead spacing and SMD option.

Applications

- Telephone line interface
- Interface to power supply circuit
- Controller for SSRs. DC motor
- Programmable Controllers

Absolute Maximum Ratings (Ta=25°C)

	Parameter	Symbol	Rating	Unit
Input	Forward current	I_F	60	mA
	Peak forward current (1μs pulse)	I_{FM}	1	A
	Reverse voltage	V_R	6	V
	Power dissipation	P_D	100	mW
Output	Collector power dissipation	P_C	150	mW
	Collector-Emitter voltage	V_{CEO}	350	V
	Collector Current	I_C	50	mA
	Emitter-Collector voltage	V_{ECO}	7	V
	Total Power Dissipation	P_{TOT}	200	mW
	Isolation Voltage*1	V_{ISO}	5000	V rms
	Operating Temperature	T_{OPR}	-55 to 100	°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

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	μA	$V_R = 5\text{V}$
Input capacitance	C_{in}	-	30	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	$V_{CE} = 200\text{V}$
Collector-Emitter breakdown voltage	BV_{CEO}	350	-	-	V	$I_C = 0.1\text{mA}$
Emitter-Collector breakdown voltage	BV_{ECO}	7	-	-	V	$I_E = 0.1\text{mA}$
Collector-Emitter capacitance	C_{CE}	-	10	-	pF	$V_{CE} = 0\text{V}, f = 1\text{MHz}$

Transfer Characteristics

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer Ratio	CTR	50	-	600	%	$I_F = 5\text{mA}, V_{CE} = 5\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$	-	-	0.4	V	$I_F = 20\text{mA}, I_C = 1\text{mA}$
Isolation resistance	R_{IO}	10^{11}	-	-	Ω	$V_{IO} = 500\text{Vdc}$
Input-output capacitance	C_{IO}	-	0.6	-	pF	$V_{IO} = 0, f = 1\text{MHz}$
Rise time	t_r	-	4	18	μs	$V_{CE} = 2\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$
Fall time	t_f	-	5	18	μs	

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

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

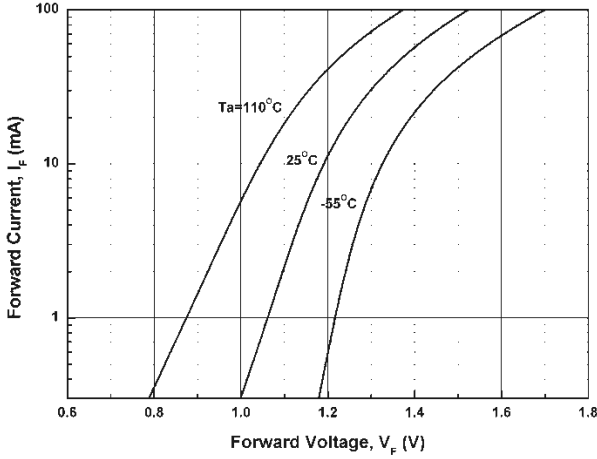


Figure 2. Current Transfer Ratio vs Forward Current

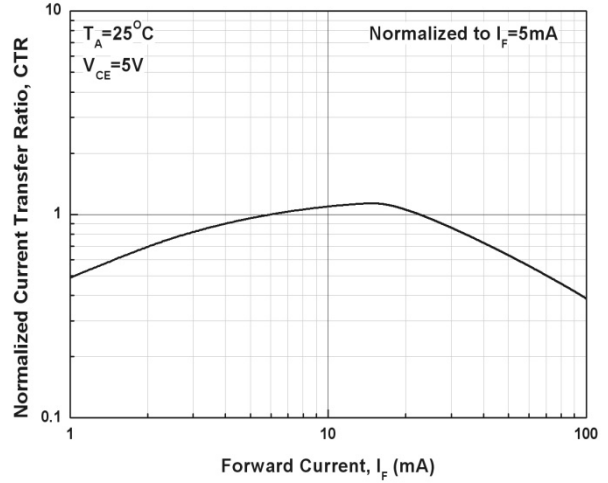


Figure 3. Collector Current vs Collector-emitter Voltage

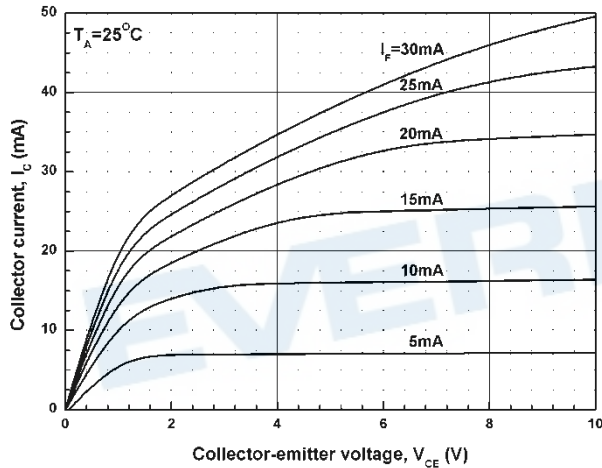


Figure 4. Relative Current Transfer Ratio vs Ambient Temperature

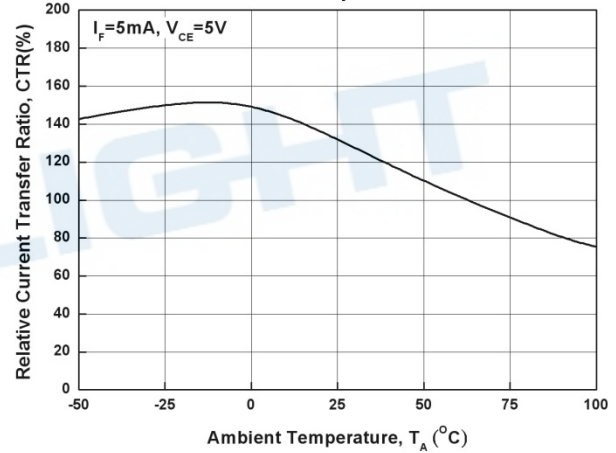


Figure 5. Collector-emitter Saturation Voltage vs Ambient Temperature

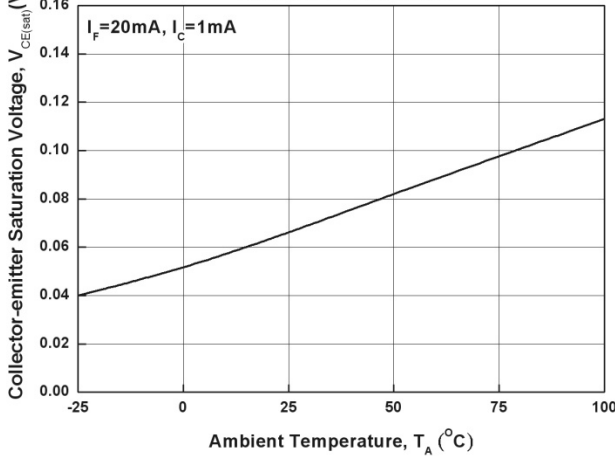


Figure 6. Dark Current vs Ambient Temperature

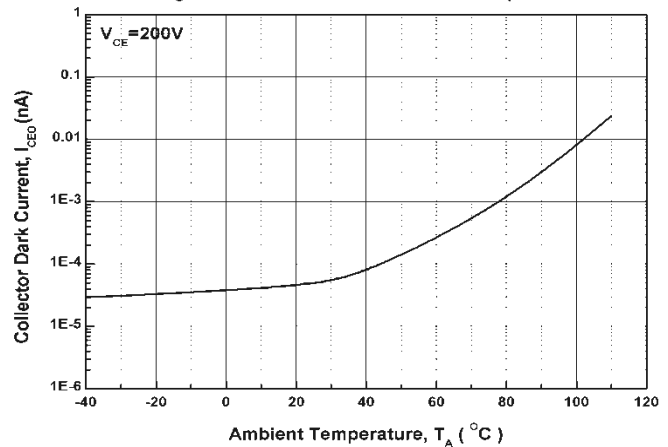


Figure .7 Switching Time vs. Load Resistance

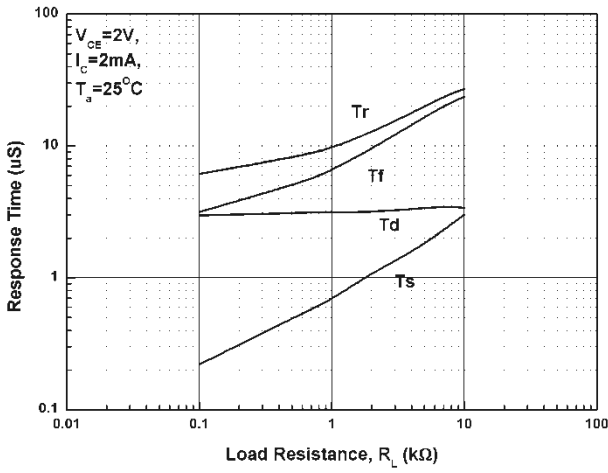
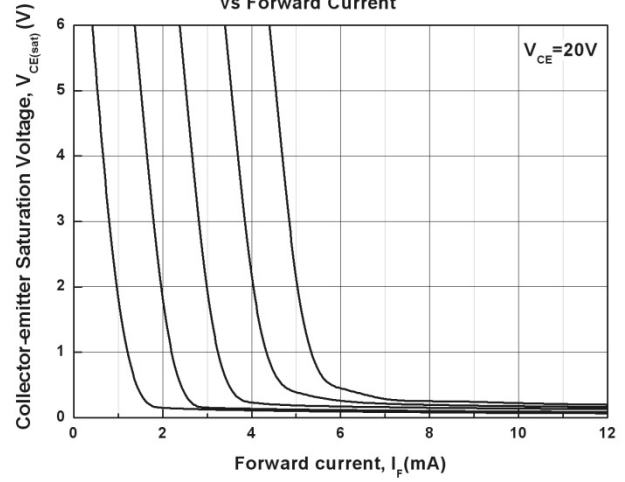


Figure 8. Collector-emitter Saturation Voltage vs Forward Current



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

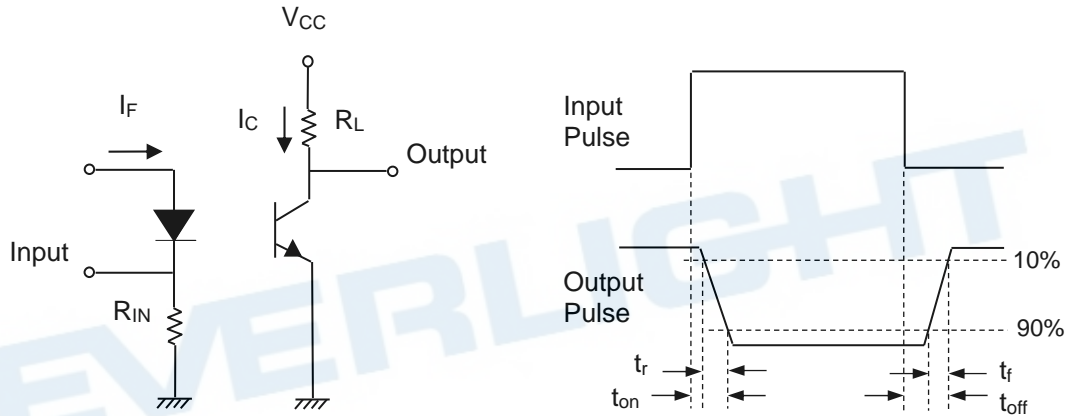


Figure 9. Switching Time Test Circuit & Waveforms

Order Information

Part Number

EL851X(Z)-V

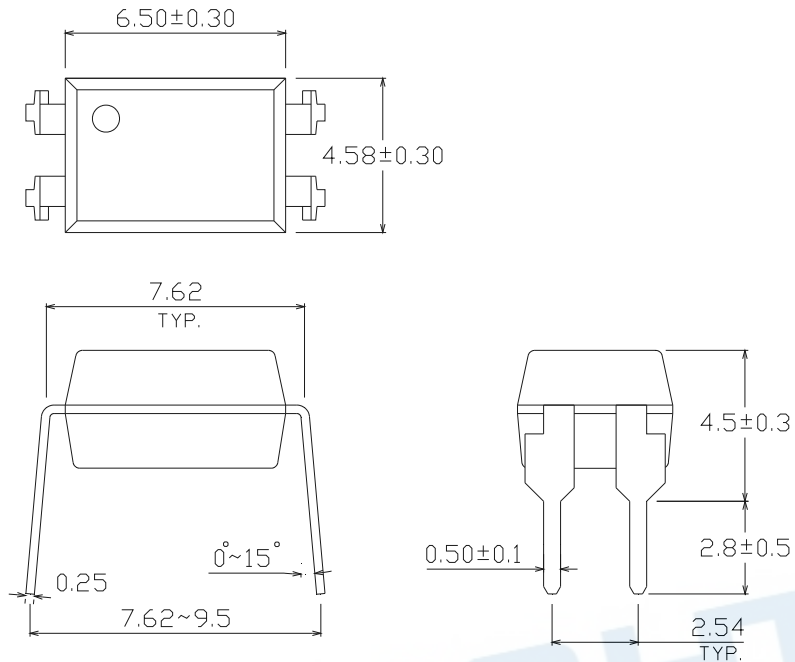
Note

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

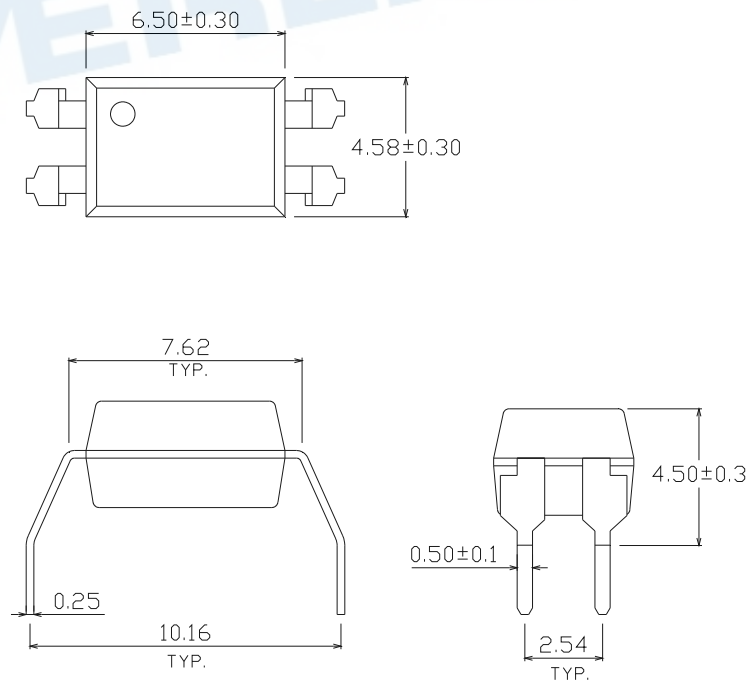
Option	Description	Packing quantity
None	Standard DIP-4	100 units per tube
M	Wide lead bend (0.4 inch spacing)	100 units per tube
S1 (TA)	Surface mount lead form (low profile) + TA tape & reel option	1000 units per reel
S1 (TB)	Surface mount lead form (low profile) + TB tape & reel option	1000 units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

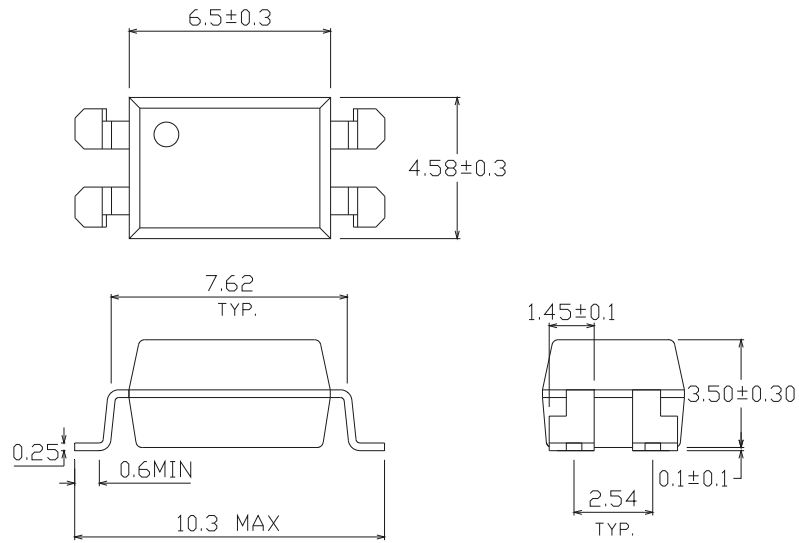
Standard DIP Type



Option M Type

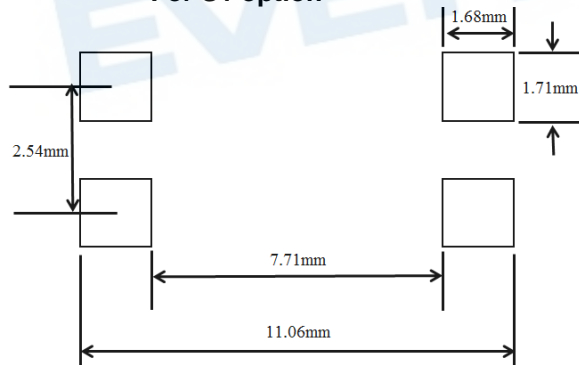


Option S1 Type



Recommended pad layout for surface mount leadform

For S1 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
851	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

EVERLIGHT

Label form

(Pb) **EVERLIGHT** 11 → 月份

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

億光料號 ← P/N: XXXXXXXXXXXX **cec** **UL** **RoHS** → 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 REF: XXXX

標籤識別碼 ← REFERENCE: BTPyyMMddXXXXX **QR Code**

產地 ← MADE IN XXXXXX

or

RoHS 標示

RoHS **(Pb)** **EVERLIGHT** 5 → 月份

客戶料號 ← CPN: XXXXXXXXXXXX 測試區 **cec** **UL** **RoHS** → 安規標示

客戶品名 ← XXXXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX-XXXXXXXX

億光料號 ← P/N: XXXXXXXXXXXX

億光品名 ← XXXXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX

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

包裝數量 ← QTY: 0123456789 HUE: XXXXXXXXXXXX

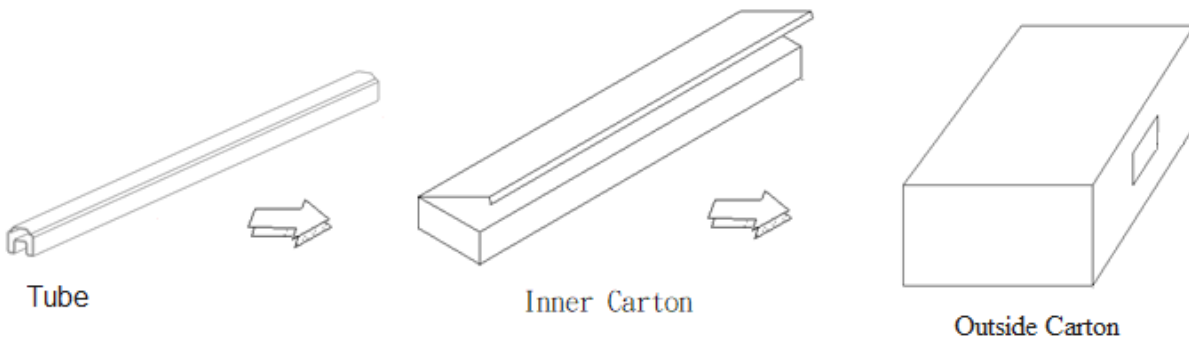
CTR等級 ← CAT: XXXXXXXXXXXX REF: XXXXXXXXXXXX **QR Code**

標籤識別碼 ← REFERENCE: BTPYYMDDXXXXX

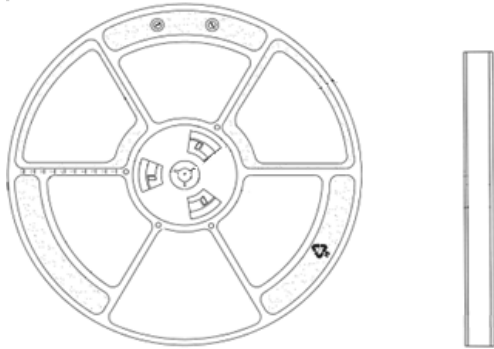
MSL等級 ← MSL-XX MADE IN XXXXXX

↓
產地

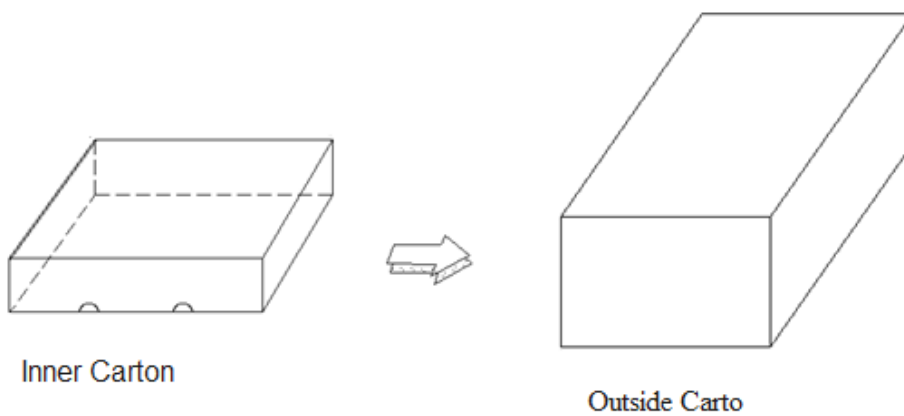
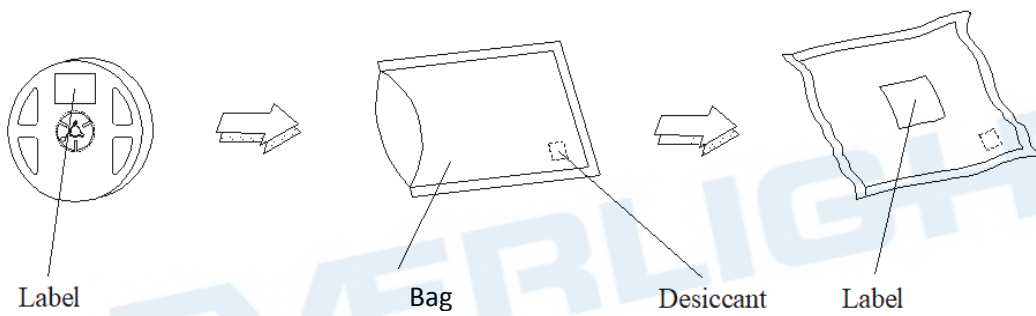
TUBE Dimension



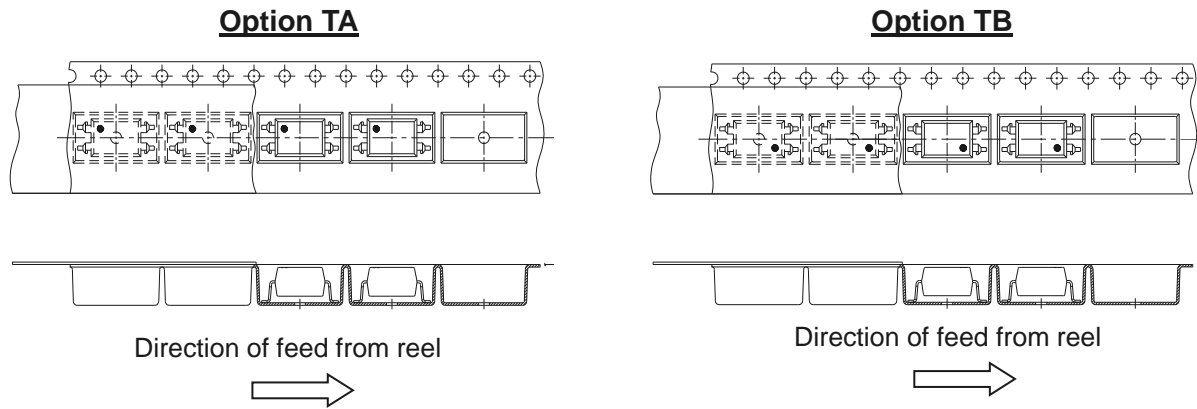
Reel Dimension



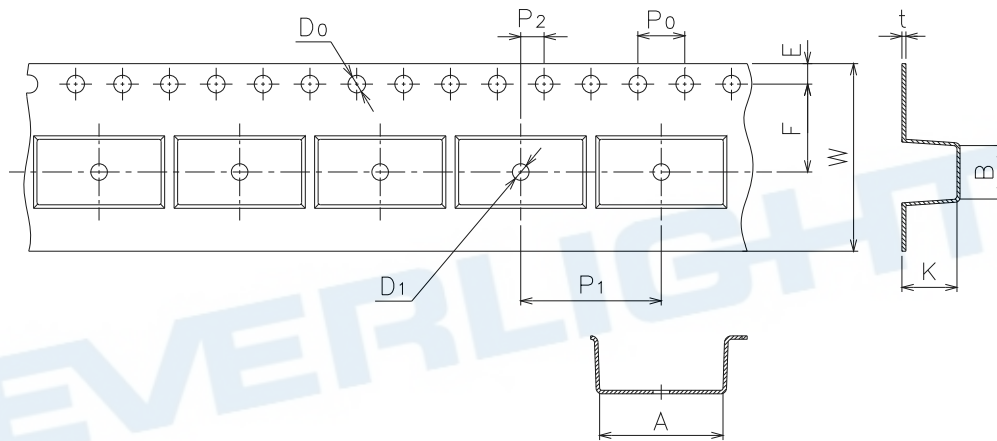
Moisture Resistant Packaging



Tape & Reel Packing Specifications

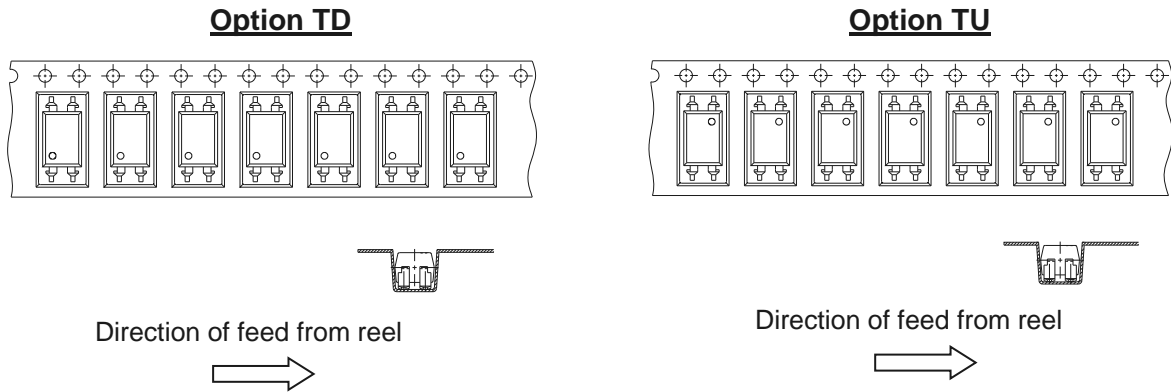


Tape dimensions

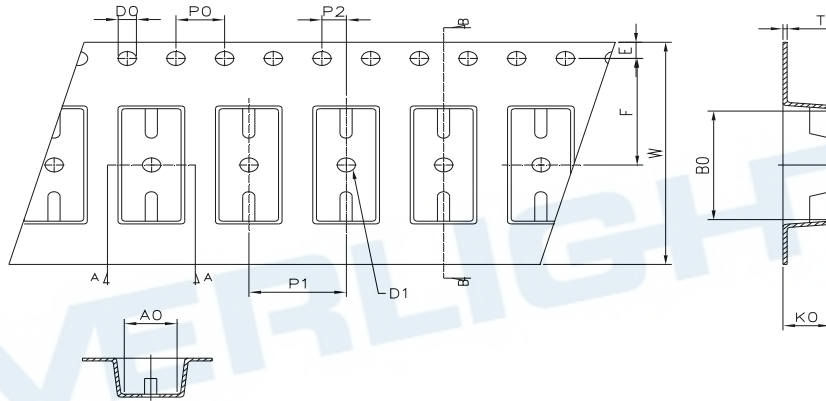


Dimension No.	A	B	Do	D1	E	F
Dimension (mm) S1	10.7±0.1	4.65±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.5±0.1
Dimension No.	Po	P1	P2	t	W	K
Dimension (mm) S1	4.0±0.1	12.0±0.1	2.0±0.1	0.4±0.1	16.0±0.3	3.90±0.1

Tape & Reel Packing Specifications



Tape dimensions

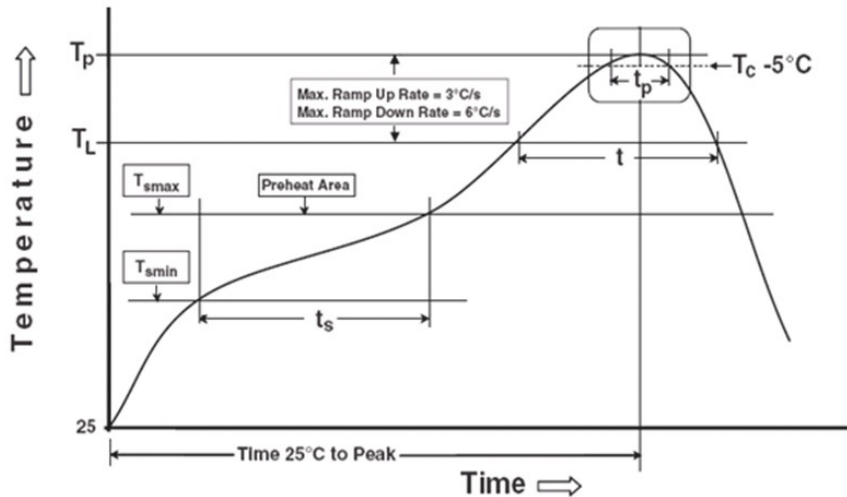


Dimension No.	Ao	Bo	Do	D1	E	F
Dimension (mm)	4.90±0.1	10.40±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.50±0.1
Dimension No.	Po	P1	P2	t	W	Ko
Dimension(mm)	4.00±0.1	8.00±0.1	2.00±0.1	0.40±0.1	16.00±0.3	4.00±0.1

Precautions for Use

1. Soldering Condition

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



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

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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2. The graphs shown in this datasheet are representing typical data only and do not show guaranteed values.
3. When using this product, please observe the absolute maximum ratings and the instructions for use outlined in these specification sheets. EVERLIGHT assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.
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