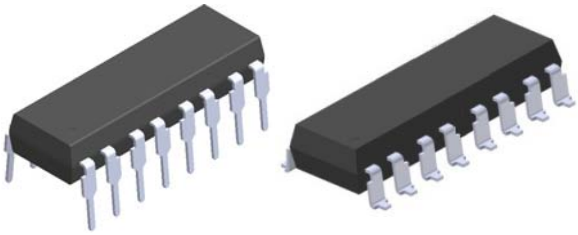
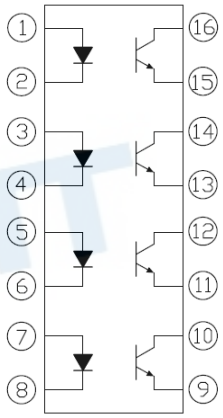
DATASHEET

16 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER
EL847 Series



Schematic



1, 3, 5, 7	Anode
2, 4, 6, 8	Cathode
9,11,13,15	Emitter
10,12,14,16	Collector

Features:

- Current transfer ratio (CTR: 50~600% at I_F =5mA, V_{CE} =5V)
- High isolation voltage between input and output (Viso=5000 V rms)
- Creepage distance >7.62 mm
- Operating temperature up to +110°C
- The product itself will remain within RoHS compliant version
- Compliance with EU REACH
- Pb free
- UL and cUL approved (No. E214129)
- VDE approved
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

Description

The EL847 series devices each of consist of an infrared emitting diodes, optically coupled to a phototransistor detector, and provides four isolated channels. They are packaged in a 16-pin DIP package and available in 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 (T_A=25℃, for each channel)

Parameter		Symbol	Rating	Unit
Input	Forward Current	I_F	60	mA
	Peak Forward Current (1us, pulse)	I_{FP}	1	A
	Reverse Voltage	V_R	6	V
	Power Dissipation	P_D	100	mW
Output	Power Dissipation	P_C	150	mW
	Collector Current	I_C	50	mA
	Collector-Emitter Voltage	V_{CEO}	80	V
	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 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 1~8 are shorted together, and pins 9~16 are shorted together.

*2 For 10 seconds

Electro-Optical Characteristics (T_A=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

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} = 20V, I_F = 0mA
Collector-Emitter Breakdown Voltage	BV_{CEO}	80	-	-	V	I_C = 0.1mA
Emitter-Collector Breakdown Voltage	BV_{ECO}	7	-	-	V	I_E = 0.1mA

Transfer Characteristics

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer Ratio	CTR	50	-	600	%	I_F = 5mA , V_{CE} = 5V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	0.1	0.2	V	I_F = 20mA , I_C = 1mA
Isolation Resistance	R_{IO}	5×10^{10}	-	-	Ω	V_{IO} = 500Vdc, 40~60% R.H.
Floating Capacitance	C_{IO}	-	0.6	1.0	pF	V_{IO} = 0, f = 1MHz
Cut-off Frequency	fc	-	80	-	kHz	V_{CE} = 5V, I_C = 2mA R_L = 100Ω, -3dB
Rise Time	t_r	-	6	18	μs	V_{CE} = 2V, I_C = 2mA, R_L = 100Ω
Fall Time	t_f	-	8	18	μs	

* Typical values at T_A= 25°C

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

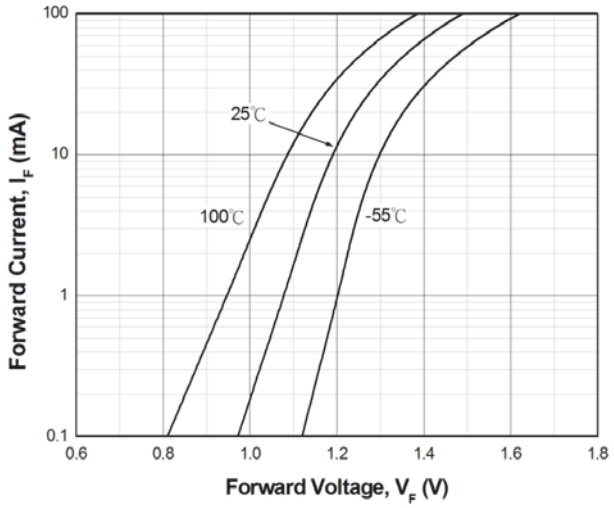


Figure 2. Normalized Collector Current vs Forward Current

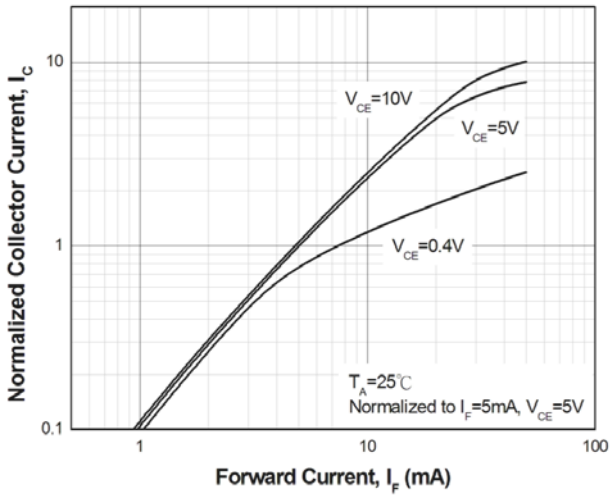


Figure 3. Normalized Current Transfer Ratio vs Forward Current

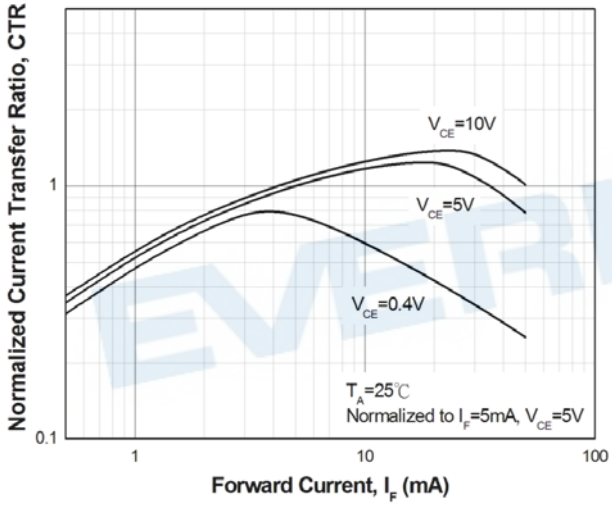


Figure 4. Normalized Collector Current vs Ambient Temperature

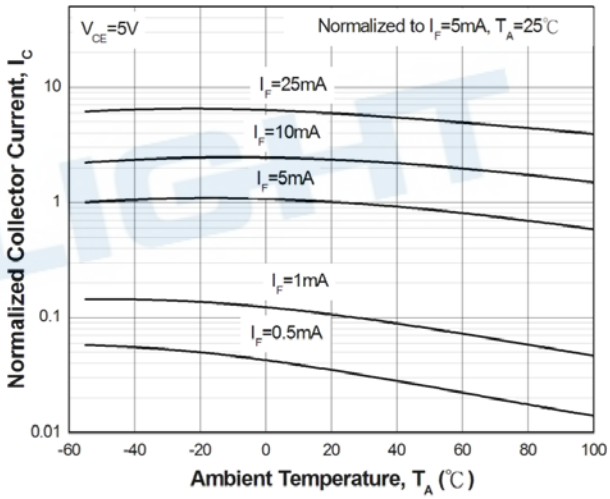


Figure 5. Collector Current vs Collector-Emitter Voltage

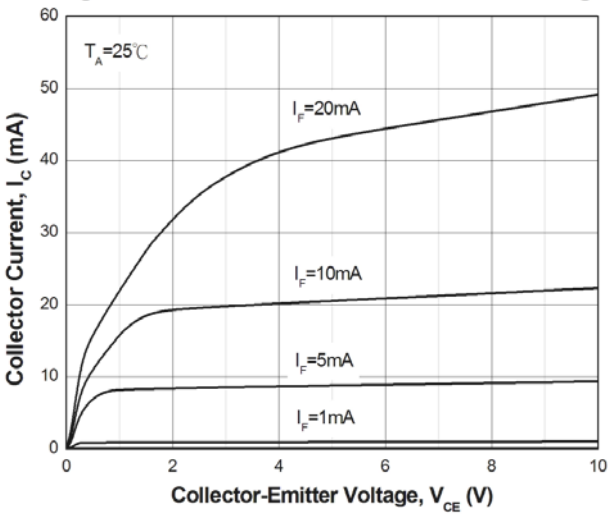


Figure 6. Collector Current vs Collector-Emitter Voltage

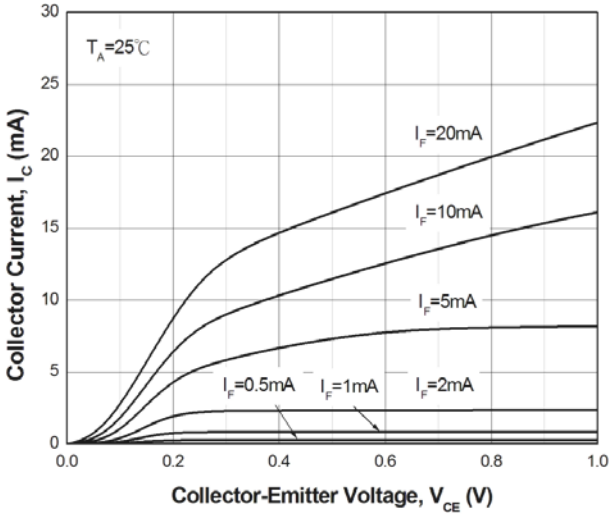


Figure 7. Collector Dark Current vs Ambient Temperature

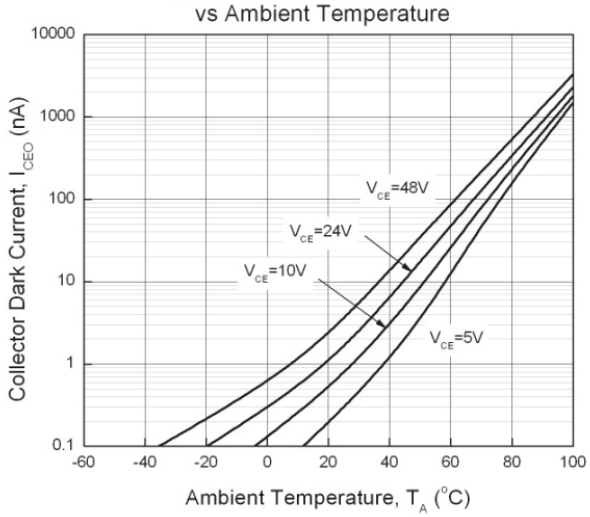


Figure 8. Switching Time vs Load Resistance

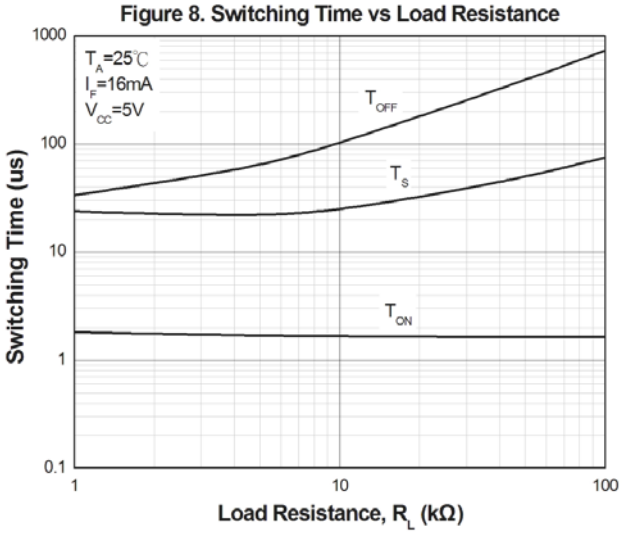
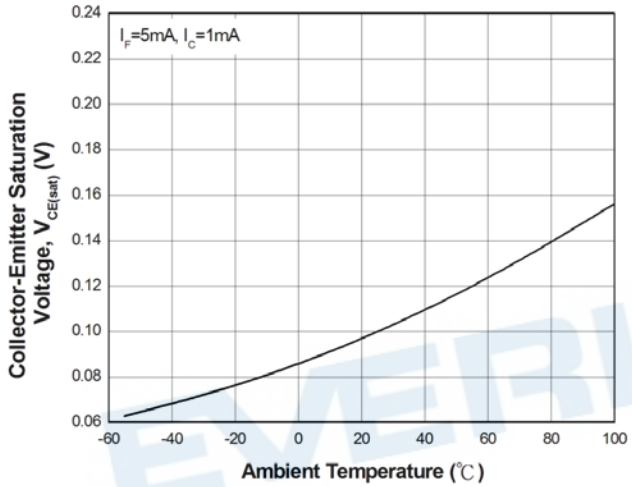


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature



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

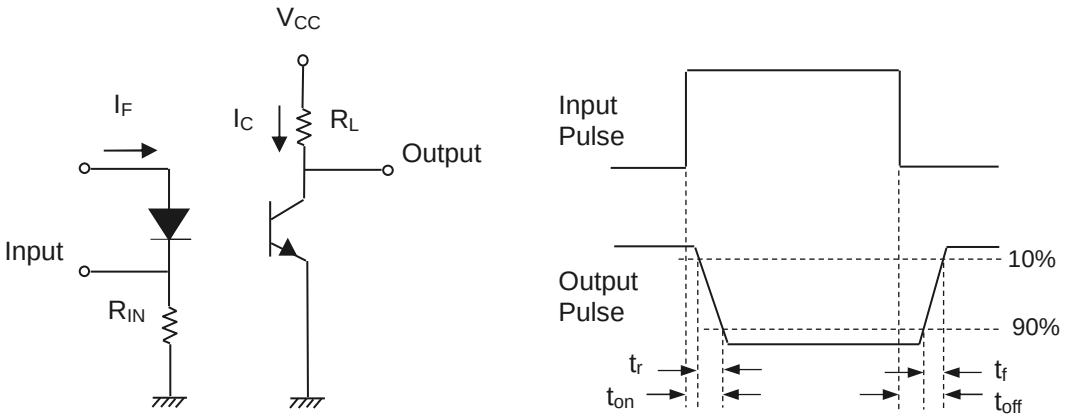


Figure 10. Switching Time Test Circuit & Waveforms

Order Information

Part Number

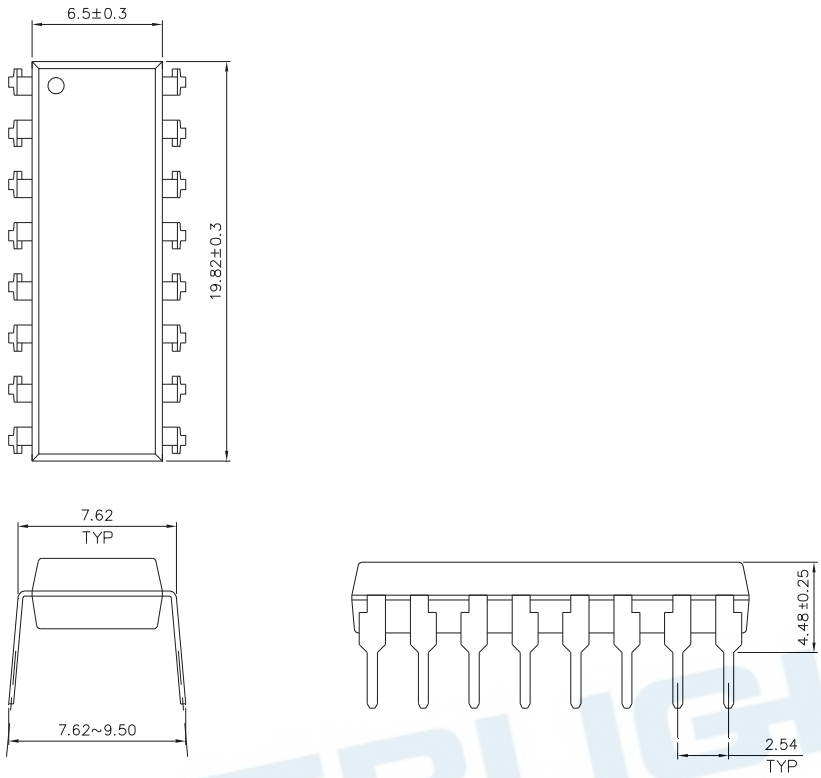
EL847X-V

Note
X = Lead form option (S or none)
V = VDE safety (optional).

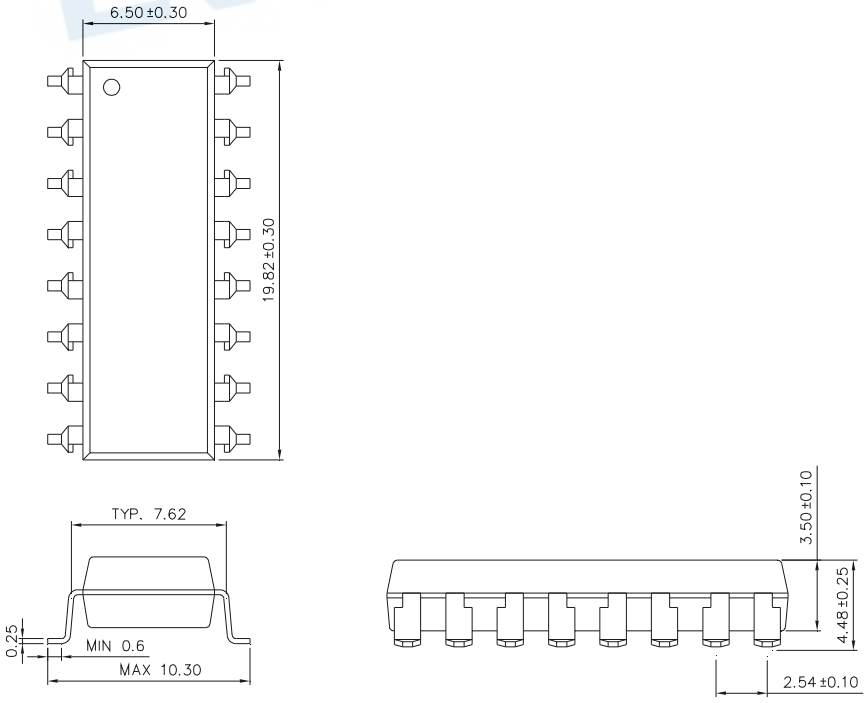
Option	Description	Packing quantity
None	Standard DIP-16	20 units per tube
S	Surface mount lead form	800 units per reel

Package Dimension (Dimensions in mm)

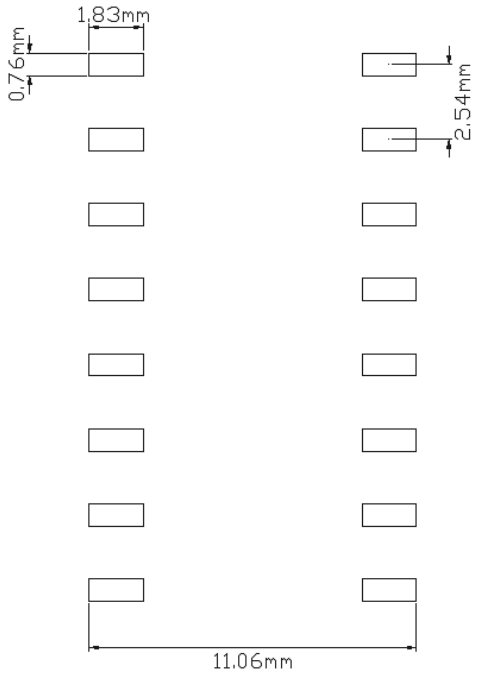
Standard DIP Type



Option S Type



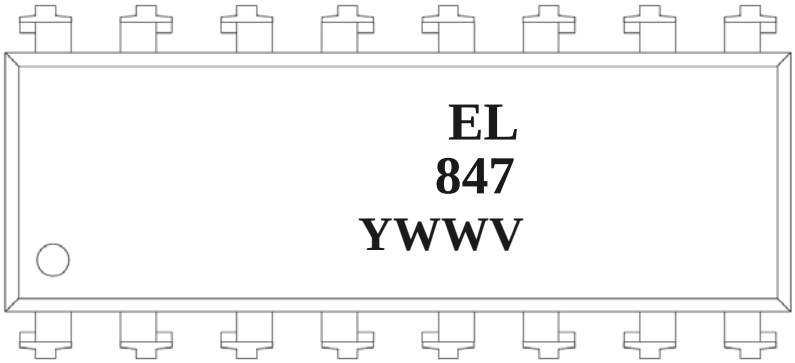
Recommended pad layout for surface mount leadform



Notes

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

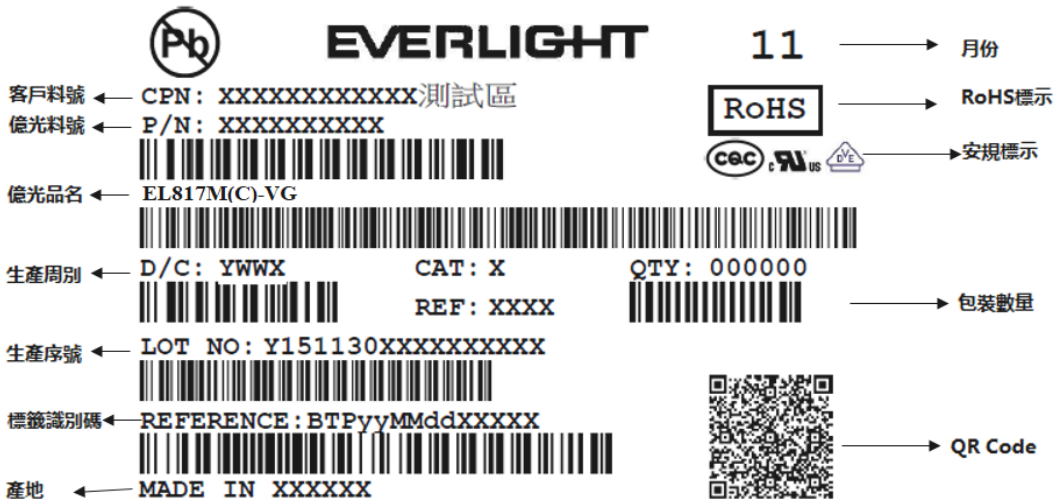
Device Marking



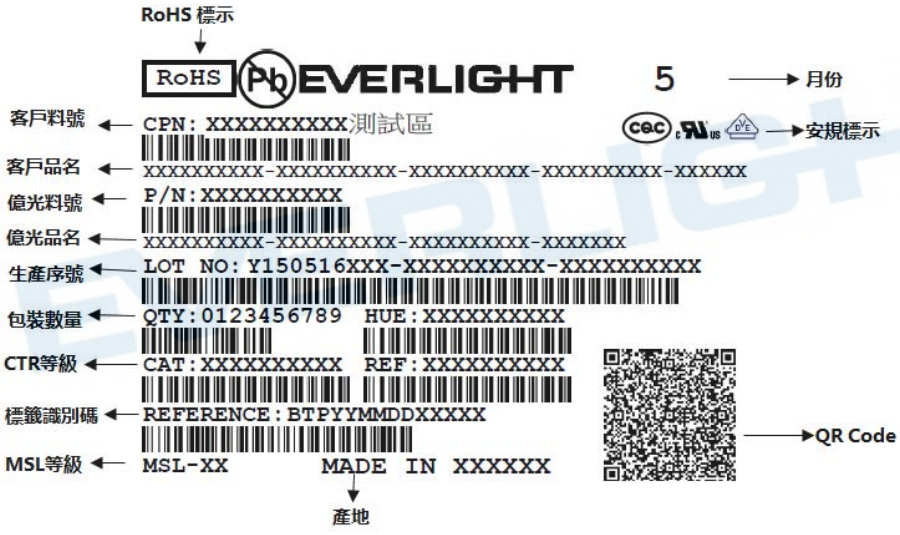
Notes

EL847	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

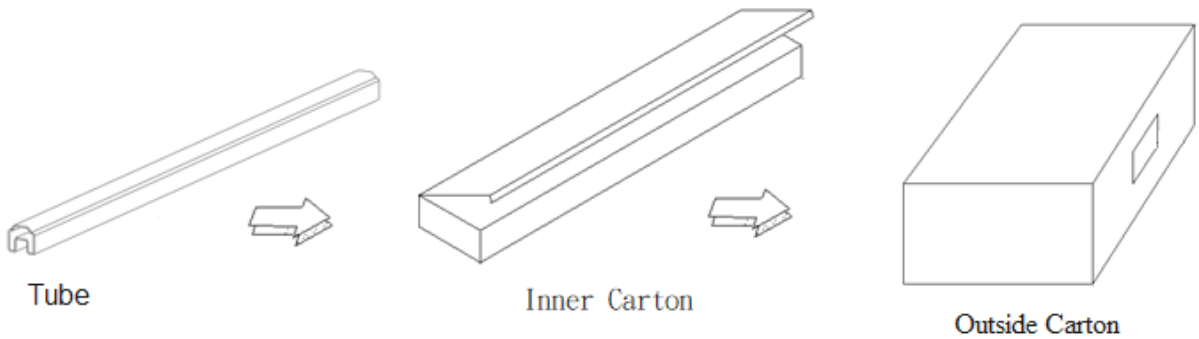
Label form



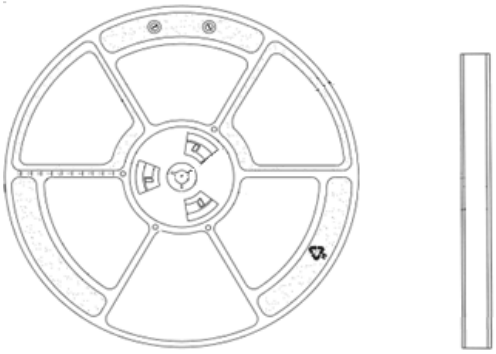
or



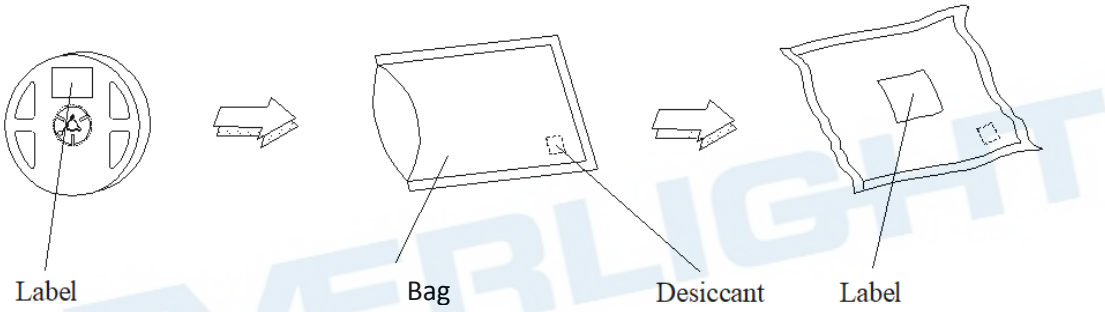
TUBE Dimension

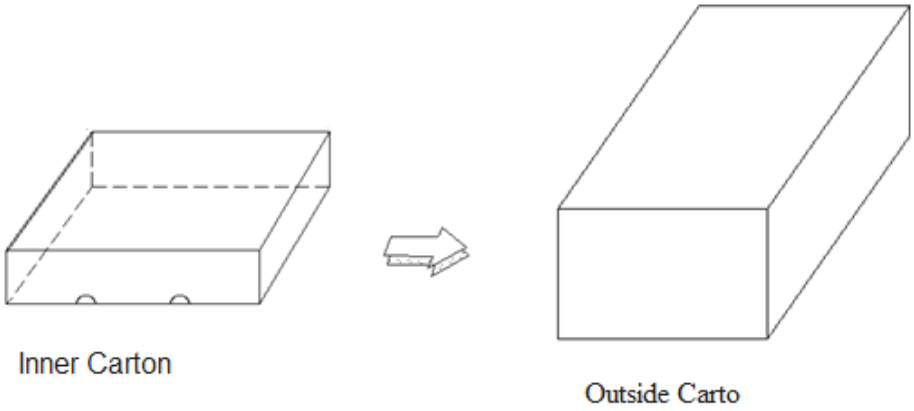


Reel Dimension

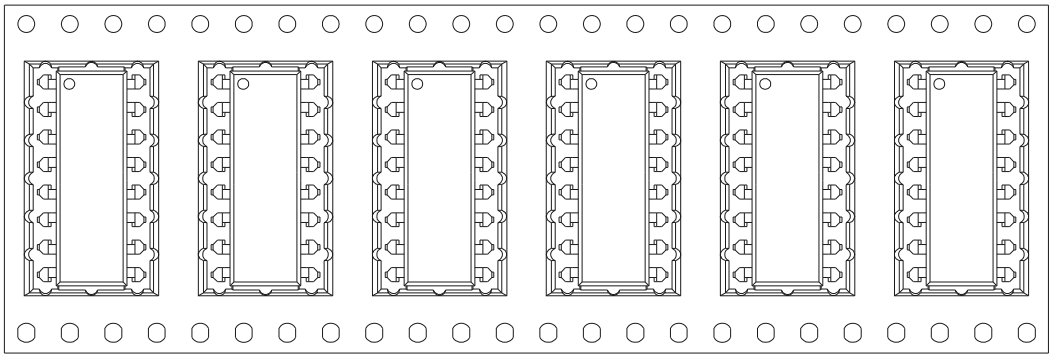


Moisture Resistant Packaging

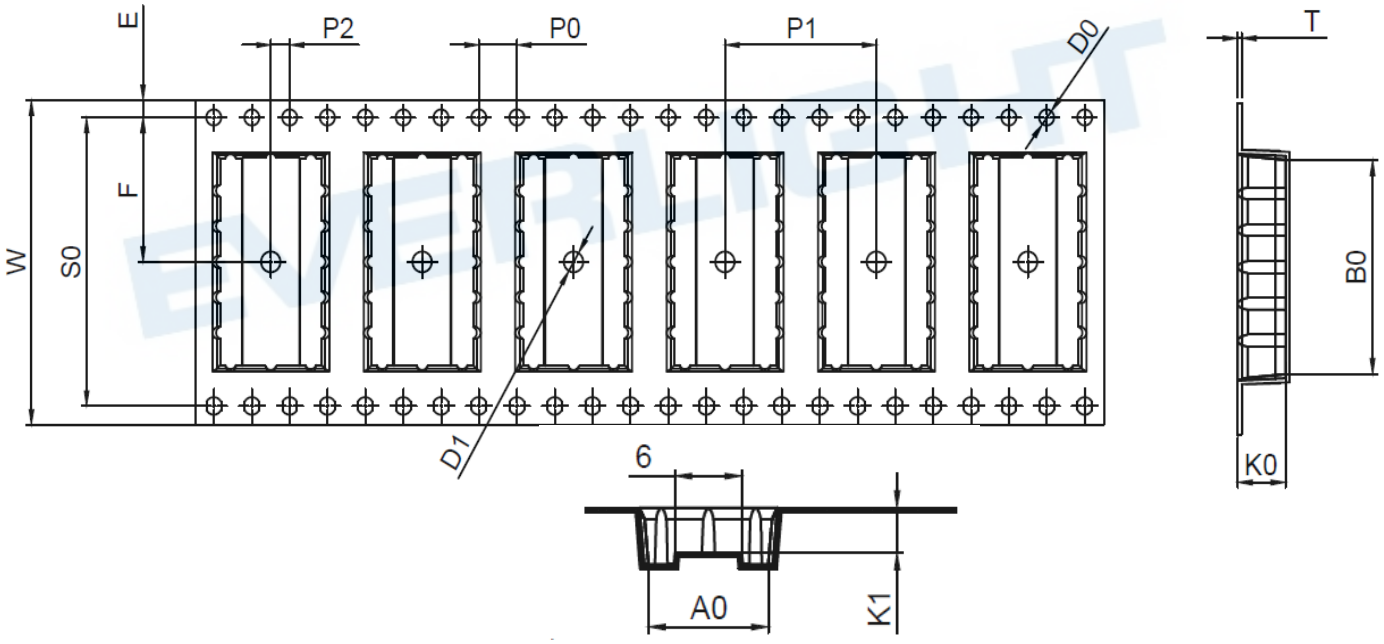




Tape & Reel Packing Specifications



Tape dimensions

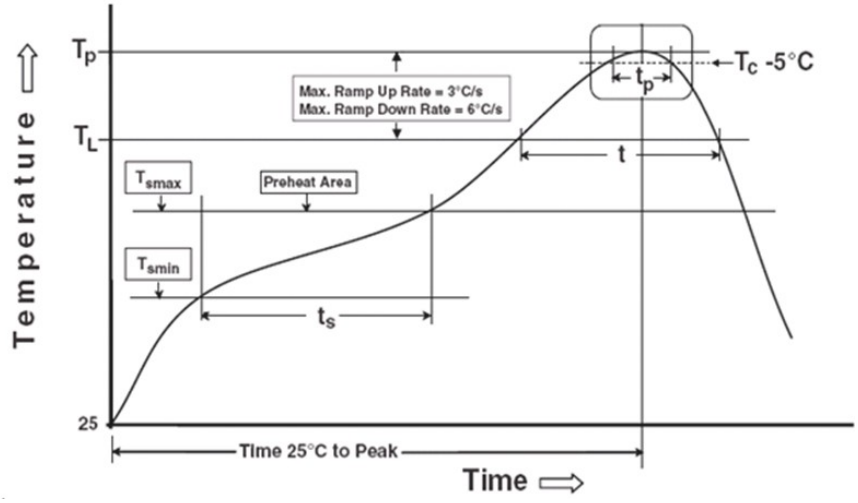


Dimension No.	W	E	F	Do	D_1	P0	P1
Dimension (mm)	32.00±0.3	1.75±0.1	14.2±0.1	1.50±0.1	2.00±0.1	4.00±0.1	16.00±0.1
Dimension No.	P2	Ao	Bo	Ko	K_1	T	So
Dimension (mm)	2.00±0.1	10.75±0.1	20.45±0.1	4.85±0.1	3.85±0.1	0.40±0.1	28.40±0.1

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°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.

DISCLAIMER

1. Above specification may be changed without notice. EVERLIGHT will reserve authority on material change for above specification.
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. EVERLIGH T 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.
4. These specification sheets include materials protected under copyright of EVERLIGHT. Reproduction in any form is prohibited without the specific consent of EVERLIGHT.
5. This product is not intended to be used for military, aircraft, automotive, medical, life sustaining or life saving applications or any other application which can result in human injury or death. Please contact authorized Everlight sales agent for special application request.
6. Statements regarding the suitability of products for certain types of applications are based on Everlight's knowledge of typical requirements that are often placed on Everlight products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Everlight's terms and conditions of purchase, including but not limited to the warranty expressed therein.