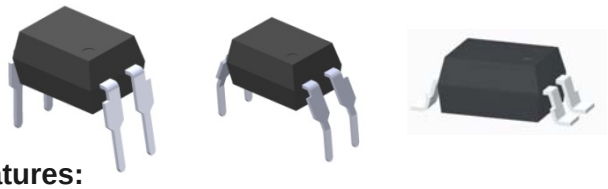
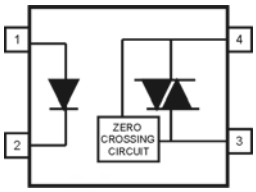
DATASHEET

4 PIN DIP ZERO-CROSS TRIAC DRIVER PHOTOCOUPLER
ELT304X, ELT306X, ELT308X Series



Schematic



Pin Configuration
1. Anode
2. Cathode
3. Terminal
4. Terminal

Features:

- Compliance Halogens Free(Br < 900 ppm, Cl < 900 ppm, Br+Cl < 1500 ppm)
- Peak breakdown voltage
  - 400V: ELT304X
  - 600V: ELT306X
  - 800V: ELT308X
- High isolation voltage between input and output (Viso=5000 V rms)
- Zero voltage crossing
- The product itself will remain within RoHS compliant version
- Compliance with EU REACH
- Pb free
- UL and cUL approved
- VDE approved
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

Description

The ELT304X, ELT306X and ELT308X series of devices each consist of an GaAs infrared emitting diode optically coupled to a monolithic silicon zero voltage crossing photo triac.
They are designed for use with a discrete power triac in the interface of logic systems to equipment powered from 110 to 380 VAC lines, such as solid-state relays, industrial controls, motors, solenoids and consumer appliances.

Applications

- Solenoid/valve controls
- Light controls
- Static power switch
- AC motor drivers
- E.M. contactors
- Temperature controls
- AC Motor starters

Absolute Maximum Ratings (Ta=25℃)

Parameter			Symbol	Rating	Unit
Input	Forward current		I_F	60	mA
	Reverse voltage		V_R	6	V
	Power dissipation		P_D	100	mW
Output	Off-state Output Terminal Voltage	ELT304X	V_{DRM}	400	V
		ELT306X		600	
		ELT308X		800	
	Peak Repetitive Surge Current		I_{TSM}	1	A
	Power dissipation		P_C	300	mW
Total power dissipation			P_{TOT}	330	mW
Isolation voltage *1			V_{ISO}	5000	Vrms
Operating temperature			T_{OPR}	-55 to 100	℃
Storage temperature			T_{STG}	-55 to 125	℃
Soldering Temperature*2			T_{SOL}	260	℃

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.

*3 Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability. The absolute maximum Ratings are stress only T_A=25ºC unless otherwise specified. Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum rating.

Recommended Operating Conditions (Note)

Please use under recommended operating conditions to obtain expected characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit
Input forward current	EL30X1	I_F	20	25	30	mA
	EL30X2		15	20	25	mA
	EL30X3		7	10	20	mA
AC mains voltage		V_{AC}	-	-	240	V
Operating temperature		T_{OPR}	-25	-	85	ºC

Notes:

The recommended operating conditions are given as a design guide necessary to obtain the intended performance of the device. Each parameter is an independent value. When creating a system design using this device, the electrical characteristics specified in this data sheet should also be considered.

Electro-Optical Characteristics (Ta=25℃ unless specified otherwise)

Input

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	V_F	-	-	1.5	V	I_F = 30mA
Reverse Leakage current	I_R	-	-	10	μA	V_R = 6V

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
Peak Blocking Current	I_{DRM}	-	-	500	nA	V_{DRM} = Rated V_{DRM} I_F = 0mA
Peak On-state Voltage	V_{TM}	-	-	3	V	$I_{TM(RMS)}$=100 mA I_F=Rated I_{FT}
Critical Rate of Rise off-state Voltage	dv/dt	600	-	-	V/μs	V_{PEAK} = 0.636×Rated V_{DRM}, I_F = 0mA (Fig. 11)
Inhibit Voltage (MT1-MT2 voltage above which device will not trigger)	V_{INH}	-	-	20	V	I_F= 5mA
Leakage in Inhibited State	I_{DRM2}	-	-	1000	μA	I_F= Rated I_{FT}, V_{DRM}=Rated V_{DRM}, off state

Transfer Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Condition
LED Trigger Current	ELT3041 ELT3061 ELT3081	I_{FT}	-	-	15	mA	Main terminal Voltage=3V*4
	ELT3042 ELT3062 ELT3082		-	-	10		
	ELT3043 ELT3063 ELT3083		-	-	5		
Holding Current		I_H	-	280	-	μA	

*4. All devices are guaranteed to trigger at an I_F value over than max I_{FT}

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

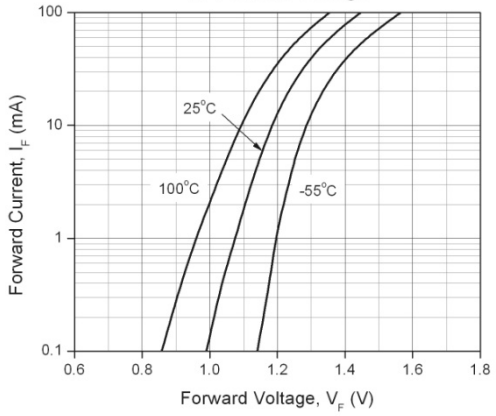


Figure 2. On-State Characteristics

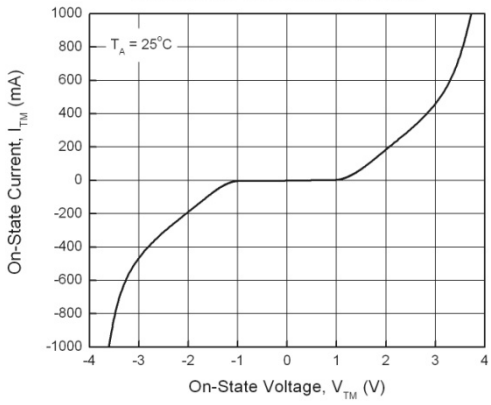


Figure 3. Holding Current vs. Ambient Temperature

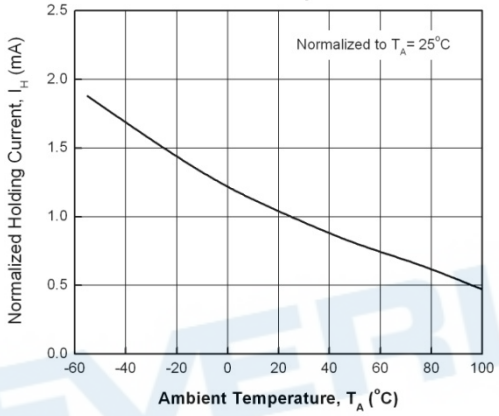


Figure 4. LED Current Required to Trigger vs. LED Pulse Width

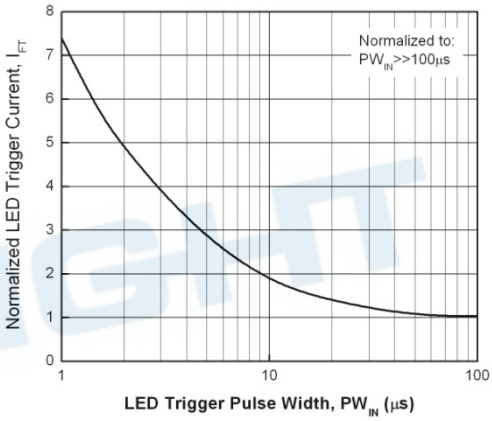


Figure 5. Leakage Current vs. Ambient Temperature

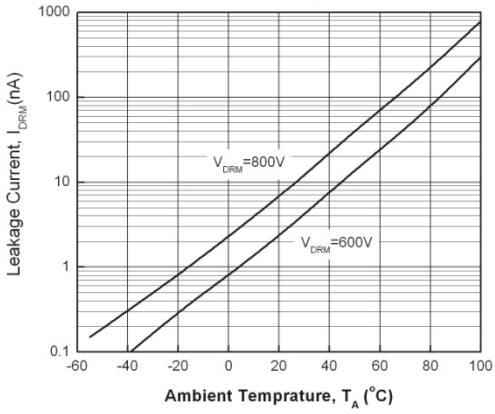


Figure 6. LED Trigger Current vs. Ambient Temperature

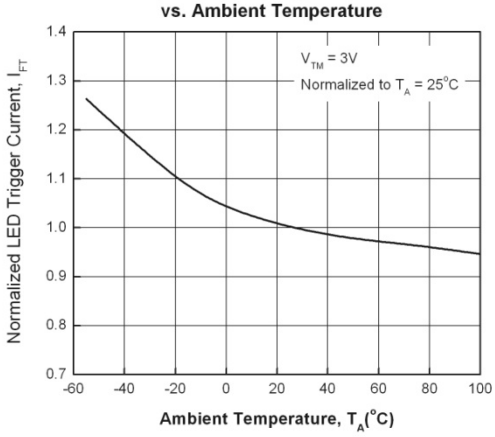


Figure 7. Off-State Output Terminal Voltage vs. Ambient Temperature

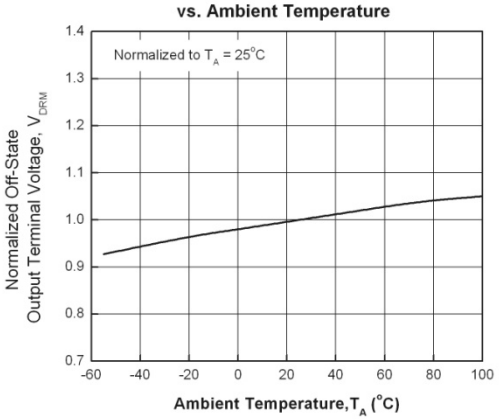


Figure 8. Leakage in Inhibit State vs. Ambient Temperature

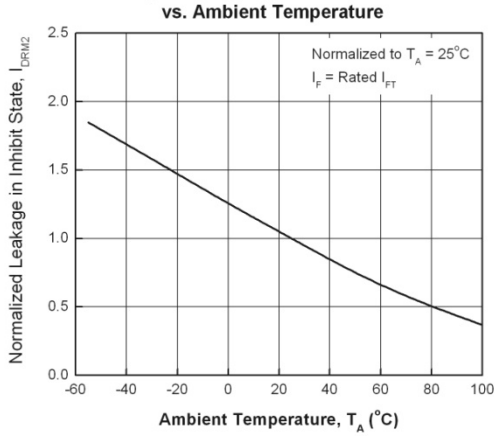


Figure 9. Inhibit Voltage vs. Ambient Temperature

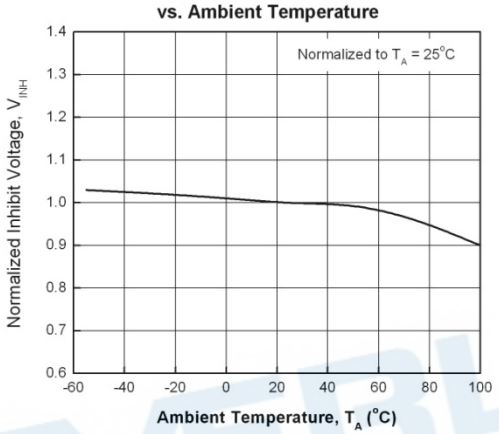
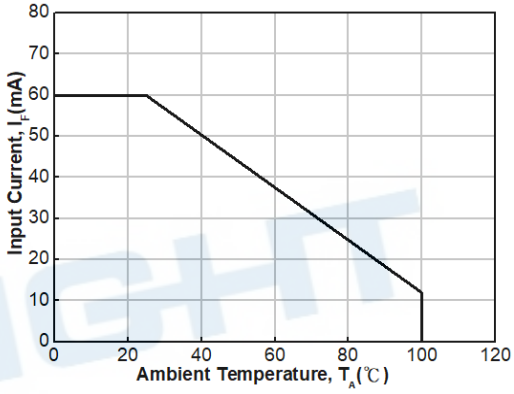
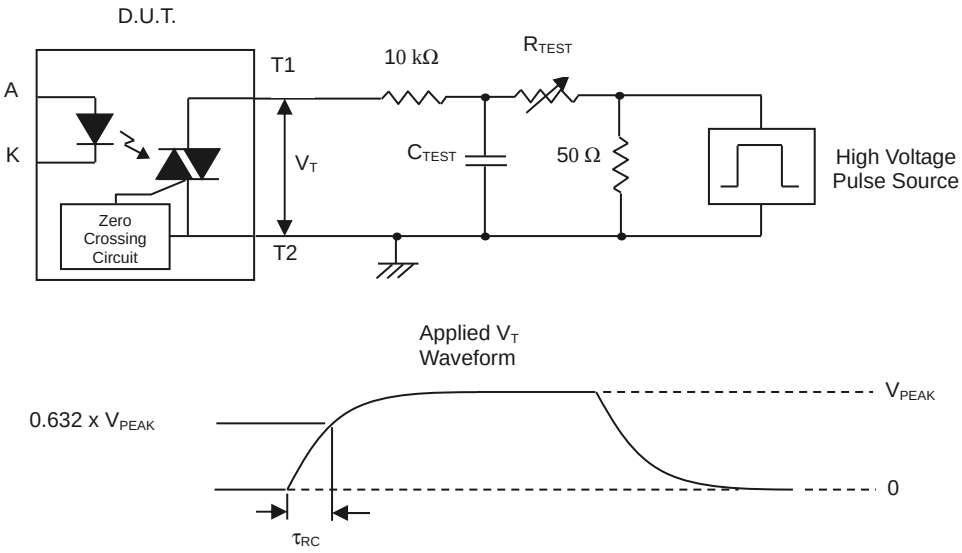


Figure10. Input Current vs Ambient Temperature



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

Figure 11. Static dv/dt Test Circuit & Waveform



Measurement Method

The high voltage pulse is set to the required V_{PEAK} value and applied to the D.U.T. output side through the RC circuit above. LED current is not applied. The waveform V_T is monitored using a x100 scope probe. By varying R_{TEST}, the dv/dt (slope) is increased, until the D.U.T. is observed to trigger (waveform collapses). The dv/dt is then decreased until the D.U.T. stops triggering. At this point, τ_{RC} is recorded and the dv/dt calculated.

$$dv/dt = \frac{0.632 \times V_{PEAK}}{\tau_{RC}}$$

Order Information

Part Number

ELT304X(Y)(Z)-V
or ELT306X(Y)(Z)-V
or ELT308X(Y)(Z)-V

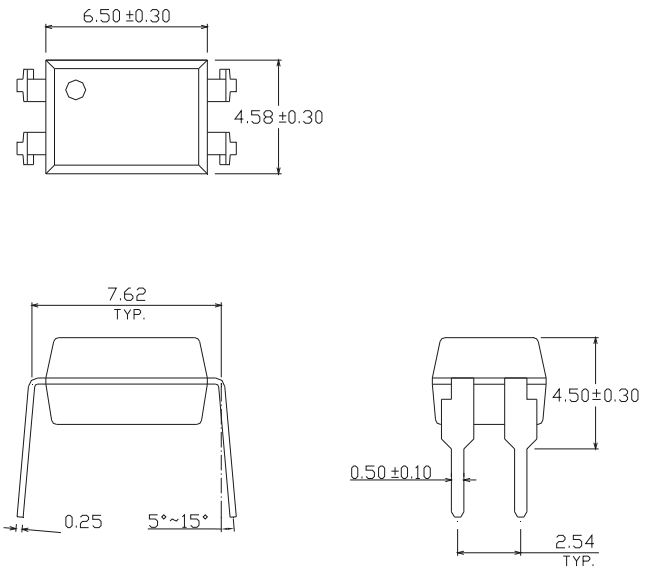
Note

Note
X = Part No. (1, 2, or 3)
Y = Lead form option (S, S1, M or none)
Z = Tape and reel option (TA, TB, TU, TD or none).
V = VDE safety approved option

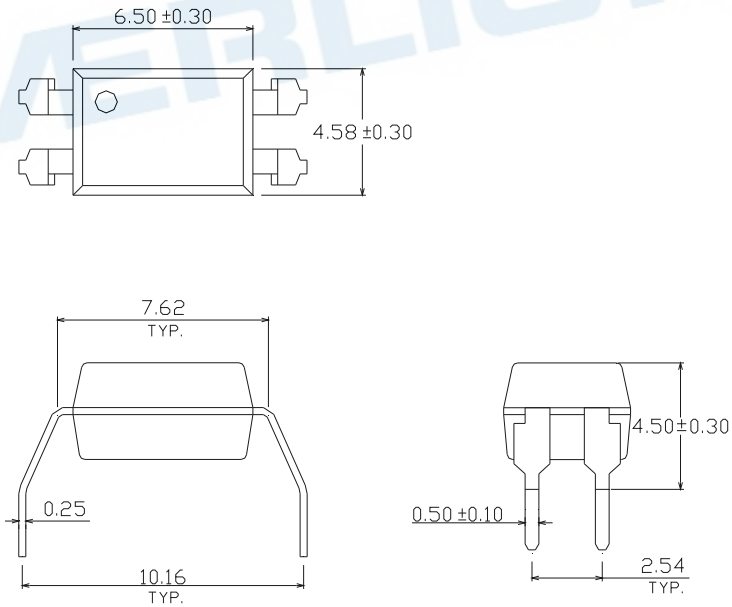
Option	Description	Packing quantity
None	Standard DIP-4	100 units per tube
M	Wide lead bend (0.4 inch spacing)	100 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount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

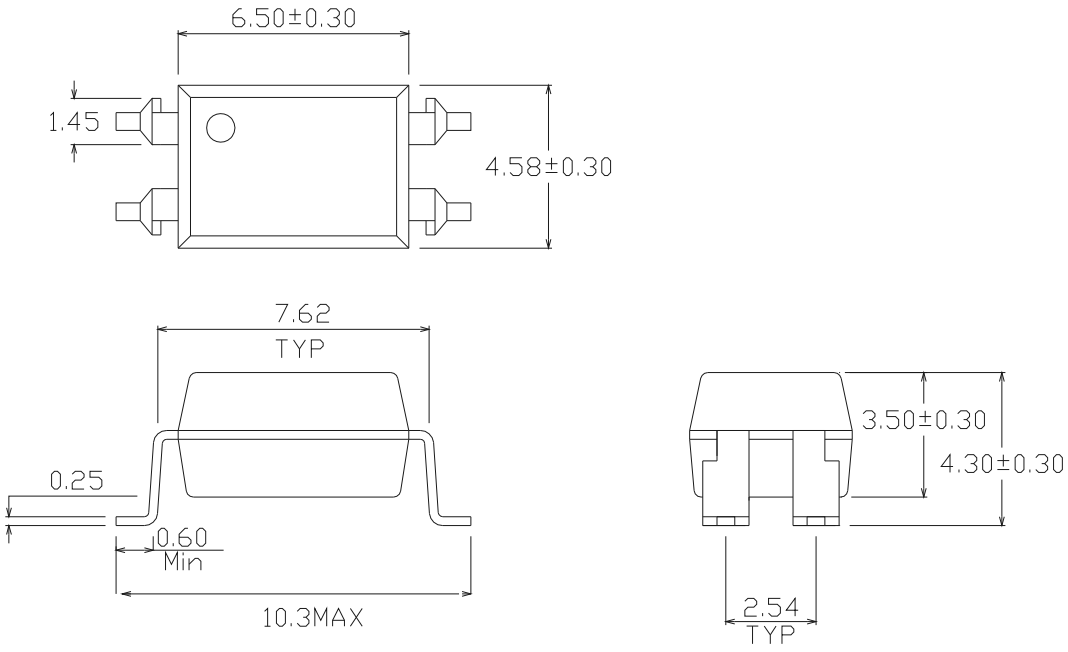
Standard DIP Type



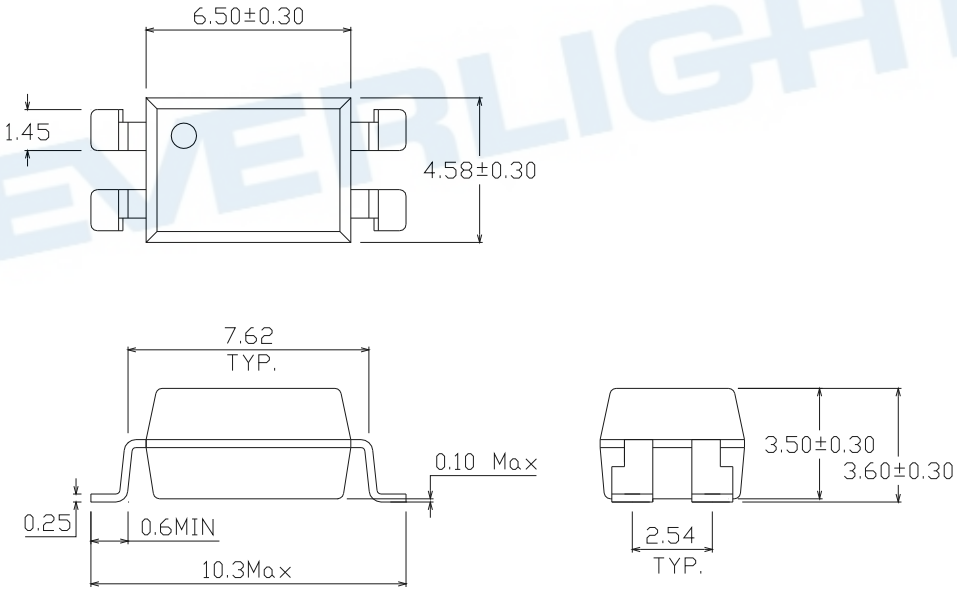
Option M Type



Option S Type

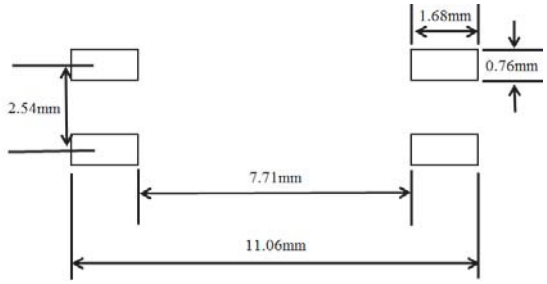


Option S1 Type

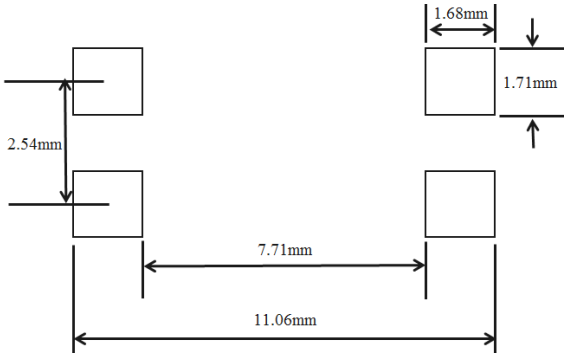


Recommended pad layout for surface mount leadform

For S option



For S1 option

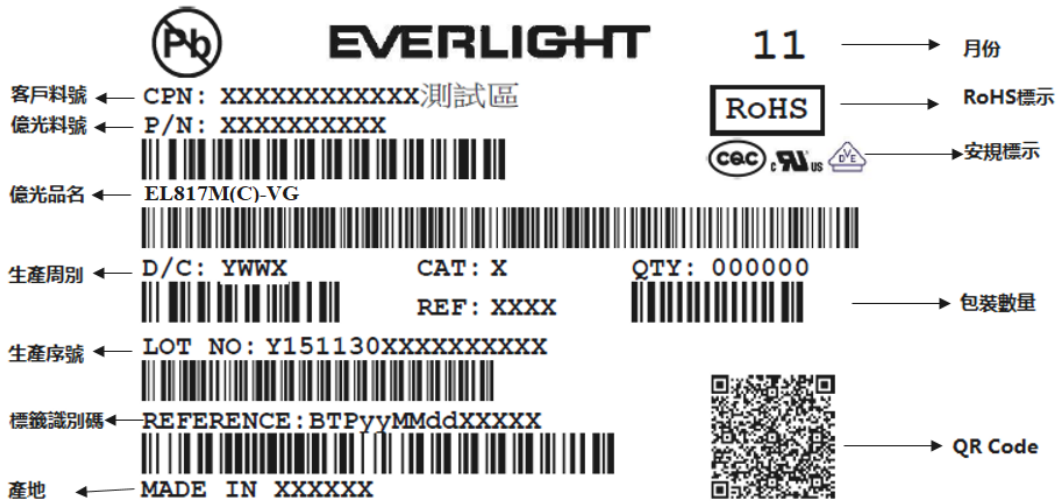


Device Marking

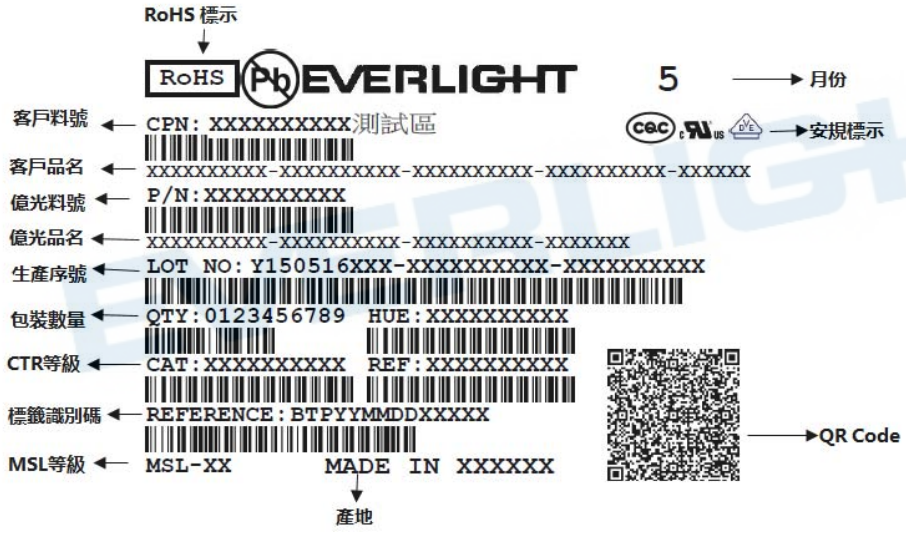
Notes

EL	denotes Everlight
T3083	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE option

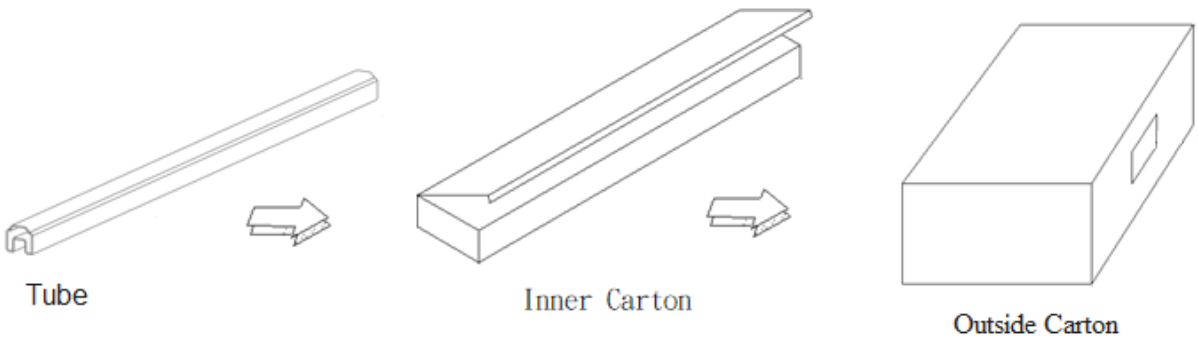
Label form



or

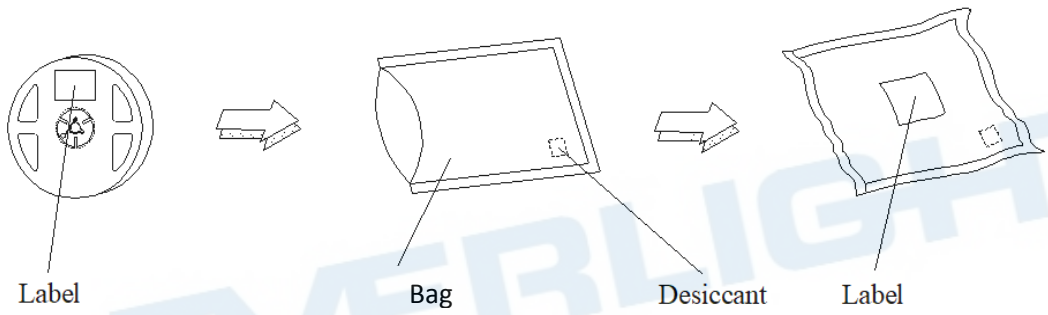


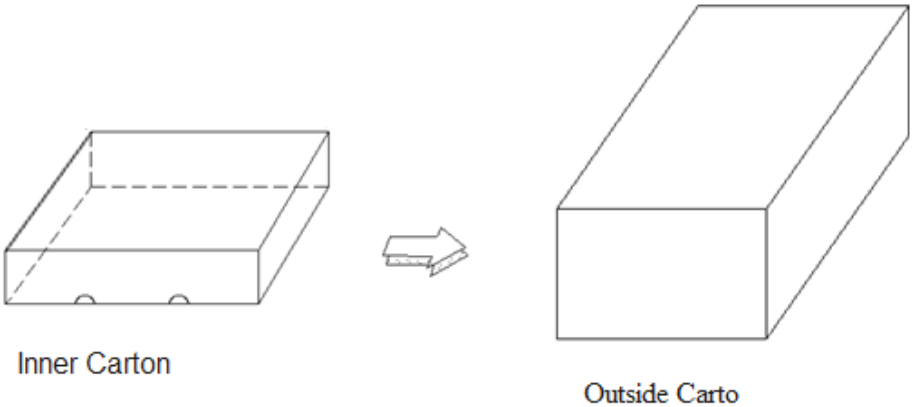
TUBE Dimension



Reel Dimension

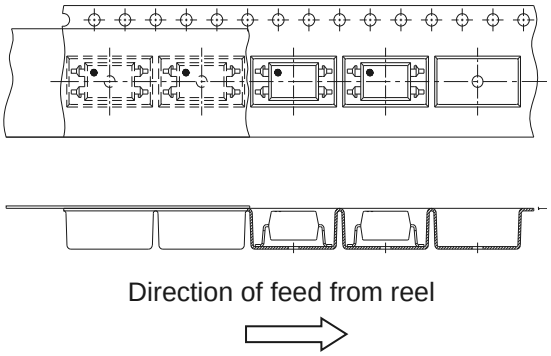
Moisture Resistant Packaging





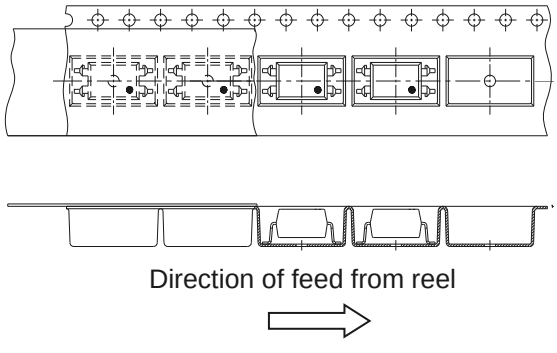
Tape & Reel Packing Specifications

Option TA



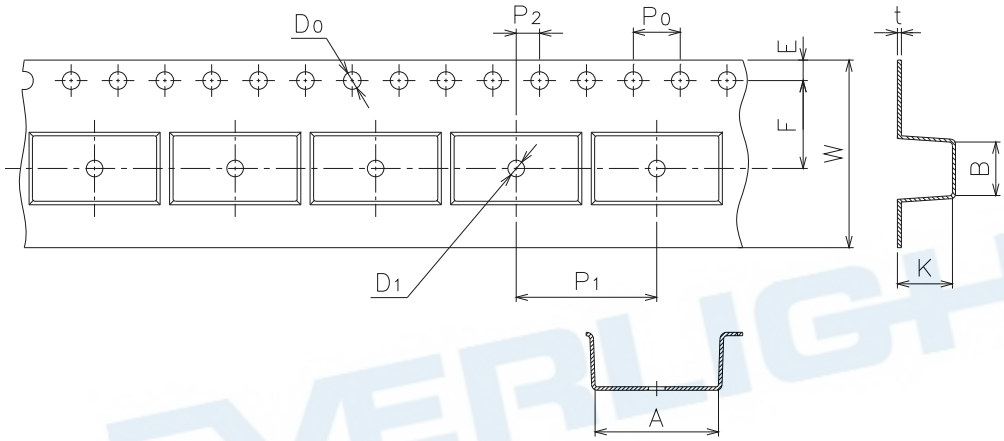
Direction of feed from reel

Option TB



Direction of feed from reel

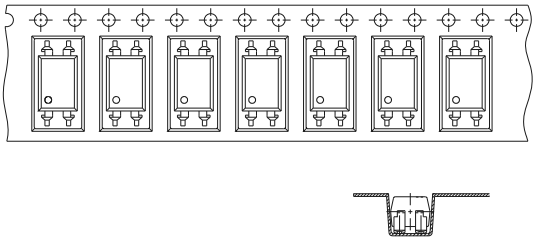
Tape dimensions



Dimension No.	A	B	Do	D1	E	F
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.	**Po**	**P1**	**P2**	**t**	**W**	**K**
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

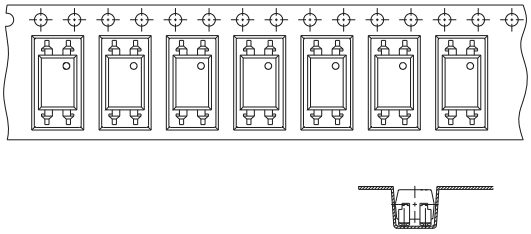
Tape dimensions

Option TD



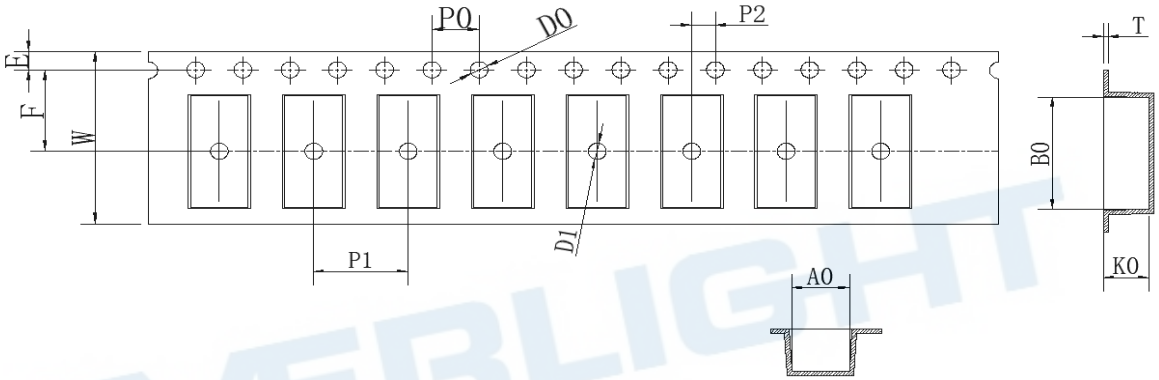
Direction of feed from reel

Option TU



Direction of feed from reel

Tape dimensions

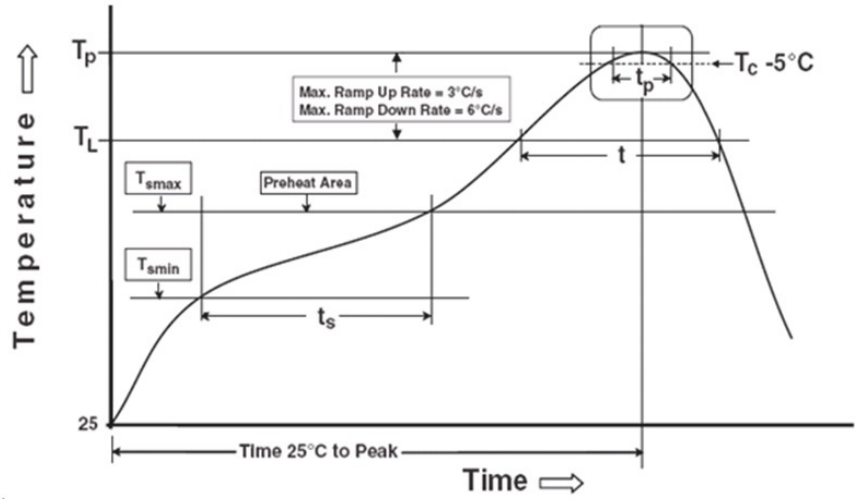


Dimension No.	Ao	Bo	Do	D1	E	F
Dimension (mm) S	4.90±0.1	10.40±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.50±0.1
Dimension (mm) S1	4.90±0.1	10.40±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.50±0.1
Dimension No.	**Po**	**P1**	**P2**	**t**	**W**	**Ko**
Dimension (mm) S	4.00±0.1	8.00±0.1	2.00±0.1	0.40±0.1	16.00±0.3	4.60±0.1
Dimension (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



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. 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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