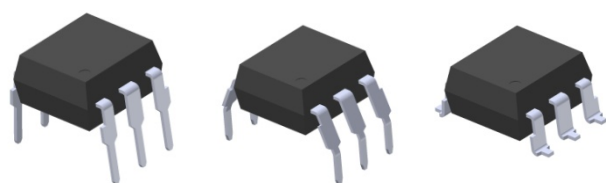
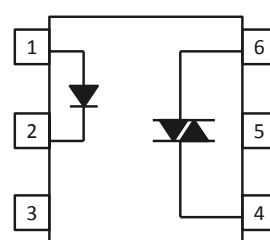


6 PIN DIP RANDOM-PHASE TRIAC DRIVER PHOTOCOUPLER EL301X, EL302X, EL305X Series



Schematic



Features:

- Peak breakdown voltage
 - 250V: EL301X
 - 400V: EL302X
 - 600V: EL305X
- High isolation voltage between input and output (Viso=5000 V rms)
- Compact dual-in-line package
- Pb free
- Compliance with EU REACH
- The product itself will remain within RoHS compliant version
- UL and cUL approved
- VDE approved
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

Pin Configuration

1. Anode
2. Cathode
3. No Connection
4. Terminal-MT2
5. Substrate
(do not connect)
6. Terminal-MT1

Description

The EL301X, EL302X and EL305X series of devices each consist of an infrared emitting diode optically coupled to a monolithic silicon random phase photo Triac.

They are designed for interfacing between electronic controls and power triacs to control resistive and inductive loads for 115 to 240 VAC operations.

Applications

- Solenoid/valve controls
- Lamp ballasts
- Static AC power switch
- Interfacing microprocessors to 115 to 240Vac peripherals
- Incandescent lamp dimmers
- Temperature controls
- Motor controls

Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	Reverse voltage	V_R	6	V
	Power dissipation	P_D	100	mW
Output	Off-state Output Terminal Voltage	V_{DRM}	EL301X 250	V
			EL302X 400	
			EL305X 600	
	On-State RMS Current	$I_{T(RMS)}$	100	mA
	Peak Repetitive Surge Current ($p_w \leq 100\mu s, 120pps$)	I_{TP}	2	A
	Peak Non-repetitive Surge Current ($f=60Hz$, one cycle)	I_{TSM}	1	A
	Power dissipation	P_O	300	mW
	Total power dissipation	P_{TOT}	400	mW
Isolation voltage ^{*1}		V_{ISO}	5000	Vrms
Operating temperature		T_{OPR}	-40 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&3 are shorted together, and pins 4, 5 & 6 are shorted together.

*2 For 10 seconds

Recommended Operating Conditions (Note)

Please use under recommended operating conditions to obtain expected characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Forward current	I_F	EL30X1 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	°C

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°C unless specified otherwise)

Input

Parameter	Symbol	Min.	Typ.* ¹	Max.	Unit	Condition
Forward Voltage	V _F	-	1.18	1.5	V	I _F = 10mA
Reverse Leakage current	I _R	-	-	10	μA	V _R = 6V* ¹

Note:

*1.Reverse Voltage(V_R) Condition is applied to I_R test only.The device is not designed for reverse operation

Output

Parameter	Symbol	Min.	Typ.* ¹	Max.	Unit	Condition
Peak Blocking Current	I _{DRM}	-	-	500	nA	V _{DRM} = Rated V _{DRM} I _F = 0mA* ²
Peak On-state Voltage	V _{TM}	-	-	3.0	V	I _{T(RMS)} =100mA 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.10)

Notes:

*1. Typical values at T_a = 25°C.

*2. Test voltage must be applied within dv/dt rating.

*3. This is static dv/dt. See Figure 10 for test circuit. Commutating dv/dt is a function of the load-driving thyristor(s) only.

Transfer Characteristics

Parameter	Symbol	Min.	Typ.* ¹	Max.	Unit	Condition
LED Trigger Current	EL3020			30		
	EL3010 EL3021 EL3051	-	-	15		
	EL3011 EL3022 EL3052	-	-	10		
	EL3012 EL3023 EL3053	-	-	5		
	I _{FT}				mA	Main terminal Voltage=3V* ⁴
Holding Current	I _H	-	250	-	μA	

Notes:

*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

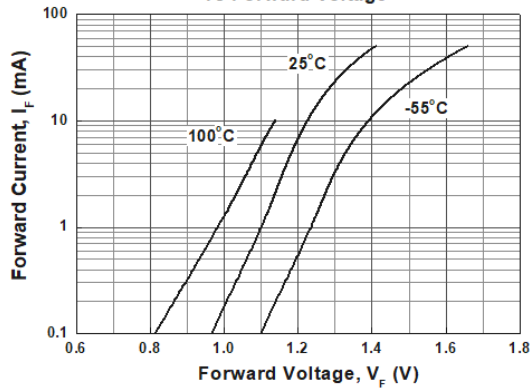


Figure 2. On-State Characteristics

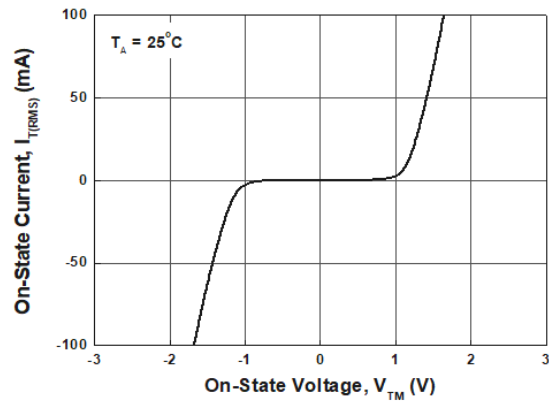


Figure 3. Holding Current vs. Ambient Temperature

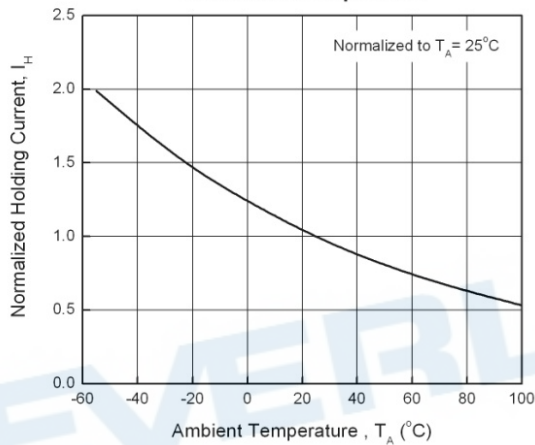


Figure 4. LED Current Required to Trigger vs. LED Pulse Width

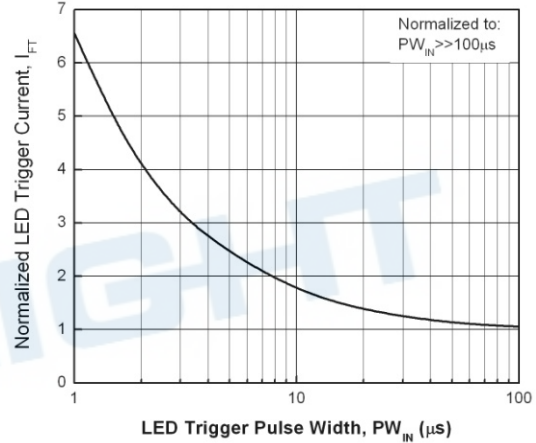


Figure 5. Leakage Current vs. Ambient Temperature

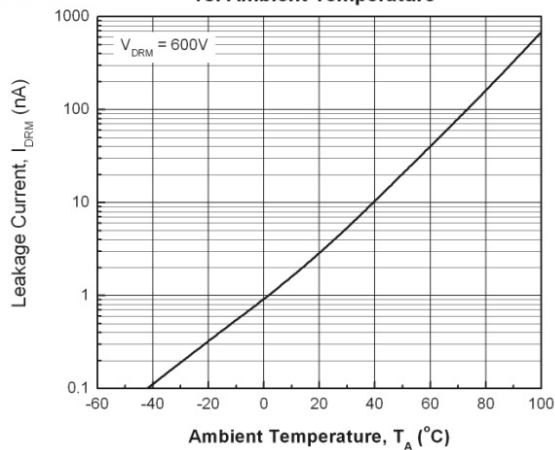


Figure 6. LED Trigger Current vs. Ambient Temperature

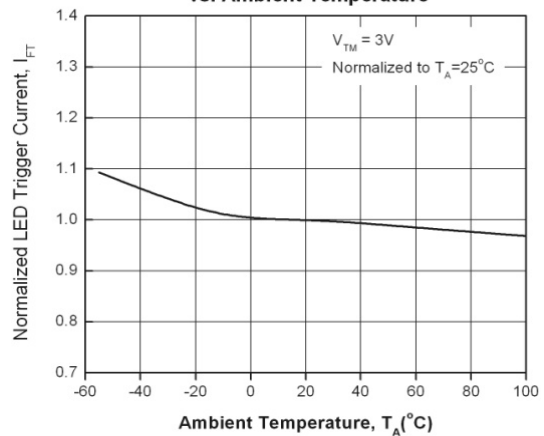


Figure 7. Off-State Output Terminal Voltage vs. Ambient Temperature

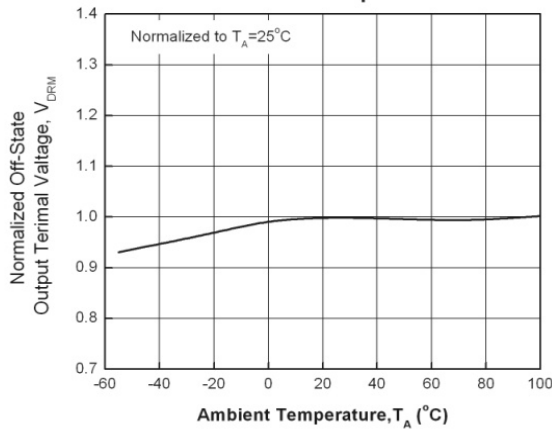


Fig 8. I_F Maximum rating vs Temperature

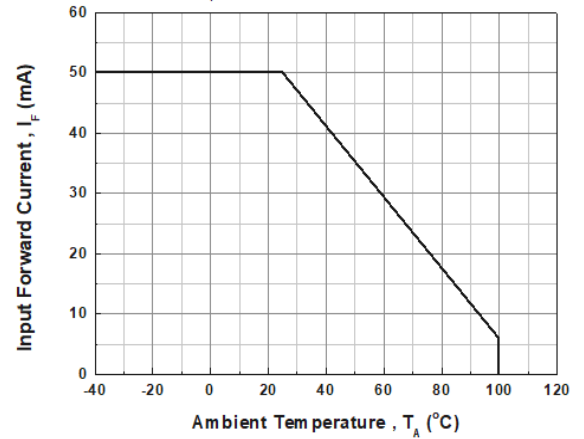
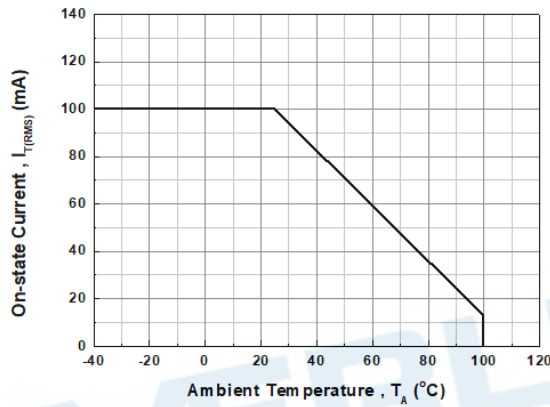
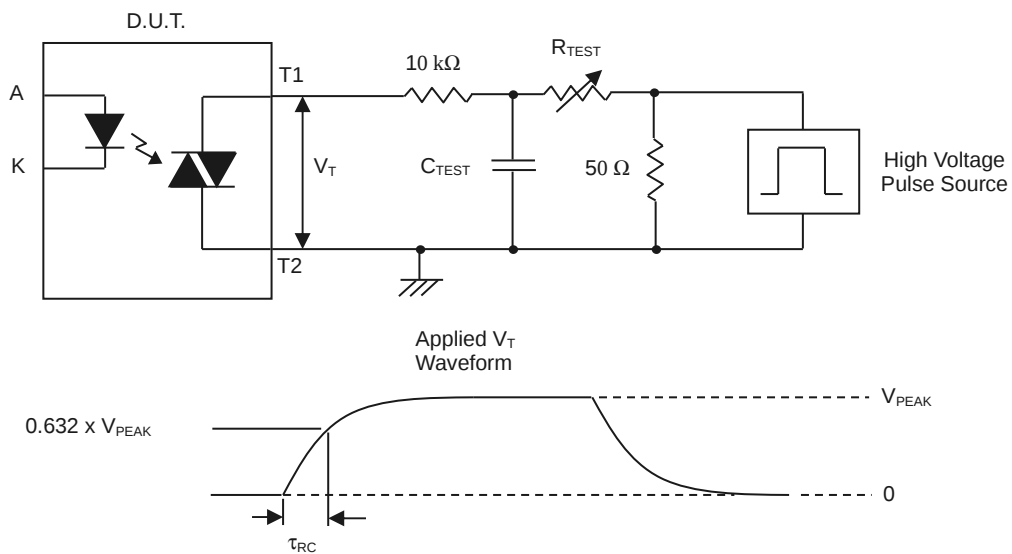


Fig 9. On-state Current vs Temperature



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

Figure 10. 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

EL301XY(Z)-V
or **EL302XY(Z)-V**
or **EL305XY(Z)-V**

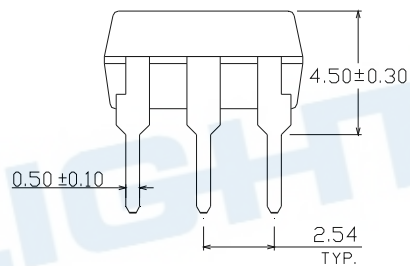
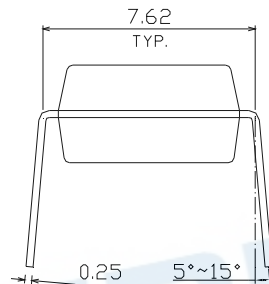
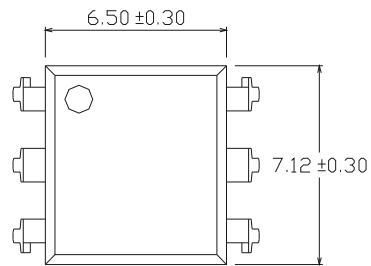
Notes

X = Part No. for EL301x (0, 1 or 2).
X = Part No. for EL302x (0,1, 2 or 3)
X = Part No. for EL305x (1, 2 or 3)
Y = Lead form option (S, S1, M or none)
Z = Tape and reel option (TA, TB or none).
V = VDE safety approved (optional)

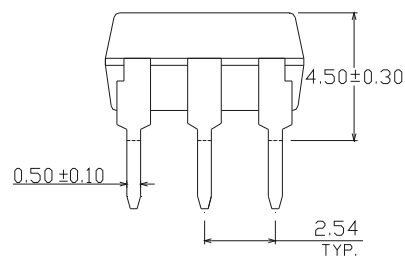
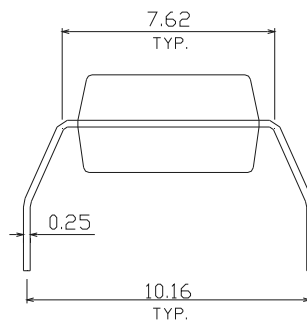
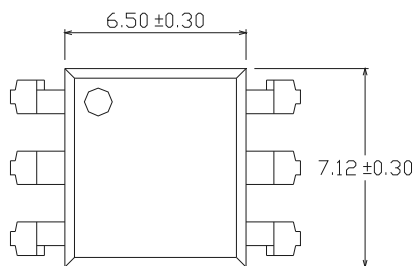
Option	Description	Packing quantity
None	Standard DIP-6	65 units per tube
M	Wide lead bend (0.4 inch spacing)	65 units per tube
S	Surface mount lead form	65 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	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

Package Dimension (Dimensions in mm)

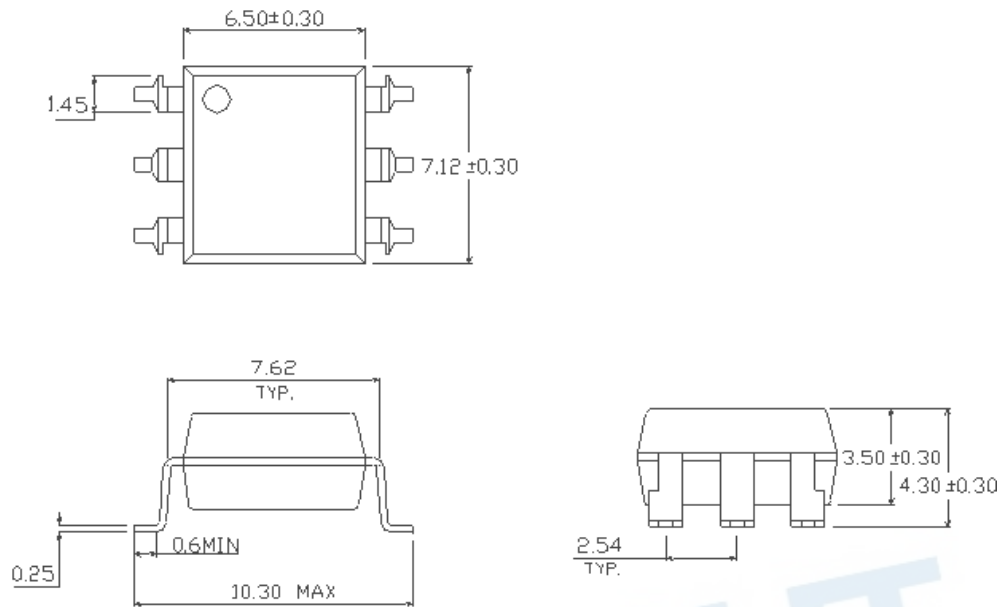
Standard DIP Type



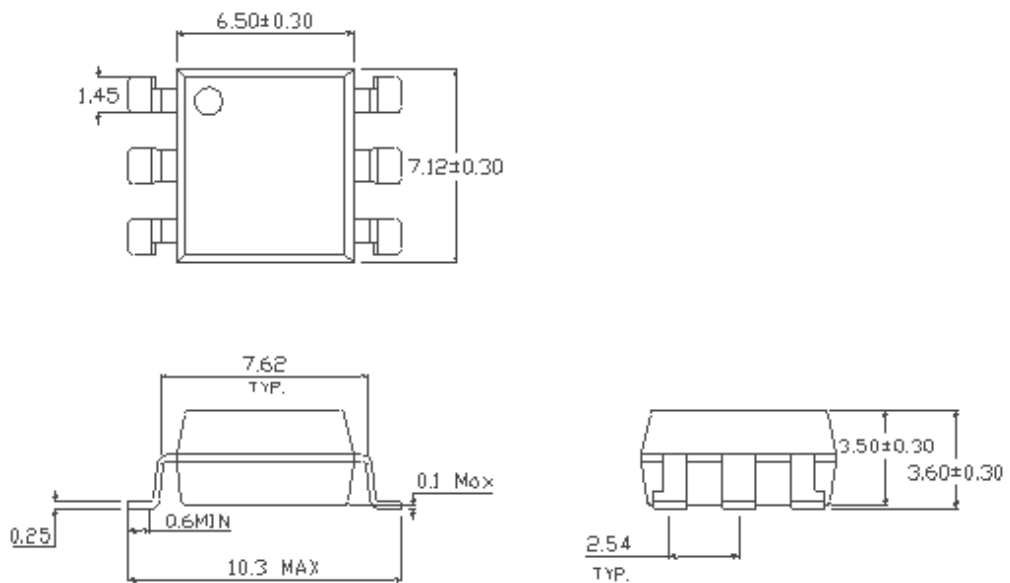
Option M Type



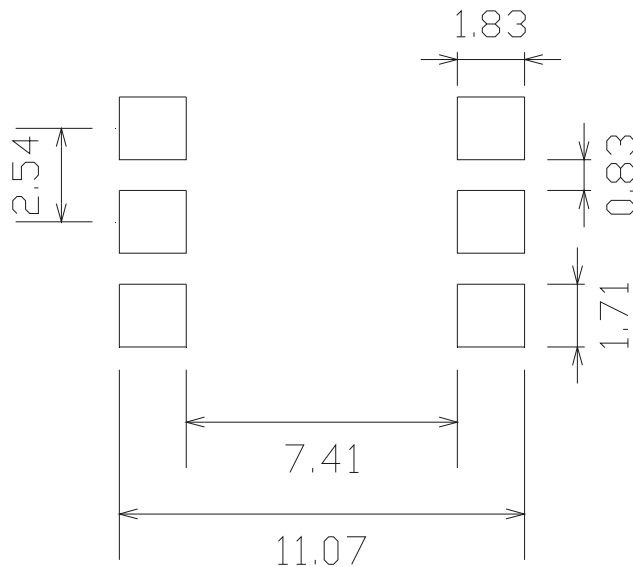
Option S Type



Option S1 Type



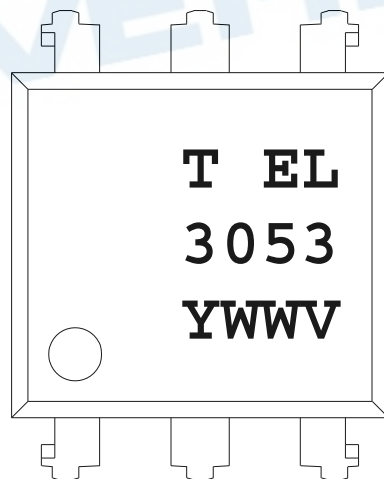
Recommended pad layout for surface mount leadform



Notes

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

Device Marking



Notes

T denotes Factory
No code : made in China
T : made in Taiwan
EL denotes EVERLIGHT
3053 denotes Device Number
Y denotes 1 digit Year code
WW denotes 2 digit Week code
V denotes VDE (optional)

Label form

(Pb) **EVERLIGHT** **11** → 月份

客戶料號 ← CPN: XXXXXXXXXXXX 測試區

億光料號 ← P/N: XXXXXXXXXXXX

億光品名 ← EL817M(C)-VG

生產周別 ← D/C: YWWX CAT: X QTY: 000000

生產序號 ← LOT NO: Y151130XXXXXXXXXX

標籤識別碼 ← REFERENCE: BTPyyMMddXXXXX

產地 ← MADE IN XXXXXX

RoHS 標示

安規標示

包裝數量

QR Code

or

RoHS 標示

RoHS **(Pb)** **EVERLIGHT** **5** → 月份

客戶料號 ← CPN: XXXXXXXXXXXX 測試區

客戶品名 ← XXXXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX-XXXXXX

億光料號 ← P/N: XXXXXXXXXXXX

億光品名 ← XXXXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX-XXXXXX

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

包裝數量 ← QTY: 0123456789 HUE: XXXXXXXXXXXX

CTR等級 ← CAT: XXXXXXXXXXXX REF: XXXXXXXXXXXX

標籤識別碼 ← REFERENCE: BTPYMMDDXXXXX

MSL等級 ← MSL-XX

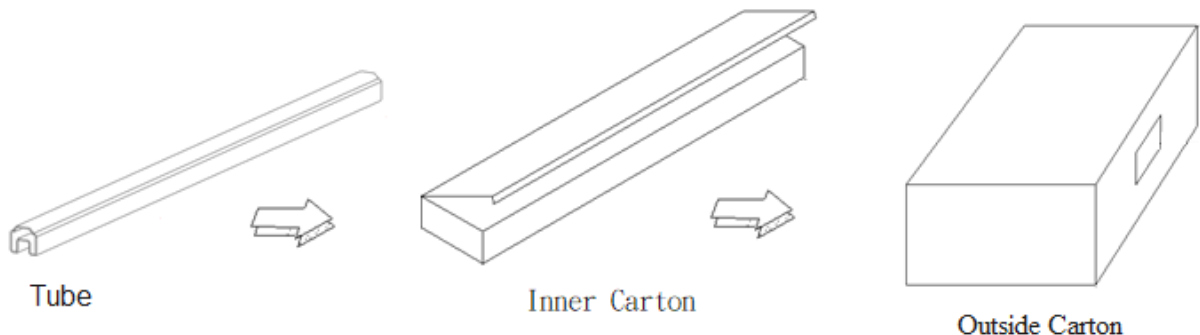
MADE IN XXXXXX

產地

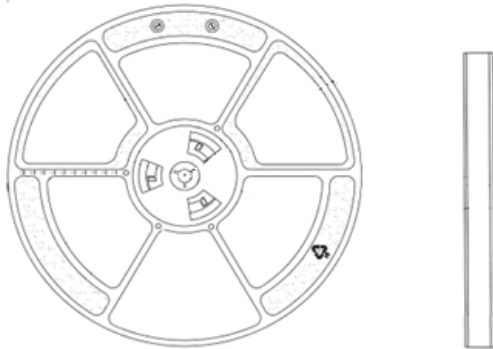
安規標示

QR Code

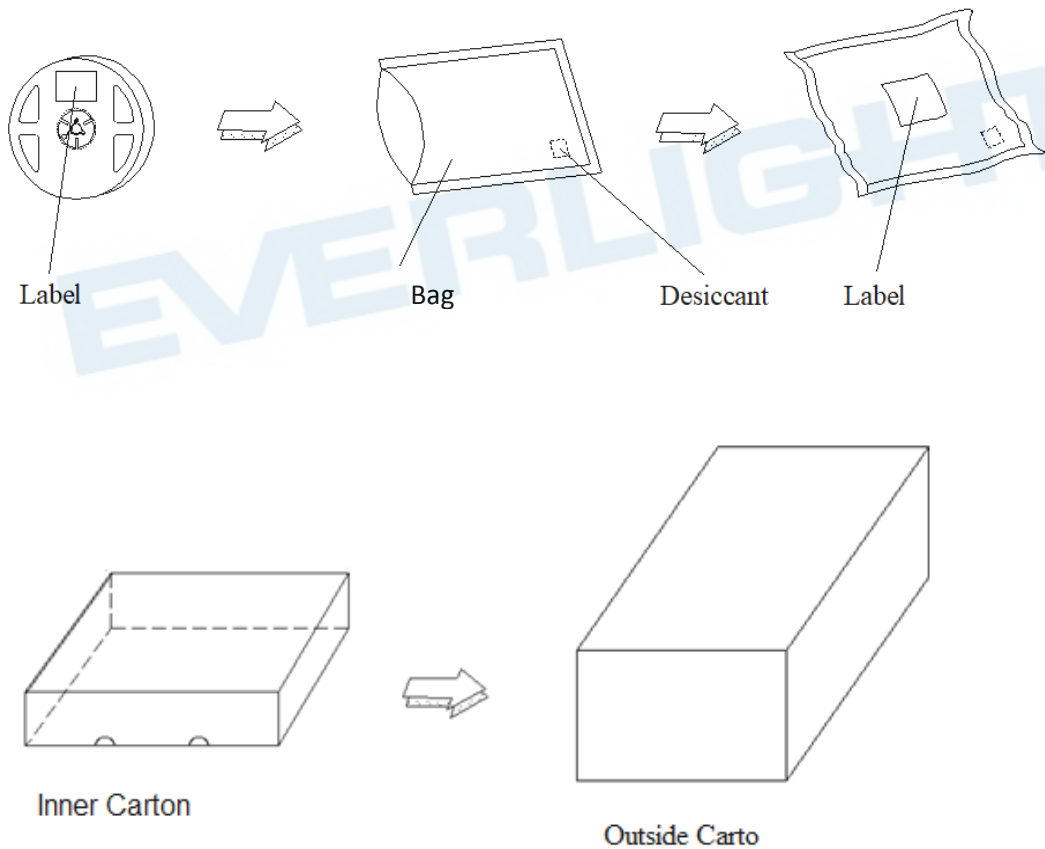
TUBE Dimension



Reel Dimension

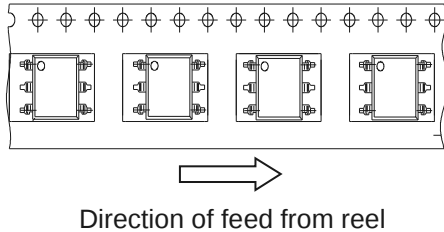


Moisture Resistant Packaging

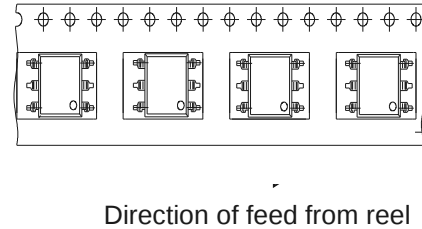


Tape & Reel Packing Specifications

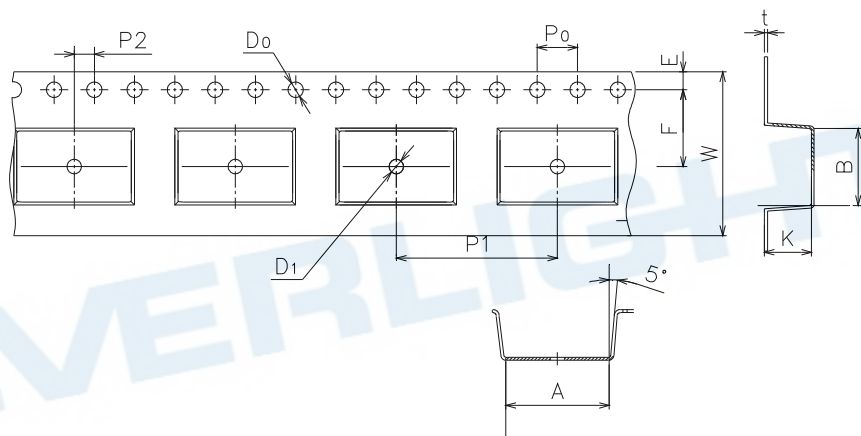
Option TA



Option TB



Tape dimensions

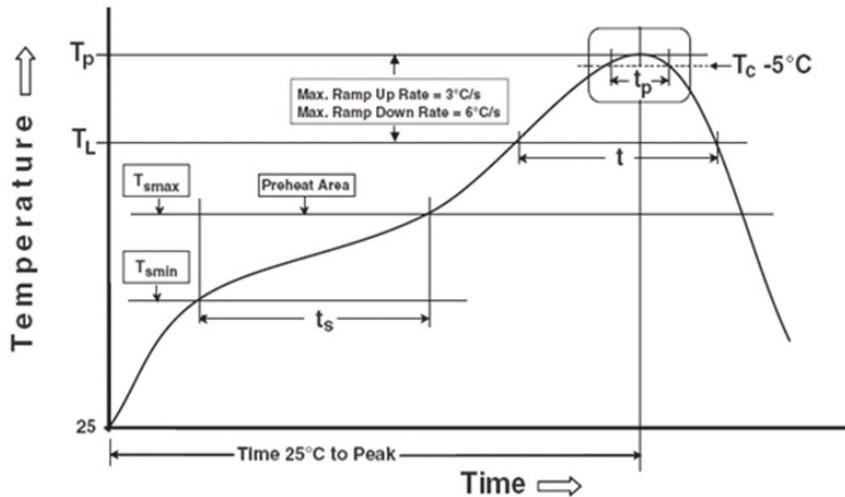


Dimension No.	A	B	D0	D1	E	F
Dimension (mm)	10.8±0.1	7.5±0.1	1.5±0.1	1.5±0.1	1.75±0.1	7.5±0.1
Dimension No.	P0	P1	P2	t	W	K
Dimension (mm)	4.0±0.15	12±0.1	2.0±0.1	0.35±0.03	16.0±0.2	4.5±0.1

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: $T_P - 5^\circ C$	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

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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