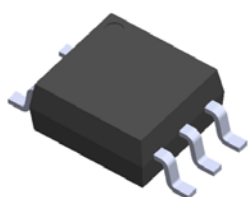
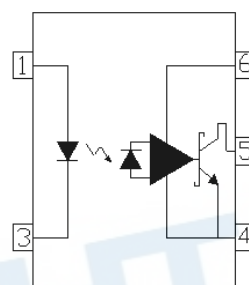


5 PIN SOP HIGH SPEED 10MBit/s LOGIC GATE PHOTOCOUPLER ELM6XX Series



Schematic



Pin Configuration

1, Anode
3, Cathode
4, Gnd
5, Vout
6, Vcc

Features

- Compliance Halogen Free .
(Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm)
- High speed 10Mbit/s
- Guaranteed performance from -40 to 85°C
- Logic gate output
- High isolation voltage between input and output (Viso=3750 V rms)
- Compliance with EU REACH
- Pb free and RoHS compliant.
- UL and cUL approved(No. E214129)
- VDE approved (No. 40028116)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

Description

The ELM600, ELM601 and ELM611 are consists of an infrared emitting diode optically coupled to a high speed integrated photo detector logic gate with a strobable output. The devices are packaged in a 5-pin small outline package which conforms to the standard footprint.

Applications

- Ground loop elimination
- LSTTL to TTL, LSTTL or 5 volt CMOS
- Line receiver, data transmission
- Data multiplexing
- Switching power supplies
- Pulse transformer replacement
- Computer peripheral interface

Truth Table

Input	Output
H	L
L	H

Absolute Maximum Ratings (T_A=25 °C)

	Parameter	Symbol	Rating	Unit
Input	Forward current	I _F	50	mA
	Reverse voltage	V _R	5	V
	Power dissipation	P _D	100	mW
Output	Power dissipation	P _C	85	mW
	Output current	I _O	50	mA
	Output voltage	V _O	7.0	V
	Supply voltage	V _{CC}	7.0	V
	Output Power Dissipation	P _O	85	mW
	Isolation Voltage* ¹	V _{ISO}	3750	V rms
	Operating Temperature	T _{OPR}	-40 ~ +85	°C
	Storage Temperature	T _{STG}	-55 ~ +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 & 3 are shorted together, and pins 4, 5 & 6 are shorted together.

*2 For 10 seconds

Electrical Characteristics (T_A=-40 to 85°C unless specified otherwise)

Input

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward voltage	V _F	-	1.45	1.8	V	I _F = 10mA
Reverse voltage	V _R	5.0	-	-	V	I _R = 10μA, T _A =25°C
Temperature coefficient of forward voltage	V _F /T _A	-	-1.9	-	mV/°C	I _F =10mA
Input capacitance	C _{IN}	-	70	-	pF	V _F =0, f=1MHz

Note: 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.	Max.	Unit	Condition
High level supply current	I _{CCH}	-	6.0	9	mA	I _F =0mA, V _{CC} =5.5V
Low level supply current	I _{CCL}	-	7.5	10	mA	I _F =10mA, V _{CC} =5.5V

Transfer Characteristics

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
High Level Output Current	I _{OH}	-	2.1	30	uA	V _{CC} =5.5V, V _O =5.5V, I _F =250uA
Low Level Output Current	V _{OL}	-	0.4	0.6	V	V _{CC} = 5.5V, I _F =5mA, I _{OL} (Sinking)=13mA
Input Threshold Current	I _{FT}	-	2.4	5	mA	V _{CC} = 5.5V, V _O =0.6V, I _{OL} (Sinking)=13mA

Switching Characteristics ($T_A = -40$ to 85°C , $V_{CC} = 5\text{V}$, $I_F = 7.5\text{mA}$ unless specified otherwise)

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Propagation delay time to output High level* ³ (Fig.10)	T_{PHL}	-	41	100	ns	$C_L = 15\text{pF}$, $R_L = 350\Omega$, $T_A = 25^\circ\text{C}$
Propagation delay time to output Low level* ³ (Fig.10)	T_{PLH}	-	50	100	ns	$C_L = 15\text{pF}$, $R_L = 350\Omega$, $T_A = 25^\circ\text{C}$
Pulse width distortion	$ T_{PHL} - T_{PLH} $	-	9	35	ns	$C_L = 15\text{pF}$, $R_L = 350\Omega$
Propagation Delay Skew* ⁴	t_{PSK}	-	-	40	ns	$C_L = 15\text{pF}$, $R_L = 350\Omega$
Output rise time (Fig.10)	t_r	-	40	-	ns	$C_L = 15\text{pF}$, $R_L = 350\Omega$
Output fall time (Fig.10)	t_f	-	10	-	ns	$C_L = 15\text{pF}$, $R_L = 350\Omega$
Common Mode Transient Immunity at Logic High * ⁶ (Fig.11)	M600	-	-	-	V/ μS	$I_F = 7.5\text{mA}$, $V_{OH} = 2.0\text{V}$, $R_L = 350\Omega$, $T_A = 25^\circ\text{C}$ $V_{CM} = 10\text{Vp-p}$
	M601	5,000				$I_F = 7.5\text{mA}$, $V_{OH} = 2.0\text{V}$, $R_L = 350\Omega$, $T_A = 25^\circ\text{C}$ $V_{CM} = 50\text{Vp-p}$
	M611	20,000				$I_F = 7.5\text{mA}$, $V_{OH} = 2.0\text{V}$, $R_L = 350\Omega$, $T_A = 25^\circ\text{C}$ $V_{CM} = 1000\text{Vp-p}$
Common Mode Transient Immunity at Logic Low * ⁷ (Fig.11)	M600	-	-	-	V/ μS	$I_F = 0\text{mA}$, $V_{OL} = 0.8\text{V}$, $R_L = 350\Omega$, $T_A = 25^\circ\text{C}$ $V_{CM} = 10\text{Vp-p}$
	M601	5,000				$I_F = 0\text{mA}$, $V_{OL} = 0.8\text{V}$, $R_L = 350\Omega$, $T_A = 25^\circ\text{C}$ $V_{CM} = 50\text{Vp-p}$
	M611	20,000				$I_F = 0\text{mA}$, $V_{OL} = 0.8\text{V}$, $R_L = 350\Omega$, $T_A = 25^\circ\text{C}$ $V_{CM} = 1000\text{Vp-p}$

*All typicals at $T_A = 25^\circ\text{C}$, $V_{CC} = 5\text{V}$

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

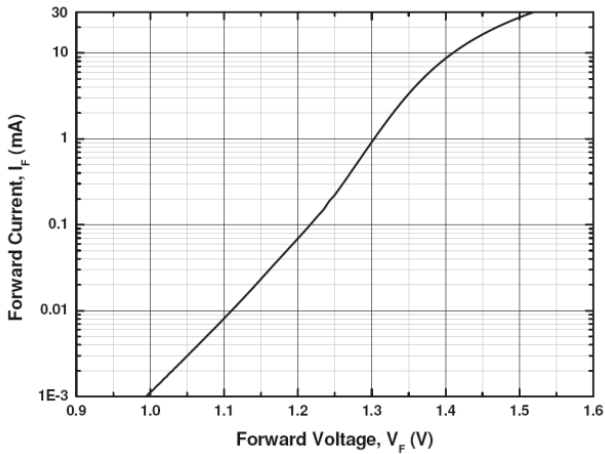


Figure 2. Low Level Output Voltage vs Ambient Temperature

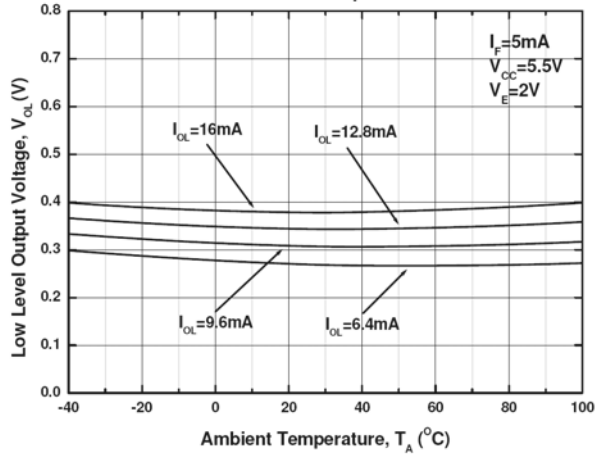


Figure 3. Low Level Output Current vs Ambient Temperature

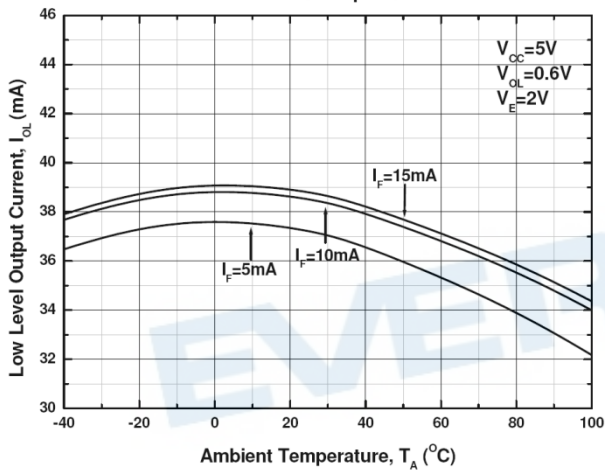


Figure 4. Input Threshold Current vs Ambient Temperature

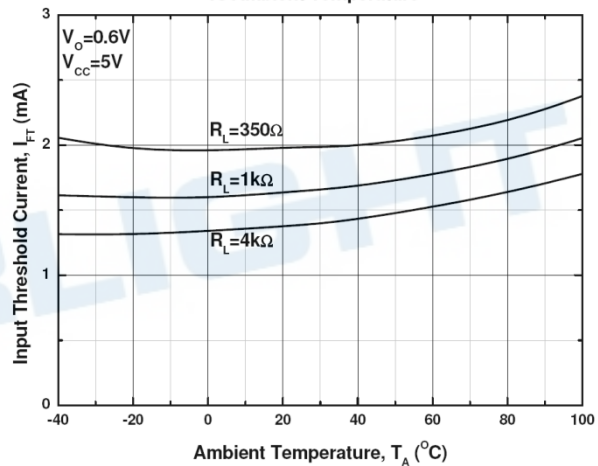


Figure 5. Input Current vs Output Voltage

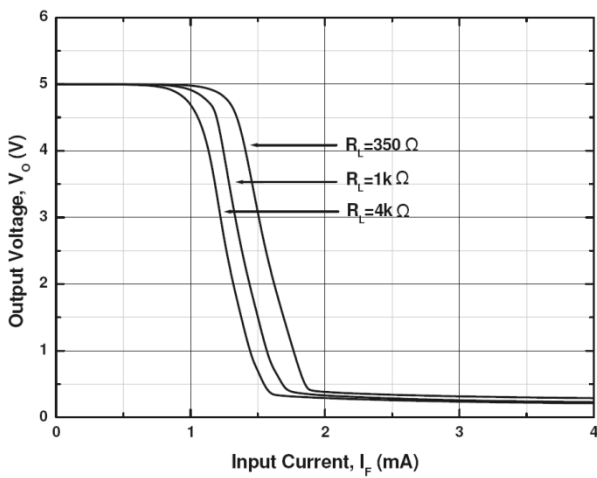


Figure 6. High Level Output Current vs Ambient Temperature

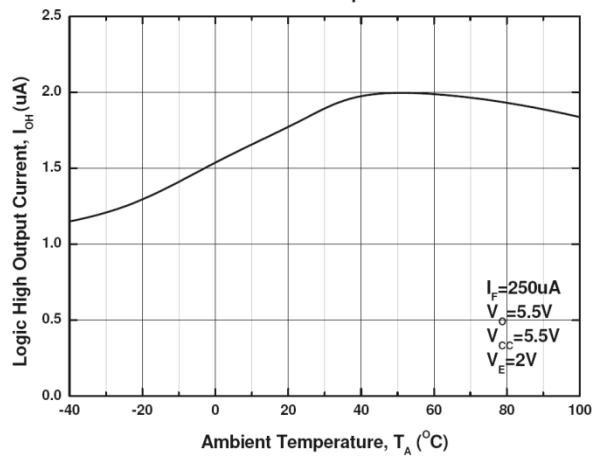


Figure 7. Propagation Delay vs. Temperature

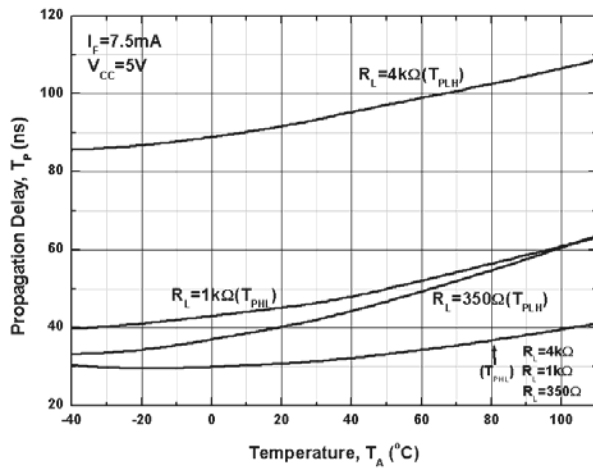


Figure 8. Pulse Width Distortion vs. Temperature

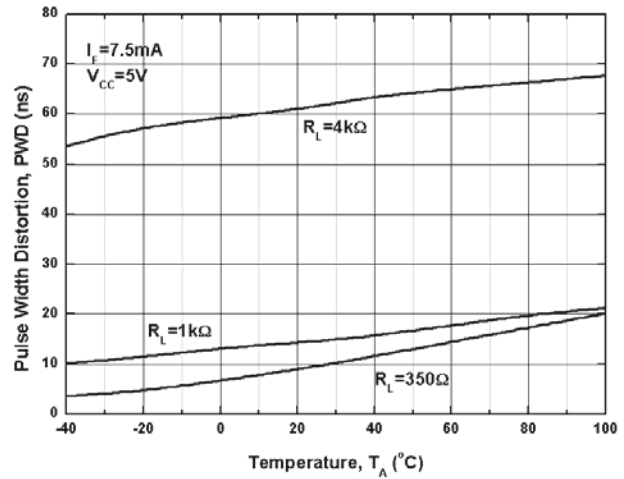
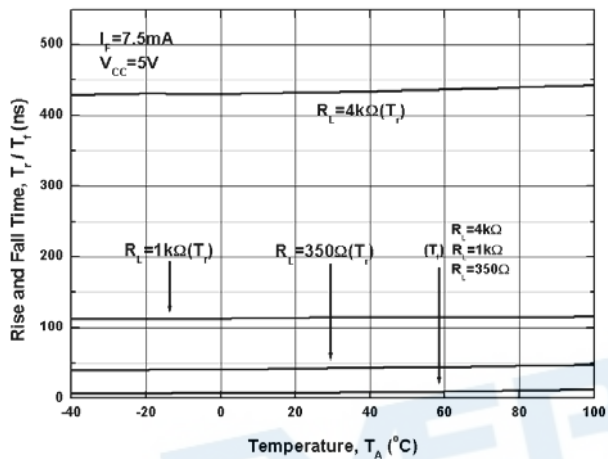


Figure 9. Rise and Fall Time vs. Temperature



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

Fig. 10 Test circuit and waveforms for t_{PHL} , t_{PLH} , t_r , and t_f

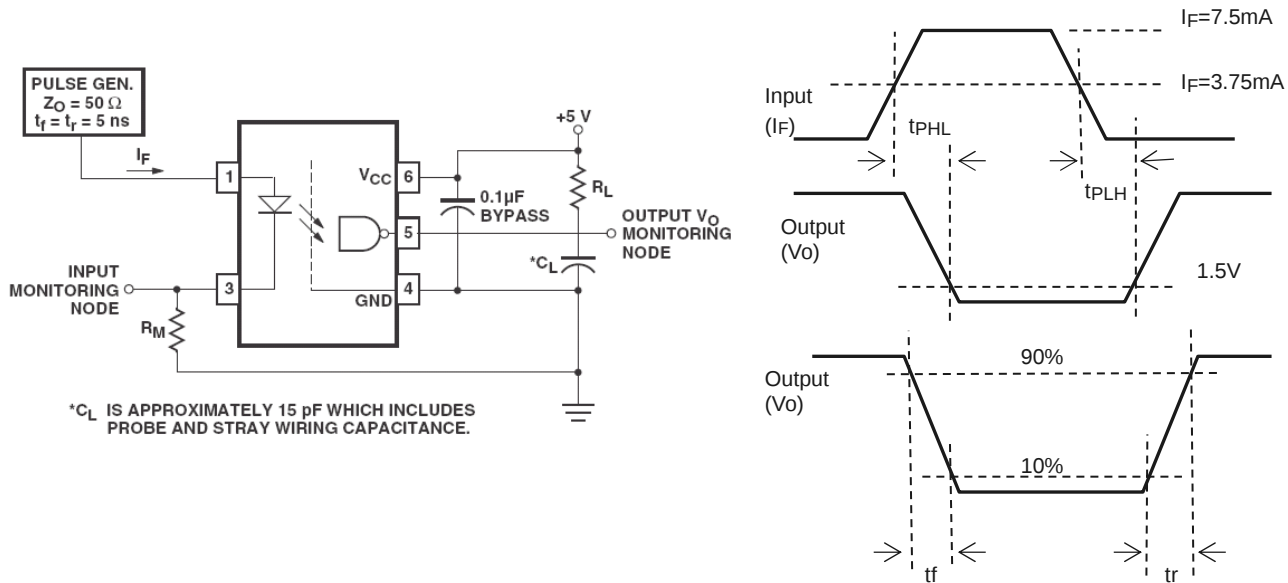
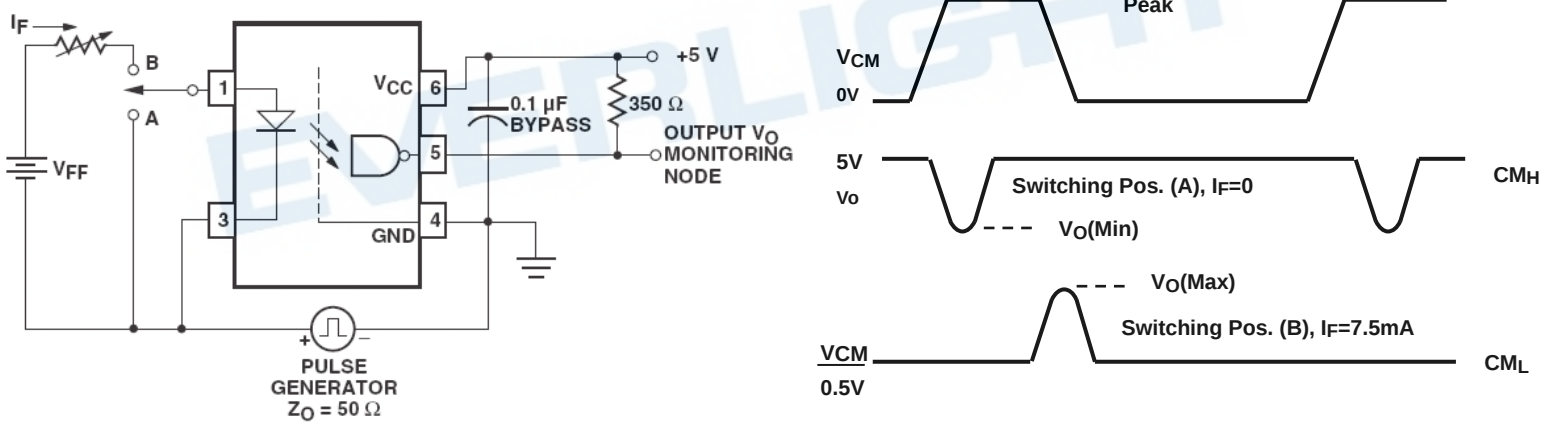


Fig. 11 Test circuit Common mode Transient Immunity



Order Information

Part Number

ELM6XX(Z)-V

Note

XX = Part no.(00, 01 or 11)

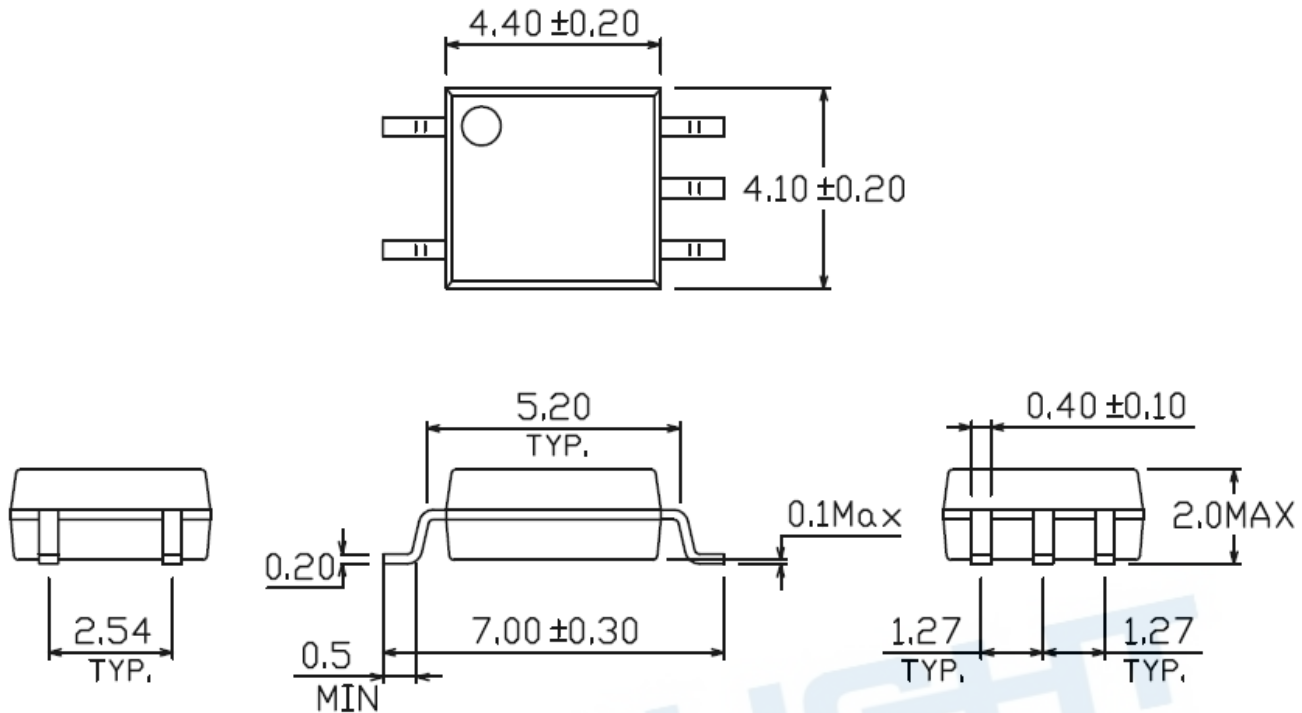
Z = Tape and reel option (TA, TB or none).

V = VDE (optional)

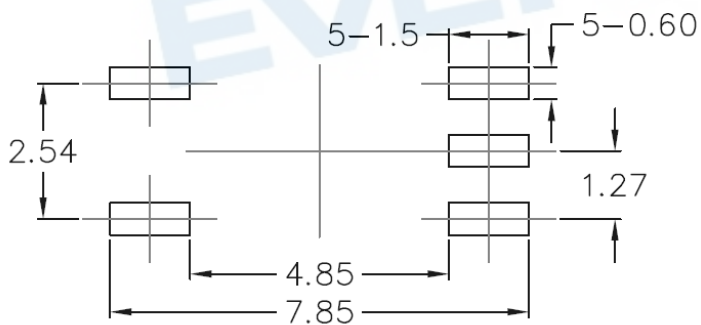
Option	Description	Packing quantity
None	Standard SMD option	100 units per tube
(TA)	Surface mount lead form + TA tape & reel option	3500 units per reel
(TB)	Surface mount lead form + TB tape & reel option	3500 units per reel

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Package Dimension
(Dimensions in mm)



Recommended pad layout for surface mount leadform



Device Marking



Notes

EL	denotes EVERLIGHT
M611	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

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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: BTPYYMMDDXXXXX

MSL等級 ← MSL-XX

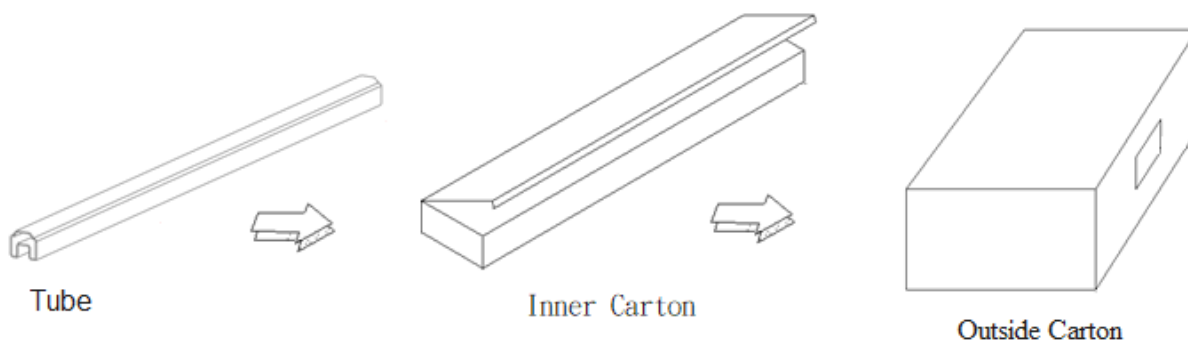
MADE IN XXXXXX

產地

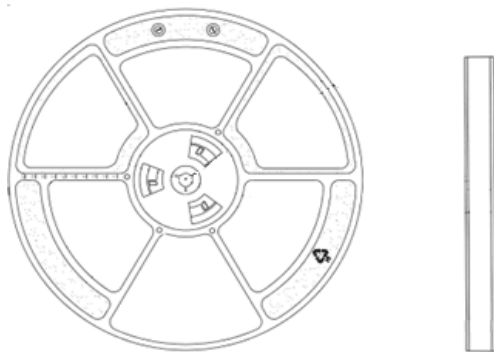
安規標示

QR Code

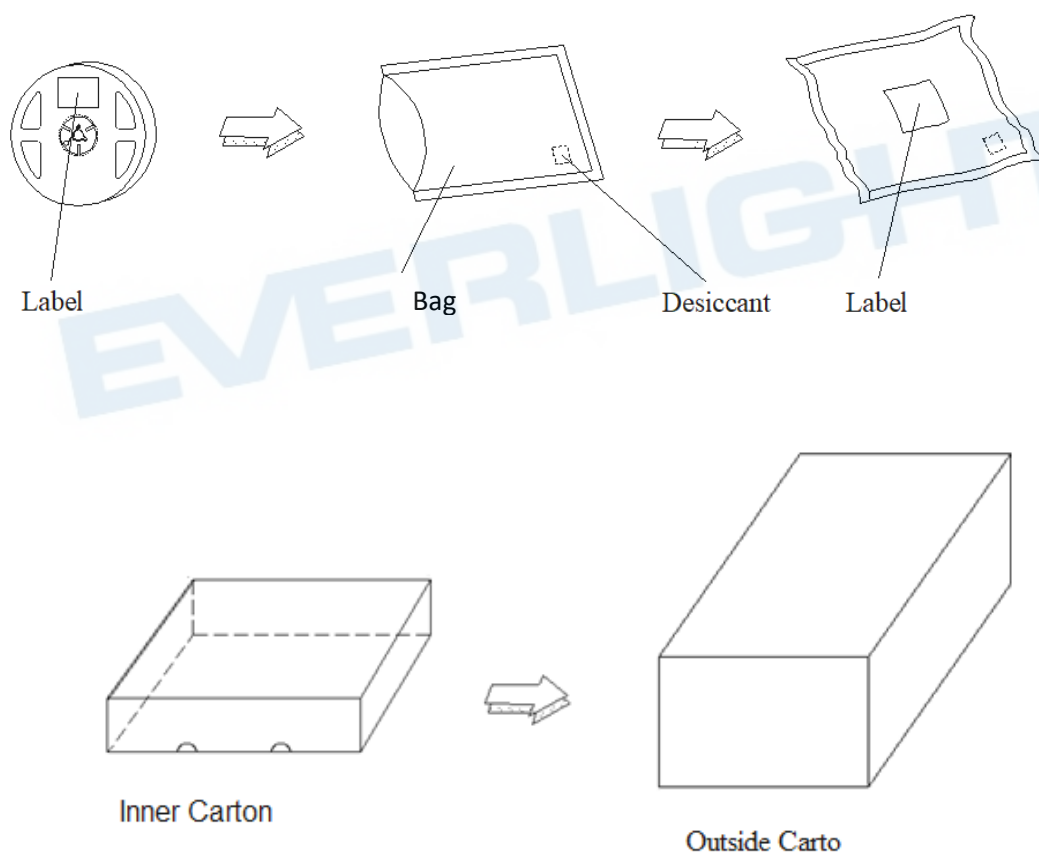
TUBE Dimension



Reel Dimension

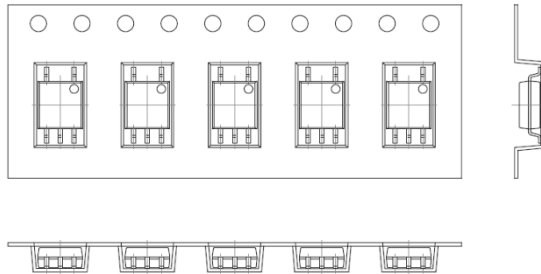


Moisture Resistant Packaging



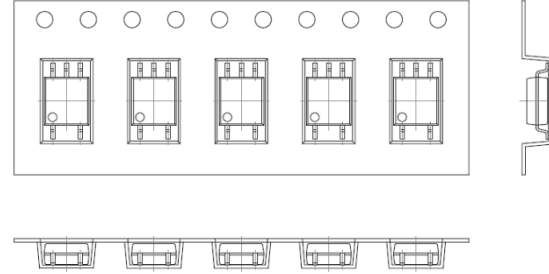
Tape & Reel Packing Specifications

Option TA



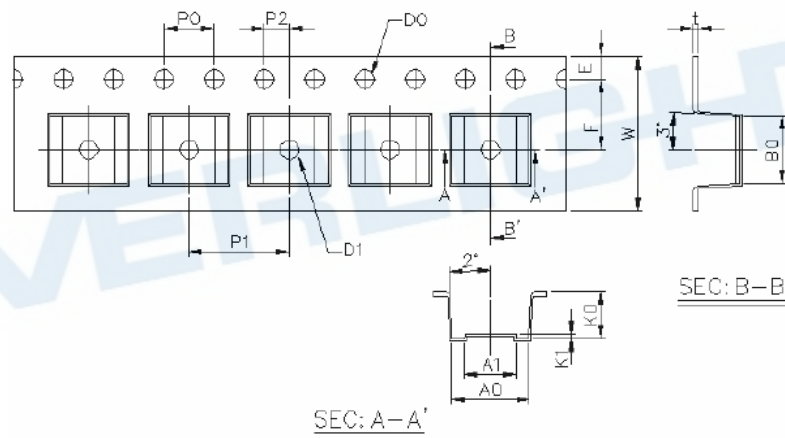
Direction of feed from reel

Option TB



Direction of feed from reel

Tape dimensions

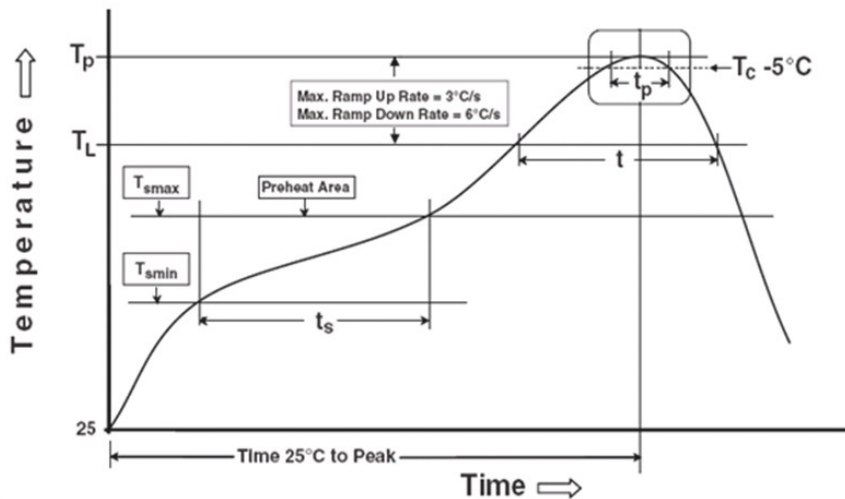


Dimension No.	A	B	Do	D1	E	F
Dimension(mm)	10.4±0.1	10.0±0.1	1.5±0.1	1.5±0.1	1.75±0.1	7.5±0.1
Dimension No.	Po	P1	P2	t	W	K
Dimension(mm)	4.0±0.1	12.0±0.1	2.0±0.1	0.4±0.1	16.0+0.3/ -0.1	4.5±0.1

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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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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