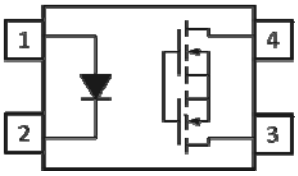
DATASHEET

GENERAL PURPOSE SOLID STATE RELAY
4PIN DIP TYPE FORM A SSR

Schematic



Pin Configuration
1. Anode
2. Cathode
3, 4. MOSFET

Features

- Compliance Halogens Free (Br < 900ppm, Cl < 900ppm, Br+Cl < 1500ppm)
- Normally open signal pole signal throw relay
- Low operating current
- 60 to 600V output withstand voltage
- Low on resistance
- Wide operating temperature range of -40°C to 85°C
- High isolation voltage between input and output (Viso = 5000 Vrms)
- The product itself will remain within RoHS compliant version
- Compliance with EU REACH
- Pb free
- UL 1577 + cUL approved (No. E214129)
- UL 508 + cUL approved (No. E348721)
- VDE approved (No. 40028391)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

Description

The EL406A, EL425A, EL440A and EL460A are solid state relays containing an AlGaAs infrared LEDs on the light emitting side (input side) optically coupled to a high voltage output detector circuit. The detector consists of a photovoltaic diode array and MOSFETs on the output side. The single channel configuration is equivalent to 1 form A EMR. They are packaged in 4 pin DIP and available in surface mount SMD option.

Applications

- Exchange equipment
- Measurement equipment
- FA/OA equipment
- Industrial controls
- Security

Absolute Maximum Ratings (T_A=25 °C, unless otherwise specified)

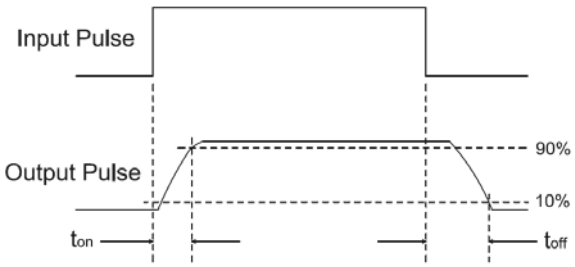
Parameter		Symbol	Rating				Unit
			EL406A	EL425A	EL440A	EL460A	
Input	Forward Current	I_F	50				mA
	Reverse Voltage	V_R	5				V
	Peak Forward Current*1	I_{FP}	1				A
	Power Dissipation	P_{in}	75				mW
Output	Break Down Voltage	V_L	60	250	400	600	V
	Continuous Load Current	I_L	550	150	120	50	mA
	Pulse Load Current*2	I_{LPeak}	1.2	0.5	0.3	0.15	A
	Power Dissipation	P_{out}	500				mW
Total Power Dissipation		P_T	550				mW
Isolation Voltage*3		V_{iso}	5000				Vrms
Storage Temperature		T_{STG}	-40 to 125				°C
Operating Temperature		T_{OPR}	-40 to 85				°C
Soldering Temperature*4		T_{SOL}	260				°C

Notes:
*1. f =100Hz, Duty Cycle = 0.1%
*2. A connection: 100ms (1 shot), V_L = DC
*3. 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.
*4. For 10 seconds

Electro-Optical Characteristics (T_A=25 °C)

	Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage		V_F	I_F = 10mA	-	1.18	1.5	V
	Reverse Current		I_R	V_R = 5V	-	-	1	μA
Output	Off State leakage Current		I_{leak}	I_F = 0mA, V_L = Max.	-	-	1	μA
	On Resistance	EL406A	$R_{d(ON)}$	I_F = 10mA, I_L = Max. t = 1s	-	0.7	2.5	Ω
		EL425A			-	6.5	15	
		EL440A			-	20	30	
		EL460A			-	40	70	
	Output Capacitance	EL406A	C_{out}	V_L = 0V, f = 1MHz	-	85	-	pF
		EL425A			-	60	-	
		EL440A			-	45	-	
		EL460A			-	30	-	
Transfer Characteristics	LED turn on Current	EL406A	$I_{F(on)}$	I_L = Max.	-	2.9	5	mA
		EL425A			-	2.84	5	
		EL440A			-	2.92	5	
		EL460A			-	2.38	5	
	LED turn off current	EL406A	$I_{F(off)}$	I_L = Max.	0.4	2.74	-	mA
		EL425A			0.4	2.72	-	
		EL440A			0.4	2.78	-	
		EL460A			0.4	2.26	-	
	Turn On Time	EL406A	T_{on}	I_F = 10 mA, I_L = Max. R_L = 200Ω ,	-	1.4	3	ms
		EL425A			-	1.2	3	
		EL440A			-	0.4	3	
		EL460A			-	1.4	3	
	Turn Off Time	EL406A	T_{off}		-	0.05	0.5	ms
		EL425A				0.05	0.5	
		EL440A				0.05	0.5	
		EL460A				0.05	0.5	
	Isolation Resistance		R_{I-O}	V_{I-O} = 500V DC	5×10^{10}	-	-	Ω
	Isolation Capacitance		C_{I-O}	V = 0V, f = 1MHz	-	1.5	-	pF

Turn on/Turn off Time



Typical Electro-Optical Characteristics Curves

Figure 1-1. Load current vs Ambient temperature

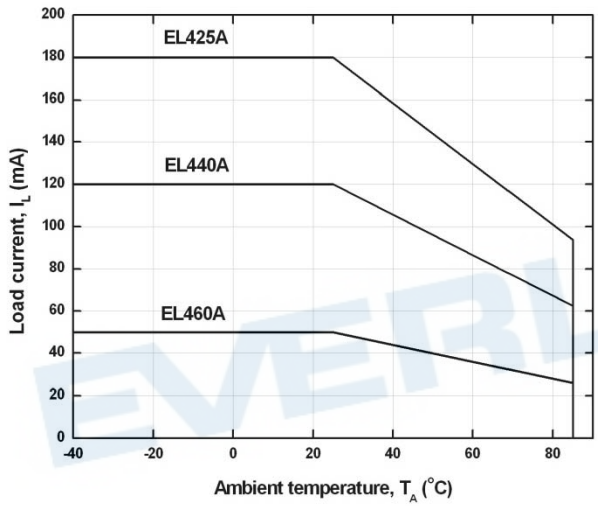


Figure 1-2. Load current vs Ambient temperature

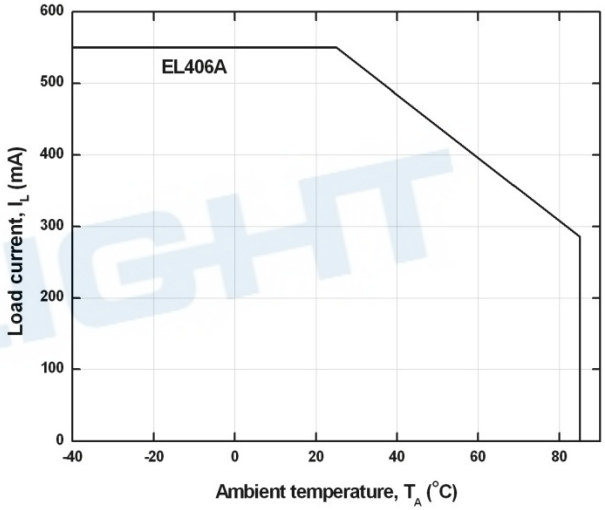


Figure 2-1. On Resistance vs Ambient Temperature

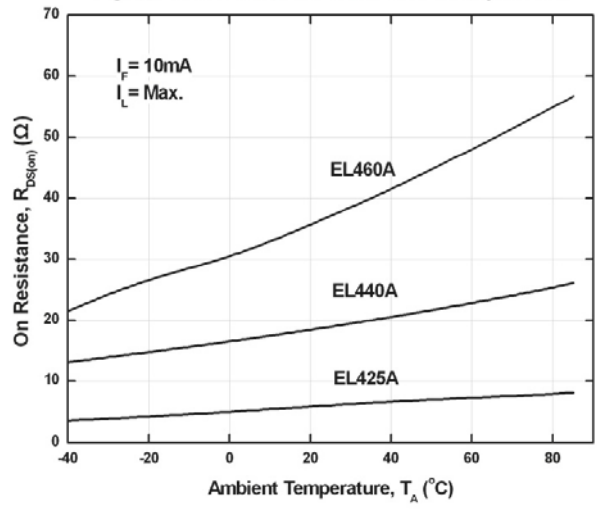


Figure 2-2. On Resistance vs Ambient Temperature

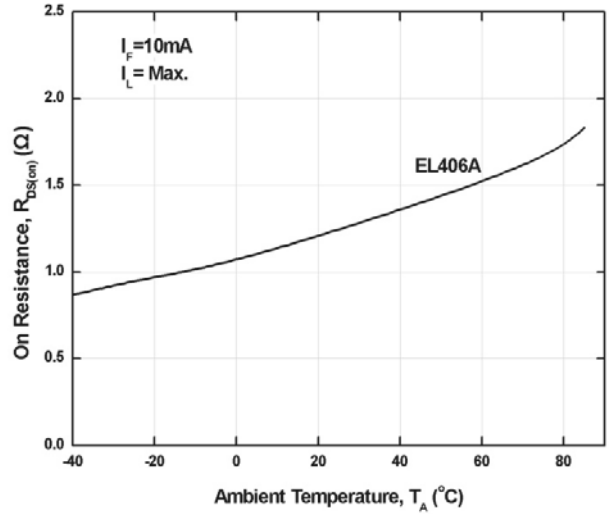


Figure 3. Switching Time vs Ambient Temperature

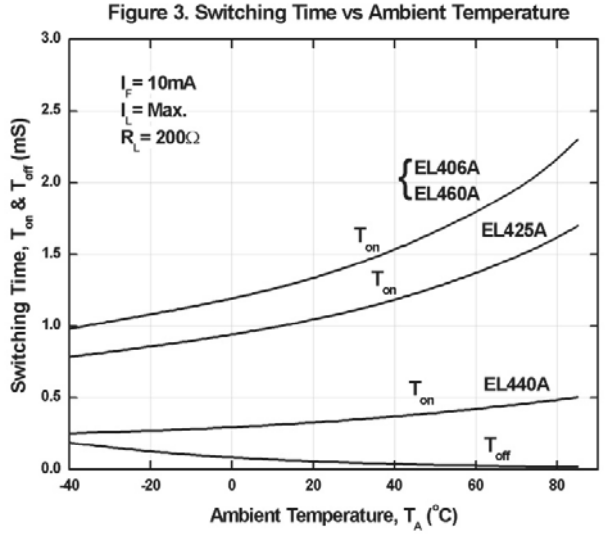


Figure 4-1. Turn On Time vs LED Forward Current

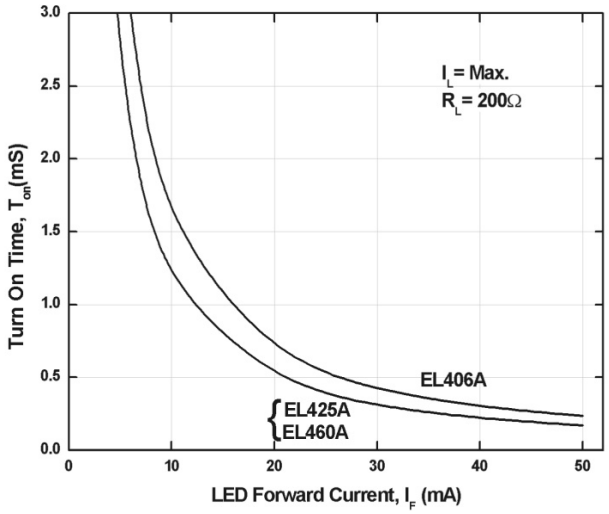


Figure 4-2. Turn On Time vs LED Forward Current

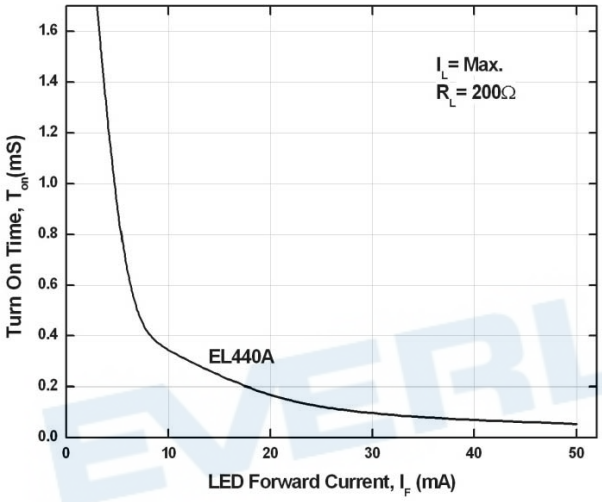


Figure 5. Turn Off Time vs LED Forward Current

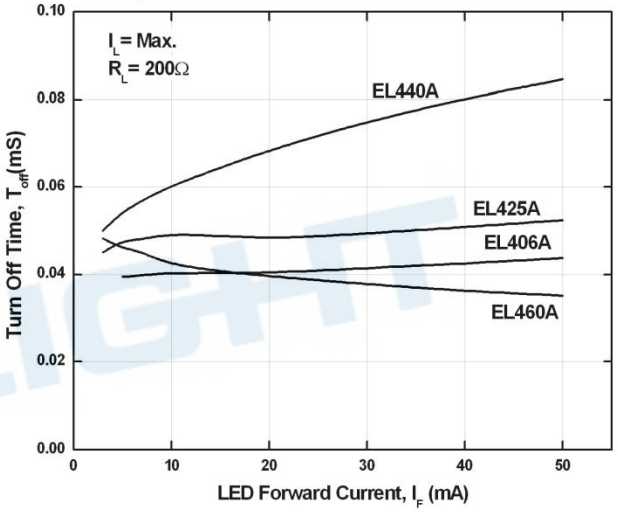


Figure 6. Normalized LED Operate on Current vs Ambient Temperature

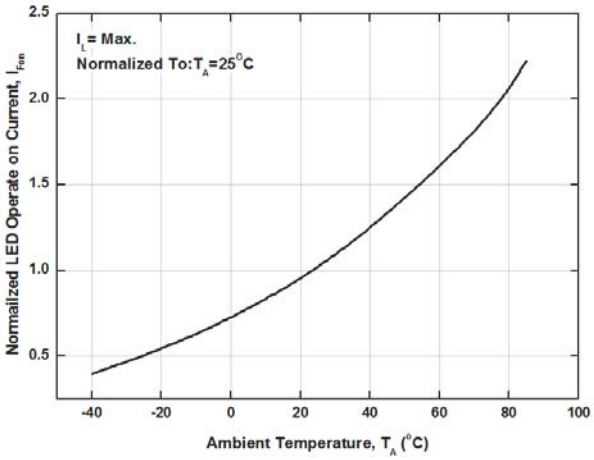


Figure 7. Normalized LED Turn off Current vs Ambient Temperature

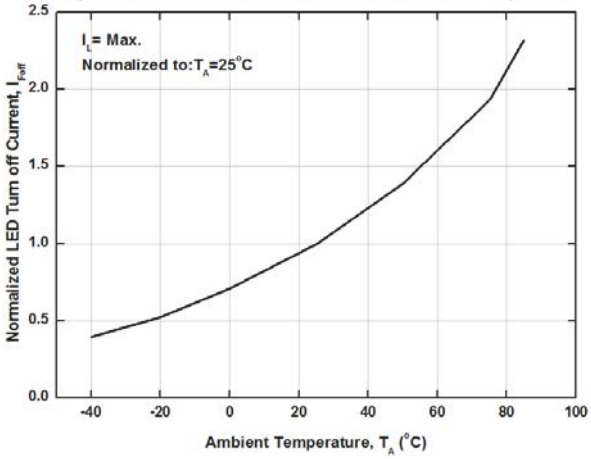


Figure 8. LED Dropout Voltage vs Ambient Temperature

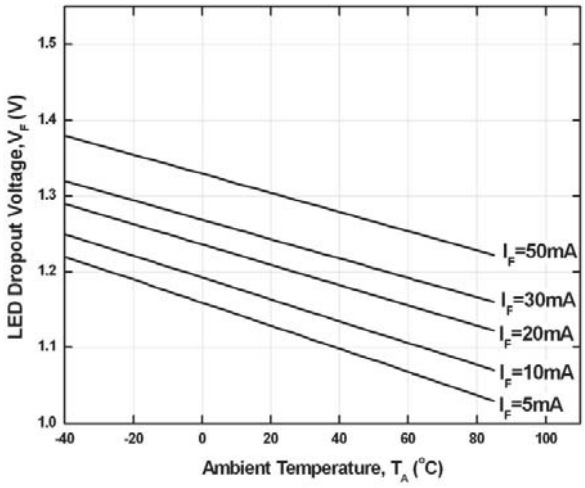


Figure 9-1. Load Voltage vs Load Current

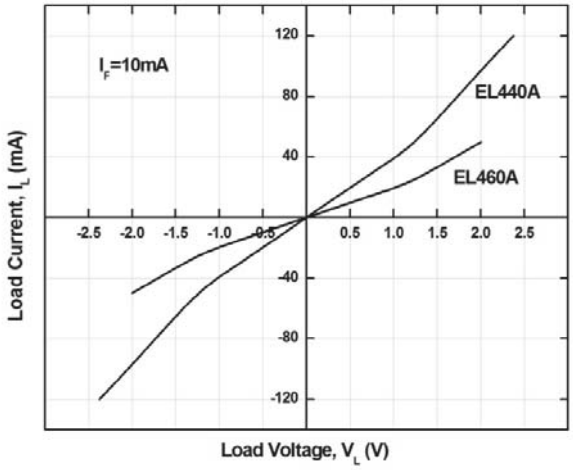


Figure 9-2. Load Voltage vs Load Current

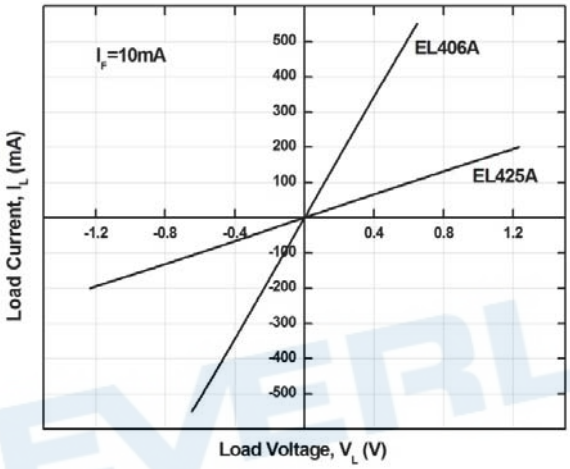


Figure 10. Off State Leakage Current vs Load Voltage

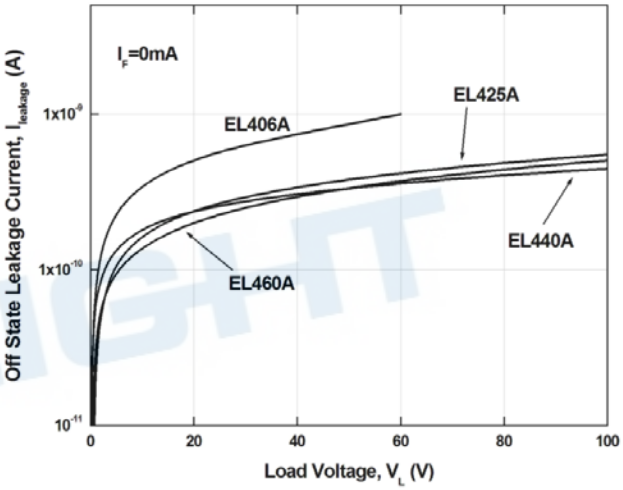
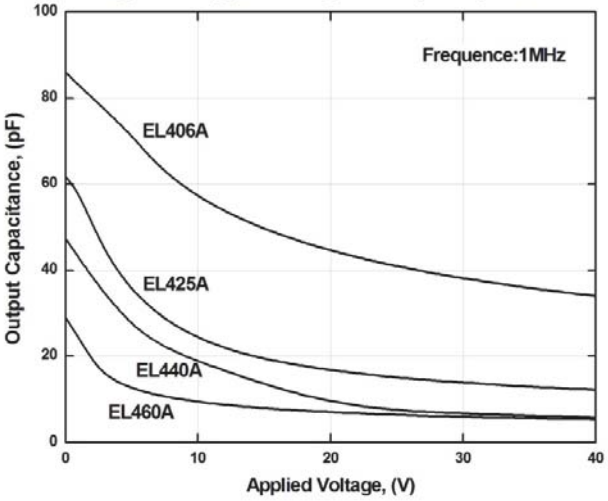


Figure 11. Applied Voltage VS Output Capacitance



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

Order Information

Part Number

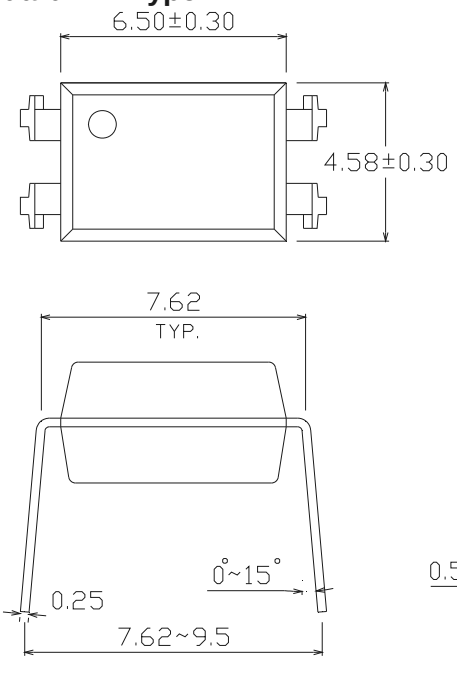
EL4XXA(Y)(Z)-V

Note:
XX = Part No. (06, 25, 40 or 60)
Y = Lead form option (S1, or none)
Z = Tape and reel option (TA, TB, TU, TD or none).
V = VDE safety approved option

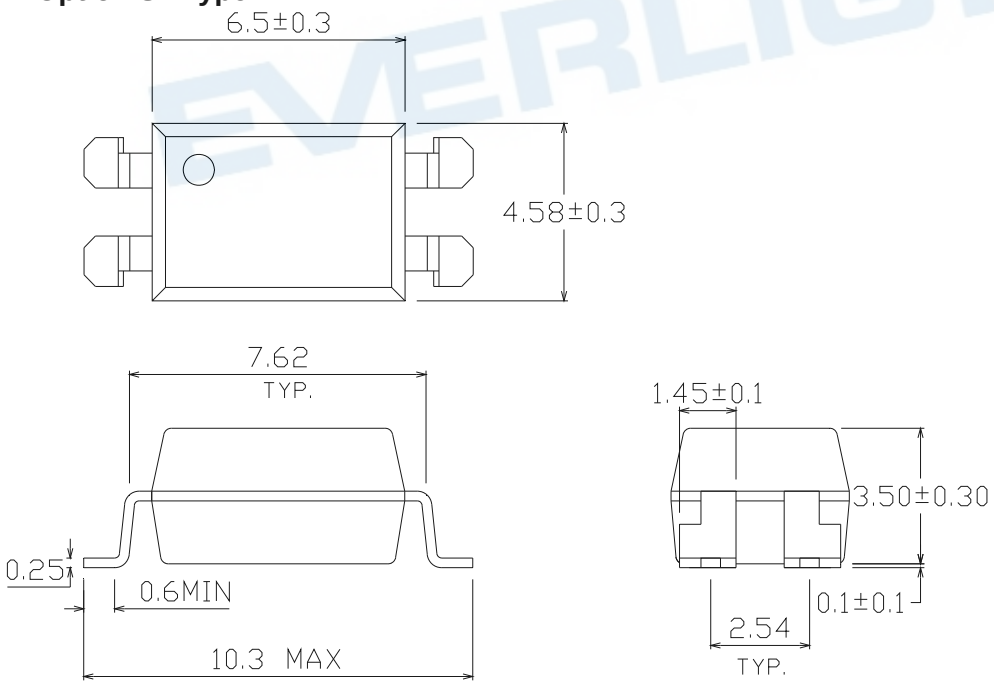
Option	Description	Packing quantity
None	Standard DIP-4	100 units per tube
S1 (TA)	Surface mount lead form (low profile) + TA tape & reel option	1000 units per reel
S1 (TB)	Surface mount lead form (low profile) + TB tape & reel option	1000 units per reel
S1 (TU)	Surface mount lead form (low profile)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

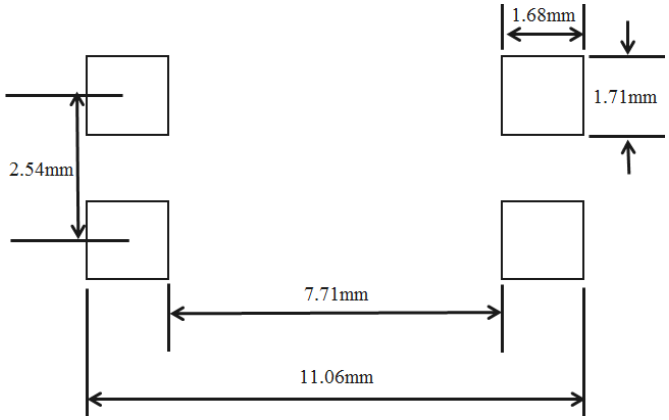


Option S1 Type



Recommended Pad Layout for Surface Mount Leadform

4Pin SMD

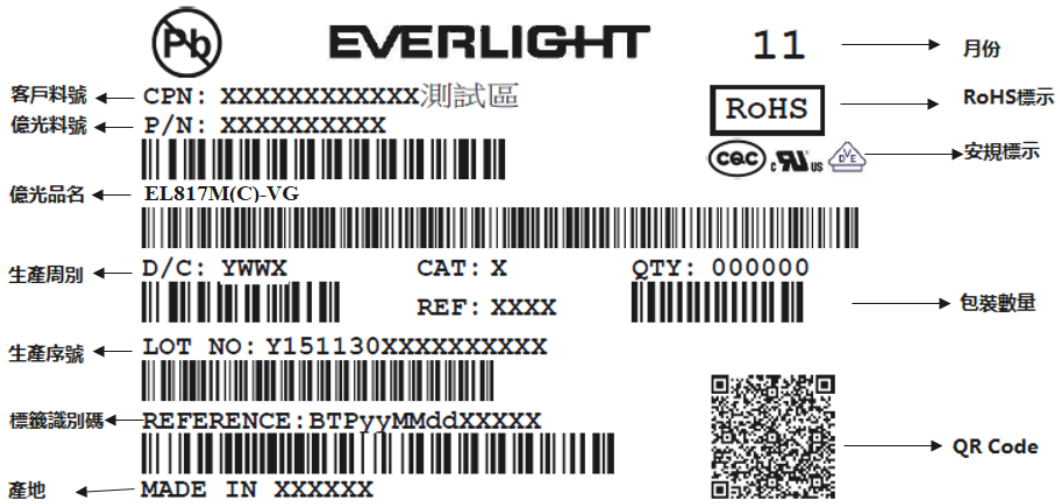


Device Marking

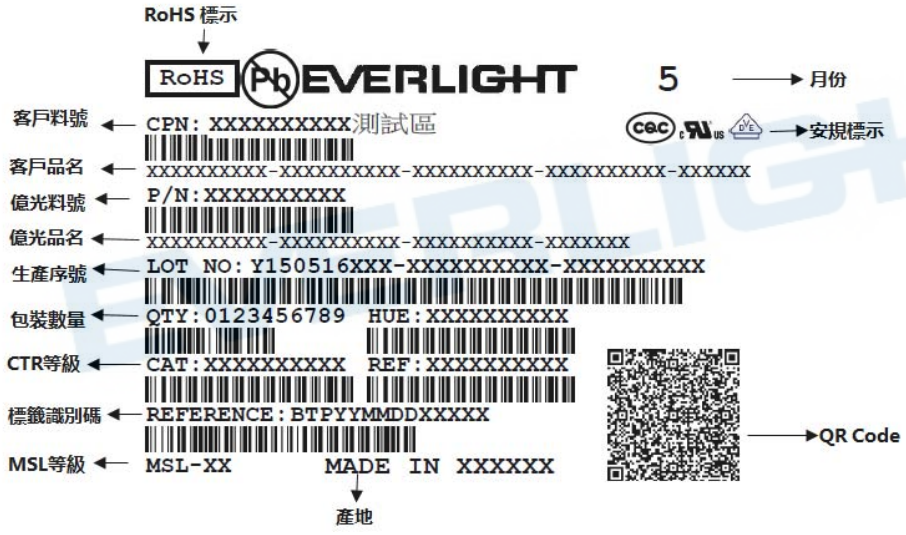
Notes

EL	denotes Everlight
460A	denotes Part Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE option

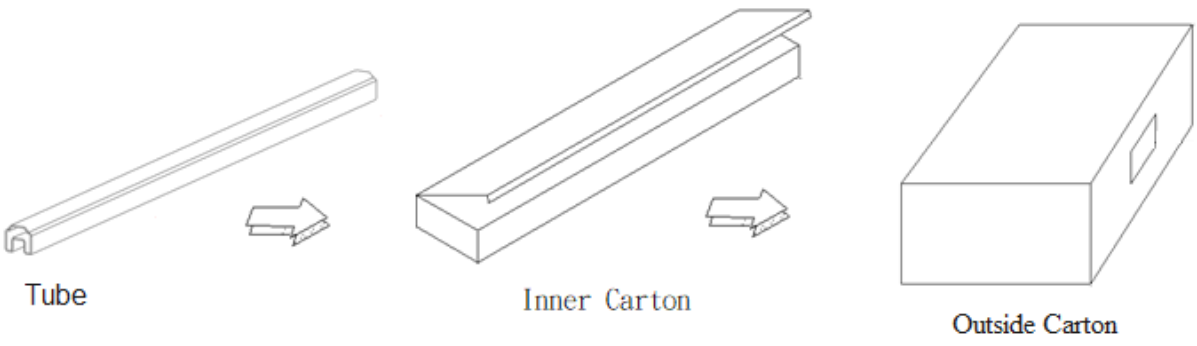
Label form



or

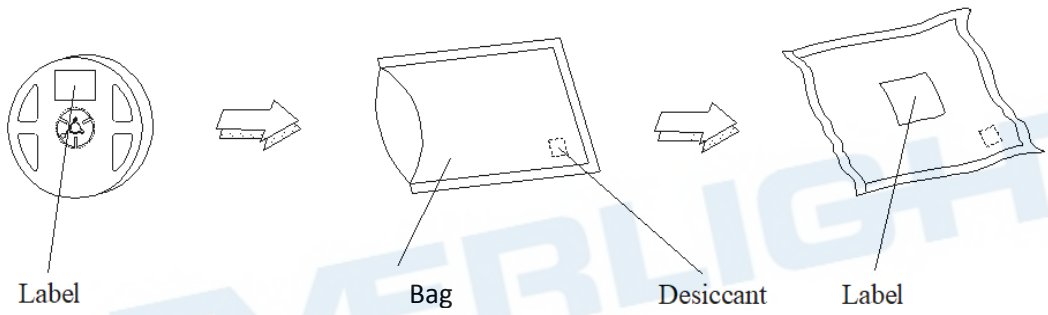


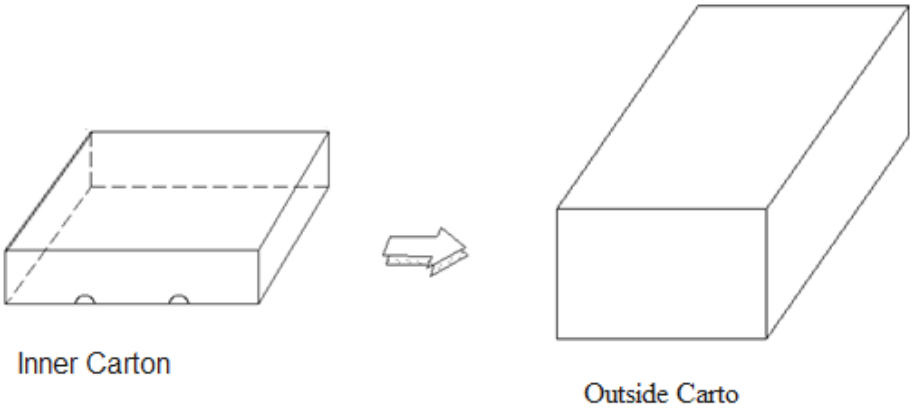
TUBE Dimension



Reel Dimension

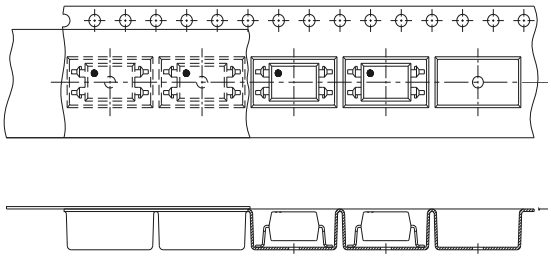
Moisture Resistant Packaging



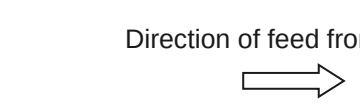


Tape & Reel Packing Specifications

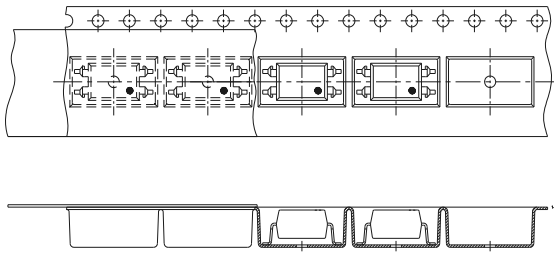
Option TA



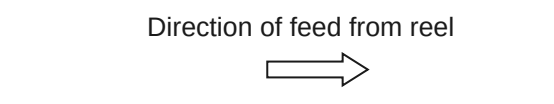
Direction of feed from reel

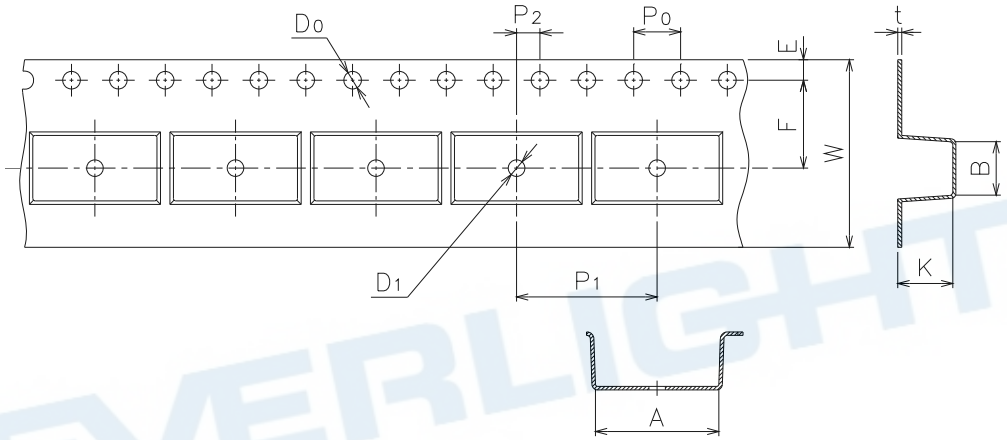


Option TB



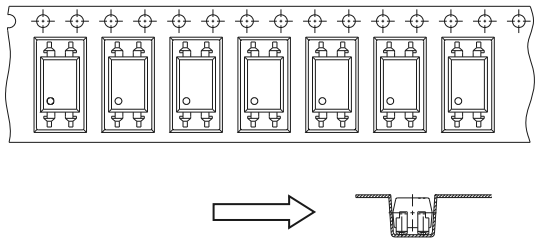
Direction of feed from reel





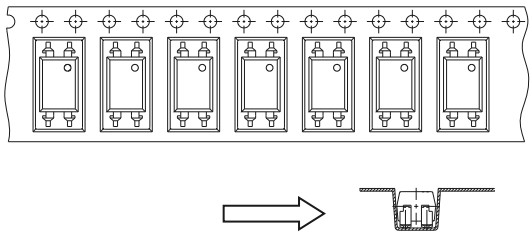
Dimension No.	A	B	Do	D1	E	F
Dimension (mm) S1	10.7±0.1	4.65±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.5±0.1
Dimension No.	Po	P1	P2	t	W	K
Dimension (mm) S1	4.0±0.1	12.0±0.1	2.0±0.1	0.4±0.1	16.0±0.3	3.90±0.1

Option TD



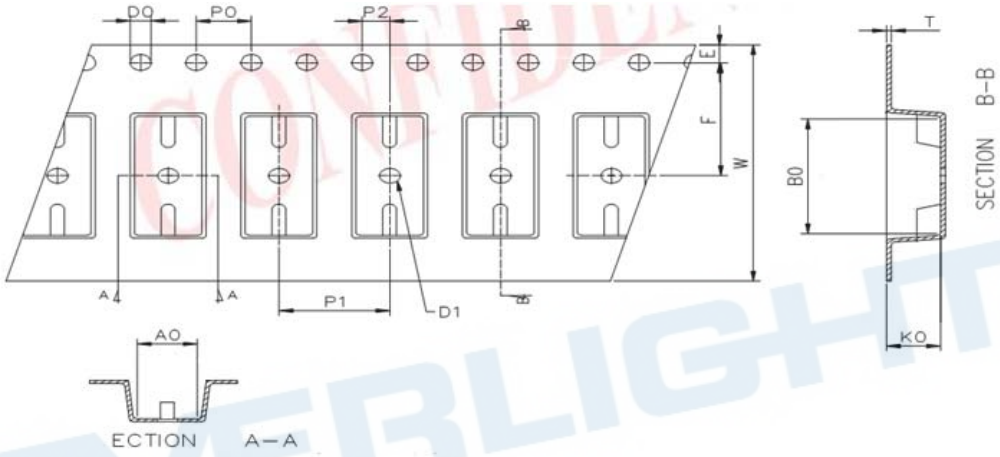
Direction of feed from reel

Option TU



Direction of feed from reel

Tape Dimensions

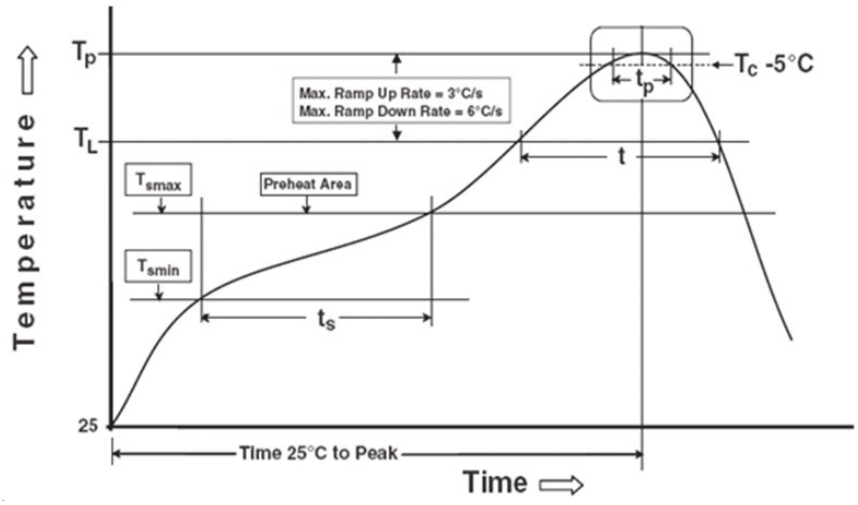


Dimension No.	**Ao**	**Bo**	**Do**	**D1**	**E**	**F**
Dimension(mm) S1	4.90±0.1	10.40±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.50±0.1
Dimension No.	**Po**	**P1**	**P2**	**t**	**W**	**Ko**
Dimension(mm) S1	4.00±0.1	8.00±0.1	2.00±0.1	0.40±0.1	16.00±0.3	4.00±0.1

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.
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.