

## Technical Data Sheet

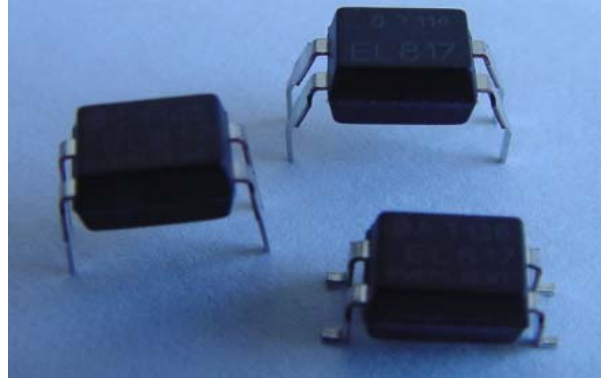
### Photo coupler

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### EL816 Series

#### Features:

- Current transfer ratio  
(CTR:MIN.50% at  $I_F = 5\text{mA}$ ,  $V_{CE} = 5\text{V}$ )
- High isolation voltage between input and output ( $V_{iso} = 5000 \text{Vrms}$ )
- Compact dual-in-line package  
EL816:1-channel type
- Pb free
  
- UL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved (No. 202236/202225)
- NEMKO approved (No. P00102385/P02101854)
- DEMKO approved (No. 310352-05/311822-01)
- FIMKO approved (No. FI 16763 A3)
- CSA approved (No. 1143601)
- BSI approved (No. 8592 / 8593)
  
- Options available:
  - Leads with 0.4"(10.16mm) spacing (M Type)
  - Leads bends for surface mounting (S Type)
  - Tape and Reel of Type I for SMD(Add"-TA" Suffix)
  - Tape and Reel of Type II for SMD(Add"-TB" Suffix)
  - The tape is 16mm and is wound on a 33cm reel



#### Description

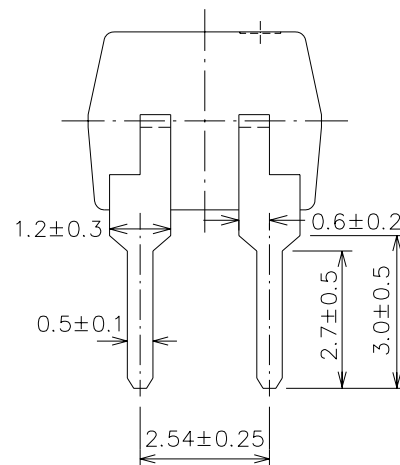
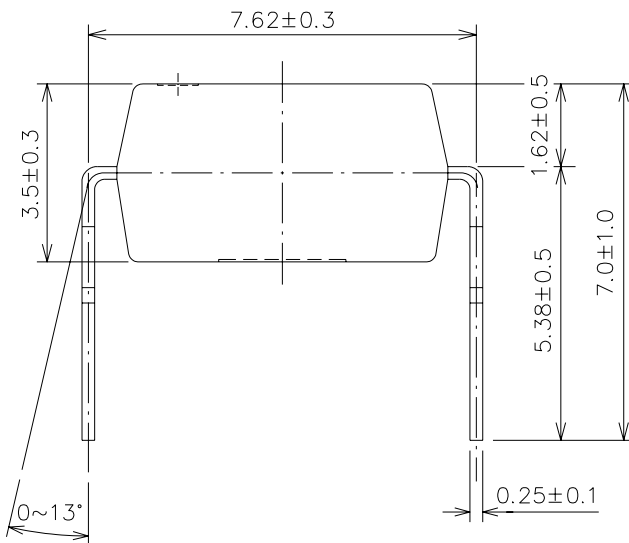
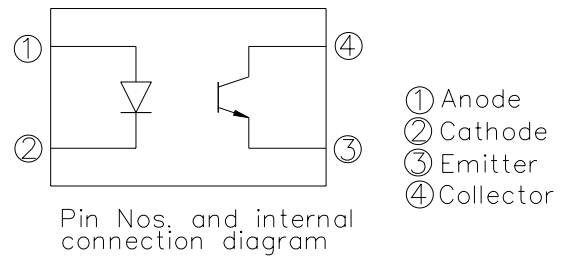
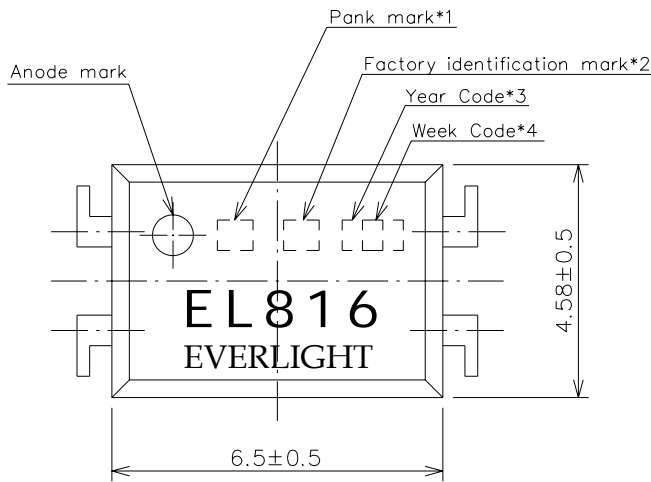
The EL816 series contains an infrared emitting diode optically coupled to a phototransistor. It is packaged in a 4-pin DIP package and available in wide-lead spacing and SMD option.

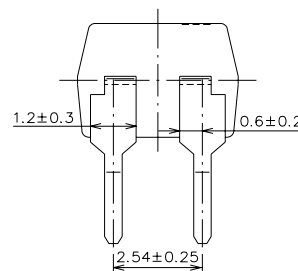
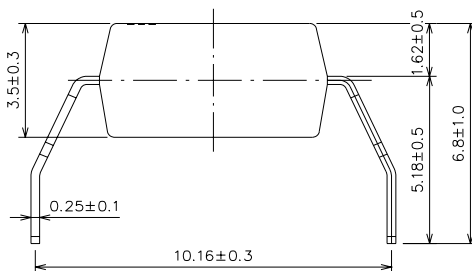
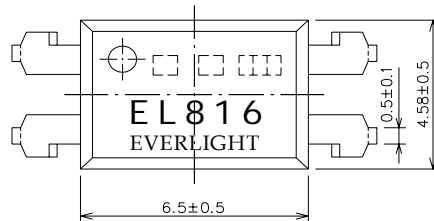
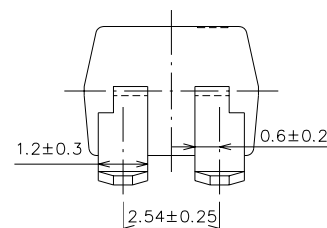
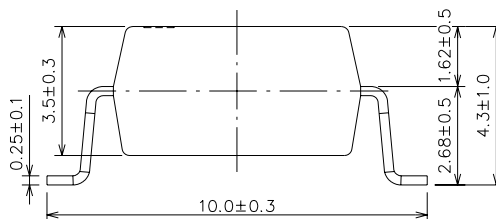
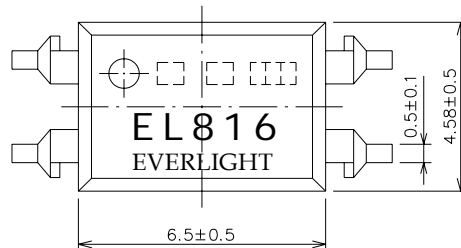
#### Applications

- Computer terminals
- System appliances, measuring instruments
- Registers, copiers, automatic vending machines
- Cassette type recorder
- Electric home appliances, such as fan heaters, etc.
- Signal transmission between circuits of different potentials and impedances

**Technical Data Sheet**  
**Photo coupler**
**EL816 Series**
**Device Selection Guide**

Part No.	Chip Material	
	IR	PT
EL816	GaAs	Silicon

**Package Dimensions**


**Technical Data Sheet**  
**Photo coupler**
**EL816 Series**
**Package Dimensions**
**M Type**

**S Type**

**Notes:**

- |   |   |
|---|---|
| 1. Rank shall be or shall not be marked                   | 6. Specifications are subject to change |
| 2. Factory code shall be marked<br>(T: Taiwan / C: China) | 7. without notice                       |
| 3. Year date code   | 8. External creepage $\geq$ 7.6 mm      |
| 4. 2-digit work week                                      | External clearance $\geq$ 7.6 mm        |
| 5. All dimensions are in millimeters                      | 9. Internal clearance $\geq$ 0.4 mm     |

**Technical Data Sheet**  
**Photo coupler**
**EL816 Series**
**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	70	mW
Output	Collector Power Dissipation	$P_C$	150	mW
	Collector Current	$I_C$	50	mA
	Collector-Emitter Voltage	$V_{CEO}$	80	V
	Emitter-Collector Voltage	$V_{ECO}$	6	V
Total Power Dissipation		$P_{tot}$	200	mW
* <sup>1</sup> Isolation Voltage		$V_{iso}$	5000	$V_{rms}$
Operating Temperature		$T_{opr}$	-55~+110	°C
Storage Temperature		$T_{stg}$	-55~+125	°C
* <sup>2</sup> Soldering Temperature		$T_{sol}$	260	°C

\*<sup>1</sup> AC for 1 minute, R.H.= 40 ~ 60% R.H.

-Isolation voltage shall be measured using the following method.

- (1) Short between anode and cathode on the primary side and between collector, emitter and base on the secondary side.
- (2) The isolation voltage tester with zero-cross circuit shall be used.
- (3) The waveform of applied voltage shall be a sine wave

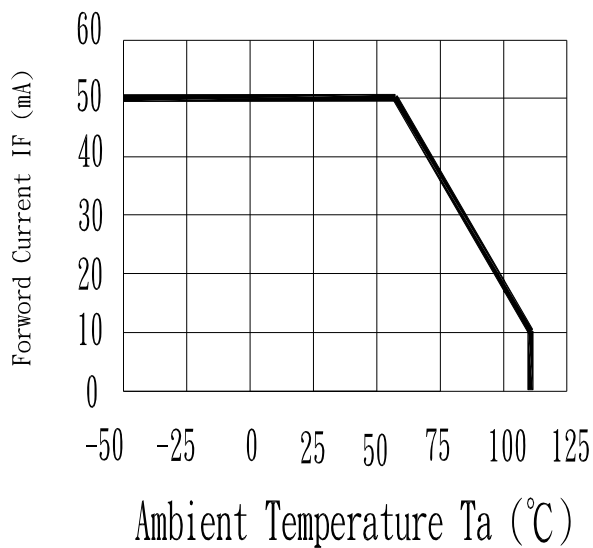
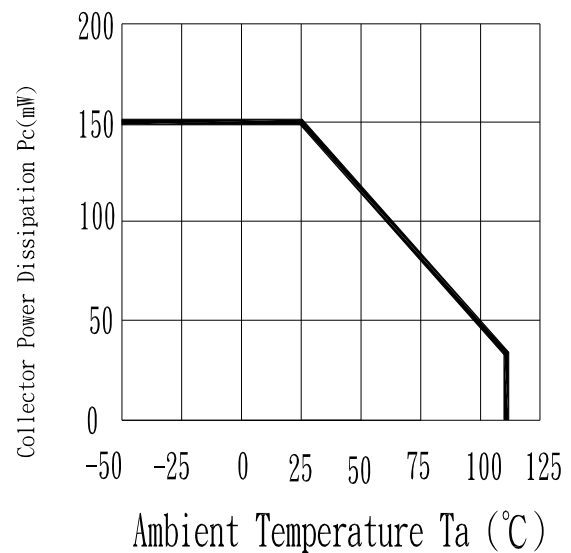
\*<sup>2</sup> For 10 seconds

**Technical Data Sheet**  
**Photo coupler**
**EL816 Series**
**(Ta=25°C)**
**Electro-Optical Characteristics**

Parameter		Symbol	Min.	Typ.	Max.	Unit	Condition
Input	Forward Voltage	$V_F$	-	1.2	1.4	V	$I_F=20mA$
	Reverse Current	$I_R$	-	-	10	uA	$V_R=4V$
	Terminal Capacitance	$C_t$	-	30	250	pF	$V=0, f=1kHz$
Output	Collector Dark current	$I_{CEO}$	-	-	100	nA	$V_{CE}=20V$
	Collector-Emitter Breakdown Voltage	$BV_{CEO}$	80	-	-	V	$I_C=0.1mA$
Transfer Characteristics	Current Transfer Ratio	CTR	50	-	600	%	$I_F=5mA, V_{CE}=5V$
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	0.1	0.2	V	$I_F=20mA, I_C=1 mA$
	Isolation Resistance	$R_{ISO}$	$5 \times 10^{10}$	$10^{11}$	-	$\Omega$	DC500V, 40~60% R.H.
	Floating Capacitance	$C_f$	-	0.6	1.0	pF	$V=0, f=1MHz$
	Cut-off Frequency	$f_c$	-	80	-	kHz	$V_{CE}=5V, I_C=2 mA$ $R_L=100\Omega, -3dB$
	Rise time	$t_r$	-	4	18	$\mu s$	$V_{CE}=2V$ $I_C=2mA, R_L=100\Omega$
	Fall time	$t_f$	-	3	18	$\mu s$	

**Technical Data Sheet**  
**Photo coupler**
**EL816 Series**
**Supplement**
**Rank Table of Current Transfer Ratio CTR**

Model No.	Rank mark	CTR (%)	Condition
EL816	---	50 to 600	$I_F = 5 \text{ mA}$ $V_{CE} = 5 \text{ V}$ $T_a = 25^\circ\text{C}$
EL816(A)	A	50 to 160	
EL816(B)	B	130 to 260	
EL816(C)	C	200 to 400	
EL816(D)	D	300 to 600	
EL816(X)	X	100 to 200	
EL816(Y)	Y	150 to 300	

**Fig. 1 Forward Current vs. Ambient Temperature**

**Fig. 2 Collector Power Dissipation vs. Ambient Temperature**


Technical Data Sheet  
Photo coupler

**EL816 Series**

Fig.3 Collector-emitter Saturation Voltage vs. Forward Current (Ta=25°C)

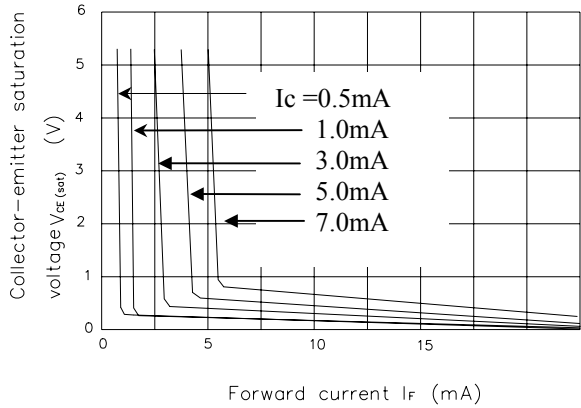


Fig.4 Current transfer Ratio vs. Forward Current

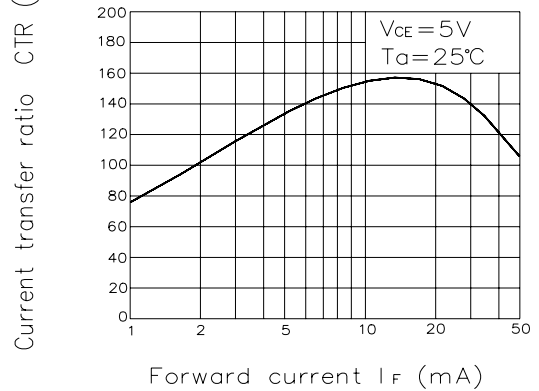


Fig.5 Forward Current vs. Forward Voltage

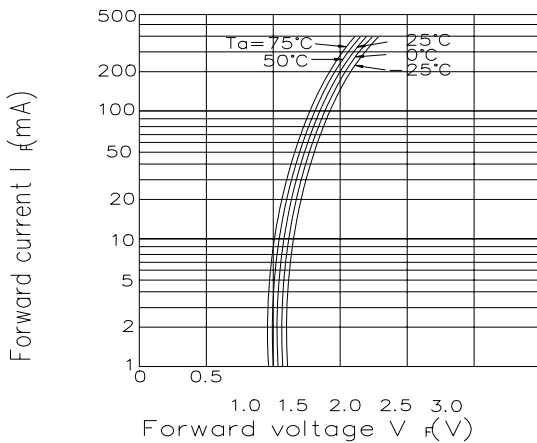


Fig.6 Collector Current vs. Collector-emitter Voltage (Ta=25°C)

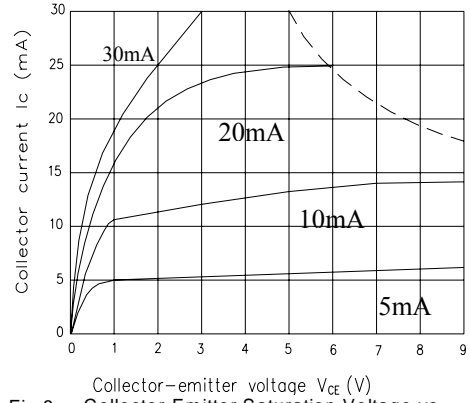


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

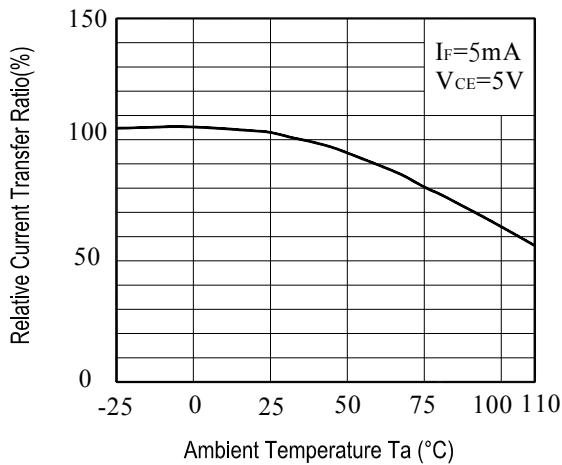
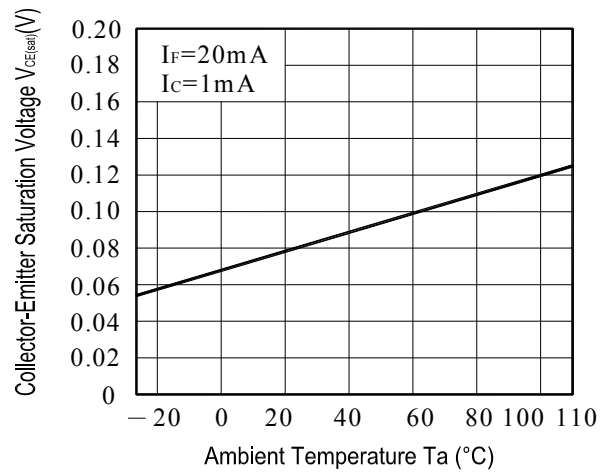


Fig.8 Collector-Emitter Saturation Voltage vs. Ambient Temperature



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**Photo coupler**

**EL816 Series**

Fig.9 Collector Dark Current vs. Ambient Temperature

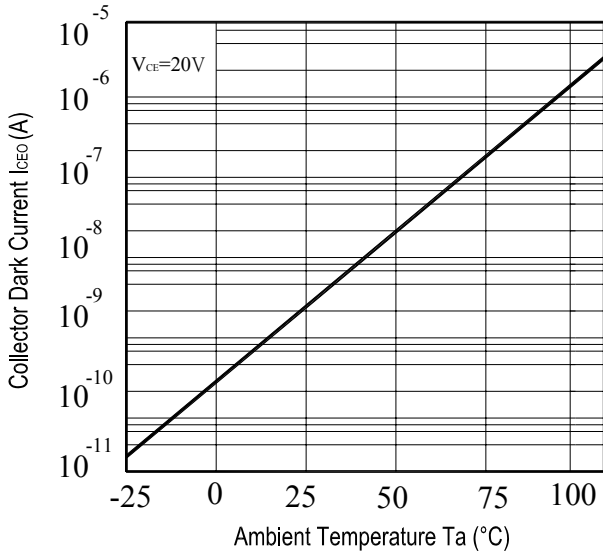


Fig.10 Response Time vs. Load Resistance

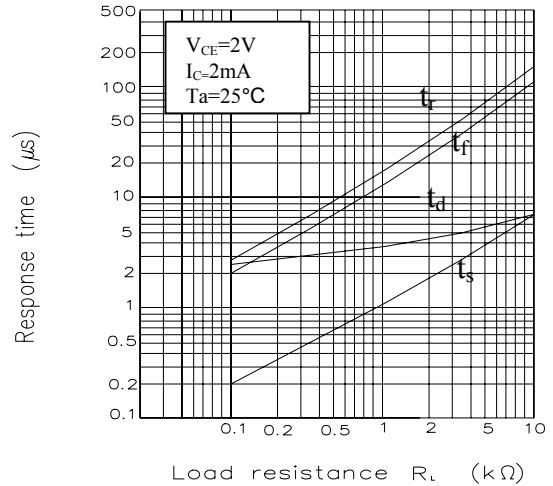
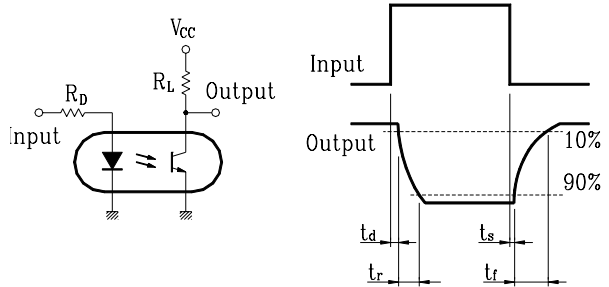
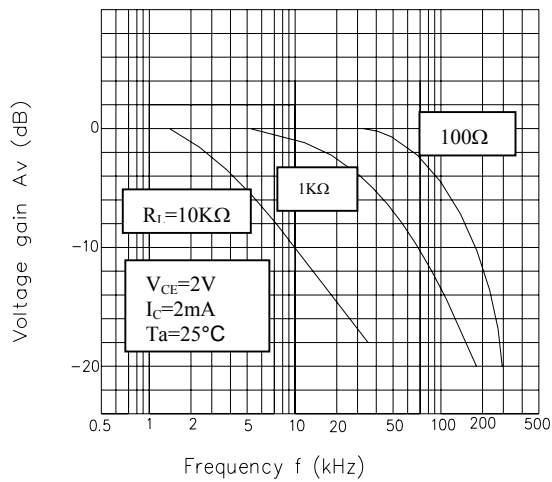


Fig.11 Frequency Response





**Technical Data Sheet**  
**Photo coupler**
**EL816 Series**
**RELIABILITY PLAN**

- The reliability of products shall be satisfied with items listed below.

Confidence level : 90 % , LTPD : 10 %

Classification	Test Item	Description & Condition	(Acc.) Sample	Failure Criteria	Reference Standard
<b>Endurance test</b>	Operation Life *	Ta = 25 ± 3°C IR: If = 50 mA Pt: Pc = 130 mW ( Vf=1.4v) , 1000 hrs	0 / 22	CTR shift > 1.2 Vf > U* 1.0 Ir > U * 1.0 Vce(sat) > U*1.0 Bvceo < L*1.0 Bveco < L*1.0 L :Low Spec.Limit U : Up Spec.	MIL-S-750 : 1026 MIL-S-883 : 1005 JIS C 7021 : B-1
	High Temperature / High Humidity Reverse Bias (H3TRB)	Ta = 85 ± 3°C , Humi. = 85 % rh Pt: 80% * Vce (max rating) , 1000 hrs	0 / 22		JIS C 7021 : B-11
	High Temperature Reverse Bias (HTRB)	Ta = 105 ± 3°C Pt: 100% * Vce (Max rating) , 1000 hrs	0 / 22		JIS C 7021 : B-8
	Low Temperature Storage	Ta = -50 ± 3°C , 1000 hrs	0 / 22		JIS C 7021 : B-12
	High Temperature Storage	Ta = 125 ± 3°C , 1000 hrs	0 / 22		JIS C 7021 : B-10 MIL-S-883 : 1008
	Autoclave	P = 15 PSIG , Ta = 121 °C , Humi. = 100 % rh , 48 hrs	0 / 22		JESD 22-A102-B
<b>Environmental Test</b>	Temperature Cycling (Air to Air)	125°C ~ -55°C 30 ~ 30 min , 100 cycles	0 / 22	Limit	MIL-S-883 :1010 JIS C 7021 : A-4
	Thermal Shock (Liquid to Liquid)	125 ~ -55°C t (dwell) = 5 min t (trans.) = 10 sec , 100 cycles	0 / 22		MIL-S-202 : 107D MIL-S-750 : 1051 MIL-S-883 :1011
	Solder Resistance	Ta = 260 ± 3°C t (dwell) = 10 ± 1 sec	0 / 22		MIL-S-750 : 2031 JIS C 7021 : A-1
	Solder Ability	Ta = 230 ± 3 °C t (dwell) = 5 ± 1 sec	0 / 22		MIL-S-883 : 2003 JIS C 7021 : A-2

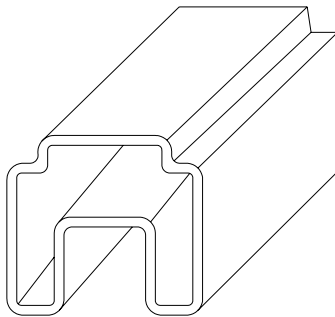


Technical Data Sheet  
Photo coupler

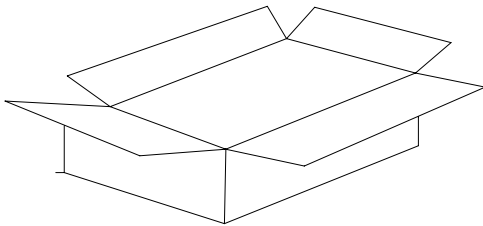
EL816 Series

1. Tube Packing Specifications ( For Dip & M,S Type)

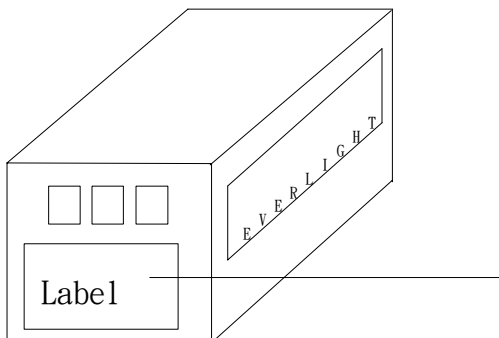
1. Tube



2.Inner Carton



3.Outside Carton



EVERLIGHT

CPN:

P/N:



EL816

QTY:



CAT:

HUE:

REF:

LOT NO:



MADE IN TAIWAN

CPN: Customer's Production Number

P/N : Production Number

QTY: Packing Quantity

CAT: Ranks

HUE: Peak Wavelength

REF: Reference

LOT No: Lot Number

MADE IN TAIWAN: Production Place

● Packing Quantity

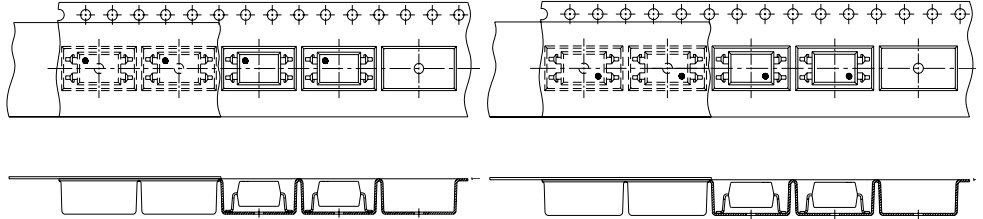
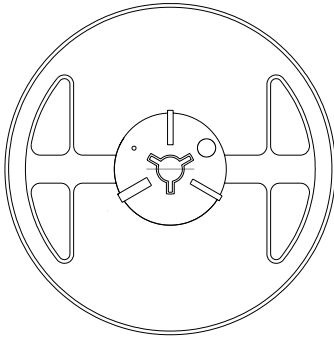
1. 100 Pcs/ Per Tube
2. 25 Tubes / Inner Carton
3. 12 Inner Cartons / Outside Carton

**Technical Data Sheet**  
**Photo coupler**

**EL816 Series**

**2. Tape & Reel Packing Specifications**

**1. Tape & Reel (For S Type)**



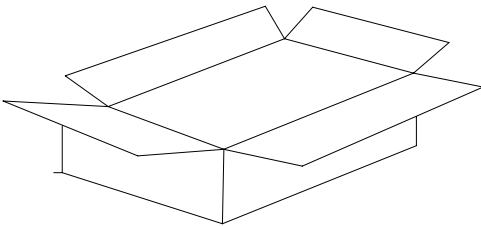
**TA**

**TB**



**EVERLIGHT**

**2. Inner Carton**



CPN:

P/N:



EL816

QTY:



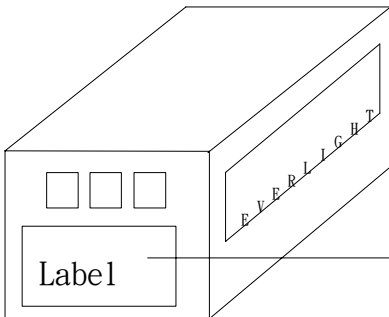
CAT:

HUE:

REF:

LOT NO:

**3. Outside Carton**



MADE IN TAIWAN

CPN: Customer's Production Number

P/N : Production Number

QTY: Packing Quantity

CAT: Ranks

HUE: Peak Wavelength

REF: Reference

LOT No: Lot Number

MADE IN TAIWAN: Production Place

● **Packing Quantity**

1. 1,000 Pcs/ Per Reel
2. 3 Reels / Inner Carton
3. 10 Inner Cartons / Outside Carton



**Technical Data Sheet**  
**Photo coupler**

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**EL816 Series**

**Notes**

1. Above specification may be changed without notice. EVERLIGHT will reserve authority on material change for above specification.
2. When using this product, please observe the absolute maximum ratings and the instructions for using 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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