

Technical Data Sheet

Photocoupler

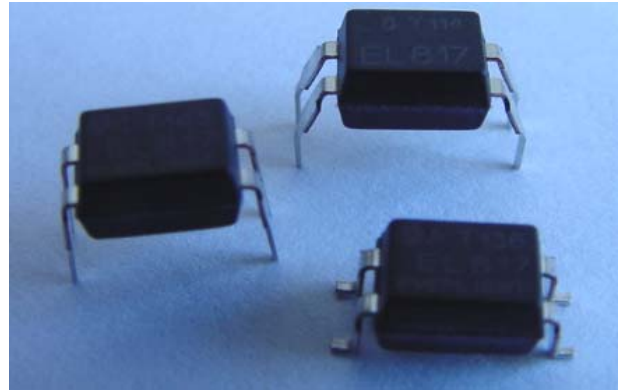
EL815 Series

Features:

- Current transfer ratio
(CTR:MIN.600% at $I_F = 1\text{mA}$, $V_{CE} = 2\text{V}$)
- High isolation voltage between input and output (Viso=5000 V rms)
- Compact dual-in-line package
EL815:1-channel type
- Pb free

- UL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved (No. 0227193/01)
- NEMKO approved (No. P00102385)
- DEMKO approved (No. 310352-04)
- FIMKO approved (No. FI 16763A2)
- CSA approved (No. 1143601)

- 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



Applications

- Telephone sets, telephone exchangers
- Sequence controllers
- System appliances, measuring instruments
- Signal transmission between circuits of different potentials and impedances

Technical Data Sheet

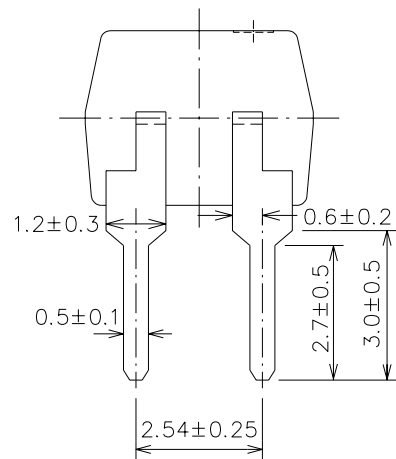
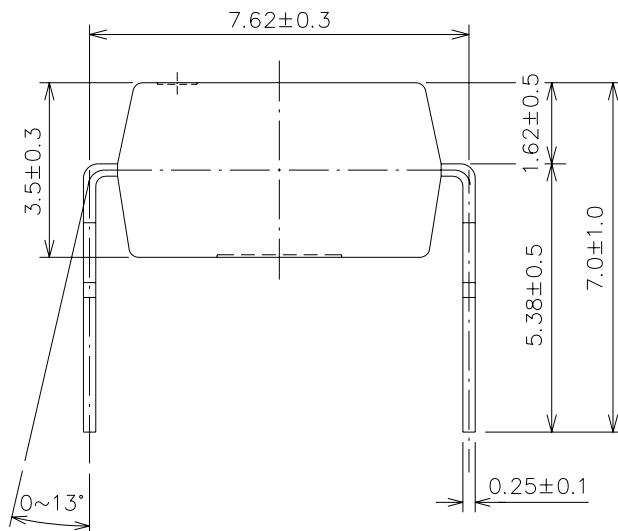
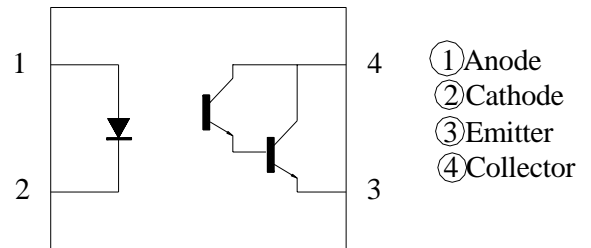
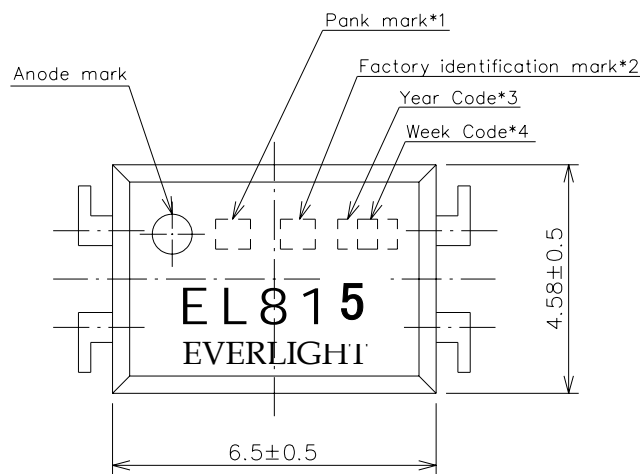
Photocoupler

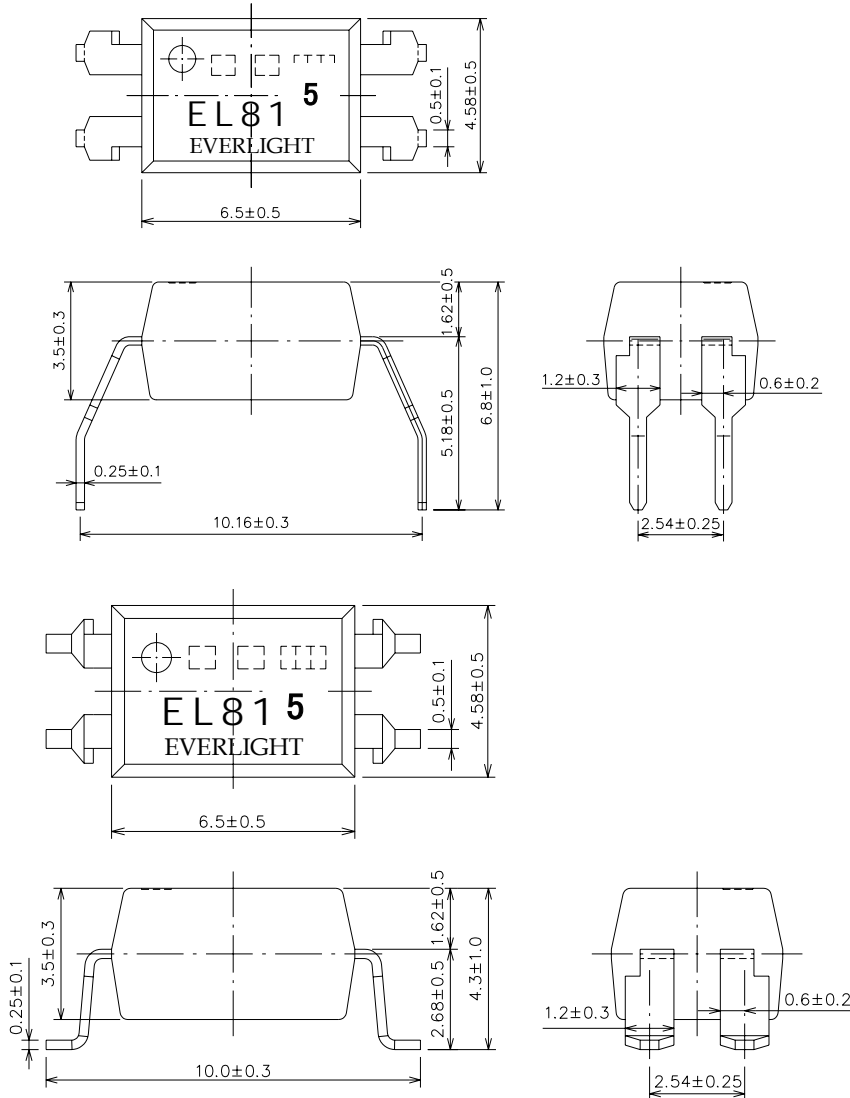
Device Selection Guide

EL815 Series

Part. No.	Chip Material	
	IR	PT
EL817(B1)	GaAs	Silicon

Package Dimensions



**Technical Data Sheet
Photocoupler**
EL815 Series
Package Dimensions

Notes:

1. Rank shall be or shall not be marked
2. Factory code shall be marked (T: Taiwan / C: China)
3. Year date code
4. 2-digit work week
5. All dimensions are in millimeters
6. Specifications are subject to change without notice

**Technical Data Sheet
Photocoupler**
EL815 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	80	mA
	Collector-Emitter Voltage	V_{CEO}	35	V
	Emitter-Collector Voltage	V_{ECO}	6	V
Total Power Dissipation		P_{tot}	200	mW
*1 Isolation Voltage		V_{iso}	5000	V rms
Operating Temperature		T_{opr}	-55~+110	°C
Storage Temperature		T_{stg}	-55~+125	°C
*2 Soldering Temperature		T_{sol}	260	°C

*1 AC for 1 minute, R.H= 40~ 60%RH

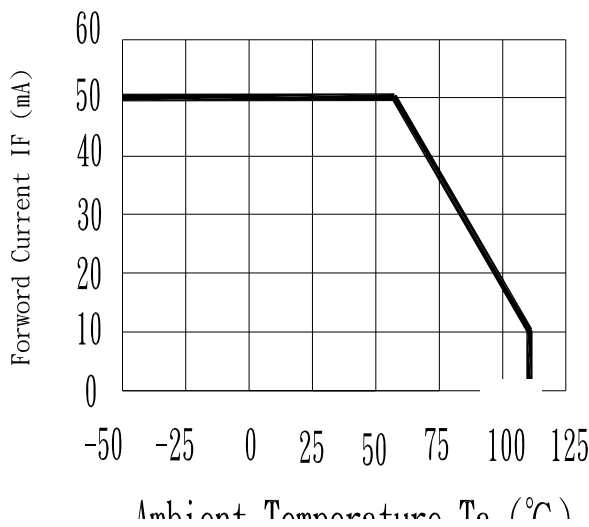
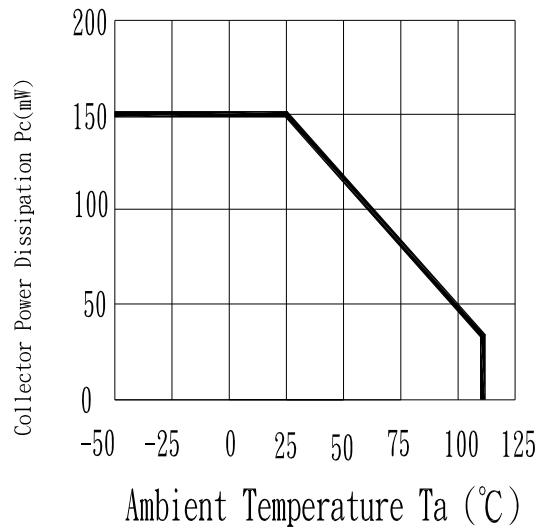
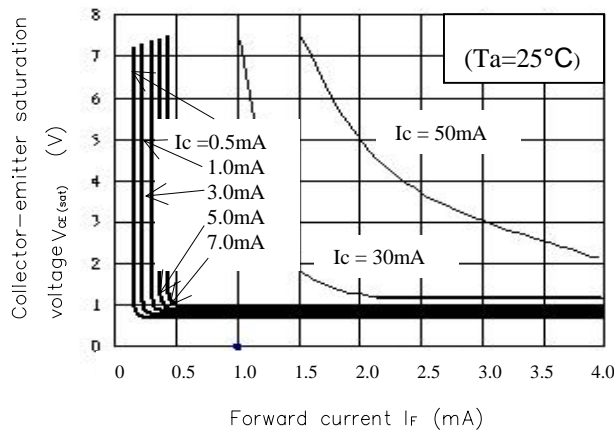
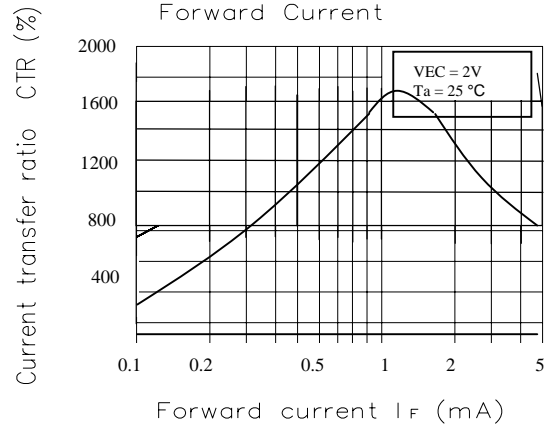
-Isolation voltage shall be measured using the following method.

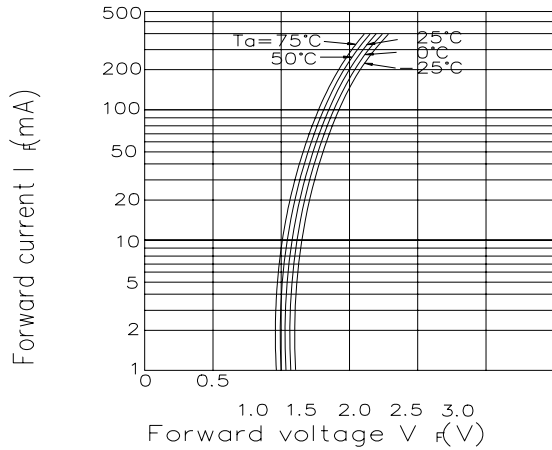
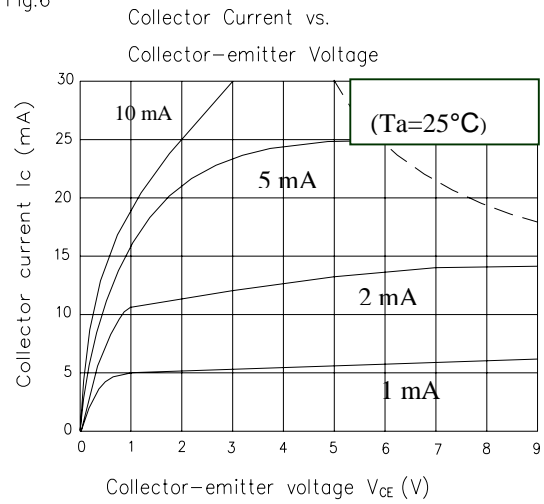
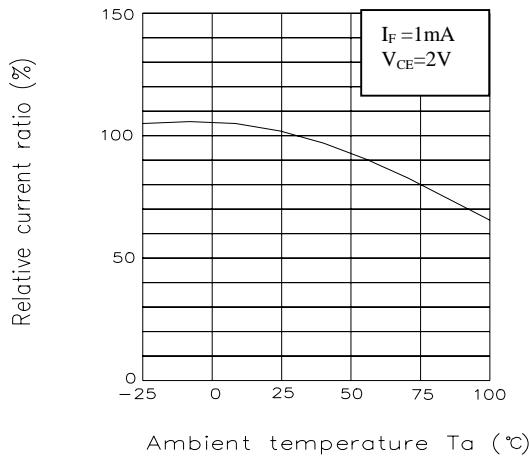
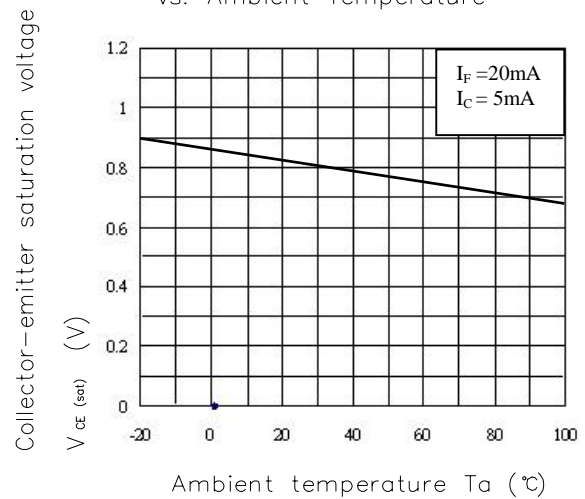
- (1) Short between anode and cathode on the primary side and between collector, emitter and base on the secondary side.
- (2) The isolation voltage tester with zero-cross circuit shall be used.
- (3) The waveform of applied voltage shall be a sine wave

*2 For 10 seconds

**Technical Data Sheet
Photocoupler**
**EL815 Series
(Ta=25°C)**
Electro-Optical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Condition
Input	Forward	V_F	-	1.2	1.4	V	$I_F=20\text{mA}$
	Reverse Current	I_R	-	-	10	μA	$V_R=4\text{V}$
	Terminal	C_t	-	30	250	pF	$V=0, f=1\text{kHz}$
Output	<i>Collector Dark current</i>	I_{CEO}	-	-	1	μA	$V_{CE}=10\text{V}$
	<i>Collector-Emitter breakdown voltage</i>	BV_{CEO}	35	-	-	V	$I_c=0.1\text{mA}$
Transfer Characteristics	Current Transfer ratio	CTR	600	-	7,500	%	$I_F=1\text{mA}, V_{CE}=2\text{V}$
	Collector-Emitter saturation voltage	$V_{CE(sat)}$	-	0.8	1.0	V	$I_F=20\text{mA}, I_c=5\text{mA}$
	Isolation resistance	R_{ISO}	5×10^{10}	10^{11}	-	Ω	DC500V, 40~60%R.H
	Floating capacitance	C_f	-	0.6	1.0	pF	$V=0, f=1\text{MHz}$
	Cut-off frequency	f_c	1	6	-	kHz	$V_{CE}=5\text{V}, I_c=2\text{mA}$ $R_L=100\Omega, -3\text{dB}$
	Rise time	t_r	-	60	300	μs	$V_{CE}=2\text{V}$ $I_c=10\text{mA}, R_L=100\Omega$
	Fall time	t_f	-	53	250	μs	

**Technical Data Sheet
Photocoupler**
EL815 Series
**Typical Electrical / Optical Characteristic Curves
(25°C Ambient Temperature Unless Otherwise Noted)**
Fig. 1 Forward Current vs. Ambient Temperature

Fig. 2 Collector Power Dissipation vs. Ambient Temperature

Fig. 3 Collector-emitter Saturation Voltage vs. Forward Current

Fig. 4 Current transfer Ratio vs. Forward Current


**Technical Data Sheet
Photocoupler**
EL815 Series
Fig.5 Forward Current vs. Forward Voltage

Fig.6

Fig.7
Relative Current Transfer Ratio vs. Ambient Temperature

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


Technical Data Sheet
Photocoupler

EL815 Series

Fig.9

Collector Dark Current vs. Ambient Temperature

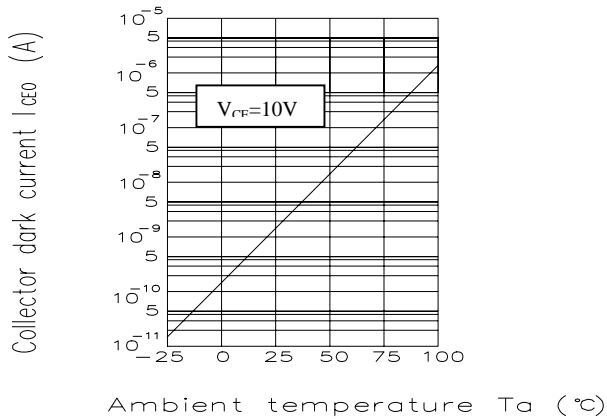


Fig.10

Response Time vs. Load Resistance

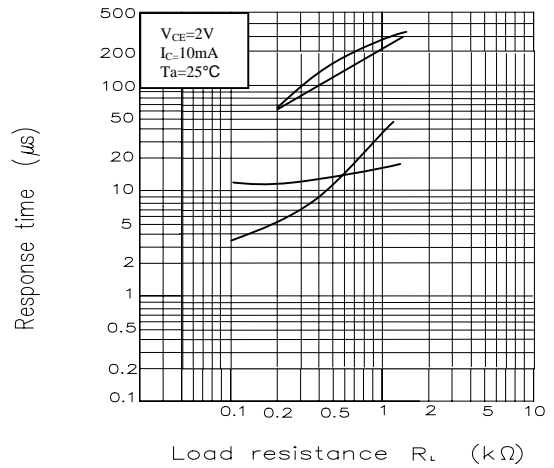
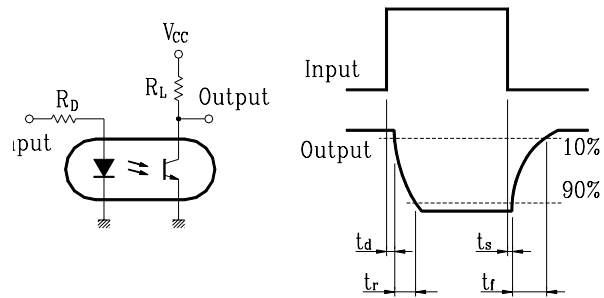
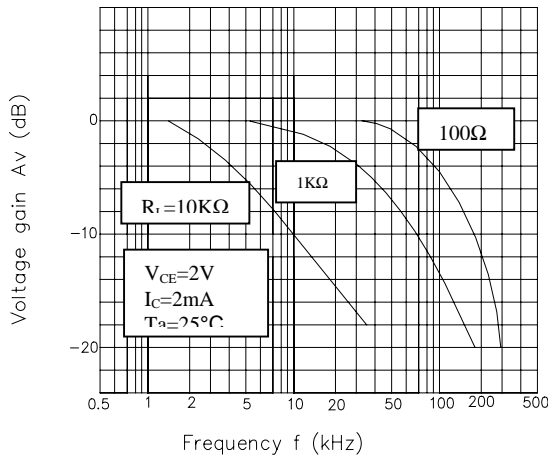


Fig.11

Frequency Response





Technical Data Sheet
Photocoupler

EL815 Series

RELIABILITY PLAN

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

Confidence level : 90 % , LTPD : 10 %

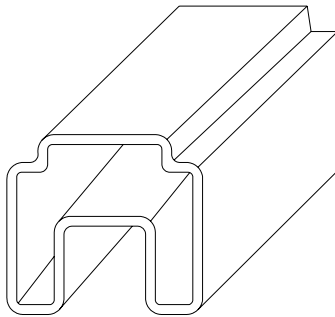
Classification	Test Item	Description & Condition	(Acc.) Sample	Failure Criteria	Reference Standard
Endurance test	Operation Life *	Ta = 25 ± 3°C IR: If = 50 mA Pt: Pc = 130 mW (Vf=1.4v) , 1000 hrs	0 / 22	CTR shift > 1.2 Vf > U* 1.0 Ir > U * 1.0 Vce(sat) >U*1.0 Bvceo < L*1.0 Bveco < L*1.0 L :Low Spec.Limit U : Up Spec. Limit	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
	Auto clamp	P = 15 PSIG , Ta = 121 °C , Humi. = 100 % rh , 48 hrs	0 / 22		JESD 22-A102-B
	Environmental Test	Temperature Cycling (Air to Air)	125°C ~ - 55 °C 30 ~ 30 min , 100 cycles		0 / 22
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
Photocoupler

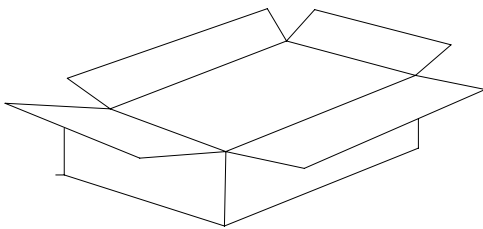
EL815 Series

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

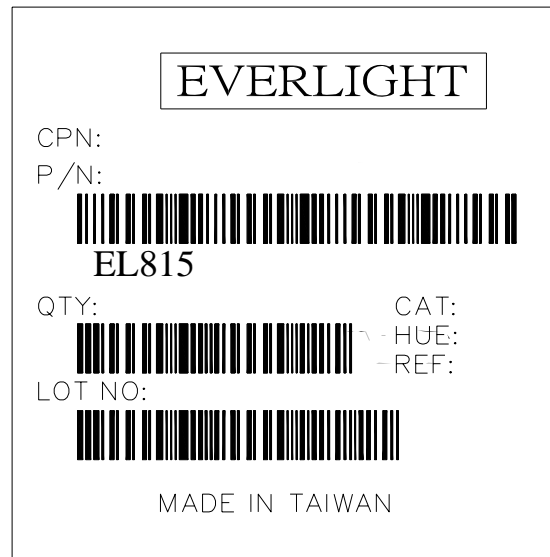
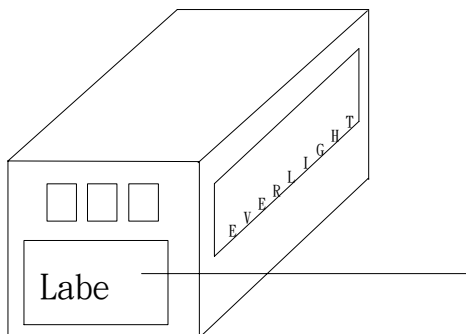
1. Tube



2. Inner Carton



3. Outside Carton



● Packing Quantity

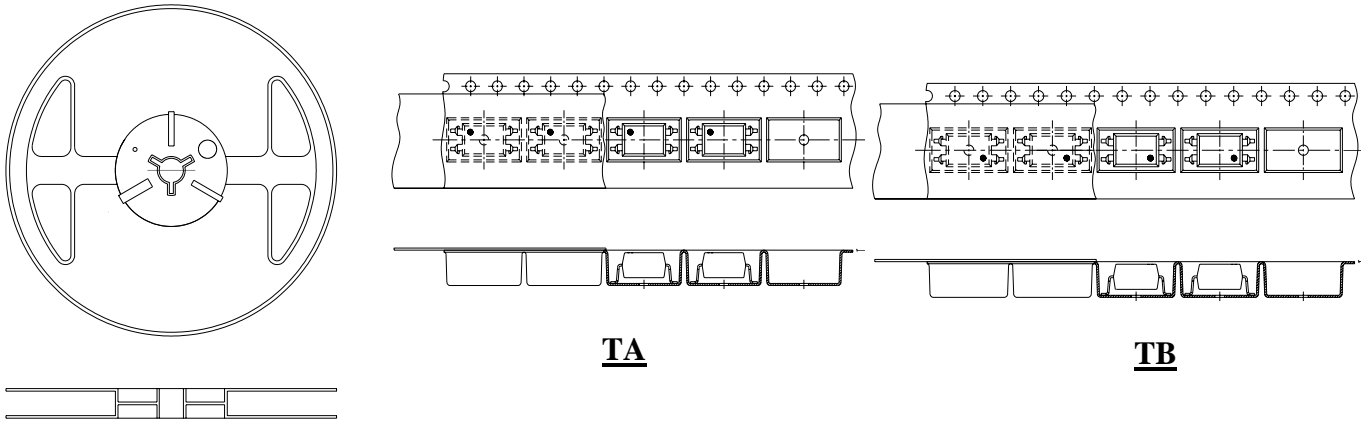
1. 100 Pcs/ Per Tube
2. 25 Tubes / Inner Carton
3. 12 Inner Cartons / Outside Carton

**Technical Data Sheet
Photocoupler**

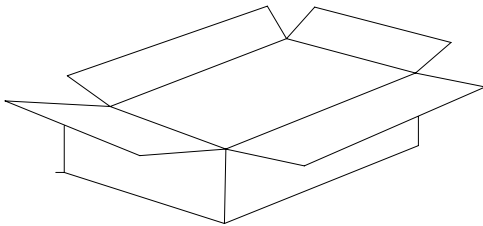
EL815 Series

1. Tape & Reel Packing Specifications

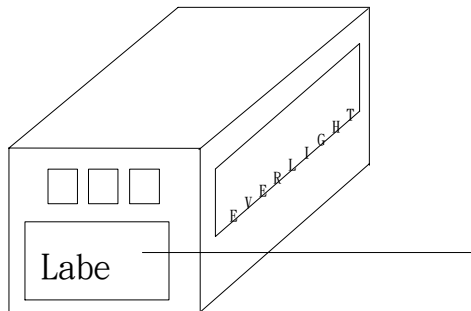
1. Tape & Reel (For S Type only)



2. Inner Carton



3. Outside Carton



● **Packing Quantity**

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