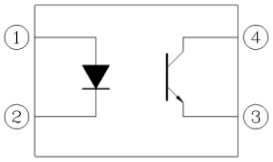
4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER
EL816(SG)(BY)-G Series

Preliminary

This is a preliminary specification
Intended for design purposes and
Subject to change without prior
notice.

Schematic



Pin Configuration
1. Anode
2. Cathode
3. Emitter
4. Collector

Features:

- Compliance Halogens Free
  (Br < 900 ppm, Cl < 900 ppm, Br+Cl < 1500 ppm)
- High isolation voltage between input and output (Viso=5000 V rms)
- Creepage distance >7.62 mm
- Operating temperature up to +110°C
- The product itself will remain within RoHS compliant version
- Compliance with EU REACH
- UL and cUL approved(No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved
- State Grid approved
- MSL1

Description

The EL816(SG)(BY)-G series of devices each consist of an infrared emitting diodes, optically coupled to a phototransistor detector.

Applications

- Programmable controllers
- System appliances, measuring instruments
- Telecommunication equipments
- Home appliances, such as fan heaters, etc.
- Signal transmission between circuits of different potentials and impedances

Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	60	mA
	Reverse voltage	V_R	6	V
	Power Dissipation	P_D	100	mW
Output	Power dissipation	P_C	150	mW
	Collector current	I_C	50	mA
	Collector-Emitter voltage	V_{CEO}	80	V
	Emitter-Collector voltage	V_{ECO}	7	V
Total Power Dissipation		P_{TOT}	200	mW
Isolation Voltage*1		V_{ISO}	5000	Vrms
Operating Temperature		T_{OPR}	-55 to 110	°C
Storage Temperature		T_{STG}	-55 to 110	°C
Soldering Temperature*2		T_{SOL}	260	°C
Opearting humidity		H_{OPR}	<75	%R.H.

Notes:
*1 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.
*2 For 10 seconds

Electro-Optical Characteristics (Ta=25°C unless specified otherwise)

Input

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	V_F	1.01	-	1.29	V	I_F = 10mA
Reverse Current	I_R	-	-	9.9	μA	V_R = 5V

Output

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Collector-Emitter dark current	I_{CEO}	-	-	20	nA	V_{CE} = 5V, I_F = 0mA
		-	-	100	nA	V_{CE} = 24V, I_F = 0mA
Collector-Emitter breakdown voltage	BV_{CEO}	80.1	-	-	V	I_C = 0.1mA
Emitter-Collector breakdown voltage	BV_{ECO}	7.01	-	-	V	I_E = 0.1mA

Transfer Characteristics

Parameter		Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer ratio	D	CTR	300	-	600	%	I_F = 5mA ,V_{CE} = 5V
			200	-	500		I_F = 2mA ,V_{CE} = 5V
	D1		300	-	470		I_F = 5mA ,V_{CE} = 5V
			140	-	-		I_F = 1mA ,V_{CE} = 5V
Collector-Emitter saturation voltage		$V_{CE(sat)}$	-	-	0.39	V	I_F = 1mA ,I_C = 1mA
Isolation resistance		R_{IO}	1.01×10^{12}	-	-	Ω	V_{IO} = 500Vdc, 40~60% R.H.
Rise time		t_r	-	-	12	μs	V_{CC} = 10V, I_C = 2mA, R_L = 100Ω
Fall time		t_f	-	-	12	μs	
Turn on time		ton	-	-	12	μs	
Turn off time		toff	-	-	12	μs	

* Typical values at T_a = 25°C

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

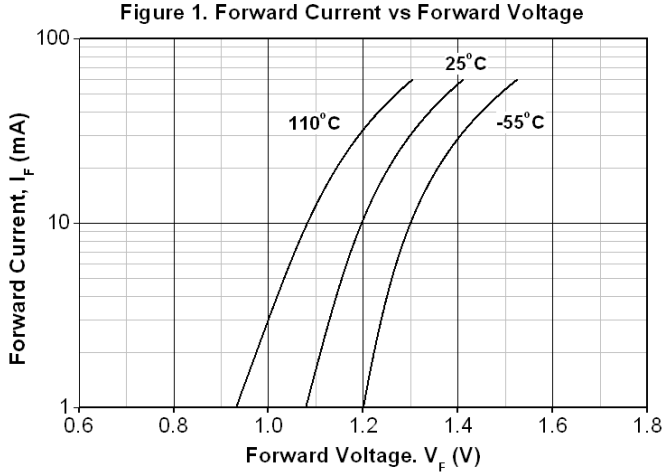


Figure 2. Normalized Current Transfer Ratio vs Forward Current

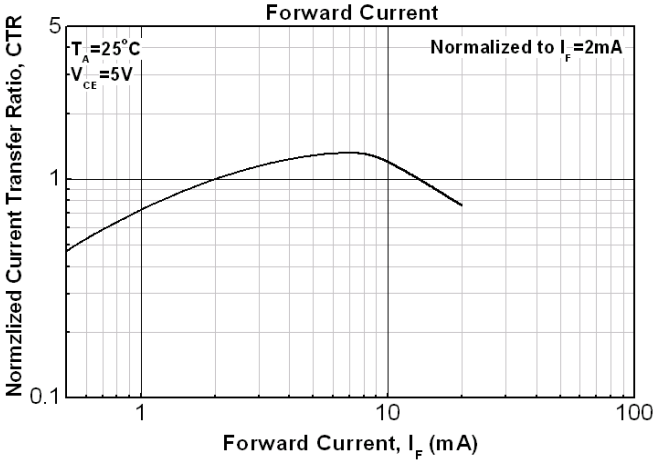


Figure 3. Current Transfer Ratio vs Ambient Temperature

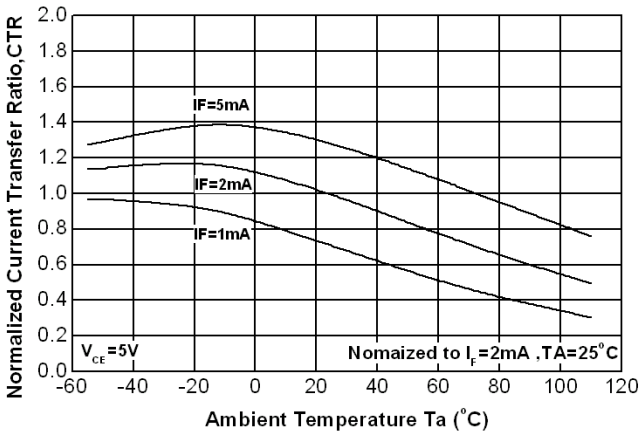


Figure 4. Dark Current vs Ambient Temperature

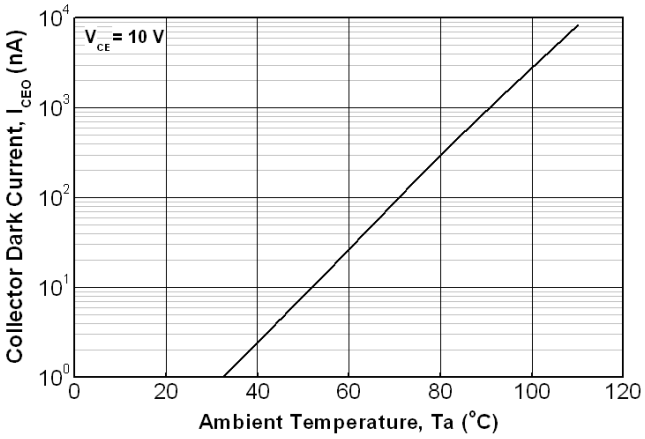


Figure 5. Collector-Emitter Saturation Voltage vs Collector Current

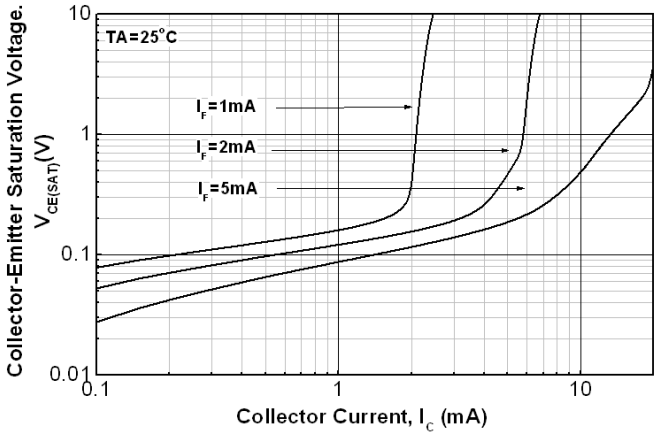
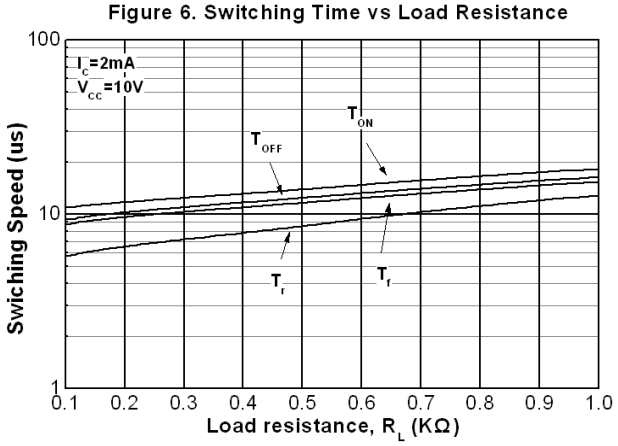
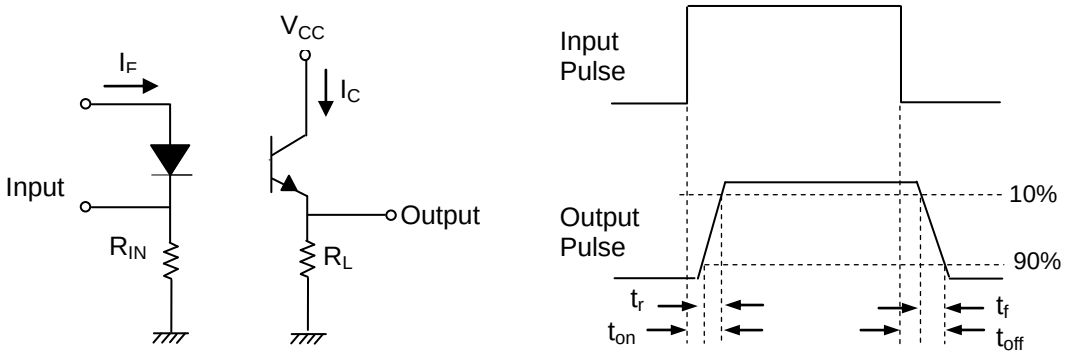


Figure 6. Switching Time vs Load Resistance





Switching Time Test Circuit & Waveforms

Order Information

Part Number

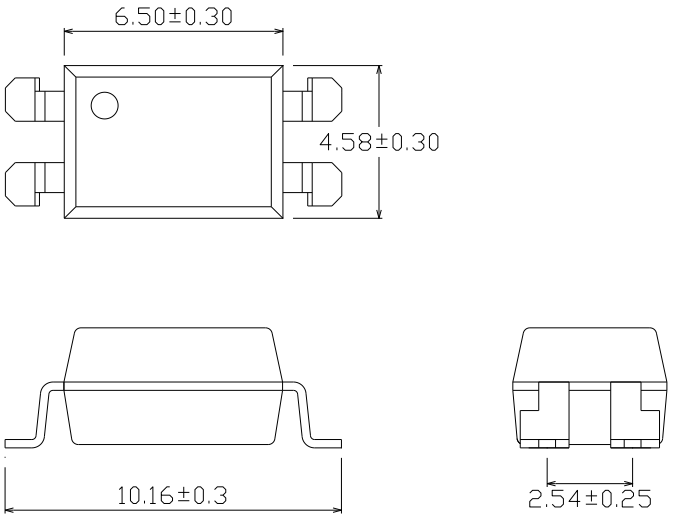
EL816S1(Y)(Z)(SG)(BY)-VG

Note

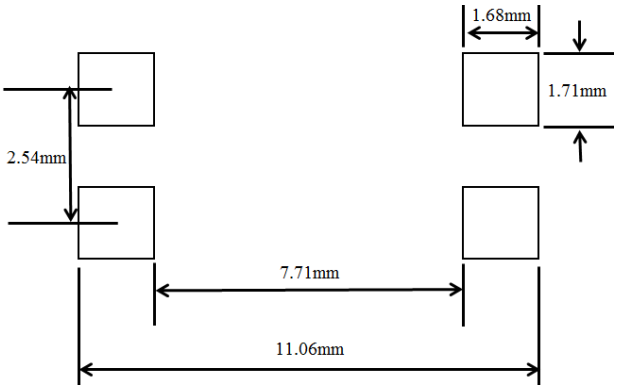
S1 = Lead form option
Y = CTR Rank
Z = Tape and reel option (TU, TD).
V = VDE safety (optional).
G = Halogens free

Option	Description	Packing quantity
S1 (TU)	Surface mount lead form (low profile) + TU tape & reel option	1500 units per reel
S1 (TD)	Surface mount lead form (low profile) + TD tape & reel option	1500 units per reel

Package Dimension (Dimensions in mm)



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.

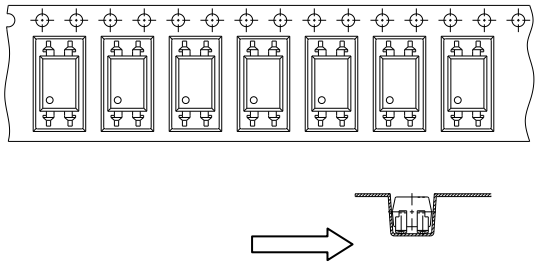
Device Marking

Notes

EL	denotes EVERLIGHT
816	denotes Device Number
F	denotes Factory Code (G: China and Green part)
R	denotes CTR Rank
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE(optional)

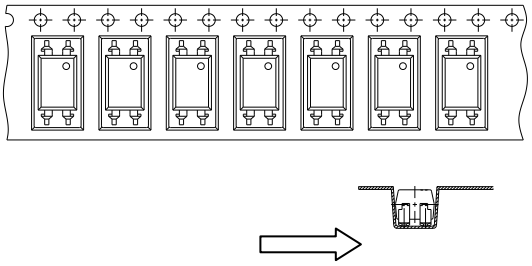
Tape & Reel Packing Specifications

Option TD



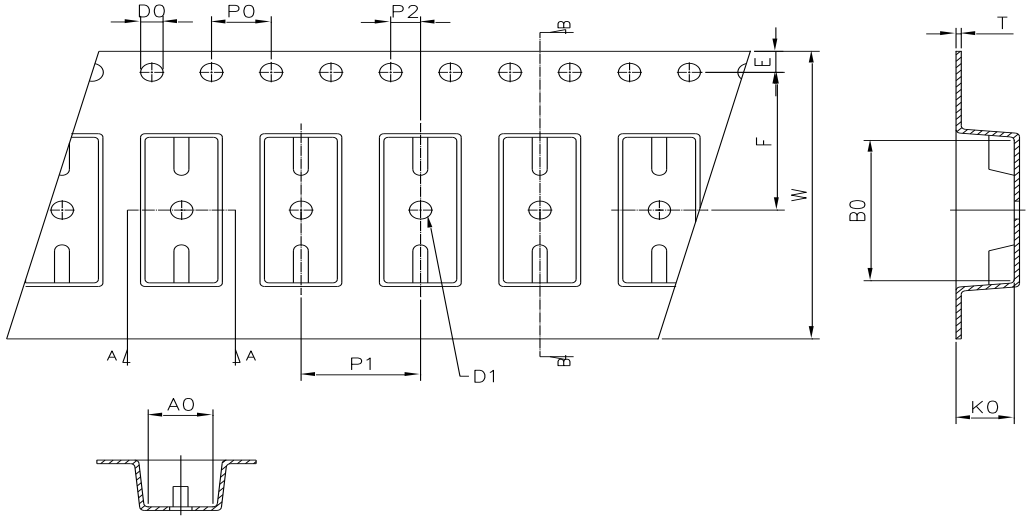
Direction of feed from reel

Option TU



Direction of feed from reel

Tape dimensions

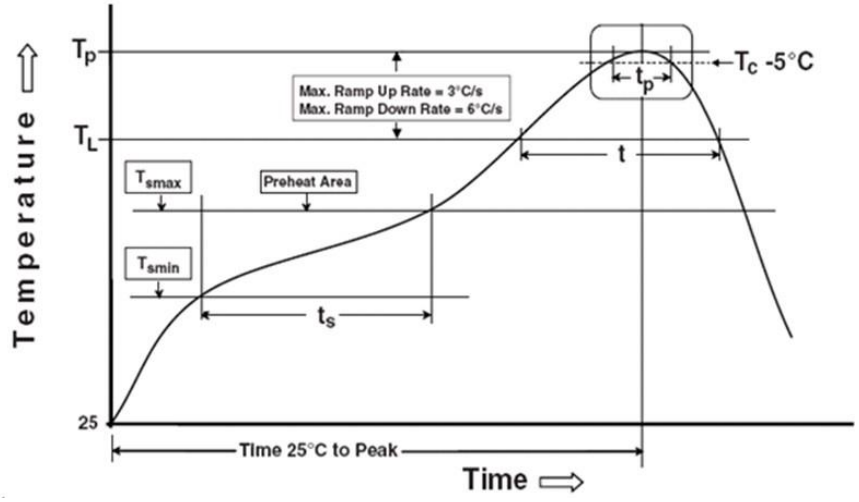


Dimension No.	**Ao**	**Bo**	**Do**	**D1**	**E**	**F**
Dimension (mm) S1	4.90±0.1	10.40±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.50±0.1
Dimension No.	**Po**	**P1**	**P2**	**t**	**W**	**Ko**
Dimension (mm) S1	4.00±0.1	8.00±0.1	2.00±0.1	0.40±0.1	16.00±0.3	4.60±0.1

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

DISCLAIMER

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