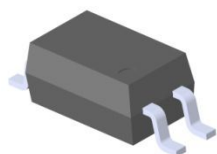
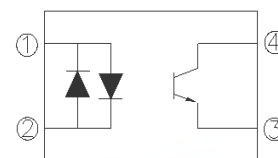


### 4 PIN SSOP PHOTOTRANSISTOR PHOTOCOUPLER AC INPUT PHOTOCOUPLER EL3H4-G Series



Schematic



Pin Configuration

1. Anode / Cathode
2. Cathode / Anode
3. Emitter
4. Collector

#### Features

- Compliance Halogen Free  
(Br < 900 ppm, Cl < 900 ppm, Br+Cl < 1500 ppm)
- AC input response
- Current transfer ratio  
(CTR: Min. 20% at  $I_F = \pm 1\text{mA}$ ,  $V_{CE} = 5\text{V}$ )
- High isolation voltage between input and output (Viso = 3750 V rms)
- Compact small outline package
- Compliance with EU REACH
- The product itself will remain within RoHS compliant version
- UL and cUL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

#### Description

The EL3H4-G series contains two infrared emitting diode, connected in inverse parallel, optically coupled to a phototransistor encapsulated with green compound. It is packaged in a 4-pin small outline SMD package

#### Applications

- AC line monitor
- Programmable controllers
- Telephone line interface
- Unknown polarity DC sensor

Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rating	Unit
Input	Forward current	$I_F$	±50	mA
	Peak forward current (t = 10μs)	$I_{FM}$	1	A
	Power Dissipation	$P_D$	70	mW
	No derating required up to T <sub>a</sub> = 100°C			
Output	Power dissipation	$P_C$	150	mW
	Derating factor (above T <sub>a</sub> = 80°C)		3.7	mW/°C
	Collector-Emitter voltage	$V_{CEO}$	80	V
	Emitter-Collector voltage	$V_{ECO}$	6	V
Total Power Dissipation		$P_{TOT}$	200	mW
Isolation Voltage* <sup>1</sup>		$V_{ISO}$	3750	V rms
Operating Temperature		$T_{OPR}$	-55 to 100	°C
Storage Temperature		$T_{STG}$	-55 to 125	°C
Soldering Temperature* <sup>2</sup>		$T_{SOL}$	260	°C

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	$V_F$	-	1.2	1.4	V	$I_F = \pm 20\text{mA}$
Input capacitance	$C_{in}$	-	50	250	pF	$V = 0, f = 1\text{kHz}$

**Output**

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Collector-Emitter dark current	$I_{CEO}$	-	-	100	nA	$V_{CE} = 20\text{V}, I_F = 0\text{mA}$
Collector-Emitter breakdown voltage	$BV_{CEO}$	80	-	-	V	$I_C = 0.1\text{mA}$
Emitter-Collector breakdown voltage	$BV_{ECO}$	6	-	-	V	$I_E = 0.01\text{mA}$

**Transfer Characteristics**

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer ratio	EL3H4	20	-	300	%	$I_F = \pm 1\text{mA}, V_{CE} = 5\text{V}$
	EL3H4A	50	-	150		
	EL3H4B	100	-	300		
CTR Symmetry		0.5		2.0		$I_F = \pm 1\text{mA}, V_{CE} = 5\text{V}$
Collector-Emitter saturation voltage	$V_{CE(sat)}$	-	0.1	0.2	V	$I_F = \pm 20\text{mA}, I_C = 1\text{mA}$
Isolation resistance	$R_{IO}$	$5 \times 10^{10}$	$10^{11}$	-	$\Omega$	$V_{IO} = 500\text{Vdc}, 40 \sim 60\% \text{ R.H.}$
Floating capacitance	$C_{IO}$	-	0.6	1.0	pF	$V_{IO} = 0, f = 1\text{MHz}$
Rise time	$t_r$	-	-	18	$\mu\text{s}$	$V_{CE} = 2\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$
Fall time	$t_f$	-	-	18	$\mu\text{s}$	

\* Typical values at  $T_a = 25^\circ\text{C}$

## Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

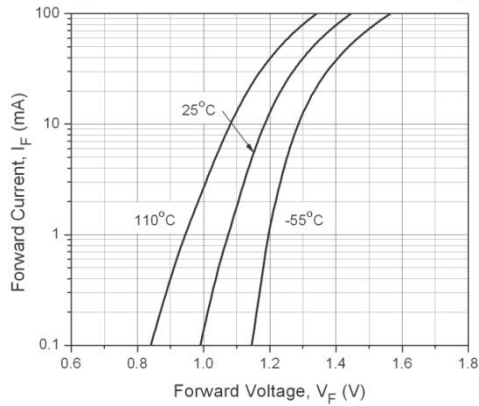


Figure 2. Normalized Collector Current vs Forward Current

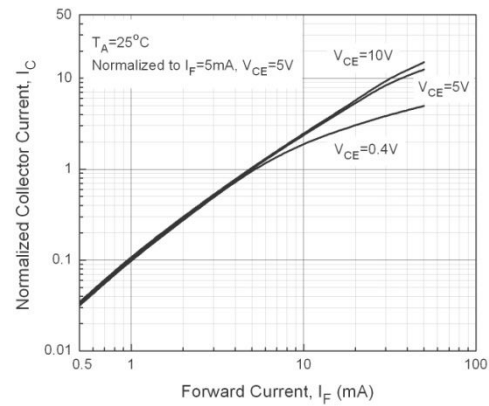


Figure 3. Normalized Current Transfer Ratio vs Forward Current

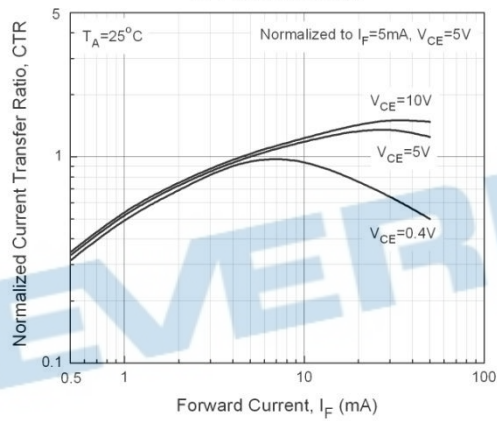


Figure 4. Normalized Collector Current vs Ambient Temperature

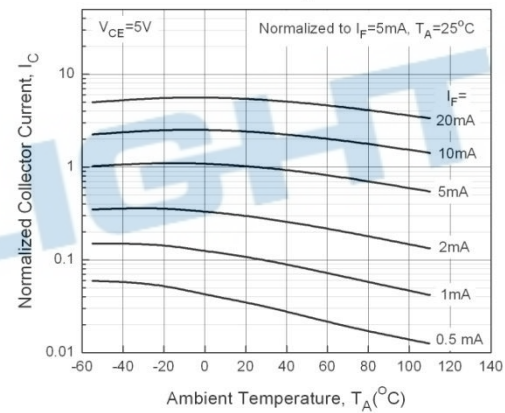


Figure 5. Normalized Current Transfer Ratio vs Ambient Temperature

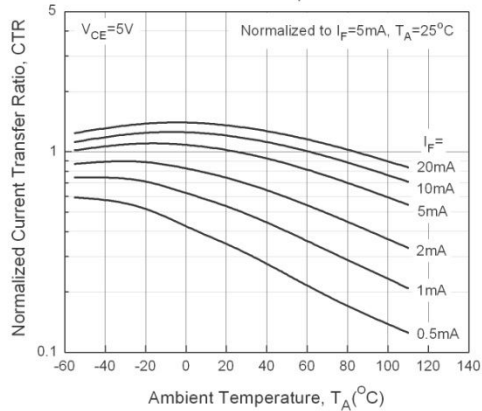


Figure 6. Collector Current vs Collector-Emitter Voltage

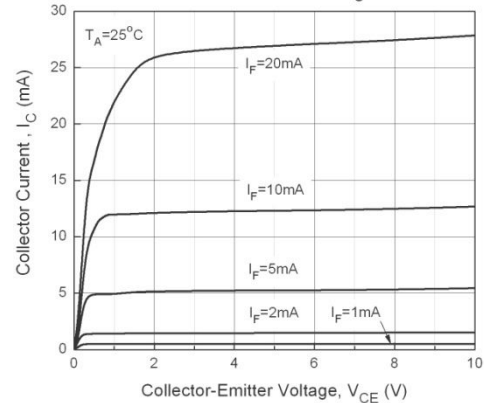


Figure 7. Collector Current vs Collector-Emitter Voltage

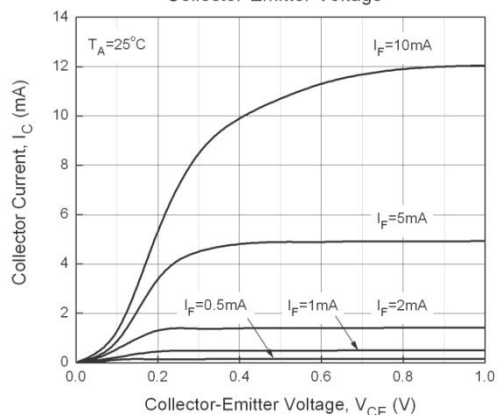


Figure 8. Collector Dark Current vs Ambient Temperature

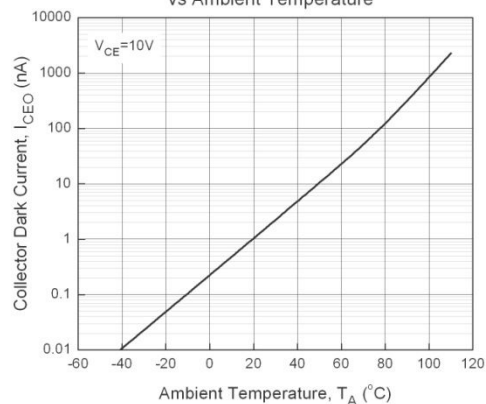


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature

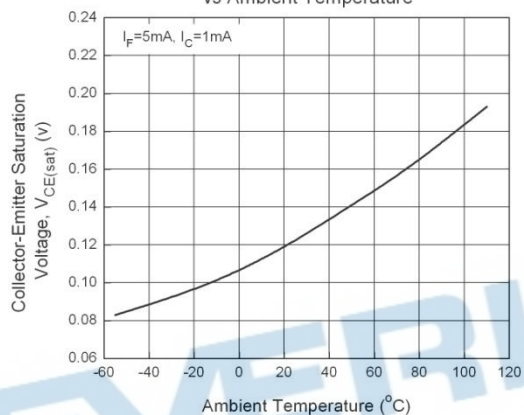


Figure 10. Switching Time vs Load Resistance

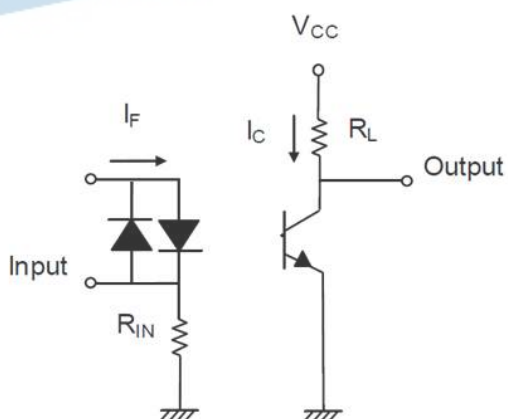
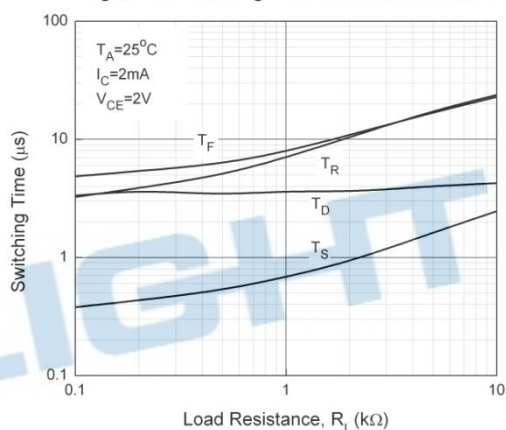


Figure 11. Switching Time Test Circuit &amp; Waveforms

Order Information

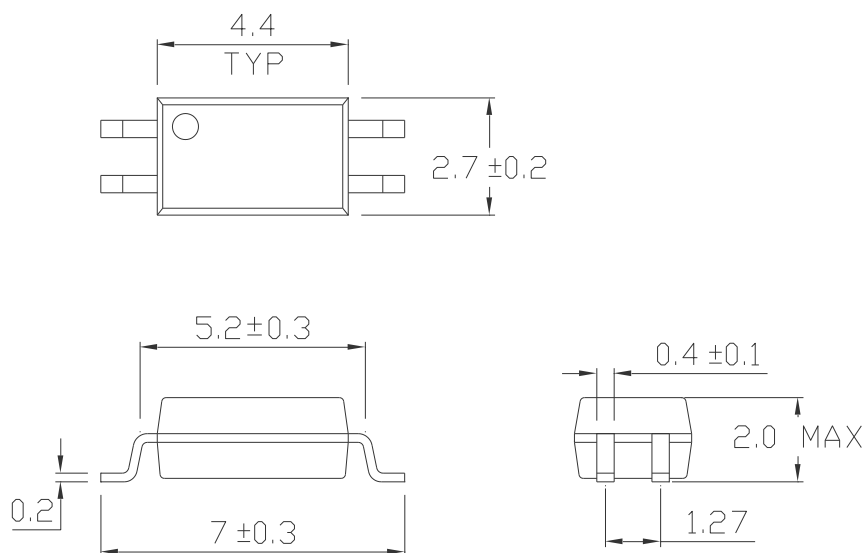
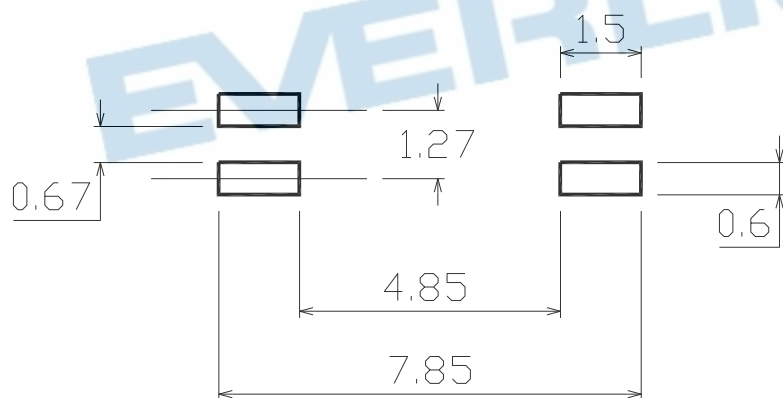
Part Number

EL3H4(Y)(Z)-VG

Notes

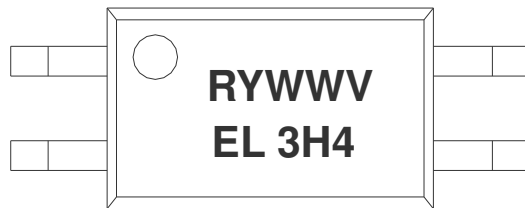
- Y = CTR Rank (A, B or none)
- Z = Tape and reel option (TA, TB, EA, EB or none).
- V = VDE (optional)
- G = Halogens free

Option	Description	Packing quantity
None	Standard SMD option	150 units per tube
-V	Standard SMD option + VDE	150 units per tube
(TA)	TA Tape & reel option	5000 units per reel
(TB)	TB Tape & reel option	5000 units per reel
(TA)-V	TA Tape & reel option + VDE	5000 units per reel
(TB)-V	TB Tape & reel option + VDE	5000 units per reel
(EA)	TA Tape & reel option	1000 units per reel
(EB)	TB Tape & reel option	1000 units per reel
(EA)-V	TA Tape & reel option + VDE	1000 units per reel
(EB)-V	TB Tape & reel option + VDE	1000 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

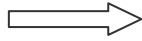
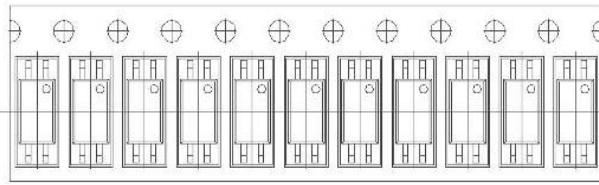
EL	denotes EVERLIGHT
3H4	denotes Device Number
R	denotes CTR Rank (A, B or none)
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

EVERLIGHT



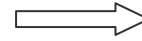
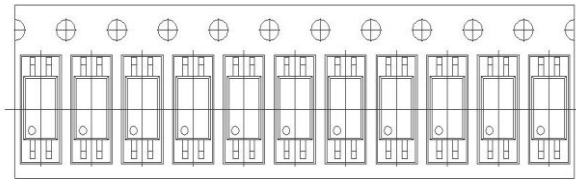
## Tape & Reel Packing Specifications

### Option TA



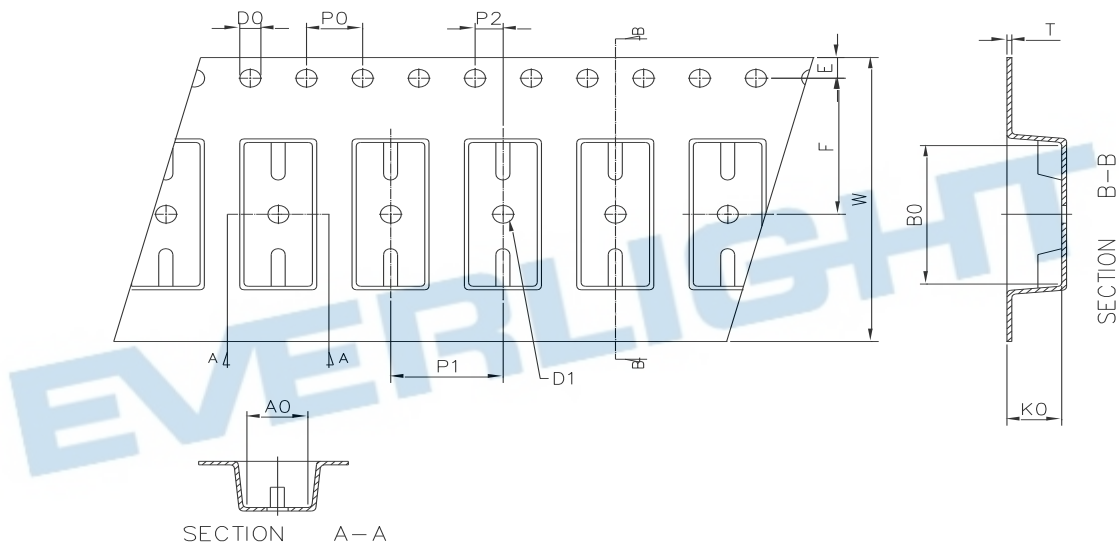
Direction of feed from reel

### Option TB



Direction of feed from reel

## Tape dimensions

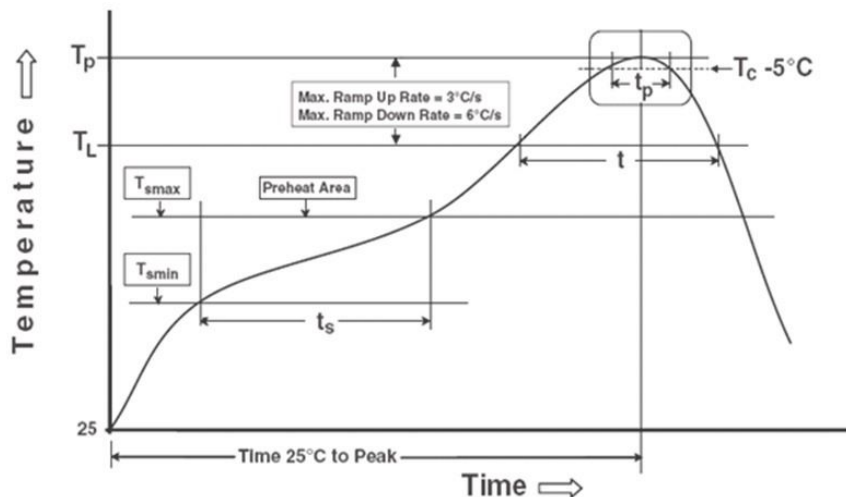


Dimension No.	A0	B0	D0	D1	E	F
Dimension (mm)	$3.00 \pm 0.10$	$7.45 \pm 0.10$	$1.50 + 0.1/-0$	$1.50 \pm 0.10$	$1.75 \pm 0.10$	$5.50 \pm 0.10$
Dimension No.	PO	P1	P2	t	W	K0
Dimension (mm)	$4.00 \pm 0.15$	$4.00 \pm 0.10$	$2.00 \pm 0.10$	$0.30 \pm 0.05$	$12.1 \pm 0.2$	$2.45 \pm 0.1$

## Precautions for Use

### 1. Soldering Condition

#### 1.1 (A) Maximum Body Case Temperature Profile for evaluation of Reflow Profile



Notes

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

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