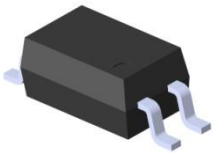




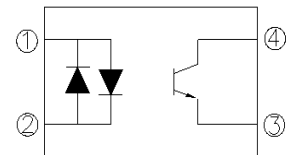
THE DATASHEET OF EL3H4(A)(TB)-G



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 No derating required up to $T_a = 100^\circ\text{C}$ | P_D | 70 | mW |
| Output | Power dissipation | P_C | 150 | mW |
| | Derating factor (above $T_a = 80^\circ\text{C}$) | | 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*1 | | V_{ISO} | 3750 | V rms |
| Operating Temperature | | T_{OPR} | -55 to 100 | °C |
| Storage Temperature | | T_{STG} | -55 to 125 | °C |
| Soldering Temperature*2 | | 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} | 5×10^{10} | 10^{11} | - | Ω | $V_{IO} = 500\text{Vdc}, 40\sim 60\% \text{ R.H.}$ |
| Floating capacitance | C_{IO} | - | 0.6 | 1.0 | pF | $V_{IO} = 0, f = 1\text{MHz}$ |
| Rise time | t_r | - | - | 18 | μs | $V_{CE} = 2\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$ |
| Fall time | t_f | - | - | 18 | μs | |

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

Typical Electro-Optical Characteristics Curves

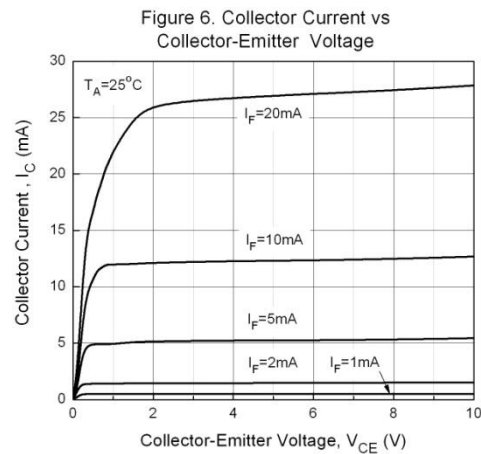
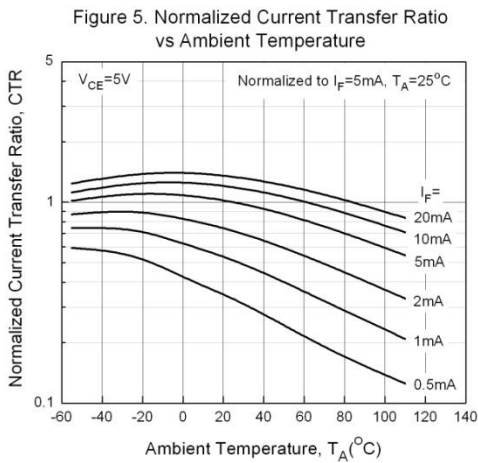
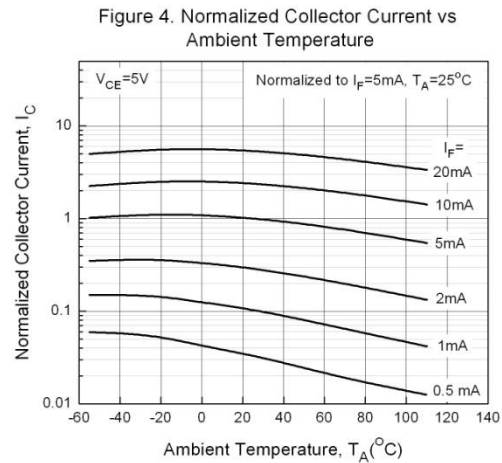
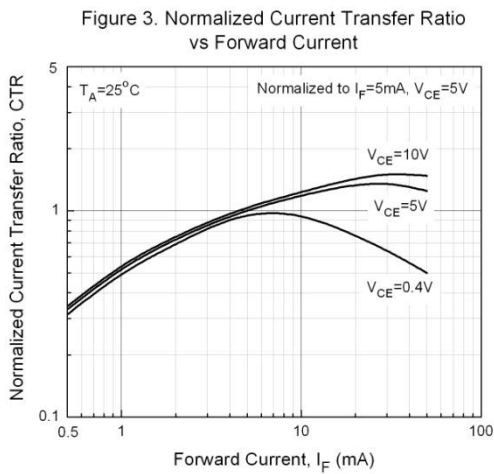
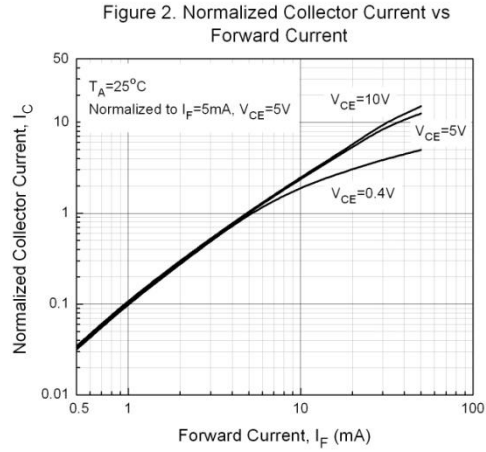
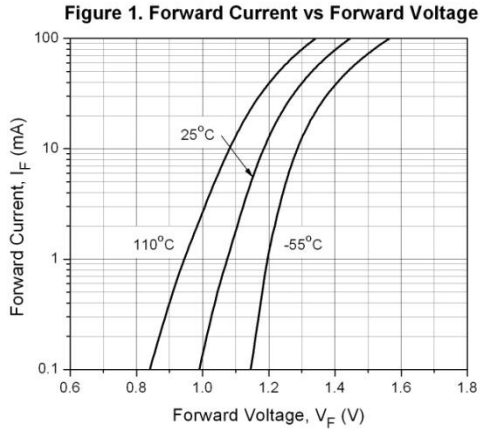


Figure 7. Collector Current vs Collector-Emitter Voltage

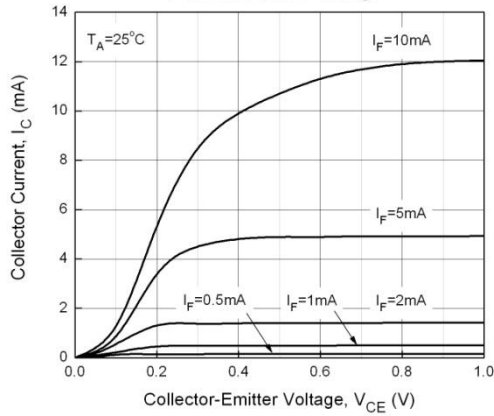


Figure 8. Collector Dark Current vs Ambient Temperature

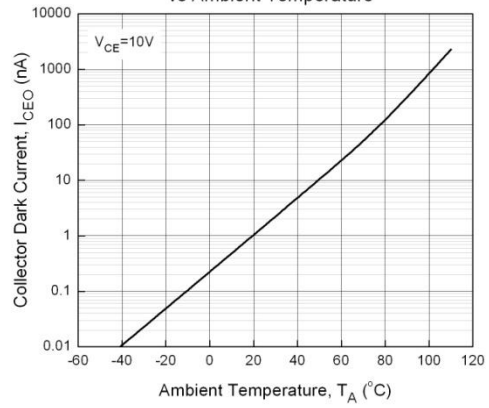


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature

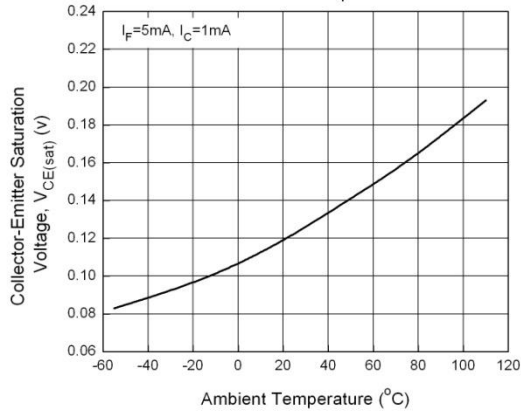


Figure 10. Switching Time vs Load Resistance

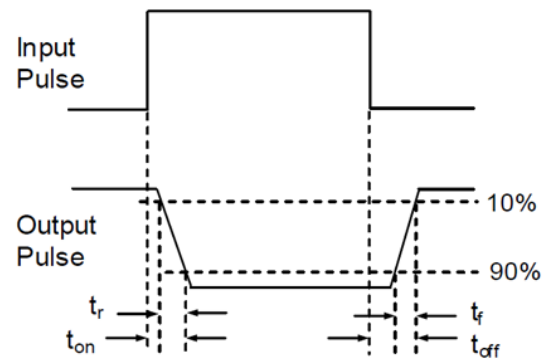
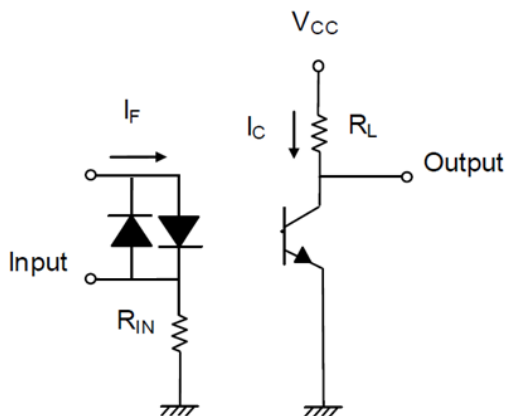
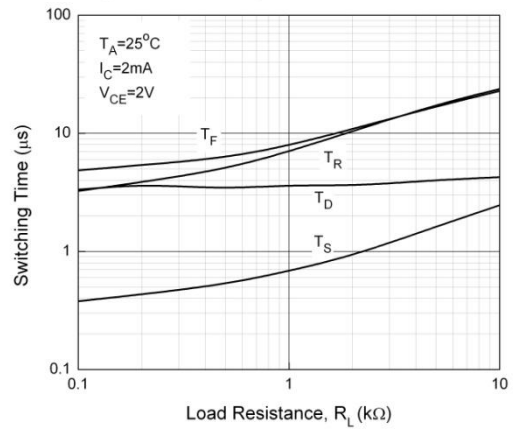


Figure 11. Switching Time Test Circuit & Waveforms

Order Information

Part Number

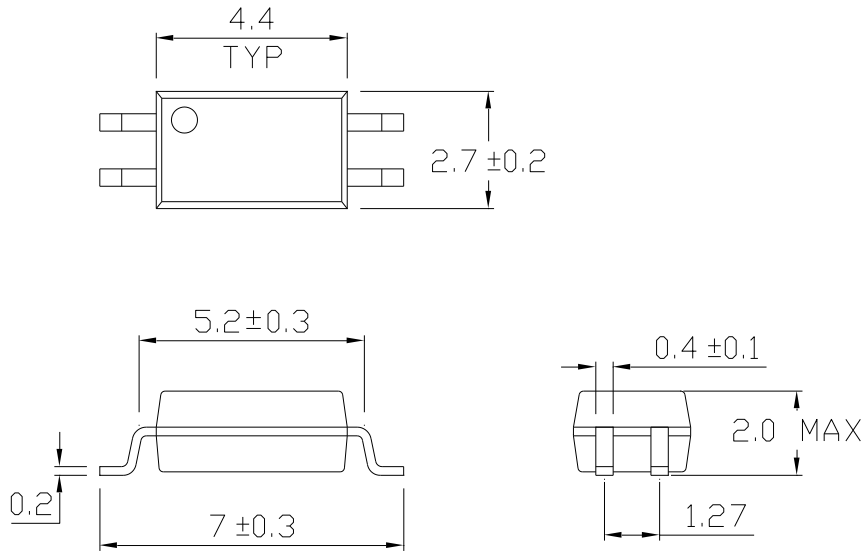
EL3H4(Y)(Z)-VG

Notes

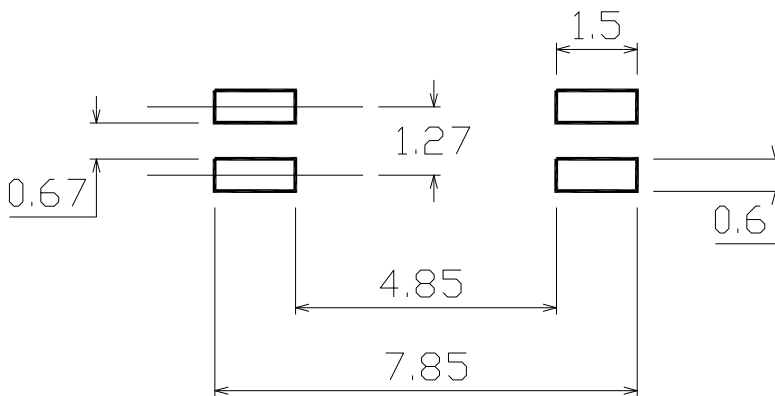
- Y = CTR Rank (A, B or none)
- Z = Tape and reel option (TA, TB, EA, EB or none).
- V = VDE (optional)
- G = Halogens free

| 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

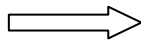
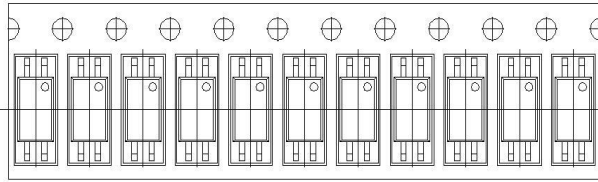


Notes

| | |
|-----|---------------------------------|
| 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) |

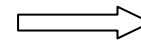
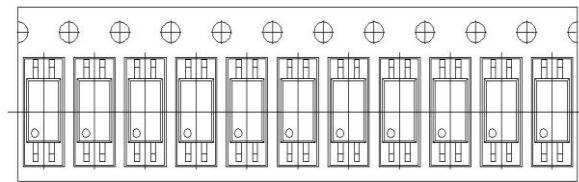
Tape & Reel Packing Specifications

Option TA



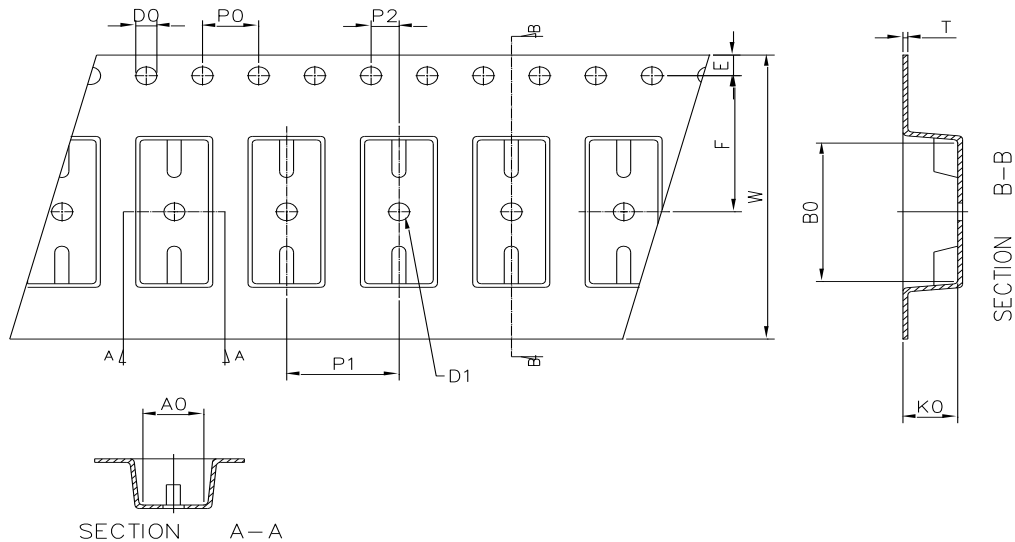
Direction of feed from reel

Option TB



Direction of feed from reel

Tape dimensions

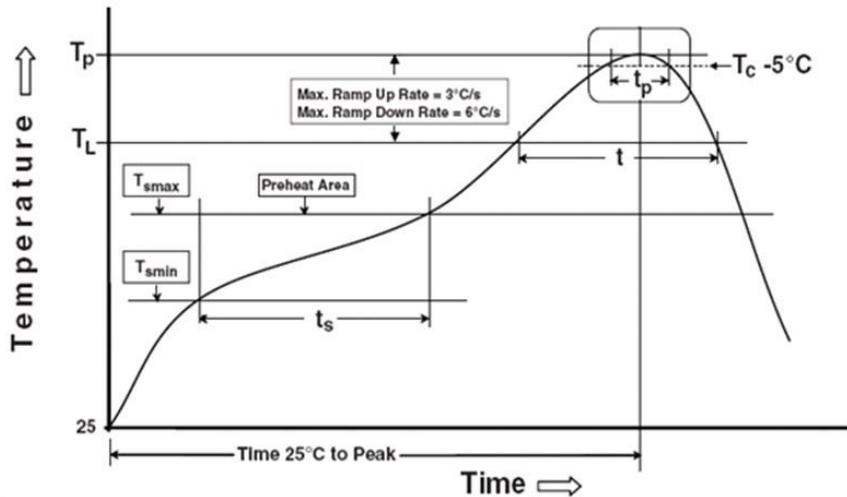


| | | | | | | |
|----------------|-------------|-------------|---------------|-------------|-------------|-------------|
| Dimension No. | A0 | B0 | D0 | D1 | E | F |
| Dimension (mm) | 3.00 ± 0.10 | 7.45 ± 0.10 | 1.50 + 0.1/-0 | 1.50 ± 0.10 | 1.75 ± 0.10 | 5.50 ± 0.10 |
| Dimension No. | P0 | P1 | P2 | t | W | K0 |
| Dimension (mm) | 4.00 ± 0.15 | 4.00 ± 0.10 | 2.00 ± 0.10 | 0.30 ± 0.05 | 12.1 ± 0.2 | 2.45 ± 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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