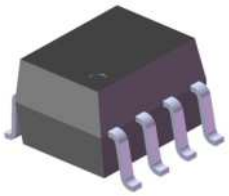
# 8 PIN SOP PHOTOTRANSISTOR PHOTOCOUPLER

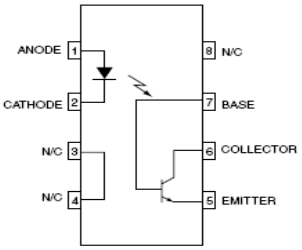
# EL20X / 21X series

## Features

- Current transfer ratios in offered in narrow ranges
  EL205: 40-80%
  EL206: 63-125%
  EL207: 100-200%
  EL208: 160-320%
  EL211: >20%
  EL212: >50%
  EL213: >100%
- High isolation voltage between input and output
  Viso = 3750 Vrms
- Operating temperature range of -55 to +110℃
- High BVceo of 80V
- Standard SO-8 footprint package
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approval (pending)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CSA approved (No. 2007189)



Schematic




1. Anode
2. Cathode
3. No Connection
4. No Connection
5. Emitter
6. Collector
7. Base
8. No Connection

## Description

The EL20X and EL21X series contain an infrared emitting diode optically coupled to a phototransistor detector. The devices are packaged in an 8-pin small outline package which conforms to the standard SO-8 footprint.

## Applications

- Feedback Control Circuits
- Interfacing and coupling systems of different potentials and impedances
- General Purpose Switching Circuits
- Monitor and Detection Circuits

# 8 PIN SOP PHOTOTRANSISTOR PHOTOCOUPLER

# EL20X / 21X series

## Absolute Maximum Ratings ($T_a$=25°C)

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Input | Forward current | $I_F$ | 60 | mA |
| | Peak forward current (t = 10μs) | $I_{FM}$ | 1 | A |
| | Reverse voltage | $V_R$ | 6 | V |
| | Power dissipation<br>No Derating needed | $P_D$ | 90 | mW |
| Output | Collector power dissipation<br>No derating needed | $P_C$ | 150 | mW |
| | Collector-Emitter voltage | $V_{CEO}$ | 80 | V |
| | Collector-Base voltage | $V_{CBO}$ | 80 | V |
| | Emitter-Collector voltage | $V_{ECO}$ | 7 | V |
| Total power dissipation | | $P_{tot}$ | 240 | mW |
| Isolation voltage *1 | | $V_{iso}$ | 3750 | Vrms |
| Operating temperature | | $T_{opr}$ | -55~+110 | °C |
| Storage temperature | | $T_{stg}$ | -55~+150 | °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 & 3 are shorted together, and pins 4, 5 & 6 are shorted together.

*2 For 10 seconds.

# 8 PIN SOP PHOTOTRANSISTOR PHOTOCOUPLER

# EL20X / 21X series

## Electrical Characteristics ($T_a$=25°C unless specified otherwise)

### Input

| Parameter | Symbol | Min. | Typ.* | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| Forward voltage | $V_F$ | - | 1.3 | 1.5 | V | $I_F$ = 10mA |
| Reverse current | $I_R$ | - | 0.1 | 100 | μA | $V_R$ = 6V |
| Input capacitance | $C_{in}$ | - | 13 | - | pF | V = 0, f = 1MHz |

### Output

| Parameter | Symbol | Min. | Typ.* | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| Collector-Emitter dark current | $I_{CEO}$ | - | 5.0 | 50 | nA | $V_{CE}$ = 10V, $I_F$ = 0mA |
| Collector-Emitter breakdown voltage | $BV_{CEO}$ | 80 | - | - | V | $I_C$ = 0.1mA |
| Emitter-Collector breakdown voltage | $BV_{ECO}$ | 7 | - | - | V | $I_E$ = 0.1mA |
| Collector-Emitter capacitance | $C_{CE}$ | - | 8 | - | pF | VCE = 0V, f = 1MHz |

### Transfer Characteristics

| Parameter | | Symbol | Min. | Typ.* | Max. | Unit | Condition |
|---|---|---|---|---|---|---|---|
| Current Transfer Ratio | EL205 | CTR | 40 | - | 80 | % | $I_F$ = 10mA ,$V_{CE}$ = 5V |
| | EL206 | | 63 | - | 125 | | |
| | EL207 | | 100 | - | 200 | | |
| | EL208 | | 160 | - | 320 | | |
| | EL211 | | 20 | - | - | | |
| | EL212 | | 50 | - | - | | |
| | EL213 | | 100 | - | - | | |
| Current Transfer Ratio | EL205 | CTR | 13 | 25 | - | % | $I_F$ = 1mA ,$V_{CE}$ = 5V |
| | EL206 | | 22 | 40 | - | | |
| | EL207 | | 34 | 60 | - | | |
| | EL208 | | 56 | 95 | - | | |
| | EL215 | | 20 | 50 | - | | |
| | EL216 | | 50 | 80 | - | | |
| | EL217 | | 100 | 130 | - | | |
| Collector-emitter saturation voltage | | $V_{CE(sat)}$ | - | - | 0.4 | V | $I_F$ = 10mA , $I_C$ = 2mA |
| Isolation resistance | | $R_{IO}$ | - | $10^{11}$ | - | Ω | $V_{IO}$ = 500Vdc |
| Input-output capacitance | | $C_{IO}$ | - | 0.5 | - | pF | $V_{IO}$ = 0, f = 1MHz |

**Transfer Characteristics ( Continue )**

| | | | | | | |
|---|---|---|---|---|---|---|
| Turn-on time | $T_{on}$ | - | 3.0 | - | μs | $V_{CC}$ = 10V, $I_C$ = 2mA, $R_L$ = 100Ω |
| Turn-off time | $T_{off}$ | - | 3.0 | - | | |
| Rise time | $T_r$ | - | 1.6 | - | | |
| Fall time | $T_f$ | - | 2.2 | - | | |

* Typical values at $T_a$ = 25°C

# 8 PIN SOP PHOTOTRANSISTOR PHOTOCOUPLER

# EL20X / 21X series

## Typical Performance Curves

Figure 1. Forward Current vs Forward Voltage

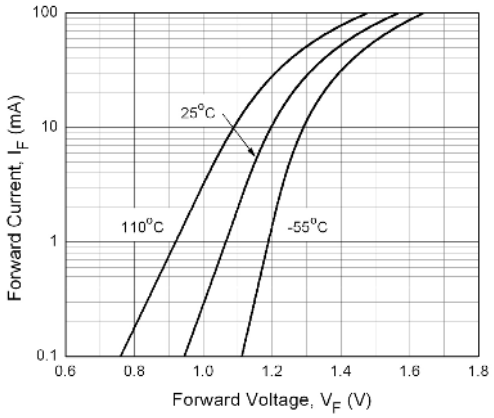



Figure 2. Normalized Collector Current vs. Forward Current

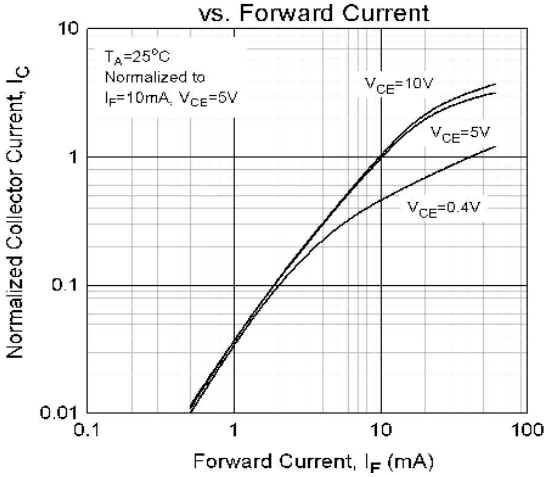



Figure 3. Normalized Collector Current vs Ambient Temperature

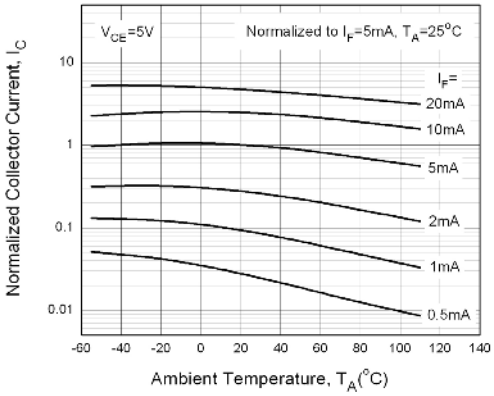



Figure 4. Collector Dark Current vs Ambient Temperature

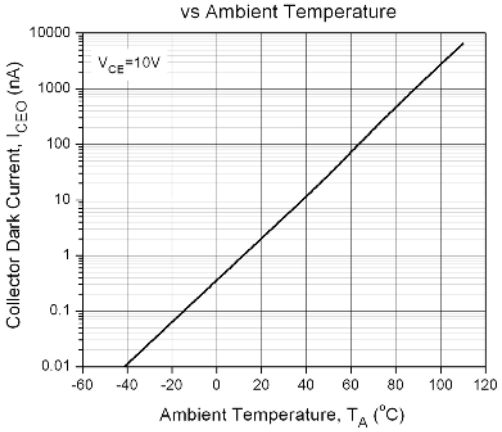



Figure 5. Collector Current vs Collector-Emitter Voltage

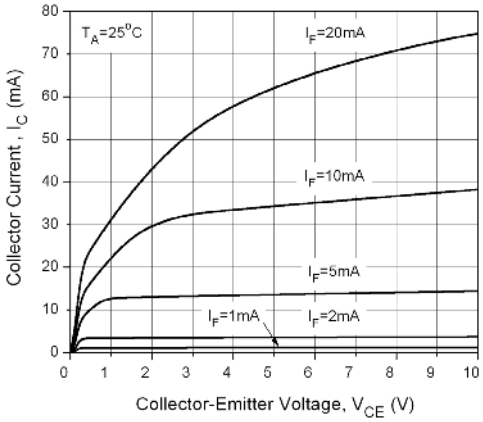



Figure 6. Collector Current vs Collector-Emitter Voltage

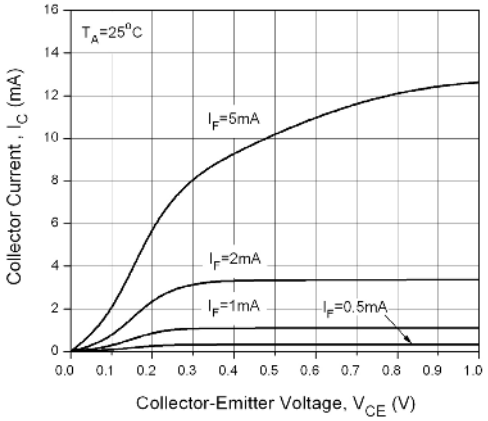
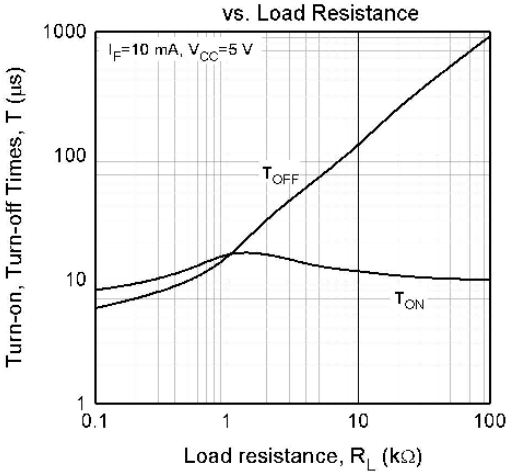


Figure 7. Turn-on, Turn-off Times vs. Load Resistance



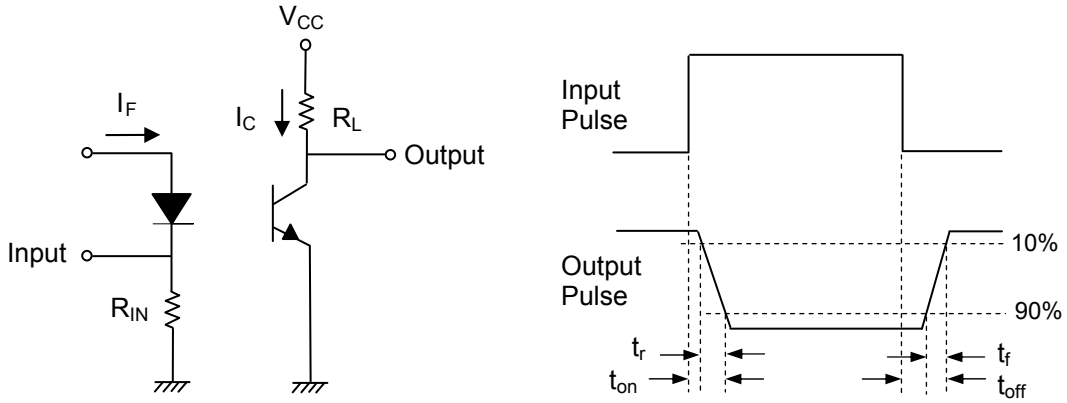




**Figure 8. Switching Time Test Circuit & Waveforms**

## Order Information

### Part Number

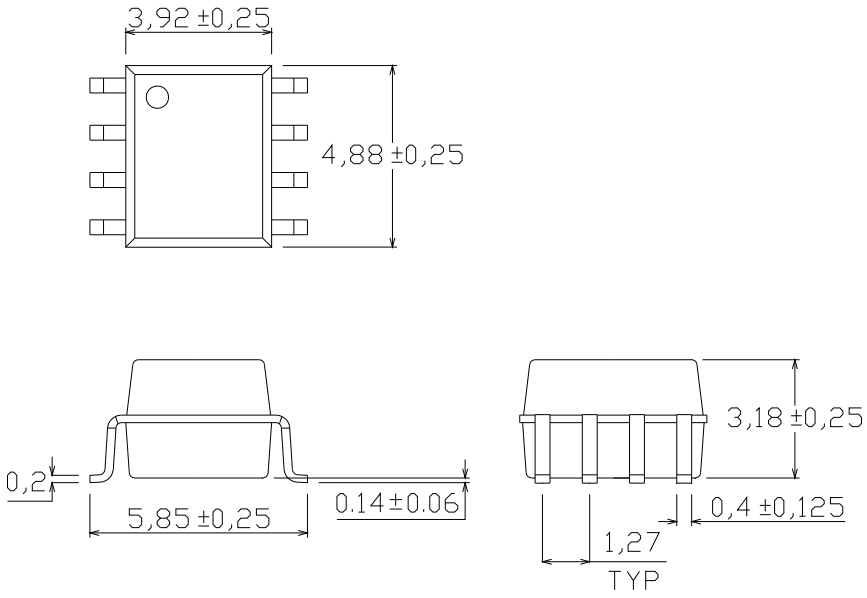
# EL2XX(Y)-V

Note
XX = Part no. (05, 06, 07, 08, 11, 12, 13, 15, 16 or 17)
Y = Tape and reel option (TA, TB or none).
V = VDE safety (Optional)

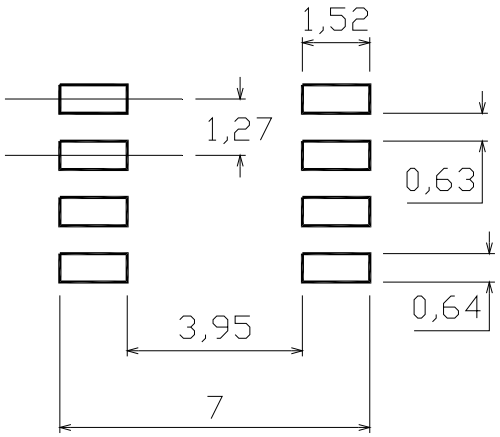
| Option | Description | Packing quantity |
|---|---|---|
| None | Standard | 100 units per tube |
| -V | Standard + VDE | 100 units per tube |
| (TA) | TA tape & reel option | 2000 units per reel |
| (TB) | TB tape & reel option | 2000 units per reel |
| (TA)-V | TA tape & reel option + VDE | 2000 units per reel |
| (TB)-V | TB tape & reel option + VDE | 2000 units per reel |

## Package Drawings

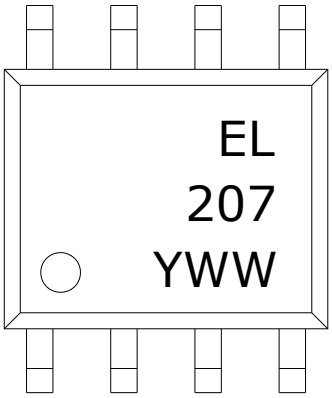
**(Dimensions in mm)**




**Recommended pad layout for suface mount leadfrom**



## Device Marking




**Notes**

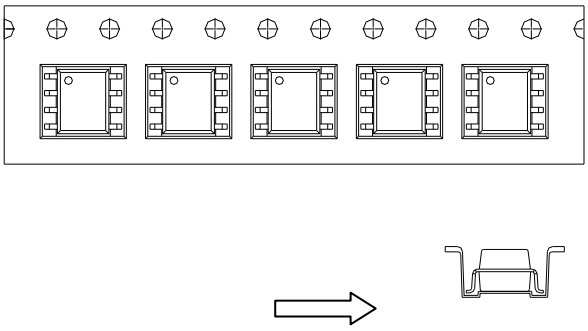
| | |
|---|---|
| EL | denotes Everlight |
| 207 | denotes Part Number |
| Y | denotes 1 digit Year code |
| WW | denotes 2 digit Week code |

# 8 PIN SOP PHOTOTRANSISTOR PHOTOCOUPLER

# EL20X / 21X series

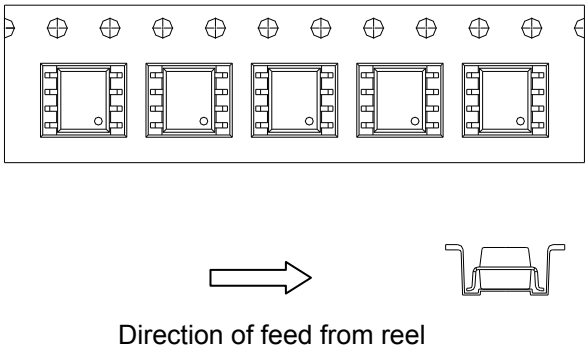
## Tape & Reel Packing Specifications

**Option TA**



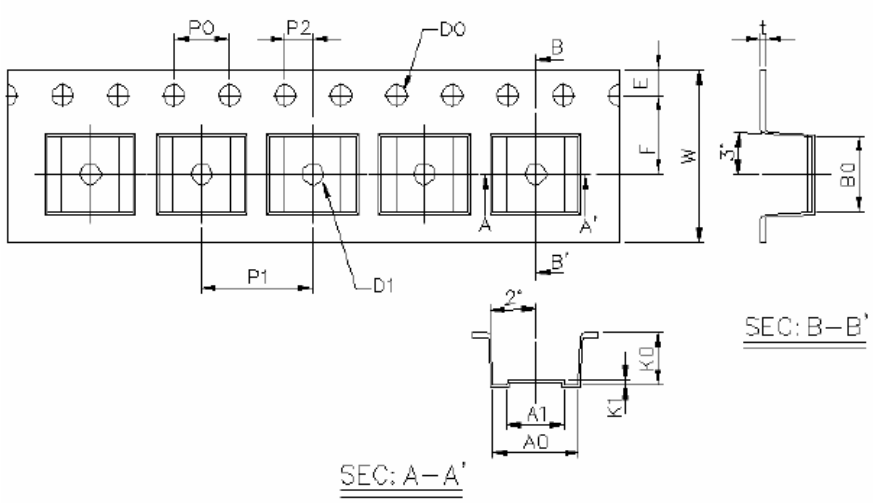
Direction of feed from reel

**Option TB**



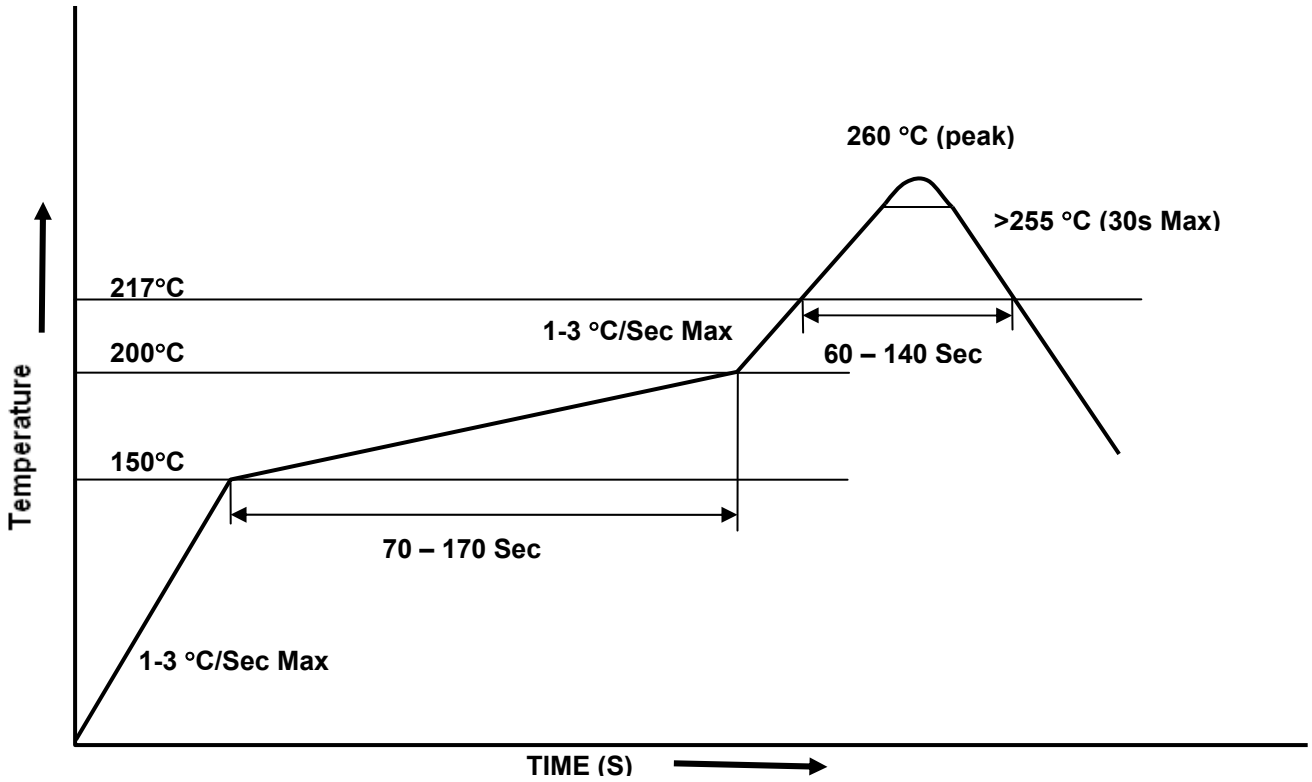
Direction of feed from reel

## Tape dimensions




| Dimension No. | **A0** | **A1** | **B0** | **D0** | **D1** | **E** | **F** |
|---|---|---|---|---|---|---|---|
| Dimension(mm) | 6.2±0.1 | 4.1±0.1 | 5.28±0.1 | 1.5±0.1 | 1.5±0.3 | 1.75±0.1 | 5.5±0.1 |
| Dimension No. | **Po** | **P1** | **P2** | **t** | **W** | **K0** | **K1** |
| Dimension(mm) | 4.0±0.1 | 8.0±0.1 | 2.0±0.1 | 0.4±0.1 | 12.0+0.3/ -0.1 | 3.7±0.1 | 0.3±0.1 |

## Solder Reflow Temperature Profile



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