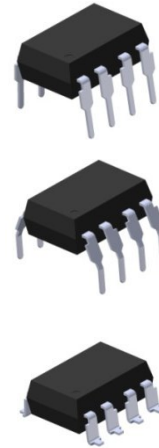


8PIN DIP IGBT/MOSFET 3.0A Output Current GATE DRIVER PHOTOCOUPLER EL3184

Features:

- Guaranteed performance from -40 to 100
- Peak Output Current : $I_{OP} = \pm 3.0A$ (max)
- Threshold Input Current: $I_{FLH} = 5$ mA (max)
- Common mode transient immunity : $\pm 15kV/\mu s$ (min)
- High isolation voltage between input and output (Viso=5000 V rms)
- Use P-channel MOSFET at output stage
- Pb free and RoHS compliant.
- cUL approved (E214129)
- VDE approved (40028391)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved



Description

The EL3184 consists of an infrared light emitting diodes and integrated high gain, high-speed photo detectors. The device is housed in a 8 pin DIP package.

The photo detector has an internal shield that provides a guaranteed common-mode transient immunity of ± 15 kV/ μs . It is suitable for direct gate driving circuit for IGBTs or power MOSFETs.

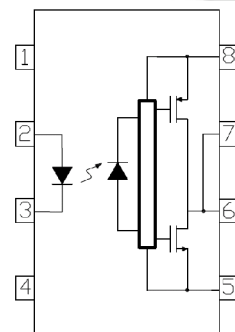
Applications

- Isolated IGBT/Power MOSFET gate drive
- Industrial Inverter
- AC brushless and DC motor drives
- Inverter for home appliances

Truth Table

| Input | $V_{CC}-V_{EE}$ | $V_{CC}-V_{EE}$ | Output |
|-------|-----------------|-----------------|------------|
| | Positive Going | Negative Going | |
| L | 0 to 30 V | 0 to 30V | L |
| H | 0 to 11.5V | 0 to 10V | L |
| H | 11.5 to 13.5V | 10 to 12V | Transition |
| H | 13.5 to 30V | 12 to 30V | H |

Schematic



Pin Configuration

- 1, NC
- 2, Anode
- 3, Cathode
- 4, NC
- 5, V_{EE}
- 6, V_{O2}
- 7, V_{O1}
- 8, V_{CC}

8PIN DIP IGBT/MOSFET 3.0A Output Current GATE DRIVER PHOTOCOUPLER EL3184

Absolute Maximum Ratings (T_A=25°C)

| Parameter | | Symbol | Rating | Unit |
|--------------------------------------|---------------------------------------|----------------------------------|------------|-------|
| Input | Forward current | I _F | 25 | mA |
| | Pulse Forward Current* ¹ | I _{FP} | 1 | A |
| | Reverse voltage | V _R | 5 | V |
| Output | "H" Peak Output current* ² | I _{OPH} | 3 | A |
| | "L" Peak Output Current* ² | I _{OPL} | 3 | A |
| | Peak Output Voltage | V _O | 35 | V |
| | Supply Voltage | V _{CC} -V _{EE} | 0 to 35 | V |
| | Power Dissipation | P _C | 250 | mW |
| Operating frequency* ³ | | f | 50 | KHz |
| Isolation voltage * ⁴ | | V _{ISO} | 5000 | V rms |
| Total Power Dissipation | | P _T | 300 | mW |
| Operating temperature | | T _{OPR} | -40 ~ +100 | °C |
| Storage temperature | | T _{STG} | -55 ~ +125 | °C |
| Soldering temperature * ⁵ | | T _{SOL} | 260 | °C |

Notes

*1 Pulse width ≤ 1 μs, 300pps.

*2 Max. pulse width=10us, max. duty cycle =1.1%

*3 Exponential waveform pulse width P_w ≤ 0.3us, I_{OPH}≥-2.5A, I_{OPL}≤2.5A,

*4 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1 to 4 are shorted together, and pins 5 to 8 are shorted together.

*5 For 10 seconds.

8PIN DIP IGBT/MOSFET

3.0A Output Current GATE DRIVER PHOTOCOUPLER

EL3184

Electrical Characteristics

Apply over all recommended condition, typical value is measured at $V_{CC}=30V$, $V_{EE}=$ ground, $T_A=25^{\circ}C$ unless specified otherwise.

Input

| Parameter | Symbol | Min. | Typ.* | Max. | Unit | Condition |
|--------------------------------------------|-------------------------|------|-------|------|-----------------|--------------------|
| Forward voltage | V_F | - | 1.4 | 1.8 | V | $I_F = 10mA$ |
| Reverse voltage | V_R | 5.0 | - | - | V | $I_R = 10\mu A$ |
| Temperature coefficient of forward voltage | $\Delta V_F/\Delta T_A$ | - | -1.9 | - | mV/ $^{\circ}C$ | $I_F = 10mA$ |
| Input capacitance | C_{IN} | - | 60 | - | pF | $V_F=0$, $f=1MHz$ |

Output

| Parameter | Symbol | Min. | Typ.* | Max. | Unit | Condition |
|---------------------------|-----------|------|-------|------|------|---------------------------------|
| High level supply current | I_{CCH} | - | 1.65 | 3.8 | mA | $I_F=7$ to $10mA$, $V_O=$ Open |
| Low level supply current | I_{CCL} | - | 1.55 | 3.8 | | $V_F=0$ to $0.8V$, $V_O=$ Open |

Transfer Characteristics

| Parameter | Symbol | Min. | Typ.* | Max. | Unit | Condition |
|-----------------------------------------|-------------|---------------|-------|---------------|------|---------------------------|
| High Level Output Current* ⁶ | I_{OH} | - | - | -0.5 | A | $V_O=V_{CC}-1.5V$ |
| | | - | - | -2.5 | | $V_O=V_{CC}-6V$ |
| Low Level Output Current* ⁶ | I_{OL} | 0.5 | - | - | A | $V_O=V_{EE}+1.5V$ |
| | | 2.5 | - | - | | $V_O=V_{EE}+6V$ |
| High Level Output Voltage | V_{OH} | $V_{CC}-6.25$ | - | - | V | $I_F=10mA$, $I_O=-2.5A$ |
| | | $V_{CC}-0.5$ | - | - | | $I_F=10mA$, $I_O=-100mA$ |
| Low Level Output Voltage | V_{OL} | - | - | $V_{EE}+6.25$ | V | $I_F=0mA$, $I_O=2.5A$ |
| | | - | - | $V_{EE}+0.5$ | | $I_F=0mA$, $I_O=100mA$ |
| Input Threshold Current | I_{FLH} | - | 3.1 | 7 | mA | $I_O=0mA$, $V_O > 5V$ |
| Input Threshold Voltage | V_{FHL} | 0.8 | - | - | V | $I_O=0mA$, $V_O < 5V$ |
| Under Voltage Lockout Threshold | V_{UVLO+} | 11.5 | - | 13.5 | V | $I_F=10mA$, $V_O > 5V$ |
| Under Voltage Lockout Threshold | V_{UVLO-} | 10.0 | - | 12.0 | V | $I_F=10mA$, $V_O < 5V$ |

8PIN DIP IGBT/MOSFET

3.0A Output Current GATE DRIVER PHOTOCOUPLER

EL3184

Switching Characteristics

Apply over all recommended condition, typical value is measured at $V_{CC}=30V$, $V_{EE}=\text{ground}$, $T_A=25^\circ C$ unless specified otherwise.

| Parameter | Symbol | Min. | Typ.* | Max. | Unit | Condition |
|------------------------------------------------------------|-----------------------|------|-------|------|-------------|----------------------------------------------------------------------------------------------|
| Propagation delay time to output High level | t_{PLH} | 150 | 215 | 250 | ns | $I_F=10mA$ $C_L=10nF$, $R_L=10\Omega$, $f=250KHz$, Duty=50%, $T_A=25^\circ C$ |
| Propagation delay time to output Low level | t_{PHL} | 150 | 195 | 250 | ns | |
| Pulse width distortion | $ t_{PHL} - t_{PLH} $ | - | 20 | 80 | ns | |
| Propagation Delay Skew* ⁷ | t_{PSK} | -90 | - | 90 | ns | |
| Output rise time | t_r | - | 55 | - | ns | |
| Output fall time | t_f | - | 55 | - | ns | |
| UVLO Turn on Delay | $t_{UVLO\ ON}$ | | 30 | | us | |
| UVLO Turn off Delay | $t_{UVLO\ OFF}$ | | 0.4 | | us | $I_F=10mA$, $V_O<5V$ |
| Common Mode Transient Immunity at Logic High* ⁸ | CM_H | -15 | - | - | kV/ μS | $I_F=10$ to $16mA$, $V_{CC}=30V$, $R_L=350\Omega$, $T_A=25^\circ C$ $V_{CM}=2kVp-p$ |
| Common Mode Transient Immunity at Logic Low* ⁹ | CM_L | 15 | - | - | kV/ μS | $V_F=0V$, $V_{CC}=30V$, $R_L=350\Omega$, $T_A=25^\circ C$ $V_{CM}=2kVp-p$ |

Notes:

*6 Max. pulse width=10us, max. duty cycle =1.1%

*7 Propagation delay skew is defined as the difference between the largest and smallest propagation delay times (i.e. t_{PHL} or t_{PLH}) of multiple samples. Evaluations of these samples are conducted under identical test conditions (supply voltage, input current, temperature, etc).

*8 Common mode transient immunity at output high is the maximum tolerable negative dv/dt on the trailing edge of the common mode impulse signal, V_{CM} , to assure that the output will remain high (i.e. $V_O>15.0V$)

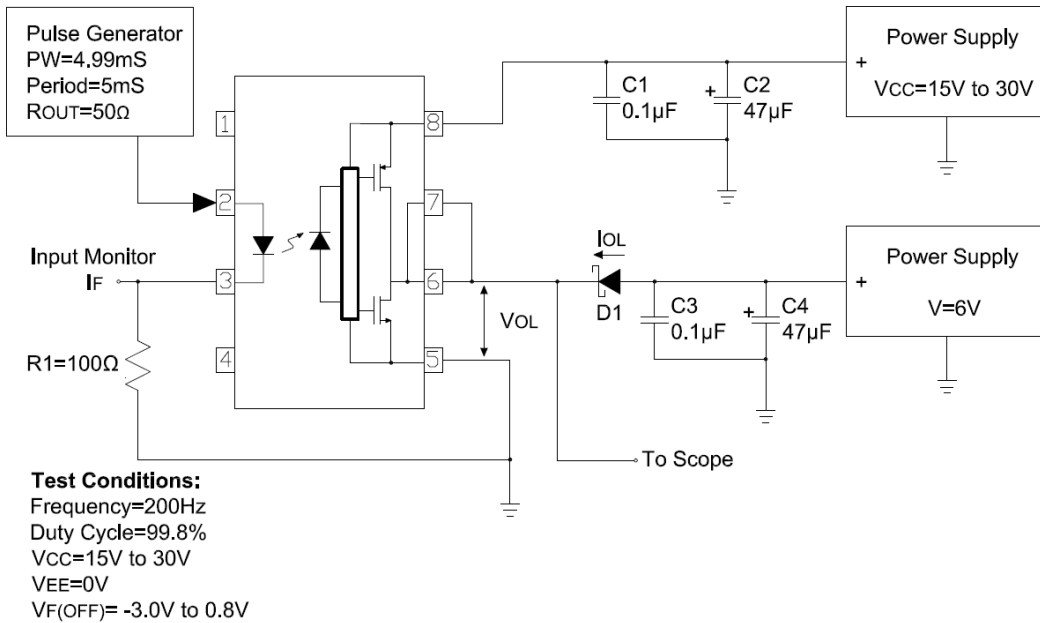
*9 Common mode transient immunity at output low is the maximum tolerable positive dv/dt on the leading edge of the common mode pulse signal, V_{CM} , to assure that the output will remain low (i.e. $V_O<1.0V$)

Test Circuit

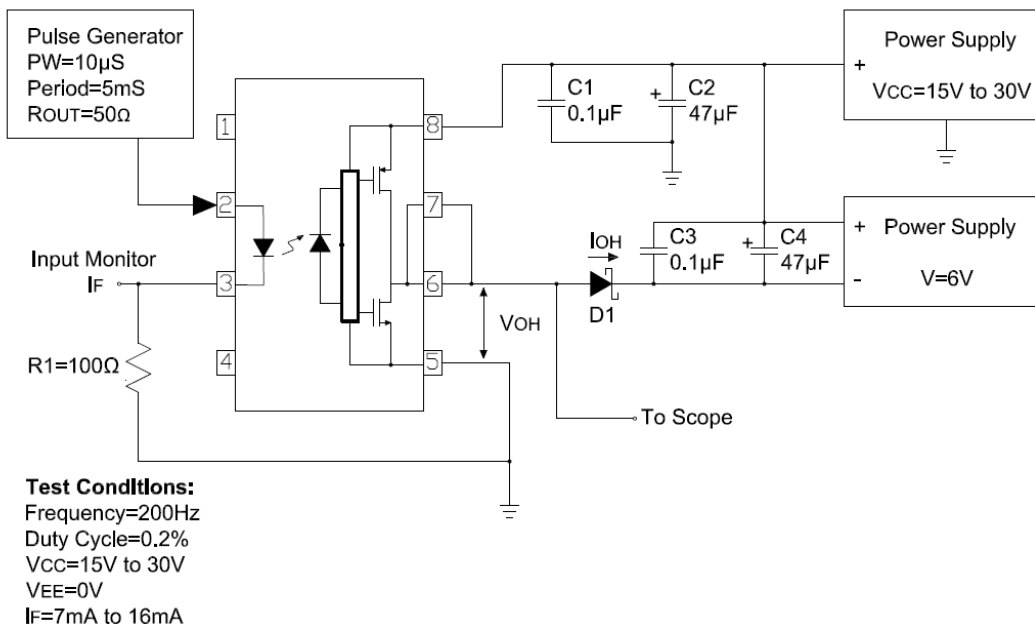
8PIN DIP IGBT/MOSFET

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IoL Test Circuit

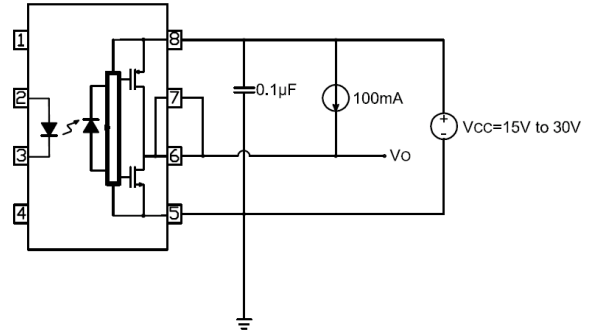
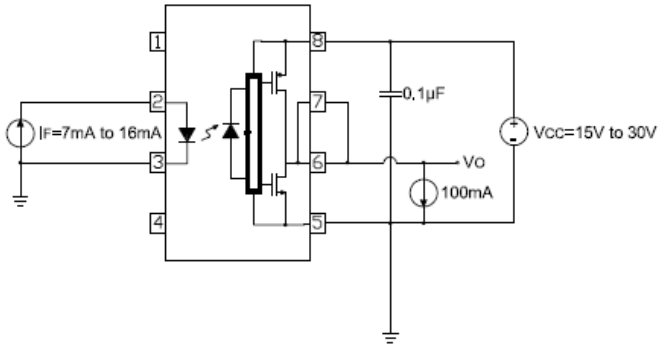


IoH Test Circuit

8PIN DIP IGBT/MOSFET

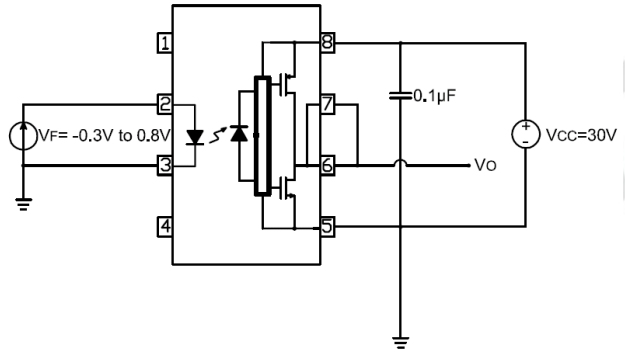
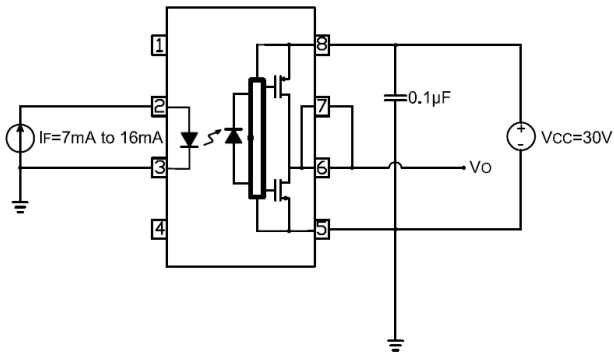
3.0A Output Current GATE DRIVER PHOTOCOUPLER

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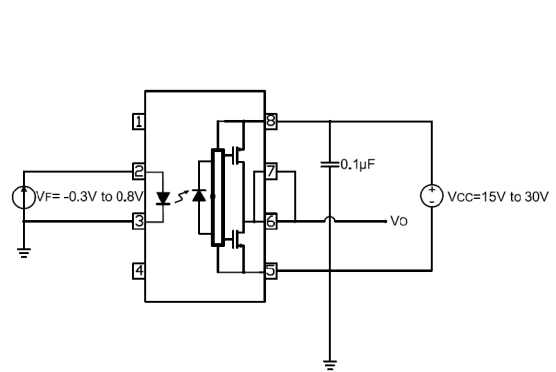
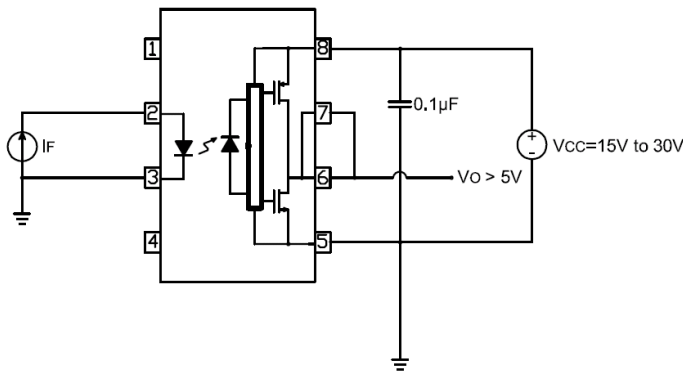
I_F Test Circuit

V_{OH} Test Circuit



I_{OH} Test Circuit

V_{OL} Test Circuit



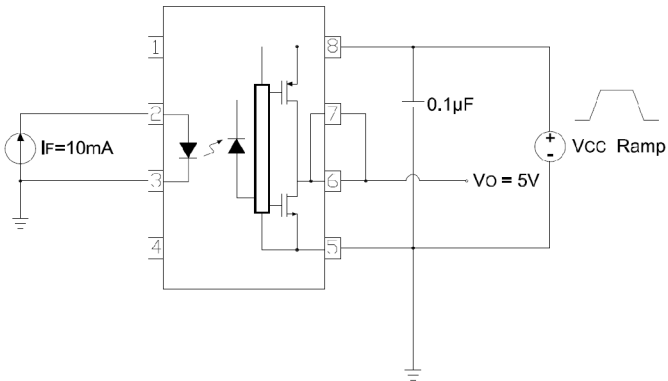
I_{CH} Test Circuit

I_{CL} Test Circuit

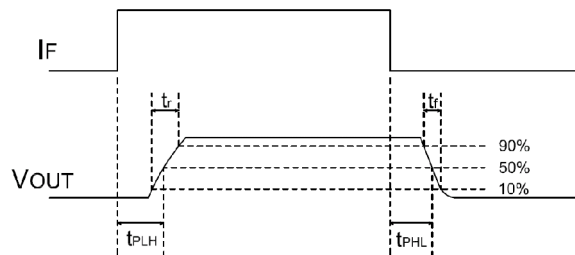
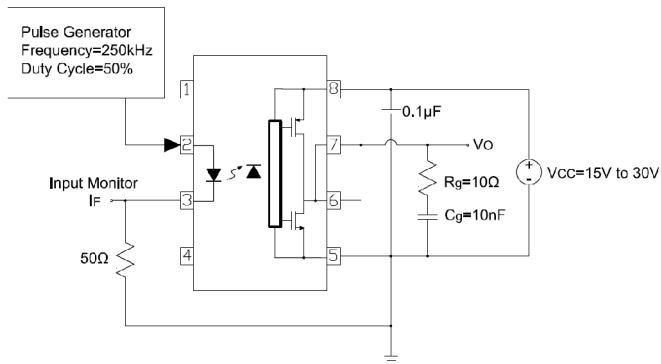
8PIN DIP IGBT/MOSFET

3.0A Output Current GATE DRIVER PHOTOCOUPLER

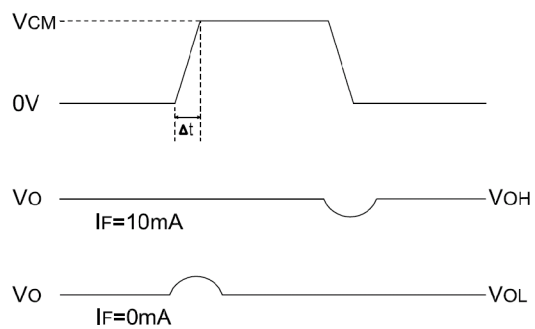
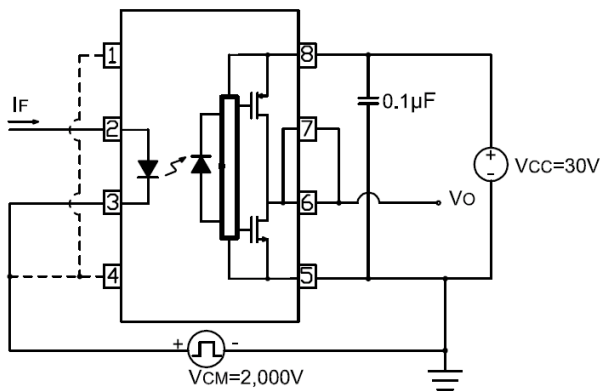
EL3184



U_{VLO} Test Circuit



t_{PHL}, t_{PLH}, t_r and t_f Test Circuit and Waveforms



CMR Test Circuit and Waveforms

8PIN DIP IGBT/MOSFET

3.0A Output Current GATE DRIVER PHOTOCOUPLER

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Typical Performance Curves

Fig.1 Output High Voltage Drop vs. Output High Current

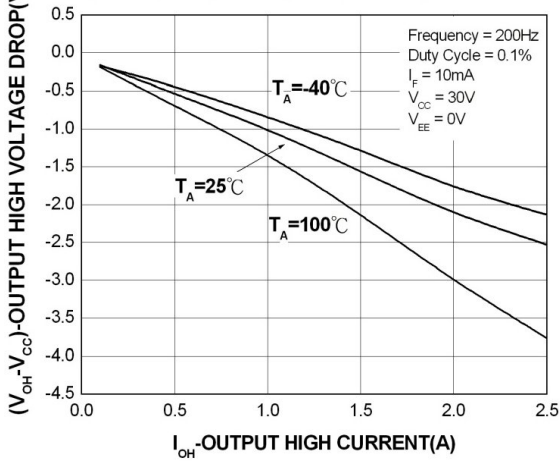


Fig.2 Output High Voltage Drop vs. Ambient Temperature

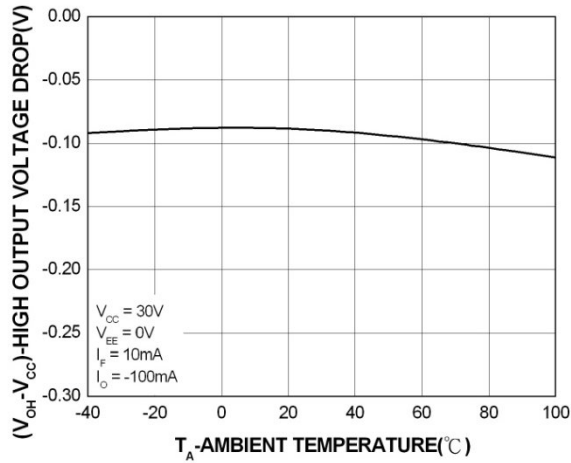


Fig.3 Output High Current vs. Ambient Temperature

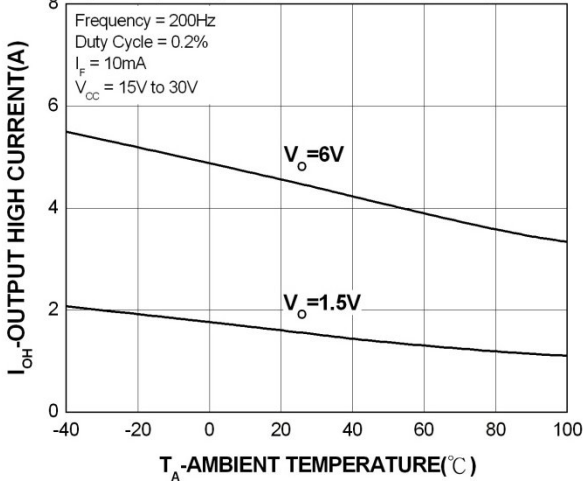
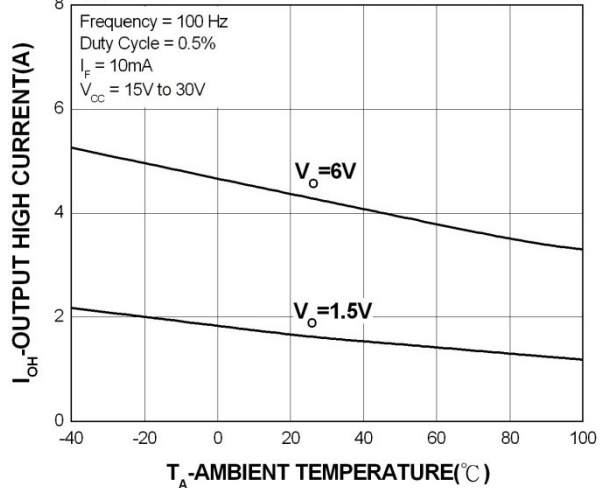


Fig.4 Output High Current vs. Ambient Temperature



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Fig.5 Output Low Voltage vs. Output Low Current

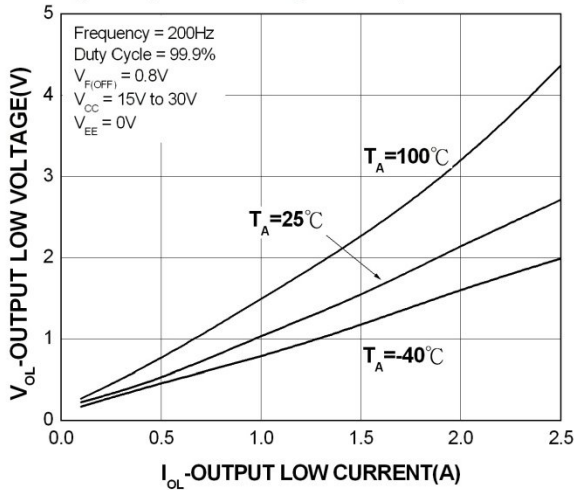


Fig.6 Output Low Voltage vs. Ambient Temperature

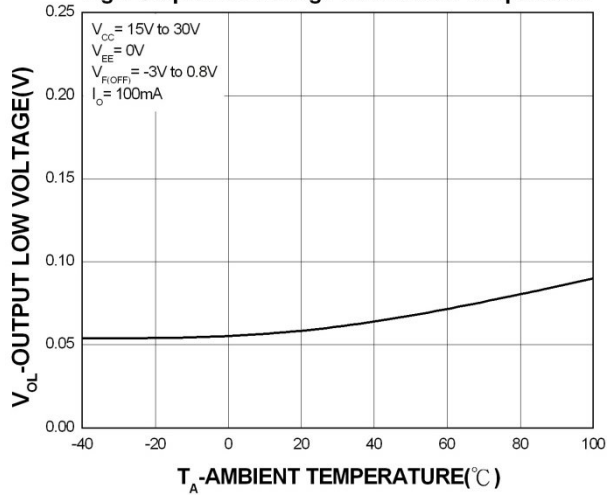


Fig.7 Output Low Current vs. Ambient Temperature

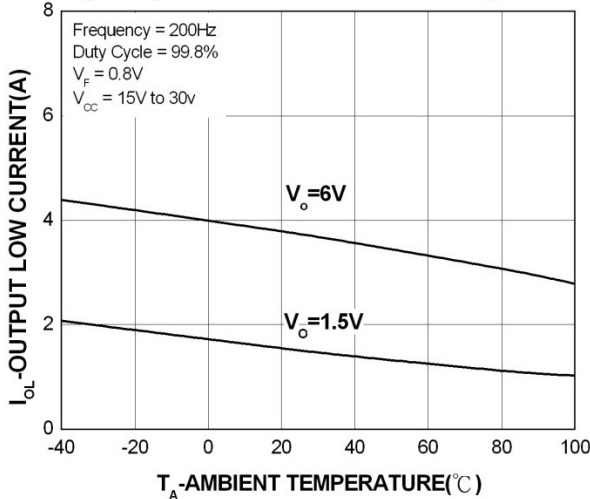


Fig.8 Output Low Current vs. Ambient Temperature

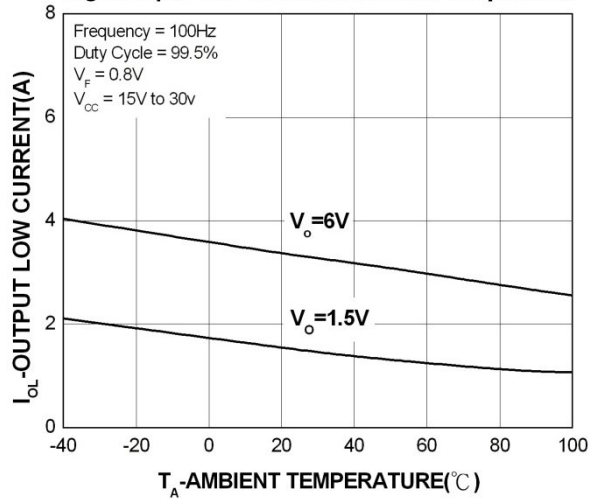


Fig.9 Supply Current vs. Ambient Temperature

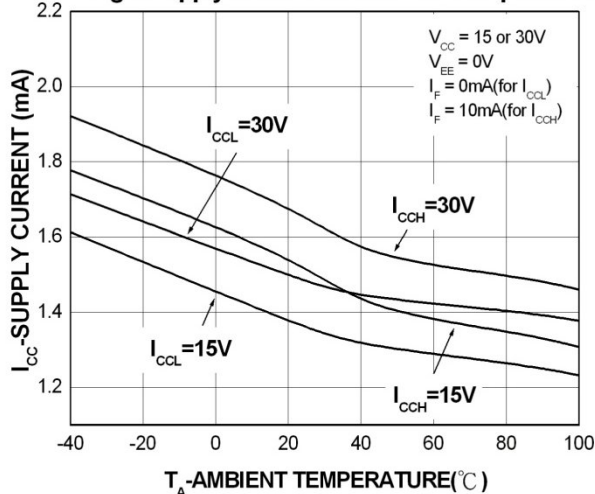
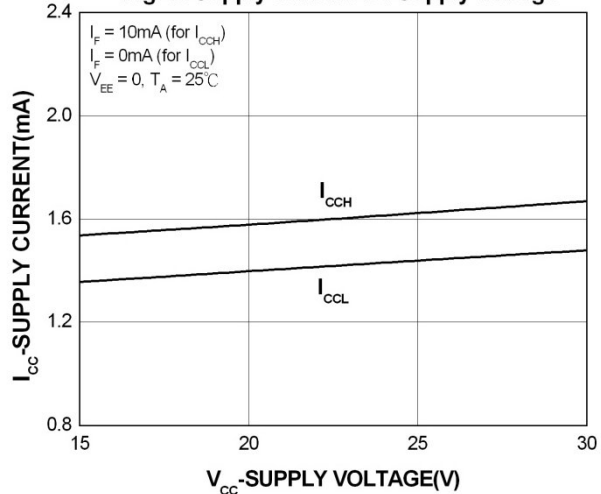


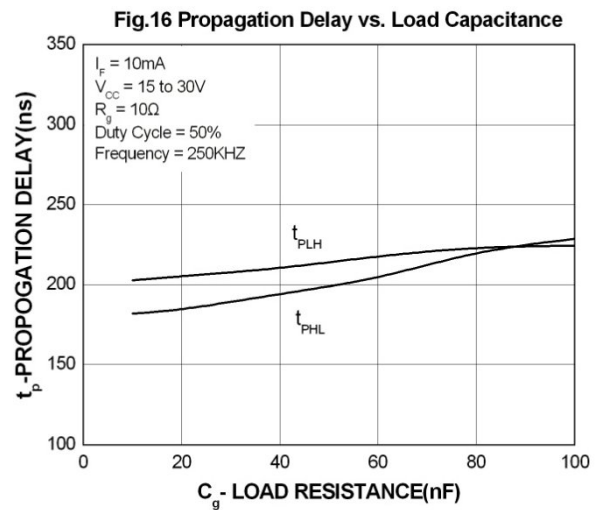
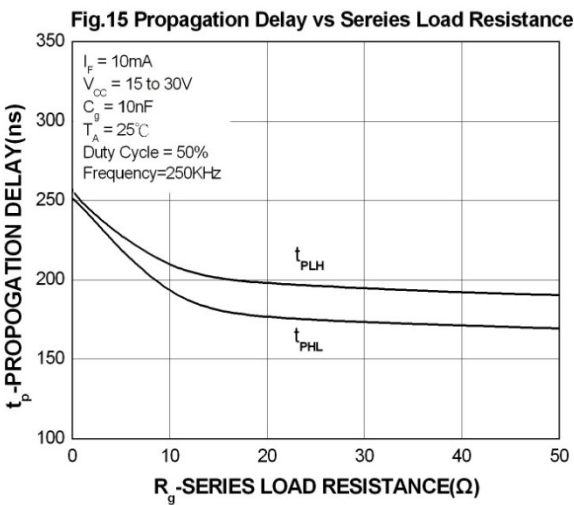
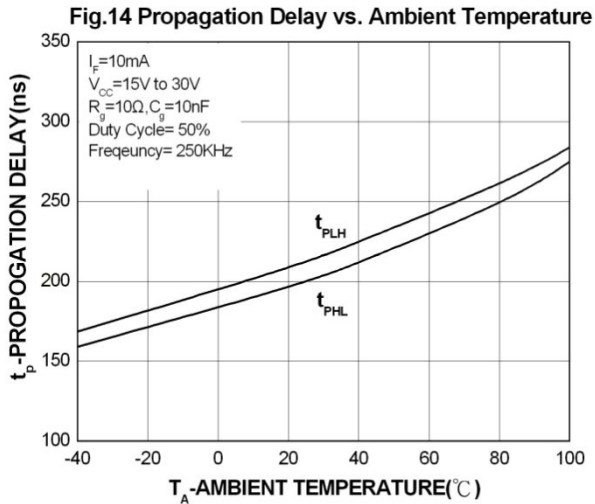
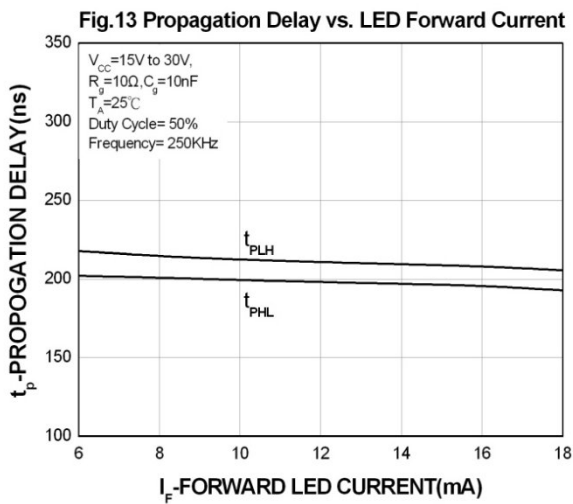
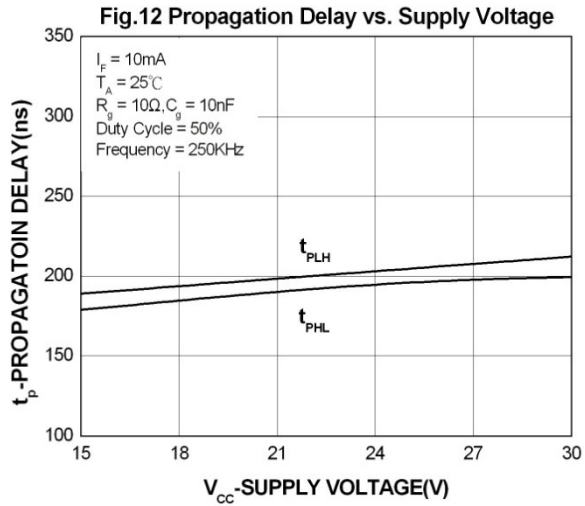
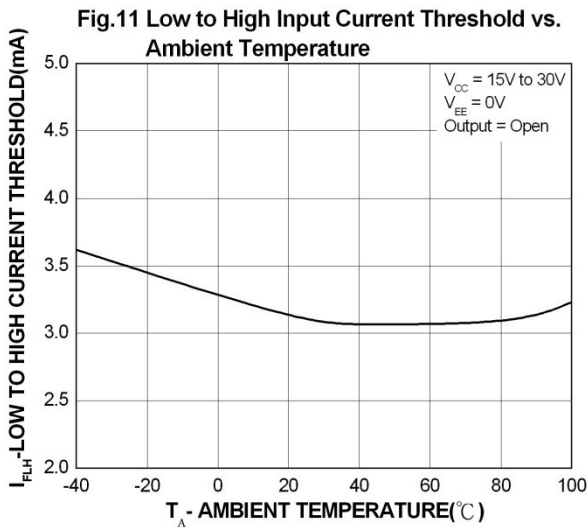
Fig.10 Supply Current vs. Supply Voltage



8PIN DIP IGBT/MOSFET

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8PIN DIP IGBT/MOSFET

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Fig.17 Transfer Characteristics

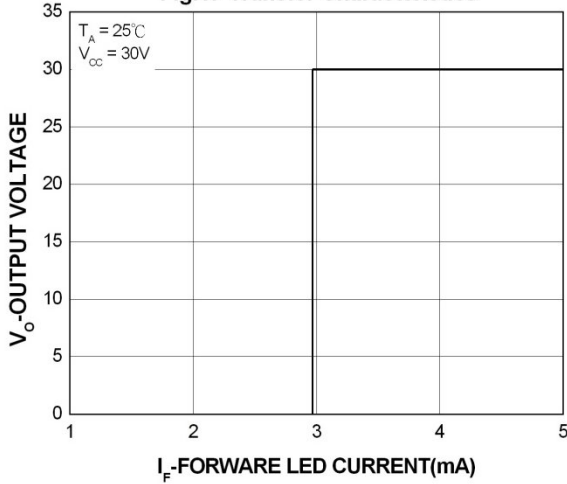


Fig.18 Input Forward Current vs. Forward Voltage

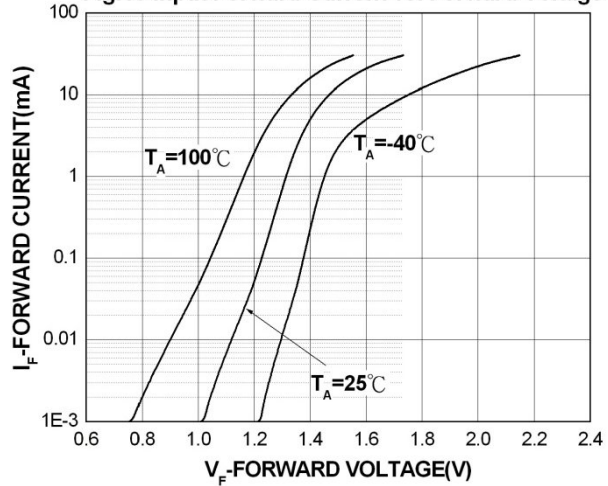
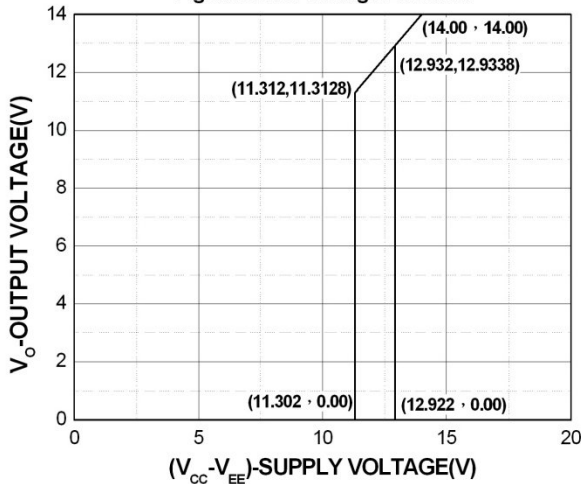


Fig.19 Under Voltage Lockout



Order Information

Part Number

EL3184Y(Z)-V

Note

- Y = Lead form option (S, M or none)
- Z = Tape and reel option (TA, TB or none).
- V = VDE (optional)

| Option | Description | Packing quantity |
|--------|-------------|-------------------|
| None | Standard | 45 units per tube |

8PIN DIP IGBT/MOSFET

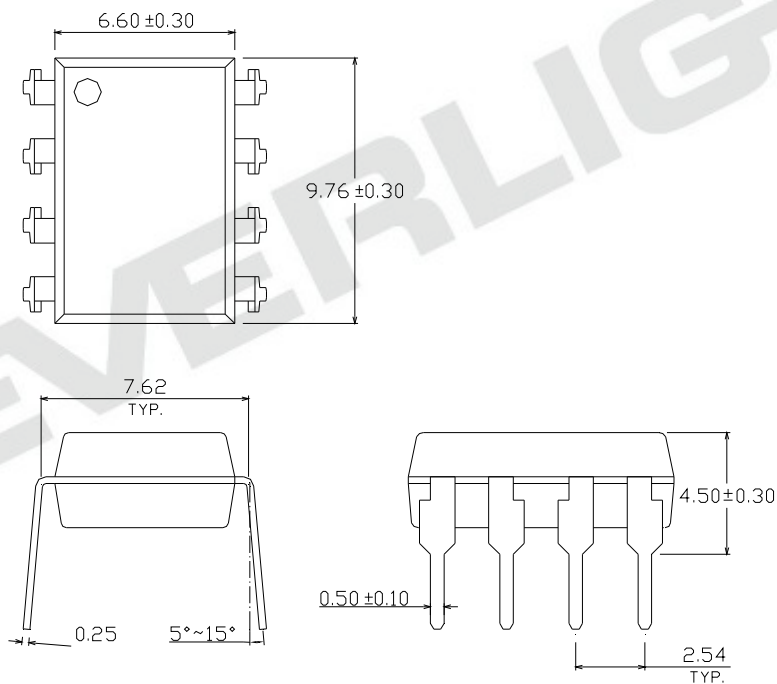
3.0A Output Current GATE DRIVER PHOTOCOUPLER

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| | | |
|------|-------------------------------------------------|---------------------|
| M | Wide lead bend (0.4 inch spacing) | 45 units per tube |
| (TA) | Surface mount lead form + TA tape & reel option | 1000 units per reel |
| (TB) | Surface mount lead form + TB tape & reel option | 1000 units per reel |

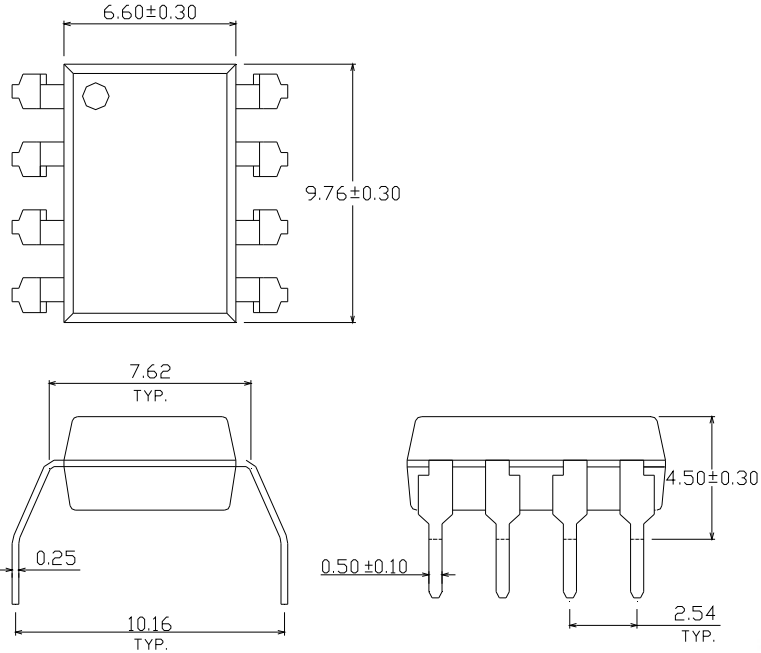
Package Drawing (Dimensions in mm)

Standard DIP Type

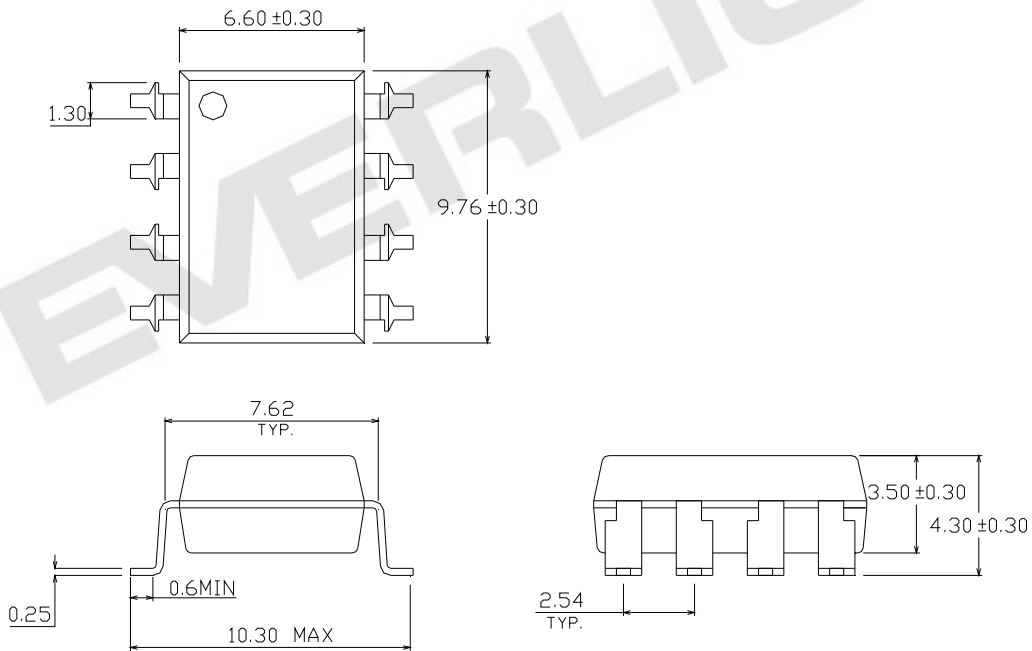


Option M Type

8PIN DIP IGBT/MOSFET 3.0A Output Current GATE DRIVER PHOTOCOUPLER EL3184



Option S Type

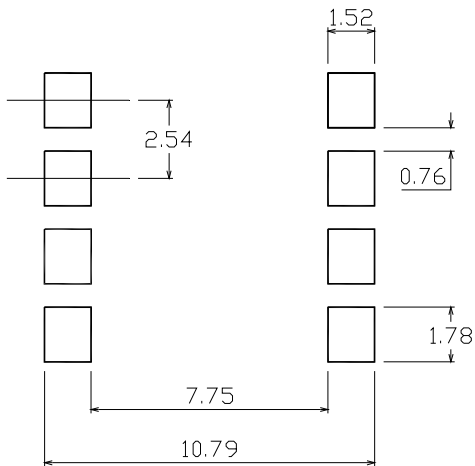


Recommended pad layout for surface mount leadform

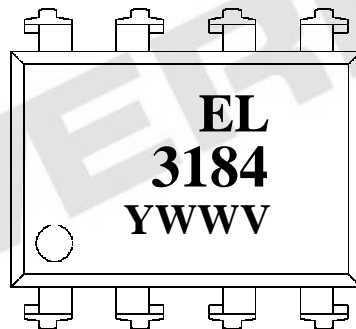
8PIN DIP IGBT/MOSFET

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Device Marking



Notes

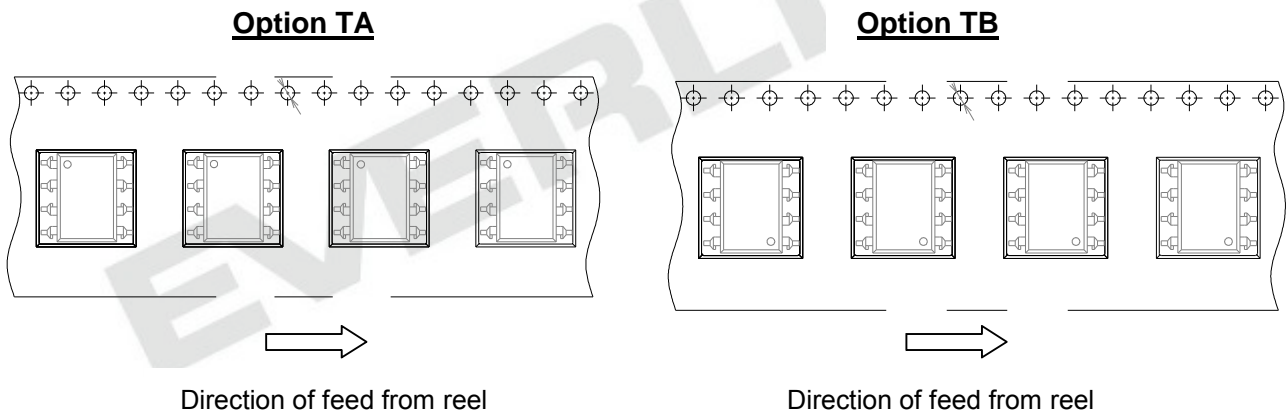
- 3184 denotes Device Number
- Y denotes 1 digit Year code
- WW denotes 2 digit Week code
- V denotes VDE (optional)

8PIN DIP IGBT/MOSFET

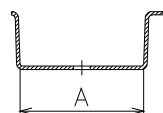
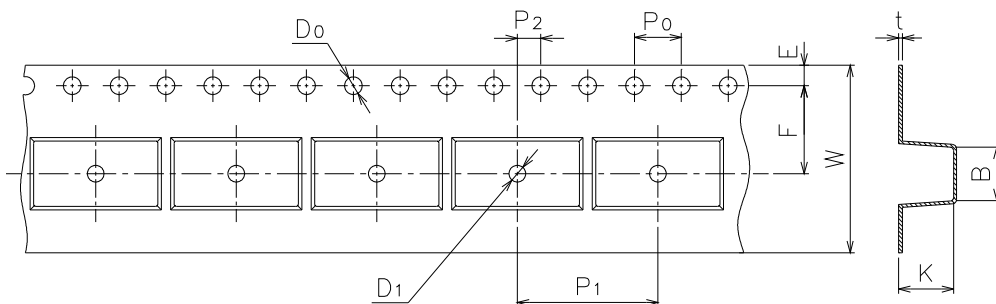
3.0A Output Current GATE DRIVER PHOTOCOUPLER

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Tape & Reel Packing Specifications



Tape dimensions



Expired Period: Forever

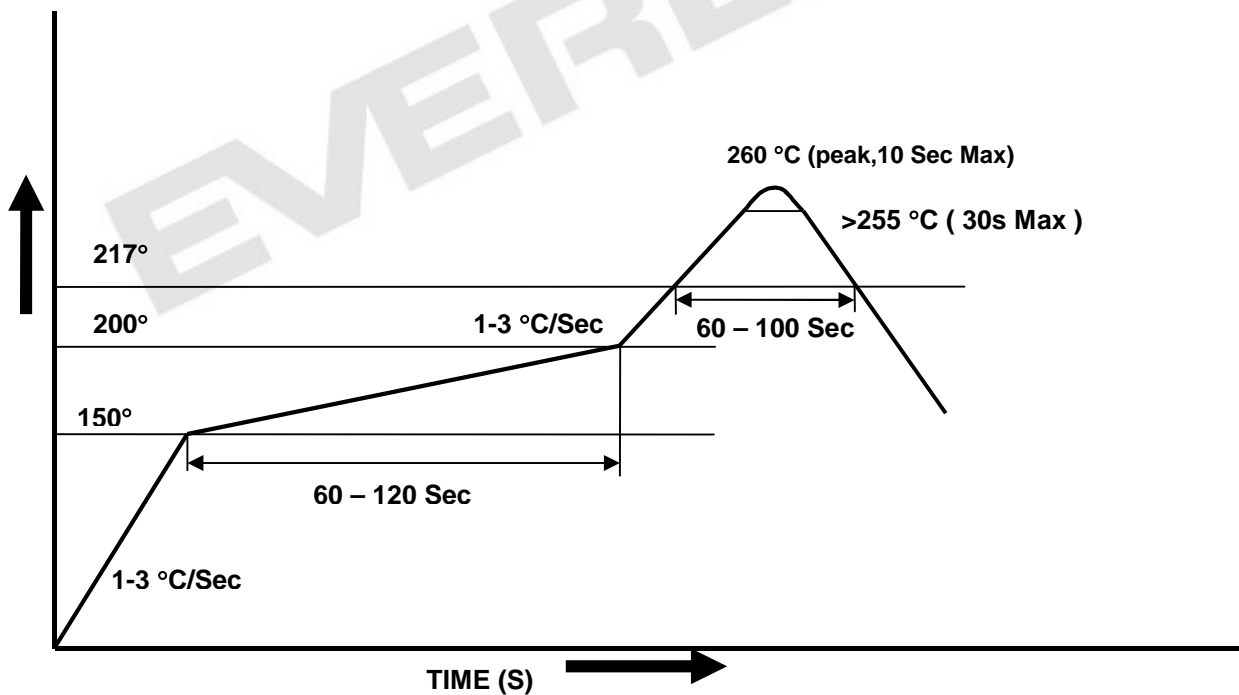
8PIN DIP IGBT/MOSFET

3.0A Output Current GATE DRIVER PHOTOCOUPLER

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| | | | | | | |
|---------------|-----------|-----------|-----------|-----------|-------------------|----------|
| Dimension No. | A | B | Do | D1 | E | F |
| Dimension(mm) | 10.4±0.1 | 10.0±0.1 | 1.5±0.1 | 1.5±0.1 | 1.75±0.1 | 7.5±0.1 |
| Dimension No. | Po | P1 | P2 | t | W | K |
| Dimension(mm) | 4.0±0.1 | 12.0±0.1 | 2.0±0.1 | 0.4±0.1 | 16.0+0.3/ -0.1 | 4.5±0.1 |

Solder Reflow Temperature Profile



8PIN DIP IGBT/MOSFET

3.0A Output Current GATE DRIVER PHOTOCOUPLER

EL3184

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2. When using this product, please observe the absolute maximum ratings and the instructions for using outlined in these specification sheets. EVERLIGHT assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.
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