

PS9332L, PS9332L2

Data Sheet

2.0 A OUTPUT CURRENT, HIGH CMR, IGBT GATE DRIVE,
 ACTIVE MILLER CLAMP, 8-PIN SDIP PHOTOCOUPLER

R08DS0105EJ0100

Rev.1.00

Sep 06, 2013

DESCRIPTION

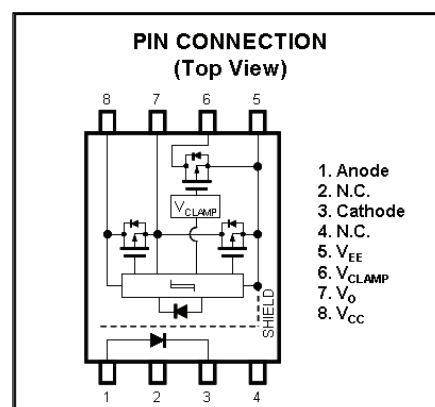
The PS9332L and PS9332L2 are optical coupled isolators containing a GaAlAs LED on the input side and a photo diode, a signal processing circuit and a power output transistor on the output side on one chip.

The PS9332L and PS9332L2 are designed specifically for high common mode transient immunity (CMR), high output current, active miller clamp and high switching speed.

The PS9332L and PS9332L2 are suitable for driving IGBTs and MOS FETs.

FEATURES

- Long creepage distance (8 mm MIN.: PS9332L2)
- Peak output current (2.0 A MAX., 1.5 A MIN.)
- High speed switching (t_{PLH} , t_{PHL} = 200 ns MAX.)
- UVLO (Under Voltage Lock Out) protection with hysteresis
- Built-in Active Miller Clamp
- High common mode transient immunity (CM_H , CM_L = ± 50 kV/ μ s MIN.)
- Operating Ambient Temperature (125 °C)
- Embossed tape product : PS9332L-E3, PS9332L2-E3: 2 000 pcs/reel
- Pb-Free product
- <R> • Safety standards
 - UL approved: No. E72422
 - CSA approved: No. CA 101391 (CA5A, CAN/CSA-C22.2 60065, 60950)
 - SEMKO approved (EN 60065, EN 60950)
 - DIN EN 60747-5-5 (VDE 0884-5) approved (Option)

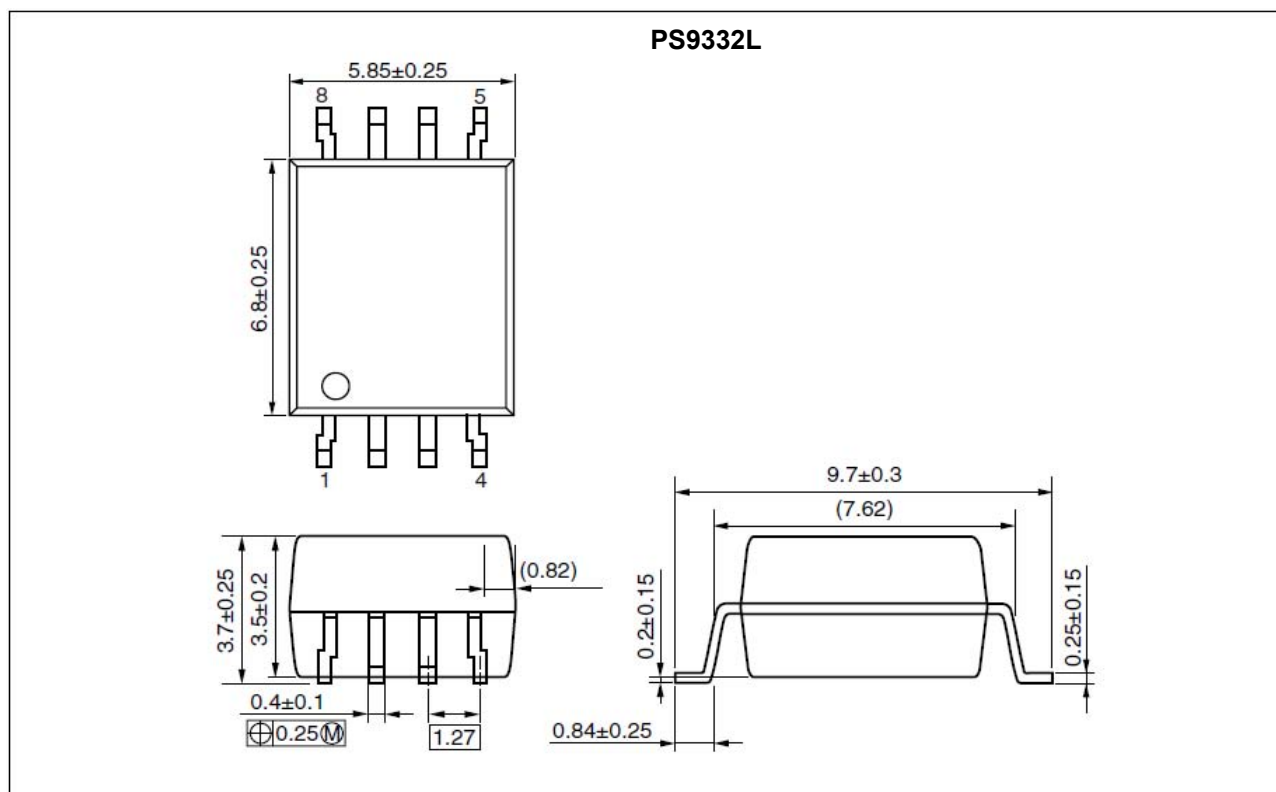
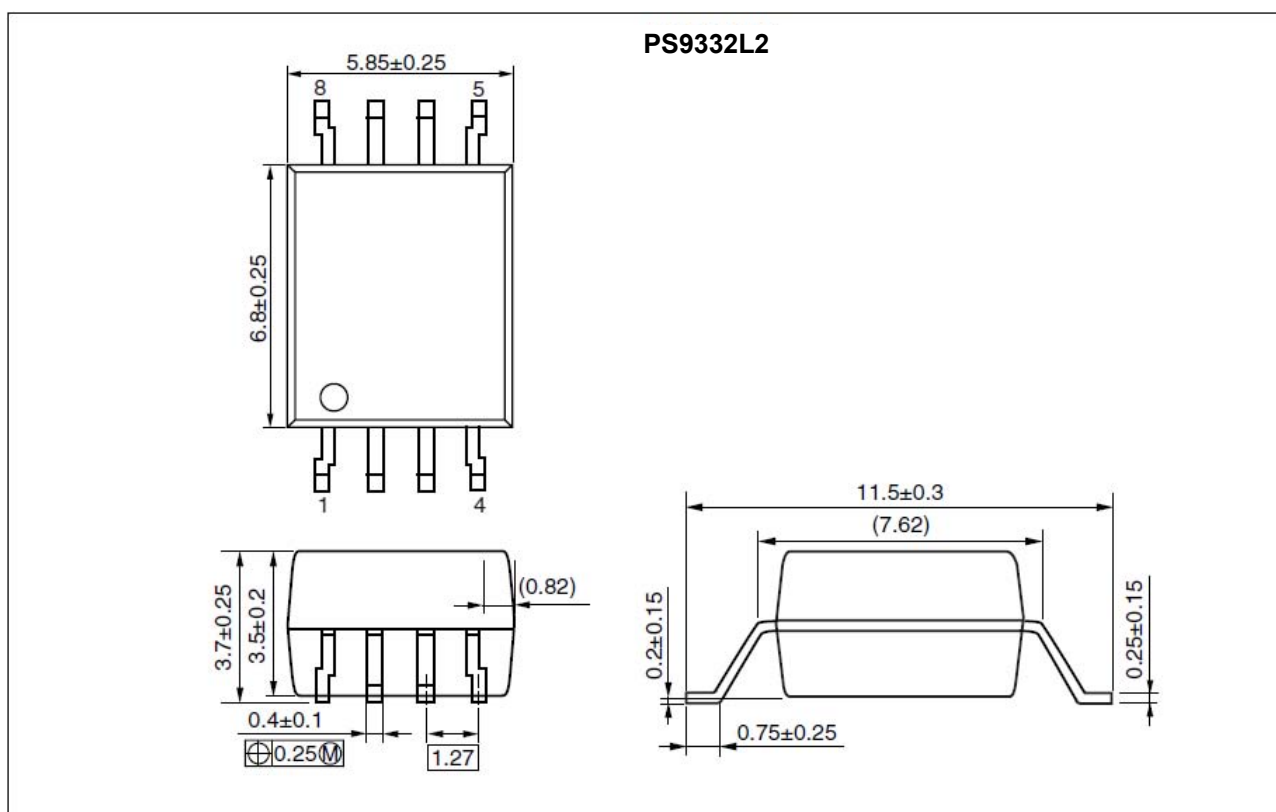


APPLICATIONS

- IGBT, Power MOS FET Gate Driver
- Industrial inverter
- IH (Induction Heating)

The mark <R> shows major revised points.

The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

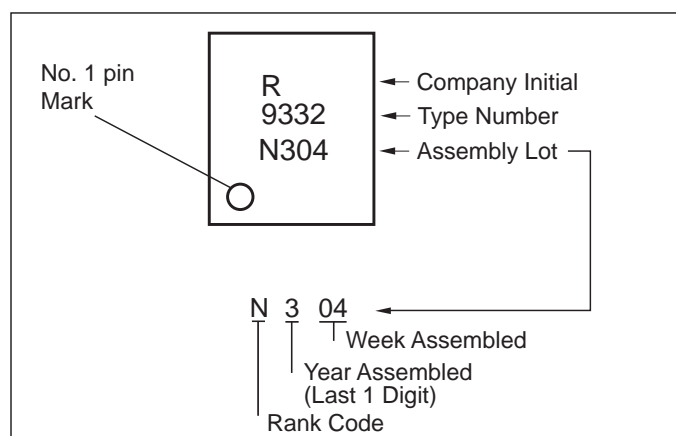
PS9332L, PS9332L2**PACKAGE DIMENSIONS (UNIT: mm)****Lead Bending Type (Gull-wing) For Surface Mount****Lead Bending Type (Gull-wing) For Long Creepage Distance (Surface Mount)**

PS9332L, PS9332L2

PHOTOCOUPLER CONSTRUCTION

| Parameter | PS9332L | PS9332L2 |
|--------------------------------|---------|----------|
| Air Distance (MIN.) | 7 mm | 8 mm |
| Outer Creepage Distance (MIN.) | 8 mm | 8 mm |
| Isolation Distance (MIN.) | 0.4 mm | 0.4 mm |

MARKING EXAMPLE



<R> ORDERING INFORMATION

| Part Number | Order Number | Solder Plating Specification | Packing Style | Safety Standard Approval | Application Part Number ^{*1} |
|---------------|------------------|------------------------------|------------------------------|--|---------------------------------------|
| PS9332L | PS9332L-AX | Pb-Free (Ni/Pd/Au) | 20 pcs (Tape 20 pcs cut) | Standard products (UL, CSA, | PS9332L |
| PS9332L-E3 | PS9332L-E3-AX | | Embossed Tape 2 000 pcs/reel | | |
| PS9332L2 | PS9332L2-AX | | 20 pcs (Tape 20 pcs cut) | SEMKO approved) | PS9332L2 |
| PS9332L2-E3 | PS9332L2-E3-AX | | Embossed Tape 2 000 pcs/reel | | |
| PS9332L-V | PS9332L-V-AX | | 20 pcs (Tape 20 pcs cut) | DIN EN 60747-5-5 (VDE 0884-5) approved | PS9332L |
| PS9332L-V-E3 | PS9332L-V-E3-AX | | Embossed Tape 2 000 pcs/reel | | |
| PS9332L2-V | PS9332L2-V-AX | | 20 pcs (Tape 20 pcs cut) | (Option) | PS9332L2 |
| PS9332L2-V-E3 | PS9332L2-V-E3-AX | | Embossed Tape 2 000 pcs/reel | | |

Note: ^{*1}. For the application of the Safety Standard, following part number should be used.

PS9332L, PS9332L2

<R> ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

| Parameter | | Symbol | Ratings | Unit |
|-----------------------------------|---|-----------------------|------------------|------------------|
| Diode | Forward Current | I_F | 25 | mA |
| | Peak Transient Forward Current (Pulse Width $< 1\ \mu\text{s}$) | $I_{F(\text{TRAN})}$ | 1.0 | A |
| | Reverse Voltage | V_R | 5 | V |
| | Power Dissipation ^{*1} | P_D | 45 | mW |
| Detector | High Level Peak Output Current ^{*2} | $I_{OH(\text{PEAK})}$ | 2.0 | A |
| | Low Level Peak Output Current ^{*2} | $I_{OL(\text{PEAK})}$ | 2.0 | A |
| | Supply Voltage | $(V_{CC} - V_{EE})$ | 0 to 35 | V |
| | Output Voltage | V_O | -0.5 to V_{CC} | V |
| | Peak Clamp Sink Current | I_{CLAMP} | 2.0 | A |
| | Miller Clamping Pin Voltage | V_{CLAMP} | -0.5 to V_{CC} | V |
| | Power Dissipation ^{*3} | P_C | 250 | mW |
| Isolation Voltage ^{*4} | | BV | 5 000 | Vr.m.s. |
| Operating Frequency ^{*5} | | f | 50 | kHz |
| Operating Ambient Temperature | | T_A | -40 to +125 | $^\circ\text{C}$ |
| Storage Temperature | | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

Notes: *1. Reduced to 1.1 mW/ $^\circ\text{C}$ at $T_A = 105^\circ\text{C}$ or more.

*2. Maximum pulse width = 10 μs , Maximum duty cycle = 0.2%

*3. Reduced to 5.5 mW/ $^\circ\text{C}$ at $T_A = 105^\circ\text{C}$ or more.

*4. AC voltage for 1 minute at $T_A = 25^\circ\text{C}$, RH = 60% between input and output.

Pins 1-4 shorted together, 5-8 shorted together.

*5. $I_{OH(\text{PEAK})} \leq 2.0\text{ A}$ ($\leq 0.3\ \mu\text{s}$), $I_{OL(\text{PEAK})} \leq 2.0\text{ A}$ ($\leq 0.3\ \mu\text{s}$)

RECOMMENDED OPERATING CONDITIONS

| Parameter | Symbol | MIN. | TYP. | MAX. | Unit |
|-------------------------------|---------------------|------|------|------|------------------|
| Supply Voltage | $(V_{CC} - V_{EE})$ | 15 | | 30 | V |
| Forward Current (ON) | $I_{F(\text{ON})}$ | 7 | | 16 | mA |
| Forward Voltage (OFF) | $V_{F(\text{OFF})}$ | -2 | | 0.8 | V |
| Operating Ambient Temperature | T_A | -40 | | 125 | $^\circ\text{C}$ |

PS9332L, PS9332L2
<R> ELECTRICAL CHARACTERISTICS (at RECOMMENDED OPERATING CONDITIONS, $V_{EE} = \text{GND}$, unless otherwise specified)

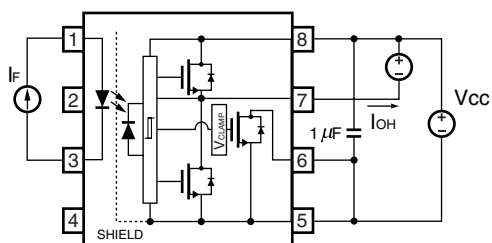
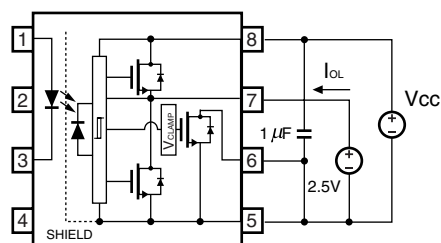
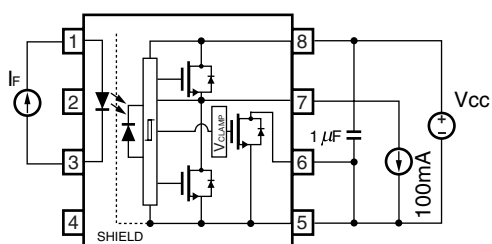
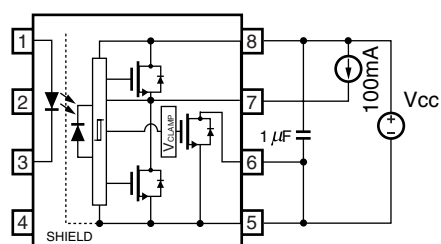
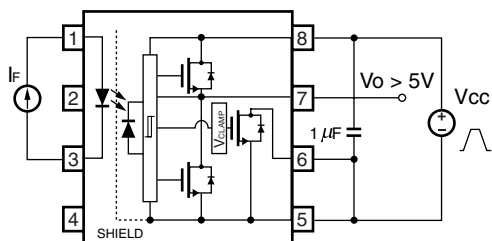
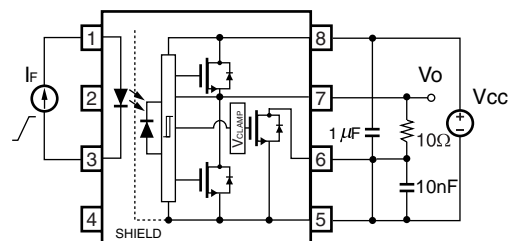
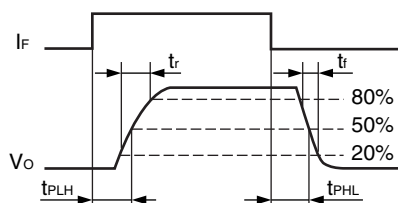
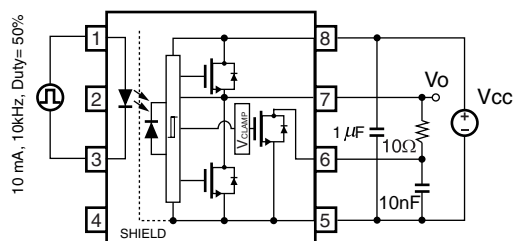
| Parameter | | Symbol | Conditions | MIN. | TYP.* ¹ | MAX. | Unit |
|-----------|---|--------------|--|----------------|--------------------|------|---------------|
| Diode | Forward Voltage | V_F | $I_F = 10 \text{ mA}$, $T_A = 25^\circ\text{C}$ | 1.35 | 1.56 | 1.75 | V |
| | Reverse Current | I_R | $V_R = 3 \text{ V}$, $T_A = 25^\circ\text{C}$ | | | 10 | μA |
| | Input Capacitance | C_{IN} | $f = 1 \text{ MHz}$, $V_F = 0 \text{ V}$, $T_A = 25^\circ\text{C}$ | | 30 | | pF |
| Detector | High Level Output Current | I_{OH} | $V_O = (V_{CC} - 4 \text{ V})^{*2}$ | 0.5 | 1.5 | | A |
| | | | $V_O = (V_{CC} - 15 \text{ V})^{*3}$ | 1.5 | | | |
| | Low Level Output Current | I_{OL} | $V_O = (V_{EE} + 2.5 \text{ V})^{*2}$ | 0.5 | 1.5 | | A |
| | | | $V_O = (V_{EE} + 15 \text{ V})^{*3}$ | 1.5 | | | |
| | Clamp Output Peak Current | I_{CLAMP} | $V_{CLAMP} = V_{EE} + 2.5 \text{ V}$ | 0.5 | 1.6 | | A |
| | Clamp Pin Threshold Voltage | V_{tCLAMP} | | | 3.0 | | V |
| | High Level Output Voltage | V_{OH} | $I_O = -100 \text{ mA}^{*4}$ | $V_{CC} - 3.0$ | $V_{CC} - 1.3$ | | V |
| | Low Level Output Voltage | V_{OL} | $I_O = 100 \text{ mA}$ | | 0.1 | 0.5 | V |
| | High Level Supply Current | I_{CCH} | $I_F = 10 \text{ mA}$, $V_O = \text{open}$ | | 1.5 | 2.5 | mA |
| | Low Level Supply Current | I_{CCL} | $V_F = 0$ to 0.8 V , $V_O = \text{open}$ | | 1.5 | 2.5 | mA |
| | UVLO Threshold Voltage | V_{UVLO+} | $V_O > 5 \text{ V}$, $I_F = 10 \text{ mA}$ | 10.8 | 12.4 | 13.4 | V |
| | | V_{UVLO-} | $V_O < 5 \text{ V}$, $I_F = 10 \text{ mA}$ | 9.5 | 11.2 | 12.5 | |
| | UVLO Hysteresis | $UVLO_{HYS}$ | $(V_{UVLO+}) - (V_{UVLO-})$ | | 1.2 | | |
| Coupled | Threshold Input Current ($L \rightarrow H$) | I_{FLH} | $I_O = 0 \text{ mA}$, $V_O > 5 \text{ V}$ | | 1.5 | 4.0 | mA |
| | Threshold Input Voltage ($H \rightarrow L$) | V_{FHL} | $I_O = 0 \text{ mA}$, $V_O < 5 \text{ V}$ | 0.8 | | | V |

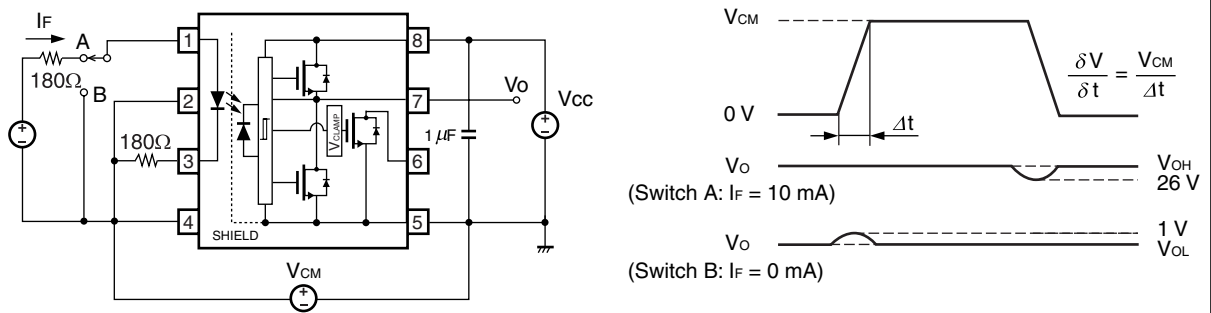
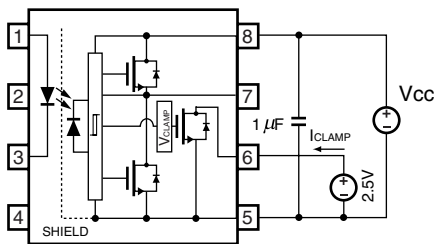
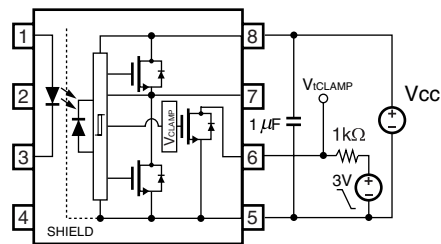
Notes: *1. Typical values at $T_A = 25^\circ\text{C}$.*2. Maximum pulse width = $50 \mu\text{s}$, Maximum duty cycle = 0.5%.*3. Maximum pulse width = $10 \mu\text{s}$, Maximum duty cycle = 0.2%.*4. V_{OH} is measured with the DC load current in this testing. (Maximum pulse width = 2 ms, Maximum duty cycle = 20%)
<R> SWITCHING CHARACTERISTICS (at RECOMMENDED OPERATING CONDITIONS, $V_{EE} = \text{GND}$, unless otherwise specified)

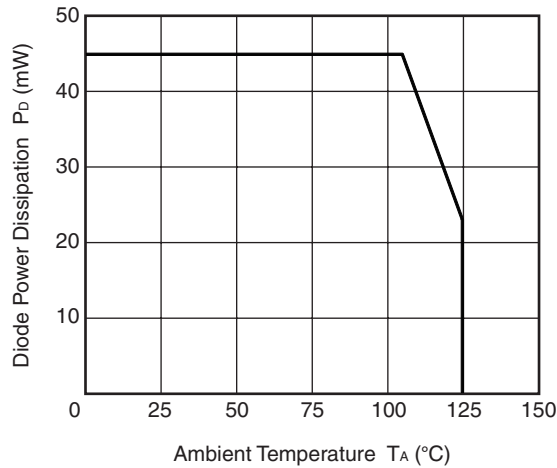
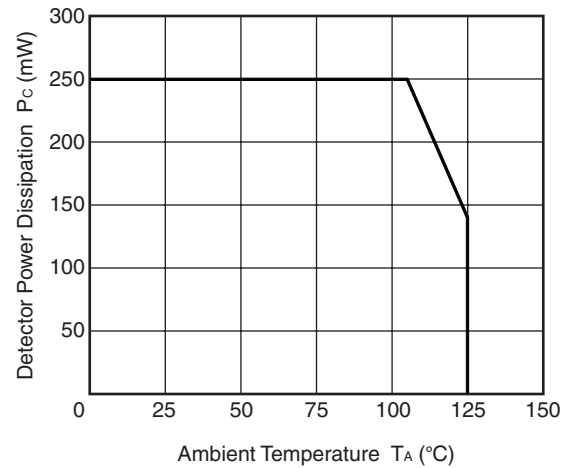
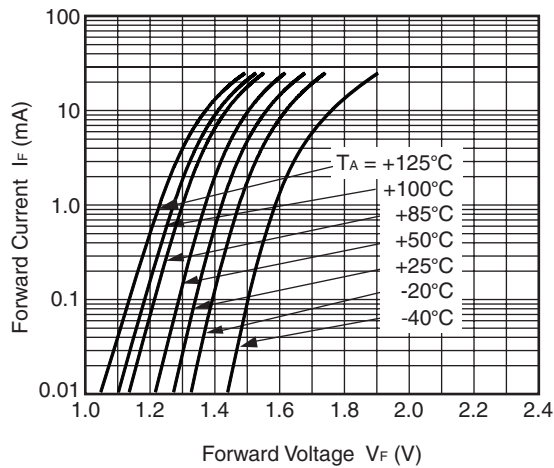
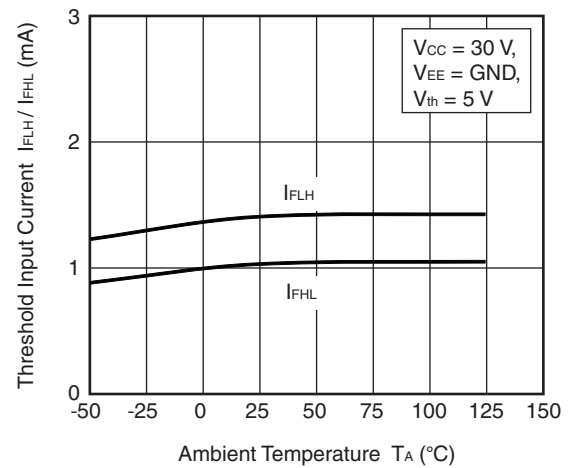
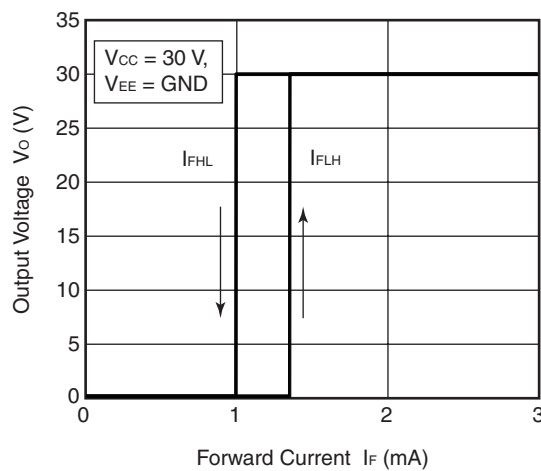
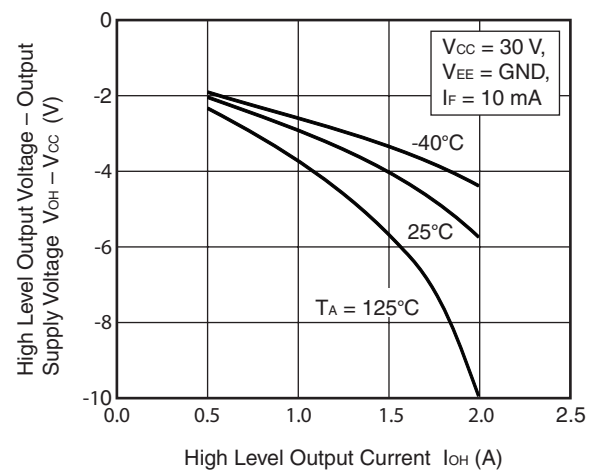
| Parameter | Symbol | Conditions | MIN. | TYP.* ¹ | MAX. | Unit |
|--|-----------------------|---|------|--------------------|------|-------------------|
| Propagation Delay Time ($L \rightarrow H$) | t_{PLH} | $R_g = 10 \Omega$, $C_g = 10 \text{ nF}$, $f = 10 \text{ kHz}$, Duty Cycle = 50% ^{*2} , $I_F = 10 \text{ mA}$ | | 75 | 200 | ns |
| Propagation Delay Time ($H \rightarrow L$) | t_{PHL} | | | 110 | 200 | ns |
| Pulse Width Distortion (PWD) | $ t_{PHL} - t_{PLH} $ | | | 35 | 75 | ns |
| Propagation Delay Time (Difference Between Any Two Products) | $t_{PHL} - t_{PLH}$ | | -90 | | 90 | ns |
| Rise Time | t_r | | | 17 | | ns |
| Fall Time | t_f | | | 17 | | ns |
| Common Mode Transient Immunity at High Level Output | $ CM_H $ | $T_A = 25^\circ\text{C}$, $I_F = 10 \text{ mA}$, $V_{CC} = 30 \text{ V}$, $V_{CM} = 1.5 \text{ kV}$ $V_{O(MIN.)} = 26 \text{ V}$ | 50 | | | kV/ μs |
| Common Mode Transient Immunity at Low Level Output | $ CM_L $ | $T_A = 25^\circ\text{C}$, $I_F = 0 \text{ mA}$, $V_{CC} = 30 \text{ V}$, $V_{CM} = 1.5 \text{ kV}$ $V_{O(MAX.)} = 1 \text{ V}$ | 50 | | | kV/ μs |

Notes: *1. Typical values at $T_A = 25^\circ\text{C}$.

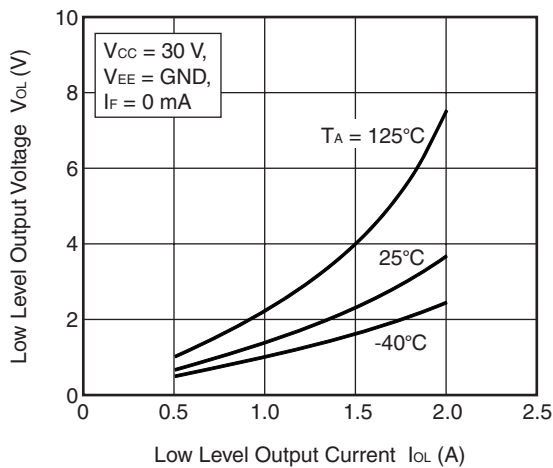
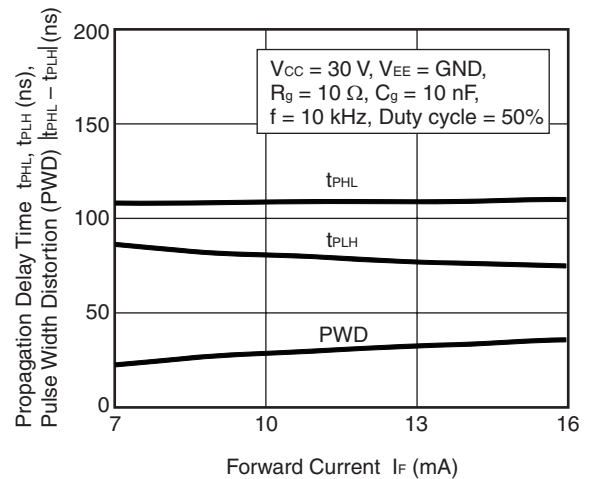
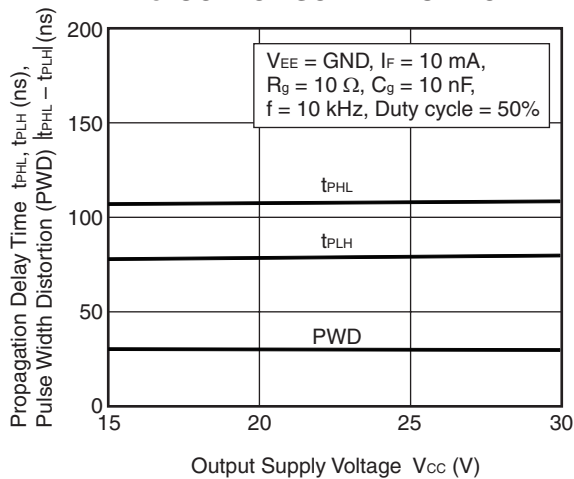
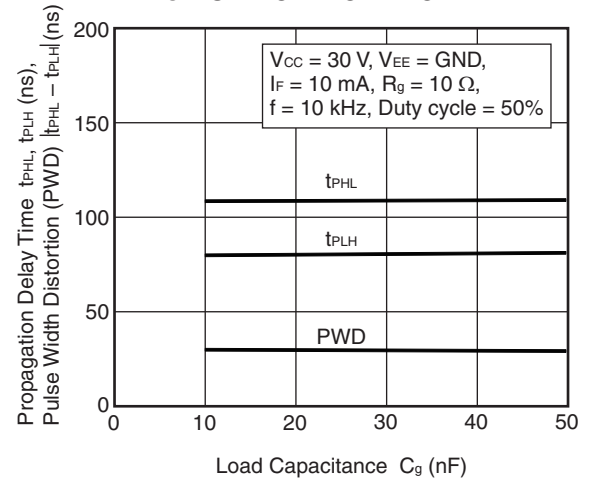
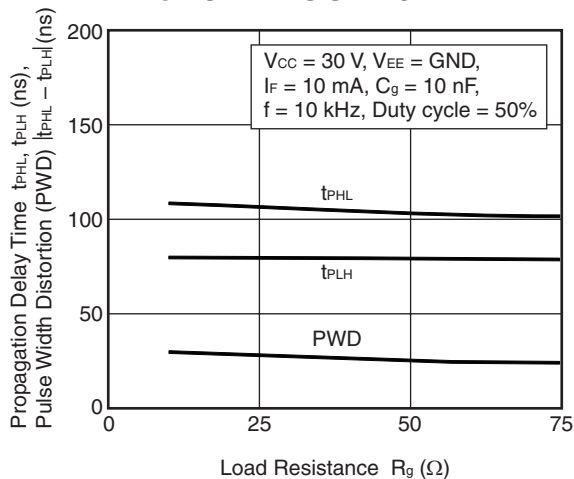
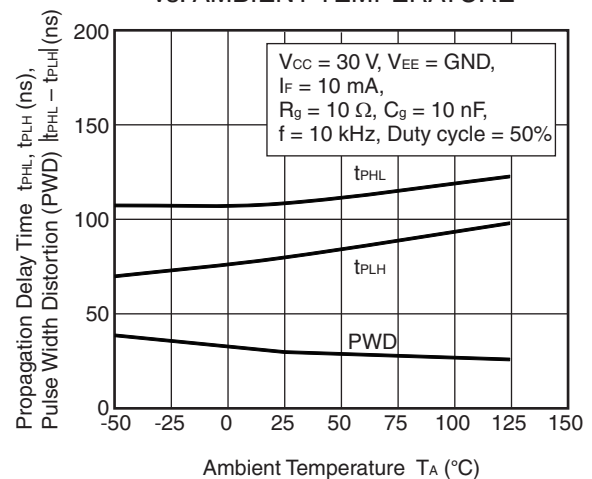
*2. This load condition is equivalent to the IGBT load at 1 200 V/75 A.

PS9332L, PS9332L2
<R> TEST CIRCUIT
Fig. 1 I_{OH} Test Circuit

Fig. 2 I_{OL} Test Circuit

Fig. 3 V_{OH} Test Circuit

Fig. 4 V_{OL} Test Circuit

Fig. 5 UVLO Test Circuit

Fig. 6 I_{FLH} Test Circuit

Fig. 7 $t_{PLH}/t_{PHL}/t_r/t_f$ Test Circuit and Wave Forms


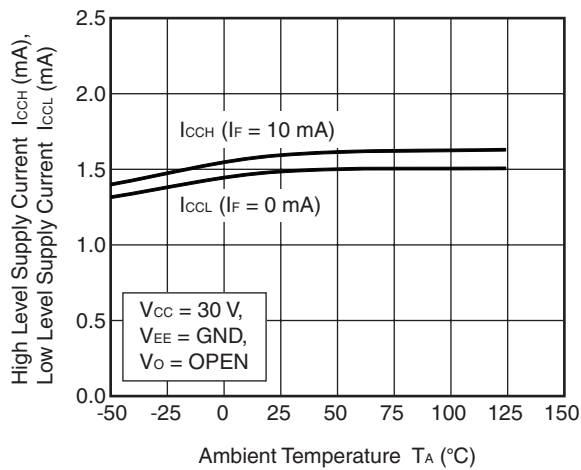
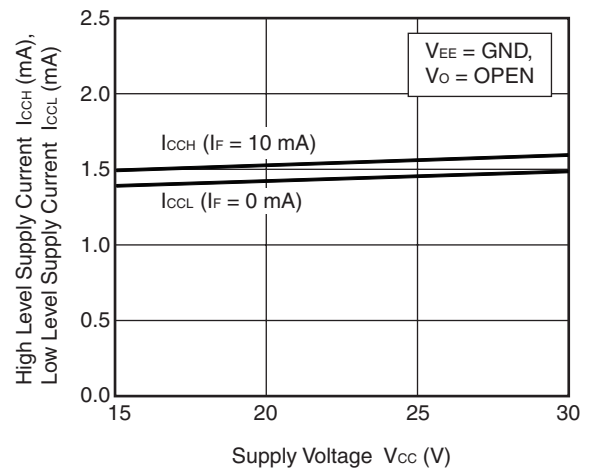
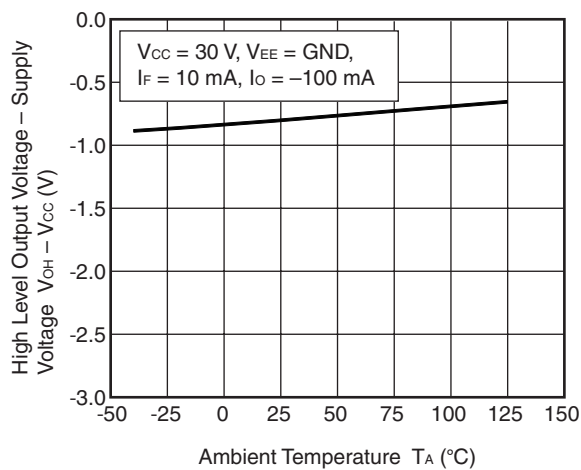
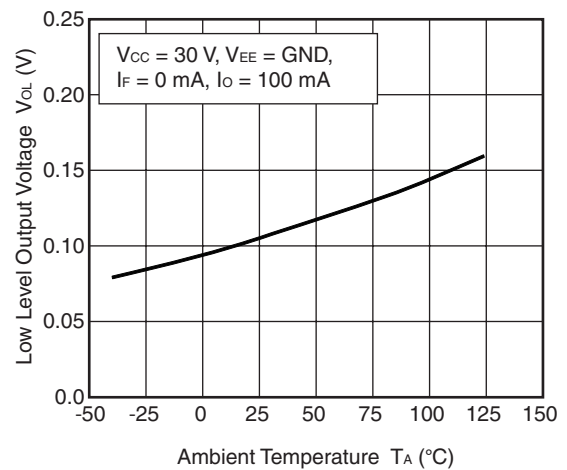
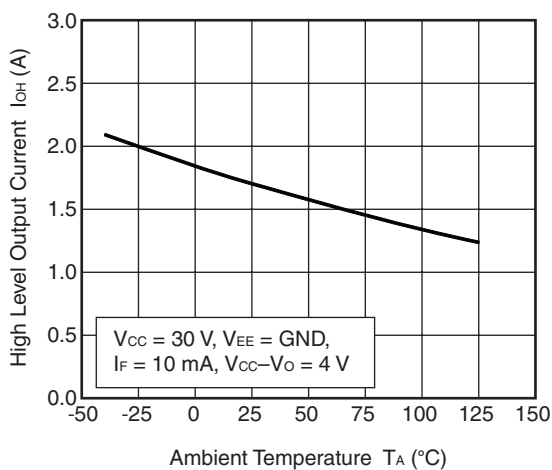
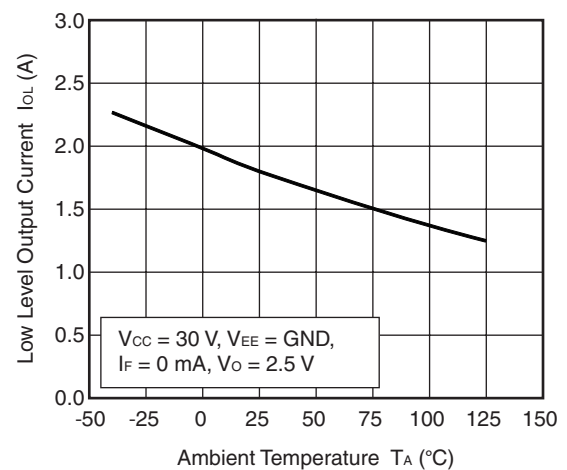
PS9332L, PS9332L2
Fig. 8 CMR Test Circuit and Wave Forms

Fig. 9 I_{CLAMP} Test Circuit

Fig. 10 V_{tCLAMP} Test Circuit


PS9332L, PS9332L2
<R> TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)
**DIODE POWER DISSIPATION
vs. AMBIENT TEMPERATURE**

**DETECTOR POWER DISSIPATION
vs. AMBIENT TEMPERATURE**

**FORWARD CURRENT vs.
FORWARD VOLTAGE**

**THRESHOLD INPUT CURRENT vs.
AMBIENT TEMPERATURE**

**OUTPUT VOLTAGE vs.
FORWARD CURRENT**

**HIGH LEVEL OUTPUT VOLTAGE – OUTPUT SUPPLY
VOLTAGE vs. HIGH LEVEL OUTPUT CURRENT**


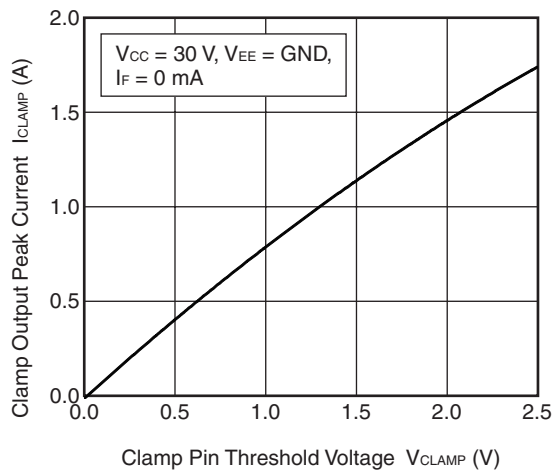
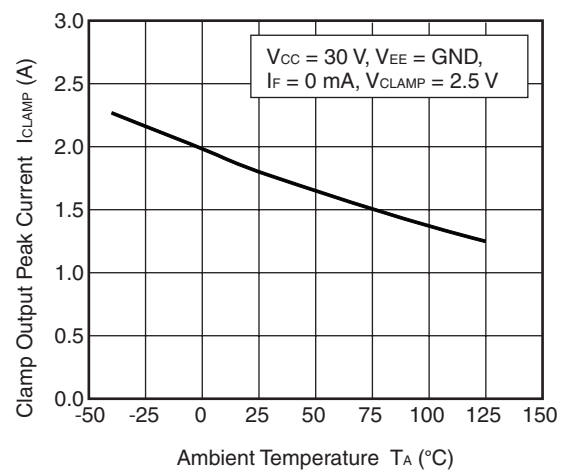
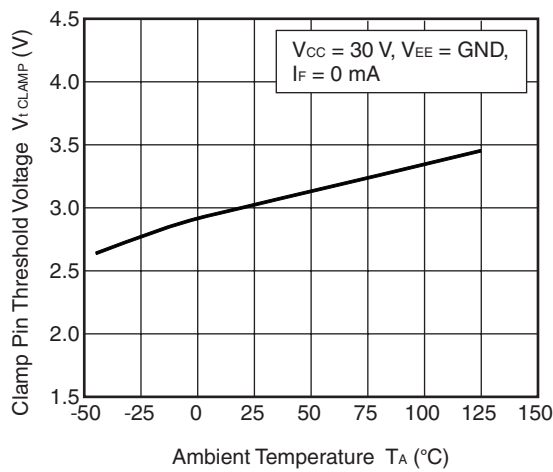
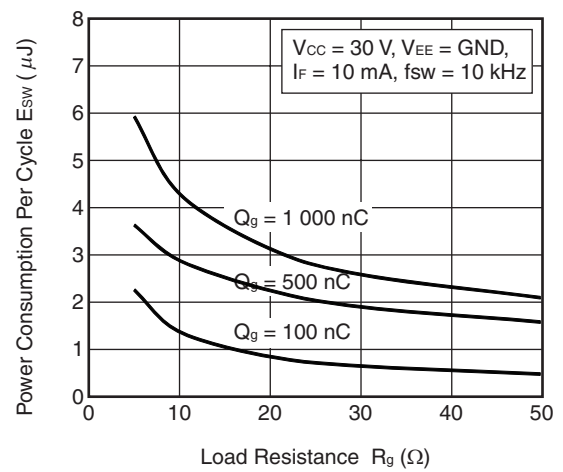
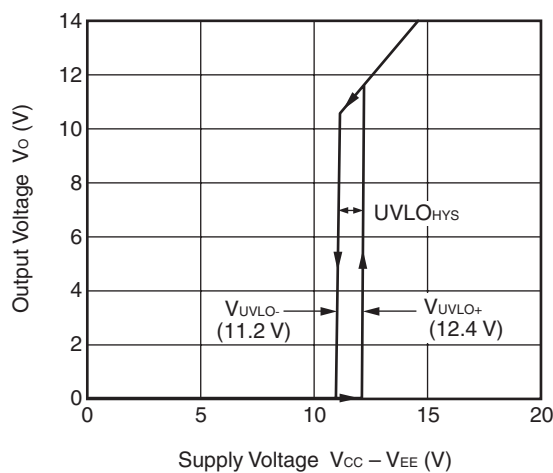
Remark The graphs indicate nominal characteristics.

PS9332L, PS9332L2
**LOW LEVEL OUTPUT VOLTAGE vs.
LOW LEVEL OUTPUT CURRENT**

**PROPAGATION DELAY TIME,
PULSE WIDTH DISTORTION
vs. FORWARD CURRENT**

**PROPAGATION DELAY TIME,
PULSE WIDTH DISTORTION
vs. OUTPUT SUPPLY VOLTAGE**

**PROPAGATION DELAY TIME,
PULSE WIDTH DISTORTION
vs. LOAD CAPACITANCE**

**PROPAGATION DELAY TIME,
PULSE WIDTH DISTORTION
vs. LOAD RESISTANCE**

**PROPAGATION DELAY TIME,
PULSE WIDTH DISTORTION
vs. AMBIENT TEMPERATURE**


Remark The graphs indicate nominal characteristics.

PS9332L, PS9332L2
**SUPPLY CURRENT vs.
AMBIENT TEMPERATURE**

**SUPPLY CURRENT vs.
SUPPLY VOLTAGE**

**HIGH LEVEL OUTPUT VOLTAGE – SUPPLY
VOLTAGE vs. AMBIENT TEMPERATURE**

**LOW LEVEL OUTPUT VOLTAGE vs.
AMBIENT TEMPERATURE**

**HIGH LEVEL OUTPUT CURRENT vs.
AMBIENT TEMPERATURE**

**LOW LEVEL OUTPUT CURRENT vs.
AMBIENT TEMPERATURE**


Remark The graphs indicate nominal characteristics.

PS9332L, PS9332L2
**CLAMP OUTPUT PEAK CURRENT vs.
CLAMP PIN THRESHOLD VOLTAGE**

**CLAMP OUTPUT PEAK CURRENT vs.
AMBIENT TEMPERATURE**

**CLAMP PIN THRESHOLD VOLTAGE
vs. AMBIENT TEMPERATURE**

**POWER CONSUMPTION PER CYCLE
vs. LOAD RESISTANCE**

OUTPUT VOLTAGE vs. SUPPLY VOLTAGE


Remark The graphs indicate nominal characteristics.

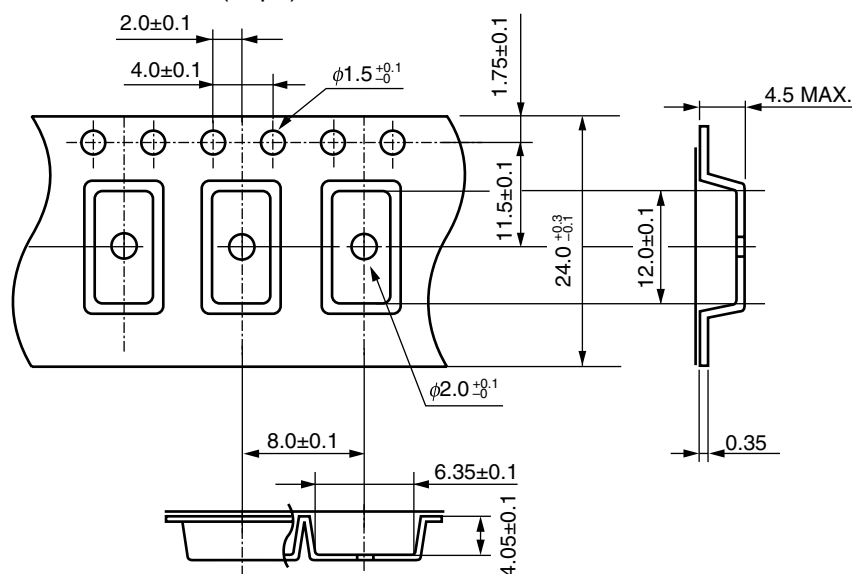
Technical drawing of a mechanical part, showing a top view and a side view. The top view includes dimensions: 2.0±0.1, 4.0±0.1, 1.75±0.1, 7.5±0.1, 16.0±0.3, 10.2±0.1, and 4.5 MAX. The side view includes dimensions: 8.0±0.1, 6.35±0.1, 4.05±0.1, and 0.35. The drawing also shows a hole with a diameter of $\phi 1.5 \pm_{-0}^{+0.1}$.

Diagram of the PS9332L-E3 component, showing three channels. Each channel has four input pins (top) and four output pins (bottom). A large arrow points to the right, indicating the signal direction.

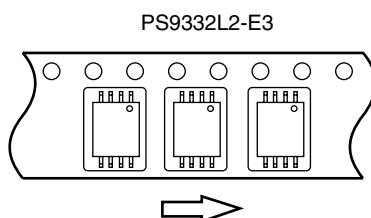
Technical drawing of a circular flange. The front view (left) shows a circular flange with a central hole. The outer diameter is $\phi 330 \pm 2.0$. The inner hole has a diameter of $\phi 21.0 \pm 0.8$. The central hole has a diameter of $\phi 13.0 \pm 0.2$. The flange thickness is 2.0 ± 0.5 . The central hole has a radius of $R 1.0$. The side view (right) shows the flange profile with a total height of $\phi 330 \pm 2.0$. The central hole has a diameter of $\phi 100 \pm 1.0$. The flange thickness is 2.0 ± 0.5 . The outer edge of the flange has a diameter of 17.5 ± 1.0 . The inner edge of the flange has a diameter of 21.5 ± 1.0 . The outer edge of the flange has a diameter of 15.9 to 19.4 .

Packing: 2 000 pcs/reel

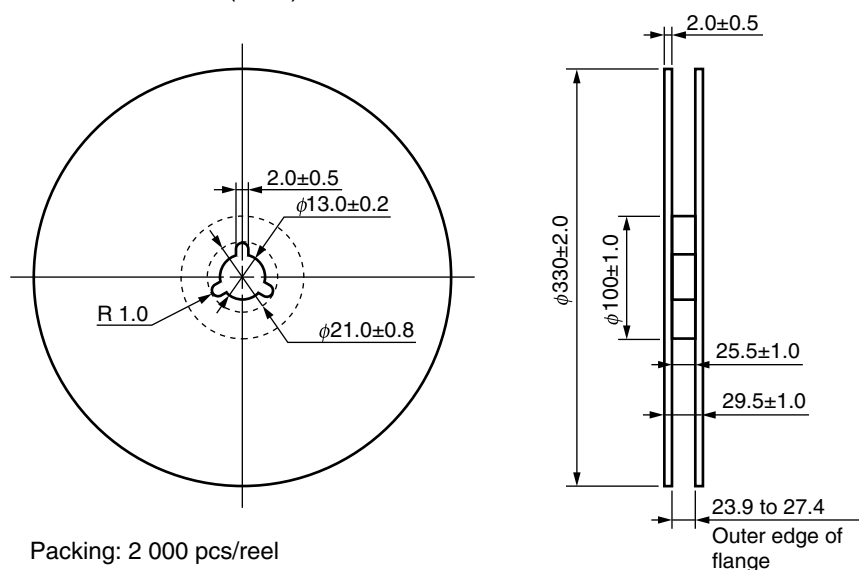
Outline and Dimensions (Tape)

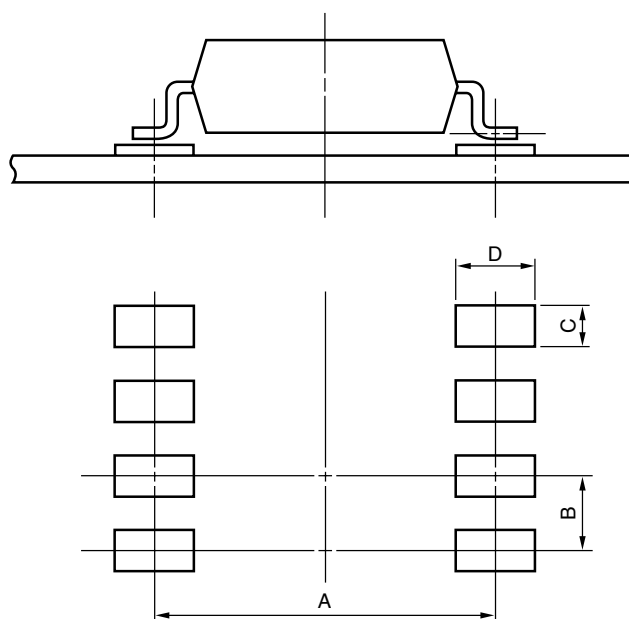


Tape Direction



Outline and Dimensions (Reel)



PS9332L, PS9332L2
RECOMMENDED MOUNT PAD DIMENSIONS (UNIT: mm)


| Part Number | Lead Bending | A | B | C | D |
|-----------------|---|------|------|-----|-----|
| PS9332L | lead bending type (Gull-wing) for surface mount | 9.2 | 1.27 | 0.8 | 2.2 |
| PS9332L2 | lead bending type (Gull-wing) for long creepage distance (surface mount) | 10.2 | 1.27 | 0.8 | 2.2 |

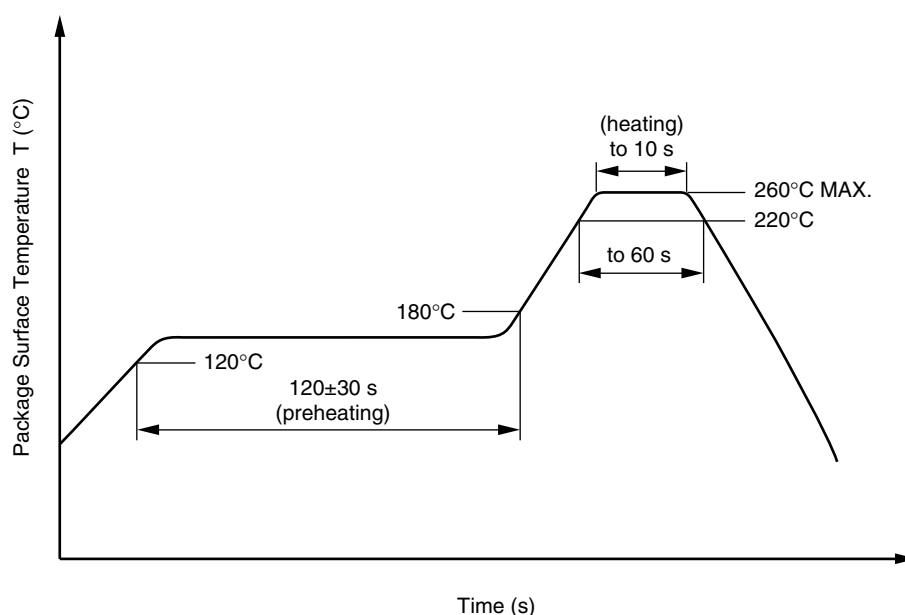
NOTES ON HANDLING

1. Recommended soldering conditions

(1) Infrared reflow soldering

- | | |
|---|--|
| • Peak reflow temperature | 260°C or below (package surface temperature) |
| • Time of peak reflow temperature | 10 seconds or less |
| • Time of temperature higher than 220°C | 60 seconds or less |
| • Time to preheat temperature from 120 to 180°C | 120 ± 30 s |
| • Number of reflows | Three |
| • Flux | Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.) |

Recommended Temperature Profile of Infrared Reflow



(2) Wave soldering

- | | |
|-------------------------|--|
| • Temperature | 260°C or below (molten solder temperature) |
| • Time | 10 seconds or less |
| • Preheating conditions | 120°C or below (package surface temperature) |
| • Number of times | One (Allowed to be dipped in solder including plastic mold portion.) |
| • Flux | Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.) |

(3) Soldering by Soldering Iron

- | | |
|--|--|
| • Peak Temperature (lead part temperature) | 350°C or below |
| • Time (each pins) | 3 seconds or less |
| • Flux | Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.) |

(a) Soldering of leads should be made at the point 1.5 to 2.0 mm from the root of the lead

(4) Cautions

- | | |
|----------|--|
| • Fluxes | Avoid removing the residual flux with freon-based and chlorine-based cleaning solvent. |
|----------|--|

PS9332L, PS9332L2**2. Cautions regarding noise**

Be aware that when voltage is applied suddenly between the photocoupler's input and output at startup, the output transistor may enter the on state, even if the voltage is within the absolute maximum ratings.

USAGE CAUTIONS

1. This product is weak for static electricity by designed with high-speed integrated circuit so protect against static electricity when handling.
2. Board designing
 - (1) By-pass capacitor of more than 1.0 μ F is used between V_{CC} and GND near device. Also, ensure that the distance between the leads of the photocoupler and capacitor is no more than 10 mm.
 - (2) When designing the printed wiring board, ensure that the pattern of the IGBT collectors/emitters is not too close to the input block pattern of the photocoupler.

If the pattern is too close to the input block and coupling occurs, a sudden fluctuation in the voltage on the IGBT output side might affect the photocoupler's LED input, leading to malfunction or degradation of characteristics. (If the pattern needs to be close to the input block, to prevent the LED from lighting during the off state due to the abovementioned coupling, design the input-side circuit so that the bias of the LED is reversed, within the range of the recommended operating conditions, and be sure to thoroughly evaluate operation.)
 - (3) Pin 2,4 (which is an NC^{*1} pin) can either be connected directly to the GND pin on the LED side or left open. Unconnected pins should not be used as a bypass for signals or for any other similar purpose because this may degrade the internal noise environment of the device.

Note: *1. NC: Non-Connection (No Connection).
3. Make sure the rise/fall time of the forward current is 0.5 μ s or less.
4. In order to avoid malfunctions, make sure the rise/fall slope of the supply voltage is 3 V/ μ s or less.
5. Avoid storage at a high temperature and high humidity.

PS9332L, PS9332L2
<R> SPECIFICATION OF VDE MARKS LICENSE DOCUMENT

| Parameter | Symbol | Spec. | Unit |
|--|----------------------|-----------------------------|----------------------|
| Maximum repetitive peak operating isolation voltage | U_{IORM} | 1 130 | V_{peak} |
| Partial discharge test voltage at 100% production test $U_{pr} = 1.875 \times U_{IORM}$, Method b, $t_m=1\text{sec}$, $p_d < 5 \text{ pC}$ | U_{pr} | 1 808 | V_{peak} |
| Partial discharge test voltage at Type test and Sample test $U_{pr} = 1.875 \times U_{IORM}$, Method a, $t_m=10\text{sec}$, $p_d < 5 \text{ pC}$ | U_{pr} | 2 119 | V_{peak} |
| Maximum transient isolation voltage (Transient overvoltage $t_{ini}=60\text{sec}$) | U_{IOTM} | 8 000 | V_{peak} |
| Installation classification (IEC 60664/ DIN EN 60664-1/ VDE0110 Part 1) for rated mains voltage $\leq 300 \text{ Vr.m.s.}$ for rated mains voltage $\leq 600 \text{ Vr.m.s.}$ for rated mains voltage $\leq 1\,000 \text{ Vr.m.s.}$ | | I - IV I - IV I - III | |
| Comparative tracking index (IEC 60112/ DIN EN 60112/ VDE 0303 Part 11) | CTI | 175 | |
| Material group (DIN EN 60664-1/ VDE0110 Part 1) | | III a | |
| Pollution degree (DIN EN 60664-1/ VDE0110 Part 1) | | 2 | |
| Climatic category (IEC 60068-1/ DIN EN 60068-1) | | 40/125/21 | |
| Operating temperature range | T_A | -40 to +125 | $^{\circ}\text{C}$ |
| Storage temperature range | T_{stg} | -55 to +150 | $^{\circ}\text{C}$ |
| Isolation resistance, minimum value $V_{IO} = 500 \text{ Vdc}$ at $T_A = 25^{\circ}\text{C}$ $V_{IO} = 500 \text{ Vdc}$ at $T_A \text{ MAX.}$ at least 100°C | Ris MIN. Ris MIN. | 10^{12} 10^{11} | Ω Ω |
| Safety limiting values ratings (maximum allowable in the event of a fault or a failure, see thermal derating curve) | | | |
| Maximum ambient safety temperature | T_s | 175 | $^{\circ}\text{C}$ |
| Maximum input current | I_{si} | 400 | mA |
| Maximum output power | P_{so} | 700 | mW |
| Isolation resistance at $V_{IO}= 500 \text{ Vdc}$, $T_A=T_s$ | Ris MIN. | 10^9 | Ω |

PS9332L, PS9332L2**Caution**

GaAs Products

This product uses gallium arsenide (GaAs).

GaAs vapor and powder are hazardous to human health if inhaled or ingested, so please observe the following points.

- Follow related laws and ordinances when disposing of the product. If there are no applicable laws and/or ordinances, dispose of the product as recommended below.
 1. Commission a disposal company able to (with a license to) collect, transport and dispose of materials that contain arsenic and other such industrial waste materials.
 2. Exclude the product from general industrial waste and household garbage, and ensure that the product is controlled (as industrial waste subject to special control) up until final disposal.
- Do not burn, destroy, cut, crush, or chemically dissolve the product.
- Do not lick the product or in any way allow it to enter the mouth.

| | |
|-------------------------|-------------------------------------|
| Revision History | PS9332L, PS9332L2 Data Sheet |
|-------------------------|-------------------------------------|

| Rev. | Date | Description | |
|------|--------------|-------------|---|
| | | Page | Summary |
| 0.01 | Nov 30, 2012 | – | First edition issued |
| 1.00 | Sep 06, 2013 | Throughout | “Preliminary Data Sheet” is changed to “Data Sheet.” |
| | | p.1 | Addition of Safety standards |
| | | p.3 | Addition of ORDERING INFORMATION |
| | | p.4 | Modification of ABSOLUTE MAXIMUM RATINGS |
| | | p.5 | Modification of ELECTRICAL / SWITCHING CHARACTERISTICS |
| | | p.6 to 7 | Modification of TEST CIRCUIT |
| | | p.8 to 11 | Addition of TYPICAL CHARACTERISTICS |
| | | p.17 | Addition of SPECIFICATION OF VDE MARKS LICENSE DOCUMENT |

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