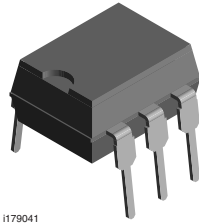
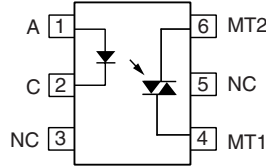


**Optocoupler, Phototriac Output, High dV/dt, Low Input Current**

1179041

**DESCRIPTION**

The IL4216, IL4217, IL4218 consists of an AlGaAs IRLED optically coupled to a pair of photosensitive non-zero crossing SCR chips and are connected inversely parallel to form a TRIAC. These three semiconductors are assembled in a six pin 0.3 inch dual in-line package.

High input sensitivity is achieved by using an emitter follower phototransistor and a cascaded SCR predriver resulting in an LED trigger current of less than 1.3 mA (DC).

The use of a proprietary dV/dt clamp results in a static dV/dt of greater than 10 kV/μs. This clamp circuit has a MOSFET that is enhanced when high dV/dt spikes occur between MT1 and MT2 of the TRIAC. The FET clamps the base of the phototransistor when conducting, disabling the internal SCR predriver.

The blocking voltage of up to 800 V permits control of off-line voltages up to 240 VAC, with a safety factor more than two, and is sufficient for as much as 380 VAC. Current handling capability is up to 300 mA RMS, continuous at 25 °C.

The IL4216, IL4217, IL4218 isolates low-voltage logic from 120, 240, and 380 VAC lines to control resistive inductive, or capacitive loads including motors solenoids, high current thyristors or TRIAC and relays.

**FEATURES**

- High input sensitivity  $I_{FT} = 1.3$  mA
- 300 mA on-state current
- High static dV/dt 10000 V/μs, typical
- Very Low Leakage < 10 μA
- Isolation test voltage 5300 V<sub>RMS</sub>
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

**RoHS**  
COMPLIANT**APPLICATIONS**

- Solid state relay
- Industrial controls
- Office equipment
- Consumer appliances

**AGENCY APPROVALS**

- UL1577, file no. E52744 system code J
- CSA 93751
- DIN EN 60747-5-5 (VDE 0884) available with option 1
- BSI IEC 60950; IEC 60065
- FIMKO

**ORDER INFORMATION**

PART	REMARKS
IL4216	600 V V <sub>DRM</sub> , DIP-6
IL4217	700 V V <sub>DRM</sub> , DIP-6
IL4218	800 V V <sub>DRM</sub> , DIP-6
IL4216-X006	600 V V <sub>DRM</sub> , DIP-6 400 mil (option 6)
IL4216-X009	600 V V <sub>DRM</sub> , SMD-6 (option 9)
IL4217-X007	700 V V <sub>DRM</sub> , SMD-6 (option 7)
IL4217-X009	700 V V <sub>DRM</sub> , SMD-6 (option 9)
IL4218-X006	800 V V <sub>DRM</sub> , DIP-6 400 mil (option 6)
IL4218-X007	800 V V <sub>DRM</sub> , SMD-6 (option 7)
IL4218-X009	800 V V <sub>DRM</sub> , SMD-6 (option 9)

**Note**

For additional information on the available options refer to option information.

ABSOLUTE MAXIMUM RATINGS <sup>(1)</sup>					
PARAMETER	TEST CONDITION	PART	SYMBOL	VALUE	UNIT
<b>INPUT</b>					
Reverse voltage			$V_R$	6.0	V
Forward current			$I_F$	60	mA
Surge current			$I_{FSM}$	2.5	A
Power dissipation			$P_{diss}$	100	mW
Derate linearly from 25 °C				1.33	mW/°C
Thermal resistance			$R_{th}$	750	°C/W
<b>OUTPUT</b>					
Peak off-state voltage		IL4216	$V_{DRM}$	600	V
		IL4217	$V_{DRM}$	700	V
		IL4218	$V_{DRM}$	800	V
RMS on-state current			$I_{DRM}$	300	mA
Single cycle surge			$I_{TSM}$	3.0	A
Power dissipation			$P_{diss}$	300	mW
Derate linearly from 25 °C				6.6	mW/°C
Thermal resistance			$R_{th}$	150	°C/W
<b>COUPLER</b>					
Creepage distance				≥ 7.0	mm
Clearance				≥ 7.0	mm
Storage temperature			$T_{stg}$	- 55 to + 150	°C
Ambient temperature			$T_{amb}$	- 55 to + 100	°C
Isolation test voltage			$V_{ISO}$	5300	$V_{RMS}$
Isolation resistance	$V_{IO} = 500\text{ V}, T_{amb} = 25\text{ °C}$		$R_{IO}$	≥ $10^{12}$	$\Omega$
	$V_{IO} = 500\text{ V}, T_{amb} = 100\text{ °C}$		$R_{IO}$	≥ $10^{11}$	$\Omega$
Lead soldering temperature <sup>(2)</sup>	5.0 s		$T_{sld}$	260	°C

## Notes

<sup>(1)</sup>  $T_{amb} = 25\text{ °C}$ , unless otherwise specified.

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.

<sup>(2)</sup> Refer to reflow profile for soldering conditions for surface mounted devices (SMD). Refer to wave profile for soldering conditions for through hole devices (DIP).



ELECTRICAL CHARACTERISTICS							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT							
Forward voltage	$I_F = 20 \text{ mA}$		$V_F$		1.3	1.5	V
Breakdown voltage	$I_R = 10 \text{ }\mu\text{A}$		$V_{BR}$	6.0	30		V
Reverse current	$V_R = 6.0 \text{ V}$		$I_R$		0.1	10	$\mu\text{A}$
Input capacitance	$V_F = 0 \text{ V}$ , $f = 1.0 \text{ MHz}$		$C_{IN}$		40		pF
Thermal resistance, junction to lead			$R_{thjl}$		750		$^{\circ}\text{C/W}$
OUTPUT							
Repetitive peak off-state voltage	$I_{DRM} = 100 \text{ }\mu\text{A}$	IL4216	$V_{DRM}$	600	650		V
		IL4217	$V_{DRM}$	700	750		V
		IL4218	$V_{DRM}$	800	850		V
Off-state voltage	$I_{D(RMS)} = 70 \text{ }\mu\text{A}$	IL4216	$V_{D(RMS)}$	424	460		V
		IL4217	$V_{D(RMS)}$	484	536		V
		IL4218	$V_{D(RMS)}$	565	613		V
Off-state current	$V_D = 600 \text{ V}$ , $T_{amb} = 100 \text{ }^{\circ}\text{C}$		$I_{D(RMS)}$		10	100	$\mu\text{A}$
Reverse current	$V_R = 600 \text{ V}$ , $T_{amb} = 25 \text{ }^{\circ}\text{C}$		$I_{RMS}$		10	100	$\mu\text{A}$
On-state voltage	$I_T = 300 \text{ mA}$		$V_{TM}$		1.7	3.0	V
On-state current	$PF = 1.0$ , $V_{T(RMS)} = 1.7 \text{ V}$		$I_{TM}$			300	mA
Surge (non-repetitive, on-state current)	$f = 50 \text{ Hz}$		$I_{TSM}$			3.0	A
Holding current	$V_T = 3.0 \text{ V}$		$I_H$		65	200	$\mu\text{A}$
Latching current	$V_T = 2.2 \text{ V}$		$I_L$			500	$\mu\text{A}$
LED trigger current	$V_{AK} = 5.0 \text{ V}$		$I_{FT}$		0.7		mA
Critical rate of rise of off-state voltage	$V_D = 0.67 V_{DRM}$ , $T_{amb} = 25 \text{ }^{\circ}\text{C}$		$dV/dt_{cr}$	10 000			V/ $\mu\text{s}$
	$V_D = 0.67 V_{DRM}$ , $T_{amb} = 80 \text{ }^{\circ}\text{C}$		$dV/dt_{cr}$	5000			V/ $\mu\text{s}$
Critical rate of rise of voltage at current commutation	$V_D = 230 V_{RMS}$ , $I_D = 300 \text{ mA}_{RMS}$ , $T_J = 25 \text{ }^{\circ}\text{C}$		$dV/dt_{crq}$		8		V/ $\mu\text{s}$
	$V_D = 230 V_{RMS}$ , $I_D = 300 \text{ mA}_{RMS}$ , $T_J = 85 \text{ }^{\circ}\text{C}$		$dV/dt_{crq}$		7		V/ $\mu\text{s}$
Critical rate of rise of on-state current commutation	$V_D = 230 V_{RMS}$ , $I_D = 300 \text{ mA}_{RMS}$ , $T_J = 25 \text{ }^{\circ}\text{C}$		$dI/dt_{crq}$		12		A/ms
Thermal resistance, junction to lead			$R_{thjl}$		150		$^{\circ}\text{C/W}$
COUPLER							
Capacitance (input to output)	$f = 1.0 \text{ MHz}$ , $V_{IO} = 0 \text{ V}$		$C_{IO}$		0.8		pF
Critical rate of rise of coupled input to output voltage	$I_T = 0$ , $V_{RM} = V_{DM} = 300 \text{ VAC}$		$dV_{(IO)}/dt$	5000	1.0		mA

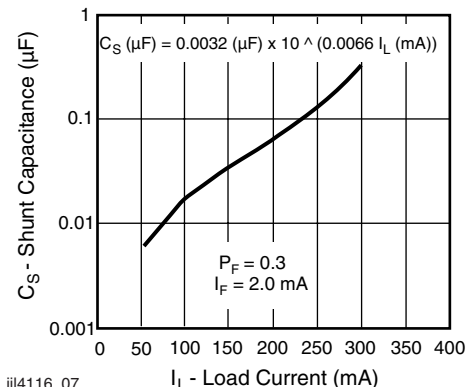
**Note**

$T_{amb} = 25 \text{ }^{\circ}\text{C}$ , unless otherwise specified.

Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements.

**POWER FACTOR CONSIDERATIONS**

A snubber is not needed to eliminate false operation of the TRIAC driver because of the IL4216, IL4217, IL4218 high static and commutating dV/dt with loads between 1 and 0.8 power factors. When inductive loads with power factors less than 0.8 are being driven, include a RC snubber or a single capacitor directly across the device to damp the peak commutating dV/dt spike. Normally a commutating dV/dt causes a turning-off device to stay on due to the stored energy remaining in the turning-off device.



iii4116\_07

Fig. 3 - Shunt Capacitance vs. Load Current vs. Power Factor

## TYPICAL CHARACTERISTICS

$T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified

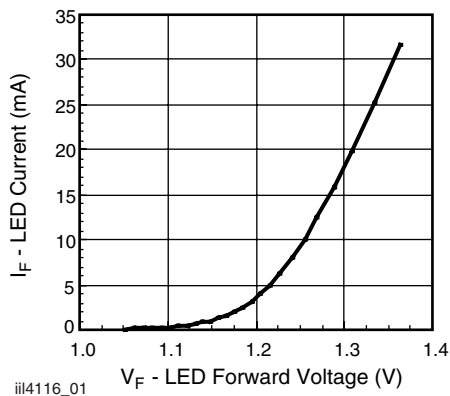


Fig. 4 - LED Forward Current vs. Forward Voltage

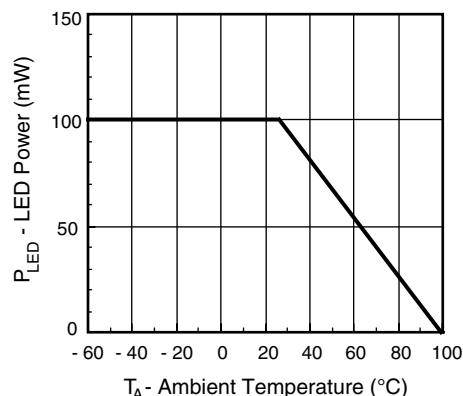


Fig. 7 - Maximum LED Power Dissipation

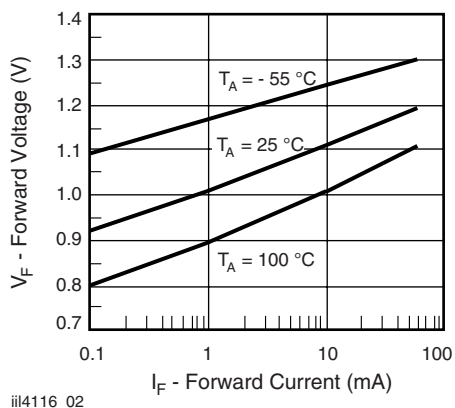


Fig. 5 - Forward Voltage vs. Forward Current

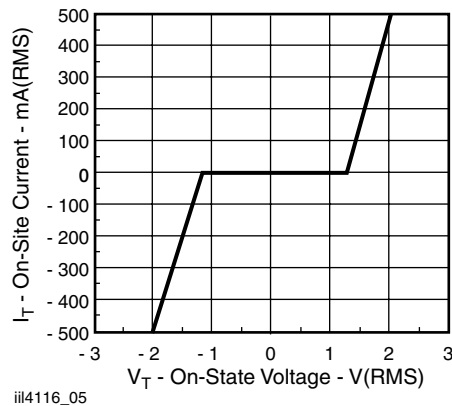


Fig. 8 - On-State Terminal Voltage vs. Terminal Current

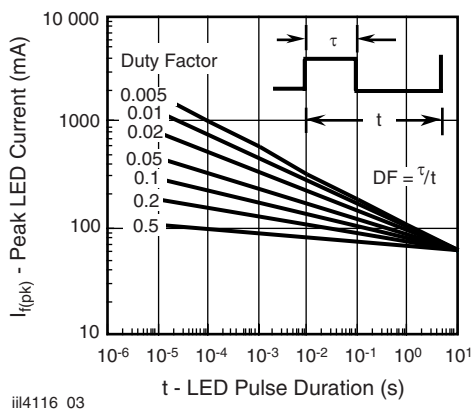


Fig. 6 - Peak LED Current vs. Duty Factor,  $\tau$

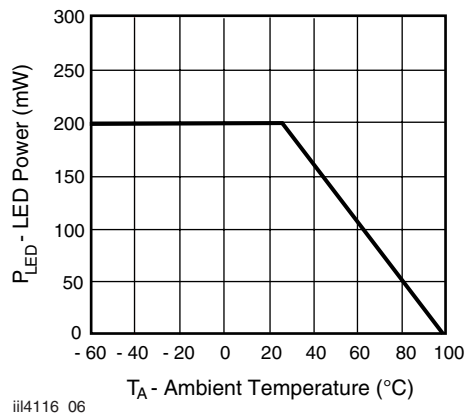


Fig. 9 - Maximum Output Power Dissipation

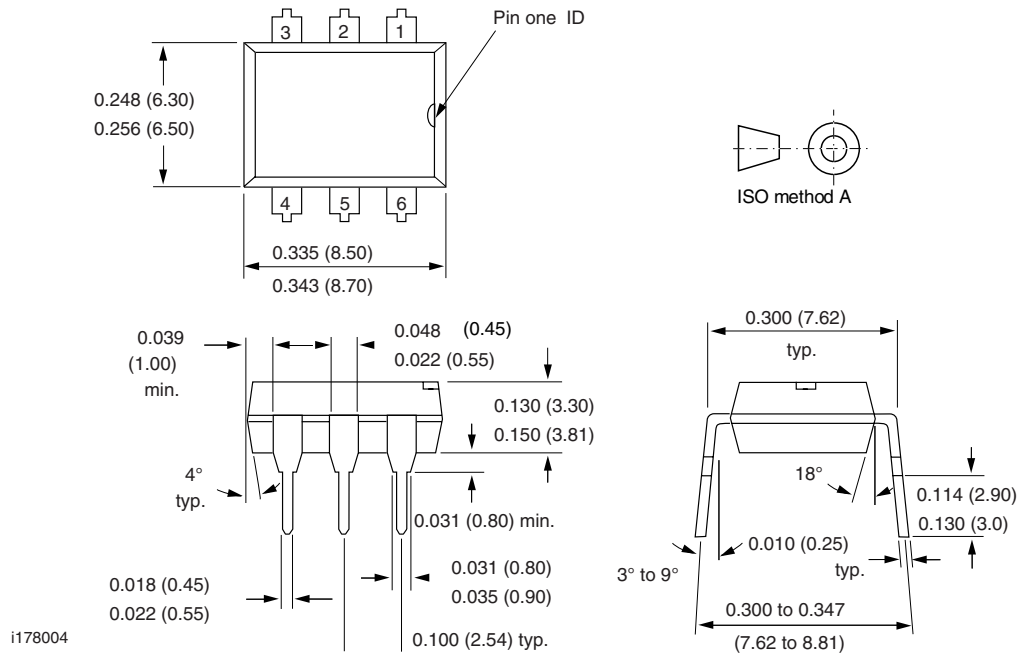


# IL4216, IL4217, IL4218

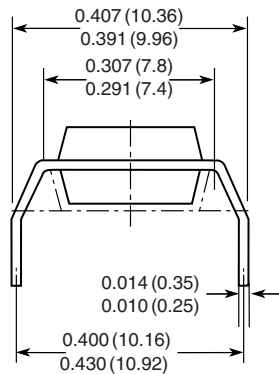
Optocoupler, Phototriac Output,  
High dV/dt, Low Input Current

Vishay Semiconductors

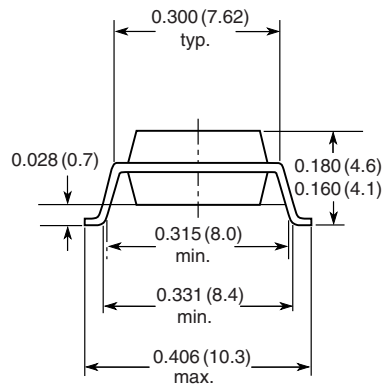
## PACKAGE DIMENSIONS in inches (millimeters)



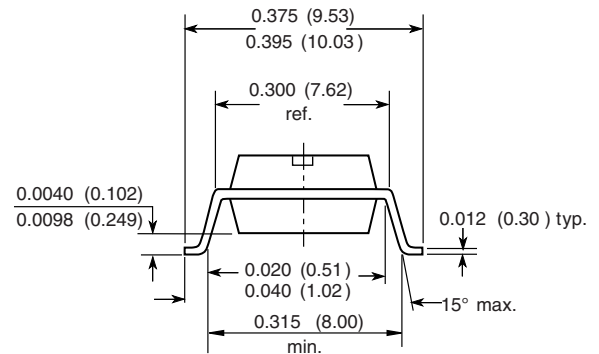
### Option 6



### Option 7



### Option 9



18450

## OZONE DEPLETING SUBSTANCES POLICY STATEMENT

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively.
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA.
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design  
and may do so without further notice.

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Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany



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