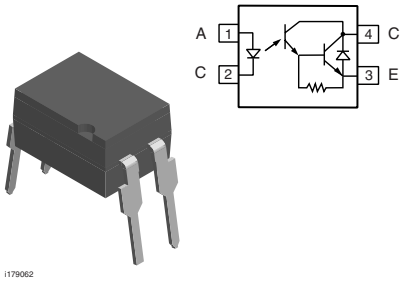
Optocoupler, Photodarlington Output, High Gain, 300 BV_{CEO}



FEATURES

- High collector emitter voltage, V_{CEO} = 300 V
- High isolation test voltage: 5300 V_{RMS}
- Standard plastic DIP-4 package
- Compatible with Toshiba TLP627
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Pb-free

e3

RoHS COMPLIANT

AGENCY APPROVALS

- UL - file no. E52744 system code H or J
- DIN EN 60747-5-2 (VDE 0884)/DIN EN 60747-5-5 pending available with option 1
- BSI IEC 60950; IEC 60065
- FIMKO

DESCRIPTION

The SFH619A is optically coupled isolators with a gallium arsenide infrared LED and a silicon photodarlington sensor. Switching can be achieved while maintaining a high degree of isolation between driving and load circuits. These optocouplers can be used to replace reed and mercury relays with advantages of long life, high speed switching and elimination of magnetic fields.

ORDER INFORMATION	
PART	**REMARKS**
SFH619A	CTR > 1000 %, DIP-4
SFH619A-X007	CTR > 1000 %, SMD-4 (option 7)
SFH619A-X009	CTR > 1000 %, SMD-4 (option 9)

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

ABSOLUTE MAXIMUM RATINGS (1)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
INPUT				
Peak reverse voltage		V_{RM}	6.0	V
Forward continuous current		I_F	60	mA
Derate linearly from 25 °C			1.33	mW/°C
Power dissipation		P_{diss}	100	mW
OUTPUT				
Collector emitter breakdown voltage		BV_{CEO}	300	V
Emitter collector breakdown voltage		BV_{ECO}	0.3	V
Collector (load) current		I_C	125	mA
Derate linearly from 25 °C			2.0	mW/°C
Power dissipation		P_{diss}	150	mW
COUPLER				
Derate linearly from 25 °C			3.33	mW/°C
Total power dissipation		P_{tot}	250	mW
Isolation test voltage between emitter and detector, standard climate: 23 °C/50 % RH, DIN 50014	t = 1.0 s	V_{ISO}	5300	V_{RMS}

ABSOLUTE MAXIMUM RATINGS (1)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
COUPLER				
Isolation resistance	V_{IO} = 500 V, T_{amb} = 25 °C	R_{IO}	$\geq 10^{12}$	Ω
	V_{IO} = 500 V, T_{amb} = 100 °C	R_{IO}	$\geq 10^{11}$	Ω
Storage temperature		T_{stg}	- 55 to + 150	°C
Operating temperature		T_{amb}	- 55 to + 100	°C
Soldering temperature (2)	max. 10 s, dip soldering: distance to seating plane ≥ 1.5 mm	T_{sld}	260	°C

Notes

(1) T_{amb} = 25 °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.

(2) 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	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT						
Forward voltage	I_F = 10 mA	V_F		1.2	1.5	V
Reverse current	V_R = 6.0 V	I_R		0.02	10	µA
Capacitance	V_R = 0 V	C_O		14		pF
OUTPUT						
Collector emitter breakdown voltage	I_{CE} = 100 µA	BV_{CEO}	300			V
Emitter collector breakdown voltage	I_{EC} = 100 µA	BV_{ECO}	0.3			V
Collector emitter dark current	V_{CE} = 200 V,T_A = 25 °C	I_{CEO}		10	200	nA
	V_{CE} = 200 V,T_A = 100 °C	I_{CEO}			20	nA
Collector emitter capacitance	V_{CE} = 0 V, f = 1.0 MHz	C_{CE}		39		pF
COUPLER						
Collector emitter saturation voltage	I_F = 1.0 mA, I_C = 10 mA	V_{CEsat}			1.0	V
	I_F = 10 mA, I_C = 100 mA	V_{CEsat}	0.3		1.2	V
Coupling capacitance	V_{I-O} = 0 V, f = 1.0 MHz	C_C		0.6		pF

Note

T_{amb} = 25 °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.

CURRENT TRANSFER RATIO

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Coupling transfer ratio	I_F = 1.0 mA, V_{CE} = 1.0 V	CTR	1000			%

SWITCHING CHARACTERISTICS

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Rise time	V_{CC} = 10 V, I_C = 10 mA, R_L = 100 Ω	t_r		3.5		µs
	V_{CC} = 10 V, I_F = 16 mA, R_L = 180 Ω	t_r		1.0		µs
Fall time	V_{CC} = 10 V, I_C = 10 mA, R_L = 100 Ω	t_f		14.5		µs
	V_{CC} = 10 V, I_F = 16 mA, R_L = 180 Ω	t_f		20.5		µs
Turn-on time	V_{CC} = 10 V, I_C = 10 mA, R_L = 100 Ω	t_{on}		4.5		µs
	V_{CC} = 10 V, I_F = 16 mA, R_L = 180 Ω	t_{on}		1.5		µs
Turn-off time	V_{CC} = 10 V, I_C = 10 mA, R_L = 100 Ω	t_{off}		29.0		µs
	V_{CC} = 10 V, I_F = 16 mA, R_L = 180 Ω	t_{off}		53.5		µs

SAFETY AND INSULATION RATINGS						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Climatic classification (according to IEC 68 part 1)				55/100/21		
Comparative tracking index		CTI	175		399	
V_{IOTM}			10000			V
V_{IORM}			890			V
P_{SO}					400	mW
I_{SI}					275	mA
T_{SI}					175	°C
Creepage distance	standard DIP-4		7			mm
Clearance distance	standard DIP-4		7			mm
Creepage distance	400 mil DIP-4		8			mm
Clearance distance	400 mil DIP-4		8			mm
Insulation thickness, reinforced rated	per IEC 60950 2.10.5.1		0.4			mm

Note

As per IEC 60747-5-2, § 7.4.3.8.1, this optocoupler is suitable for "safe electrical insulation" only within the safety ratings. Compliance with the safety ratings shall be ensured by means of protective circuits.

TYPICAL CHARACTERISTICS

T_{amb} = 25 °C, unless otherwise specified

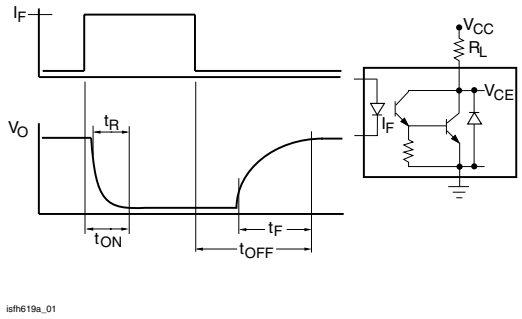


Fig. 1 - Switching Waveform and Switching Schematic

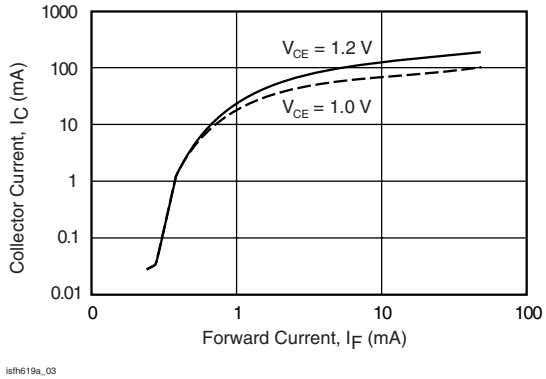


Fig. 2 - Collector Current (mA) vs. Forward Current (mA)

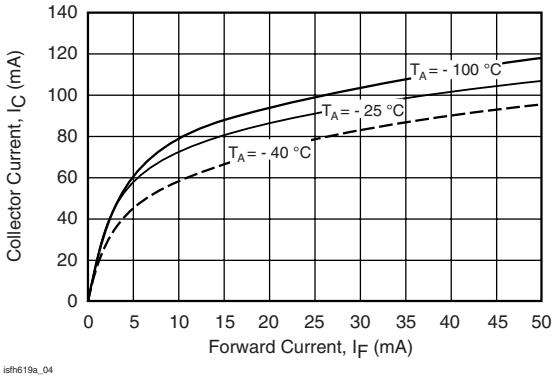


Fig. 3 - Collector Current vs. Forward Current

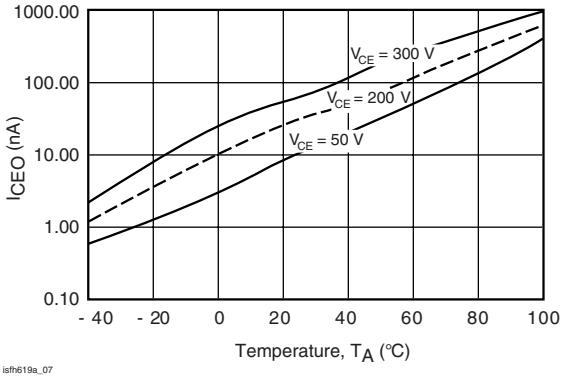


Fig. 6 - Collector Emitter Dark Current vs. Collector Emitter Voltage over Temperature

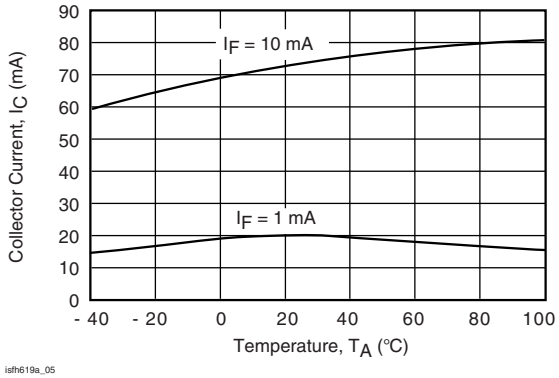


Fig. 4 - Collector Current vs. Ambient Temperature

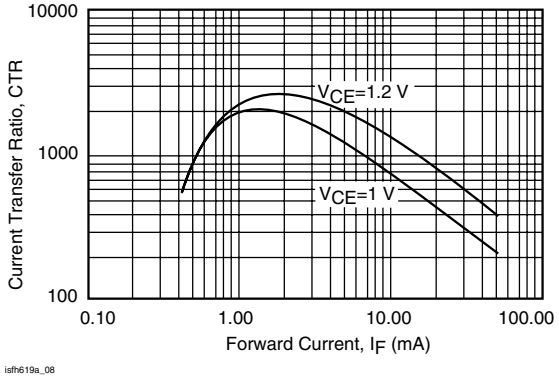


Fig. 7 - Current Transfer Ratio vs. Forward Current

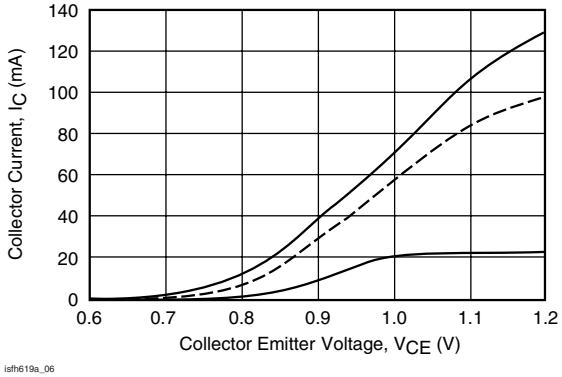


Fig. 5 - Collector Current vs. Collector Emitter Voltage

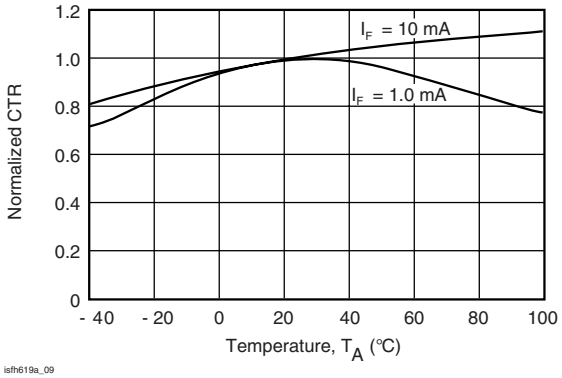


Fig. 8 - Normalized CTR vs. Temperature

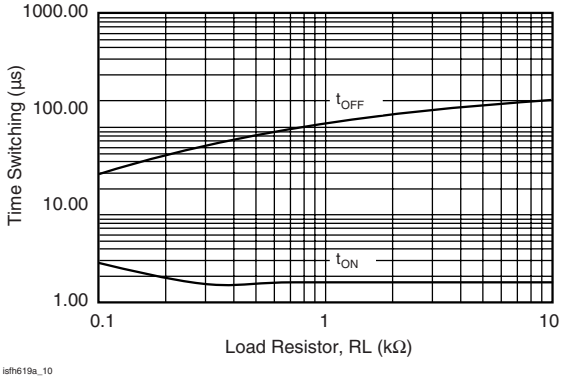
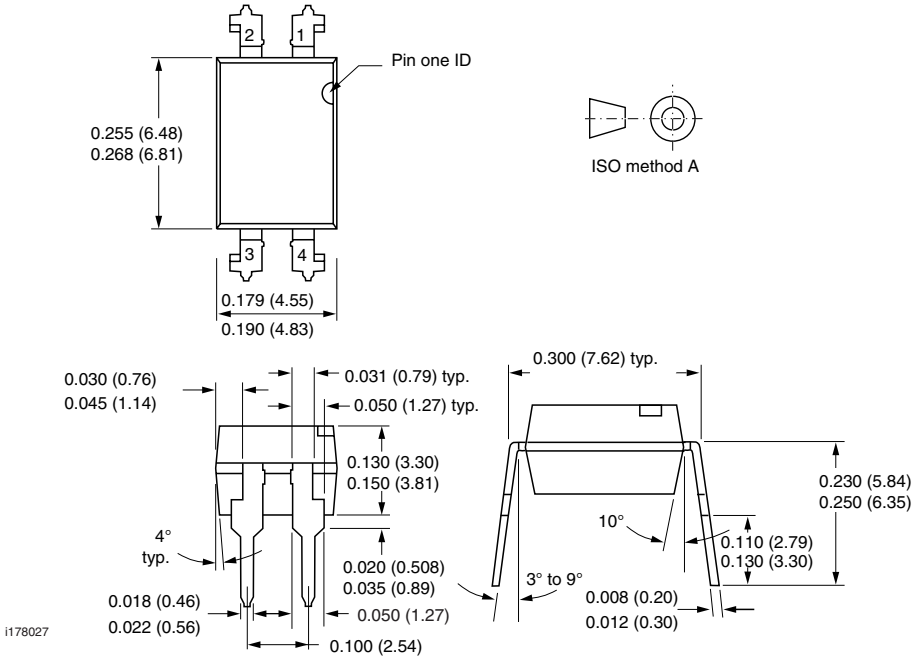
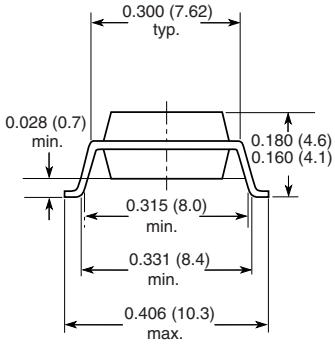


Fig. 9 - Switching Time vs. Load Resistor

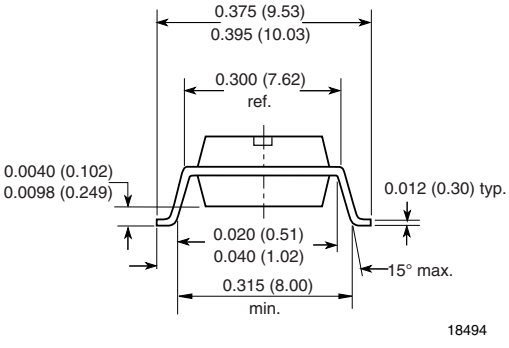
PACKAGE DIMENSIONS in inches (millimeters)



Option 7



Option 9



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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.

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

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