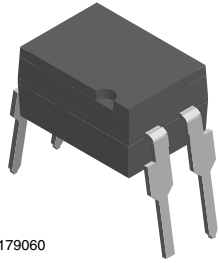
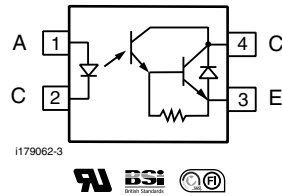


# Optocoupler, Photodarlington Output, High Gain, 300 V $BV_{CEO}$



i179060



i179062-3


**FEATURES**

- High collector emitter voltage,  $V_{CEO} = 300\text{ V}$
- High isolation test voltage:  $5300\text{ V}_{RMS}$
- Standard plastic DIP-4 package
- Compatible with Toshiba TLP627
- Compliant to RoHS Directive to 2002/95/EC and in accordance WEEE 2002/96/EC

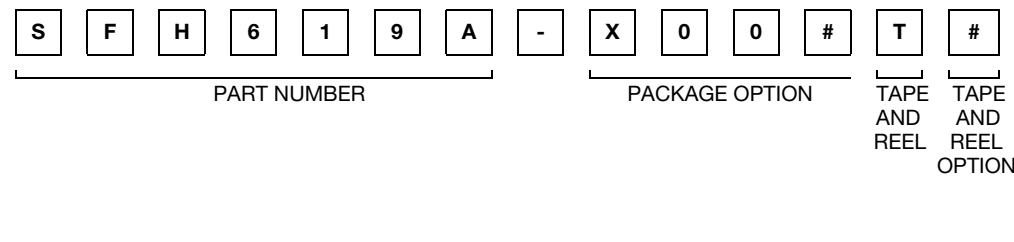

**RoHS**  
COMPLIANT

**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.

**AGENCY APPROVALS**

- UL - file no. E52744 system code H
- BSI IEC 60950; IEC 60065
- FIMKO

**ORDERING INFORMATION**


AGENCY CERTIFIED/PACKAGE	CTR (%)
UL, BSI, FIMKO	≥ 1000
DIP-4	SFH619A
SMD-4, option 7	SFH619A-X007T <sup>(1)</sup>
SMD-4, option 9	SFH619A-X009T <sup>(1)</sup>
SMD-4, option 9	SFH619A-X009T0 <sup>(2)</sup>

**Notes**

- Additional options may be possible, please contact sales office.
- <sup>(1)</sup> Also available in tubes; do not put T on the end.
- <sup>(2)</sup> Option with 90° rotation.

**ABSOLUTE MAXIMUM RATINGS** ( $T_{amb} = 25\text{ °C}$ , unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>INPUT</b>				
Peak reverse voltage		$V_{RM}$	6	V
Forward continuous current		$I_F$	60	mA
Derate linearly from 25 °C			1.33	mW/°C
Power dissipation		$P_{diss}$	100	mW
<b>OUTPUT</b>				
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	mW/°C
Power dissipation		$P_{diss}$	150	mW



ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>COUPLER</b>				
Derate linearly from 25 °C			3.33	mW/°C
Total power dissipation		$P_{tot}$	250	mW
Isolation test voltage between emitter and detector	$t = 1\text{ s}$	$V_{ISO}$	5300	$V_{RMS}$
Isolation resistance	$V_{IO} = 500\text{ V}, T_{amb} = 25\text{ }^{\circ}\text{C}$	$R_{IO}$	$\geq 10^{12}$	$\Omega$
	$V_{IO} = 500\text{ V}, T_{amb} = 100\text{ }^{\circ}\text{C}$	$R_{IO}$	$\geq 10^{11}$	$\Omega$
Storage temperature		$T_{stg}$	- 55 to + 150	°C
Operating temperature		$T_{amb}$	- 55 to + 100	°C
Soldering temperature <sup>(1)</sup>	max. 10 s, dip soldering: distance to seating plane $\geq 1.5\text{ mm}$	$T_{slid}$	260	°C

**Notes**

- 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>(1)</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 ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>						
Forward voltage	$I_F = 10\text{ mA}$	$V_F$		1.2	1.5	V
Reverse current	$V_R = 6\text{ V}$	$I_R$		0.02	10	$\mu\text{A}$
Capacitance	$V_R = 0\text{ V}$	$C_O$		14		pF
<b>OUTPUT</b>						
Collector emitter breakdown voltage	$I_{CE} = 100\text{ }\mu\text{A}$	$BV_{CEO}$	300			V
Emitter collector breakdown voltage	$I_{EC} = 100\text{ }\mu\text{A}$	$BV_{ECO}$	0.3			V
Collector emitter dark current	$V_{CE} = 200\text{ V}, T_A = 25\text{ }^{\circ}\text{C}$	$I_{CEO}$		10	200	nA
	$V_{CE} = 200\text{ V}, T_A = 100\text{ }^{\circ}\text{C}$	$I_{CEO}$			20	nA
Collector emitter capacitance	$V_{CE} = 0\text{ V}, f = 1\text{ MHz}$	$C_{CE}$		39		pF
<b>COUPLER</b>						
Collector emitter saturation voltage	$I_F = 1\text{ mA}, I_C = 10\text{ mA}$	$V_{CEsat}$			1	V
	$I_F = 10\text{ mA}, I_C = 100\text{ mA}$	$V_{CEsat}$	0.3		1.2	V
Coupling capacitance	$V_{IO} = 0\text{ V}, f = 1\text{ MHz}$	$C_C$		0.6		pF

**Note**

- 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.

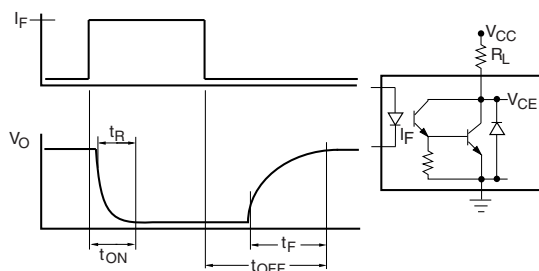
CURRENT TRANSFER RATIO						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Coupling transfer ratio	$I_F = 1\text{ mA}, V_{CE} = 1\text{ V}$	CTR	1000			%

SWITCHING CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Rise time	$V_{CC} = 10\text{ V}, I_C = 10\text{ mA}, R_L = 100\text{ }\Omega$	$t_r$		3.5		$\mu\text{s}$
	$V_{CC} = 10\text{ V}, I_F = 16\text{ mA}, R_L = 180\text{ }\Omega$	$t_r$		1		$\mu\text{s}$
Fall time	$V_{CC} = 10\text{ V}, I_C = 10\text{ mA}, R_L = 100\text{ }\Omega$	$t_f$		14.5		$\mu\text{s}$
	$V_{CC} = 10\text{ V}, I_F = 16\text{ mA}, R_L = 180\text{ }\Omega$	$t_f$		20.5		$\mu\text{s}$
Turn-on time	$V_{CC} = 10\text{ V}, I_C = 10\text{ mA}, R_L = 100\text{ }\Omega$	$t_{on}$		4.5		$\mu\text{s}$
	$V_{CC} = 10\text{ V}, I_F = 16\text{ mA}, R_L = 180\text{ }\Omega$	$t_{on}$		1.5		$\mu\text{s}$
Turn-off time	$V_{CC} = 10\text{ V}, I_C = 10\text{ mA}, R_L = 100\text{ }\Omega$	$t_{off}$		29		$\mu\text{s}$
	$V_{CC} = 10\text{ V}, I_F = 16\text{ mA}, R_L = 180\text{ }\Omega$	$t_{off}$		53.5		$\mu\text{s}$

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

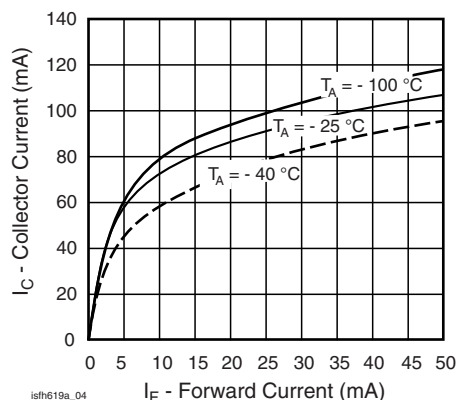
**Note**

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


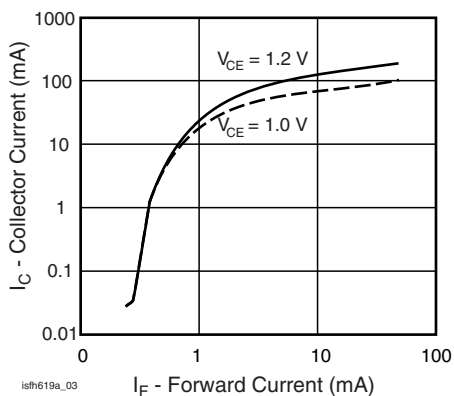
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Fig. 1 - Switching Waveform and Switching Schematic



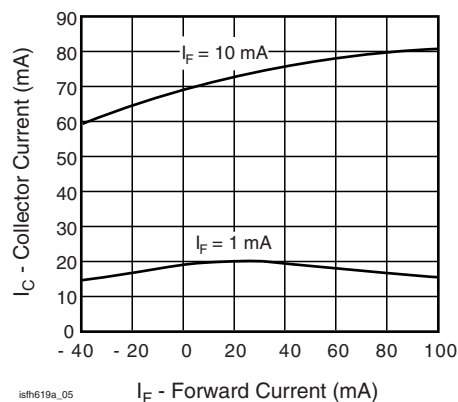
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Fig. 3 - Collector Current vs. Forward Current



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



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Fig. 4 - Collector Current vs. Ambient Temperature

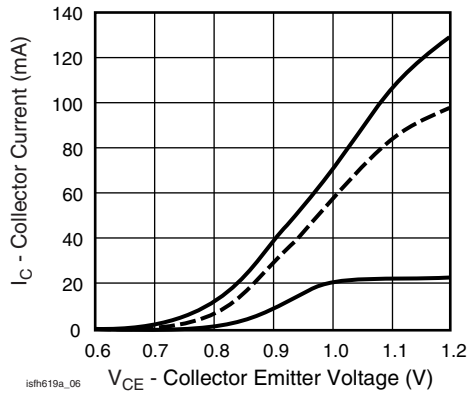


Fig. 5 - Collector Current vs. Collector Emitter Voltage

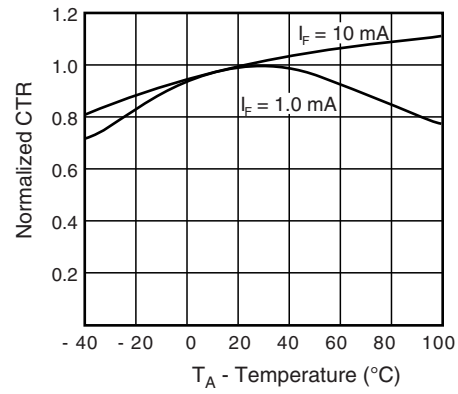


Fig. 8 - Normalized CTR vs. Temperature

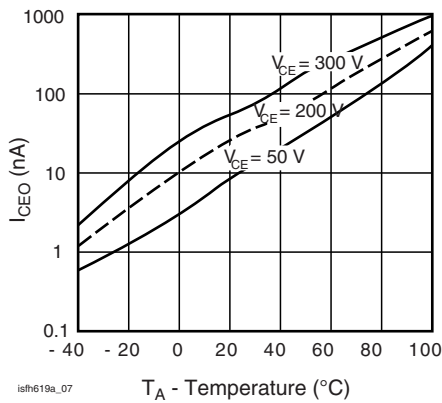


Fig. 6 - Collector Emitter Dark Current vs. Collector Emitter Voltage over Temperature

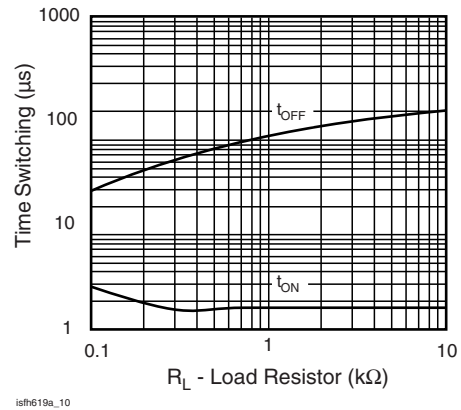


Fig. 9 - Switching Time vs. Load Resistor

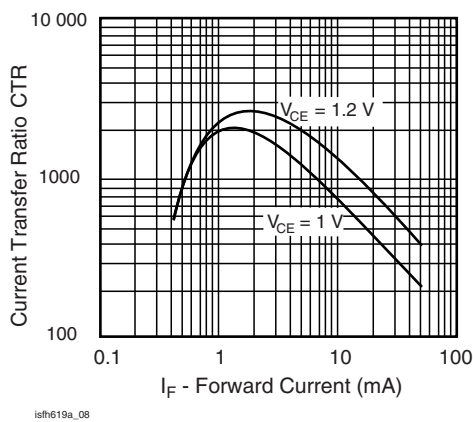
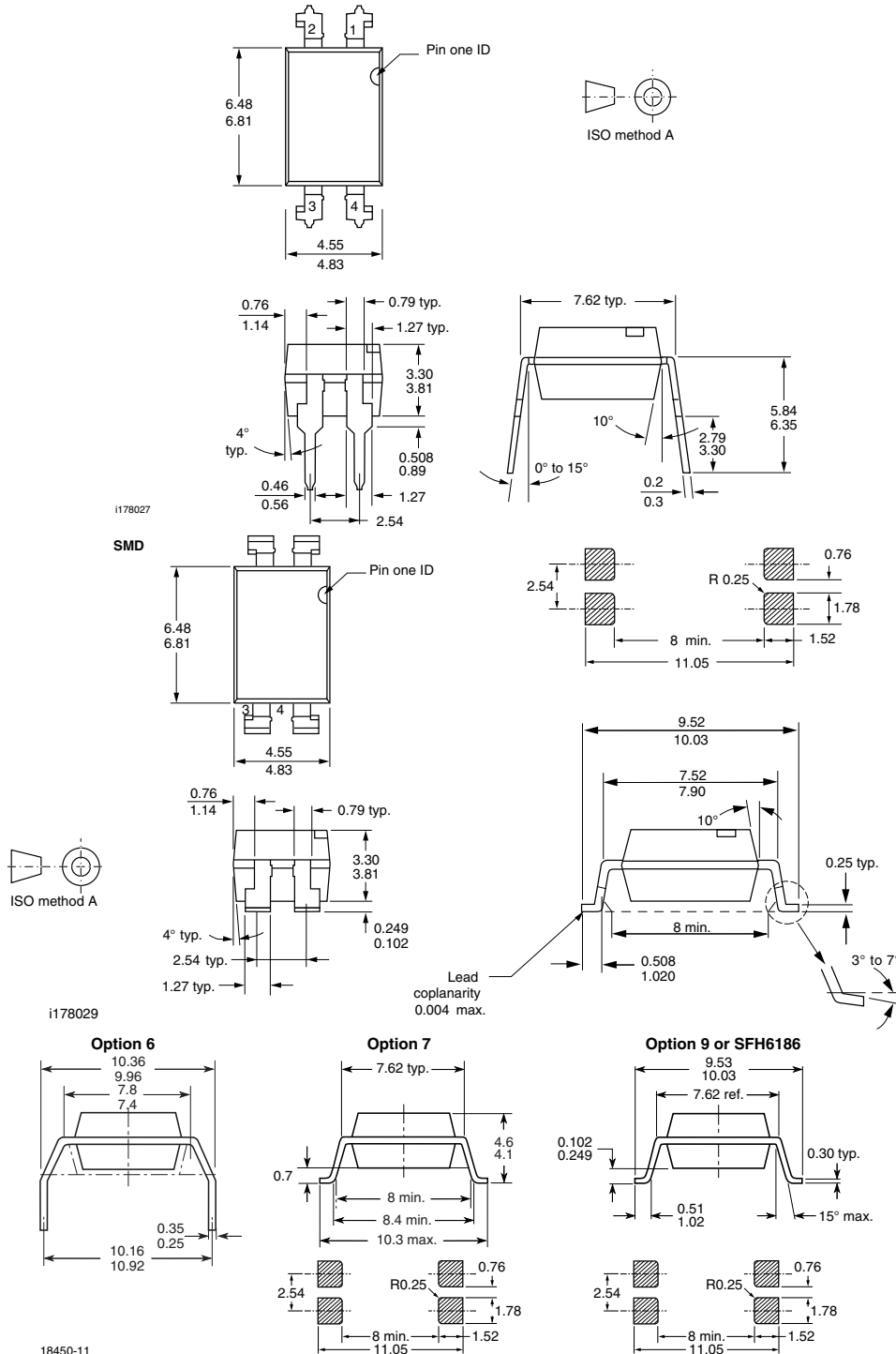
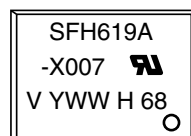


Fig. 7 - Current Transfer Ratio vs. Forward Current

**PACKAGE DIMENSIONS** in millimeters



**PACKAGE MARKING** (example)



**Notes**

- Only option 7 reflected in the package marking.
- Tape and reel suffix (T) is not part of the package marking.



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