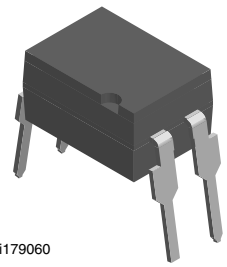
Optocoupler, Photodarlington Output, High Gain, 300 V BV_{CEO}



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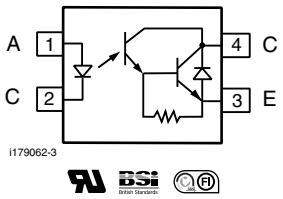


FEATURES

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

Pb-free

e3

RoHS COMPLIANT

AGENCY APPROVALS

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

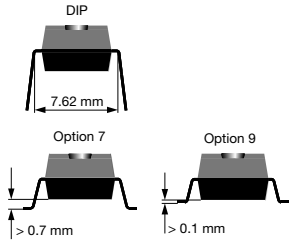
DESCRIPTION

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.

ORDERING INFORMATION

S	F	H	6	1	9	A	-	X	0	0	#	T	#

PART NUMBER — PACKAGE OPTION — TAPE AND REEL — TAPE AND REEL OPTION



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

Notes

- Additional options may be possible, please contact sales office.

(1) Also available in tubes; do not put T on the end.

(2) Option with 90° rotation.

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

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
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
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	mW/°C
Power dissipation		P_{diss}	150	mW

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
COUPLER				
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 s	V_{ISO}	5300	V_{RMS}
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 (1)	max. 10 s, dip soldering: distance to seating plane ≥ 1.5 mm	T_{sld}	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.

(1) 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 °C, unless otherwise specified)						
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 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 MHz	C_{CE}		39		pF
COUPLER						
Collector emitter saturation voltage	I_F = 1 mA, I_C = 10 mA	V_{CEsat}			1	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 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 mA, V_{CE} = 1 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		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		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)

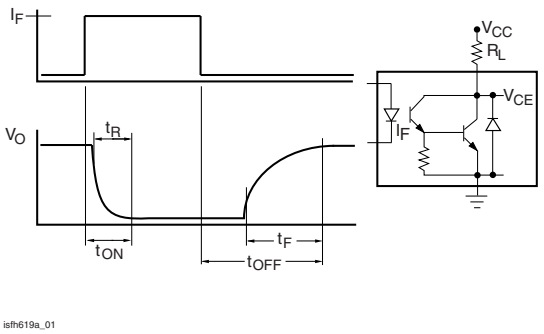


Fig. 1 - Switching Waveform and Switching Schematic

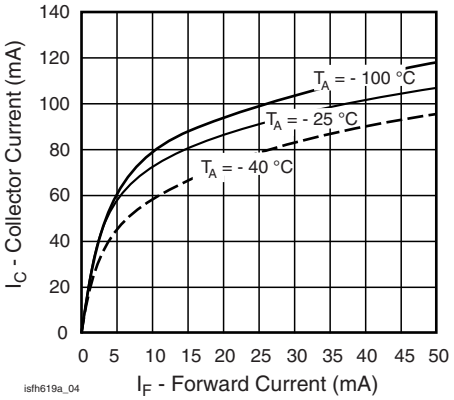


Fig. 3 - Collector Current vs. Forward Current

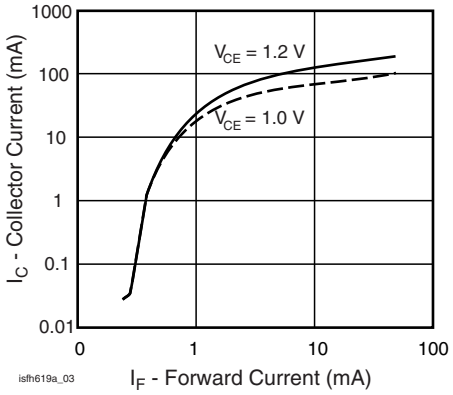


Fig. 2 - Collector Current (mA) vs. Forward Current (mA)

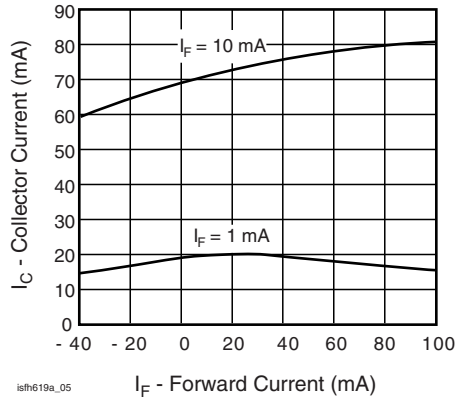


Fig. 4 - Collector Current vs. Ambient Temperature

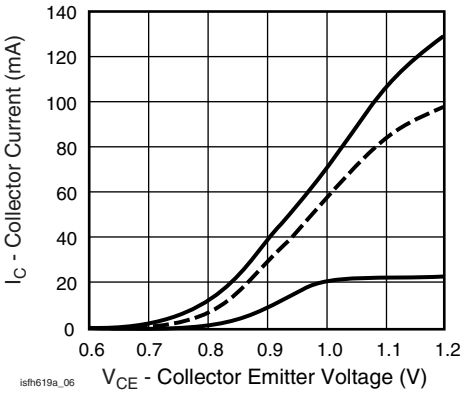


Fig. 5 - Collector Current vs. Collector Emitter Voltage

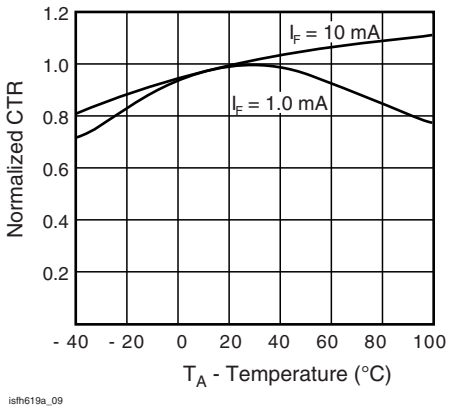


Fig. 8 - Normalized CTR vs. Temperature

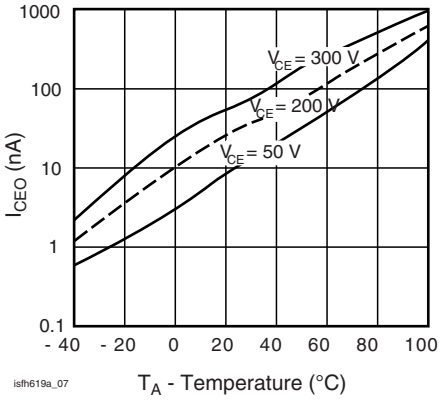


Fig. 6 - Collector Emitter Dark Current vs. Collector Emitter Voltage over Temperature

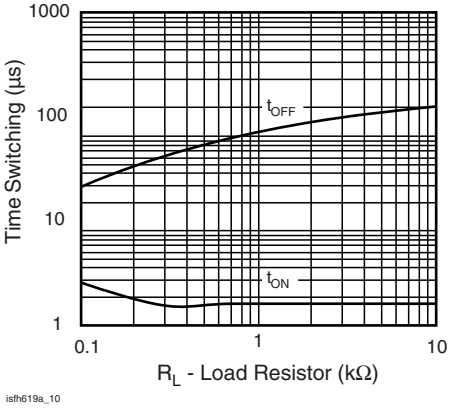


Fig. 9 - Switching Time vs. Load Resistor

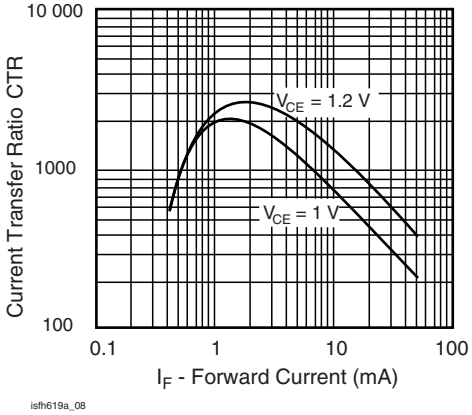
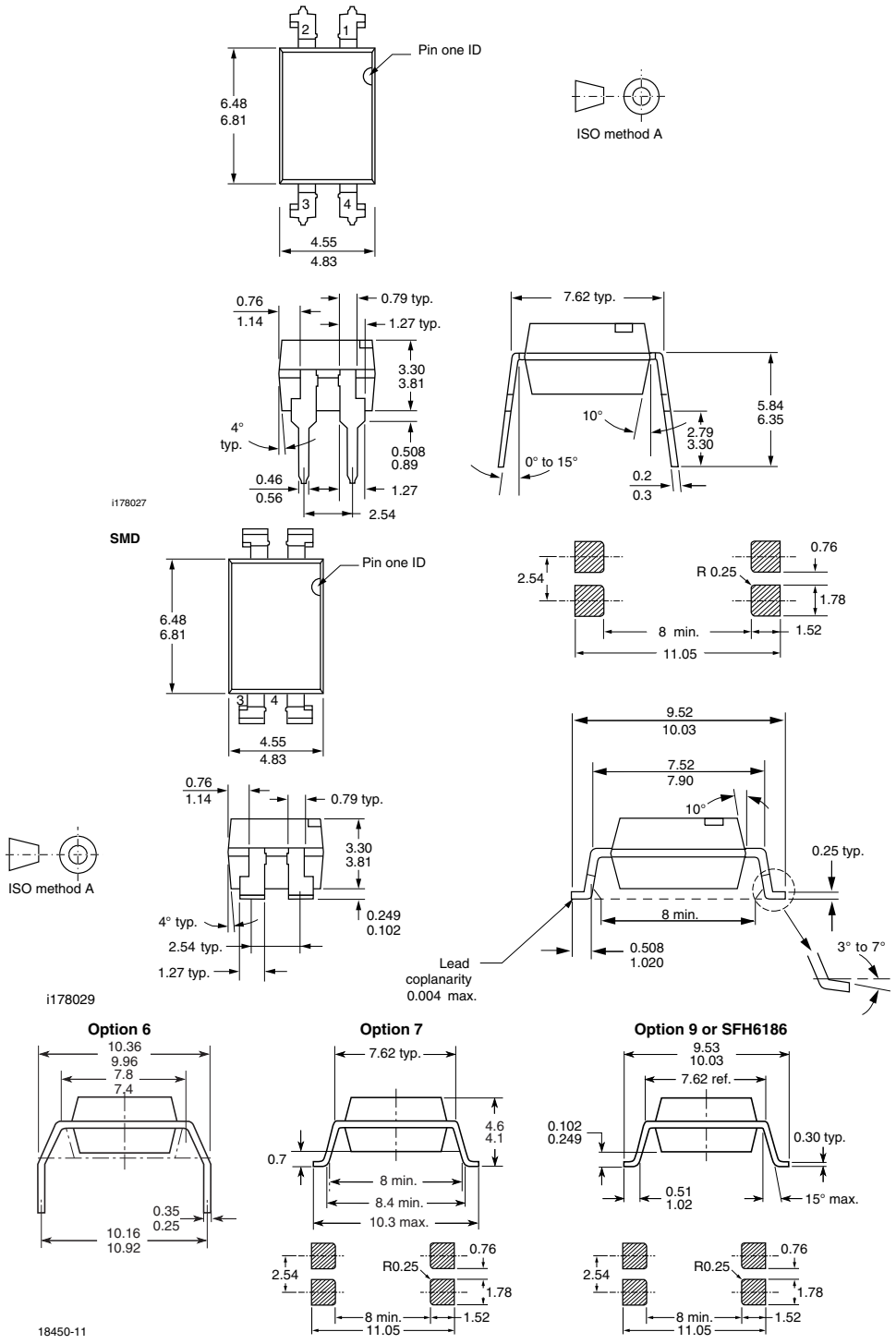
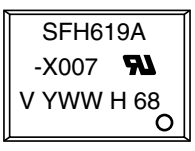


Fig. 7 - Current Transfer Ratio vs. Forward Current

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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