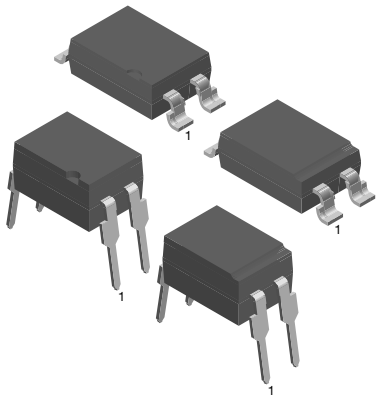
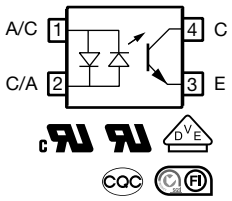
Optocoupler, Phototransistor Output, AC Input, Low Input Current





LINKS TO ADDITIONAL RESOURCES

Product Page | Design Tools | SPICE Models

DESCRIPTION

The SFH628A (DIP) and SFH6286 (SMD) feature a high current transfer ratio, low coupling capacitance and high isolation voltage. These couplers have a GaAs infrared emitting diode, which is optically coupled to a silicon planar phototransistor detector, and is incorporated in a plastic DIP-4 or SMD package.

The coupling devices are designed for signal transmission between two electrically separated circuits.

The couplers are end-stackable with 2.54 mm lead spacing. Creepage and clearance distances of > 8 mm are achieved with option 6. This version complies with IEC 60950 (DIN VDE 0805) for reinforced insulation to an operation voltage of 400 V_{RMS} or DC.

FEATURES

- High common mode interference immunity
- Isolation rated voltage 4420 V_{RMS}
- Low coupling capacitance
- Good CTR linearity depending on forward current
- Low CTR degradation
- High collector emitter voltage, V_{CEO} = 55 V
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

APPLICATIONS

- Telecom
- Industrial controls
- Battery powered equipment
- Office machines

AGENCY APPROVALS

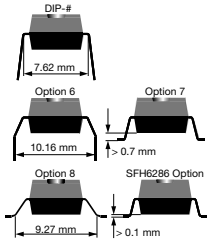
- UL
- cUL
- DIN EN 60747-5-5 (VDE 0884-5), available with option 1
- BSI
- CQC
- FIMKO

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ORDERING INFORMATION

S	F	H	6	2	8	x	-	#	X	0	#	#	T
PART NUMBER								CTR BIN	PACKAGE OPTION				TAPE AND REEL



AGENCY CERTIFIED / PACKAGE	CTR (%)					
	SFH628A			SFH6286		
UL, cUL, BSI, FIMKO, CQC	**63 to 200**	**100 to 320**	**160 to 500**	**63 to 200**	**100 to 320**	**160 to 500**
DIP-4	SFH628A-2	SFH628A-3	SFH628A-4	-	-	-
SFH6286 option	-	-	-	SFH6286-2T (1)	SFH6286-3T (1)	SFH6286-4T (1)
UL, cUL, BSI, FIMKO, CQC, VDE (option 1)	**63 to 200**	**100 to 320**	**160 to 500**	**63 to 200**	**100 to 320**	**160 to 500**
DIP-4	-	SFH628A-3X001	-	-	-	-
DIP-4, 400 mil, option 6	SFH628A-2X016	SFH628A-3X016	SFH628A-4X016	-	-	-
SMD-4, option 7	-	SFH628A-3X017T (1)	-	-	-	-
SMD-4, option 8	SFH628A-2X018T	-	-	-	-	-
SFH6286 option	-	-	-	SFH6286-2X001T	SFH6286-3X001T	SFH6286-4X001T (1)

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

(1) Also available in tubes; do not add T to end

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

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
DC forward current		I_F	± 50	mA
Surge forward current	t ≤ 10 µs	I_{FSM}	± 2.5	A
Power dissipation		P_{diss}	76	mW
OUTPUT				
Collector emitter voltage		V_{CEO}	55	V
Emitter collector voltage		V_{ECO}	7	V
Collector current		I_C	50	mA
	t_p ≤ 1 ms	I_C	100	mA
Power dissipation		P_{diss}	150	mW
COUPLER				
Storage temperature range		T_{stg}	-55 to +150	°C
Ambient temperature range		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).

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ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT							
Forward voltage	I_F = ± 5 mA		V_F	-	1.1	1.5	V
Capacitance	V_R = 0 V, f = 1 MHz		C_O	-	45	-	pF
Thermal resistance			R_{thja}	-	1070	-	K/W
OUTPUT							
Collector emitter leakage current	V_{CE} = 10 V		I_{CEO}	-	10	200	nA
Collector emitter capacitance	V_{CE} = 5 V, f = 1 MHz		C_{CE}	-	7	-	pF
Thermal resistance			R_{thja}	-	500	-	K/W
COUPLER							
Collector emitter saturation voltage	I_F = ± 1 mA, I_C = 0.5 mA	SFH628A-2	V_{CEsat}	-	0.25	0.4	V
		SFH6286-2	V_{CEsat}	-	0.25	0.4	V
	I_F = ± 1 mA, I_C = 0.8 mA	SFH628A-3	V_{CEsat}	-	0.25	0.4	V
		SFH6286-3	V_{CEsat}	-	0.25	0.4	V
	I_F = ± 1 mA, I_C = 1.25 mA	SFH628A-4	V_{CEsat}	-	0.25	0.4	V
		SFH6286-4	V_{CEsat}	-	0.25	0.4	V

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 (T_{amb} = 25 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
I_C/I_F	I_F = ± 1 mA, V_{CE} = 0.5 V	SFH628A-2	CTR	63	-	200	%
		SFH6286-2	CTR	63	-	200	%
	I_F = ± 0.5 mA, V_{CE} = 1.5 V	SFH628A-2	CTR	32	100	-	%
		SFH6286-2	CTR	32	100	-	%
	I_F = ± 1 mA, V_{CE} = 0.5 V	SFH628A-3	CTR	100	-	320	%
		SFH6286-3	CTR	100	-	320	%
	I_F = ± 0.5 mA, V_{CE} = 1.5 V	SFH628A-3	CTR	50	160	-	%
		SFH6286-3	CTR	50	160	-	%
	I_F = ± 1 mA, V_{CE} = 0.5 V	SFH628A-4	CTR	160	-	500	%
		SFH6286-4	CTR	160	-	500	%
	I_F = ± 0.5 mA, V_{CE} = 1.5 V	SFH628A-4	CTR	80	250	-	%
		SFH6286-4	CTR	80	250	-	%

SWITCHING CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Turn-on time	V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω	t_{on}	-	6	-	µs
Rise time	V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω	t_r	-	3.5	-	µs
Turn-off time	V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω	t_{off}	-	5.5	-	µs
Fall time	V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω	t_f	-	5	-	µs

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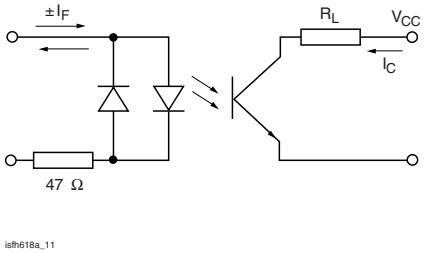


Fig. 1 - Test Circuit

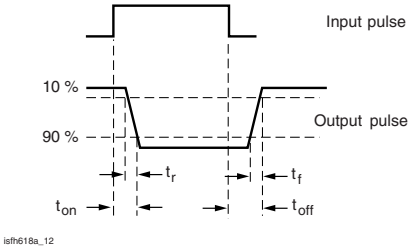


Fig. 2 - Test Circuit and Waveforms

SAFETY AND INSULATION RATINGS				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Climatic classification	According to IEC 68 part 1		55 / 100 / 21	
Comparative tracking index		CTI	175	
Maximum rated withstanding isolation voltage	t = 1 min	V_{ISO}	4420	V_{RMS}
Maximum transient isolation voltage		V_{IOTM}	10 000	V_{peak}
Maximum repetitive peak isolation voltage		V_{IORM}	890	V_{peak}
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
Output safety power		P_{SO}	400	mW
Input safety current		I_{SI}	275	mA
Safety temperature		T_S	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		DTI	≥ 0.4	mm

Note

- As per IEC 60747-5-5, § 7.4.3.8.2, 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.

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TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

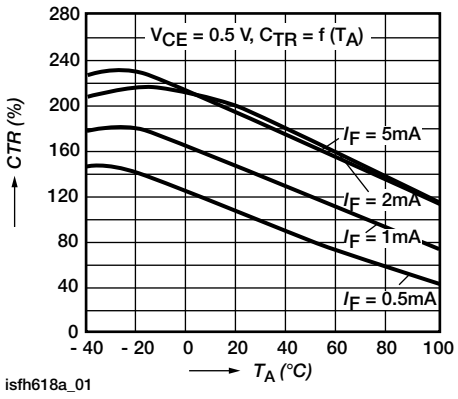


Fig. 3 - Current Transfer Ratio (typ.)

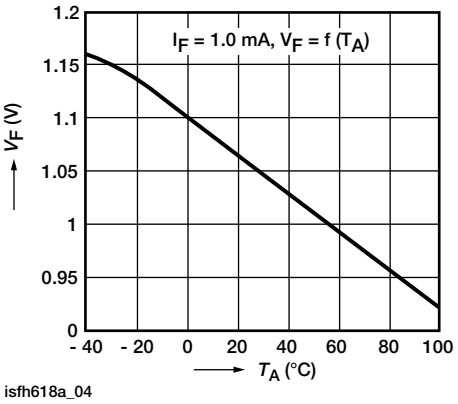


Fig. 6 - Diode Forward Voltage (typ.)

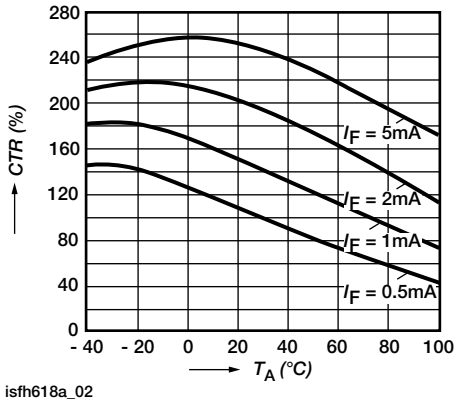


Fig. 4 - Current Transfer Ratio (typ.)

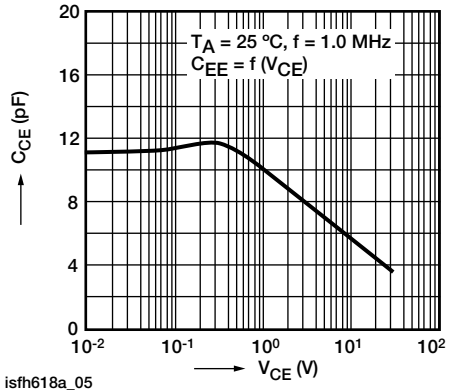


Fig. 7 - Transisitor Capacitance

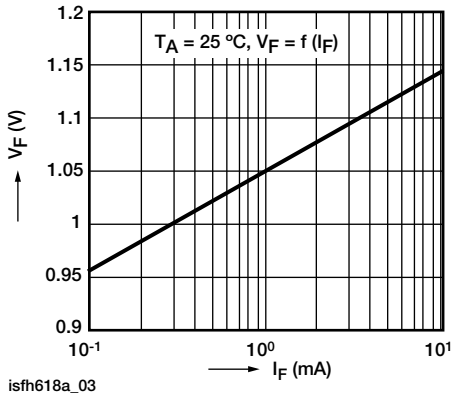


Fig. 5 - Diode Forward Voltage (typ.)

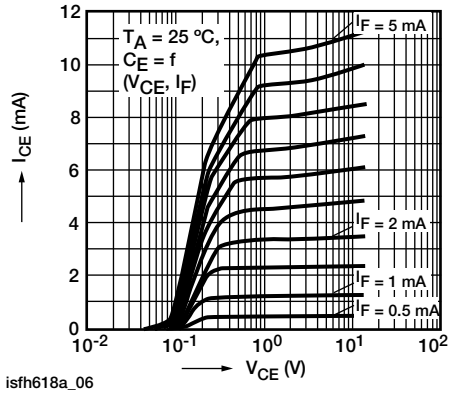


Fig. 8 - Output Characteristics

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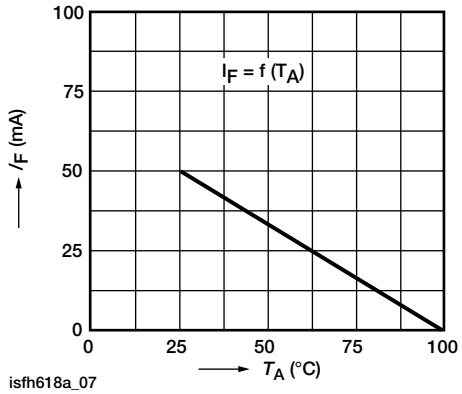


Fig. 9 - Permissible Forward Current Diode

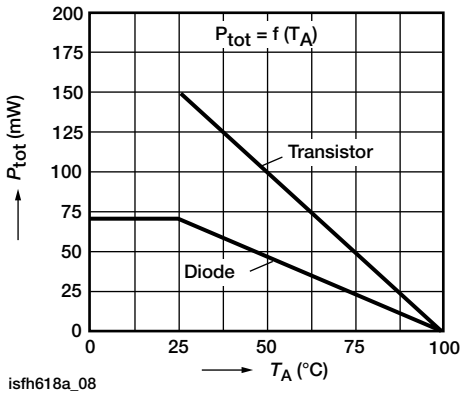


Fig. 10 - Permissible Power Dissipation

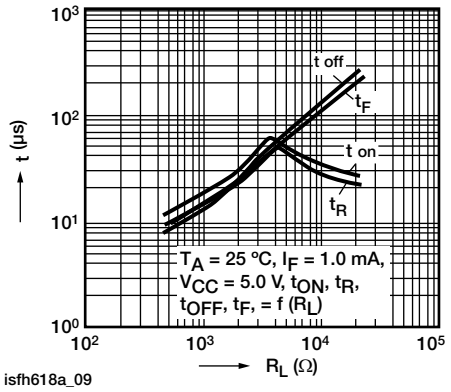
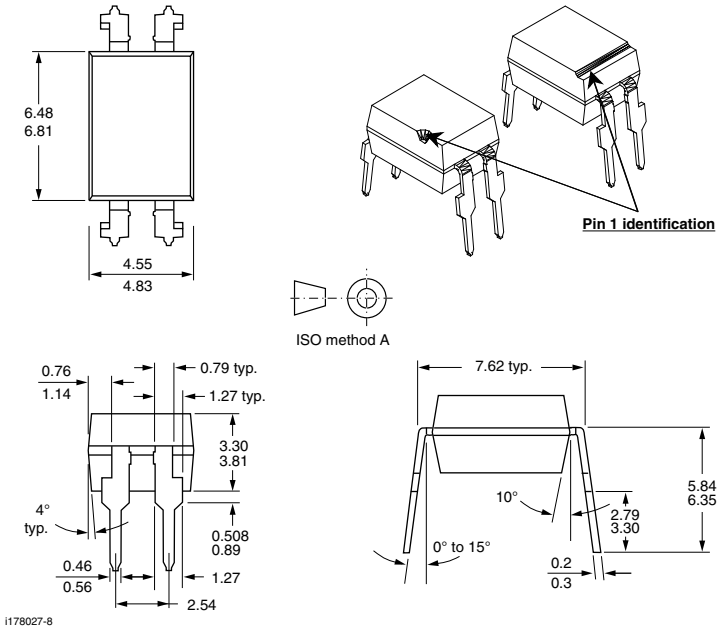


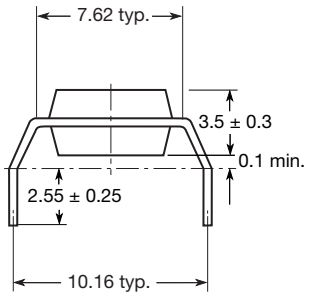
Fig. 11 - Switching Times (Typ.)

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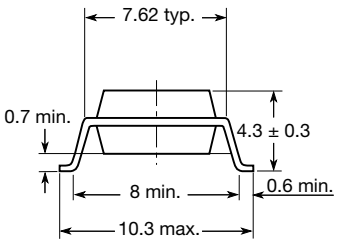
PACKAGE DIMENSIONS in millimeters



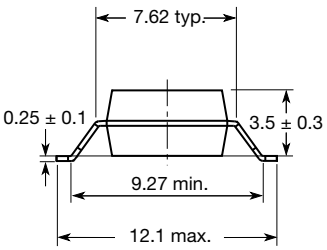
Option 6



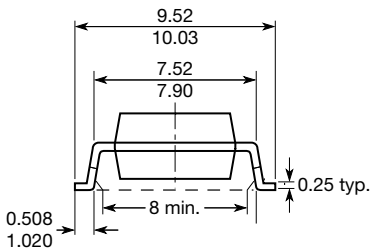
Option 7

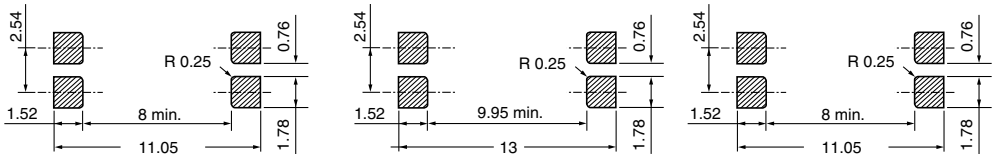


Option 8

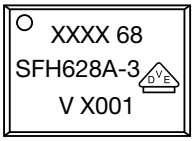


SFH6286 Option





PACKAGE MARKING (example)



Notes

- XXXX = LMC (lot marking code)
- Only options 1, 7, and 8 are reflected in the package marking
- The VDE logo is only marked on option1 parts
- Tape and reel suffix (T) is not part of the package marking

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