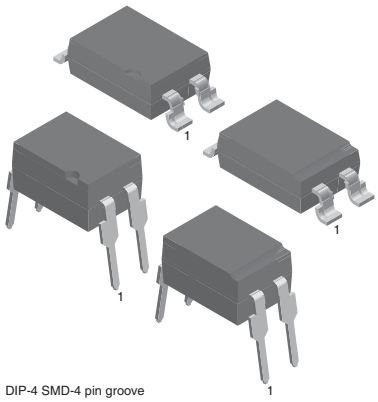
Optocoupler, Phototransistor Output, AC Input, Low Input Current



DIP-4 SMD-4 pin groove

FEATURES

- High common mode interference immunity
- Isolation test voltage, 5300 V_{RMS}
- Low coupling capacitance
- Good CTR linearity depending on forward current
- Low CTR degradation
- High collector emitter voltage, V_{CEO} = 55 V
- Compliant to RoHS Directive to 2002/95/EC and in accordance WEEE 2002/96/EC

Pb-free

e3

RoHS COMPLIANT

APPLICATIONS

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

AGENCY APPROVALS

- UL1577, file no. E52744 system code H
- DIN EN 60747-5-2 (VDE0884)/DIN EN 60747-5-5 (pending), available with option 1
- BSI IEC 60950; IEC 60065

DESCRIPTION

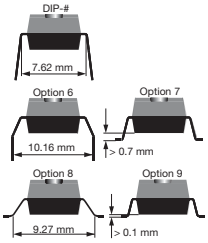
The SFH628A (DIP) and SFH6286 (SMD) feature a high current transfer ratio, low coupling capacitance and high isolation voltage. These couplers have a GaAs infrared emitting diode, which is optically coupled to a silicon planar phototransistor detector, and is incorporated in a plastic DIP-4 or SMD package.

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.

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, BSI	**63 to 200**	**100 to 320**	**160 to 500**	**63 to 200**	**100 to 320**	**160 to 500**
DIP-4	SFH628A-2T (1)	SFH628A-3	SFH628A-4	-	-	-
SMD-4, option 9	-	-	-	SFH6286-2T (1)	SFH6286-3T (1)	SFH6286-4T (1)
VDE, UL, BSI	**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	-	-	-	-
SMD-4, option 8	SFH628A-2X018	-	-	-	-	-
SMD-4, option 9	-	-	-	SFH6286-2X001T	SFH6286-3X001T	SFH6286-4X001

Note

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

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

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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_{CE}	55	V
Emitter collector voltage		V_{EC}	7	V
Collector current		I_C	50	mA
	t_p ≤ 1 ms	I_C	100	mA
Power dissipation		P_{diss}	150	mW
COUPLER				
Isolation test voltage		V_{ISO}	5300	V_{RMS}
Creepage distance			≥ 7	mm
Clearance distance			≥ 7	mm
Insulation thickness between			≥ 0.4	mm
Comparative tracking index per DIN IEC112/			175	
Isolation resistance	V_{IO} = 500 V, T_{amb} = 25 °C	R_{IO}	≥ 10^{12}	Ω
	V_{IO} = 500 V, T_{amb} = 100 °C	R_{IO}	≥ 10^{11}	Ω
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	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**	**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.

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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

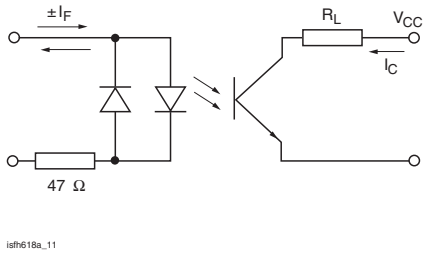

Fig. 1 - Test Circuit

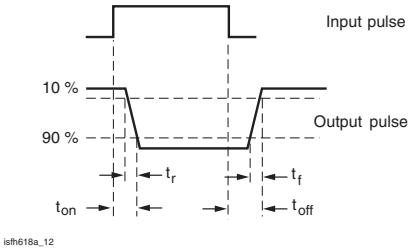

Fig. 2 - Test Circuit and Waveforms

SAFETY AND INSUFFICIENT 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-8		7			mm
Clearance distance	Standard DIP-8		7			mm
Creepage distance	400 mil DIP-8		8			mm
Clearance distance	400 mil DIP-8		8			mm
Insulation thickness, reinforced rated	per IEC 60950 2.10.5.1		0.4			mm

Note

- As per IEC 60747-5-5, § 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.

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

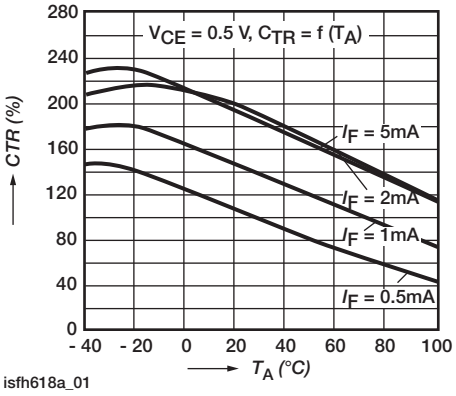

Fig. 3 - Current Transfer Ratio (typ.)

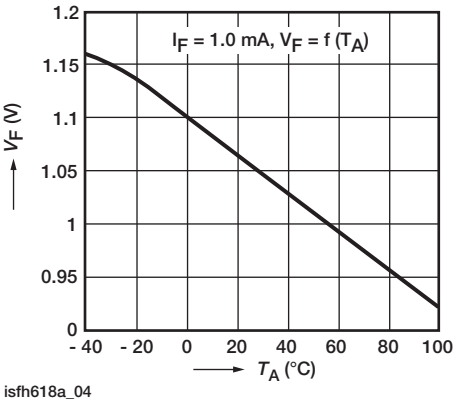

Fig. 6 - Diode Forward Voltage (typ.)

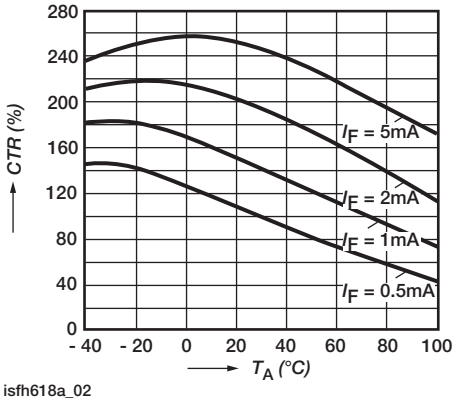

Fig. 4 - Current Transfer Ratio (typ.)

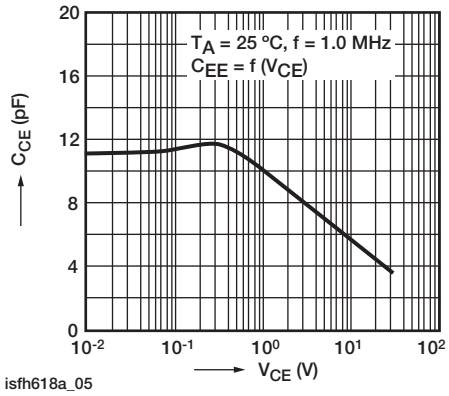

Fig. 7 - Transistor Capacitance

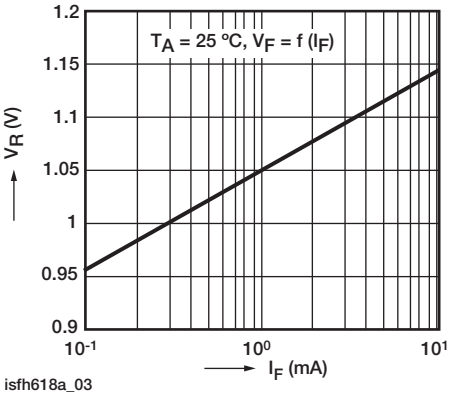

Fig. 5 - Diode Forward Voltage (typ.)

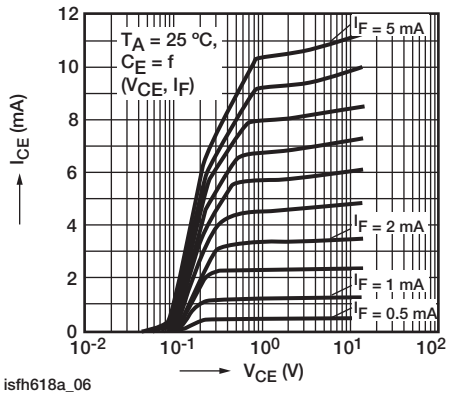

Fig. 8 - Output Characteristics

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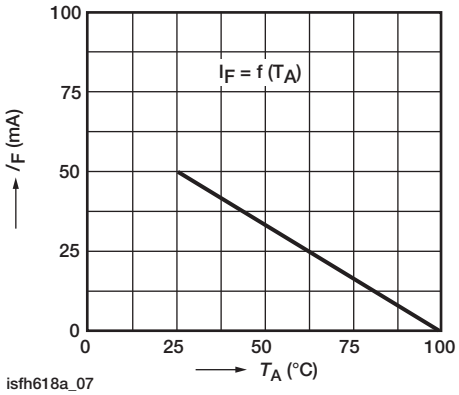


Fig. 9 - Permissible Forward Current Diode

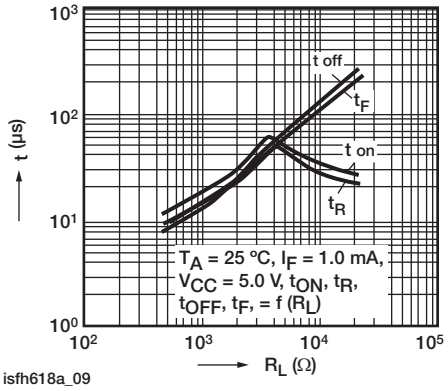


Fig. 11 - Switching Times (Typ.)

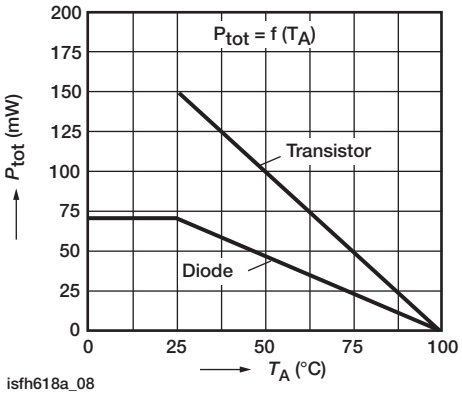
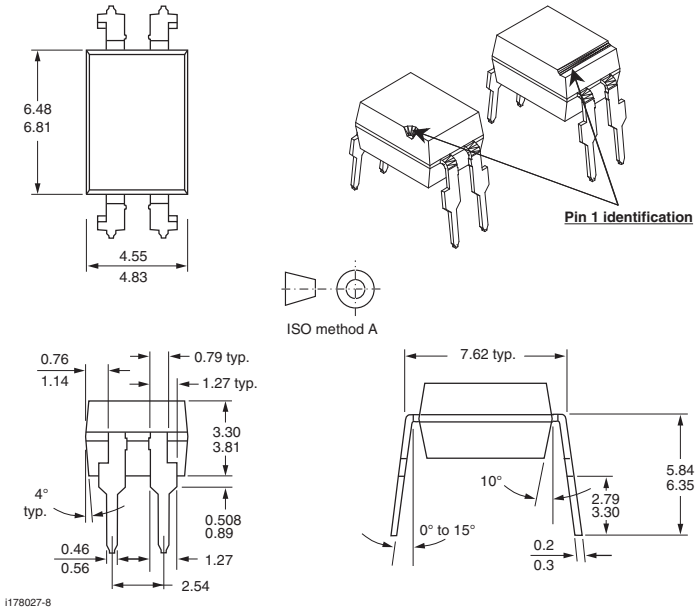


Fig. 10 - Permissible Power Dissipation

PACKAGE DIMENSIONS in millimeters



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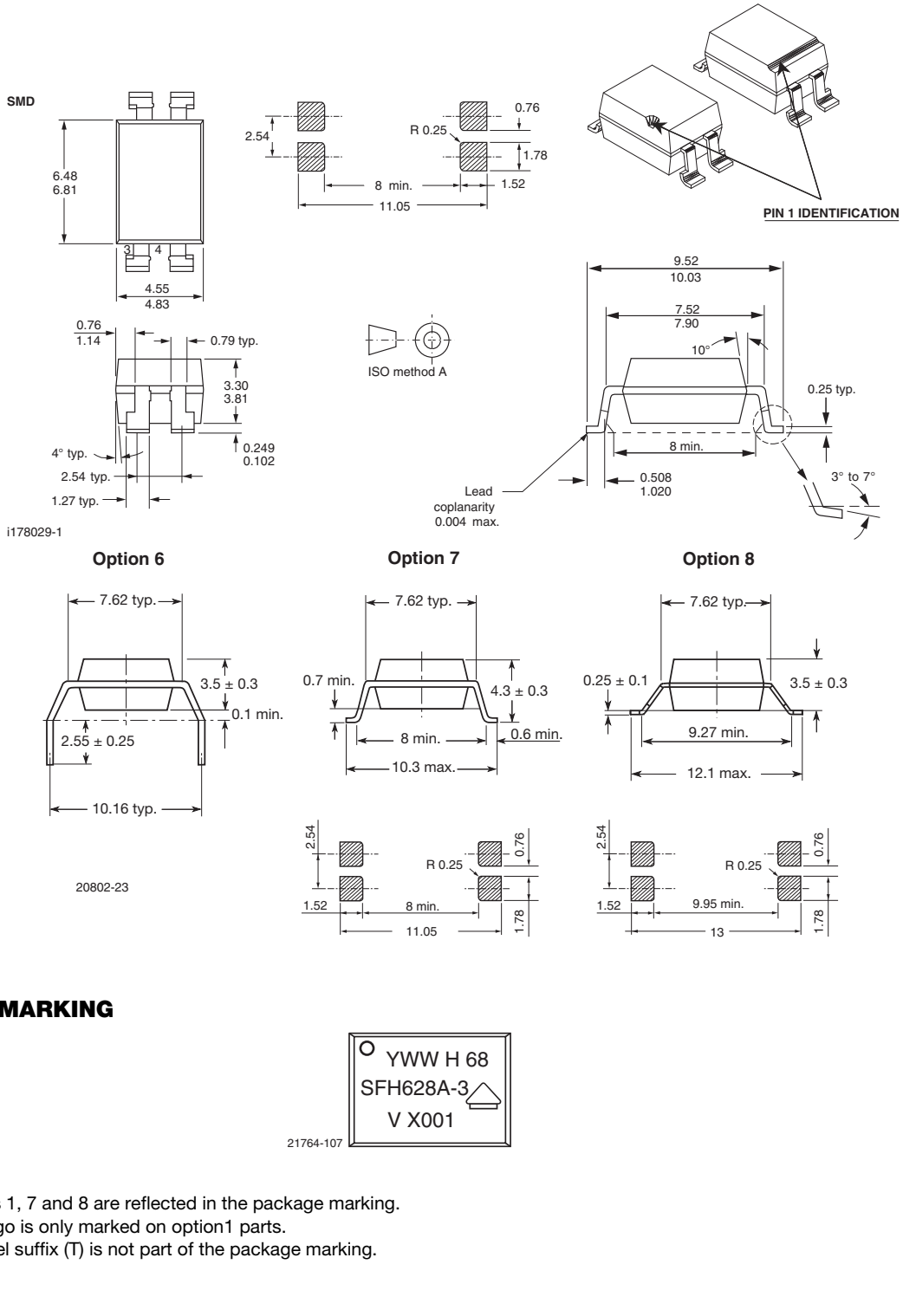

PACKAGE MARKING

Notes

- 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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