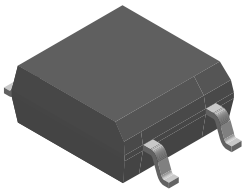
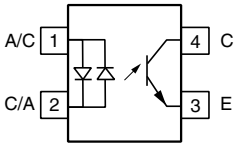
Optocoupler, Phototransistor Output, SOP-4, AC Input, Mini-Flat Package





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FEATURES

- SOP (small outline package)
- Isolation test voltage, 3750 V_{RMS} (1.0 s)
- High collector emitter breakdown voltage, V_{CEO} = 70 V
- Bidirectional AC input
- Low saturation voltage
- Fast switching times
- Temperature stable
- Low coupling capacitance
- End stackable, 0.100" (2.54 mm) spacing
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Pb-free

e3

RoHS COMPLIANT

DESCRIPTION

The SFH691AT has a GaAs infrared emitting diode emitter, which is optically coupled to silicon planar phototransistor detector, and is incorporated in a 4 pin 100 mil lead pitch miniflat package. It features a high current transfer ratio, low coupling capacitance, and high isolation voltage.
The coupling devices are designed for signal transmission between two electrically separated circuits.

APPLICATIONS

- High density mounting or space sensitive PCBs
- PLCs
- Telecommunication

AGENCY APPROVALS

- UL1577, file no. E52744 system code U
- FIMKO
- DIN EN 60747-5-5 available with option 1

ORDER INFORMATION

PART	REMARKS
SFH691AT	CTR 50 to 300 %, SMD-4

Note
The SFH691AT is available only on tape and reel.

ABSOLUTE MAXIMUM RATINGS (1)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
DC forward current		I_F	50	mA
Surge forward current	$t_p \leq 10$ µs	I_{FSM}	2.5	A
Total power dissipation		P_{diss}	80	mW
OUTPUT				
Collector emitter voltage		V_{CE}	70	V
Emitter collector voltage		V_{EC}	7.0	V
Collector current		I_C	50	mA
	$t_p \leq 1.0$ ms	I_C	100	mA
Total power dissipation		P_{diss}	150	mW

ABSOLUTE MAXIMUM RATINGS (1)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
COUPLER				
Isolation test voltage between emitter and detector	1.0 s	V_{ISO}	3750	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 range		T_{stg}	- 55 to + 150	°C
Ambient temperature range		T_{amb}	- 55 to + 100	°C
Junction temperature		T_j	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.

ELECTRICAL CHARACTERISTICS

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT						
Forward voltage	I_F ± 5.0 mA	V_F		1.15	1.4	V
Capacitance	V_R = 0 V, f = 1.0 MHz	C_O		29		pF
Thermal resistance		R_{thja}		750		°C/W
OUTPUT						
Collector emitter leakage current	V_{CE} = 20 V	I_{CEO}			100	nA
Collector emitter capacitance	V_{CE} = 5.0 V, f = 1.0 MHz	C_{CE}		5.0		pF
Thermal resistance		R_{thja}		500		°C/W
COUPLER						
Collector emitter saturation voltage	I_F = 10 mA, I_C = 2.0 mA	V_{CEsat}		0.1	0.3	V
Coupling capacitance	f = 1.0 MHz	C_C		0.4		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
Current transfer ratio	I_F = ± 5.0 mA, V_{CE} = 5.0 V	CTR	50	120	300	%
CTR1/CTR2	CTR1 = I_{C1}/I_{F1}, CTR2 = I_{C2}/I_{F2}		0.3		3.0	

SWITCHING CHARACTERISTICS

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Rise time	I_C = 5.0 mA, V_{CC} = 5.0 V, R_L = 100 Ω	t_r			3.0	µs
Fall time	I_C = 5.0 mA, V_{CC} = 5.0 V, R_L = 100 Ω	t_f			4.0	µs
Turn-on time	I_C = 5.0 mA, V_{CC} = 5.0 V, R_L = 100 Ω	t_{on}			5.0	µs
Turn-off time	I_C = 5.0 mA, V_{CC} = 5.0 V, R_L = 100 Ω	t_{off}			3.0	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}			6000			V
V_{IORM}			707			V
P_{SO}					350	mW
I_{SI}					150	mA
T_{SI}					175	°C
Creepage distance			5			mm
Clearance distance			5			mm
Insulation thickness			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

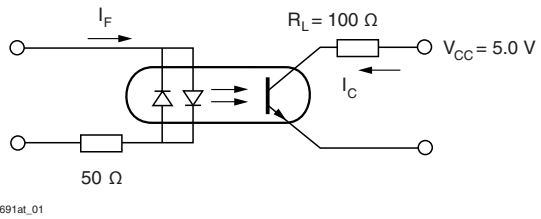
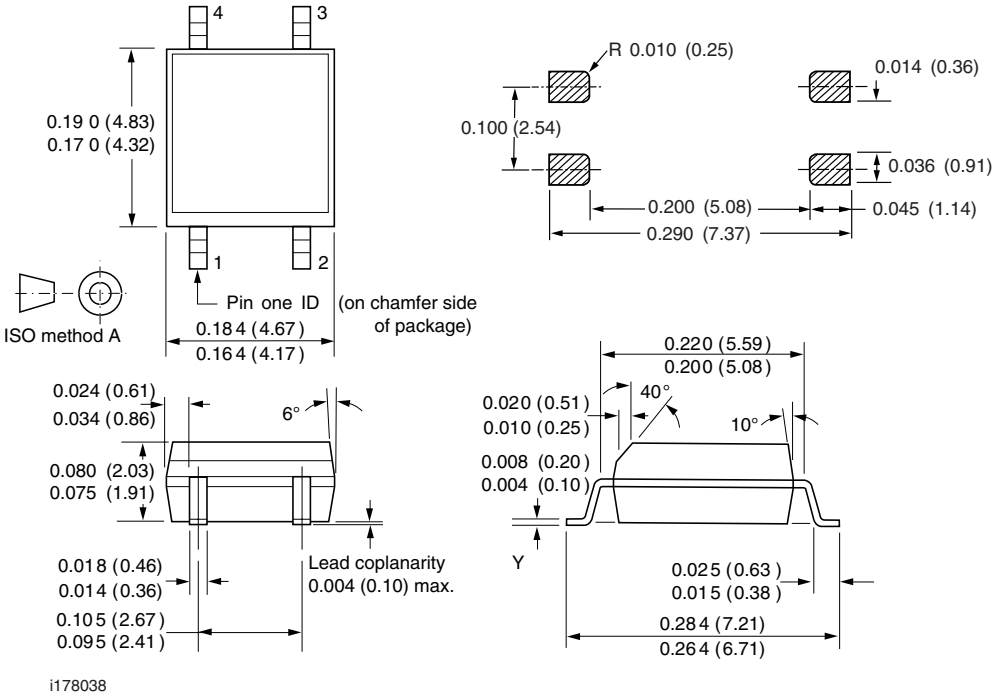


Fig. 1 - Linear Operation (without Saturation)

PACKAGE DIMENSIONS in inches (millimeters)



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It is the policy of Vishay Semiconductor GmbH to

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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