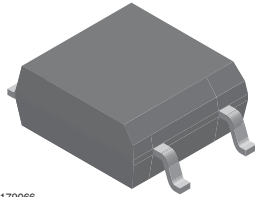
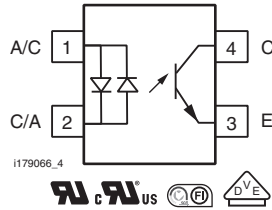


## Optocoupler, Phototransistor Output, SOP-4, AC Input, Mini-Flat Package



I179066



I179066\_4


**FEATURES**

- SOP (small outline package)
- Isolation test voltage, 3750  $V_{RMS}$  (1 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
- Compliant to RoHS Directive to 2002/95/EC and in accordance WEEE 2002/96/EC


**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
- cUL tested to CSA Bulletin 22.2 5A
- FIMKO
- DIN EN 60747-5-2 (VDE0884)/DIN EN 60747-5-5 (pending)

<b>ORDERING INFORMATION</b>	
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">S</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">F</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">H</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">6</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">9</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">1</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">A</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">T</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <div style="text-align: center;"> <span style="font-size: small;">PART NUMBER</span> </div> <div style="text-align: center;"> <span style="font-size: small;">TAPE AND REEL</span> </div> <div style="text-align: center;"> </div> </div>	
<b>AGENCY CERTIFIED/PACKAGE</b>	<b>CTR (%)</b>
<b>UL, cUL, FIMKO</b>	<b>50 to 300</b>
SMD-4	SFH691AT

\*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

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

<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>INPUT</b>				
DC forward current		$I_F$	$\pm 50$	mA
Surge forward current	$t_p \leq 10\text{ }\mu\text{s}$	$I_{FSM}$	$\pm 2.5$	A
Total power dissipation		$P_{diss}$	80	mW
<b>OUTPUT</b>				
Collector emitter voltage		$V_{CE}$	70	V
Emitter collector voltage		$V_{EC}$	7	V
Collector current		$I_C$	50	mA
	$t_p \leq 1\text{ ms}$	$I_C$	100	mA
Total power dissipation		$P_{diss}$	150	mW
<b>COUPLER</b>				
Isolation test voltage between emitter and detector	1 s	$V_{ISO}$	3750	$V_{RMS}$
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 range		$T_{stg}$	- 55 to + 150	$^{\circ}\text{C}$
Ambient temperature range		$T_{amb}$	- 55 to + 100	$^{\circ}\text{C}$
Junction temperature		$T_j$	100	$^{\circ}\text{C}$
Soldering temperature (1)	max. 10 s dip soldering distance to seating plane $\geq 1.5\text{ mm}$	$T_{sld}$	260	$^{\circ}\text{C}$

**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.

<b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>						
Forward voltage	$I_F = \pm 5\text{ mA}$	$V_F$		1.15	1.4	V
Capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$	$C_O$		29		pF
Thermal resistance		$R_{thja}$		750		$^{\circ}\text{C}/\text{W}$
<b>OUTPUT</b>						
Collector emitter leakage current	$V_{CE} = 20\text{ V}$	$I_{CEO}$			100	nA
Collector emitter capacitance	$V_{CE} = 5\text{ V}$ , $f = 1\text{ MHz}$	$C_{CE}$		5		pF
Thermal resistance		$R_{thja}$		500		$^{\circ}\text{C}/\text{W}$
<b>COUPLER</b>						
Collector emitter saturation voltage	$I_F = \pm 10\text{ mA}$ , $I_C = 2\text{ mA}$	$V_{CEsat}$		0.1	0.3	V
Coupling capacitance	$f = 1\text{ MHz}$	$C_C$		0.4		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.

<b>CURRENT TRANSFER RATIO</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Current transfer ratio	$I_F = \pm 5\text{ mA}$ , $V_{CE} = 5\text{ V}$	CTR	50	120	300	%
CTR1/CTR2	$CTR1 = I_{C1}/I_{F1}$ , $CTR2 = I_{C2}/I_{F2}$		0.3		3	

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

<b>SWITCHING CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Rise time	$I_C = 5\text{ mA}$ , $V_{CC} = 5\text{ V}$ , $R_L = 100\ \Omega$	$t_r$		3		$\mu\text{s}$
Fall time	$I_C = 5\text{ mA}$ , $V_{CC} = 5\text{ V}$ , $R_L = 100\ \Omega$	$t_f$		4		$\mu\text{s}$
Turn-on time	$I_C = 5\text{ mA}$ , $V_{CC} = 5\text{ V}$ , $R_L = 100\ \Omega$	$t_{on}$		5		$\mu\text{s}$
Turn-off time	$I_C = 5\text{ mA}$ , $V_{CC} = 5\text{ V}$ , $R_L = 100\ \Omega$	$t_{off}$		3		$\mu\text{s}$

<b>SAFETY AND INSULATION RATINGS</b>						
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	$^{\circ}\text{C}$
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.

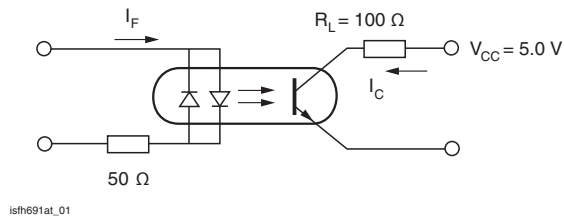
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Linear Operation (without Saturation)





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## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**