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[Vishay Semiconductor/Opto Division](#)
[SFH691AT](#)

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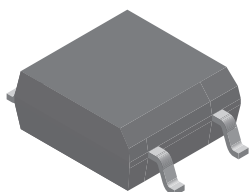


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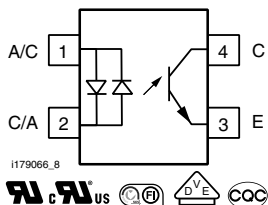
SFH691AT

Vishay Semiconductors

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



1179066



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
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



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 60747-5-5 (VDE 0884)
- CQC GB4943.1-2011 (suitable for installation altitude below 2000 m)

ORDERING INFORMATION	
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 5px;">S</div> <div style="border: 1px solid black; padding: 2px 5px;">F</div> <div style="border: 1px solid black; padding: 2px 5px;">H</div> <div style="border: 1px solid black; padding: 2px 5px;">6</div> <div style="border: 1px solid black; padding: 2px 5px;">9</div> <div style="border: 1px solid black; padding: 2px 5px;">1</div> <div style="border: 1px solid black; padding: 2px 5px;">A</div> <div style="border: 1px solid black; padding: 2px 5px; margin-left: 20px;">T</div> </div> <p style="text-align: center; margin-top: 5px;">PART NUMBER</p>	<p>SOP-4</p> <p>TAPE AND REEL</p>
AGENCY CERTIFIED/PACKAGE	CTR (%)
UL, cUL, FIMKO	50 to 300
SOP-4	SFH691AT



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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 _p ≤ 10 μs	I _{FSM}	± 2.5	A
Total power dissipation		P _{diss}	80	mW
OUTPUT				
Collector emitter voltage		V _{CEO}	70	V
Emitter collector voltage		V _{ECO}	7	V
Collector current		I _C	50	mA
	t _p ≤ 1 ms	I _C	100	mA
Total power dissipation		P _{diss}	150	mW
COUPLER				
Isolation test voltage between emitter and detector	1 s	V _{ISO}	3750	V _{RMS}
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
Junction temperature		T _j	100	°C
Soldering temperature ⁽¹⁾	max. 10 s dip soldering distance to seating plane ≥ 1.5 mm	T _{slid}	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.

ELECTRICAL CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT						
Forward voltage	I _F = ± 5 mA	V _F		1.15	1.4	V
Capacitance	V _R = 0 V, f = 1 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 V, f = 1 MHz	C _{CE}		5		pF
Thermal resistance		R _{thja}		500		°C/W
COUPLER						
Collector emitter saturation voltage	I _F = ± 10 mA, I _C = 2 mA	V _{CEsat}		0.1	0.3	V
Coupling capacitance	f = 1 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.

CURRENT TRANSFER RATIO (T _{amb} = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Current transfer ratio	I _F = ± 5 mA, V _{CE} = 5 V	CTR	50	120	300	%
CTR1/CTR2	CTR1 = I _{C1} /I _{F1} , CTR2 = I _{C2} /I _{F2}		0.3		3	



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SWITCHING CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Rise time	$I_C = 5\text{ mA}$, $V_{CC} = 5\text{ V}$, $R_L = 100\text{ }\Omega$	t_r		3		μs
Fall time	$I_C = 5\text{ mA}$, $V_{CC} = 5\text{ V}$, $R_L = 100\text{ }\Omega$	t_f		4		μs
Turn-on time	$I_C = 5\text{ mA}$, $V_{CC} = 5\text{ V}$, $R_L = 100\text{ }\Omega$	t_{on}		5		μs
Turn-off time	$I_C = 5\text{ mA}$, $V_{CC} = 5\text{ V}$, $R_L = 100\text{ }\Omega$	t_{off}		3		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	$^{\circ}\text{C}$
Creepage distance			5			mm
Clearance distance			5			mm
Insulation thickness			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.

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

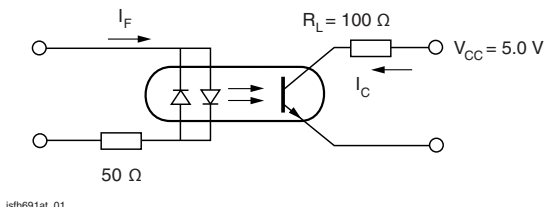


Fig. 1 - Linear Operation (without Saturation)

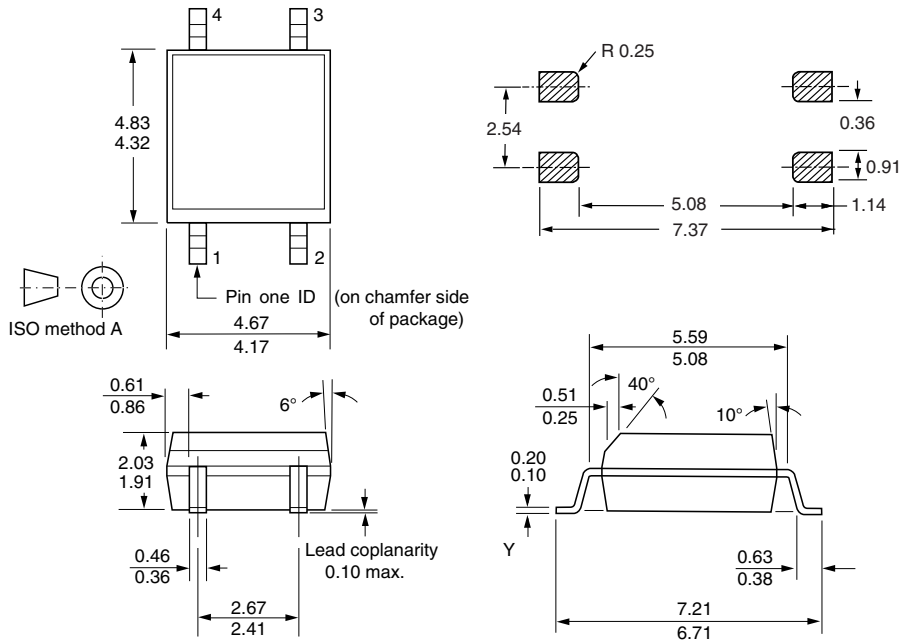


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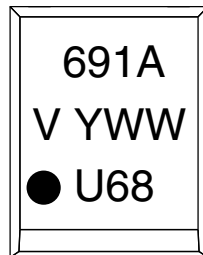
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PACKAGE DIMENSIONS in millimeters



i178038

PACKAGE MARKING (example)



Note

- Tape and reel suffix (T) is not part of the package marking.



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