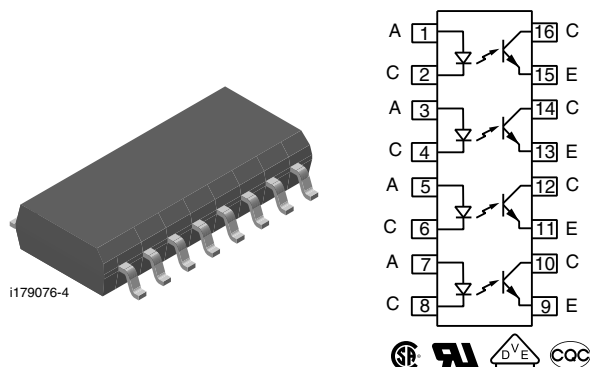


Optocoupler, Phototransistor Output, Quad Channel, SOP-16, Half Pitch Mini-Flat Package



FEATURES

- SOP (small outline package)
- Isolation test voltage, 3750 V_{RMS} (1.0 s)
- High collector emitter voltage, V_{CEO} = 70 V
- Low saturation voltage
- Fast switching times
- Temperature stable
- Low coupling capacitance
- End stackable, 0.050" (1.27 mm) spacing
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



DESCRIPTION

The SFH6916 has a GaAs infrared emitter, which is optically coupled to a silicon planar phototransistor detector, and is incorporated in a 16 pin 50 mil lead pitch miniflat package. It features a high current transfer ratio, low coupling capacitance, and high isolation voltage.

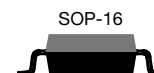
The coupling devices are designed for signal transmission between two electrically separated circuits.

AGENCY APPROVALS

- UL1577, file no. E52744 system code U
- CSA 22.2 bulletin 5A, double protection
- DIN EN 60747-5-5 (VDE 0884)
- CQC GB4943.1-2011 (suitable for installation altitude below 2000 m)

ORDERING INFORMATION

S	F	H	6	9	1	6
PART NUMBER						



AGENCY CERTIFIED/PACKAGE	CTR (%)
UL, cUL	50 to 300
SOP-16, quad channel	SFH6916

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

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Reverse voltage		V _R	6	V
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 _{CE}	70	V
Emitter collector voltage		V _{EC}	7	V
Collector current		I _C	50	mA
	t _p = 1.0 ms	I _C	100	mA
Total power dissipation per channel		P _{diss}	150	mW

**ABSOLUTE MAXIMUM RATINGS** ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
COUPLER				
Isolation test voltage between emitter and detector	$t = 1.0\text{ s}$	V_{ISO}	3750	V_{RMS}
Isolation resistance	$V_{IO} = 500\text{ V}$, $T_{amb} = 25\text{ }^{\circ}\text{C}$	R_{IO}	$\geq 10^{12}$	Ω
	$V_{IO} = 500\text{ V}$, $T_{amb} = 100\text{ }^{\circ}\text{C}$	R_{IO}	$\geq 10^{11}$	Ω
Storage temperature range		T_{stg}	- 55 to + 125	$^{\circ}\text{C}$
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 $\geq 1.5\text{ mm}$		260	$^{\circ}\text{C}$
Total power dissipation		P_{tot}	700	mW

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

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT						
Forward voltage	$I_F = 5\text{ mA}$	V_F		1.15	1.4	V
Reverse current	$V_R = 6\text{ V}$	I_R		0.01	10	μA
Capacitance	C_O	C_O		14		pF
Thermal resistance		R_{thja}		1000		K/W
OUTPUT						
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}		2.8		pF
Thermal resistance		R_{thja}		500		K/W
COUPLER						
Collector emitter saturation voltage	$I_F = 20\text{ mA}$, $I_C = 1\text{ mA}$	V_{CEsat}		0.1	0.4	V
Coupling capacitance	$f = 1\text{ MHz}$	C_C		1		pF

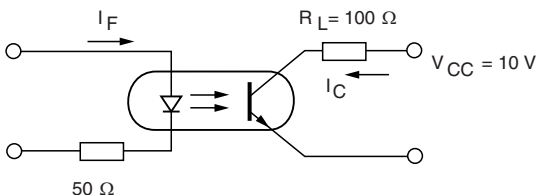
Note

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

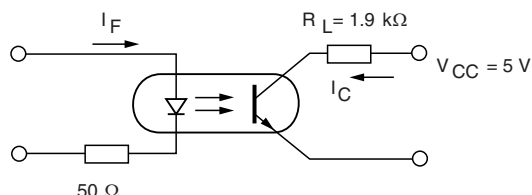
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Current transfer ratio	$I_F = 5\text{ mA}$, $V_{CC} = 5\text{ V}$	CTR	50		300	%

SWITCHING CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
NON-SATURATED						
Rise time	$I_C = 2\text{ mA}$, $V_{CC} = 10\text{ V}$, $R_L = 100\text{ }\Omega$	t_r		4		μs
Fall time	$I_C = 2\text{ mA}$, $V_{CC} = 10\text{ V}$, $R_L = 100\text{ }\Omega$	t_f		3		μs
Turn-on time	$I_C = 2\text{ mA}$, $V_{CC} = 10\text{ V}$, $R_L = 100\text{ }\Omega$	t_{on}		5		μs
Turn-off time	$I_C = 2\text{ mA}$, $V_{CC} = 10\text{ V}$, $R_L = 100\text{ }\Omega$	t_{off}		4		μs
SATURATED						
Rise time	$I_F = 16\text{ mA}$, $V_{CC} = 5\text{ V}$, $R_L = 1.9\text{ k}\Omega$	t_r		15		μs
Fall time	$I_F = 16\text{ mA}$, $V_{CC} = 5\text{ V}$, $R_L = 1.9\text{ k}\Omega$	t_f		0.5		μs
Turn-on time	$I_F = 16\text{ mA}$, $V_{CC} = 5\text{ V}$, $R_L = 1.9\text{ k}\Omega$	t_{on}		1		μs
Turn-off time	$I_F = 16\text{ mA}$, $V_{CC} = 5\text{ V}$, $R_L = 1.9\text{ k}\Omega$	t_{off}		30		μs



isth6916_01

Fig. 1 - Switching Operation (without Saturation)



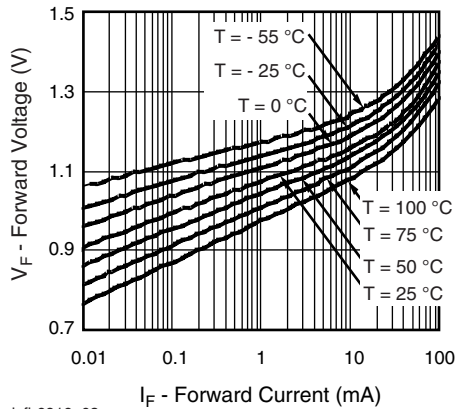
isth6916_02

Fig. 2 - Switching Operation (with Saturation)

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	
Peak transient overvoltage		V_{IOTM}	6000			V
Peak insulation voltage		V_{IORM}	707			V
Safety rating - power output		P_{SO}			350	mW
Safety rating - input current		I_{SI}			150	mA
Safety rating - temperature		T_{SI}			175	$^{\circ}\text{C}$
Creepage distance			5			mm
Clearance distance			5			mm

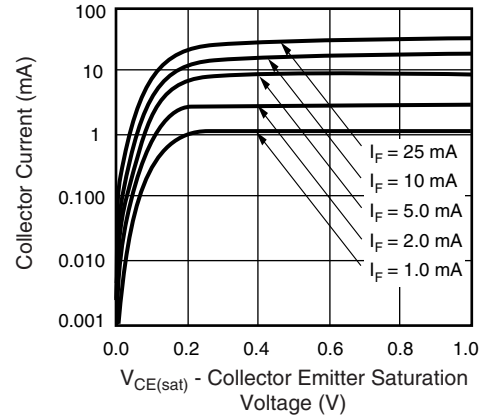
Note

- 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)


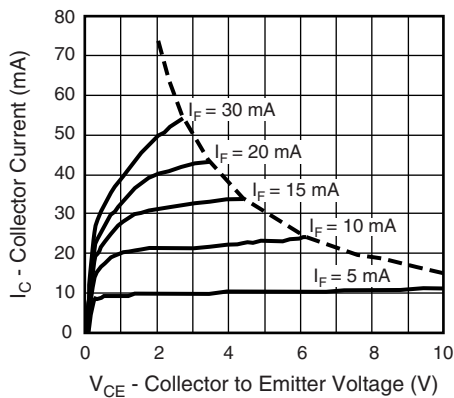
isfh6916_03

Fig. 3 - Diode Forward Voltage vs. Forward Current



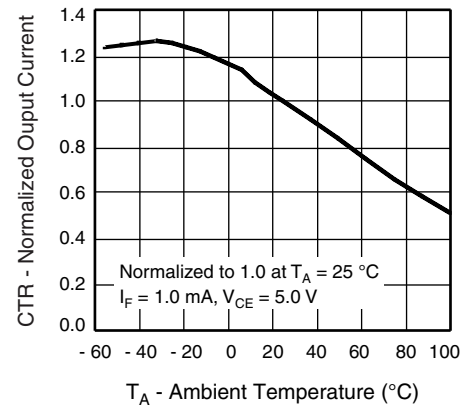
isfh6916_06

Fig. 6 - Collector Current vs. Collector Emitter Saturation Voltage



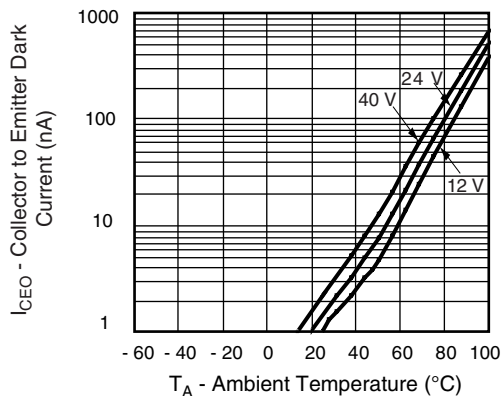
isfh6916_04

Fig. 4 - Collector Current vs. Collector Emitter Voltage



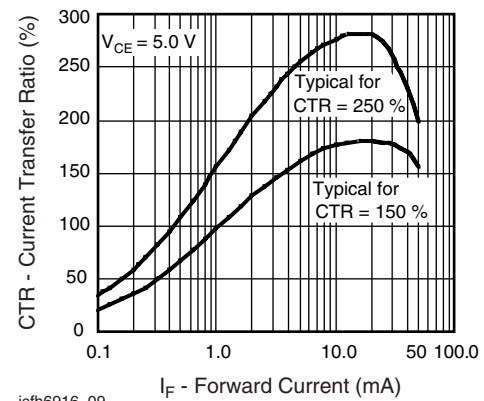
isfh6916_07

Fig. 7 - Normalized Output Current vs. Ambient Temperature



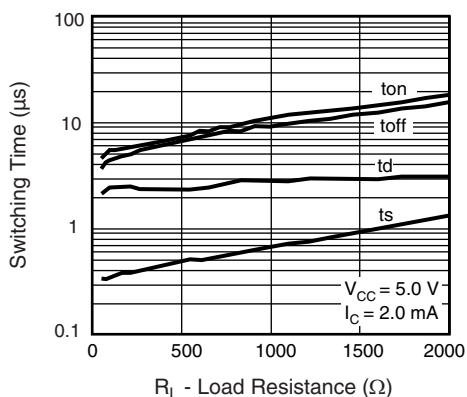
isfh6916_05

Fig. 5 - Collector to Emitter Dark Current vs. Ambient Temperature



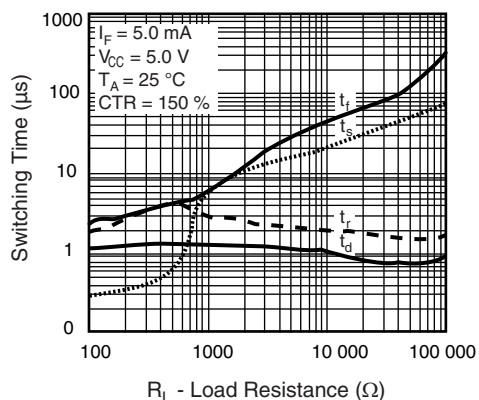
isfh6916_09

Fig. 8 - Current Transfer Ratio vs. Forward Current



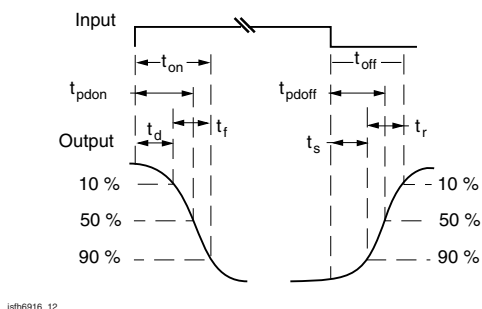
isfh6916_10

Fig. 9 - Switching Time vs. Load Resistance



isfh6916_11

Fig. 10 - Switching Time vs. Load Resistance

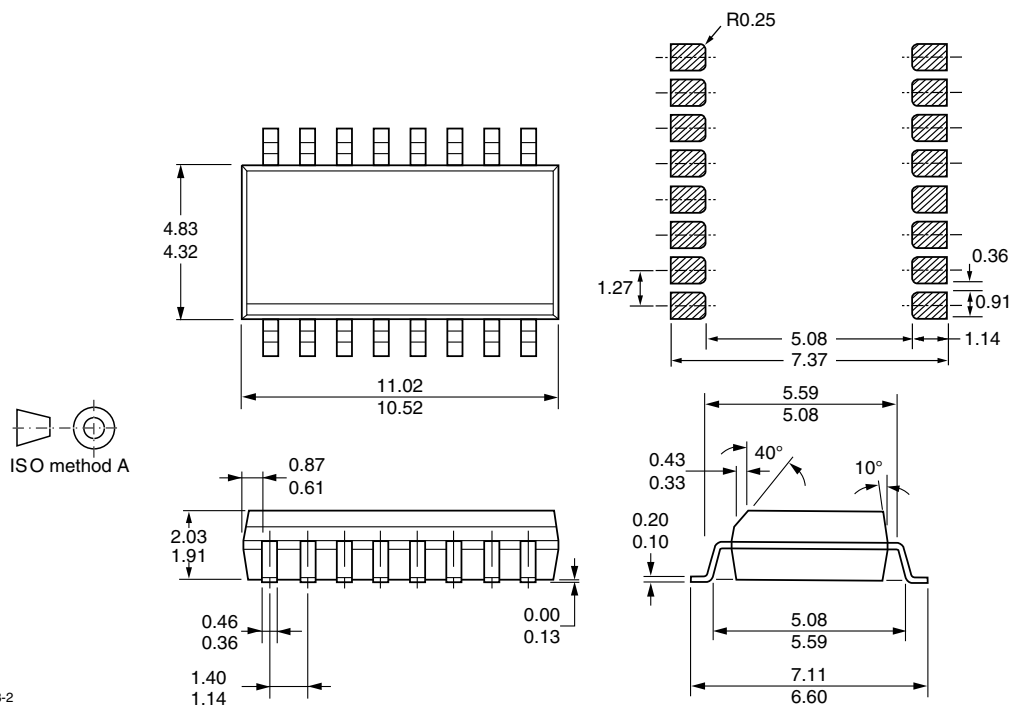


isfh6916_12

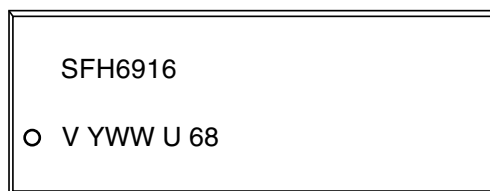
Fig. 11 - Switching Time Measurement



PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING





Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

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.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.