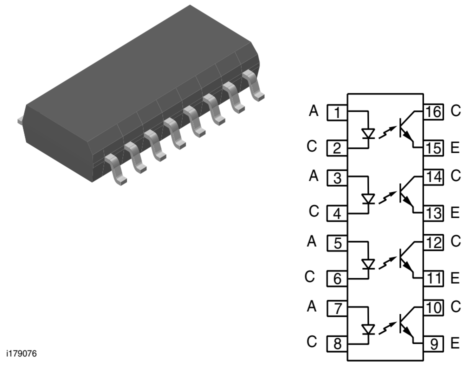
Optocoupler, Phototransistor Output, Quad Channel, SOP-16, Half Pitch Mini-Flat Package

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
- Lead-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



Agency Approvals

- UL1577, File No. E52744 System Code U

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.

Order Information

Part	Remarks
SFH6916	CTR 50 - 300 %, SMD-16

For additional information on the available options refer to Option Information.

Absolute Maximum Ratings

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 Rating for extended periods of the time can adversely affect reliability.

Input

Parameter	Test condition	Symbol	Value	Unit
Reverse voltage		V_R	6.0	V
DC Forward current		I_F	50	mA
Surge forward current	$t_p \leq 10\ \mu s$	I_{FSM}	2.5	A
Total power dissipation		P_{diss}	80	mW

Output

Parameter	Test condition	Symbol	Value	Unit
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 per channel		P_{diss}	150	mW

Coupler

Parameter	Test condition	Symbol	Value	Unit
Isolation test voltage between emitter and detector (1.0 s)		V_{ISO}	3750	V_{RMS}
Creepage			≥ 5.33	mm
Clearance			≥ 5.08	mm
Comparative tracking index per DIN IEC 112/VDEo 303, part 1			≥ 175	
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 + 125	°C
Ambient temperature range		T_{amb}	- 55 to +100	°C
Junction temperature		T_j	100	°C
Soldering temperature	max. 10 s dip soldering distance to seating plane ≥ 1.5 mm		260	°C
Total power dissipation		P_{tot}	70	mW

Electrical Characteristics

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.

Input

T_{amb} = 25 °C (except where noted)

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Forward voltage	I_F = 5 mA	V_F		1.15	1.4	V
Reverse current	V_R = 6.0 V	I_R		0.01	10	μA
Capacitance	C_O	C_O		14		pF
Thermal resistance		R_{thja}		1000		K/W

Output

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
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}		2.8		pF
Thermal resistance		R_{thja}		500		K/W

Coupler

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Collector-emitter saturation voltage	I_F = 20 mA, I_C = 1.0 mA	V_{CESAT}		0.1	0.4	V
Coupling capacitance	f = 1.0 MHz	C_C		1.0		pF

Current Transfer Ratio

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Current Transfer Ratio	I_F = 5.0 mA, V_{CC} = 5.0 V	CTR	50	300		%

Switching Characteristics

Switching Operation (without saturation)

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Rise time	I_C = 2.0 mA, V_{CC} = 10 V, R_L = 100 Ω	t_r		4.0		µs
Fall time	I_C = 2.0 mA, V_{CC} = 10 V, R_L = 100 Ω	t_f		3.0		µs
Turn on time	I_C = 2.0 mA, V_{CC} = 10 V, R_L = 100 Ω	t_{on}		5.0		µs
Turn off time	I_C = 2.0 mA, V_{CC} = 10 V, R_L = 100 Ω	t_{off}		4.0		µs

Switching Operation (with saturation)

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Rise time	I_F = 16.0 mA, V_{CC} = 5.0 V, R_L = 1.9 kΩ	t_r		15		µs
Fall time	I_F = 16.0 mA, V_{CC} = 5.0 V, R_L = 1.9 kΩ	t_f		0.5		µs
Turn on time	I_F = 16.0 mA, V_{CC} = 5.0 V, R_L = 1.9 kΩ	t_{on}		1.0		µs
Turn off time	I_F = 16.0 mA, V_{CC} = 5.0 V, R_L = 1.9 kΩ	t_{off}		30		µs

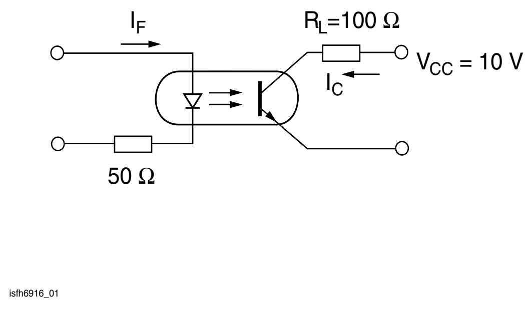


Figure 1. Switching Operation (without Saturation)

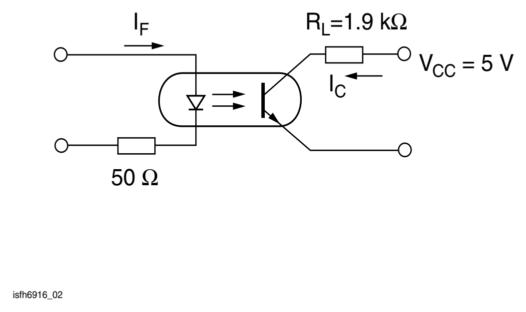


Figure 2. Switching Operation (with Saturation)

Typical Characteristics (Tamb = 25 °C unless otherwise specified)

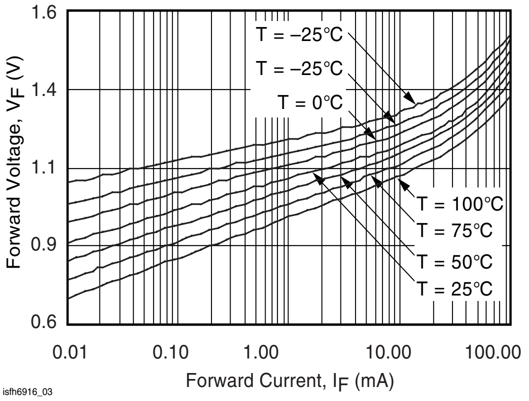


Figure 3. Diode Forward Voltage vs. Forward Current

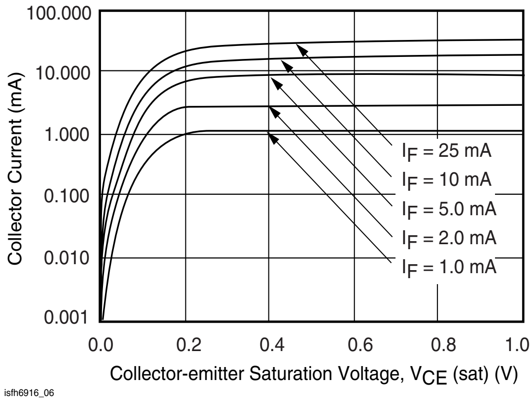


Figure 6. Collector Current vs. Collector-Emitter Saturation Voltage

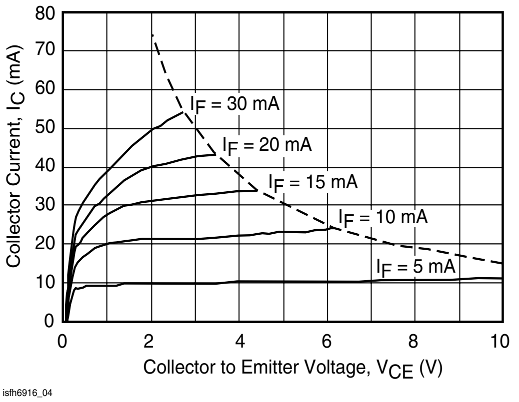


Figure 4. Collector Current vs. Collector Emitter Voltage

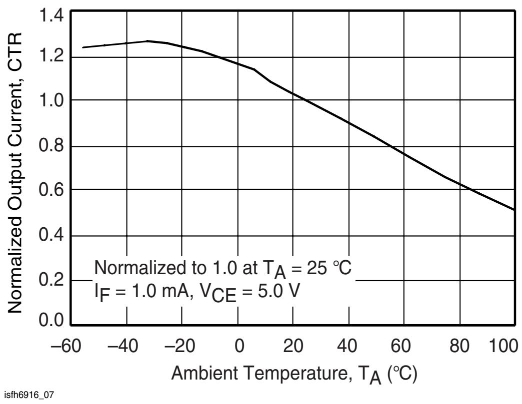


Figure 7. Normalized Output Current vs. Ambient Temperature

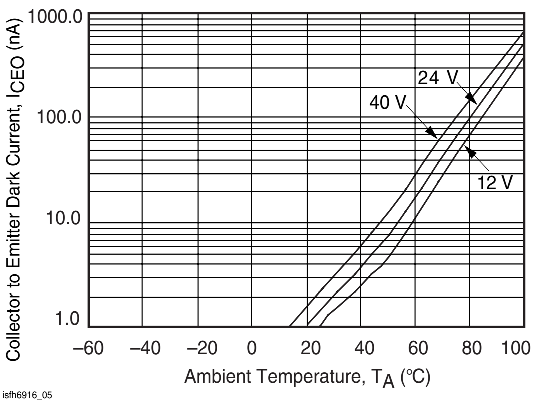


Figure 5. Collector to Emitter Dark Current vs. Ambient Temperature

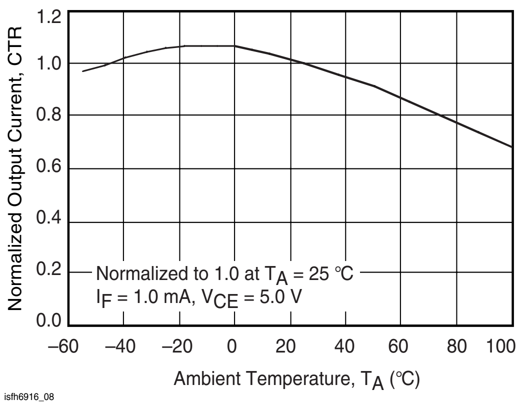


Figure 8. Normalized Output Current vs. Ambient Temperature

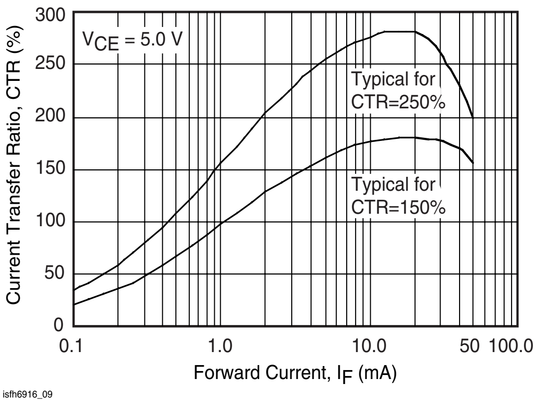


Figure 9. Current Transfer Ratio vs. Forward Current

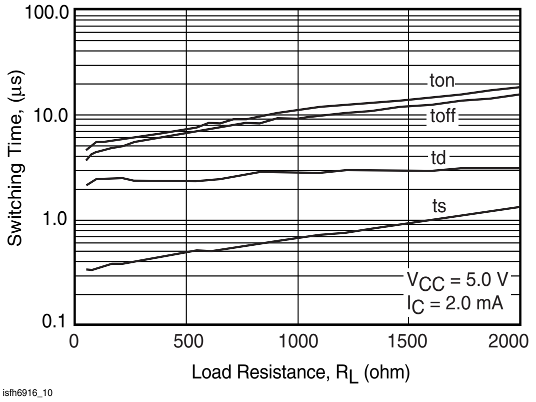


Figure 10. Switching Time vs. Load Resistance

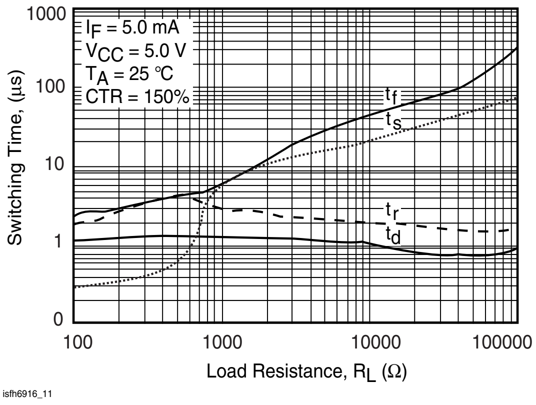


Figure 11. Switching Time vs. Load Resistance

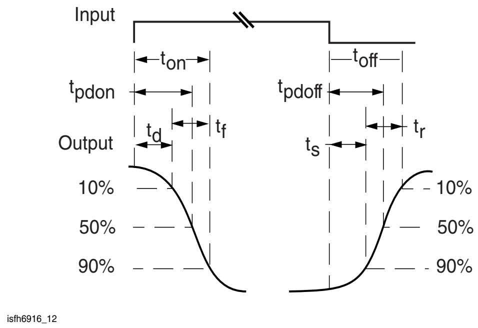
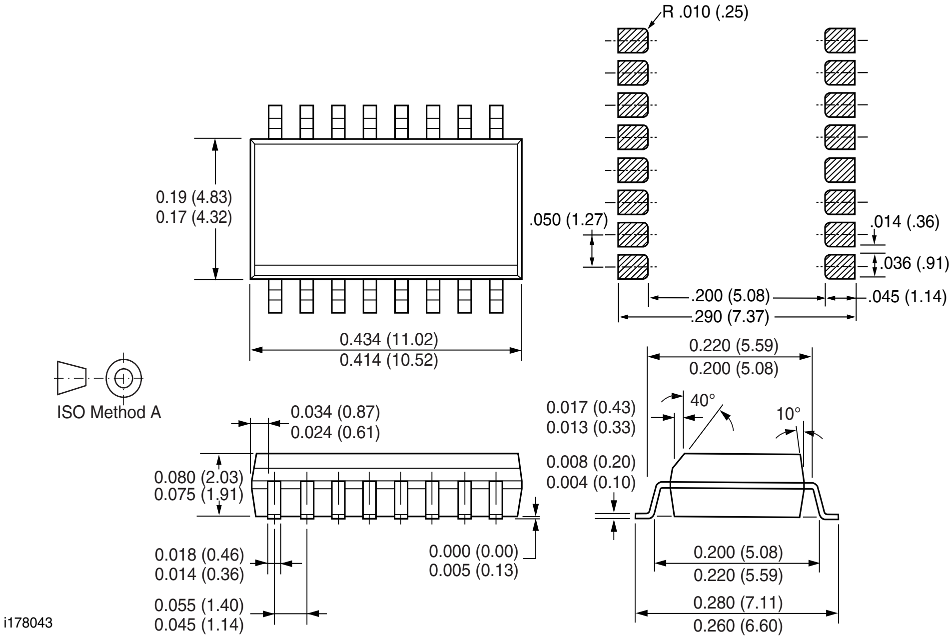


Figure 12. Switching Time Measurement

Package Dimensions in Inches (mm)



Ozone Depleting Substances Policy Statement

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 operatingsystems 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.

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