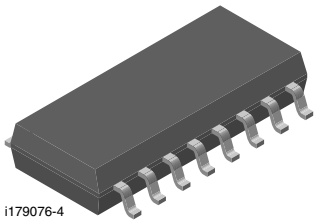
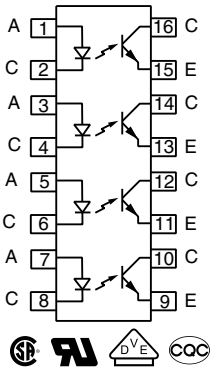
Optocoupler, Phototransistor Output, Quad Channel, SSOP-16, Half Pitch Mini-Flat Package





FEATURES

- SSOP (shrink small outline package)
- Isolation test voltage, 3750 V_{RMS}
- 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

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

LINKS TO ADDITIONAL RESOURCES

3D Models | Design Tools | Related Documents

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
- cUL
- DIN EN 60747-5-5 (VDE 0884-5), available with option 1
- BSI
- CQC GB4943.1-2011
- CQC GB8898-2011 (suitable for installation altitude below 2000 m)
- CSA
- FIMKO

ORDERING INFORMATION

S	F	H	6	9	1	6	-	X	0	0	1	T
PART NUMBER								VDE OPTION				TAPE AND REEL

SSOP-16

AGENCY CERTIFIED / PACKAGE	CTR (%)
UL, cUL, BSI, CQC, CSA, FIMKO	**50 to 300**
SSOP-16, quad channel	SFH6916T (1)
UL, cUL, VDE (option 1), BSI, CQC, CSA, FIMKO	**50 to 300**
SSOP-16, quad channel	SFH6916-X001

Notes

- Additional options may be possible, please contact sales office

(1) Also available in tubes, do not put “T” to the end

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	$t_p \leq 10$ µs	I_{FSM}	1.5	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 = 1.0 ms	I_C	100	mA
Total power dissipation per channel		P_{diss}	150	mW
COUPLER				
Storage temperature range		T_{stg}	-55 to +125	°C
Ambient temperature range		T_{amb}	-55 to +100	°C
Junction temperature		T_j	125	°C
Soldering temperature [1]	Max. 10 s dip soldering distance to seating plane ≥ 1.5 mm		260	°C
Total power dissipation		P_{tot}	250	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 °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
Reverse current	V_R = 6 V	I_R	-	0.01	10	µA
Capacitance	C_O	C_O	-	8	-	pF
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}	-	6.0	-	pF
COUPLER						
Collector emitter saturation voltage	I_F = 20 mA, I_C = 1 mA	V_{CEsat}	-	0.1	0.4	V
Coupling capacitance	f = 1 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 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Current transfer ratio	I_F = 5 mA, V_{CC} = 5 V	CTR	50	-	300	%

SWITCHING CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
NON-SATURATED						
Rise time	I_C = 2 mA, V_{CC} = 5 V, R_L = 100 Ω	t_r	-	5.5	-	µs
Fall time	I_C = 2 mA, V_{CC} = 5 V, R_L = 100 Ω	t_f	-	7	-	µs
Turn-on time	I_C = 2 mA, V_{CC} = 5 V, R_L = 100 Ω	t_{on}	-	9.5	-	µs
Turn-off time	I_C = 2 mA, V_{CC} = 5 V, R_L = 100 Ω	t_{off}	-	8.5	-	µs
SATURATED						
Turn-on time	I_F = 10 mA, V_{CC} = 5 V, R_L = 1 kΩ	t_{on}	-	3	-	µs
Turn-off time	I_F = 10 mA, V_{CC} = 5 V, R_L = 1 kΩ	t_{off}	-	20	-	µs

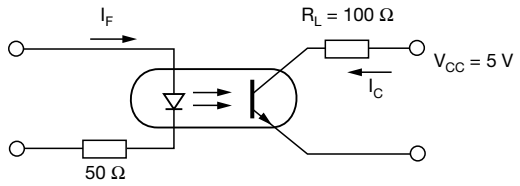


Fig. 1 - Switching Operation (without saturation)

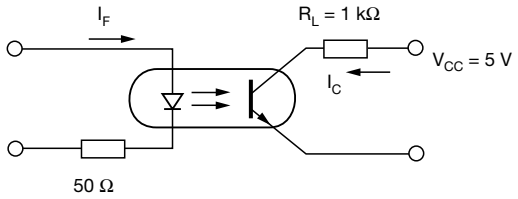


Fig. 2 - Switching Operation (with saturation)

SAFETY AND INSULATION RATINGS				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Climatic classification	According to IEC 68 part 1		55 / 100 / 21	
Comparative tracking index		CTI	175	
Maximum rated withstanding isolation voltage	According to UL1577, t = 1 min	V_{ISO}	3750	V_{RMS}
Maximum transient isolation voltage	According to DIN EN 60747-5-5	V_{IOTM}	6000	V_{peak}
Maximum repetitive peak isolation voltage	According to DIN EN 60747-5-5	V_{IORM}	707	V_{peak}
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
Output safety power		P_{SO}	350	mW
Input safety current		I_{SI}	200	mA
Safety temperature		T_S	175	°C
Creepage distance			≥ 5	mm
Clearance distance			≥ 5	mm
Insulation thickness		DTI	≥ 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 °C, unless otherwise specified)

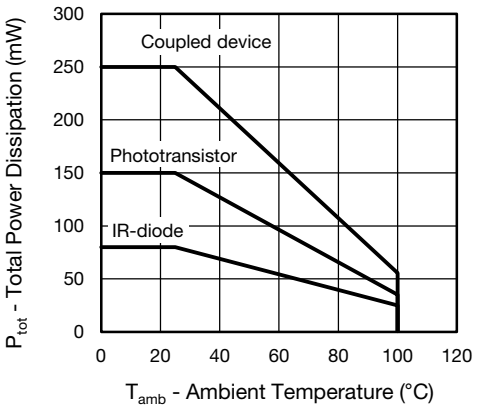


Fig. 3 - Total Power Dissipation vs. Ambient Temperature

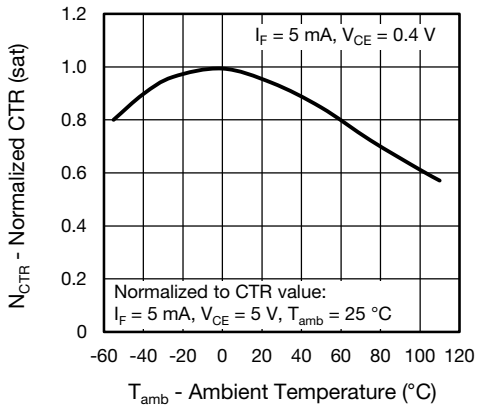


Fig. 6 - Normalized Current Transfer Ratio (saturated) vs. Ambient Temperature

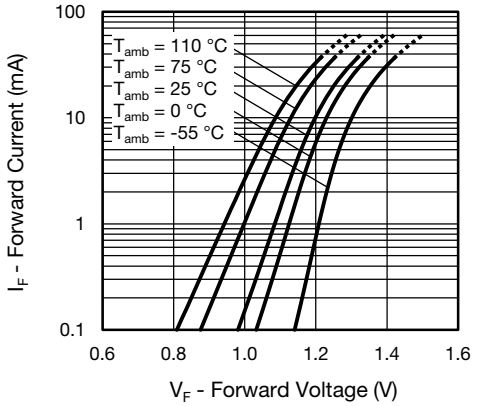


Fig. 4 - Forward Voltage vs. Forward Current

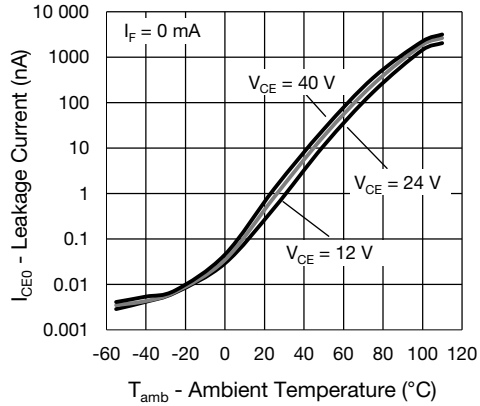


Fig. 7 - Collector Dark Current vs. Ambient Temperature

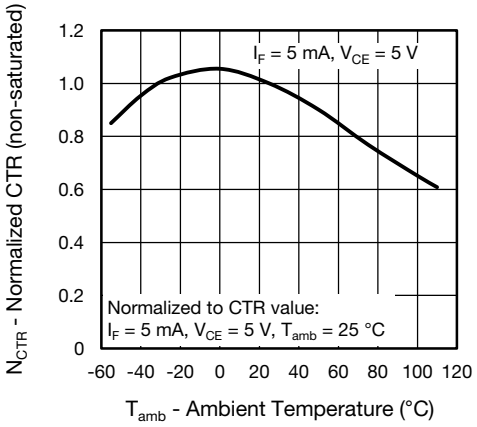


Fig. 5 - Normalized Current Transfer Ratio (non-saturated) vs. Ambient Temperature

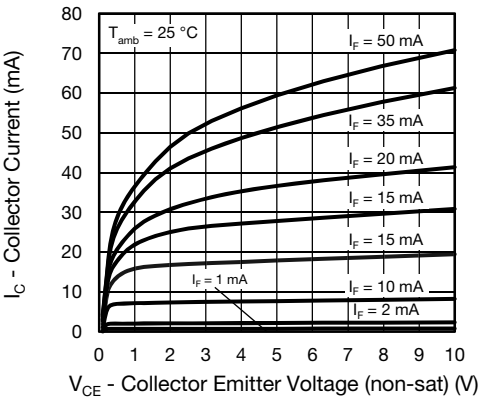


Fig. 8 - Collector Current vs. Collector Emitter Voltage (non-saturated)

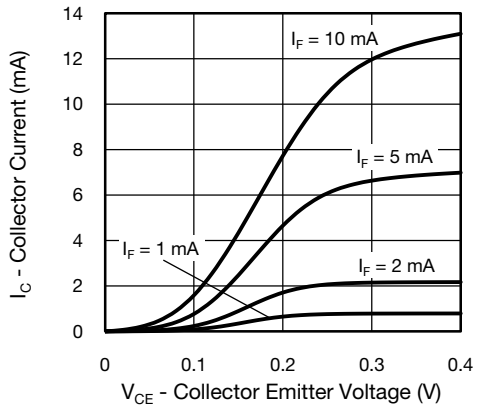


Fig. 9 - Collector Current vs. Collector Emitter Voltage (saturated)

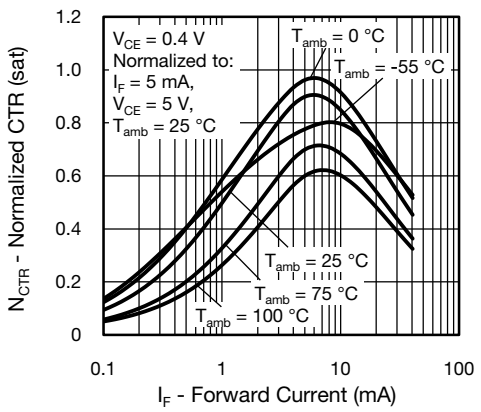


Fig. 12 - Normalized CTR (saturated) vs. Forward Current

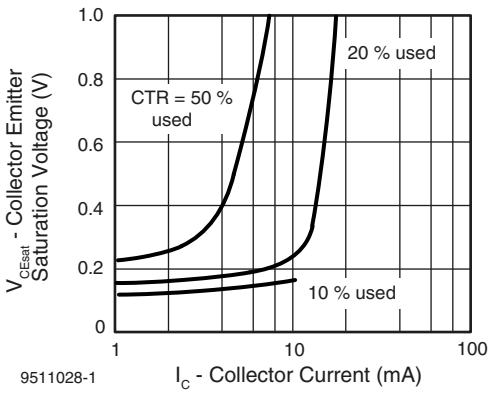


Fig. 10 - Collector Emitter Saturated Voltage vs. Collector Current

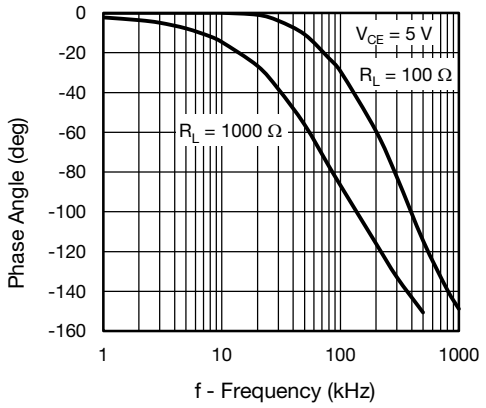


Fig. 13 - F_{CTR} vs. Phase Angle

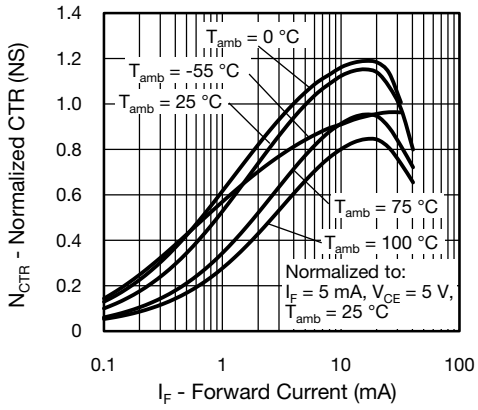


Fig. 11 - Normalized CTR (non-saturated) vs. Forward Current

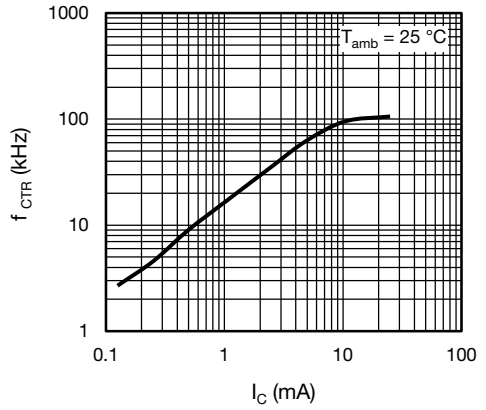


Fig. 14 - f_{CTR} vs. Collector Current

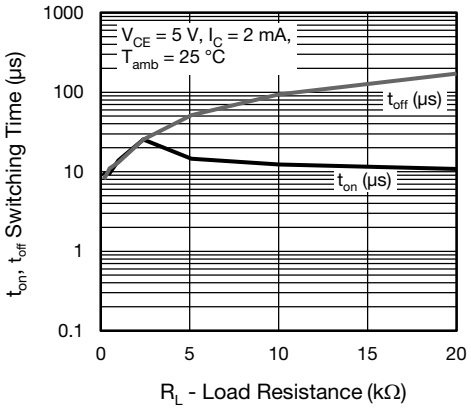
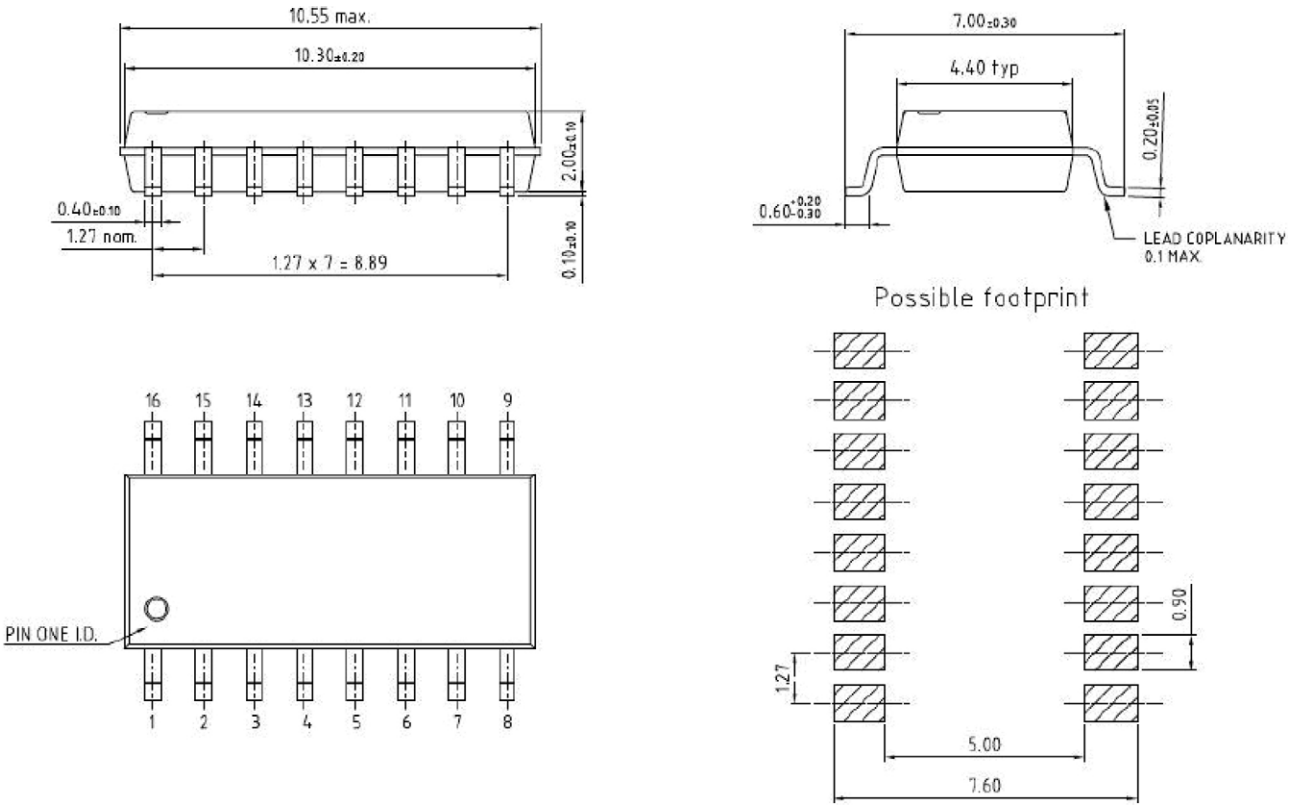
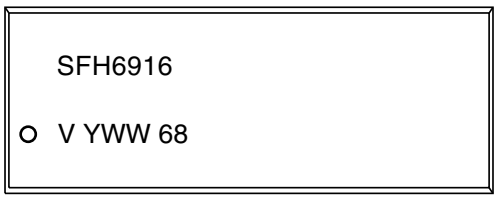


Fig. 15 - Switching Time vs. Load Resistance

PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING



TAPE AND REEL PACKAGING in millimeters

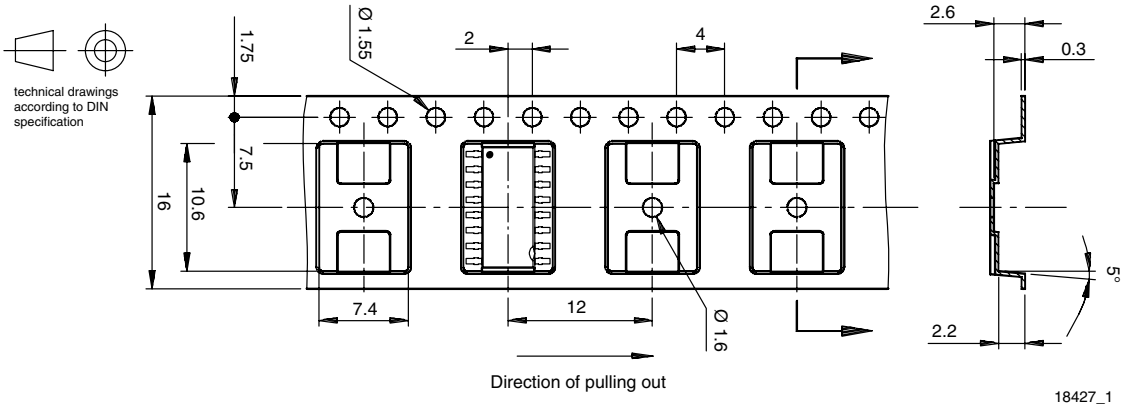


Fig. 16 - 2000 pcs/reel

SOLDER PROFILE

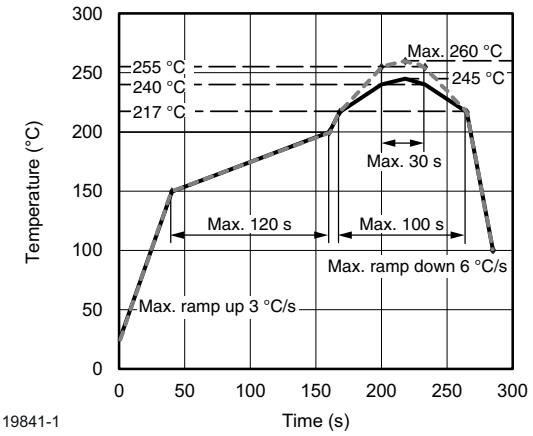


Fig. 17 - Lead (Pb)-free Reflow Solder Profile
according to J-STD-020

HANDLING AND STORAGE CONDITIONS

ESD level: HBM class 2

Floor life: unlimited

Conditions: T_{amb} < 30 °C, RH < 85 %

Moisture sensitivity level 1, according to J-STD-020

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