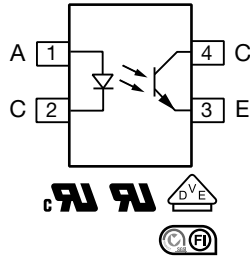
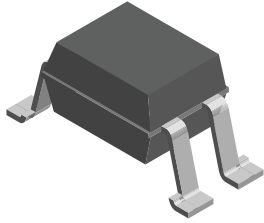




Optocoupler, Phototransistor Output, High Reliability, 5300 V_{RMS}



FEATURES

- Excellent CTR linearity depending on forward current
- Isolation test voltage, 5300 V_{RMS}
- Fast switching times
- Low CTR degradation
- Low coupling capacitance
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS COMPLIANT

LINKS TO ADDITIONAL RESOURCES



DESCRIPTION

The SFH615A-3X018T and SFH615A-4X018T features a variety of transfer ratios, low coupling capacitance and high isolation voltage. This coupler has a GaAs infrared diode emitter, which is optically coupled to a silicon planar phototransistor detector, and is incorporated in a plastic SMD package.

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

APPLICATIONS

- Switchmode power supply
- Telecom
- Battery powered equipment

AGENCY APPROVALS

- [UL 1577](#)
- [cUL](#)
- [DIN EN 60747-5-5 \(VDE0884-5\) available with option 1](#)
- [BSI](#)
- [FIMKO](#)

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;">1</div> <div style="border: 1px solid black; padding: 2px 5px;">5</div> <div style="border: 1px solid black; padding: 2px 5px;">A</div> <div style="border: 1px solid black; padding: 2px 5px;">-</div> <div style="border: 1px solid black; padding: 2px 5px;">#</div> <div style="border: 1px solid black; padding: 2px 5px;">X</div> <div style="border: 1px solid black; padding: 2px 5px;">0</div> <div style="border: 1px solid black; padding: 2px 5px;">1</div> <div style="border: 1px solid black; padding: 2px 5px;">8</div> <div style="border: 1px solid black; padding: 2px 5px;">T</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> PART NUMBER CTR BIN PACKAGE OPTION TAPE AND REEL </div>			
AGENCY CERTIFIED / PACKAGE	CTR (%)		
	10 mA		
UL, cUL, BSI, FIMKO	100 to 200	160 to 320	
SMD-4, option 8	SFH615A-3X008T	SFH615A-4X008T	
UL, cUL, BSI, FIMKO, VDE (option 1)	100 to 200	160 to 320	
SMD-4, option 8	SFH615A-3X018T ⁽¹⁾	SFH615A-4X018T	

Note

⁽¹⁾ Also available in tubes; do not add "T" to end

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Reverse voltage		V_R	6	V
DC forward current		I_F	60	mA
Surge forward current	$t_p \leq 10\text{ }\mu\text{s}$	I_{FSM}	2.5	A
OUTPUT				
Collector emitter voltage		V_{CEO}	70	V
Emitter collector voltage		V_{ECO}	7	V
Collector current		I_C	50	mA
	$t_p \leq 1\text{ ms}$	I_C	100	mA
COUPLER				
Storage temperature range		T_{stg}	-55 to +150	$^{\circ}\text{C}$
Ambient temperature range		T_{amb}	-55 to +100	$^{\circ}\text{C}$
Soldering temperature ⁽¹⁾	max. 10 s	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 (SMD)

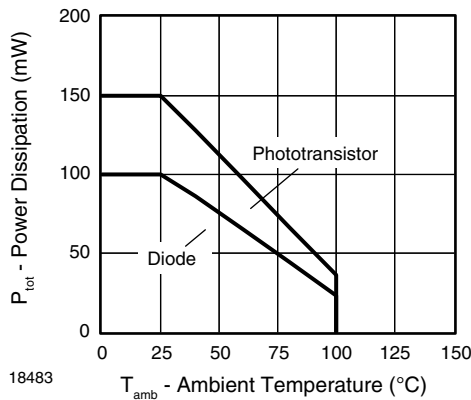


Fig. 1 - Permissible Power Dissipation vs. Ambient Temperature



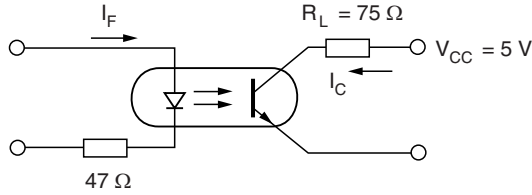
SWITCHING CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
NON-SATURATED						
Rise time	$I_F = 10 \text{ mA}$, $V_{CC} = 5 \text{ V}$, $T_A = 25 \text{ }^\circ\text{C}$, $R_L = 75 \text{ } \Omega$	t_r	-	2	-	μs
Fall time	$I_F = 10 \text{ mA}$, $V_{CC} = 5 \text{ V}$, $T_A = 25 \text{ }^\circ\text{C}$, $R_L = 75 \text{ } \Omega$	t_f	-	2	-	μs
Turn-on time	$I_F = 10 \text{ mA}$, $V_{CC} = 5 \text{ V}$, $T_A = 25 \text{ }^\circ\text{C}$, $R_L = 75 \text{ } \Omega$	t_{on}	-	3	-	μs
Turn-off time	$I_F = 10 \text{ mA}$, $V_{CC} = 5 \text{ V}$, $T_A = 25 \text{ }^\circ\text{C}$, $R_L = 75 \text{ } \Omega$	t_{off}	-	2.3	-	μs
Cut-off frequency	$I_F = 10 \text{ mA}$, $V_{CC} = 5 \text{ V}$, $T_A = 25 \text{ }^\circ\text{C}$, $R_L = 75 \text{ } \Omega$	f_{ctr}	-	250	-	kHz
SATURATED						
Rise time	$V_{CC} = 5 \text{ V}$, $T_A = 25 \text{ }^\circ\text{C}$, $R_L = 1 \text{ k}\Omega$, $I_F = 10 \text{ mA}$	t_r	-	3	-	μs
Fall time	$V_{CC} = 5 \text{ V}$, $T_A = 25 \text{ }^\circ\text{C}$, $R_L = 1 \text{ k}\Omega$, $I_F = 10 \text{ mA}$	t_f	-	14	-	μs
Turn-on time	$V_{CC} = 5 \text{ V}$, $T_A = 25 \text{ }^\circ\text{C}$, $R_L = 1 \text{ k}\Omega$, $I_F = 10 \text{ mA}$	t_{on}	-	4.2	-	μs
Turn-off time	$V_{CC} = 5 \text{ V}$, $T_A = 25 \text{ }^\circ\text{C}$, $R_L = 1 \text{ k}\Omega$, $I_F = 10 \text{ mA}$	t_{off}	-	23	-	μs

SAFETY AND INSULATION RATINGS				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Climatic classification	According to IEC 68 part 1		55 / 100 / 21	
Pollution degree	According to DIN VDE 0109		2	
Comparative tracking index	Insulation group IIIa	CTI	175	
Maximum rated withstanding isolation voltage	According to UL1577, $t = 1 \text{ min}$	V_{ISO}	4420	V_{RMS}
Tested withstanding isolation voltage	According to UL1577, $t = 1 \text{ s}$	V_{ISO}	5300	V_{RMS}
Maximum transient isolation voltage	According to DIN EN 60747-5-5	V_{IOTM}	10 000	V_{peak}
Maximum repetitive peak isolation voltage	According to DIN EN 60747-5-5	V_{IORM}	890	V_{peak}
Isolation resistance	$T_{amb} = 25 \text{ }^\circ\text{C}$, $V_{IO} = 500 \text{ V}$	R_{IO}	$\geq 10^{12}$	Ω
	$T_{amb} = 100 \text{ }^\circ\text{C}$, $V_{IO} = 500 \text{ V}$	R_{IO}	$\geq 10^{11}$	Ω
Output safety power		P_{SO}	400	mW
Input safety current		I_{SI}	275	mA
Input safety temperature		T_S	175	$^\circ\text{C}$
Creepage distance			≥ 8	mm
Clearance distance			≥ 8	mm
Insulation thickness		DTI	≥ 0.4	mm

Note

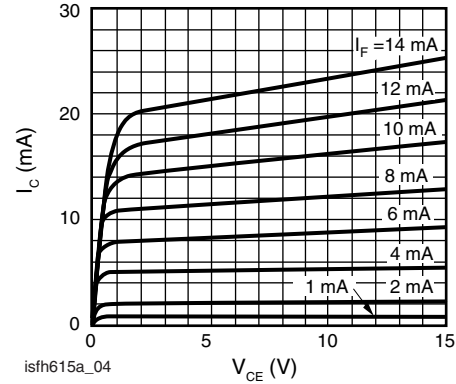
- As per IEC 60747-5-5, § 7.4.3.8.2, this optocoupler is suitable for “safe electrical insulation” only within the safety ratings. Compliance with the safety ratings shall be ensured by means of protective circuits.

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



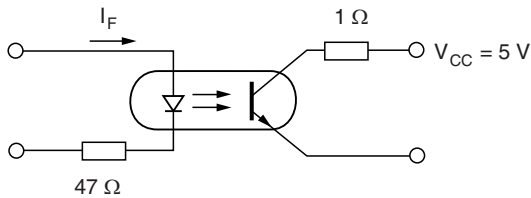
isfh615a_01

Fig. 2 - Linear Operation (without Saturation)



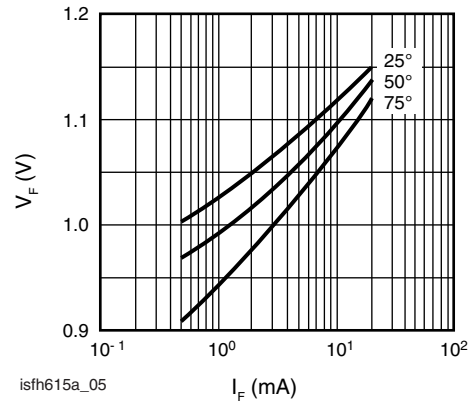
isfh615a_04

Fig. 5 - Output Characteristics (Typ.) Collector Current vs. Collector Emitter Voltage



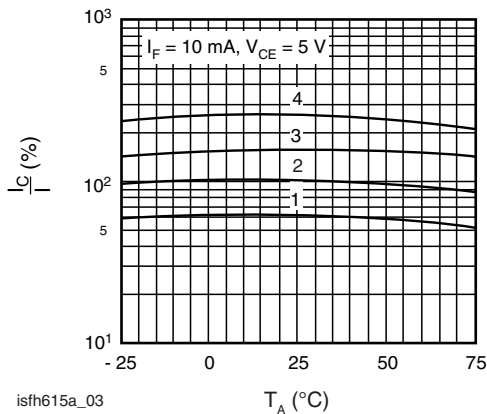
isfh615a_02

Fig. 3 - Switching Operation (with Saturation)



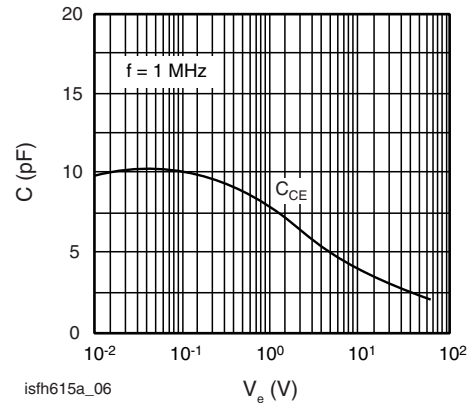
isfh615a_05

Fig. 6 - Diode Forward Voltage (Typ.) vs. Forward Current



isfh615a_03

Fig. 4 - Current Transfer Ratio (Typ.) vs. Temperature



isfh615a_06

Fig. 7 - Transistor Capacitance (Typ.) vs. Collector Emitter Voltage

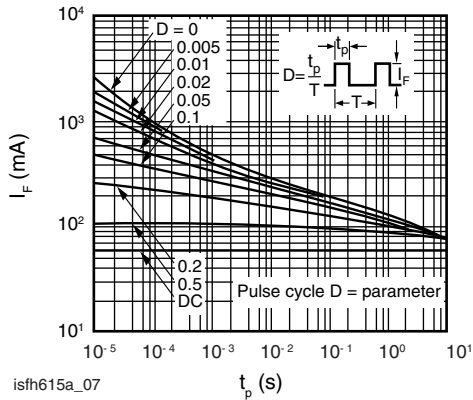
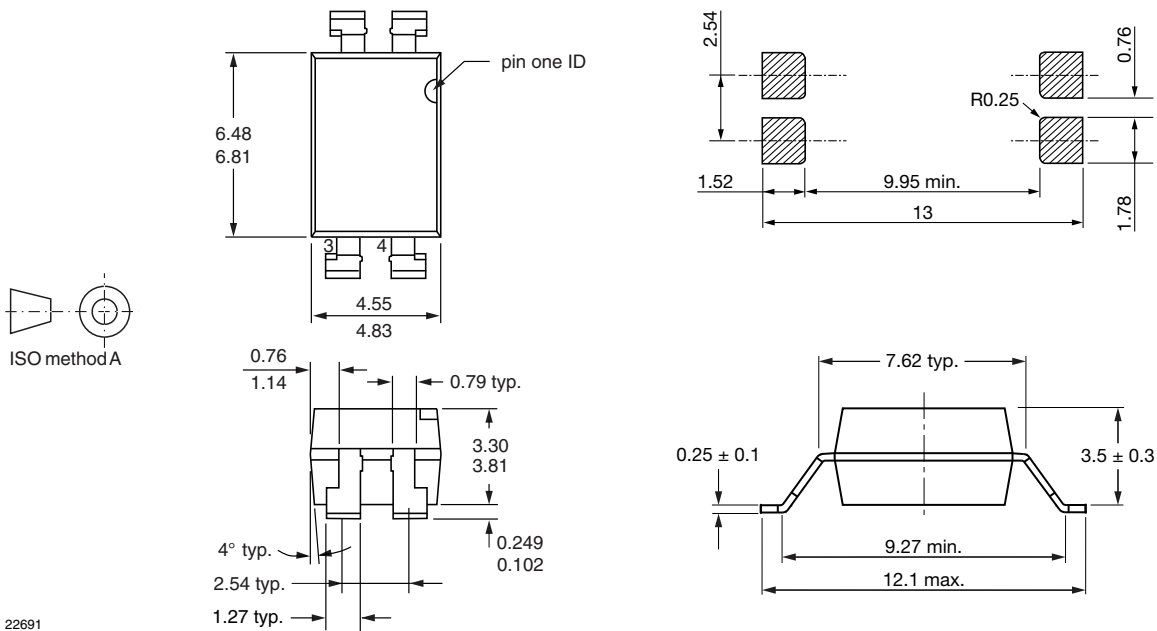
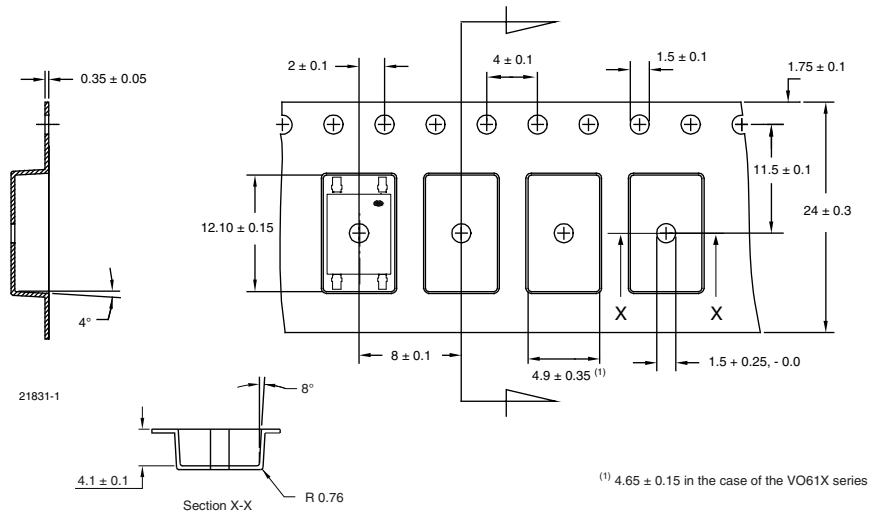


Fig. 8 - Permissible Pulse Handling Capability Forward Current vs. Pulse Width

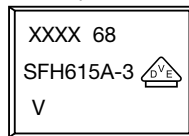
PACKAGE DIMENSIONS millimeters



SMD-4, Option 8



PACKAGE MARKING (example of SFH615A-3X018T)



Notes

- XXXX = LMC (lot marking code)
- VDE logo is only marked on option 1 parts
- Tape and reel suffix (T) is not part of the package marking

TAPE AND REEL PACKING	
TYPE	UNITS/REEL
SMD-4	1000

SOLDER PROFILES

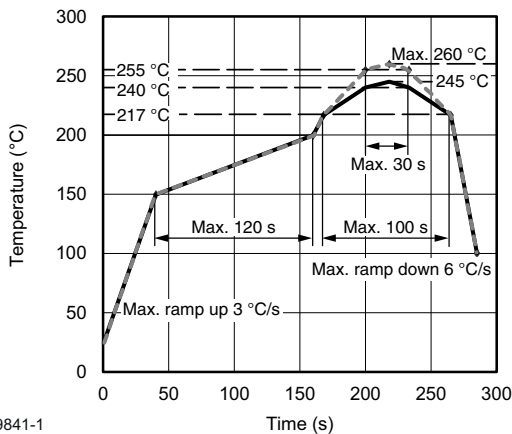


Fig. 9 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020 for SMD Devices

HANDLING AND STORAGE CONDITIONS

- ESD level: HBM class 2
- Floor life: unlimited
- Conditions: $T_{amb} < 30\text{ °C}$, RH < 85 %
- Moisture sensitivity level 1, according to J-STD-020



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