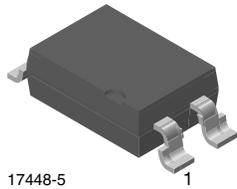
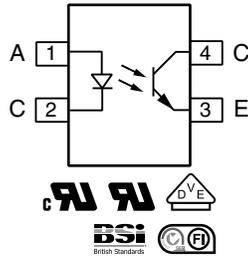




## Optocoupler, Phototransistor Output, High Reliability, 5300 V<sub>RMS</sub>



17448-5



### FEATURES

- Excellent CTR linearity depending on forward current
- Isolation test voltage, 5300 V<sub>RMS</sub>
- Fast switching times
- Low CTR degradation
- Low coupling capacitance
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



RoHS COMPLIANT

### DESCRIPTION

The SFH615A-3X018T 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

- UL1577, file no. E52744 system code H or J, double protection
- DIN EN 60747-5-5 (VDE 0884-5) available with option 1
- cUL tested to CSA 22.2 bulletin 5A
- BSI IEC 60950, IEC 60065
- FIMKO EN6005, EN60950-1

ORDERING INFORMATION														
S	F	H	6	1	5	A	-	3	X	0	1	8	T	
PART NUMBER							CTR BIN	PACKAGE OPTION			TAPE AND REEL			
AGENCY CERTIFIED/PACKAGE							CTR (%)							
							10 mA							
VDE, UL, cUL, BSI, FIMKO							100 to 200							
SMD-4, option 8							SFH615A-3X018T							

<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>INPUT</b>				
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
<b>OUTPUT</b>				
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
<b>COUPLER</b>				
Isolation test voltage between emitter and detector	$t = 1\text{ s}$	$V_{ISO}$	5300	$V_{RMS}$
Creepage distance			$\geq 7$	mm
Clearance distance			$\geq 7$	mm
Insulation thickness between emitter and detector			$\geq 0.4$	mm
Comparative tracking index per DIN IEC112/VDE0303 part 1		CTI	$\geq 175$	
Isolation resistance	$V_{IO} = 500\text{ V}, T_{amb} = 25\text{ }^{\circ}\text{C}$	$R_{IO}$	$\geq 10^{12}$	$\Omega$
	$V_{IO} = 500\text{ V}, T_{amb} = 100\text{ }^{\circ}\text{C}$	$R_{IO}$	$\geq 10^{11}$	$\Omega$
Storage temperature range		$T_{stg}$	- 55 to + 150	$^{\circ}\text{C}$
Ambient temperature range		$T_{amb}$	- 55 to +100	$^{\circ}\text{C}$
Soldering temperature <sup>(1)</sup>	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.
- <sup>(1)</sup> Refer to reflow profile for soldering conditions for surface mounted devices (SMD).

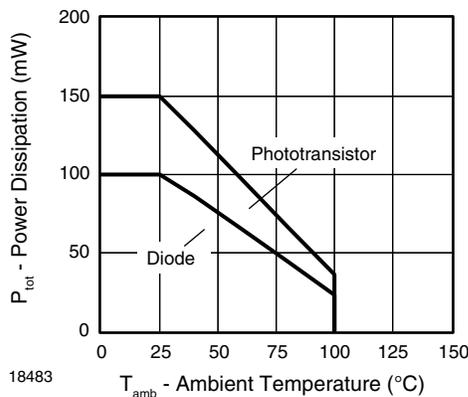


Fig. 1 - Permissible Power Dissipation vs. Ambient Temperature





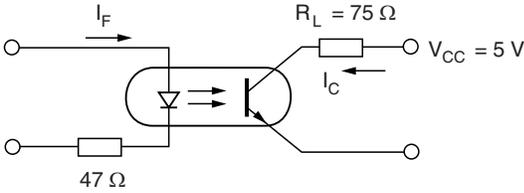
SWITCHING CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>NON-SATURATED</b>						
Rise time	$I_F = 10 \text{ mA}$ , $V_{CC} = 5 \text{ V}$ , $T_A = 25 \text{ }^\circ\text{C}$ , $R_L = 75 \text{ } \Omega$	$t_r$		2		$\mu\text{s}$
Fall time	$I_F = 10 \text{ mA}$ , $V_{CC} = 5 \text{ V}$ , $T_A = 25 \text{ }^\circ\text{C}$ , $R_L = 75 \text{ } \Omega$	$t_f$		2		$\mu\text{s}$
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		$\mu\text{s}$
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		$\mu\text{s}$
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
<b>SATURATED</b>						
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		$\mu\text{s}$
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		$\mu\text{s}$
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		$\mu\text{s}$
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		$\mu\text{s}$

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	
$V_{IOTM}$		$V_{IOTM}$	10 000			$V_{peak}$
$V_{IORM}$		$V_{IORM}$	890			$V_{peak}$
$P_{SO}$		$P_{SO}$			400	mW
$I_{SI}$		$I_{SI}$			275	mA
$T_{SI}$		$T_{SI}$			175	$^\circ\text{C}$
Creepage distance			7			mm
Clearance distance			7			mm
Insulation thickness, reinforced rated	per IEC 60950 2.10.5.1		0.4			mm

**Note**

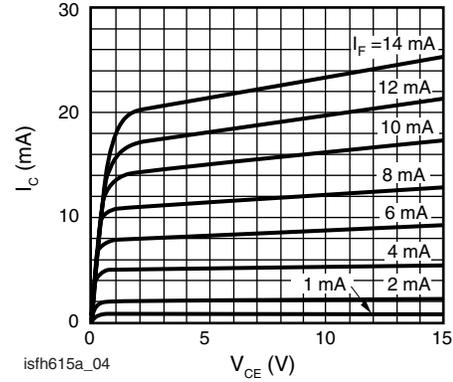
- As per IEC 60747-5-5, § 7.4.3.8.2, this optocoupler is suitable for "safe electrical insulation" only within the safety ratings. Compliance with the safety ratings shall be ensured by means of protective circuits.

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



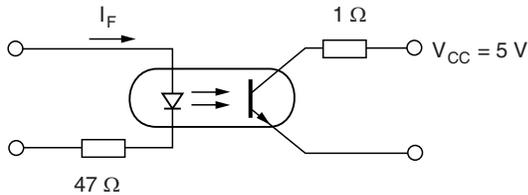
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Fig. 2 - Linear Operation (without Saturation)



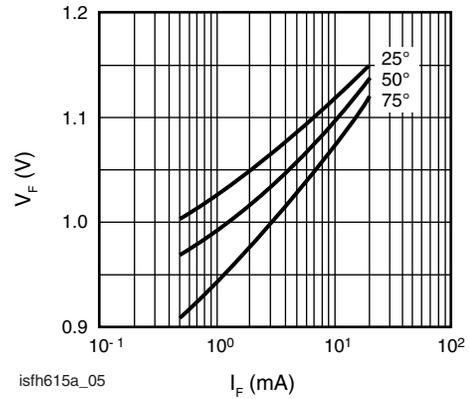
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Fig. 5 - Output Characteristics (Typ.) Collector Current vs. Collector Emitter Voltage



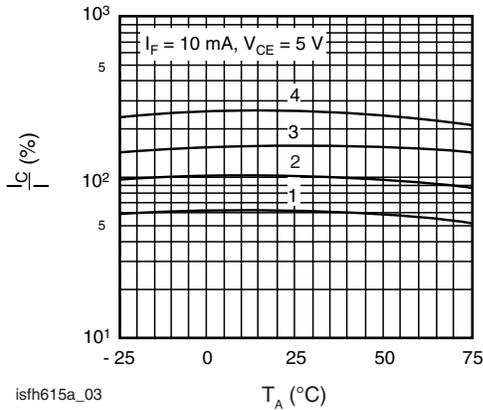
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Fig. 3 - Switching Operation (with Saturation)



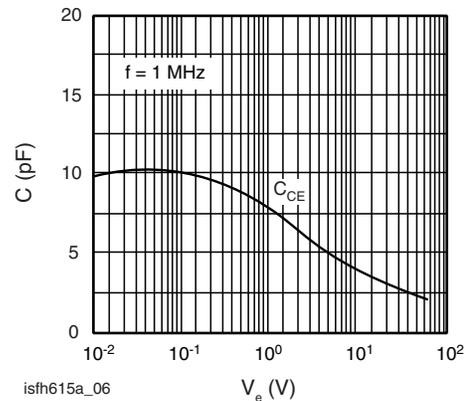
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Fig. 6 - Diode Forward Voltage (Typ.) vs. Forward Current



isfh615a\_03

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



isfh615a\_06

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

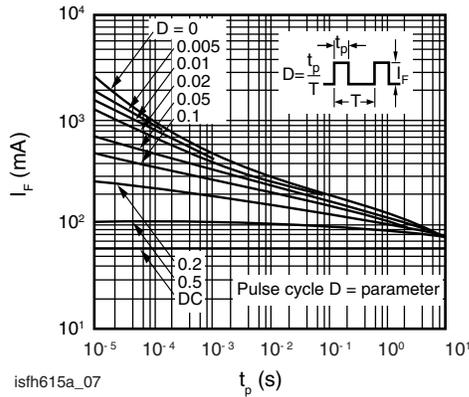
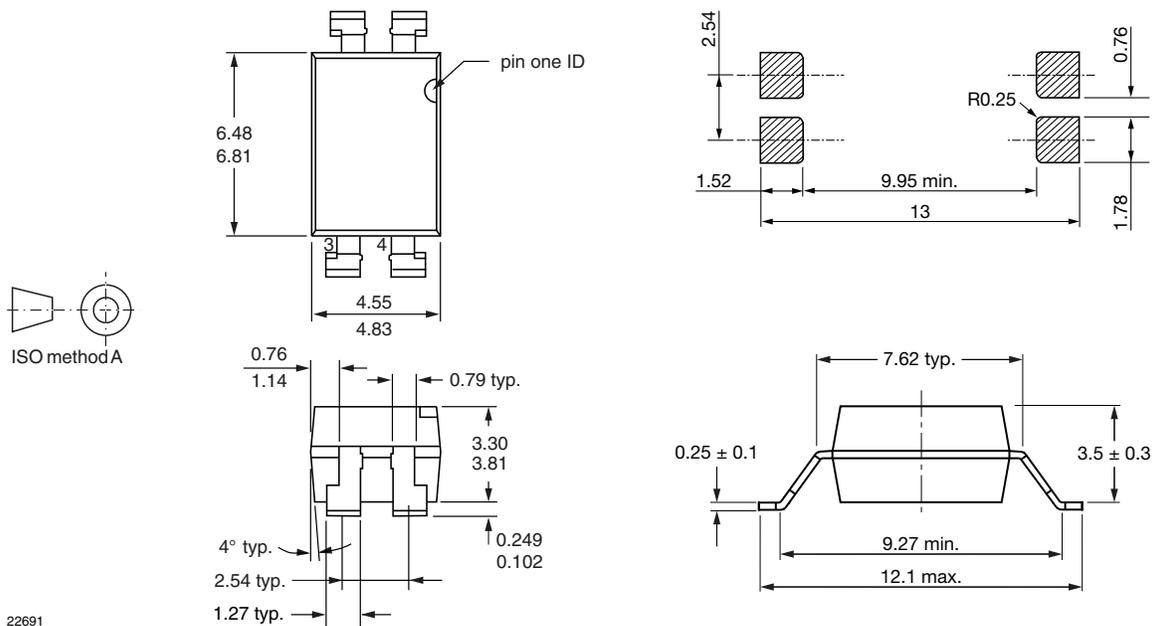
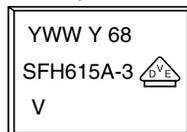


Fig. 8 - Permissible Pulse Handling Capability Forward Current vs. Pulse Width

**PACKAGE DIMENSIONS** millimeters



**PACKAGE MARKING** (example of SFH615A-3X018T)



**Notes**

- VDE logo is only marked on option 1 parts.
- Tape and reel suffix (T) is not part of the package marking.



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