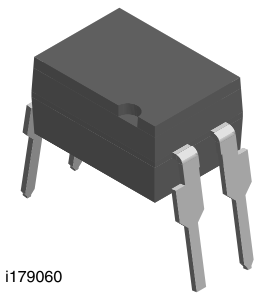
Optocoupler, Phototransistor Output, High Reliability, 5300 V_{RMS}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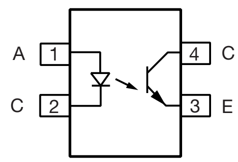

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DESCRIPTION

The SFH615XXX features a large assortment of current transfer ratio, low coupling capacitance and high isolation voltage. These couplers have a GaAs infrared emitting diode emitter, which is optically coupled to a silicon planar phototransistor detector, and is incorporated in a plastic DIP-4 package.

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

The couplers are end-stackable with 2.54 mm lead spacing. Creepage and clearance distances of > 8 mm are achieved with option 6. This version complies with 60950 (DIN VDE 0805) for reinforced insulation up to operation voltage of 400 V_{RMS} or DC.

FEATURES

- Low CTR degradation
- Good CTR linearity depending on forward current
- Isolation test voltage, 5300 V_{RMS}
- High collector emitter voltage, V_{CEO} = 70 V
- Low saturation voltage
- Fast switching times
- Temperature stable
- Low coupling capacitance
- End stackable, 0.100" (2.54 mm) spacing
- High common mode interference immunity (unconnected base)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

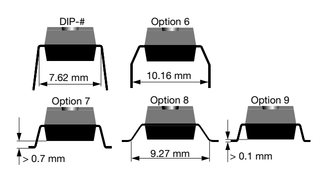
AGENCY APPROVALS

- UL1577
- cUL
- DIN EN 60747-5-5 (VDE 0884) available with option 1
- BSI

ORDERING INFORMATION

S	F	H	6	1	5	A	x	x	X	0	0	#

PART NUMBER — PACKAGE OPTION



AGENCY CERTIFIED/PACKAGE	CTR (%)			
	5 mA			
UL, cUL, BSI, FIMKO	**50 to 600**	**100 to 600**	**100 to 300**	**50 to 150**
DIP-4	SFH615AA	SFH615AGB	SFH615AGR	SFH615AY
DIP-4, 400 mil, option 6	SFH615AA-X006	-	-	-
SMD-4, option 7	SFH615AA-X007	-	SFH615AGR-X007T	SFH615AY-X007T
SMD-4, option 8	-	-	-	SFH615AY-X008T
SMD-4, option 9	-	SFH615AGB-X009T	-	SFH615AY-X009T (1)
UL, cUL, VDE, BSI, FIMKO	**50 to 600**	**100 to 600**	**100 to 300**	**50 to 150**
DIP-4	SFH615AA-X001	-	SFH615AGR-X001	-
DIP-4, 400 mil, option 6	-	-	SFH615AGR-X016	SFH615AY-X016
SMD-4, option 7	SFH615AA-X017T (1)	-	SFH615AGR-X017T (1)	-
SMD-4, option 8	-	-	-	SFH615AY-X018T (1)
SMD-4, option 9	-	-	-	SFH615AY-X019T (1)

Notes

- Additional options may be possible, please contact sales office

(1) Also available in tubes; do not add T to 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	60	mA
Surge forward current	$t_P \leq 10$ ms	I_{FSM}	2.5	A
Power dissipation		P_{diss}	100	mW
OUTPUT				
Collector emitter voltage		V_{CEO}	70	V
Emitter collector voltage		V_{ECO}	7	V
Collector current		I_C	50	mA
	$t_P \leq 10$ ms	I_C	100	mA
Total power dissipation		P_{diss}	150	mW
COUPLER				
Isolation test voltage between emitter and detector		V_{ISO}	5300	V_{RMS}
Creepage distance			≥ 7	mm
Clearance distance			≥ 7	mm
Isolation thickness between emitter and detector Comparative tracking index per DIN IEC 112/VDE 0303, part 1		CTI	≥ 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 +150	°C
Ambient temperature range		T_{amb}	-55 to +100	°C
Soldering temperature [(1)]	max. 10 s, dip soldering distance to seating plane ≥ 1.5 mm	T_{sld}	260	°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). Refer to wave profile for soldering conditions for through hole devices (DIP).

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT							
Forward voltage	I_F = 60 mA		V_F	-	1.25	1.65	V
Reverse current	V_R = 6 V		I_R	-	0.01	10	μA
Capacitance	V_R = 0 V, f = 1 MHz		C_O	-	13	-	pF
Thermal resistance			R_{thja}	-	750	-	K/W
OUTPUT							
Collector emitter capacitance	V_{CE} = 5 V, f = 1 MHz		C_{CE}	-	5.2	-	pF
Thermal resistance			R_{thja}	-	500	-	K/W
Collector emitter saturation voltage	I_F = 10 mA, I_C = 2.5 mA		V_{CEsat}	-	0.25	0.4	V
Coupling capacitance			C_C	-	0.4	-	pF
COUPLER							
Collector emitter leakage current	V_{CEO} = 10 V	SFH615AA	I_{CEO}	-	10	100	nA
		SFH615AGB	I_{CEO}	-	10	100	nA
		SFH615AGR	I_{CEO}	-	10	100	nA
		SFH615AY	I_{CEO}	-	10	100	nA

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							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
I_C/I_F	I_F = 5 mA, V_{CE} = 5 V	SFH615AA	CTR	50	-	600	%
		SFH615AGB	CTR	100	-	600	%
		SFH615AGR	CTR	100	-	300	%
		SFH615AY	CTR	50	-	150	%

SWITCHING CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn-on time	I_F = 5 mA	t_{on}	-	2	-	μs
Turn-off time	I_F = 5 mA	t_{off}	-	25	-	μs

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

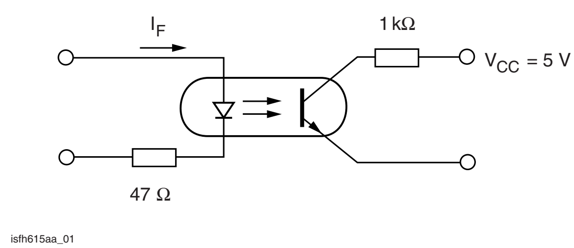


Fig. 1 - Switching Operation (with saturation)

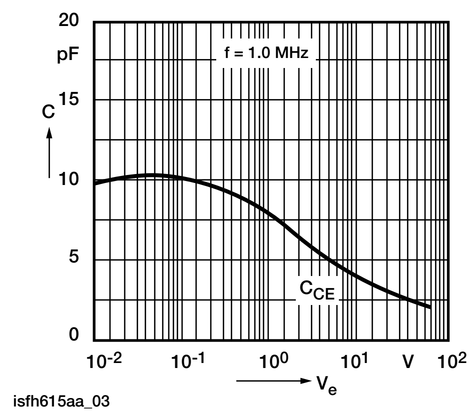


Fig. 3 - Transistor Capacitance (typ.) vs. Collector Emitter Voltage

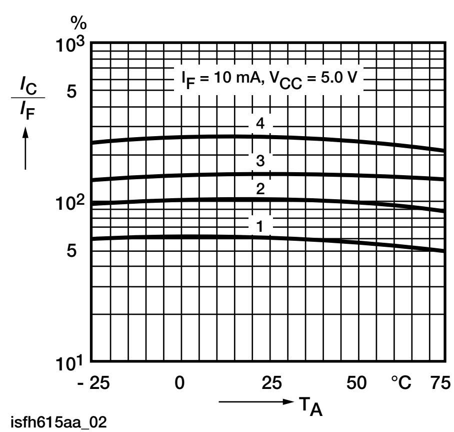


Fig. 2 - Current Transfer Ratio (typ.) vs. Temperature

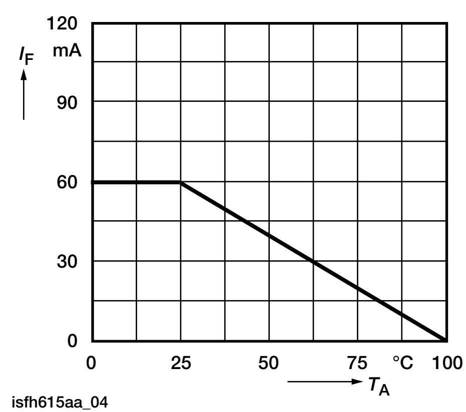


Fig. 4 - Permissible Diode Forward Current vs. Ambient Temperature

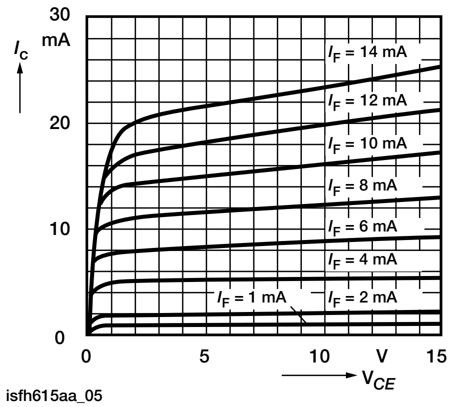


Fig. 5 - Output Characteristics (typ.) Collector Current vs. Collector Emitter Voltage

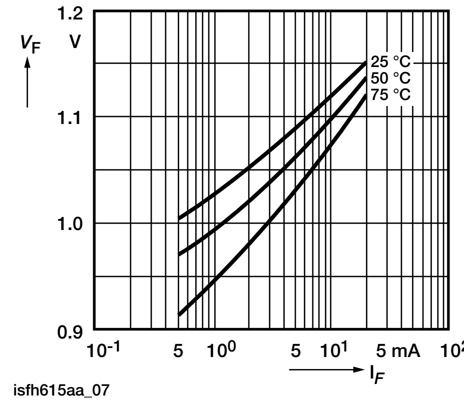


Fig. 7 - Diode Forward Voltage (typ.) vs. Forward Current

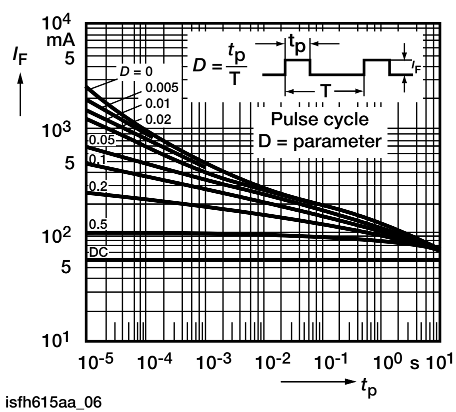


Fig. 6 - Permissible Pulse Handling Capability Forward Current vs. Pulse Width

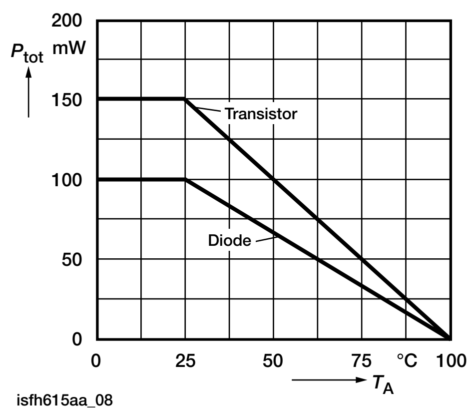
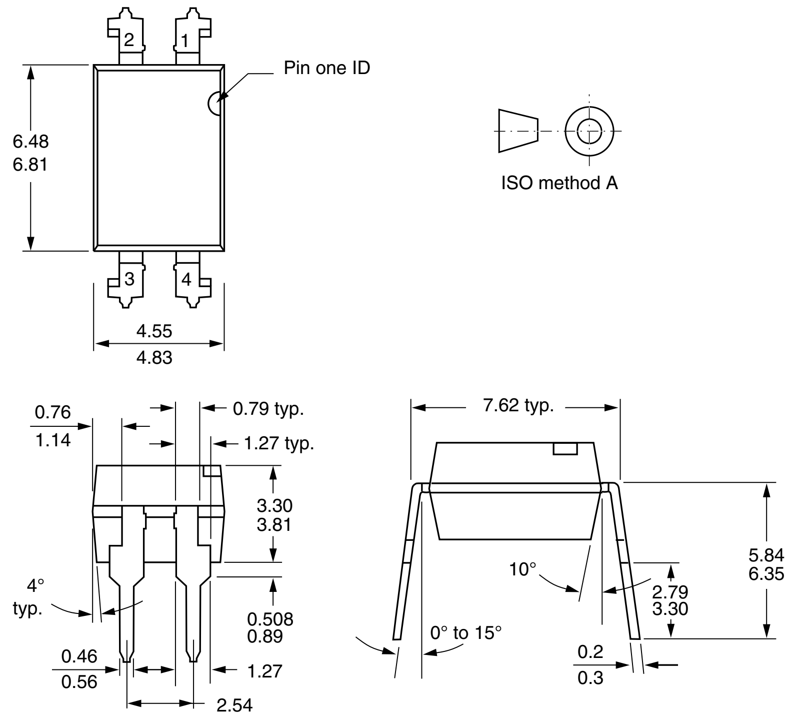


Fig. 8 - Permissible Power Dissipation vs. Temperature

PACKAGE DIMENSIONS in inches (millimeters)



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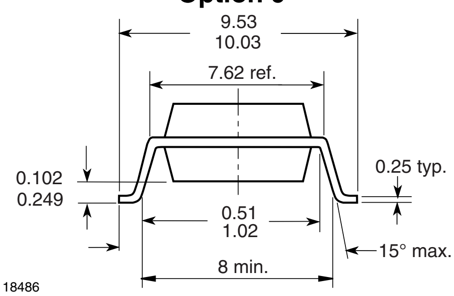
Option 9



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For technical questions, contact: optocoupleranswers@vishay.com

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