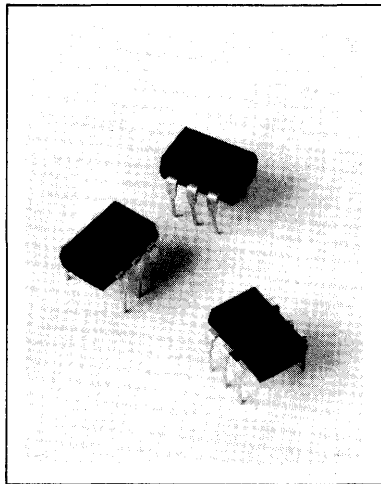


SIEMENS

SFH 601 SERIES

PHOTOTRANSISTOR OPTO-ISOLATOR



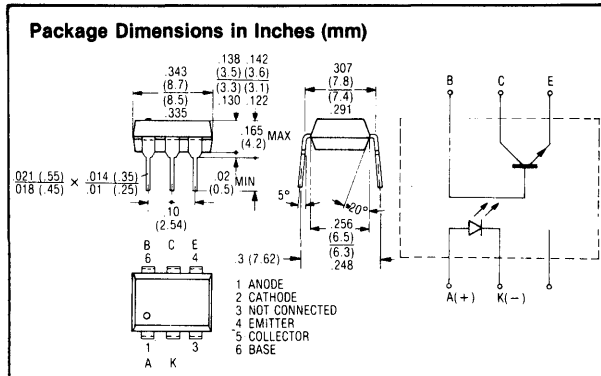
FEATURES

- Highest Quality Premium Device
- Built to Conform to VDE Requirements
- Long Term Stability
- High Current Transfer Ratios, 4 Groups
SFH 601-1, 40 to 80%
SFH 601-2, 63 to 125%
SFH 601-3, 100 to 200%
SFH 601-4, 160 to 320%
- 5300 Volt Isolation (1 Minute)
- Storage Temperature -40° to $+150^{\circ}\text{C}$
- V_{CEsat} 0.25 (< 0.4) Volt
- $I_F = 10\text{ mA}$, $I_C = 2.5\text{ mA}$
- UL Approval #E52744
- VDE Approval #0883 & #0830 group C

DESCRIPTION

The optoelectronic coupler SFH 601 comprises a GaAs LED as the emitter which is optically coupled with a silicon planar phototransistor as the detector. The component is located in a plastic plug-in case 20 AB DIN 41866.

The coupler allows to transfer signals between two electrically isolated circuits. The potential difference between the circuits to be coupled is not allowed to exceed the maximum permissible insulating voltage.



Maximum Ratings

Reverse Voltage (V_R)	6 V
Forward Current (I_F)	60 mA
Surge Current (I_{FS}), $t_p = 10\ \mu\text{s}$	1.5 A
Power Dissipation (P_{Tot})	100 mW
Detector (Silicon Phototransistor)	
Collector-Emitter Voltage (V_{CE0})	70 V
Emitter-Base Reverse Voltage (V_{EB0})	7 V
Collector Current (I_C)	50 mA
Collector Current (I_{CS}), $t = 1\text{ ms}$	100 mA
Power Dissipation (P_{Tot})	150 mW

Coupler

Storage Temperature (T_{stor})	-40 to $+150^{\circ}\text{C}$
Ambient Temperature (T_{amb})	-40 to $+100^{\circ}\text{C}$
Junction Temperature (T_j)	100°C
Soldering Temperature (T_s), 10 s Max.	260°C
Isolation Test Voltage (V_{is}), 1 Min. (between emitter and detector referred to standard climate 23/50 DIN 50014)	5300 V-

Tracking Resistance	Min. 8.2 mm
Air Path	Min. 7.6 mm

Tracking Resistance

Group III (KC = >600) in accordance with VDE 0110 § 6 Table 3 and DIN 53480/VDE 0303, Part 1.

As to nominal isolation voltage DIN 57883 or VDE 0883 applies.

Isolation Voltage (R_{is}), @ $V_{is} = 500\text{ V}$	$10^{11}\ \Omega$
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Climatic Conditions

DIN 40040, humidity Class F

Flammability

DIN 57471 or VDE 0471, Part 2, of April 1975 or MIL202E, Method 11 A

Characteristics ($T_{amb} = 25^{\circ}\text{C}$)

Emitter (GaAs LED)

Forward Voltage (V_F), $I_F = 60\text{ mA}$	1.25 (≤ 1.65) V
Breakdown Voltage (V_{BR}), $I_R = 100\ \mu\text{A}$	30 (≥ 6) V
Reverse Current (I_R), $V_R = 3\text{ V}$	0.01 (≤ 10) μA
Capacitance (C_C) ($V_R = 0\text{ V}$; $f = 1\text{ MHz}$)	40 pF

Thermal Resistance (R_{thJamb})	750 K/W
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Detector (Silicon Phototransistor)

Capacitance ($V_{CE} = 5\text{ V}$; $f = 1\text{ MHz}$)	
C_{CE}	6.8 pF
C_{CB}	8.5 pF
C_{EB}	11 pF
Thermal Resistance (R_{thJamb})	500 K/W

Specifications subject to change without notice.

Characteristics (Continued)

Coupler

Collector-Emitter Saturation Voltage (V_{CEsat})

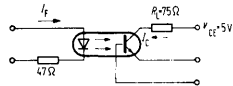
($I_F = 10\text{ mA}$, $I_C = 2.5\text{ mA}$) 0.25 (<0.4) V

Coupling Capacitance (C_K) 0.30 pF

The couplers are grouped in accordance with their current ratio $\frac{I_C}{I_F}$ at $I_F = 10\text{ mA}$ and $V_{CE} = 5\text{ V}$ and marked by numbers.

Group	1	2	3	4	
$\frac{I_C}{I_F}$	40-80	63-125	100-200	160-320	%
Collector-Emitter Leakage Current ($V_C = 10\text{ V}$), I_{CEO}	2 (<50)	2 (<50)	5 (<100)	5 (<100)	nA

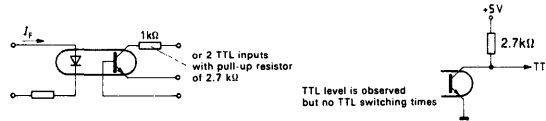
Linear operation (without saturation)



Load Resistance (R_L)	75	Ω
Delay Time (t_d)	3.0 (≤ 5.6)	μS
Rise Time (t_r)	2.0 (≤ 4.0)	μS
Storage Time (t_s)	2.3 (≤ 4.1)	μS
Fall Time (t_f)	2.0 (≤ 3.5)	μS
Cut-off Frequency (f_c)	250	kHz

$I_F = 10\text{ mA}$
 $V_{CE} = 5\text{ V}$
 $T_{amb} = 25^\circ\text{C}$

Switching operation (with saturation)



Group	1 $I_F = 20\text{ mA}$	2 and 3 $I_F = 10\text{ mA}$	4 $I_F = 5\text{ mA}$	
Switch-On Time (t_{ein})	3.0 (≤ 5.5)	4.2 (≤ 8.0)	6.0 (≤ 10.5)	μS
Rise Time (t_r)	2.0 (≤ 4.0)	3.0 (≤ 6.0)	4.6 (≤ 8.0)	μS
Switch-Off Time (t_{off})	18 (≤ 34)	23 (≤ 39)	25 (≤ 43)	μS
Fall Time (t_f)	11 (≤ 20)	14 (≤ 24)	15 (≤ 26)	μS
$V_{CE sat}$	0.25 (≤ 0.4)			V

