SIEMENS

SFH636

HIGH SPEED 5.3 kV OPTOCOUPLER

Preliminary Data Sheet

FEATURES

- **High Speed Optocoupler without Base Connection**
- **GaAlAs Emitter**
- **Integrated Detector with Photodiode and Transistor**
- **High Data Transmission Rate: 1 MBit/s**
- **TTL Compatible**
- **Open Collector Output**
- **CTR at I_F=16 mA, V_O=0.4 V, V_{CC}=4.5 V, T_A=25°C: ≥19%**
- **Good CTR Linearity Relative to Forward Current**
- **Field Effect Stable by TRIOS® (TRansparent IOn Shield)**
- **Low Coupling Capacitance**
- **dV/dt: typ. 10 kV/µs**
- **Isolation Test Voltage: 5300 VAC_{RMS}**
- **VDE 0884 Available with Option 1**
- **UL Approval, File #E52744**

APPLICATIONS

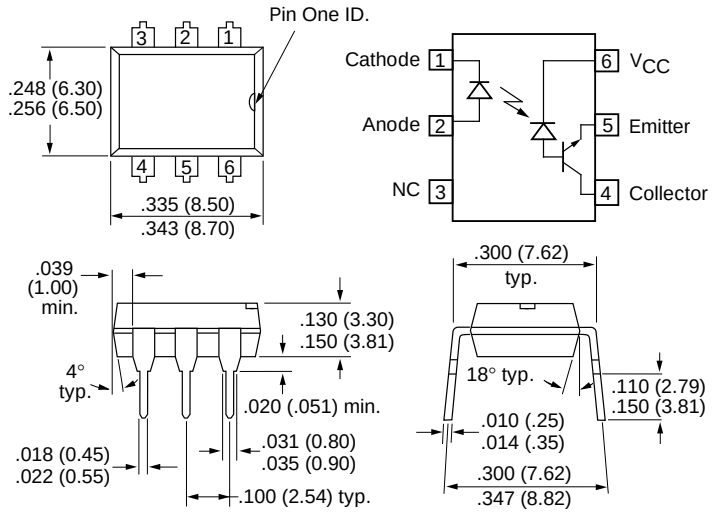
- **IGBT Drivers**
- **Data Communications**
- **Programmable Controllers**

DESCRIPTION

The SFH636 is an optocoupler with a GaAlAs infrared emitting diode, optically coupled to an integrated photodetector consisting of a photodiode and a high speed transistor in a DIP-6 plastic package. The device is functionally similar to 6N136 except there is no base connection, and the electrical foot print is different. Noise and dv/dt performance is enhanced by not bringing out the base connection.

Signals can be transmitted between two electrically separated circuits up to frequencies of 2 MHz. The potential difference between the circuits to be coupled should not exceed the maximum permissible reference voltages.

Package Dimensions in Inches (mm)



Absolute Maximum Ratings

Emitter (GaAlAs)

Reverse Voltage ..... 3 V
DC Forward Current ..... 25 mA
Surge Forward Current ..... 1 A
tp≤1 µs, 300 pulses/sec.
Total Power Dissipation ..... 45 mW

Detector (Si Photodiode + Transistor)

Supply Voltage ..... –0.5 to 30 V
Output Voltage ..... –0.5 to 20 V
Output Current ..... 8 mA
Total Power Dissipation ..... 100 mW

Package Insulation

Isolation Test Voltage
between emitter and detector
(refer to climate DIN 40046, part 2, Nov. 74) ..... 5300 VAC_{RMS}
Creepage ..... 7 mm min.
Clearance ..... 7 mm min.
Comparative Tracking Index
per DIN IEC 112/VDE0303, part 1 175
Isolation Resistance
V_{IO}=500 V, T_A=25°C ..... ≥10^{12} Ω
V_{IO}=500 V, T_A=100°C ..... ≥10^{11} Ω
Storage Temperature Range ..... –55 to +150°C
Ambient Temperature Range ..... –55 to +100°C
Junction Temperature ..... 100°C
Soldering Temperature (t=10 sec. max.) ..... 260°C
Dip soldering: distance to seating plane ≥1.5 mm

Characteristics (T_A=0° to 70°C, unless otherwise specified,typical values T_A=25°C)

Description	Symbol	Min.	Typ.	Max.	Unit
Emitter (IR GaAlAs)					
Forward Voltage, I_F=16 mA	V_F		1.5	1.8	V
Reverse Current, V_R=3 V	I_R		0.5	10	µA
Capacitance, V_R=0 V, f=1 MHz	C_0		125		pF
Thermal Resistance	R_{thJA}		700		°K/W
Detector (Si Photodiode + Transistor)					
Supply Current, Logic High I_F=0, V_O (open), V_{CC}=15 V, T_A=25°C I_F=0, V_O (open), V_{CC}=15 V	I_{CCH}		0.01	1 2	µA
Output Current, Output High I_F=0, V_O (open), V_{CC}=5.5 V, T_A=25°C I_F=0, V_O (open), V_{CC}=15 V, T_A=25°C I_F=0, V_O (open), V_{CC}=15 V	I_{OH}		.003 .01 —	0.5 1 50	µA
Capacitance, V_{CE}=5 V, f=1 MHz	C_{CE}		3		pF
Thermal Resistance	R_{thJA}		300		°K/W
Package					
Coupling Capacitance	C_C		0.6		pF
Coupling Transfer Ratio I_F=16 mA, V_O=0.4 V, V_{CC}=4.5 V, T_A=25°C I_F=16 mA, V_O=0.5 V, V_{CC}=4.5 V	I_C/I_F	 19 15	 30 —		%
Collector Emitter Saturation Voltage I_F=16 mA, I_O=2.4 mA, V_{CC}=4.5 V, T_A=25°C	V_{OL}		0.1	0.4	V
Supply Current, Logic Low I_F=16 mA, V_O open, V_{CC}=15 V	I_{CCL}		80		µA

Figure 1. Test set-up

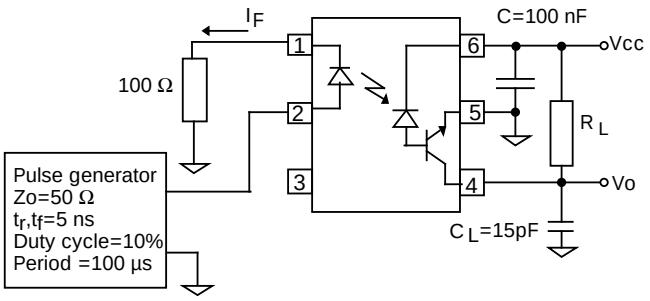
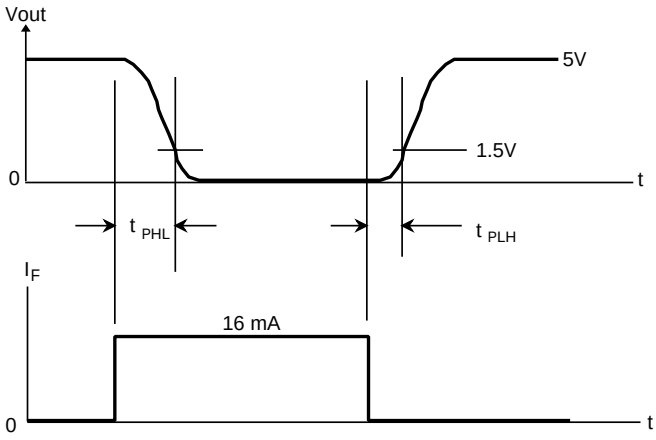


Figure 2. Switching time measurement



Description	Symbol	Min.	Typ.	Max.	Unit
Propagation Delay Time (High–Low) I_F=16 mA, V_{CC}=5 V, R_L=1.9 kΩ, T_A=25°C	t_{PHL}		0.3	0.8	µs
Propagation Delay Time (Low–High) I_F=16 mA, V_{CC}=5 V, R_L=1.9 kΩ, T_A=25°C	t_{PLH}		0.3	0.8	µs

Figure 3. Common mode transient test

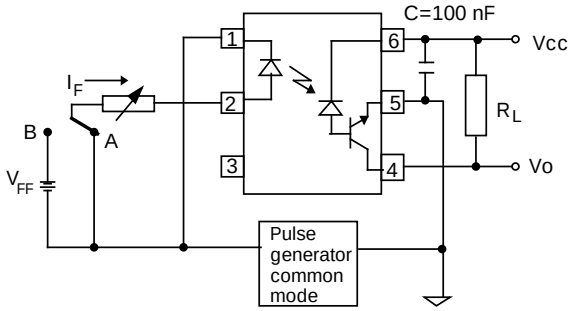
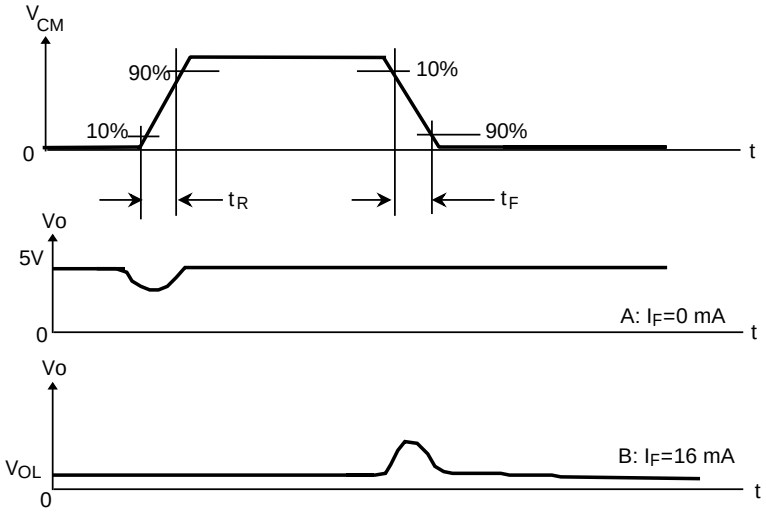


Figure 4. Measurement waveform of CMR



Description	Symbol	Min.	Typ.	Max.	Unit
Common Mode Transient Immunity (High) I_F=0, V_{CM}=1500 V_{P-P}, R_L=1.9 kΩ, V_{CC}=5 V, T_A=25°C	CM_H		10		kV/µs
Common Mode Transient Immunity (Low) I_F=16 mA, V_{CM}=1500 V_{P-P}, R_L=1.9 kΩ, V_{CC}=5 V, T_A=25°C	CM_L		10		kV/µs