


FEATURES

- Direct Replacement for HCPL4503
- High Speed Optocoupler without Base Connection
- GaAIAs Emitter
- Integrated Detector with Photodiode and Transistor
- High Data Transmission Rate: 1 MBit/s
- TTL Compatible
- Open Collector Output
- CTR at $I_F=16\text{ mA}$, $V_O=0.4\text{ V}$, $V_{CC}=4.5\text{ V}$, $T_A=25^\circ\text{C}$: $\geq 19\%$
- Good CTR Linearity Relative to Forward Current
- Field Effect Stable
- Low Coupling Capacitance
- Very High Common Mode Transient Immunity $dV/dt: \geq 15\text{ kV}/\mu\text{s}$ at $V_{CM}=1500\text{ V}$
- Insulation Test Voltage: 5300 VAC_{PK}
-  VDE 0884 Available with Option 1
- UL Approval, File #E52744

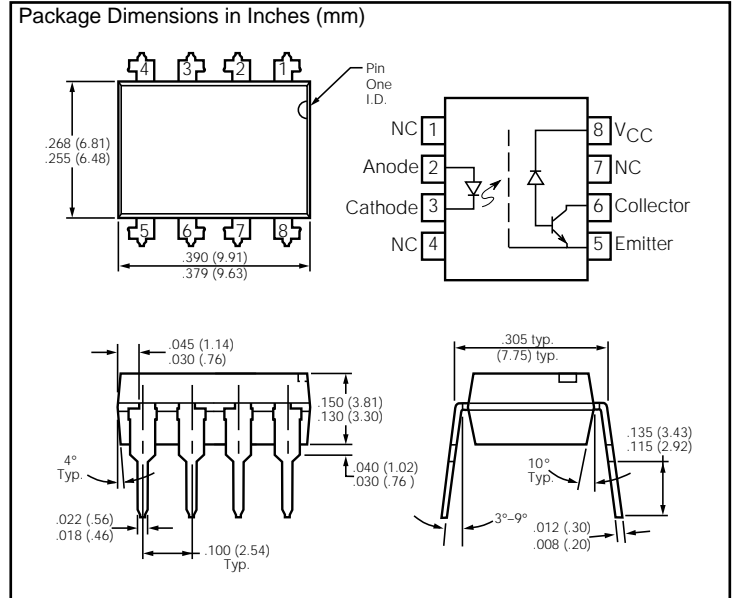
APPLICATIONS

- Data Communications
- IGBT Drivers
- Programmable Controllers

DESCRIPTION

The SFH6345 is an optocoupler with a GaAIAs infrared emitting diode, optically coupled to an integrated photodetector consisting of a photodiode and a high speed transistor in a DIP-8 plastic package. The device is similar to the 6N135 but has an additional Faraday shield on the detector which enhances the input-output dv/dt immunity.

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.



Absolute Maximum Ratings

Emitter (GaAIAs)

| | |
|---|-------|
| Reverse Voltage..... | 3 V |
| DC Forward Current | 25 mA |
| Surge Forward Current..... | 1 A |
| $t_p \leq 1\ \mu\text{s}$, 300 pulses/sec. | |
| Total Power Dissipation..... | 45 mW |

Detector (Si Photodiode + Transistor)

| | |
|------------------------------|----------------------------|
| Supply Voltage..... | -0.5 to 30 V |
| Output Voltage | -0.5 to $\geq 25\text{ V}$ |
| Output Current..... | 8 mA |
| Total Power Dissipation..... | 100 mW |

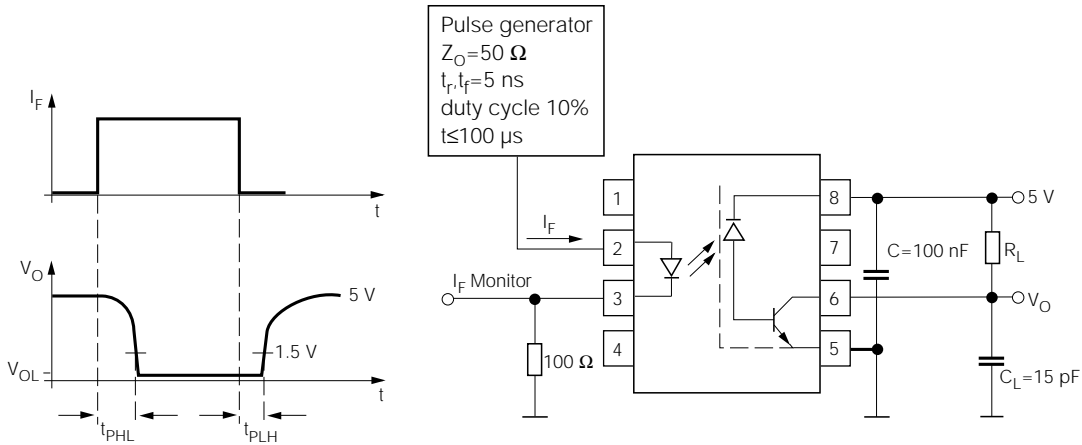
Package Insulation

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

Characteristics ($T_A=0^\circ$ to 70°C , unless otherwise specified, typical values $T_A=25^\circ\text{C}$)

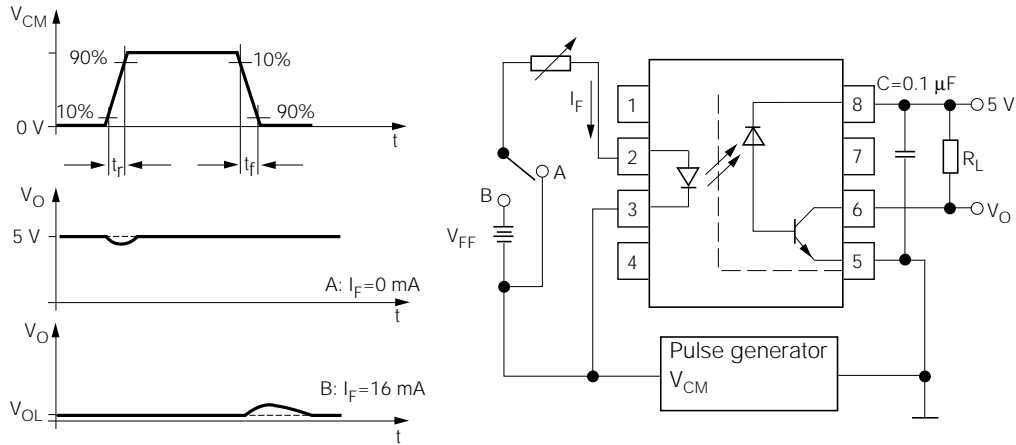
| Description | Symbol | Min. | Typ. | Max. | Unit |
|--|------------|----------|------------------|----------------|--------------------|
| Emitter (IR GaAlAs) | | | | | |
| Forward Voltage, $I_F=16\text{ mA}$ | V_F | | 1.6 | 1.9 | V |
| Reverse Current, $V_R=3\text{ V}$ | I_R | | 0.5 | 10 | μA |
| Capacitance, $V_R=0\text{ V}$, $f=1\text{ MHz}$ | C_0 | | 75 | | pF |
| Thermal Resistance | R_{thJA} | | 700 | | $^\circ\text{K/W}$ |
| Detector (Si Photodiode + Transistor) | | | | | |
| Supply Current, Logic High $I_F=0$, V_O (open), $V_{CC}=15\text{ V}$, $T_A=25^\circ\text{C}$ $I_F=0$, V_O (open), $V_{CC}=15\text{ V}$ | I_{CCH} | | 0.01 | 1 2 | μA |
| Output Current, Output High $I_F=0$, V_O (open), $V_{CC}=5.5\text{ V}$, $T_A=25^\circ\text{C}$ $I_F=0$, V_O (open), $V_{CC}=15\text{ V}$, $T_A=25^\circ\text{C}$ $I_F=0$, V_O (open), $V_{CC}=15\text{ V}$ | I_{OH} | | .003 .01 — | 0.5 1 50 | μA |
| Capacitance, $V_{CE}=5\text{ V}$, $f=1\text{ MHz}$ | C_{CE} | | 3 | | pF |
| Thermal Resistance | R_{thJA} | | 300 | | $^\circ\text{K/W}$ |
| Package | | | | | |
| Coupling Capacitance | C_C | | 0.6 | | pF |
| Coupling Transfer Ratio $I_F=16\text{ mA}$, $V_O=0.4\text{ V}$, $V_{CC}=4.5\text{ V}$, $T_A=25^\circ\text{C}$ $I_F=16\text{ mA}$, $V_O=0.5\text{ V}$, $V_{CC}=4.5\text{ V}$ | I_C/I_F | 19 15 | 30 — | | % |
| Collector Emitter Saturation Voltage $I_F=16\text{ mA}$, $I_O=2.4\text{ mA}$, $V_{CC}=4.5\text{ V}$, $T_A=25^\circ\text{C}$ | V_{OL} | | 0.1 | 0.4 | V |
| Supply Current, Logic Low $I_F=16\text{ mA}$, V_O open, $V_{CC}=15\text{ V}$ | I_{CCL} | | 80 | 200 | μA |

Switching Times (typ.)



| Description | Symbol | Min. | Typ. | Max. | Unit |
|---|-----------|------|------|------|---------------|
| Propagation Delay Time (High–Low) $I_F=16\text{ mA}$, $V_{CC}=5\text{ V}$, $R_L=1.9\text{ k}\Omega$, $T_A=25^\circ\text{C}$ | t_{PHL} | | 0.3 | 0.8 | μs |
| Propagation Delay Time (Low–High) $I_F=16\text{ mA}$, $V_{CC}=5\text{ V}$, $R_L=1.9\text{ k}\Omega$, $T_A=25^\circ\text{C}$ | t_{PLH} | | 0.3 | 0.8 | μs |

Common Mode Transient Immunity



| Description | Symbol | Min. | Typ. | Max. | Unit |
|---|----------|------|------|------|-------------------|
| Common Mode Transient Immunity (High) $I_F = 0$, $V_{CM} = 1500$ V _{P-P} , $R_L = 1.9$ k Ω , $V_{CC} = 5$ V, $T_A = 25^\circ\text{C}$ | $ CM_H $ | 15 | 30 | | kV/ μs |
| Common Mode Transient Immunity (Low) $I_F = 16$ mA, $V_{CM} = 1500$ V _{P-P} , $R_L = 1.9$ k Ω , $V_{CC} = 5$ V, $T_A = 25^\circ\text{C}$ | $ CM_L $ | 15 | 30 | | kV/ μs |