SIEMENS

IL356

HIGH VOLTAGE SOLID STATE RELAY OPTOCOUPLER

Preliminary Data Sheet

FEATURES

- **Normally Open, Single Pole Single Throw Operation**
- **Control 400 VAC or DC Voltage**
- **Switch 100 mA Loads**
- **Low ON-Resistance**
- **dv/dt, > 500 V/ms**
- **Input and Output Isolation Voltage, 2500 V_{RMS}**
- **Current Limiting**
- **Low Profile: Thickness=0.080 Inches**

Applications

- **Telephone Switch Hook**
- **Industrial Control Systems**
- **PCMCIA Card**

DESCRIPTION

The IL356 is a single pole single throw (SPST), normally open (NO), solid state relay. The relay can control AC or DC loads currents up to 100 mA, with a supply voltage up to 400 V. The device is packaged in a eight pin 2 mm surface mount package. This package offers an insulation dielectric withstand of 2500 V_{RMS}.

The coupler consists of an AlGaAs LED that is optically coupled to a dielectrically isolated photodiode array which drives two series connected high voltage MOS transistors. The typical ON-Resistance is 25 W at 25 mA lead current and is linear up to 50 mA. The incremental resistance drops to less than 20 W beyond 50 mA while reducing internal power dissipation at high load currents. There is built-in current limiting circuitry in the detector chip.

Absolute Maximum Ratings (T_A=25°C)

Emitter

Reverse Voltage ..... 5.0 V
Continuous Forward Current ..... 60 mA
Peak Forward Current, Non-repetitive (1 µs)..... 0.25 A
Power Dissipation..... 50 mW
Derate Linearly from 25°C..... .66 mW/°C

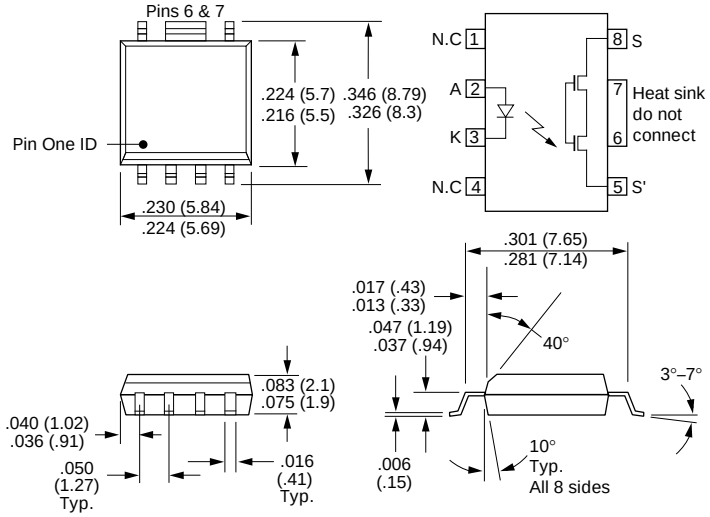
Detector

Output Breakdown Voltage .....±400 V
Continous Load Current .....±100 mA
Power Dissipation..... 300 mW
Derate Linearly from 25°C..... 5.8 mW/°C

Package

Input and Output Isolation Voltage..... 2500 V_{RMS}
Total Power Dissipation ..... 350 mW
Derate Linearly from 25°C..... 5.3 mW/°C
Isolation Resistance
V_{IO}=500 V, T_A=25°C .....≥1012 Ω
V_{IO}=500 V, T_A=100°C .....≥1011 Ω
Storage Temperature Range ..... –40 to +150°C
Operating Temperature Range..... –40 to +85°C
Junction Temperature..... 100°C
Soldering Temperature
2 mm from case, 10 sec. ..... 260°C

Package Dimensions in Inches (mm)



Electrical Specifications at 25°C unless otherwise specified

Input (Emitter)	Symbol	Min.	Typ.	Max.	Units	Condition
Forward Voltage	V_F	1.15	1.26	1.45	V	I_F=10 mA
Reverse Voltage	V_R	5			V	I_R=10 µA
Capacitance	C_{LED}		25		pF	V_R=0 f=1 MHz
Output (S-S')						
Output Off-state Leakage Current	I_{LKG}		0.04	200	nA	I_F=0 mA V_L=±100 V
				1.0	µA	I_F=0 mA V_L=±400 V
OFF Resistance	R_{OFF}		5000		GΩ	
ON-Resistance	R_{ON}	17	25	33	W	I_F=1.5 mA I_L=±25 mA
Current Limit	I_{LMT}	170	210	270	mA	I_F=1.5 mA t=5 ms
Output Capacitance	C_0		37		pF	I_F=0 mA V_L=1 V
			13		pF	I_F=0 mA V_L=50 V
Switch Offset			0.25		µV	I_F=5 mA
Transfer Characteristics						
LED Forward Current, Switch Turn-on	I_{Fon}		0.12	0.3	mA	I_L=100 mA t=10 ms
LED Forward Current, Switch Turn-off	I_{Foff}	0.001	0.1		mA	V_L=±350 V t=100 ms

Electrical Specifications continued on next page.

Electrical Specifications (continued)

Transfer Characteristics (continued)	**Sym-bol**	**Min.**	**Typ.**	**Max.**	**Units**	**Condition**
Input/Output Capacitance	C_{ISO}		0.8		pF	V_{ISO}=1 V
Turn-on Time	t_{on}		1.00		ms	I_F=1.5 mA I_L=50 mA
			0.3	1	ms	I_F=5.0 mA I_L=50 mA
Turn-off Time	t_{off}		0.20		ms	I_F=1.5 mA I_L=50 mA
			0.25	0.5	ms	I_F=5.0 mA I_L=50 mA

Figure 1. Timing test circuit

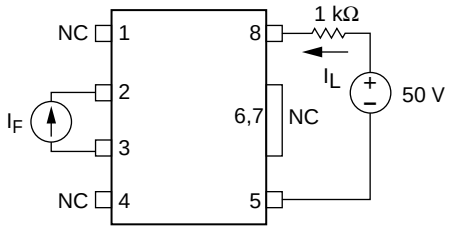


Figure 2. Timing waveform

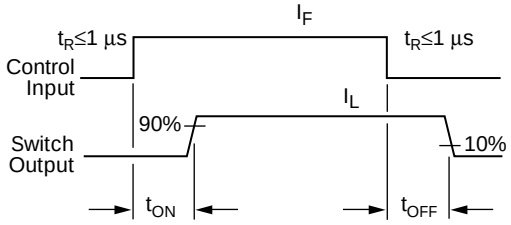


Figure 3. LED forward current vs. forward voltage

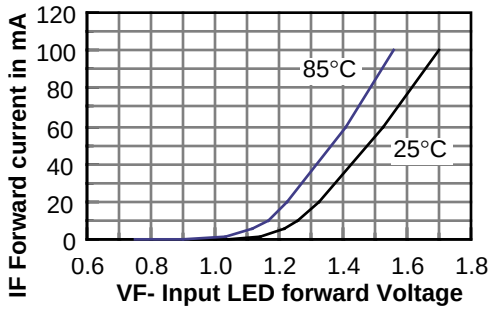


Figure 4. Recommended operating conditions

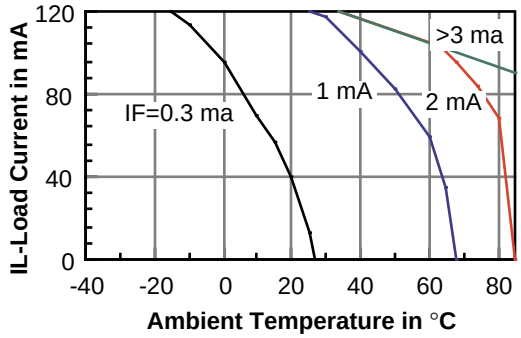


Figure 5. Change in current limit vs. temperature

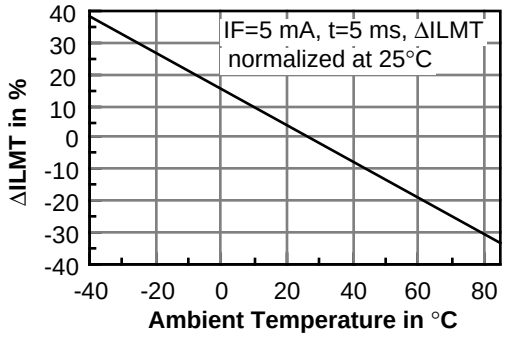


Figure 6. Min. LED current, switch turn-ON vs. temp.

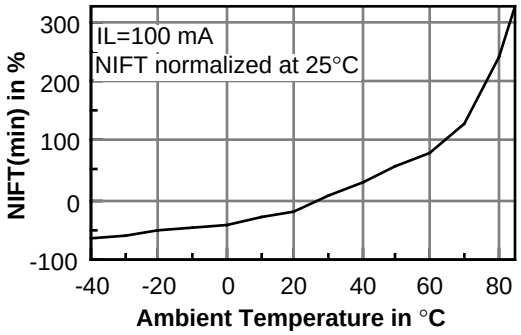


Figure 7. Change in ON resistance vs. temperature

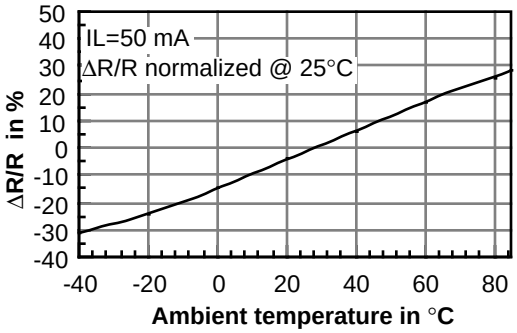


Figure 8. Switching speed vs. LED current