SIEMENS

NEW

IL356T

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**
- **Available in Tape and Reel (suffix T))**

DESCRIPTION

The IL356T 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 Ω at 25 mA lead current and is linear up to 50 mA. The incremental resistance drops to less than 20 Ω 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

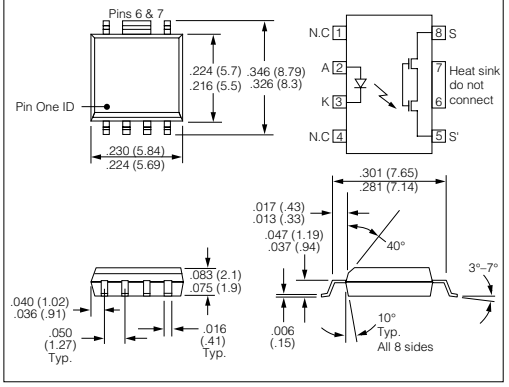
Detector

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, TA=25°C.....≥10^{12} Ω
V_{IO}=500 V, TA=100°C.....≥10^{11} 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	Ω	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)	Symbol	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

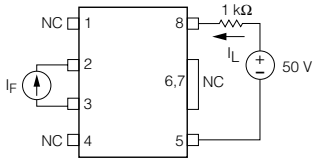


Figure. 2 Timing waveform

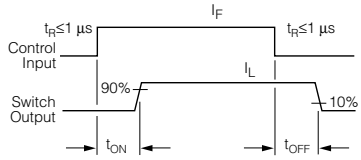


Figure 3. LED forward current vs. forward voltage

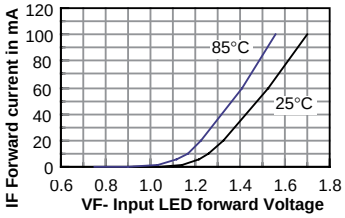


Figure 4. Recommended operating conditions

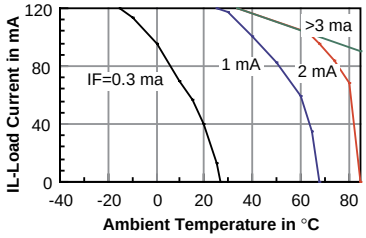


Figure 5. Change in current limit vs. temperature

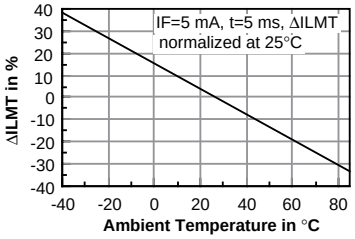


Figure 6. Min. LED current, switch turn-ON vs. temp.

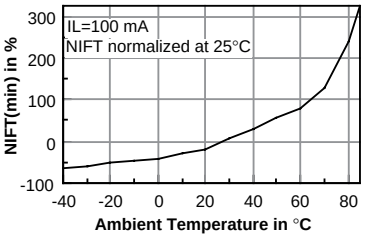


Figure 7. Change in ON resistance vs. temperature

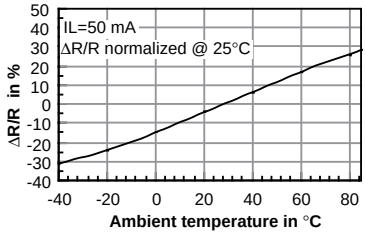


Figure 8. Switching speed vs. LED current