SIEMENS

LH1529

OPTICALLY COUPLED TELECOM SWITCH

Preliminary Data Sheet

FEATURES

- **Solid State Relay and Optocoupler in One Package**
- **Package—Single 8 Pin DIP**
- **I/O Isolation, 3750 V_{RMS}**
- **Surface Mount Option**
- **Optocoupler**
  - **Bidirectional Current Detection**
- **Solid-state Relay**
  - **Typical RON 20 Ω**
  - **Load Voltage 350 V**
  - **Load Current 120 mA**
  - **Current Limit Protection**
  - **High Surge Capability**
  - **Linear, AC/DC Operation**
  - **Clean Bounce Free Switching**
  - **Low Power Consumption**
  - **High Reliability Monolithic Receptor**

APPLICATIONS

- **General Telecom Switching**
  - **On/off Hook Control**
  - **Dial Pulse**
  - **Ring Current Detection**
  - **Loop Current Sensing**

Description

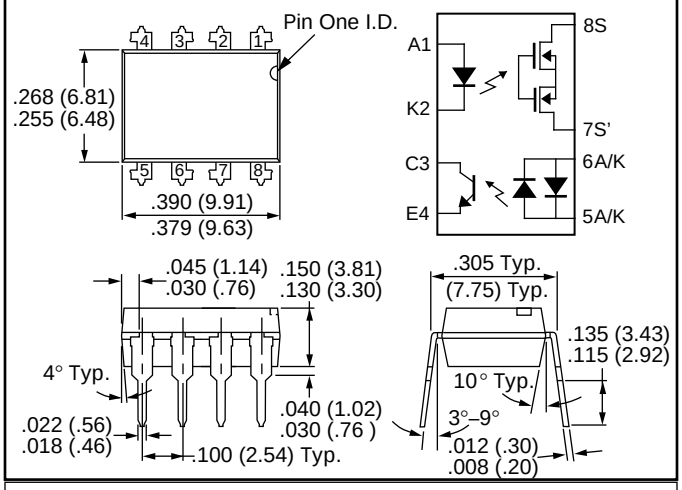
The LH1529 Telecom switch consists of an optically coupled solid state relay (SSR) and a bidirectional input optocoupler. The SSR is ideal for performing switchhook and dial-pulse switching while the optocoupler performs ring detection and loop current sensing functions. Both the SSR and opto coupler provide 3750 V_{RMS} of input to ouput isolation.

The SSR is integrated on a monolithic receptor die using high voltage BCDMOS technology. The SSR features low ON-resistance, high breakdown voltage and current-limit circuitry that protects the relay from telephone line induced lightning surges.

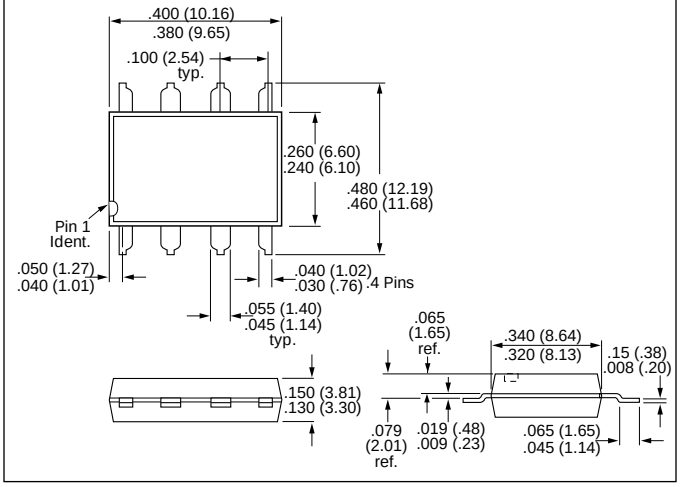
The optocoupler provides bidirectional current sensing via two antiparallel GaAs infrared emitting diodes. The opto channel provides a minimum CTR of 33% at 6 mA.

The LH1529 comes in a 8 pin, plastic DIP. To order packages with “S” bend leads, specify LH1529X00S.

Package Dimensions in Inches (mm)



“S” Bend Leads: Package Dimensions in Inches (mm)



Absolute Maximum Ratings

Package

Ambient Temperature Range ..... –40 to +85°C
Storage Temperature Range ..... –40 to +150°C
Soldering Temperature (t=10 sec. max.) ..... 260°C
Isolation Test Voltage ..... 3750 V_{RMS}
Isolation Resistance
V_{IO}=500 V, T_A=25°C ..... $\geq 10^{12}$ Ω
V_{IO}=500 V, T_A=100°C ..... $\geq 10^{11}$ Ω
Total Power Dissipation ..... 600 mW

SSR

LED Continuous Forward Current ..... 50 mA
LED Reverse Voltage ($I_R \leq 10$ µA) ..... 8 V
DC or Peak AC Load Voltage ($I_L \leq 50$ µA) ..... 350 V
Continous DC Load Current ..... 120 mA

Optocoupler

LED Continuous Forward Current ..... 50 mA
LED Reverse Voltage ($I_R \leq 10$ µA) ..... 3 V
Collector to Emitter Breakdown Voltage ..... 30 V
Phototransistor Power Dissipation ..... 150 mW

Electrical Characteristics (T_A=25°)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
SSR						
LED Forward Current for Switch Turn-on	I_{Fon}		0.7	2.0	mA	I_L=100 mA, t=10 ms
LED Forward Current for Switch Turn-off	I_{Foff}	0.2	0.6		mA	V_L=±300 V
LED Forward Voltage	V_F	1.15	1.26	1.45	V	I_F=10 mA
ON-Resistance	R_{ON}	12	20	25	W	I_F=5 mA,I_L=±50 mA
OFF-Resistance	R_{OFF}		5000		GΩ	I_F=0 mA, V_L=±100 V
Current Limit	I_{limit}	170	210	250	mA	I_F=5 mA, t=5 ms
Output Off-state Leakage Current			0.02	200 1.0	nA µA	I_F=0 mA, V_L=±100 V I_F=0 mA, V_L=±350 V
Output Capacitance Pins 7 to 8			55 10		pF pF	I_F=0 mA, V_L=1 V I_F=0 mA, V_L=50 V
Turn-on Time	T_{on}		1.3	2.5	ms	I_F=5 mA, I_L=50 mA
Turn-off Time	T_{off}		0.6	2.5	ms	I_F=5 mA, I_L=50 V
Optocoupler						
LED Forward Voltage	V_F	0.9	1.2	1.5	V	I_F=10 mA
DC Current Transfer Ratio	CTR	33	165		%	I_F=6.0 mA, V_{CE}=0.5 V
Saturation Voltage	V_{CEsat}		.07	0.5	V	I_F=16.0 mA, I_C=2 mA
Dark Current Leakage	I_{CEO}			500	nA	I_F=0 mA, V_{CE}=5 V
Trickle Current Leakage	I_{CEO}			1	µA	I_F=5 µA, V_{CE}=5 V

Figure 1. Recommended operating conditions

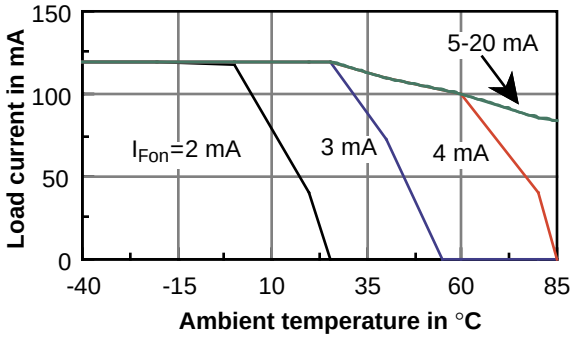


Figure 2. LED forward current vs. forward voltage

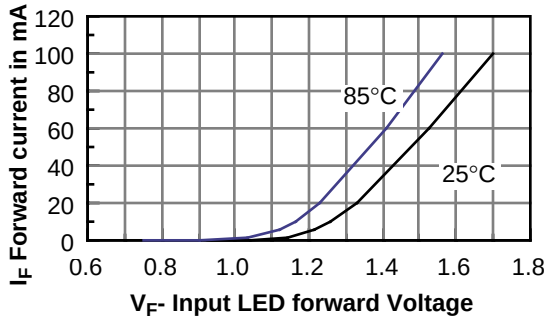


Figure 3. Typical SSR current vs. voltage

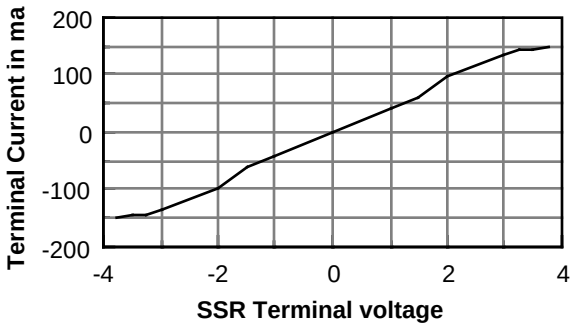


Figure 4. Change in ON=resistance vs. LED current

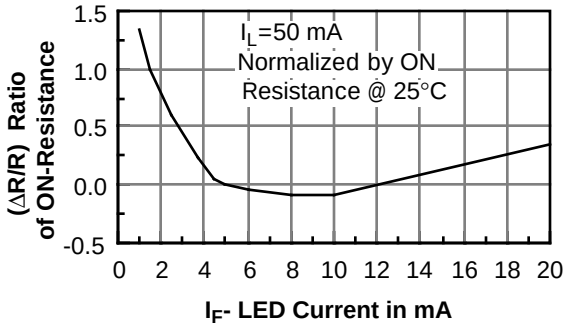


Figure 5. Change in ON-resistance vs. temp.

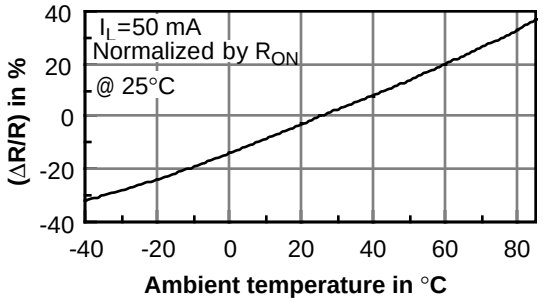


Figure 6. Turn-on current vs. temperature

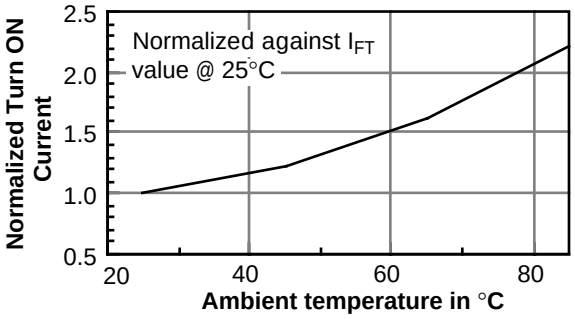


Figure 7. Current limit vs. temperature

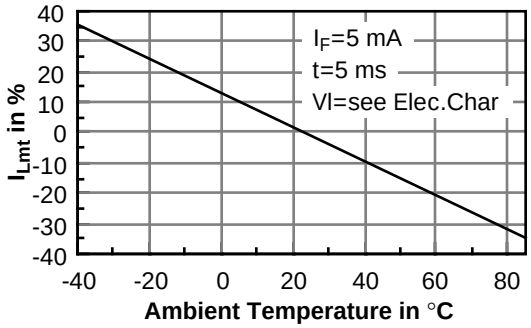


Figure 8. SSR turn-on time vs. resistive load

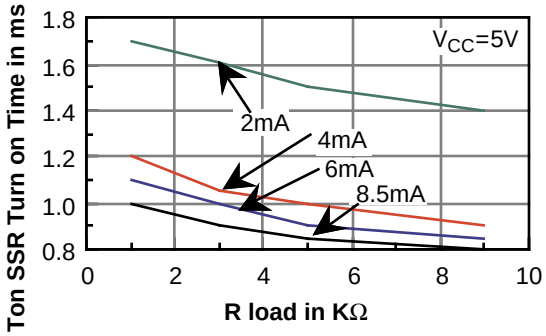


Figure 9. Collector current vs. collector voltage

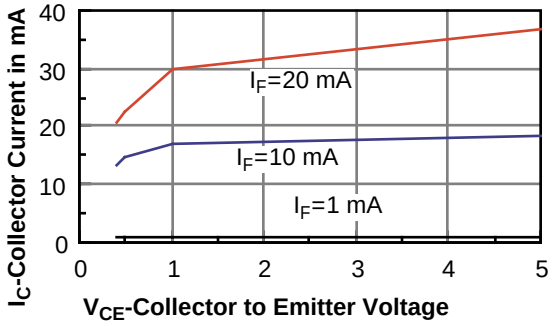


Figure 10. Collector current vs. collector voltage

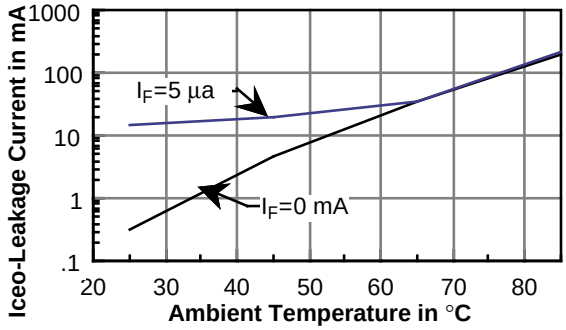


Figure 11. I_{CEO} leakage current vs. temperature

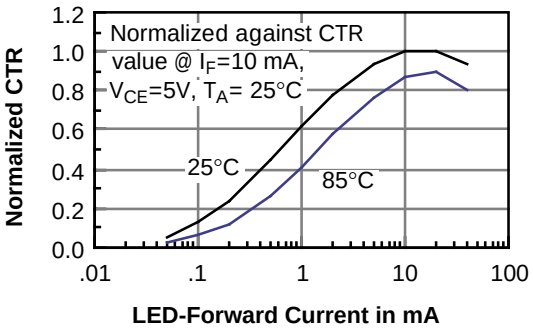


Figure 12. Non-saturated current transfer ratio

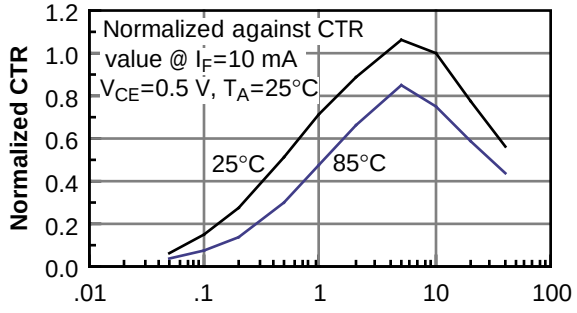


Figure 13. Switching test circuit for SSR channel

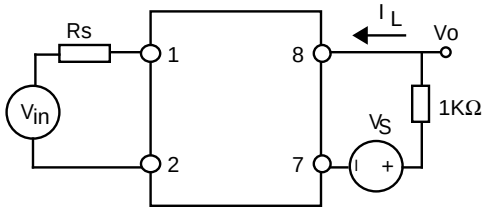


Figure 14. Switching waveform