SIEMENS

LH1525ACD
1 Form A, Dual 1 Form A SOP Solid-State Relays

FEATURES
- High-speed operation
- 1500 Vrms I/O isolation
- Current-limit protection
- High surge capability
- Linear, ac/dc operation
- Clean, bounce-free switching
- Extremely low power consumption
- High-reliability monolithic receptor
- Surface-mountable

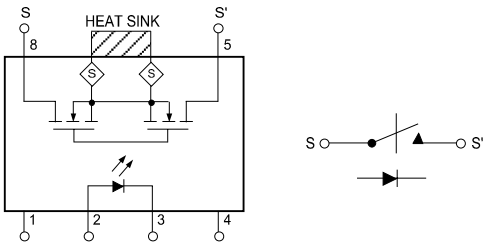
APPLICATIONS
- PCMCIA Type 2 cards
- Battery powered switch applications
- General telecom switching
- Telephone line interface
  - On/off hook
  - Ring relay
  - Ground start
- Programmable controllers
- Instrumentation

DESCRIPTION
The LH1525 relay is an SPST normally open switche (1 Form A and Dual 1 Form A respectively) in small-outline packages (SOP). They require a minimal amount of LED drive current to operate, making them ideal for battery powered and power consumption sensitive applications.

The relays are constructed using a GaAlAs LED for actuation control and an integrated monolithic die for the switch output. The die, fabricated in a high-voltage dielectrically isolated BCDMOS technology, is comprised of a photodiode array, switch-control circuitry, and MOSFET switches. In addition, the relays employ current-limiting circuitry enabling it to pass FCC 68.302 and other regulatory surge requirements when overvoltage protection is provided.

The LH1525 (1 Form A) is packaged in an 8-pin, plastic SOP (LH1525ACD). Available in sticks or on tape and reel.

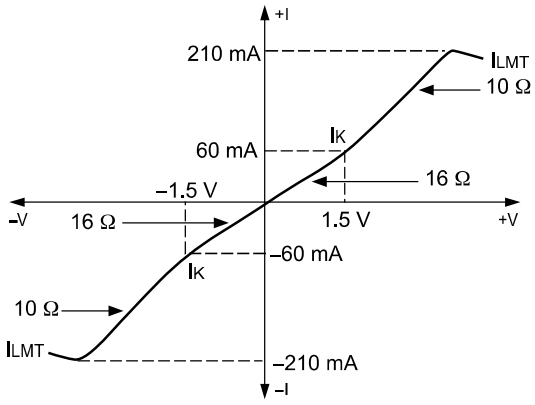
Figure 1. LH1525ACD Functional/Pin Diagram



Functional Description

Figure 3 shows the switch characteristics of the relays. The relay exhibits an ON-resistance that is exceptionally linear through the origin and up to the knee current (Ik). Beyond Ik, the incremental resistance decreases, minimizing internal power dissipation. Overload currents are clamped at I_{LMT} by the internal current-limit circuitry. The current-limiting circuitry exhibits a negative temperature coefficient, thereby reducing the current-limit value when relay temperature is increased. An extended clamp condition, which increases relay temperature, decreases the current-limit value, resulting in a current foldback characteristic. When the overload is removed, the relay resumes its normal ON-resistance characteristic.

Figure 3. Typical ac/dc ON Characteristics



In a 1 Form A relay, to turn the relay on, forward current is applied to the LED. The amount of current applied determines the amount of light produced for the photodiode array. This photodiode array develops a drive-voltage for the MOSFET switch outputs. For high-temperature or high-load current operations, more LED current is required.

Thermal Considerations

To minimize thermal resistance, pins 6 and 7 of the LH1525ACD are formed into a tab. This tab should be soldered to a printed circuit board land pattern of equal or greater size. **Do Not** run metal underneath the device or the input-to-output isolation could be jeopardized.

Absolute Maximum Ratings At 25°C

Stresses in excess of the Absolute Maximum Ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to Absolute Maximum Ratings for extended periods can adversely affect the device reliability.

Parameter	Symbol	Value	Unit
Ambient Operating Temperature Range	T_A	–40 to +85	°C
Storage Temperature Range	T_{stg}	–55 to +150	°C
Pin Soldering Temperature (t=5 s max.)	T_S	260	°C
Input/Output Isolation Voltage	V_{ISO}	1500	Vrms
LED Input Ratings:			
Continuous Forward Current	I_F	50	mA
Reverse Voltage	V_R	5	V
Output Operation:			
dc or Peak ac Load Voltage ($I_L \leq 50\ \mu A$)	V_L	400	V
Continuous dc Load Current:			
One pole operating	I_L	110	mA
Power Dissipation:			
LH1525	P_{DISS}	550	mW
Thermal Resistance, Junction to Ambient	RΘJA	120	C/W

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
LED Forward Current for Switch Turn-on (T_A=–40°C to +85°C)	I_{FON}	1.5	—	20	mA

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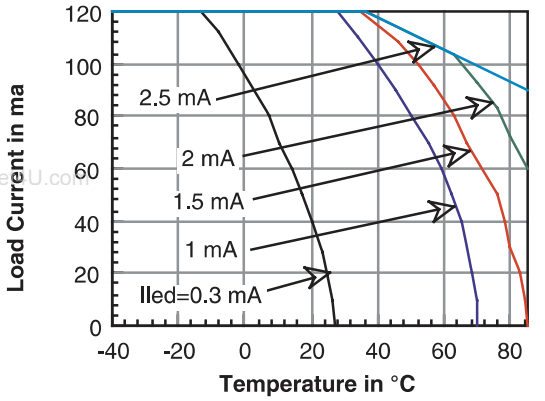

Electrical Characteristics T_A=25°C

Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluations. Typical values are for information purposes only and are not part of the testing requirements.

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
LED Forward Current for Switch Turn-on	I_{FON}	I_L=100 mA, t=10 ms	—	0.2	0.5	mA
LED Forward Current for Switch Turn-off	I_{FOFF}	V_L= ±350 V, t=100 ms	0.01	0.1	—	mA
LED Forward Voltage	V_F	I_F = 1.5 mA	0.80	1.15	1.40	V
ON-resistance: Pin 4 (±) to 6 (±)	R_{ON}	I_F=1.5 mA, I_L=±50 mA	17	25	33	Ω
Current Limit	I_{LMT}	I_F=1.5 mA, t=5 ms, V_L=7 V	170	210	270	mA
Output Off-state Leakage Current	—	I_F=0 mA, V_L=±100 V V_L=±400 V	— —	0.04 —	200 1.0	nA µA
Turn-on Time	t_{on}	I_F=1.5 mA, I_L=50 mA I_F=5.0 mA, I_L=50 mA	— —	1.0 0.3	— 1.0	ms ms
Turn-off Time	t_{off}	I_F=1.5 mA, I_L=50 mA I_F=5.0 mA, I_L=50 mA	— —	0.2 0.25	— 0.5	ms ms