Product Brief
October 1998

microelectronics group

Lucent Technologies
Bell Labs Innovations

L7581 Ringing Access Switch

Features

- Small size/surface-mount packaging
- Monolithic IC reliability
- Low impulse noise
- Make-before-break, break-before-make operation
- Clean, bounce-free switching
- Low, matched ON-resistance
- Built-in current limiting, thermal shutdown, and SLIC protection
- 5 V only operation, very low power consumption
- Battery monitor, all OFF state upon loss of battery
- No EMI
- Latched logic level inputs, no drive circuitry
- Only one external protector required

Applications

- Central office
- DLC
- PBX
- DAML
- HFC/FITL

Description

The L7581 Ringing Access Switch is a monolithic solid-state device that provides the switching functionality of a 2 form C switch.

The L7581 is designed to provide power ringing access to Tip and Ring in central office, digital loop carrier, private branch exchange, digitally added main line, and hybrid fiber coax/fiber-in-the-loop analog line card applications. The L7581 has three states: the idle talk state (line break switches closed, ringing access switches open), the power ringing state (line break switches open, ringing access switches closed), and an all OFF state.

The L7581 offers break-before-make or make-before-break switching, with simple logic level input control. Because of the solid-state construction, voltage transients generated when switching into an inductive ringing load during ring cadence or ring trip are minimized, possibly eliminating the need for external zero cross switching circuitry. State control is via logic level inputs, so no additional driver circuitry is required.

The line break switch is a linear switch that has exceptionally low ON-resistance and an excellent ON-resistance matching characteristic. The ringing access switch has a breakdown voltage rating >480 V which is sufficiently high, with proper protection, to prevent breakdown in the presence of a transient fault condition (i.e., passing the transient on to the ringing generator).

Incorporated into the L7581Axx is a diode bridge/SCR clamping circuit, current-limiting circuitry, and a thermal shutdown mechanism to provide protection to the SLIC device and subsequent circuitry during fault conditions (see the functional diagrams). Positive and negative lightning is reduced by the current-limiting circuitry and steered to ground via diodes and the integrated SCR. Power cross is also reduced by the current-limiting and thermal shutdown circuits.

The L7581Bxx version provides only an integrated diode bridge along with current limiting and thermal shutdown, as shown in the functional diagrams. This will cause positive faults to be directed to ground and negative faults to battery. In either polarity, faults are reduced by the current-limit and/or thermal shutdown mechanisms.

To protect the L7581 from an overvoltage fault condition, use of a secondary protector is required. The secondary protector must limit the voltage seen at the Tip/Ring terminals to prevent the breakdown voltage of the switches from being exceeded. To minimize stress on the solid-state contacts, use of a foldback or crowbar type secondary protector is recommended. With proper choice of secondary protection, a line card using the L7581 will meet all relevant ITU-T, LSSGR, FCC, or *UL** protection requirements.

* *UL* is a registered trademark of Underwriters Laboratories, Inc.

Description (continued)

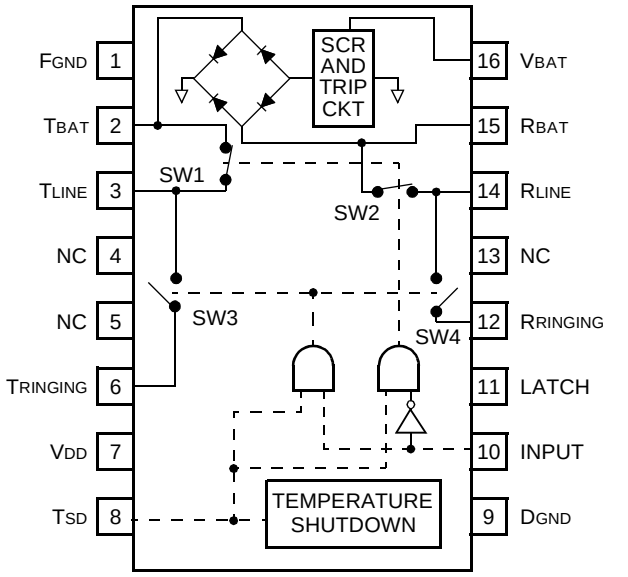
The L7581 operates off of a 5 V supply only. This gives the device extremely low idle and active power dissipation and allows use with virtually any range of battery voltage. This makes the L7581 especially appropriate for remote power applications such as DAML or FOC/FITL or other Bellcore TA-909 applications where power dissipation is particularly critical.

A battery voltage is also used by the L7581, only as a reference for the integrated protection circuit. The L7581 will enter an all OFF state upon loss of battery.

During power ringing, to turn on and maintain the ON state, the ring access switch will draw a nominal 2 mA or 4 mA from the ring generator.

The L7581 device is packaged a 16-pin, plastic SOG package (L7581AAE/BAE).

Functional Diagrams



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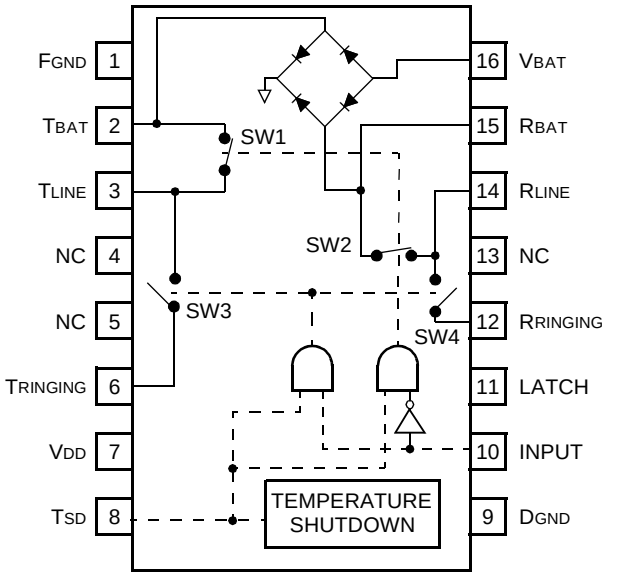
Note: Shown with A version protection.



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Note: Shown with B version protection.

For additional information, contact your Microelectronics Group Account Manager or the following:

INTERNET: **http://www.lucent.com/micro**
E-MAIL: **docmaster@micro.lucent.com**
N. AMERICA: Microelectronics Group, Lucent Technologies Inc., 555 Union Boulevard, Room 30L-15P-BA, Allentown, PA 18103
1-800-372-2447, FAX 610-712-4106 (In CANADA: **1-800-553-2448**, FAX 610-712-4106)
ASIA PACIFIC: Microelectronics Group, Lucent Technologies Singapore Pte. Ltd., 77 Science Park Drive, #03-18 Cintech III, Singapore 118256
Tel. (65) 778 8833, FAX (65) 777 7495
CHINA: Microelectronics Group, Lucent Technologies (China) Co., Ltd., A-F2, 23/F, Zao Fong Universe Building, 1800 Zhong Shan Road, South Shanghai 200233 P. R. China **Tel. (86) 21 6440 0468**, **ext. 316**, FAX (86) 21 6440 0652
JAPAN: Microelectronics Group, Lucent Technologies Japan Ltd., 7-18, Higashi-Gotanda 2-chome, Shinagawa-ku, Tokyo 141, Japan
Tel. (81) 3 5421 1600, FAX (81) 3 5421 1700
EUROPE: Data Requests: MICROELECTRONICS GROUP DATALINE **Tel. (44) 1189 324 299**, FAX (44) 1189 328 148
Technical Inquiries: GERMANY: **(49) 89 95086 0** (Munich), UNITED KINGDOM: **(44) 1344 865 900** (Ascot),
FRANCE: **(33) 1 40 83 68 00** (Paris), SWEDEN: **(46) 8 594 607 00** (Stockholm),
FINLAND: **(358) 9 4354 2800** (Helsinki), ITALY: **(39) 02 6608131** (Milan), SPAIN: **(34) 1 807 1441** (Madrid)

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