

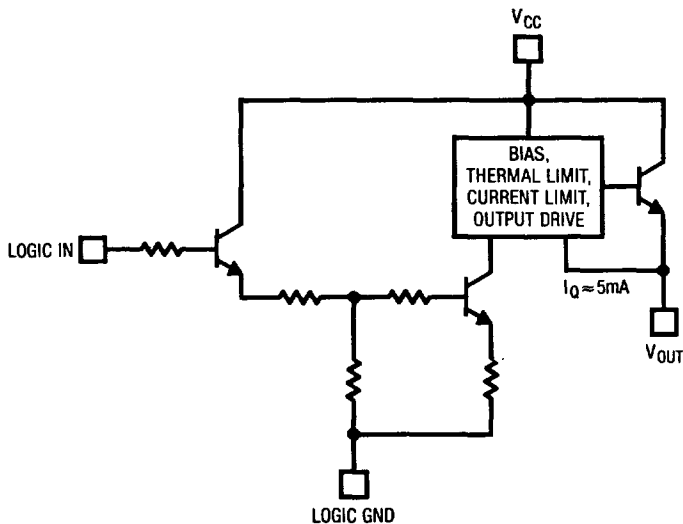
## FEATURES

- 7.5A Switch Capability
- Low Series Drop (<math>< 1.5V @ 7.5A</math>)
- Logic Input (Positive or Negative Logic)
- Current Limited
- Thermal Overload
- 5mA Quiescent Current
- 10 $\mu$ s Risetime

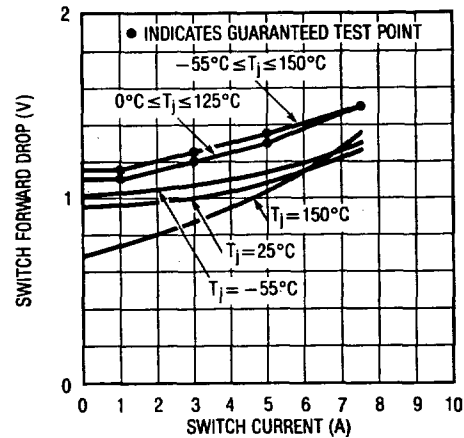
## DESCRIPTION

The LT1089 is a logic driven, high current, high side switch utilizing bipolar technology. The device is capable of driving loads up to 7.5A with a low series drop of only 1.5V, and the series drop is specified over the full range of switch currents. The device has internal current limiting and thermal overload protection. The input logic is designed so that the output can drive loads referenced either above or below the device ground pin. Either positive or negative logic can be used to drive the input. The device is available in both TO-3 metal can and TO-220 plastic packages.

## BLOCK DIAGRAM

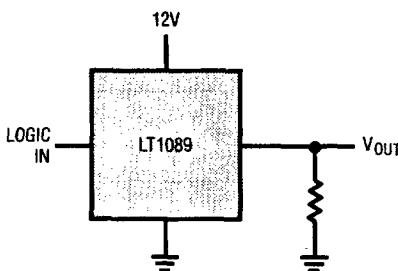


LT1089 Switch Voltage vs Output Current

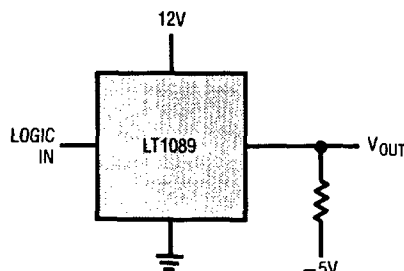


## TYPICAL APPLICATIONS

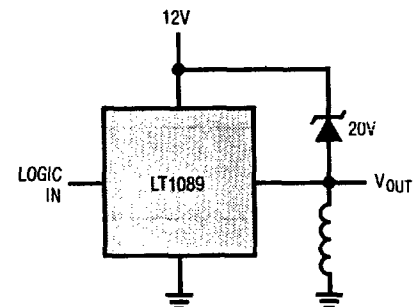
Driving Ground Referred Loads



Driving Negative Referred Loads



Driving Inductive Loads



# LT1089

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## ABSOLUTE MAXIMUM RATINGS\*

Switch Voltage ( $V_{CC} - V_{OUT}$ ) ..... 30V

Logic Input Voltage ( $V_{IN} - GND$ )..... 15V

## MAXIMUM OPERATING SPECIFICATIONS\*

Switch Voltage ( $V_{CC} - V_{OUT}$ ) ..... 20V

# ELECTRICAL CHARACTERISTICS

PARAMETER	CONDITIONS (NOTE 1)	MIN	TYP	MAX	UNITS
Output Faltime	$R_{LOAD} = 4\Omega$ (Note 4)		10	25	$\mu S$ $\mu S$
Thermal Resistance	K Package T Package			1.6 2.0	$^{\circ}C/W$ $^{\circ}C/W$

The ● denotes the specifications which apply over the full operating temperature range.

**Note 1:** Unless otherwise specified,  $(V_{CC} - GND) = 20V$  and the output load is referred to the ground pin (GND) of the device. Positive current values are defined to flow out of the device.

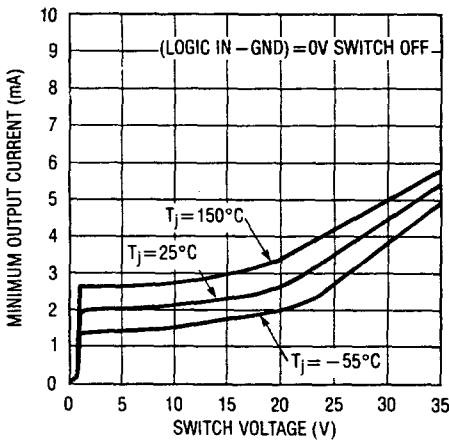
**Note 2:** For input voltages greater than 2.4V the device is guaranteed to be turned on. 1.5V is the typical threshold at 25°C.

**Note 3:** For input voltages less than 0.8V, the device is guaranteed to be in an off state. 1.5V is the typical switch threshold at 25°C.

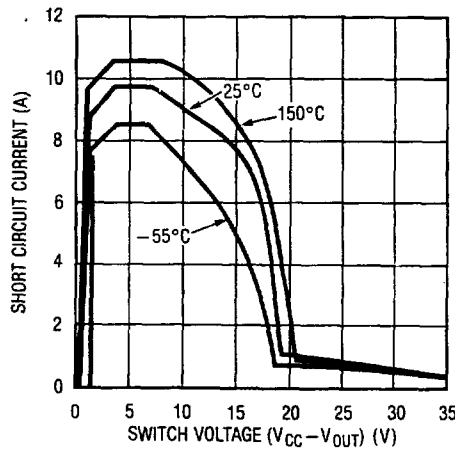
**Note 4:** For reactive loads such as large capacitors, the output faltime will be determined by the load.

# TYPICAL PERFORMANCE CHARACTERISTICS

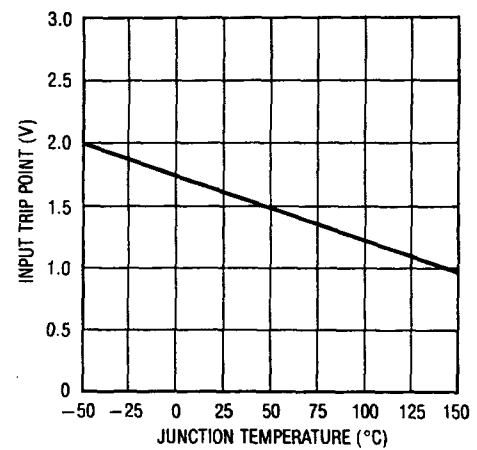
Minimum Output Current



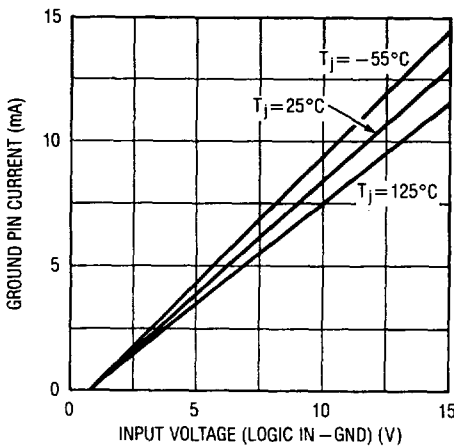
Short Circuit Current



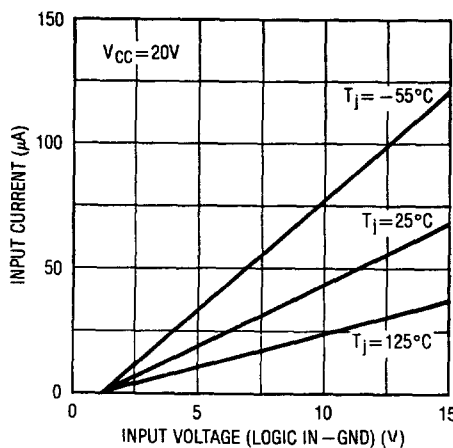
Input Trip Voltage (Logic In - GND)



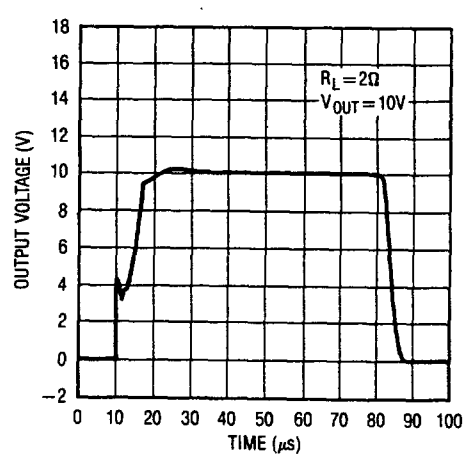
Ground Pin Current



Logic Input Current



Rise and Fall Times



## APPLICATION HINTS

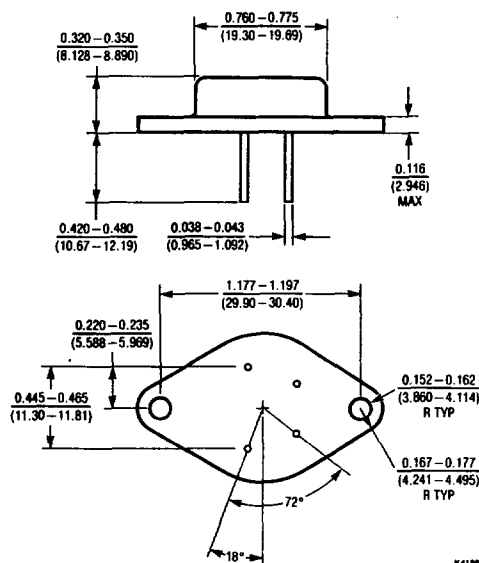
The logic and ground pins function as a differential logic input with a common-mode range of  $V_{CC}$  to  $V_{CC} - 20V$  and a differential threshold voltage ( $V_{LOGIC-GND}$ ) of 1.5V. Note that if either Logic In or GND are left open the switch remains inactive.

The LT1089 must be protected against overvoltage at turn-off when driving inductive loads. The inductive flyback voltage can easily exceed the maximum operating switch voltage ( $V_{CC} - V_{OUT}$ ) of 20V, potentially damaging the switch. The solution is to clamp the switch voltage to 20V or less with a zener diode. Remember that the switch can handle 7.5A and the zener may be required to handle the same amount of current.

Care must be exercised when operating near the maximum switch voltage. A high current or capacitive load may trip the current limit circuit at turn-on, thereby adversely affecting the risetime of  $V_{OUT}$ . The risetime is then governed by the current limit divided by the load capacitance, while the falltime is a function of the complex load. In addition, at switch voltages greater than 18V the switch current must be less than 0.5A or the device output will not pull up. Check the short circuit current characteristics for more detailed information.

## PACKAGE DESCRIPTION Dimensions in inches (millimeters) unless otherwise noted.

**K Package**  
4-Lead TO-3 Metal Can



**T Package**  
5-Lead TO-220

