

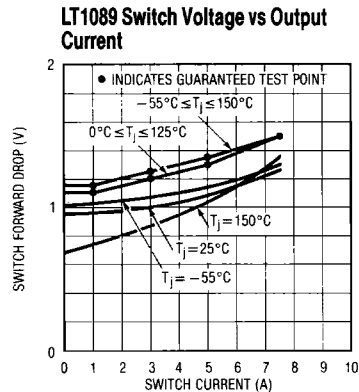
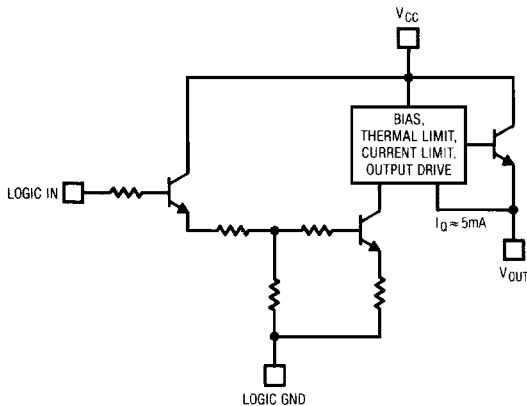
FEATURES

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

DESCRIPTION

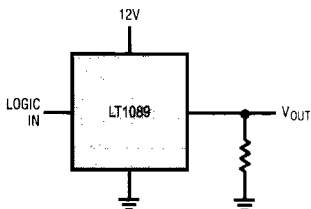
The LT1089 is a logic driven, high current, high side switch utilizing bipolar technology. The device is capable of driving loads up to 7.5A with a low series drop of only 1.5V, and the series drop is specified over the full range of switch currents. The device has internal current limiting and thermal 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

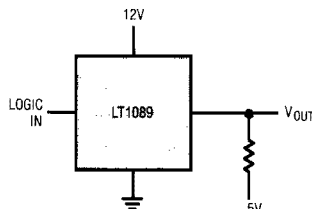


TYPICAL APPLICATIONS

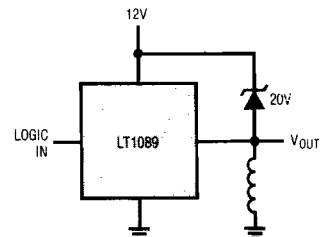
Driving Ground Referred Loads



Driving Negative Referred Loads



Driving Inductive Loads



ABSOLUTE MAXIMUM RATINGS*

Switch Voltage ($V_{CC} - V_{OUT}$) 30V
 Logic Input Voltage ($V_{IN} - GND$)..... 15V
 Logic Input Voltage Range (V_{IN}) ($V_{CC} - 30V$) < V_{IN} < V_{CC}
 Ground Pin Voltage Range (GND) . ($V_{CC} - 30V$) < GND < V_{CC}
 Operating Junction Temperature Range
 "M" Grades -55°C to 150°C
 "C" Grades..... 0°C to 125°C
 Storage Temperature Range -65°C to 150°C
 Lead Temperature (Soldering, 10 sec.) 300°C

MAXIMUM OPERATING SPECIFICATIONS*

Switch Voltage ($V_{CC} - V_{OUT}$) 20V
 Logic Input Voltage ($V_{IN} - GND$)..... 5V
 Logic Input Voltage Range (V_{IN}) ($V_{CC} - 20V$) < V_{IN} < V_{CC}
 Ground Pin Voltage Range (GND) . ($V_{CC} - 20V$) < GND < V_{CC}

*Note: Absolute maximum ratings are those voltages that the device is rated to withstand on a transient basis without damage. Maximum operating specifications are the maximum recommended operating voltages. The device is fully specified up to the maximum operating specifications. For voltages greater than the maximum operating specifications some device parameters may exceed the data sheet limits.

PACKAGE/ORDER INFORMATION

<p>BOTTOM VIEW V_{IN} NC CASE IS V_{OUT} 1 2 LOGIC IN 4 3 GND K PACKAGE 4-LEAD TO-3 METAL CAN</p>	ORDER PART NUMBER	<p>FRONT VIEW 5 LOGIC IN 4 V_{IN} 3 V_{OUT} 2 GND 1 NC T PACKAGE 5-LEAD TO-220</p>	ORDER PART NUMBER
	LT1089MK LT1089CK		LT1089CT

ELECTRICAL CHARACTERISTICS

PARAMETER	CONDITIONS (NOTE 1)	MIN	TYP	MAX	UNITS
Output Saturation Voltage	$I_{SWITCH} = 7.5A, (V_{IN} - GND) = 5V$ $4V < (V_{CC} - GND) < 20V$	●	1.3	1.5	V
Input Voltage ($V_{IN} - GND$)	Switch ON, (Note 2) $4V < (V_{CC} - GND) < 20V$	●	1.5		V
	Switch OFF, (Note 3) $4V < (V_{CC} - GND) < 20V$	●	2.4		V
		●		1.5	0.8
Input Current	Switch ON, ($V_{IN} - GND$) = 5V	●	-20	-100	μA
	Switch OFF, ($V_{IN} - GND$) = 0V	●	0		μA
		●		±5	μA
Ground Pin Current	Switch ON, ($V_{IN} - GND$) = 5V	●	3.5	5.0	mA
	Switch OFF, ($V_{IN} - GND$) = 0V	●	0		μA
		●		±20	μA
Output Current	Switch OFF, ($V_{IN} - GND$) = 0V	●	5	10	mA
Current Limit	Switch ON, ($V_{IN} - GND$) = 5V $(V_{CC} - V_{OUT}) = 5V$	●	8.0	9.5	A
	$(V_{CC} - V_{OUT}) = 20V$	●	0.5	1.0	1.5
Turn-On Delay		●	1		μs
		●		10	μs
Turn-Off Delay		●	5		μs
		●		20	μs
Output Risetime	$R_{LOAD} = 4Ω$	●	10		μs
		●		25	μs

ELECTRICAL CHARACTERISTICS

PARAMETER	CONDITIONS (NOTE 1)	MIN	TYP	MAX	UNITS
Output Faltime	$R_{LOAD} = 40$ (Note 4)	●	10	25	μS
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.

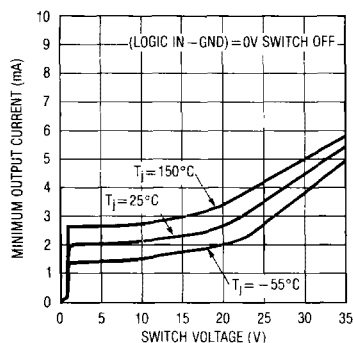
Note 2: For input voltages greater than 2.4V the device is guaranteed to be turned on. 1.5V is the typical threshold at 25°C.

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.

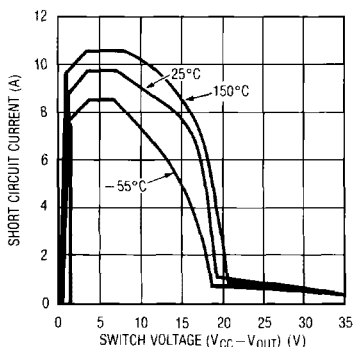
Note 4: For reactive loads such as large capacitors, the output falltime will be determined by the load.

TYPICAL PERFORMANCE CHARACTERISTICS

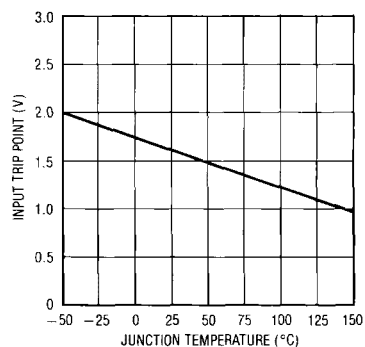
Minimum Output Current



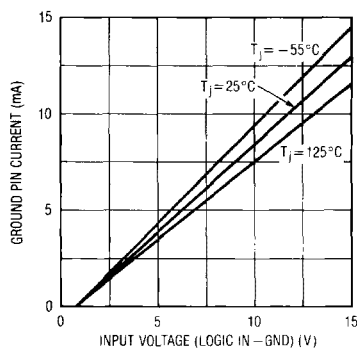
Short Circuit Current



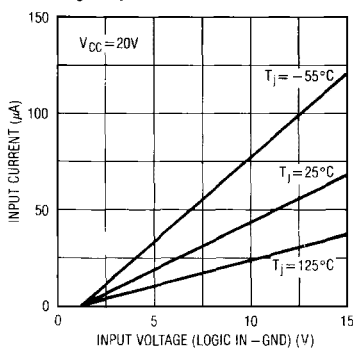
Input Trip Voltage (Logic In - GND)



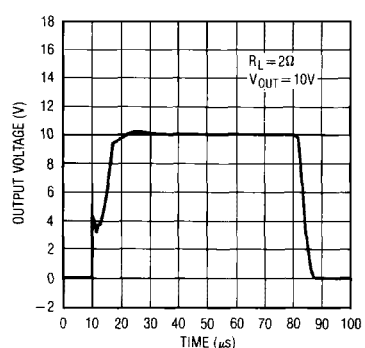
Ground Pin Current



Logic Input Current



Rise and Fall Times



APPLICATION HINTS

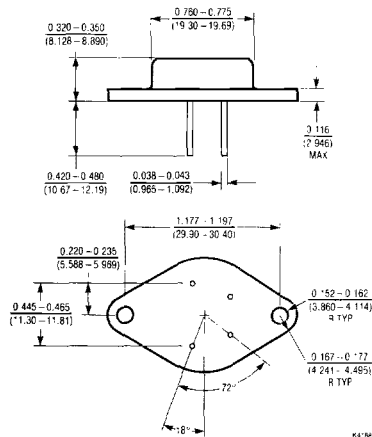
The logic and ground pins function as a differential logic input with a common-mode range of V_{CC} to $V_{CC} - 20V$ and a differential threshold voltage ($V_{LOGIC} - GND$) of 1.5V. Note that if either Logic In or GND are left open the switch remains inactive.

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

