

## Description

The AZ39151 is a 1.5A, high accuracy linear voltage regulator. It features 375mV dropout voltage at 1.5A output current and low ground current over all operating conditions.

The AZ39151 is specifically designed for low voltage, high current output systems, such as PC add-in cards where their tiny dropout voltage and ground current values are important attributes.

The AZ39151 has fixed 3.3V, 5.0V versions and ADJ (1.25V) version.

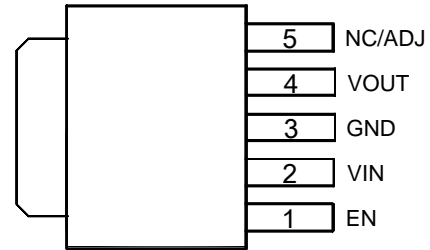
The AZ39151 is available in TO-252-5 package.

## Features

- Minimum Guaranteed Output Current: 1.5A
- Low Dropout Voltage: 375mV at  $I_{OUT} = 1.5A$
- Output Accuracy:  $\pm 1\%$
- Low Ground Current
- Internal Current and Thermal Limit
- Reversed-battery and Reversed-lead Insertion Protection
- Fast Transient Response
- TTL/CMOS Compatible Enable Pin

## Pin Assignments

(Top View)

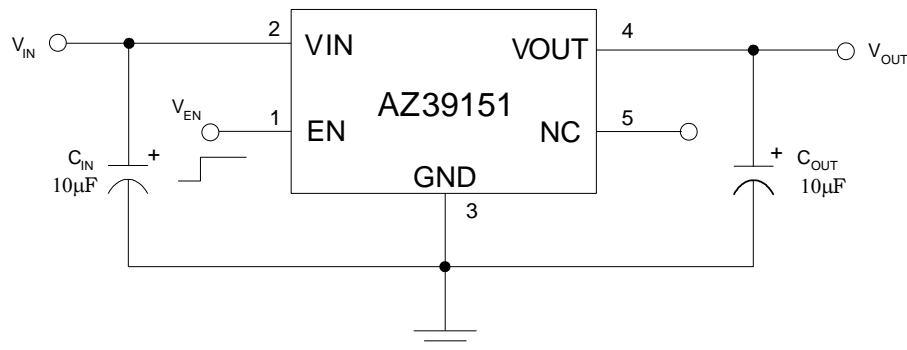


TO-252-5

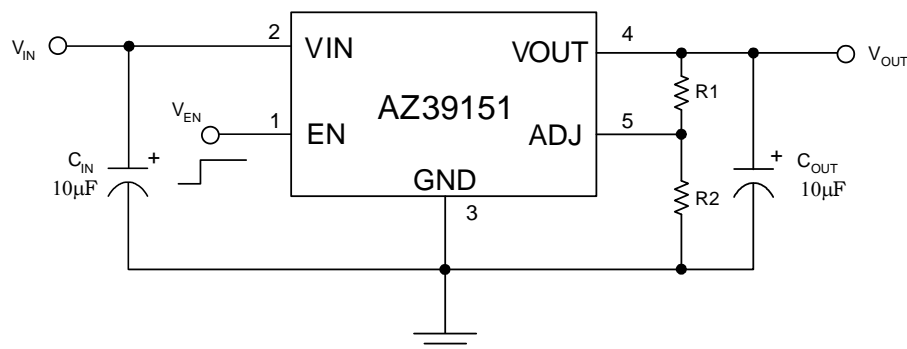
## Applications

- Set-top Box
- Hi-end DVD Player/Recorder
- LCD TV/PDP
- LDO Linear Regulator for PC Add-in Cards
- High Efficiency Linear Power Supplies
- SMPS Post Regulator

## Typical Applications Circuit



Fixed Version



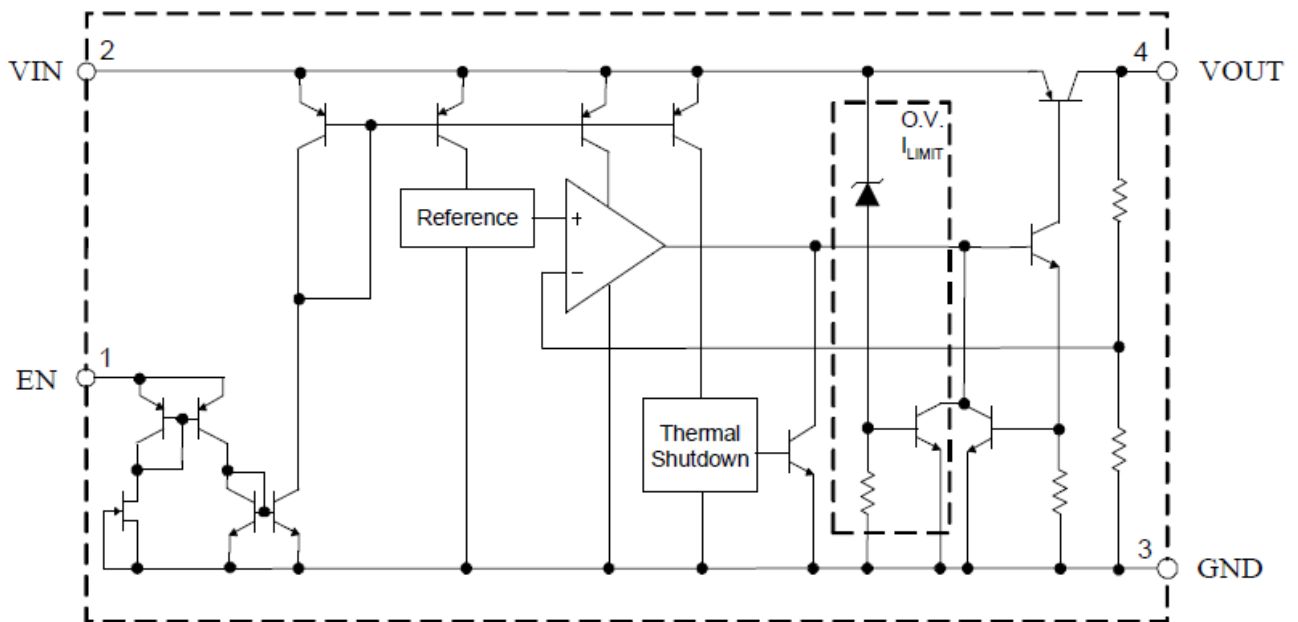
$$V_{OUT} = 1.25 \cdot (1 + R1/R2)V$$

Adjustable Version

## Pin Description

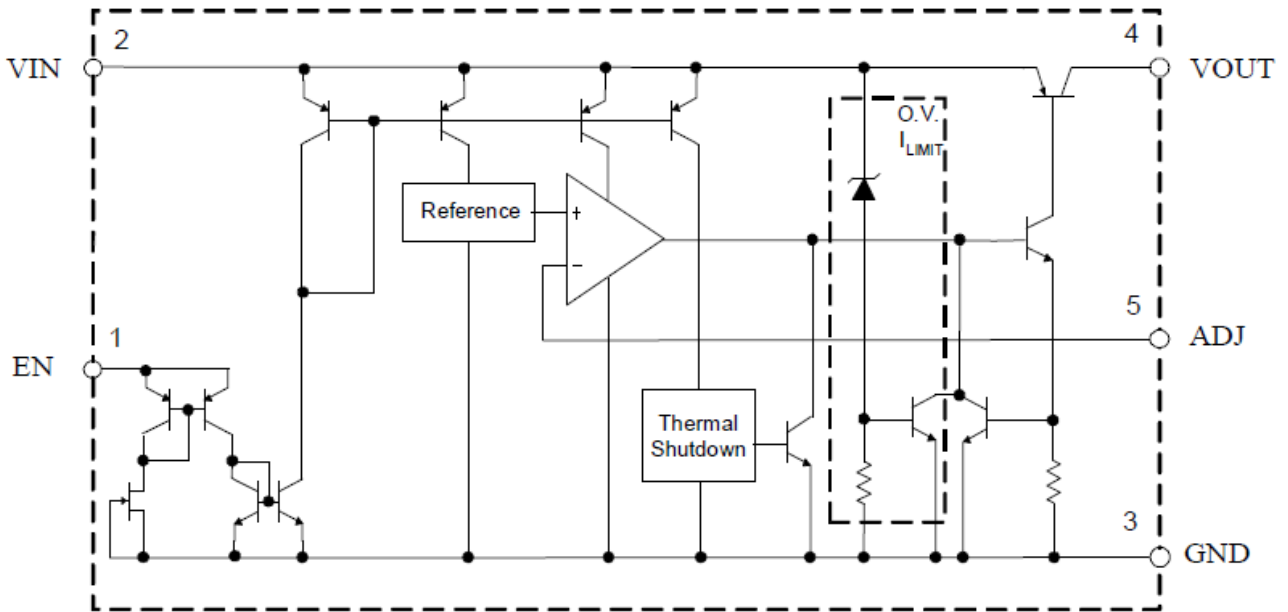
Pin Number	Pin Name	Function
1	EN	Enable: TTL/CMOS compatible input. Logic high=enable; Logic low or open=shutdown
2	VIN	Unregulated input
3	GND	Ground pin. This pin and TAB are internally connected
4	VOUT	Regulated output
5	NC/ADJ	No Connection / Adjustable Output

## Functional Block Diagram



Fixed Version

**Functional Block Diagram (Cont.)**



Adjustable Version

**Absolute Maximum Ratings (Note 1)**

Symbol	Parameter	Rating	Unit
V <sub>IN</sub>	Input Voltage	15	V
V <sub>EN</sub>	Enable Voltage	15	V
T <sub>J</sub>	Operating Junction Temperature	+150	°C
T <sub>STG</sub>	Storage Temperature Range	-65 to +150	°C
T <sub>LEAD</sub>	Lead Temperature (Soldering, 10sec)	+260	°C
ESD	ESD (Human Body Model)	5000	V
ESD	ESD (Machine Model)	450	V
θ <sub>JA</sub>	Thermal Resistance	100	°C/W

Note: 1. Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

**Recommended Operating Conditions**

Symbol	Parameter	Min	Max	Unit
V <sub>IN</sub>	Input Voltage	—	13.5	V
V <sub>EN</sub>	Enable Voltage	—	13.5	V
T <sub>J</sub>	Operating Junction Temperature	-40	+125	°C

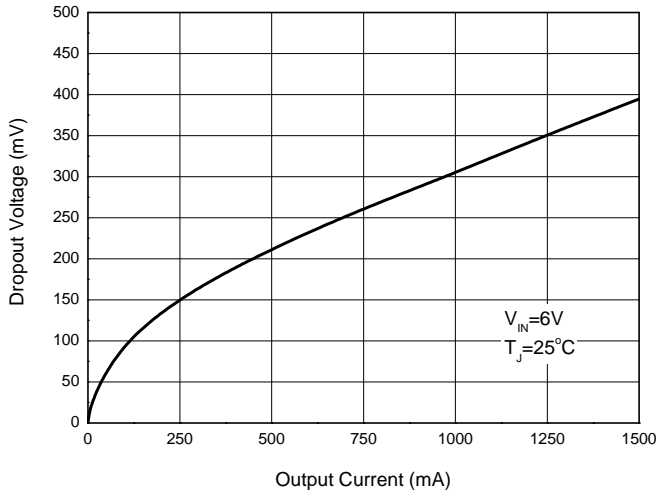
**Electrical Characteristics** (Operating Conditions:  $V_{IN} = V_{OUT} + 1V$ ,  $I_{OUT} = 10mA$ ,  $C_{IN} = 10\mu F$ ,  $C_{OUT} = 10\mu F$ ,  $T_J = +25^\circ C$ , unless otherwise specified. The **Boldface** applies over  $-40^\circ C \leq T_J \leq +125^\circ C$ .)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$V_{OUT}$	Output Voltage	—	-1	—	1	%	
		$10mA \leq I_{OUT} \leq 1.5A$ , $V_{OUT} + 1V \leq V_{IN} \leq 13.5V$	<b>-2</b>	—	<b>2</b>		
$V_{RLINE}$	Line Regulation	$V_{OUT} + 1V \leq V_{IN} \leq 13.5V$	—	3	25	mV	
$V_{RLOAD}$	Load Regulation	$10mA \leq I_{OUT} \leq 1.5A$	—	10	50	mV	
$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient (Note 2)	—	—	<b>100</b>	<b>500</b>	$\mu V/^\circ C$	
$(\Delta V_{OUT}/V_{OUT})\Delta T$		—	—	<b>20</b>	<b>100</b>	ppm/ $^\circ C$	
$V_{DROP}$	Dropout Voltage (Note 3)	$\Delta V_{OUT} = 1\%$	$I_{OUT} = 100mA$	—	80	<b>200</b>	mV
			$I_{OUT} = 750mA$	—	260	—	mV
			$I_{OUT} = 1.5A$	—	375	<b>700</b>	mV
$I_{GND}$	Ground Current	$I_{OUT} = 750mA$	—	5	<b>10</b>	mA	
		$I_{OUT} = 1.5A$	—	17	<b>34</b>	mA	
$I_{STD}$	Standby Current	$V_{IN} = 13.5V$ , $V_{EN} = 0V$	—	130	<b>220</b>	$\mu A$	
$I_{GND(DO)}$	Dropout Ground Pin Current	$V_{IN} \leq V_{OUT(NOMINAL)} - 0.5V$	—	5	—	mA	
$I_{SHORT}$	Short Circuit Current	$V_{OUT} = 0V$	—	2.8	—	A	
—	Output Noise Voltage (rms)	10Hz to 100kHz, $I_{OUT} = 100mA$	—	200	—	$\mu V$	
$I_{LOAD(MIN)}$	Minimum Load Current	—	—	—	5	mA	
PSRR	Power Supply Ripple Rejection	$f = 120Hz$ , $I_{OUT} = 750mA$	49	65	—	dB	
<b>Enable Input</b>							
$V_{EN}$	Enable Voltage	Logic low (off)	—	—	<b>0.8</b>	V	
		Logic high (on)	<b>2.25</b>	—	—		
$I_{EN}$	Enable Current	$V_{EN} = V_{IN}$	—	15	<b>35</b>	$\mu A$	
		$V_{EN} = 0.8V$	—	—	<b>4</b>		
$I_{OUT(SHDN)}$	Shutdown Output Current	$V_{EN} \leq 0.8V$ , $V_{IN} \leq 8V$ , $V_{OUT} = 0V$	—	5	<b>10</b>	$\mu A$	

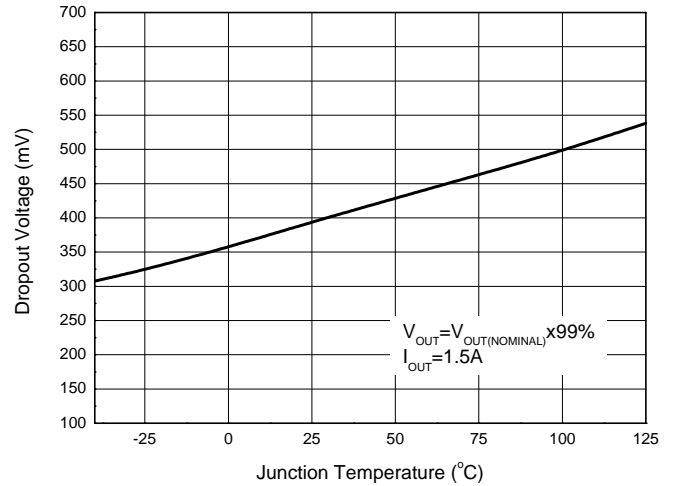
- Notes:
- Output voltage temperature coefficient is defined as the worst case voltage change divided by the total temperature range.
  - Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value which is measured at  $V_{OUT} + 1V$  applied to  $V_{IN}$ .

**Performance Characteristics**

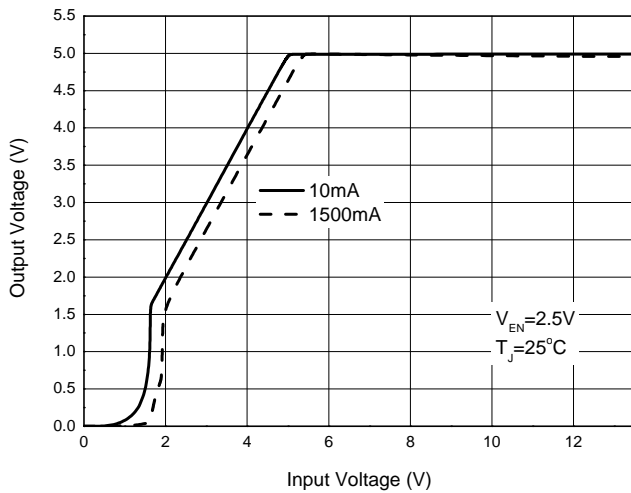
**Dropout Voltage vs. Output Current**



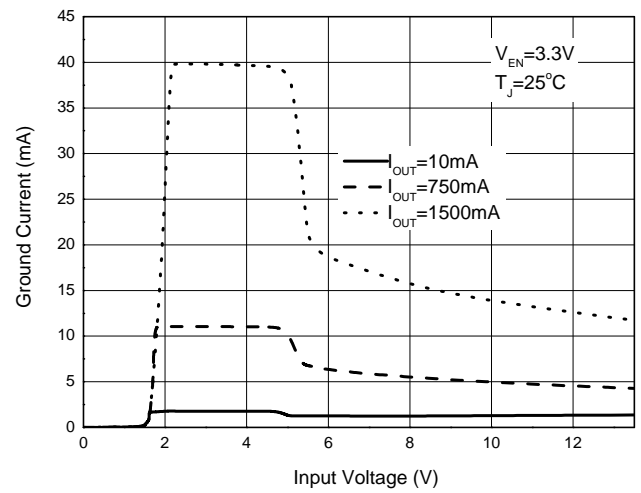
**Dropout Voltage vs. Junction Temperature**



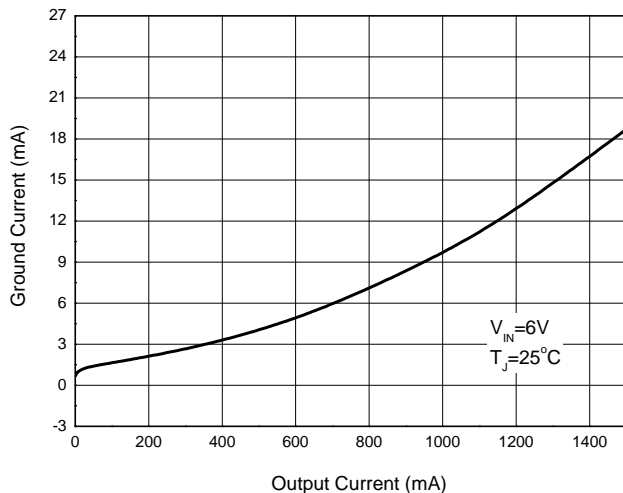
**Output Voltage vs. Input Voltage**



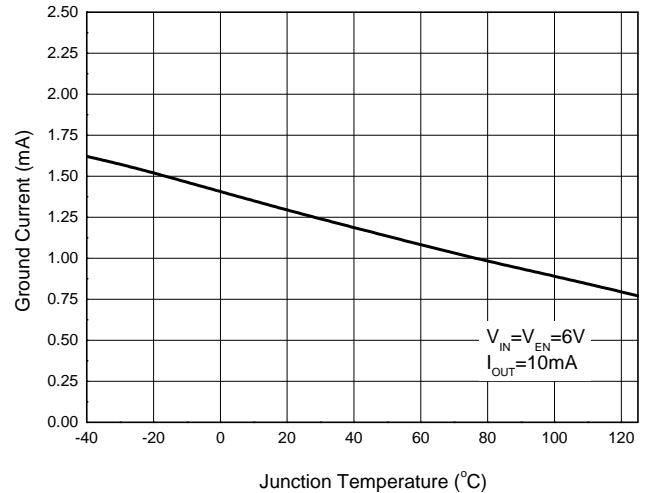
**Ground Current vs. Input Voltage**



**Ground Current vs. Output Current**

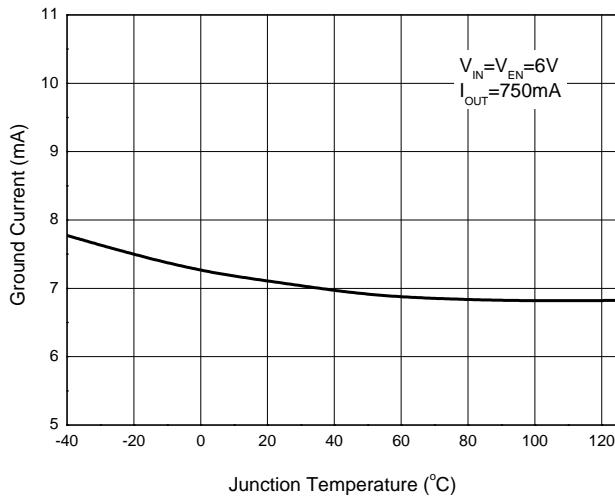


**Ground Current vs. Junction Temperature**

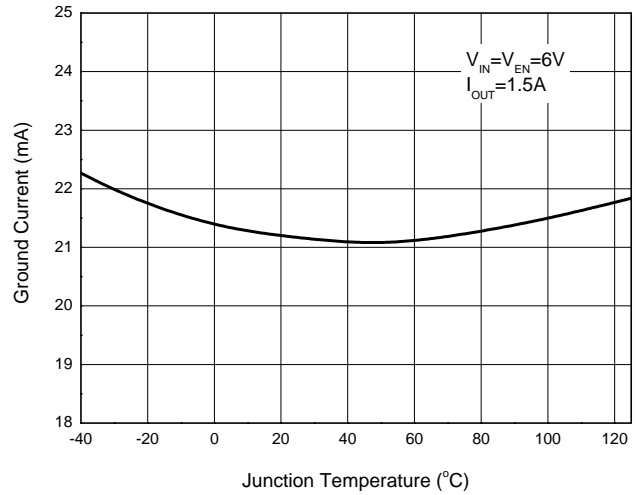


**Performance Characteristics (Cont.)**

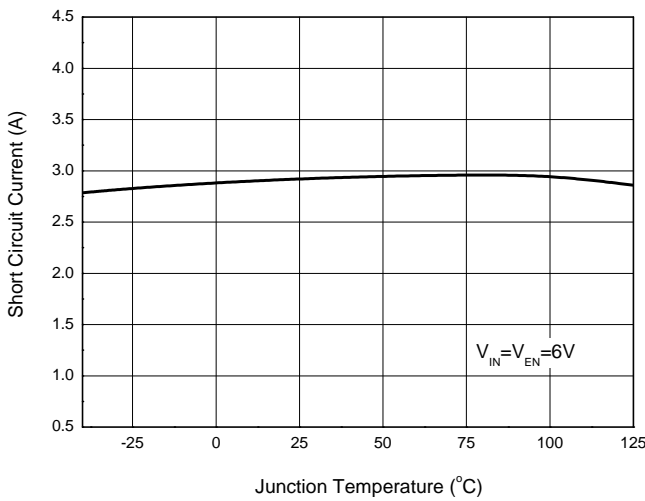
**Ground Current vs. Junction Temperature**



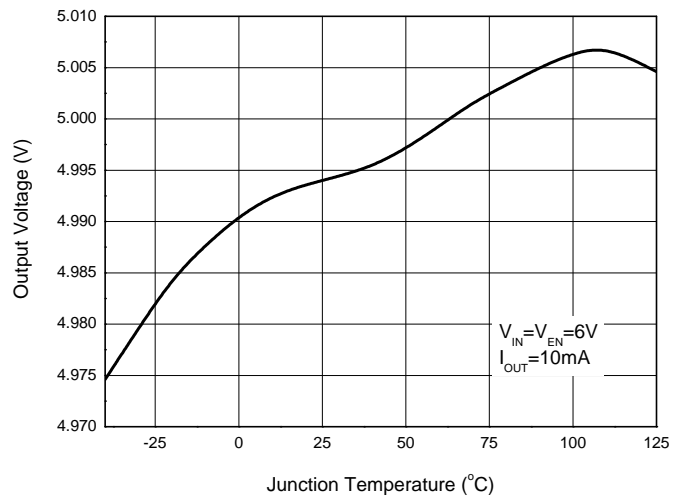
**Ground Current vs. Junction Temperature**



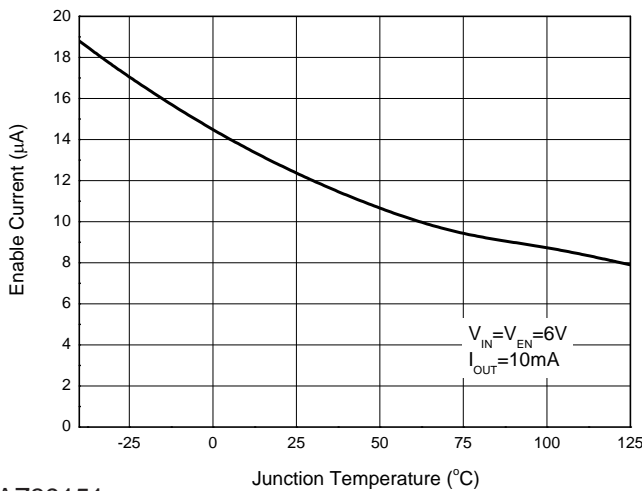
**Short Circuit Current vs. Junction Temperature**



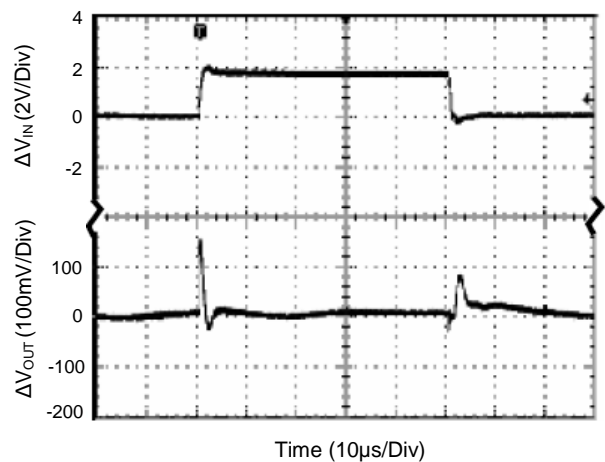
**Output Voltage vs. Junction Temperature**



**Enable Current vs. Junction Temperature**

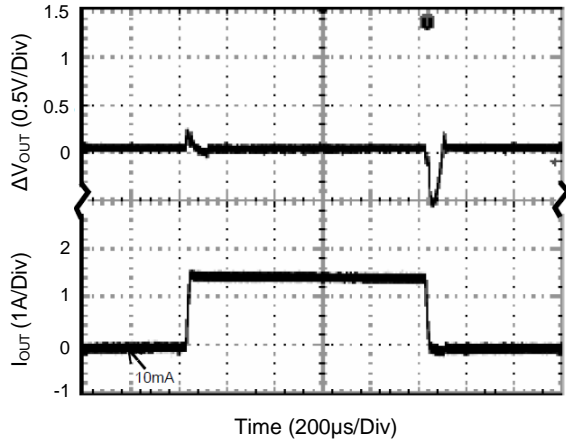


**Line Transient**  
(Conditions:  $V_{IN} = 5$  to  $7V$ ,  $I_{OUT} = 1.5A$ ,  $C_{OUT} = 10\mu F$ )

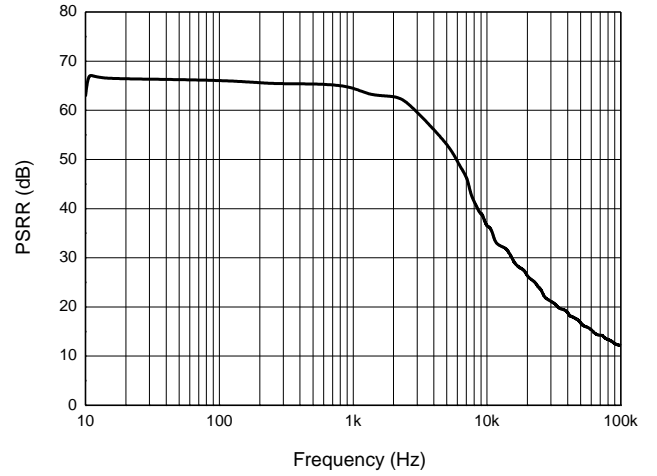


**Performance Characteristics (Cont.)**

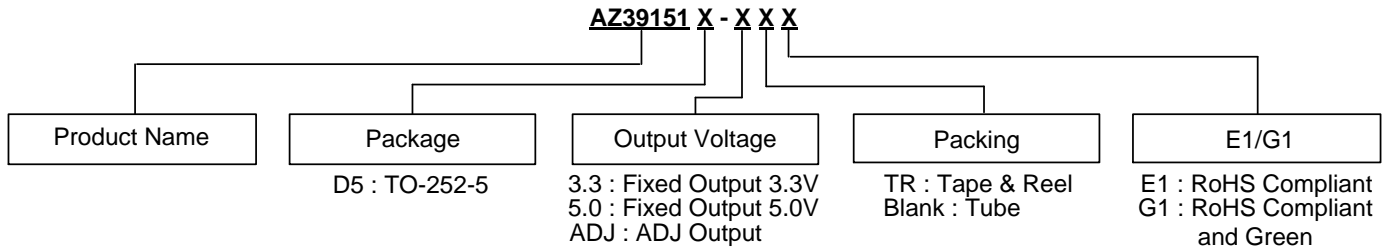
**Load Transient**  
(Conditions:  $V_{IN} = 6V$ ,  $I_{OUT} = 10mA$  to  $1.5A$ ,  
 $C_{IN} = C_{OUT} = 10\mu F$ )



**PSRR vs. Frequency**  
(Conditions:  $V_{IN} = 6V$ ,  $I_{OUT} = 10mA$ ,  
 $C_{IN} = C_{OUT} = 10\mu F$ )



**Ordering Information**

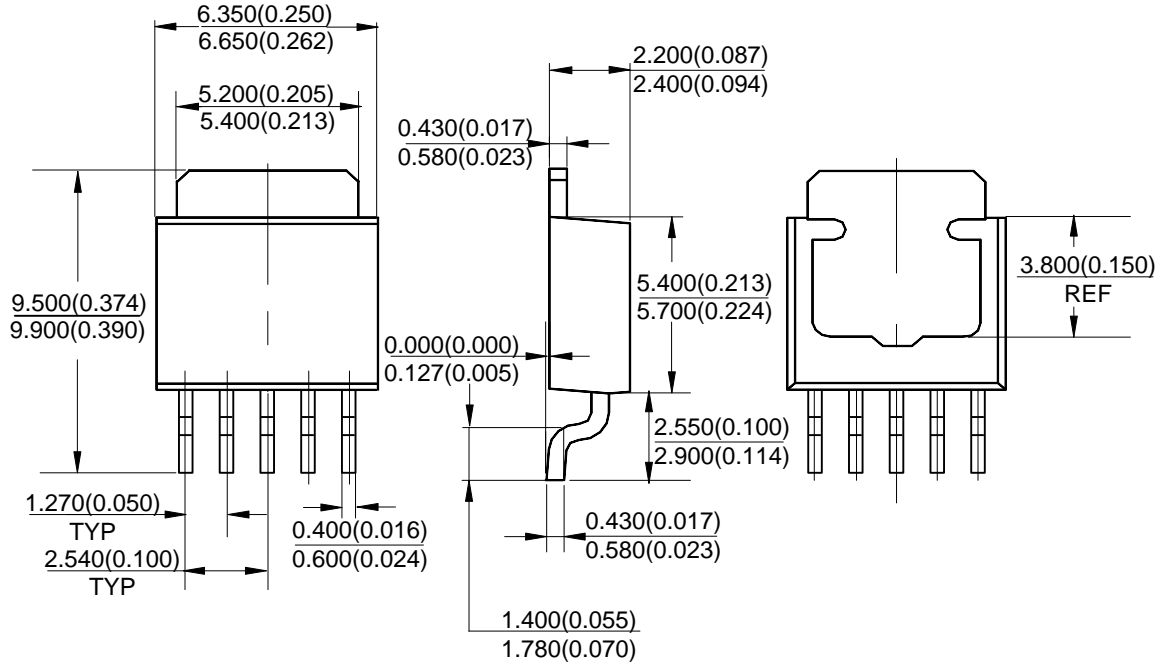


Package	Temperature Range	Part Number		Marking ID		Packing
		RoHS Compliant	RoHS Compliant and Green	RoHS Compliant	RoHS Compliant and Green	
TO-252-5	-40 to +125°C	AZ39151D5-3.3E1	AZ39151D5-3.3G1	AZ39151D5-3.3E1	AZ39151D5-3.3G1	Tube
		AZ39151D5-3.3TRE1	AZ39151D5-3.3TRG1	AZ39151D5-3.3E1	AZ39151D5-3.3G1	Tape & Reel
		AZ39151D5-5.0E1	AZ39151D5-5.0G1	AZ39151D5-5.0E1	AZ39151D5-5.0G1	Tube
		AZ39151D5-5.0TRE1	AZ39151D5-5.0TRG1	AZ39151D5-5.0E1	AZ39151D5-5.0G1	Tape & Reel
		AZ39151D5-ADJE1	AZ39151D5-ADJG1	AZ39151D5-ADJE1	AZ39151D5-ADJG1	Tube
		AZ39151D5-ADJTRE1	AZ39151D5-ADJTRG1	AZ39151D5-ADJE1	AZ39151D5-ADJG1	Tape & Reel



**Package Outline Dimensions** (All dimensions in mm(inch).)

(1) Package Type: TO-252-5



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