General Description

78LxxU is three-terminal positive regulators.One of these regulators can deliver up to 150mA of output current.The internal limiting and thermal-shutdown features of the tegulator make them essentially immune to overload.When used as a replacement for a zener diode-resistor Combination,an effective improvement in output impedance can be obtained,together with lower quiescent current.

Features

- Output Current of 150mA
- Thermal Overload Protection
- Short Circuit Protection
- Output transistor safe area protection
- No external components
- Package:SOT-89
- Output Voltage Accuracy: tolerance ±5%

Pin Configuration And Descriptions

SOT-89

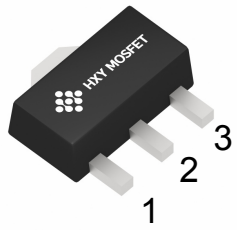


Table1:78LxxU series (SOT-89 PKG)

PIN NO.	PIN NAME	FUNCTION
1	VOUT	Output voltage pin
2	GND	GND pin
3	VIN	Input voltage pin

Order Information

Orderable Device	Package	Output Voltage	Packing Option
78LxxU	SOT-89	3.3V 5.0V 6.0V 8.0V 9.0V 12V 15V 18V 24V	1000/Reel

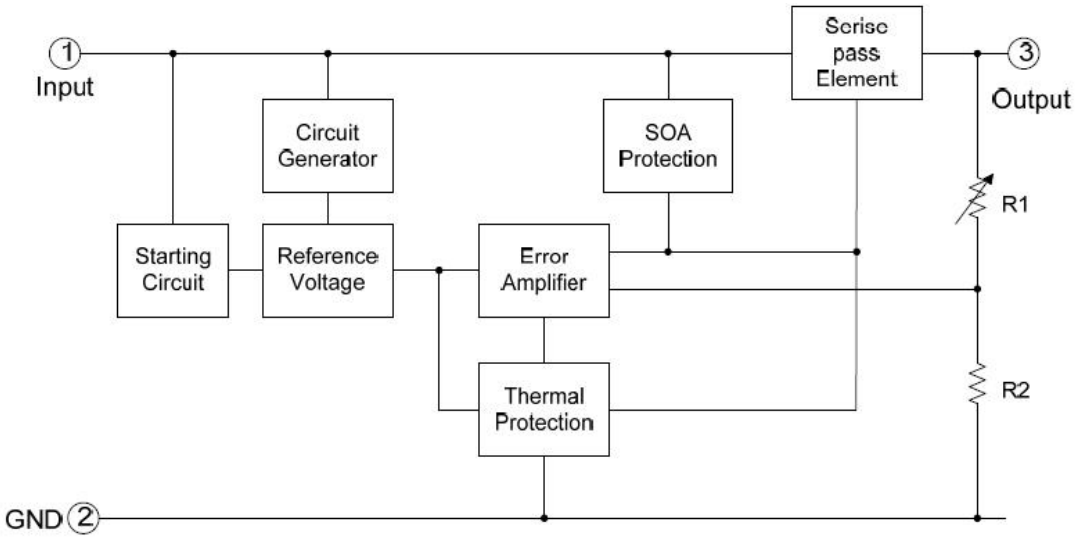
xx:33,05,06,08,09,12,15,18,24

Absolute Maximum Ratings

Description	Symbol	Value Range	Unit
Input supply voltage	V_{IN} MAX	30	V
MAX. Output current	L_{OUT}	150	mA
MAX Power	P_{max}	0.5	W
Junction temperature	T_j	-55～+150	°C
Operation temperature	T_{opr}	-40～+125	°C
Storage temperature	T_{str}	-55～+155	°C
Soldering temperature and time		+260	°C
ESD Rating, (HBM)	ESD	2	KV

Note: The absolute maximum ratings are rated values exceeding which the product could suffer physical damage. These values must therefore not be exceeded under any conditions.

Block Diagram



DC Characteristics (unless otherwise noted T_A= 25°C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	Vout	Io=40mA, VIN=10V	0.964vout	vout	1.036vout	V
		Io=1mA~40mA VIN=7V~18V	0.96vout	vout	1.04vout	
		Io=1mA~10mA VIN=10V	0.95vout	vout	1.05vout	
Line Regulation	LNR	VIN=7V~18V, Io=20mA	-150	-	150	mV
		VIN=8V~18V, Io=20mA	-100	-	100	
Load Regulation	LDR	VIN=10V, Io=1mA~100mA	-100	-	100	mV
		VIN=10V, Io=1mA~40mA	-30	-	30	
Dropout Voltage	V_{DIF}	Ta=25℃，Io=100mA	-	2	-	V
Output noise Voltage	V_N	F=10Hz to 100KHz	-	40	-	uV/Vo
Ripple Rejection	PSRR	Ta=25℃，f=120Hz, Io=40mA, VIN=8V~20V	-	80	-	dB
Quiescent Current	I_Q	VIN=10V, IOUT=40mA	-	-	5.5	mA
Quiescent Current Change	$\triangle I_Q$	VIN=8V~18V, I_O=20mA	-1.5	-	1.5	mA
		VIN=10V, IOUT=1mA~40mA,	-0.1	-	0.1	

LNR: Line Regulation. The change in output voltage for a change in the input voltage. The measurement is made under conditions of low dissipation or by using pulse techniques such that the average chip temperature is not significantly affected.

LDR: Load Regulation. The change in output voltage for a change in load current at constant chip temperature.

Application Circuit

Basic Circuits

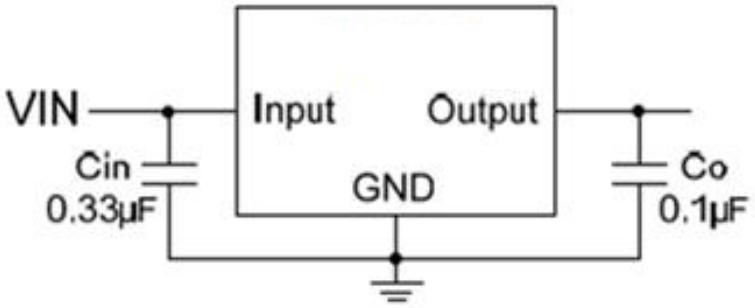


Fig.1 Typical Application

A common ground is required between the input and the output voltages. The input voltage must remain typically 2.0 V above the output voltage even during the low point on the input ripple voltage.

Cin is required if regulator is located an appreciable distance from power supply filter.

Co is not needed for stability; however, it does improve transient response.

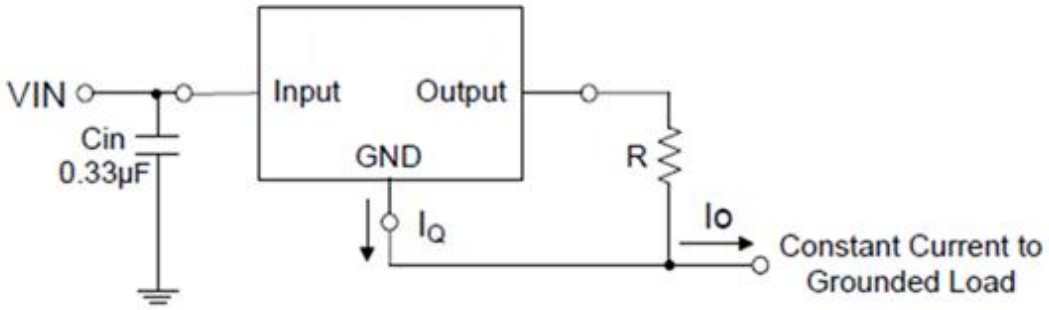


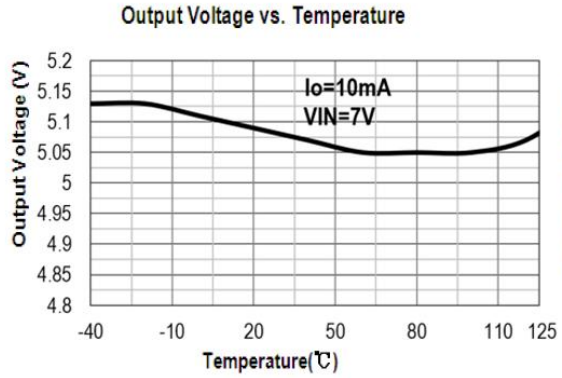
Fig.2 Constant Current Regulator

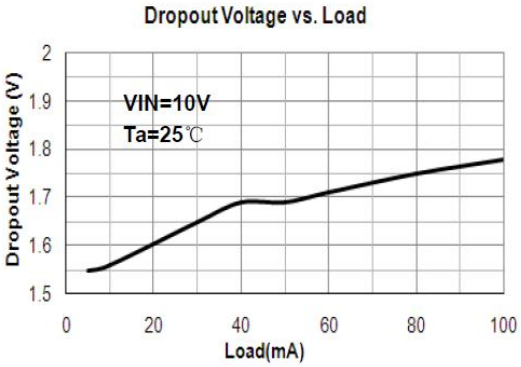
Function Description

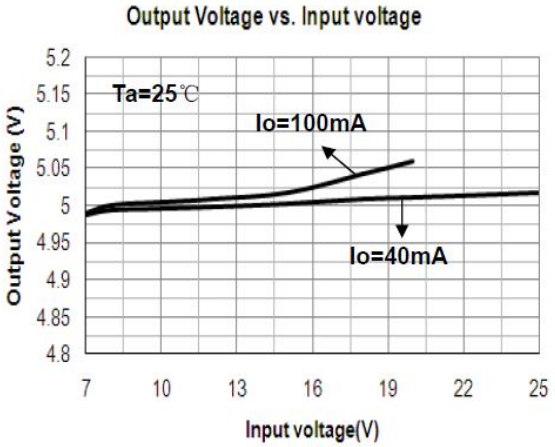
78LxxU is designed with Thermal Overload Protection that shuts down the circuit when subjected to an excessive power overload condition, and Output Transistor Safe-Area Compensation that reduces the output short circuit current as the voltage across the pass transistor is increased.

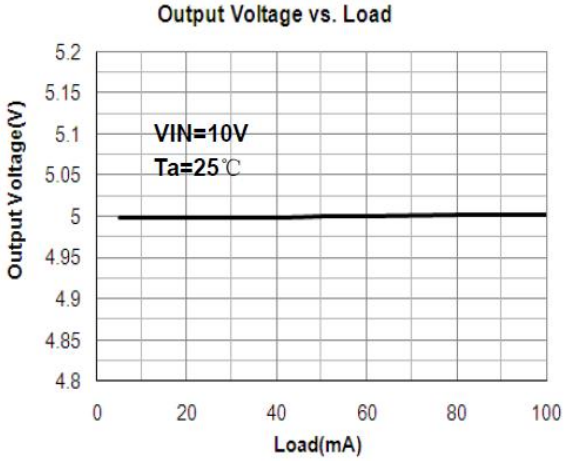
In many low current applications, compensation capacitors are not reguired. However, it is recommended that the regulator input be bypassed with a capacitor ifthe regulator is connected to the power supply filter with long wire lengths, or if the output load capacitance is large. An input bypass capacitor should be selected to provide good high frequency characteristics to insure stable operation under all load conditions. A 0.33 uFor larger tantalum, mylar, or other capacitor having low internal impedance at highfreguencies should be chosen.The bypass capacitor should be mounted with the shortest possible leadsdirectly acros s the regulator's input terminals. Normally good construction technigues should be used tominimize ground loops and lead resistance drops since the regulator has no external sense lead.

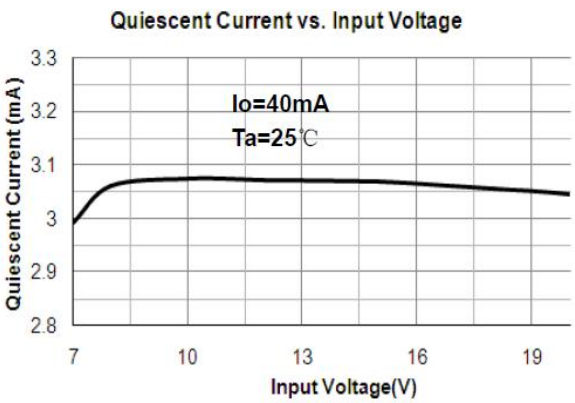
Typical Characteristics

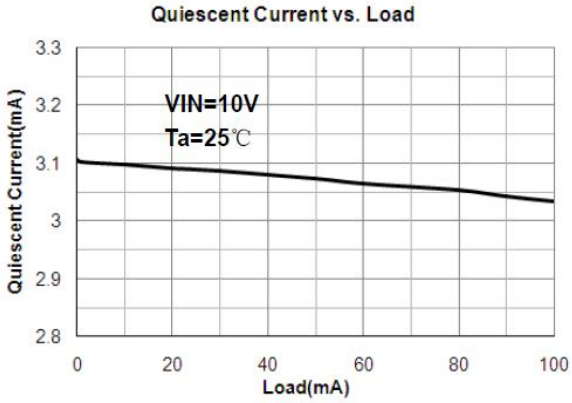






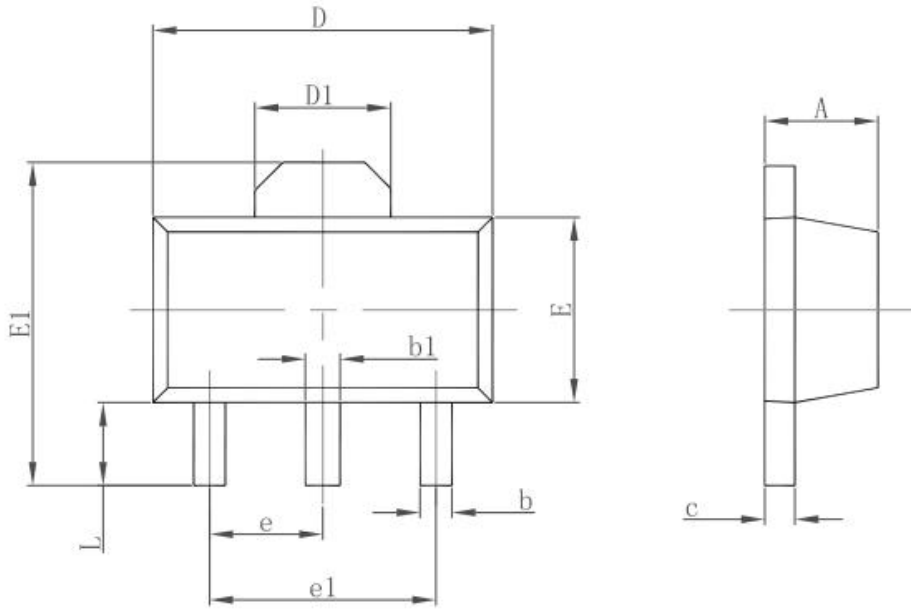






Package Outline Dimensions

SOT-89



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

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