

30V 100mA Low DropOut Voltage Regulator

Description

The FLD78L05 three terminal positive regulators is available with 5V fixed output voltage, making it useful in a wide range of applications. Used as a Zener-diode and resistor combination replacement, the FLD78L05 usually provides an effective output impedance improvement of two orders of magnitude and lower quiescent current. These regulators can provide local, on-card regulation, eliminating distribution problems associated with single-point regulation. The available voltages allow the FLD78L05 to be used in logic systems, instrumentation, HiFi, and other solid-state electronic equipment.

The FLD78L05 is available in the plastic TO-92 package, SOT89-3 package, SOT23-3 package, and SOP8 package. With adequate heat sinking, the regulator can deliver 100 mA output current. Current limiting is included to limit the peak output current to a safe value. Safe area protection for the output transistors is provided to limit internal power dissipation. If internal power dissipation is too high for the heat sinking provided, the thermal shutdown circuit prevents the IC from overheating.

Features

- V_{IN} Range up to 30V
- Output Voltage Tolerances of $\pm 5\%$ Over the temperature Range
- Output Current of 100mA
- Output Transistor Safe Area Protection
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limit
- Available in TO-92, SOT-893, SOT23-3, SOP8 Low Profile Packages

APPLICATIONS

- Battery Chargers
- Portable Instrumentation
- LED Lighting
- Low Wattage Power Supplies

TYPICAL APPLICATION

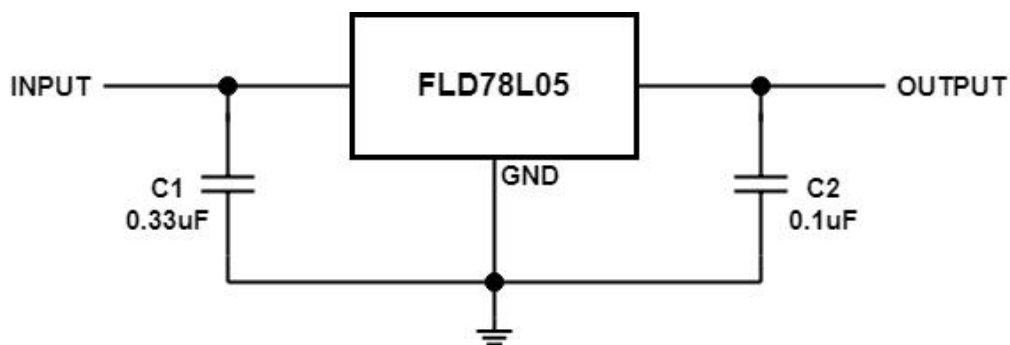


Figure 1. Typical Application for FLD78L05

PIN CONFIGURATION

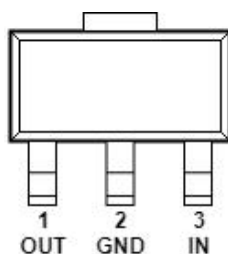


Figure 2 Pin Assignment of FLD78L05
Package SOT89-3

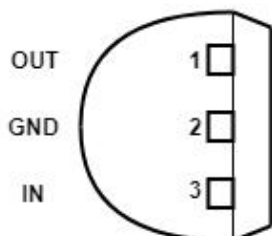


Figure 3. Pin Assignment of FLD78L05
Package TO92

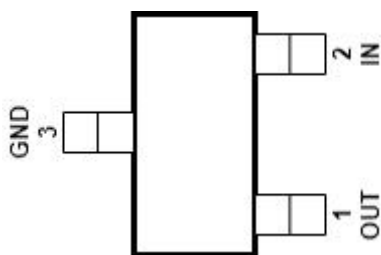


Figure 3. Pin Assignment of FLD78L05
Package SOT23-3

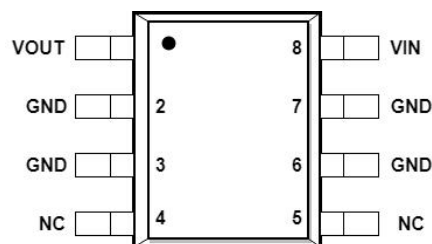


Figure 5. Pin Assignment of FLD78L05
Package SOP8

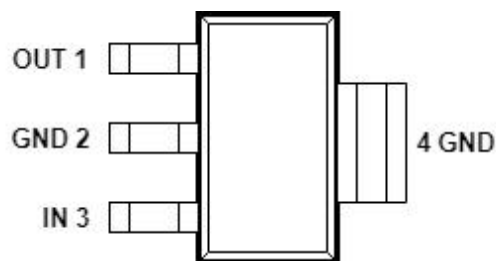


Figure 5. Pin Assignment of FLD78L05
Package SOT223

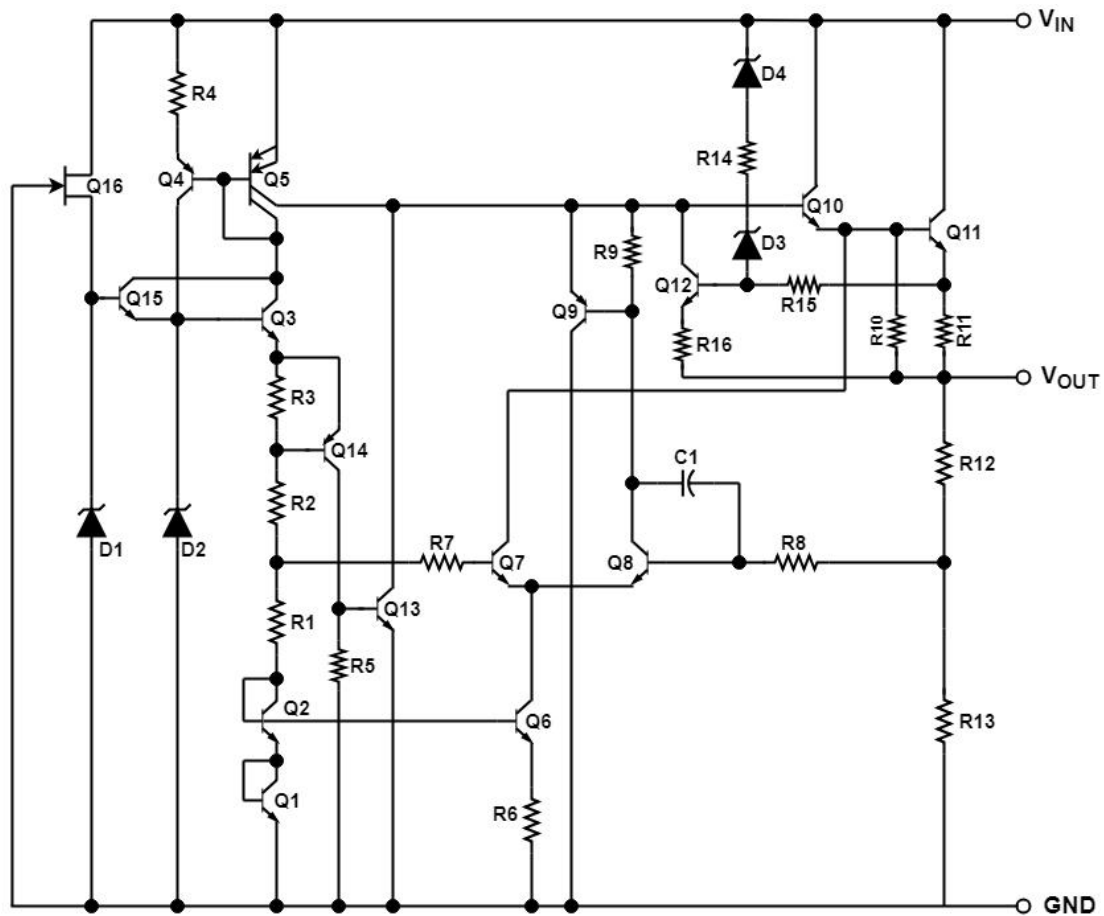
Absolute Maximum Ratings

- VIN-----0.3V to 35V
- Junction Temperature -----125°C
- Lead Temperature (Soldering, 10 sec.) -----300°C
- Storage Temperature-----65°C to 150°C

PIN DESCRIPTION

Pin Name	Pin No.TO92	Pin No.SOT89-3	Pin No.SOT23-3	Pin No.SOP8	Pin No.SOT223	Pin Function
VOUT	1	1	1	1	1	Output Voltage Pin
GND	2	2	3	2,3,6,7	2	Ground
VIN	3	3	2	8	3	Input Voltage pin

FUNCTIONAL Block Diagram



ELECTRICAL CHARACTERISTICS

$V_{IN}=10V$, $I_{OUT}=40mA$, $C_{IN}=0.33\mu F$, $C_{OUT}=0.1\mu F$, $T_J=25^{\circ}C$, unless otherwise specified

Paramter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	ΔV_{OUT}	$T_J = 25^{\circ}C$	4.8	5	5.2	V
		$V_{IN} = 7 \text{ to } 20V$, $I_{OUT} = 1mA \text{ to } 40mA$ $T_J = 0^{\circ}C \text{ to } 125^{\circ}C$	4.75		5.25	
		$I_{OUT} = 1mA \text{ to } 70mA$ $T_J = 0^{\circ}C \text{ to } 125^{\circ}C$	4.75		5.25	
Line Regulation	ΔV_{LINE}	$V_{IN} = 7 \text{ to } 20V$		12	30	mV
		$V_{IN} = 8 \text{ to } 20V$		10	25	
Load Regulation	ΔV_{LOAD}	$I_{OUT} = 1mA \text{ to } 100mA$		20	50	mV
		$I_{OUT} = 1mA \text{ to } 40mA$		10	25	
Quiescent Current	I_Q	$T_J = 25^{\circ}C$		0.3		mA
		$T_J = 125^{\circ}C$			1	mA
Quiescent Current Change	ΔI_Q	$V_{IN} = 8 \text{ to } 20V$, $T_J = 0^{\circ}C \text{ to } 125^{\circ}C$			0.2	mA
		$I_{OUT} = 1mA \text{ to } 40mA$ $T_J = 0^{\circ}C \text{ to } 125^{\circ}C$			0.1	
Ripple Rejection	PSRR	$f = 120Hz$, $V_{IN} = 8V \text{ to } 20V$ $T_J = 25^{\circ}C$	75	84		dB
Output Noise Voltage	V_N	$f = 10Hz \text{ to } 100KHz$		32		μV
Dropout Voltage	V_{DROP}			0.8		V
V_{OUT} Temp.Coefficient	$\Delta V_{OUT}/\Delta T$	$I_{OUT} = 5mA$		0.2	0.5	$mV/^{\circ}C$
Peak Output Current	I_{PK}			170		mA

TYPICAL PERFORMANCE CHARACTERISTICS

$V_{IN}=10V$, $I_{OUT}=40mA$, $C_{IN}=0.33\mu F$, $C_{OUT}=0.1\mu F$, $T_J=25^{\circ}C$, unless otherwise specified

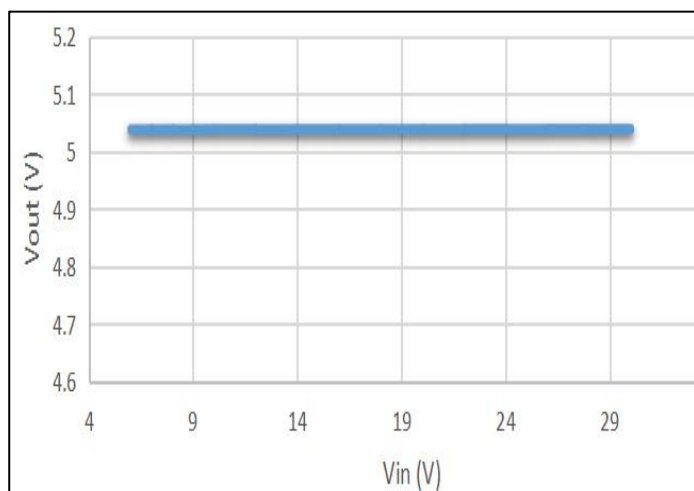


Fig 1. Output Voltage vs Input Voltage(Load=1mA)

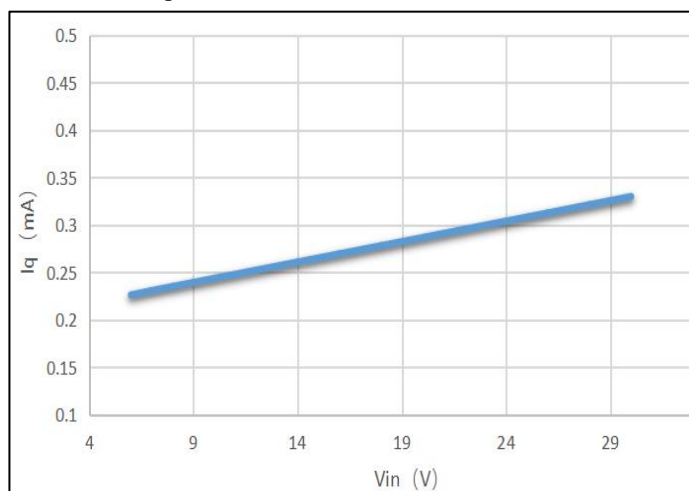


Fig 2. Quiescent Current vs Input Voltage(Load=0mA)

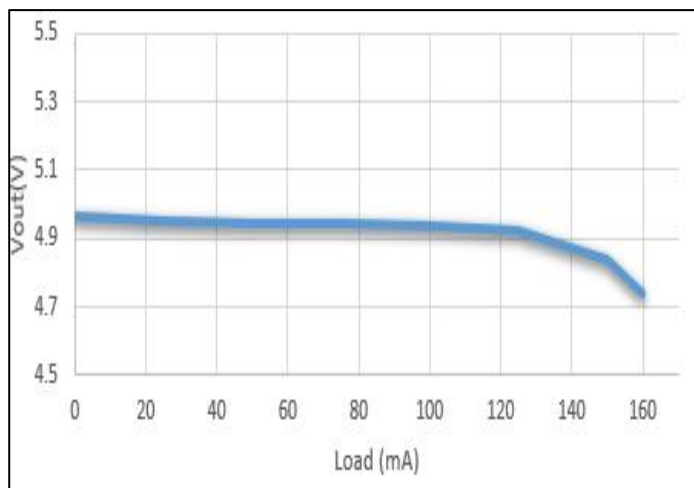


Fig 3. V_{OUT} VS Load

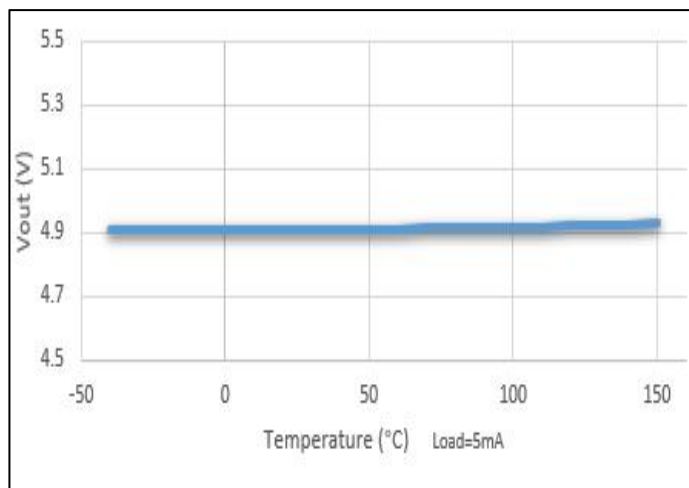


Fig 4. V_{OUT} vs Temp

Operating Waveforms

$V_{IN}=10V$, $C_{IN}=0.33\mu F$, $C_{OUT}=0.1\mu F$, $T_J=25^\circ C$, unless otherwise specified



Fig 5. V_{IN} Start up ($I_{OUT}=0mA$)

CH1: V_{OUT} , 5V/Div, DC; CH2: V_{IN} , 5V/Div, DC; TIME: 2ms/Div

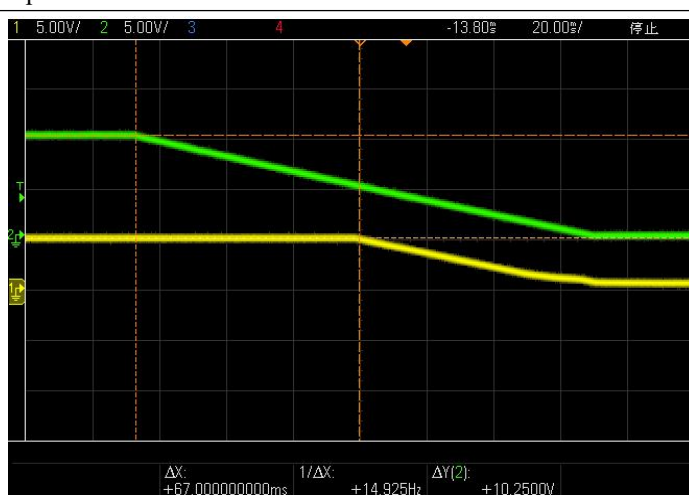


Fig 6. V_{IN} Power off ($I_{OUT}=0mA$)

CH1: V_{OUT} , 5V/Div, DC; CH2: V_{IN} , 5V/Div, DC; TIME: 20ms/Div

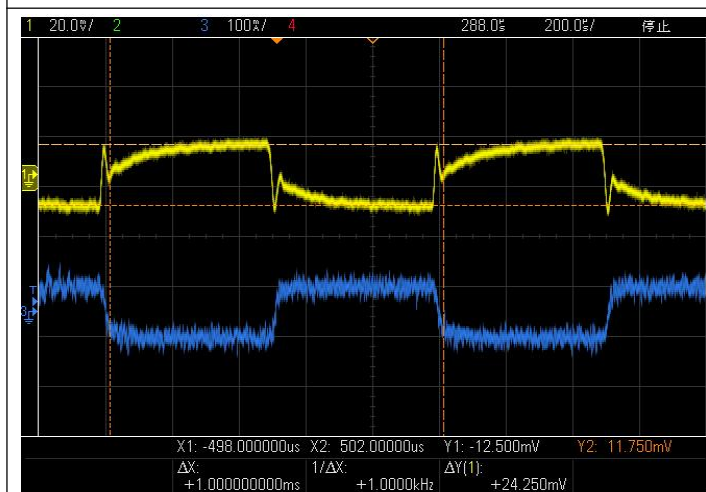
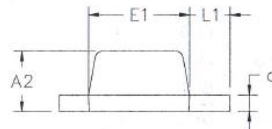
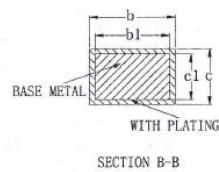
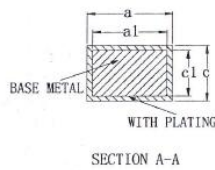
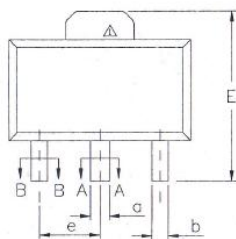
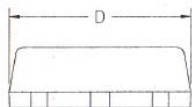
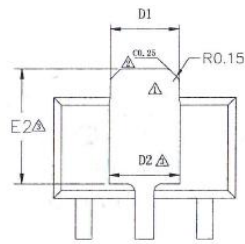


Fig5. Load Transient (0mA to 100mA)

Package Outline Dimensions(All dimensions in mm.)

Package Type: SOT89-3



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A2	1.40	1.50	1.60
b	0.38	—	0.46
b1	0.37	0.40	0.43
c	0.38	—	0.42
c1	0.37	0.38	0.39
a	0.46	—	0.56
a1	0.45	0.48	0.51
D	4.40	4.50	4.60
D1	1.62	—	1.83
E	3.95	—	4.25
E1	2.40	2.50	2.60
e	1.50BSC		
L1	0.89	—	1.20

Size (mm)	△ D2	△ E2
66.9*63	1.75REF	2.84REF

Order Information

Mode	VOUT(V)	Package	Ordering Number	Packing Option
FLD78L05-5.0	5.0	SOT23-3	FLD78L05-5.0YSOT233G/TR	Tape and Reel,3000
FLD78L05-5.0	5.0	SOP8	FLD78L05-5.0YSOP8G/TR	Tape and Reel,3000
FLD78L05-5.0	5.0	SOT89-3	FLD78L05-5.0YSOT893G/TR	Tape and Reel,1000
FLD78L05-5.0	5.0	TO92	FLD78L05-5.0YESOP8G/TR	Tape and Reel,3000

Important Notice And Disclaimer

- We reserves the right to change the instruction manual without prior notice.
- Any semiconductor product has a certain possibility of failure or malfunction under specific conditions. The buyer is responsible for complying with safety standards and taking safety measures when using our products for system design and overall manufacturing to avoid potential failure risks that may cause personal injury or property damage.
- The improvement of product quality is endless, our company will be dedicated to provide customers with better products.

Version Modification Record

Version Number	Revision
first edition	
V1.0	1. Update the Important Notice And Disclaimer on page 7.
V2.0	1. Update the Order Information on page 7.