

100V 50mA Very High Voltage Linear Regulator

Description

The FLD10005 device is a very high voltage tolerant linear regulator that offers the benefits of a thermally-enhanced package, and is able to Withstand continuous DC or transient input voltages of up to 100 V. The FLD10005 device is stable with output capacitance greater than 2.2 μ F and any input capacitance greater than 0.47 μ F. Therefore, Implementations of this device require minimal board space because of its miniaturized packaging and a potentially small output capacitor. In addition, the FLD10005 device offers an enable pin (EN) compatible with standard CMOS logic to enable a low-current shutdown mode.

The FLD10005 device has an internal thermal shutdown and current limiting to protect the system during fault conditions. The SOT23-5, ESOP8 and MSOP8 packages have an operating temperature range of $T_J = -40^{\circ}\text{C}$ to 125°C . In addition, the FLD10005 device is ideal for generating a low-voltage supply from intermediate voltage rails in telecom and industrial applications; not only can it supply a well-regulated voltage rail, but it can also withstand and maintain regulation during very high and fast voltage transients. These features translate to simpler and more cost-effective electrical surge-protection circuitry for a wide range of applications, including PoE, bias supply, and LED lighting.

Features

- VIN Range 7 to 100V
- Output Voltage Tolerances of $\pm 1.5\%$
- Output Current of 50mA
- Low Quiescent Current 23 μ A
- Quiescent Current at Shutdown 8 μ A
- Dropout Voltage 2.8V at $I_{OUT} = 50\text{ mA}$
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limit
- Adjustable Output Voltage from 1.2 to 90V

APPLICATIONS

- Microprocessors, Microcontrollers Powered by Industrial Busses With High Voltage Transients
- Industrial Automation
- Telecom Infrastructure
- Automotive
- Power over Ethernet(PoE)
- LED Lighting

TYPICAL APPLICATION

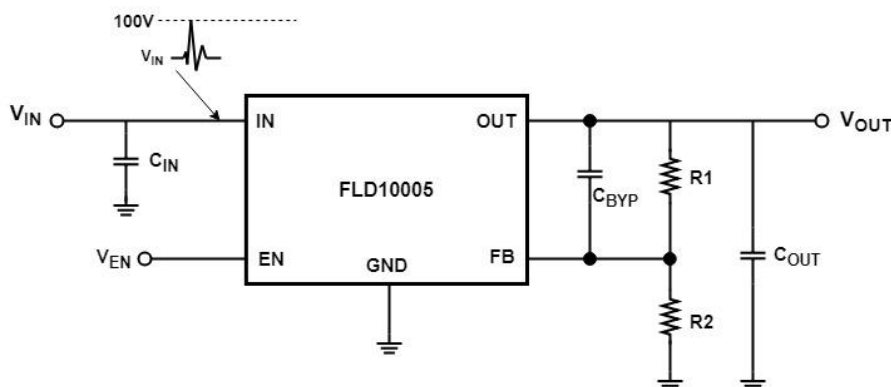


Figure 1. Typical Application for FLD10005

PIN CONFIGURATION

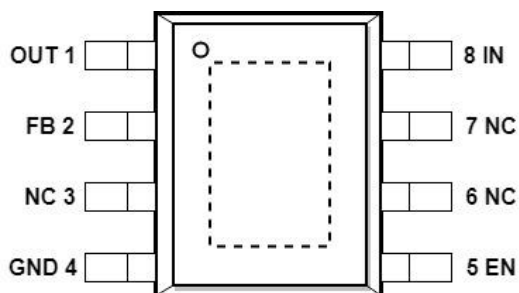


Figure 3. Pin Assignment of FLD10005
Package ESOP8

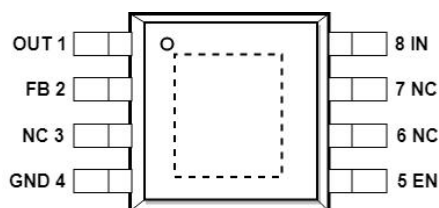


Figure 5. Pin Assignment of FLD10005
Package MSOP8

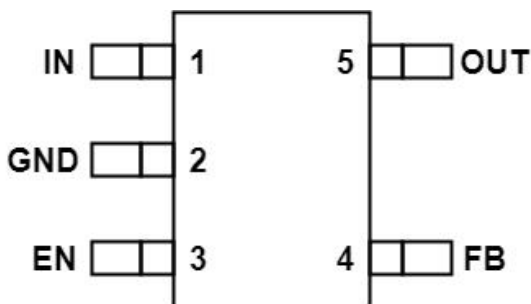


Figure 4. Pin Assignment of FLD10005
Package SOT23-5

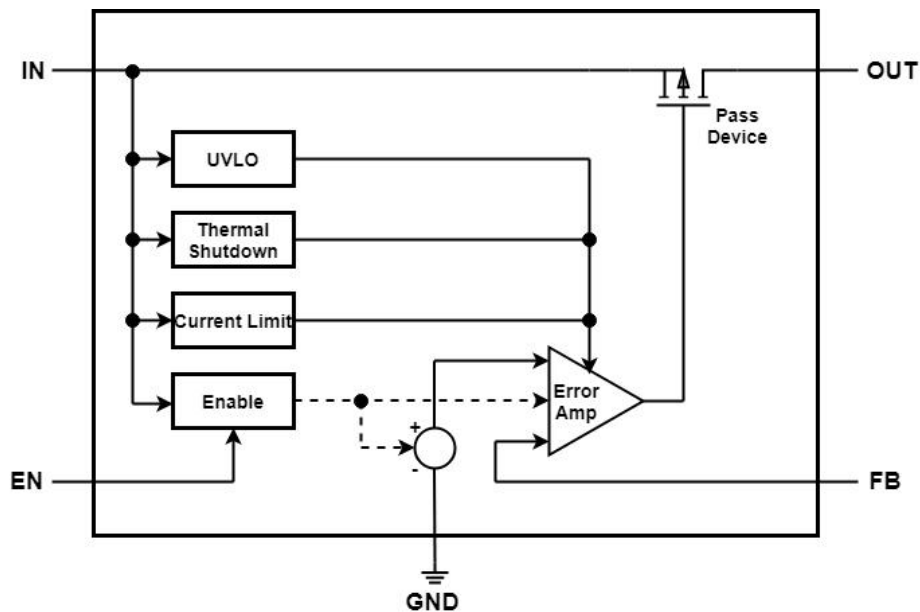
Absolute Maximum Ratings

- V_{IN} -----0.3V to 110V
- V_{OUT} -----0.3V to 110V
- FB-----0.3V to 5.5V
- EN-----0.3V to 110V
- Junction Temperature -----125°C
- Lead Temperature (Soldering, 10 sec.) -----
- 300°C
- Storage Temperature-----
- 65°C to 150°C

PIN DESCRIPTION

Pin Name	Pin No. ESOP8	Pin MSOP8	Pin No.SOT23-5	Pin Function
OUT	1	1	5	Output Voltage Pin
FB	2	2	4	Feedback
NC	3,6,7	3,6,7	-	Non Connect
GND	4,EP	4,EP	2	Ground
VIN	8	8	1	Input Voltage pin
EN	5	5	3	Enable

FUNCTIONAL Block Diagram

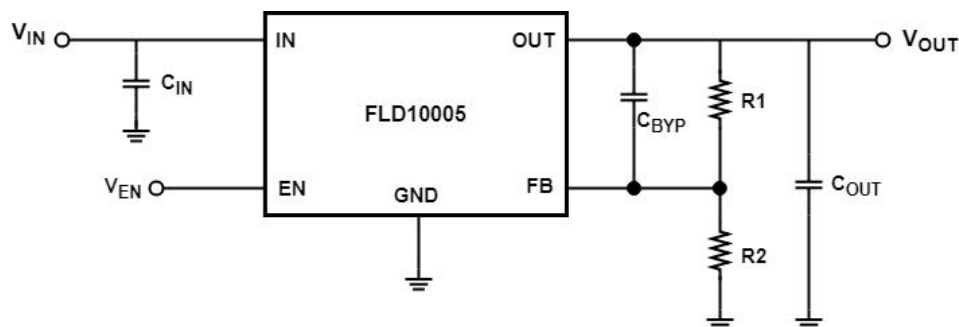


Design Parameters

Vout (V)	Cin (uF)	Cout(uF)	*Cbypass(nF)	R1 (Kohm)	R2 (Kohm)
12	10	10	10	698	49.9
5	10	10	10	262	49.9
3.5	10	10	10	156	49.9
1.8	10	10	10	62.5	49.9

*Cbypass is for Maximum AC Performance, not requested.

1. $V_{out} = 0.8V * (R1+R2) / R2$
2. $10\mu A < V_{out} / (R1+R2) < 30\mu A$



ELECTRICAL CHARACTERISTICS

$V_{IN}=V_{OUT} + 3V$ or $V_{IN}=7V$ (whichever is greater), $I_{OUT}=100\mu A$, $C_{IN}=1\mu F$, $C_{OUT}=4.7\mu F$, $T_J=25^\circ C$, unless otherwise specified

Paramter	Symbol	Conditions	Min	Typ	Max	Unit
Input Voltage	V_{IN}		7		100	V
Internal Reference	V_{REF}		0.788	0.8	0.812	V
Line Regulation	ΔV_{LINE}	$V_{IN}=7V$ to $100V$		3	20	mV
Load Regulation	ΔV_{LOAD}	$100\mu A < I_{OUT} < 50mA$		20	50	mV
Dropout Voltage	V_{DROP}	$I_{OUT}=20mA$		1000		mV
		$I_{OUT}=50mA$		2800		mV
Quiescent Current	I_Q	$I_{OUT} = 0mA$		23	40	μA
Shutdown Current	I_{SD}	$V_{EN} = 0V$		8	15	μA
Current Limit	I_{CL}	$V_{OUT} = 90\% V_{OUT(NOM)}$	55	120	200	mA
Enable high Low level	V_{ENHI}		1.0		V_{IN}	V
	V_{ENLO}		0		0.4	V
Enable Pin Current	I_{EN}			0.02	1	μA
Feedback Pin Current	I_{FB}			0.01	0.11	μA
Thermal Shutdown	T_{SD}	Shutdown, temperature increasing		160		$^\circ C$
		Reset, temperature decreasing		140		$^\circ C$

TYPICAL PERFORMANCE CHARACTERISTICS

$V_{IN}=12V$, $V_{OUT}=5V$, $I_{OUT}=1mA$, $C_{IN}=0.47\mu F$, $C_{OUT}=2.2\mu F$, $T_J=25^\circ C$, unless otherwise specified

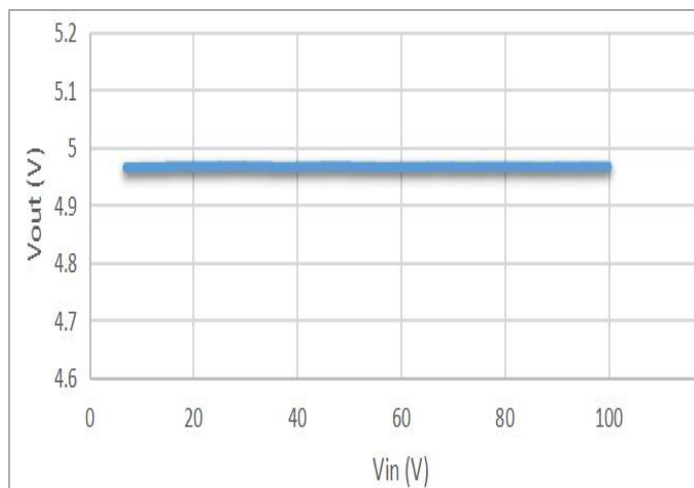


Fig1. Vout vs Vin

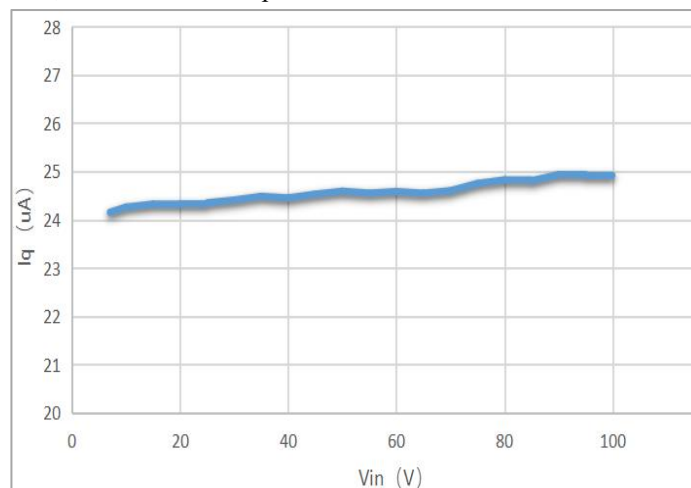


Fig2. Iq vs Vin

Operating Waveforms

$V_{IN}=12V, V_{OUT}=5V, T_A=25^{\circ}C$, unless otherwise specified

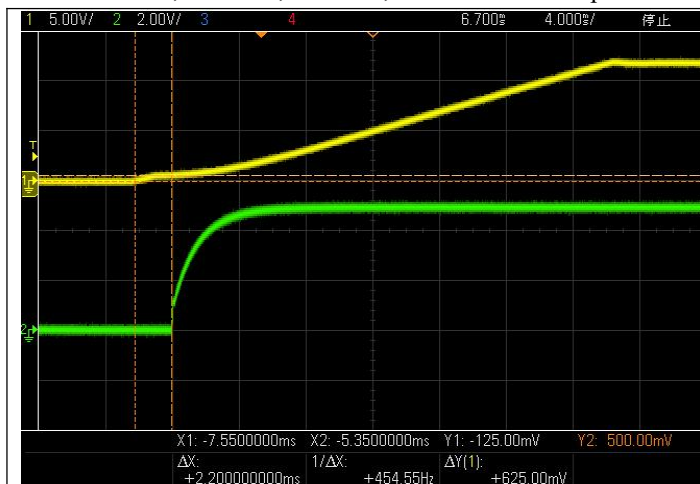


Fig 3. Enable ON



Fig 4. Enable OFF

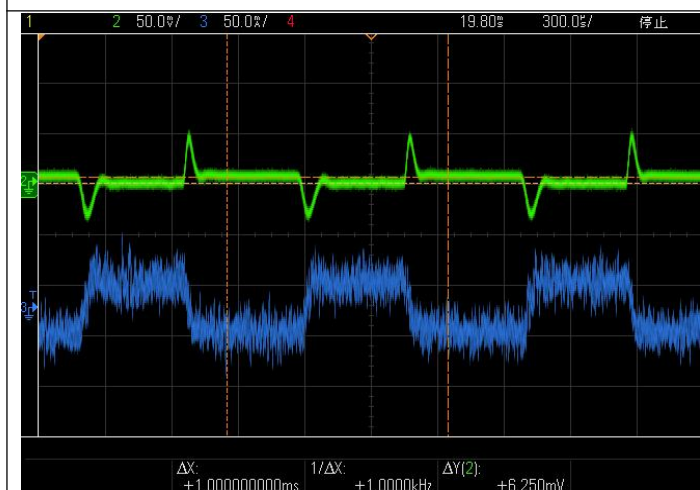
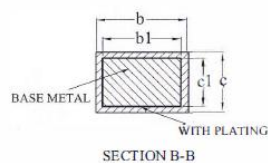
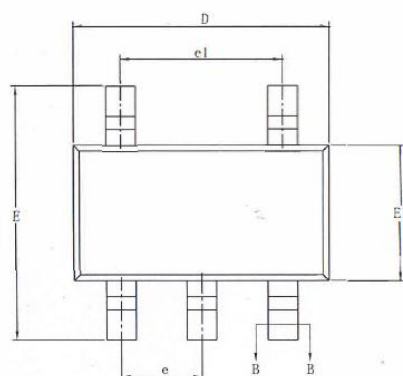
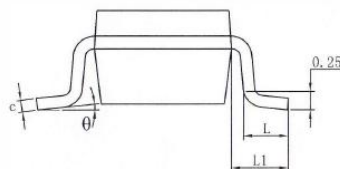
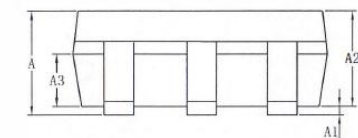


Fig 5. Load transient 0 to 50mA

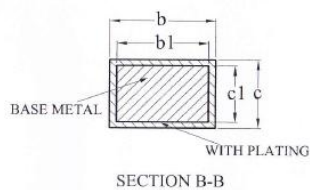
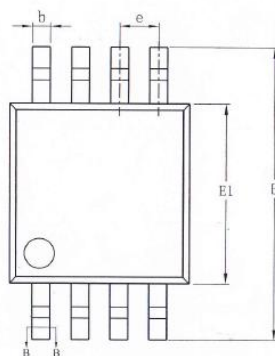
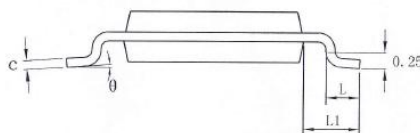
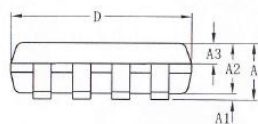
Package Outline Dimensions(All dimensions in mm.)

(1) Package Type: SOT23-5



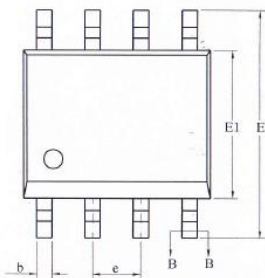
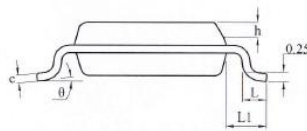
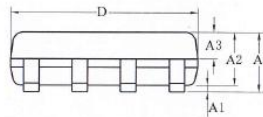
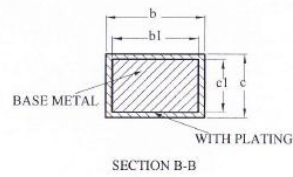
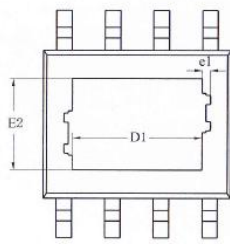
SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.25
A1	0.04	—	0.10
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.33	—	0.41
b1	0.32	0.35	0.38
c	0.15	—	0.19
c1	0.14	0.15	0.16
D	2.82	2.92	3.02
E	2.60	2.80	3.00
E1	1.50	1.60	1.70
e	0.95BSC		
e1	1.90BSC		
L	0.30	—	0.60
L1	0.60REF		
θ	0	—	8°

(2) Package Type: MSOP8



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.10
A1	0.05	—	0.15
A2	0.75	0.85	0.95
A3	0.30	0.35	0.40
b	0.28	—	0.36
b1	0.27	0.30	0.33
c	0.15	—	0.19
c1	0.14	0.15	0.16
D	2.90	3.00	3.10
E	4.70	4.90	5.10
E1	2.90	3.00	3.10
e	0.65BSC		
L	0.40	—	0.70
L1	0.95REF		
θ	0	—	8°

(3) Package Type: ESOP8



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.65
A1	0.05	—	0.15
A2	1.30	1.40	1.50
A3	0.60	0.65	0.70
b	0.39	—	0.47
b1	0.38	0.41	0.44
c	0.20	—	0.24
c1	0.19	0.20	0.21
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27BSC		
h	0.25	—	0.50
L	0.50	0.60	0.80
L1	1.05REF		
θ	0	—	8°

Size (mil) LAP size (mm)	D1	E2	c1
90*90	2.09REF	2.09REF	0.16REF
95*130	3.10REF	2.21REF	0.10REF

Order information

Mode	VOUT(V)	Package	Ordering Number	Packing Option
FLD10005	Adj	SOT23-5	FLD10005YSOT235G/TR	Tape and Reel,3000
FLD10005	Adj	MSOP8	FLD10005YMSOP8G/TR	Tape and Reel,3000
FLD10005	Adj	ESOP8	FLD10005YESOP8G/TR	Tape and Reel,3000

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- 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.