

24V 150mA Ultra low Quiescent-Current LDO

1.Description

The FLD2415 ultra-low quiescent current regulator features low dropout voltage and low current in the standby mode. With less than 1.5uA quiescent current at no load, the FLD2415 is ideally suited for standby micro-control-unit systems, especially for always-on applications like E-meters, fire alarms, smoke detectors and other battery operated systems. The FLD2415 retains all of the features that are common to low dropout regulators including a low dropout PMOS pass device, short circuit protection, and thermal shutdown.

The FLD2415 has a 24V maximum operating voltage limit, a -40°C to 125°C operating temperature range, and $\pm 2\%$ output voltage tolerance over the entire output current, input voltage, and temperature range. The FLD2415 is available in SOT23-5, SOT23-3, SOT-89-3L, surface mount packages.

2.Features

- VIN Range up to 24V
- Output Voltage Tolerances of $\pm 2\%$ Over the Temperature Range
- Output Current of 150mA
- Ultra Low Quiescent Current ($I_Q = 1.5\mu A$)
- Dropout Voltage Typically 600mV at $I_{OUT}=100mA$
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limit
- Ceramic Capacitor Stable

3.Applications

- Portable, Battery Powered Equipment
- Ultra Low Power Microcontroller
- Notebook computers

4.Order Information

Mode	VOUT(V)	Package	Ordering Number	Packing Option
FLD2415-1.5	1.5	SOT23-3	FLD2415-1.5YSOT233G/TR	Tape and Reel,3000
	1.5	SOT23-5	FLD2415-1.5YSOT235G/TR	Tape and Reel,3000
	1.5	SOT-89-3L	FLD2415-1.5YSOT893G/TR	Tape and Reel,1000
FLD2415-1.8	1.8	SOT23-3	FLD2415-1.8YSOT233G/TR	Tape and Reel,3000
	1.8	SOT23-5	FLD2415-1.8YSOT235G/TR	Tape and Reel,3000
	1.8	SOT-89-3L	FLD2415-1.8YSOT893G/TR	Tape and Reel,1000
FLD2415-2.5	2.5	SOT23-3	FLD2415-2.5YSOT233G/TR	Tape and Reel,3000
	2.5	SOT23-5	FLD2415-2.5YSOT235G/TR	Tape and Reel,3000
	2.5	SOT-89-3L	FLD2415-2.5YSOT893G/TR	Tape and Reel,1000
FLD2415-3.3	3.3	SOT23-3	FLD2415-3.3YSOT233G/TR	Tape and Reel,3000
	3.3	SOT23-5	FLD2415-3.3YSOT235G/TR	Tape and Reel,3000
	3.3	SOT-89-3L	FLD2415-3.3YSOT893G/TR	Tape and Reel,1000
FLD2415-5.0	5.0	SOT23-3	FLD2415-5.0YSOT233G/TR	Tape and Reel,3000
	5.0	SOT23-5	FLD2415-5.0YSOT235G/TR	Tape and Reel,3000
	5.0	SOT-89-3L	FLD2415-5.0YSOT893G/TR	Tape and Reel,1000

5.Typical Application

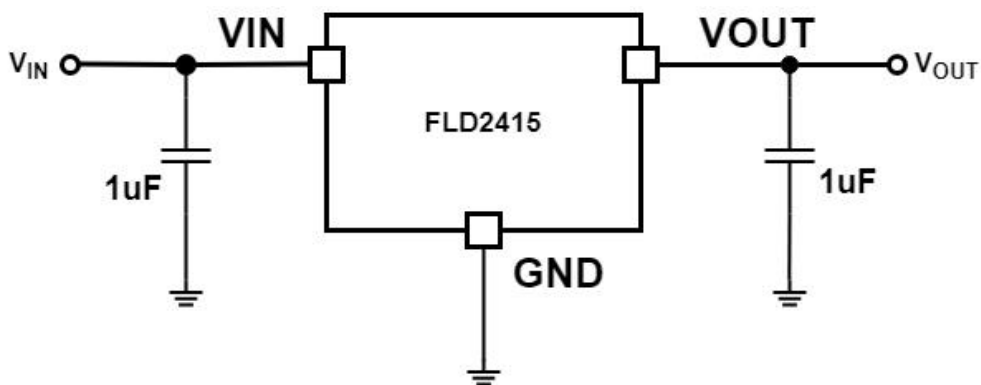
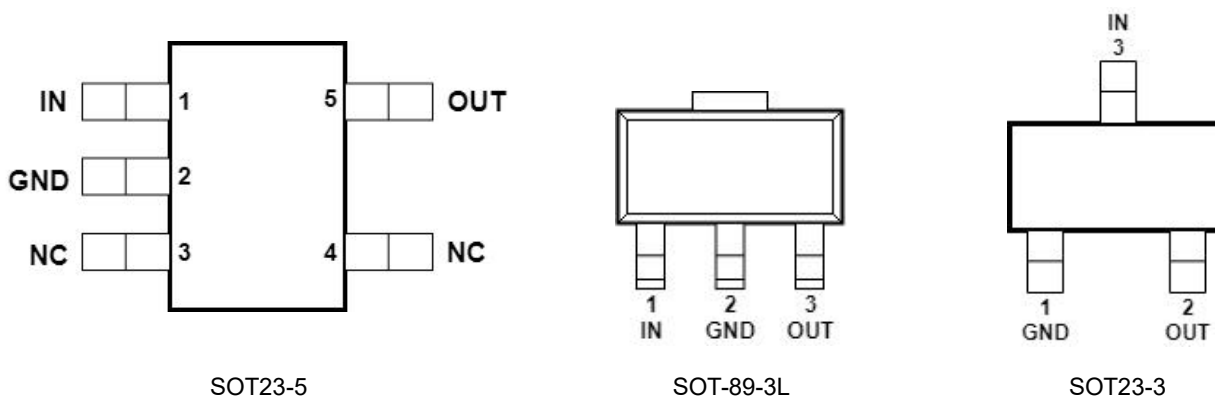


Figure 1. Typical Application for FLD2415

6. Pin Configuration



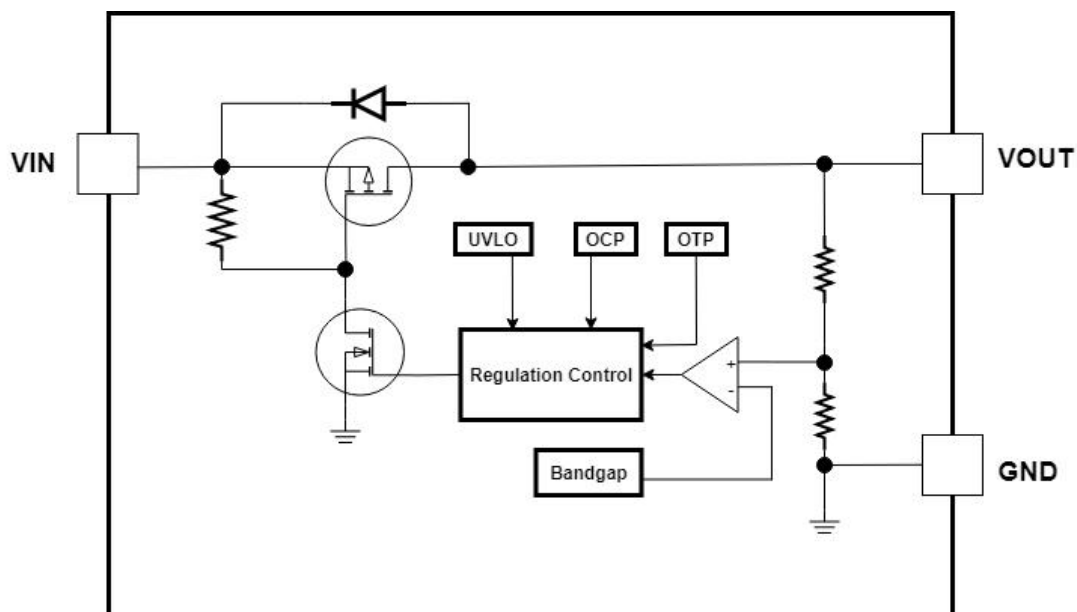
7. Pin Description

Pin Name	Pin No.SOT23-5	Pin No.SOT-89-3L	Pin No.SOT23-3	Pin Function
VOUT	5	3	2	Output Voltage Pin
GND	2	2	1	Ground
VIN	1	1	3	Input Voltage pin
NC	3,4	--	--	Non-Connection

8. Absolute Maximum Ratings

- VIN-----0.3V to +28V
- Junction Temperature -----125℃
- Lead Temperature (Soldering, 10 sec.) -----300℃
- Storage Temperature-----65℃ to 150℃

9.Functional Block Diagram



10.Electrical Characteristics

($V_{IN} = V_{OUT} + 1V$, $I_{OUT} = 1mA$, $C_{IN} = C_{OUT} = 1\mu F$, $T_J = 25^{\circ}C$, unless otherwise specified)

Paramter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	ΔV_{OUT}		-2%		2%	V
Line Regulation	ΔV_{LINE}	$V_{IN} = V_{OUT} + 2V$ to $24V$, or $V_{IN} = 5V$ to $24V$, if $V_{OUT} < 3V$		2	50	mV
Load Regulation	ΔV_{LOAD}	$I_{OUT} = 1mA$ to $150mA$		0.15	1.5	%
Dropout Voltage	V_{DROP}	$I_{OUT} = 100mA$		650		mV
		$I_{OUT} = 150mA$		1100		mV
Quiescent Current	I_Q	$I_{OUT}=0mA$		1.5	4.0	μA
Current Limit	I_{CL}		170	200		mA
Thermal Shutdown	T_{SD}			160		$^{\circ}C$
Thermal Shutdown Hy	T_{SDHY}			30		$^{\circ}C$

11. Typical Performance Characteristics

$V_{IN} = V_{OUT} + 1.5V$, $I_{OUT} = 1mA$, $V_{OUT} = 3.3V$, $C_{IN} = C_{OUT} = 1\mu F$, $T_J = 25^\circ C$, unless otherwise specified

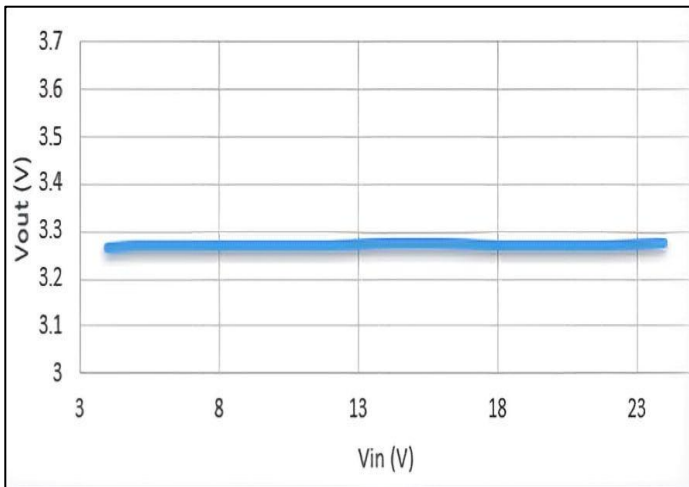


Fig 1. V_{OUT} vs V_{IN}

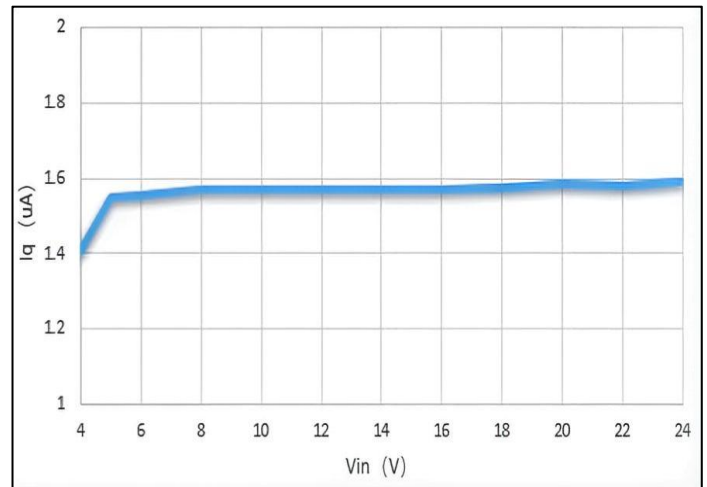


Fig 2. I_Q vs V_{IN}

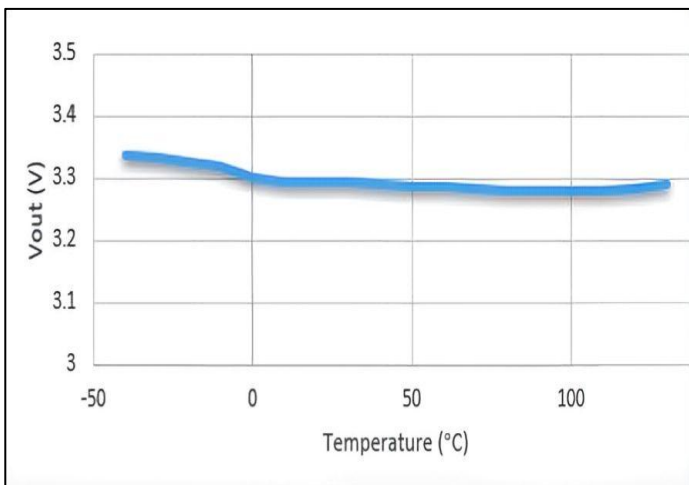


Fig 3. V_{OUT} (3.3V) vs Temperature

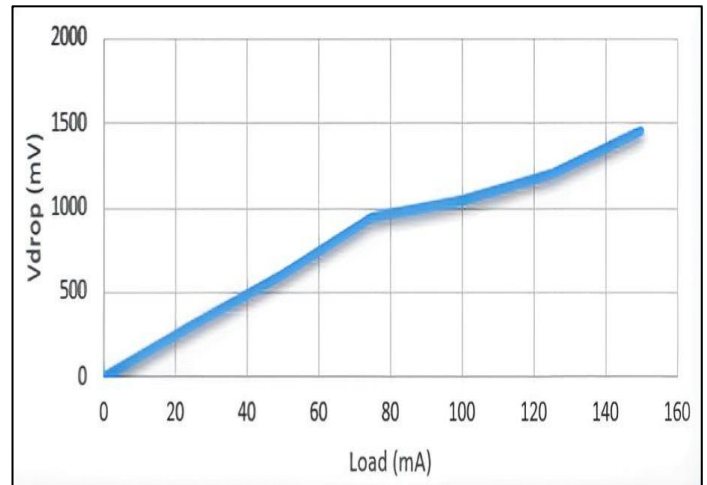


Fig 4. Dropout vs Load

12. Operating Waveforms

$V_{IN}=V_{OUT}+1.5V$, $V_{OUT}=3.3V$, $C_{IN}=C_{OUT}=1\mu F$, $T_J=25^\circ C$, unless otherwise specified



Fig 6. V_{IN} Start up

CH1: V_{IN} ,2V/Div;CH2: V_{OUT} ,2V/Div;TIME:2.5ms/Div



Fig 7. V_{IN} Shut down

CH1: V_{IN} ,2V/Div;CH2: V_{OUT} ,2V/Div;TIME:10ms/Div

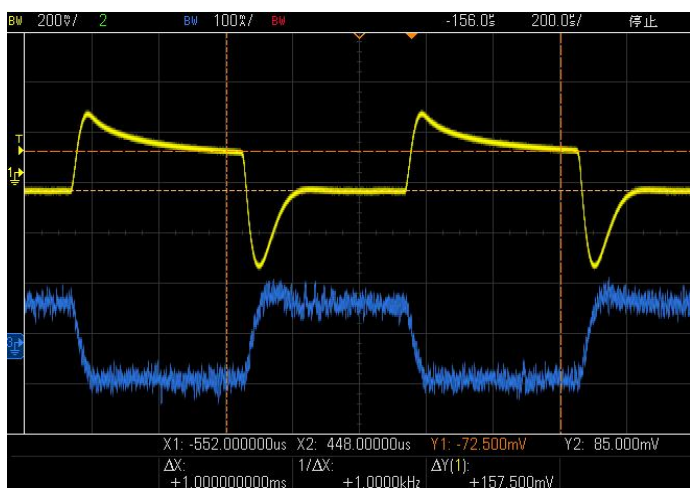
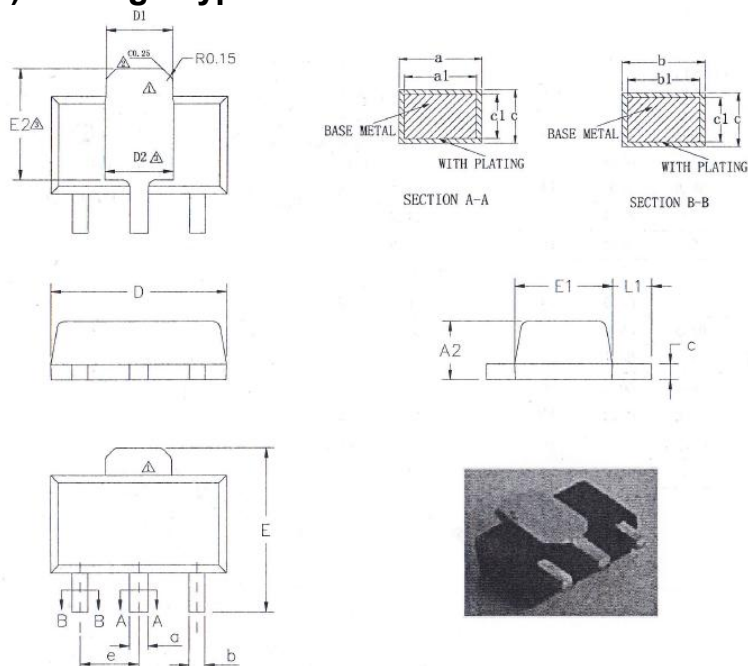


Fig 5. V_{OUT} Load Transient (1 to 150mA)

CH1: V_{OUT} ,200mV/Div;CH3: I_{OUT} ,100mA/Div;
TIME:200us/Div

13.Package Outline Dimensions(All dimensions in mm.)

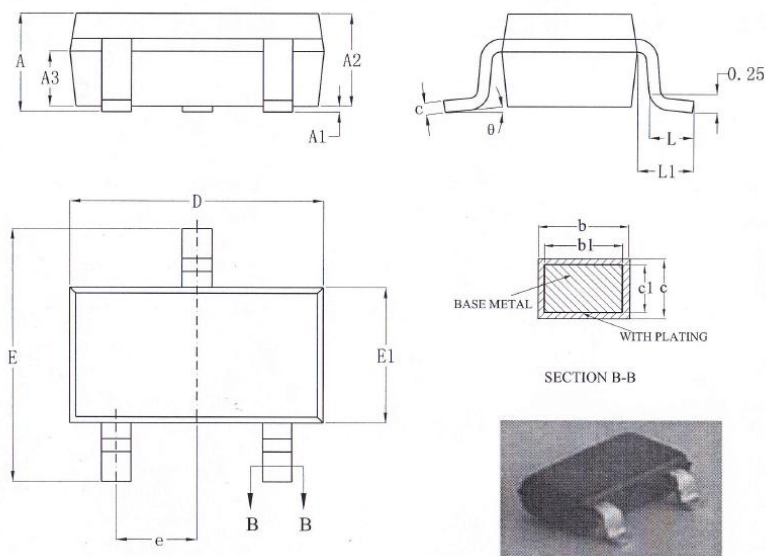
(1) Package Type: SOT-89-3L



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

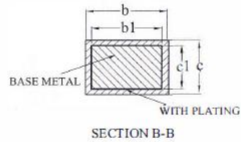
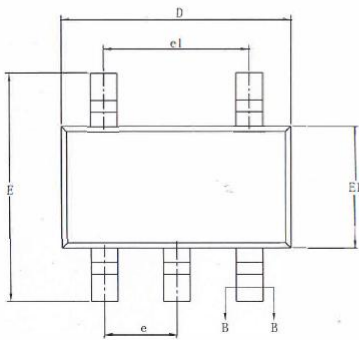
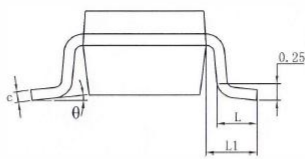
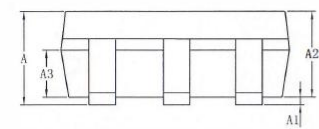
Symbol	Symbol	Symbol
△ D2	△ D2	△ E2
66.9#63	1.75REF	2.84REF

(2) Package Type: SOT23-3



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		
L	0.30	—	0.60
L1	0.60REF		
θ	0	—	8°

(3) 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°

14.Important Notice And Disclaimer

- We reserve 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.

15.Version Modification Record

Version Number	Revision
first edition	/
V1.0	1. Update the Important Notice And Disclaimer on page 9.