

24V 150mA Ultralow-Quiescent-Current LDO

Description

The FLD2415 ultra-low quiescent current regulator features low dropout voltage and low current in the standby mode. With less than 1.5 μ A 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, SOT89-3, surface mount packages.

Features

- V_{IN} 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

APPLICATIONS

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

TYPICAL APPLICATION

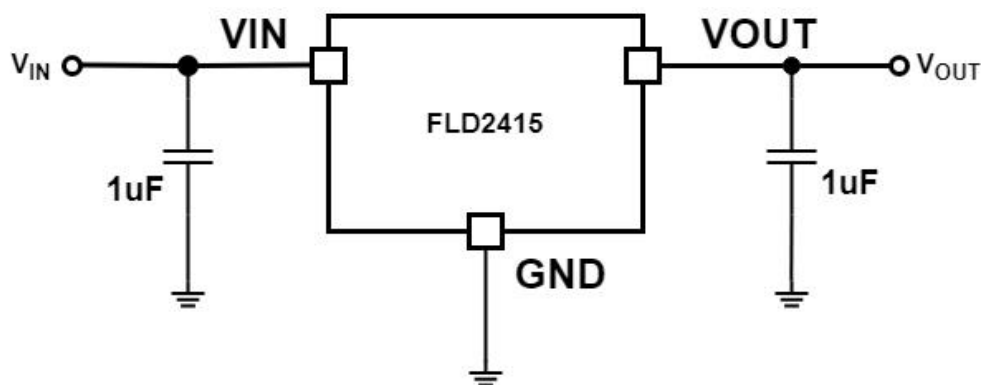


Figure 1. Typical Application for FLD2415

PIN CONFIGURATION

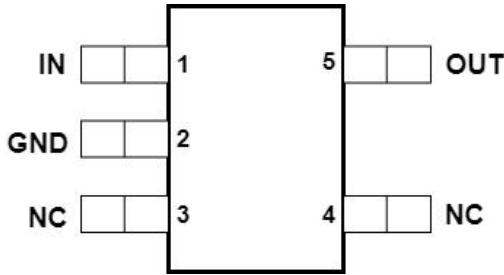


Figure 2. Pin Assignment of FLD2415
Package SOT23-5

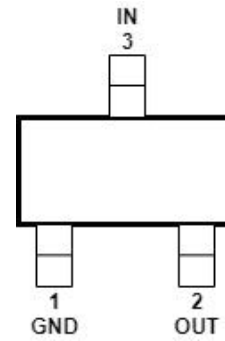


Figure 4 . Pin Assignment of FLD2415
Package SOT23-3

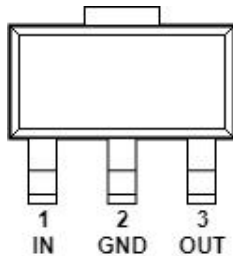


Figure 3 . Pin Assignment of FLD2415
Package SOT89-3

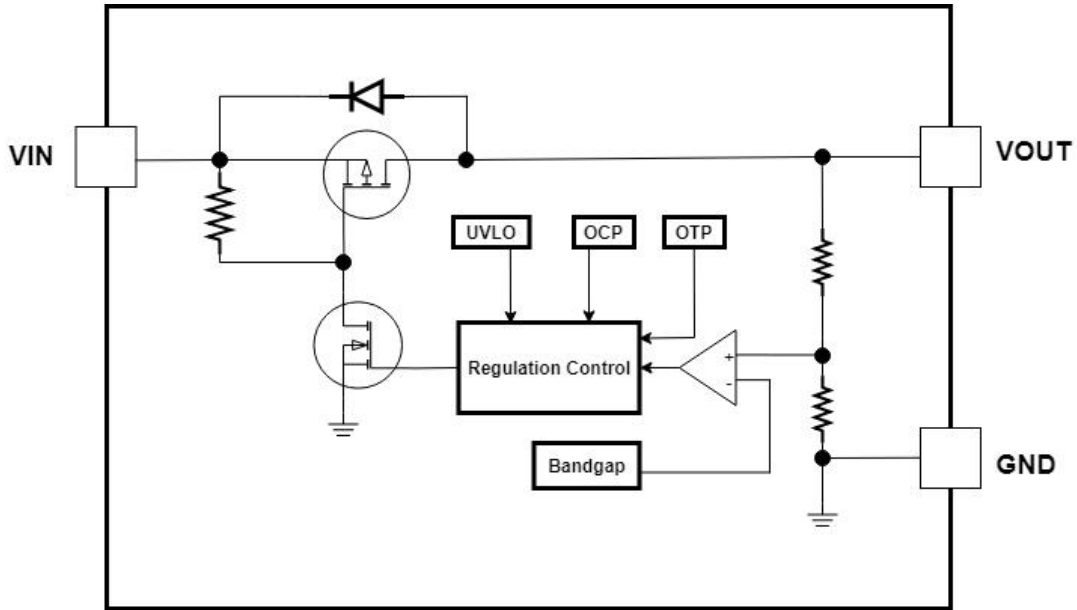
Absolute Maximum Ratings

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

PIN DESCRIPTION

Pin Name	Pin No.SOT23-5	Pin No.SOT89-3	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

FUNCTIONAL Block Diagram



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		$^\circ C$

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

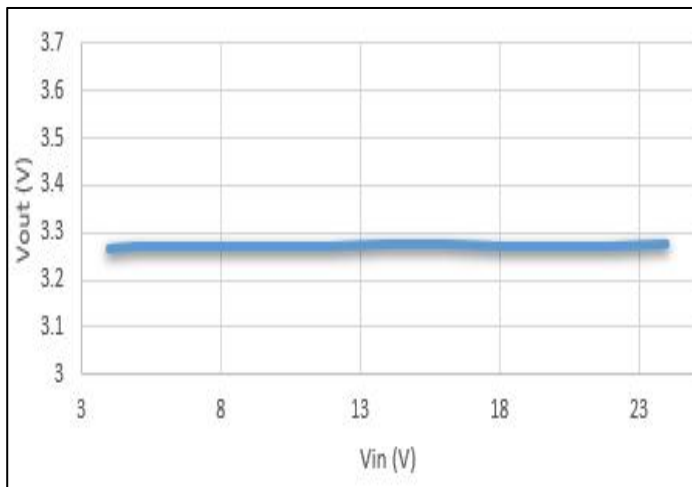


Fig 1. V_{OUT} vs V_{IN}

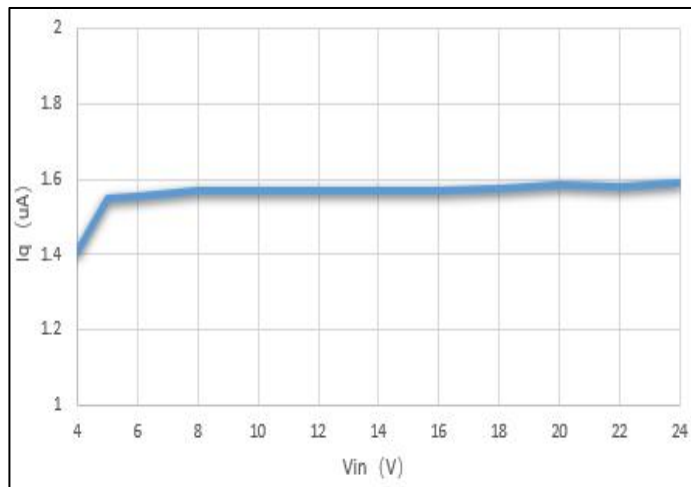


Fig 2. Fig 2. I_Q vs V_{IN}

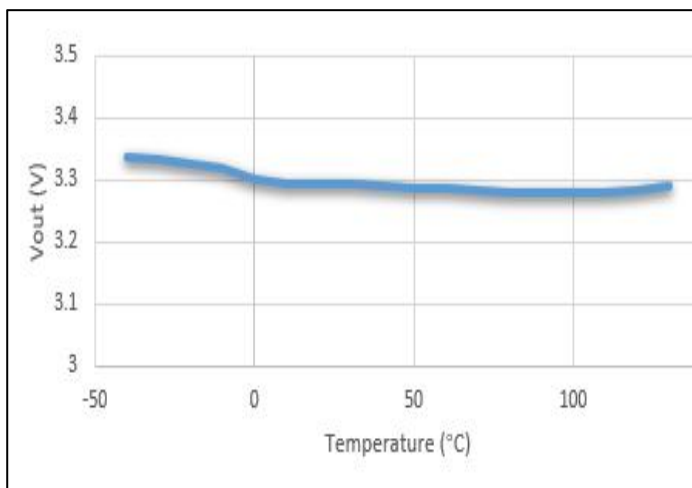


Fig 3. V_{OUT} (3.3V) vs Temperature

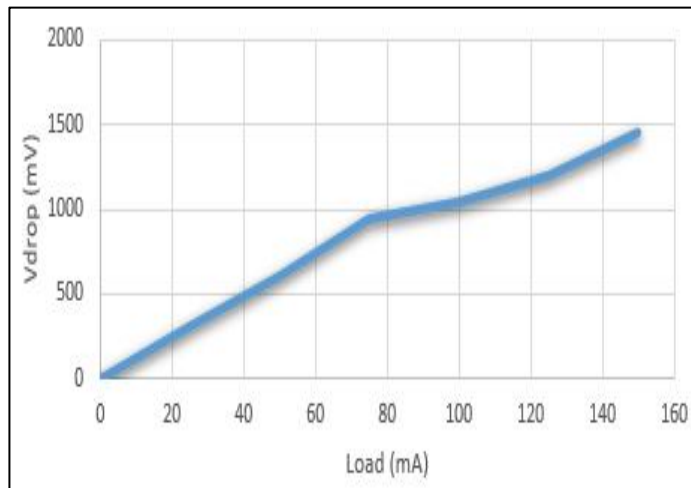


Fig 4. Dropout vs Load

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

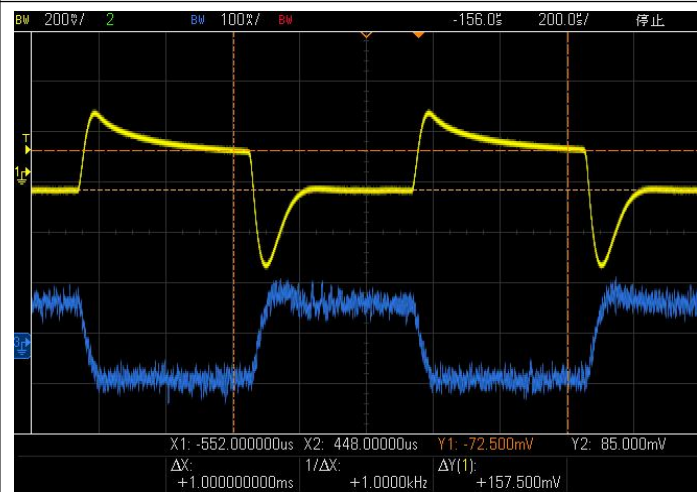
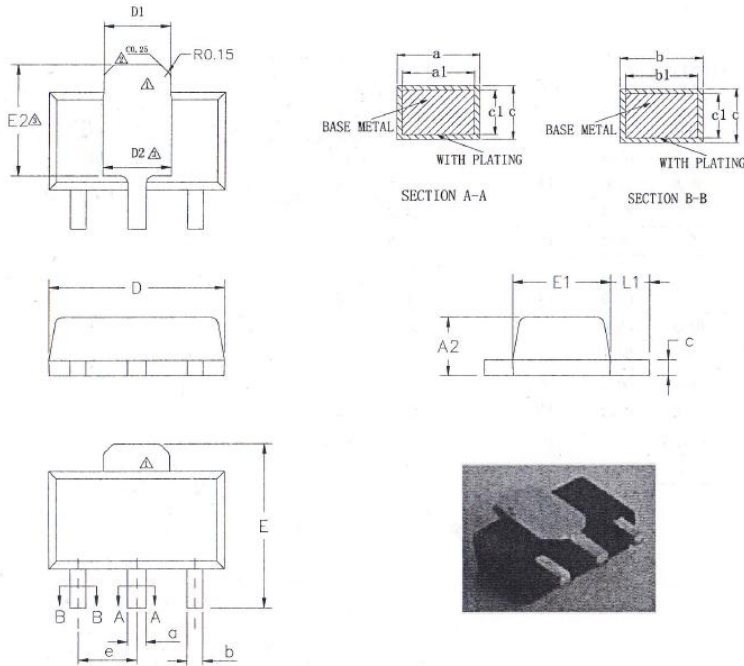


Fig 5. V_{OUT} Load Transient (1 to 150mA)

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

Package Outline Dimensions(All dimensions in mm.)

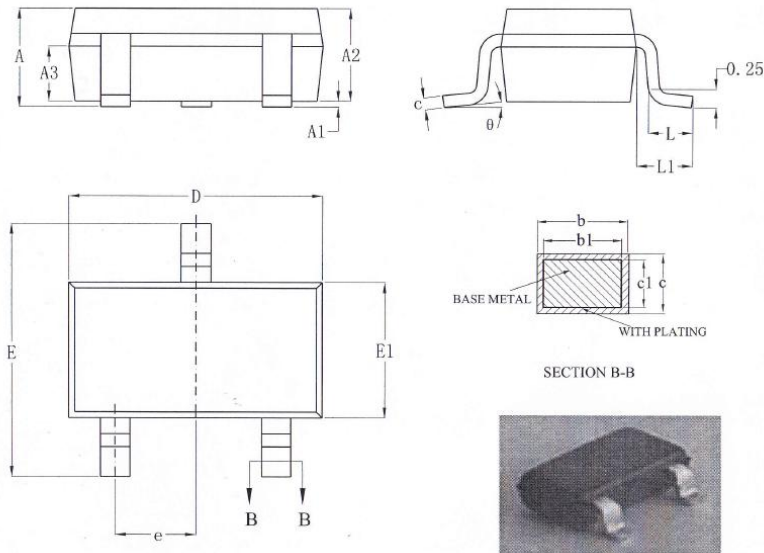
(1) Package Type: SOT89-3



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

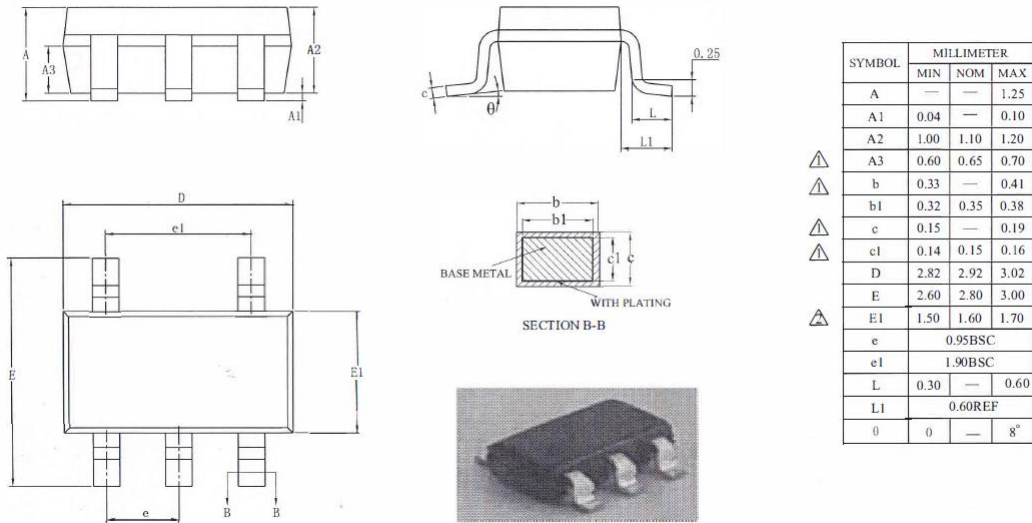
Size (mm)	D2	E2
66.9*63	1.75REF	2.84REF

(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



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
FLD2415-1.5	1.5	SOT23-5	FLD2415-1.5YSOT235G/TR	Tape and Reel,3000
FLD2415-1.5	1.5	SOT89-3	FLD2415-1.5YSOT893G/TR	Tape and Reel,3000
FLD2415-1.8	1.8	SOT23-3	FLD2415-1.8YSOT233G/TR	Tape and Reel,3000
FLD2415-1.8	1.8	SOT23-5	FLD2415-1.8YSOT235G/TR	Tape and Reel,3000
FLD2415-1.8	1.8	SOT89-3	FLD2415-1.8YSOT893G/TR	Tape and Reel,3000
FLD2415-2.5	2.5	SOT23-3	FLD2415-2.5YSOT233G/TR	Tape and Reel,3000
FLD2415-2.5	2.5	SOT23-5	FLD2415-2.5YSOT235G/TR	Tape and Reel,3000
FLD2415-2.5	2.5	SOT89-3	FLD2415-2.5YSOT893G/TR	Tape and Reel,3000
FLD2415-3.3	3.3	SOT23-3	FLD2415-3.3YSOT233G/TR	Tape and Reel,3000
FLD2415-3.3	3.3	SOT23-5	FLD2415-3.3YSOT235G/TR	Tape and Reel,3000
FLD2415-3.3	3.3	SOT89-3	FLD2415-3.3YSOT893G/TR	Tape and Reel,3000
FLD2415-5.0	5.0	SOT23-3	FLD2415-5.0YSOT233G/TR	Tape and Reel,3000
FLD2415-5.0	5.0	SOT23-5	FLD2415-5.0YSOT235G/TR	Tape and Reel,3000
FLD2415-1.8	5.0	SOT89-3	FLD2415-5.0YSOT893G/TR	Tape and Reel,3000