6V 600mA 75dB PSRR Fixed Output Low Dropout

1. Description

The FLD6204 is a low dropout linear regulator which can deliver output current as high as 600mA. It can work under a wide operational range, from 1.7V to 6V. It only requires minimal peripheral devices to work properly, which are 1uF input, 1uF output capacitor, and a resistor ladder to set the output voltage.

FLD6204 employs a proprietary control loop to achieve a fast transient load response. FLD6204 is equipped with all kinds of protection, such as output short circuit protection, over current protection and over temperature protection.

FLD6204 is consists of precise bandgap voltage reference module, error amplifier, protection circuitry, driver block, current sensing block and power MOSFET.

FLD6204 is housed in a SOT23-5, DFN1x1-4L and SOT23-3 package.

2. Features

- Input operation range: 1.7 to 6V
- 70uA quiescent current in operation
- Output current up to 600mA
- 75dB PSRR
- Foldback short circuit protection
- Output fast discharge when shut off
- Over temperature protection
- Package: SOT23-5, SOT23-3, DFN1×1-4L

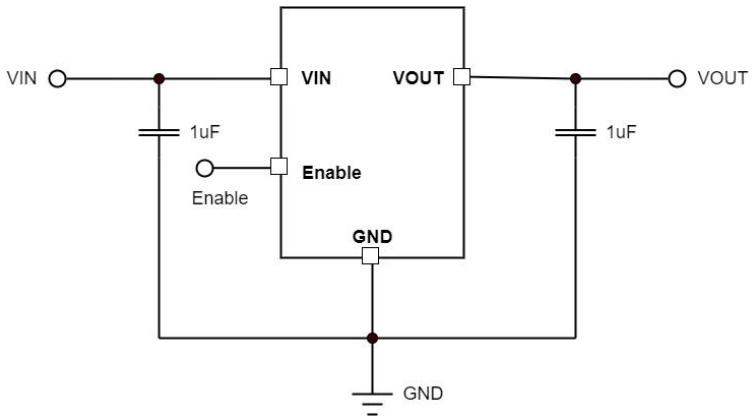
3. Applications

- Set-top Box
- Security surveillance system
- Toys
- TV
- Smart phone
- Tablet
- Wireless modules
- All other electronic devices

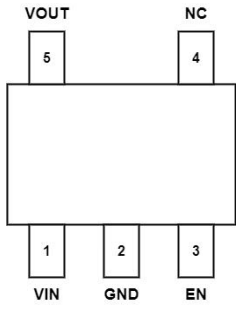
4.Order Information

Part Number	Output Voltage (V)	Package Description	Ordering Code	Packing Quantity
FLD6204-1.2	1.2	SOT23-5	FLD6204-SCA12CT	Tape and Reel,3000
	1.2	SOT23-3	FLD6204-SBA12CT	Tape and Reel,3000
	1.2	DFN1×1-4L	FLD6204-DFA12CT	Tape and Reel,10000
FLD6204-1.5	1.5	SOT23-5	FLD6204-SCA15CT	Tape and Reel,3000
	1.5	SOT23-3	FLD6204-SBA15CT	Tape and Reel,3000
	1.5	DFN1×1-4L	FLD6204-DFA15CT	Tape and Reel,10000
FLD6204-1.8	1.8	SOT23-5	FLD6204-SCA18CT	Tape and Reel,3000
	1.8	SOT23-3	FLD6204-SBA18CT	Tape and Reel,3000
	1.8	DFN1×1-4L	FLD6204-DFA18CT	Tape and Reel,10000
FLD6204-2.8	2.8	SOT23-5	FLD6204-SCA28CT	Tape and Reel,3000
	2.8	SOT23-3	FLD6204-SBA28CT	Tape and Reel,3000
	2.8	DFN1×1-4L	FLD6204-DFA28CT	Tape and Reel,10000
FLD6204-3.0	3.0	SOT23-5	FLD6204-SCA30CT	Tape and Reel,3000
	3.0	SOT23-3	FLD6204-SBA30CT	Tape and Reel,3000
	3.0	DFN1×1-4L	FLD6204-DFA30CT	Tape and Reel,10000
FLD6204-3.3	3.3	SOT23-5	FLD6204-SCA33CT	Tape and Reel,3000
	3.3	SOT23-3	FLD6204-SBA33CT	Tape and Reel,3000
	3.3	DFN1×1-4L	FLD6204-DFA33CT	Tape and Reel,10000

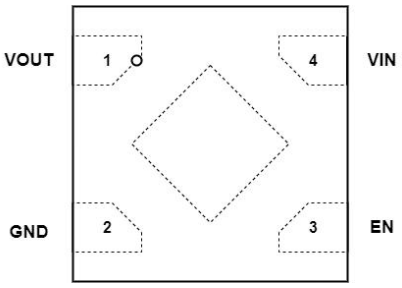
5.Typical Application



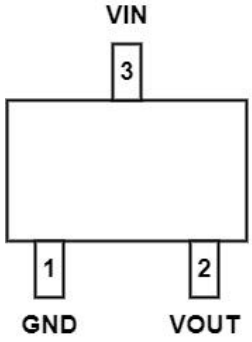
6.Pin Configuration and Functions



SOT23-5



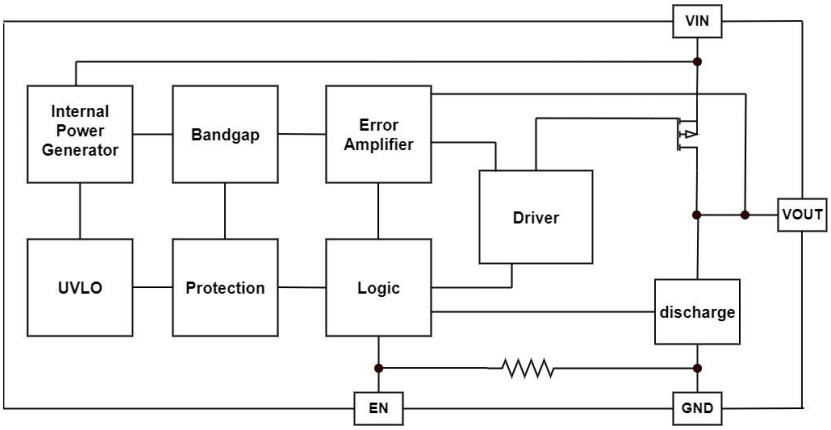
DFN1×1-4L



SOT23-3

Pin Number			Pin Name	Description
SOT23-5	DFN1×1-4L	SOT23-3		
1	4	3	VIN	The input power node, connecting a 1uF capacitor to ground
2	3	1	GND	Ground
3	2		EN	Chip enable pin, pull high to turn on the chip
4			NC	Not connected
5	1	2	VOUT	The output node, connecting a 1uF capacitor to ground

7.Functional block diagram



8. Absolute Maximum Ratings

Description			Range	Unit
V_{IN}			-0.3~7	V
V_{OUT}			-0.3~5.5	V
Continuous Power Dissipation (T^A = 25°C)(2) SOT23-5			0.4	W
Junction Temperature			-40~125	°C
Lead Temperature			260	°C
Storage Temperature			-65~125	°C
Thermal Resistance(3)	SOT23-5	θ_{JA}	170	°C/W
		θ_{JC}	75	
	DFN1×1-4L	θ_{JA}	120	
		θ_{JC}	60	

Note:

(1) Exceeding these ratings may damage the device.

(2) The maximum allowable power dissipation is a function of the maximum junction temperature T_J(MAX), the junction-to-ambient thermal resistance θ_{JA}, and the ambient temperature TA. The maximum allowable continuous power dissipation at any ambient temperature is calculated by PD(MAX)=(T_J(MAX)-T_A)/θ_{JA}. Exceeding the maximum allowable power dissipation will cause excessive die temperature, and the regulator will go into thermal shutdown. Internal thermal shutdown circuitry protects the device from permanent damage.

(3) Measured on JESD51-7, 4-layer PCB.

9. Electrical Characteristics

All typical values are at T_j=25°C (unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Input voltage range, V_{IN}	V_{IN}	-	1.7	-	6	V
Quiescent current, I_Q	I_Q	V_{IN} = 5V, I_{LOAD} = 0A	30	70	80	μA
Shutdown current, I_{OFF}	I_{SD}	V_{IN} = 5V, V_{CE} = 0	-	0.1	2	μA
Output voltage accuracy	V_{OUT}	V_{IN} = 5V	-2	-	+2	%
Output current Limit	I_{LIMIT}	V_{IN} = 5V, V_{OUT} = 3.3V	0.7	0.9	-	A
Line regulation	ΔV_{OUT}	V_{IN} = 3.3 to 5V	-	0.04	0.1	%/V
Load regulation	ΔV_{OUT}	V_{IN} = V_{OUT}+1V, I_{OUT}= 0.1 ~ 0.6A	0	2.5	-	%/A
Dropout Voltage	V_{DROP}	I_{OUT}= 100mA	-	0.09	-	V
		I_{OUT}= 300mA	-	0.27	-	V
		I_{OUT}= 600mA	-	0.6	-	V
CE input threshold ON		V_{IN} = 5V	1.15	-	-	V
CE input threshold OFF		V_{IN} = 5V	-	-	0.8	V
CE input pull down resistor		-	-	330	-	KΩ
Output discharge resistor		V_{IN} = 5V	45	60	75	Ω
Short Current Limit	I_{SHORT}	V_{IN} = 4.3V	-	140	-	mA
Over temperature protection	OTP	-	-	170	-	°C
OTP hysteresis	OTP_{HYS}	-	-	30	-	°C

10.Application Information

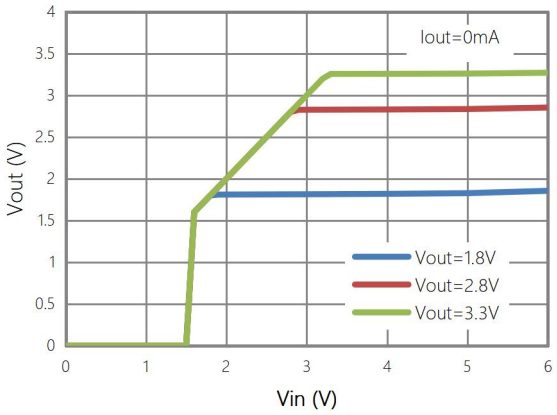
Capacitor Selection： 1uF at input node, and 1uf at output node are good enough for FLD6204 to keep its control loop's stability under entire operation range.

Thermal Conditions： The power consumption in FLD6204 is the product of dropout voltage and output current. Assuming a normal operation condition, 5V in and 3.3V out at 300mA, the power consumption is 510mW, which will result in a high temperature inside the chip. So, a good heat dissipation design of PCB is quite important. Because the heat dissipation of the SOT23-5 package is conducted through the pin No. 2, which is GND node of FLD6204, please make sure the ground plate of PCB is big enough to carry away the heat generated in the chip. And as for DFN1x1-4L package which has an exposed heat dissipation pad, please connect this pad to ground plate of PCB.

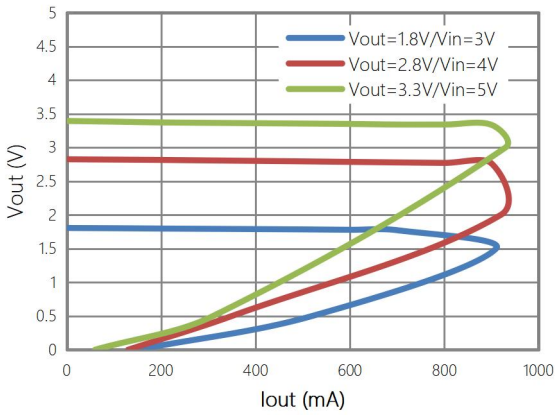
11.Typical Characteristics

C_{IN}=C_{OUT}=1uF, T_A = 25°C, unless otherwise specified

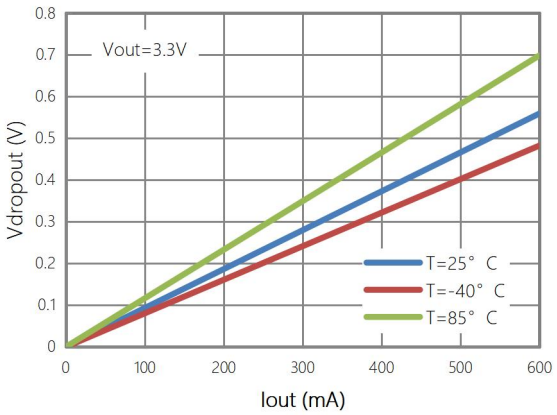
Vout Vs. Vin



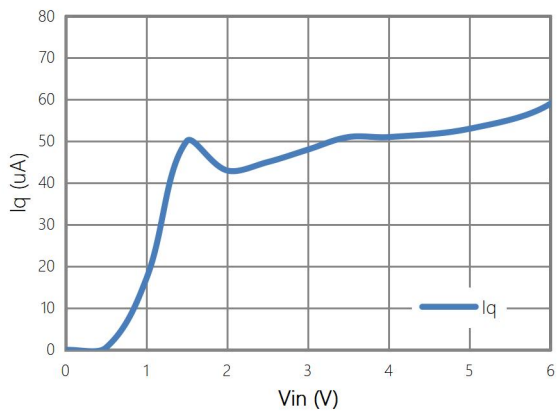
Vout Vs. Iout



Vdropout Vs. Iout



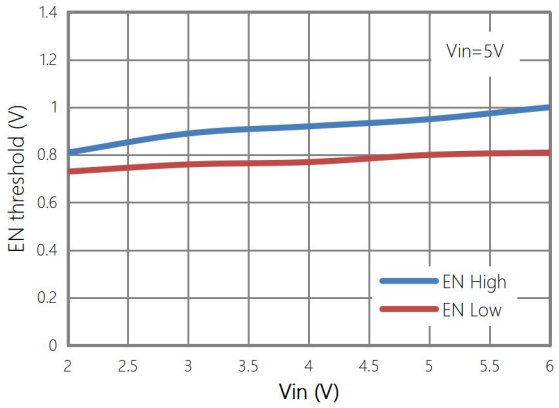
Iq Vs. Vin



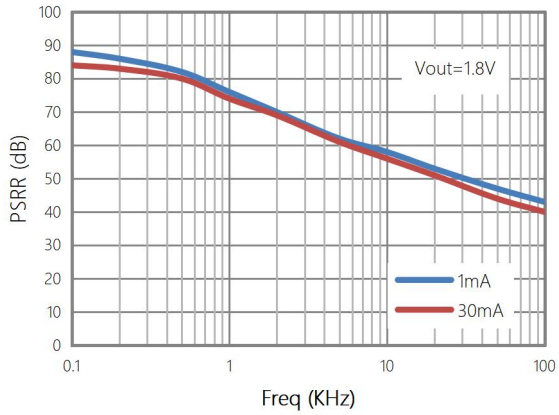
11.Typical Characteristics (continue)

C_{IN}=C_{OUT}=1uF, T_A = 25°C, unless otherwise specified

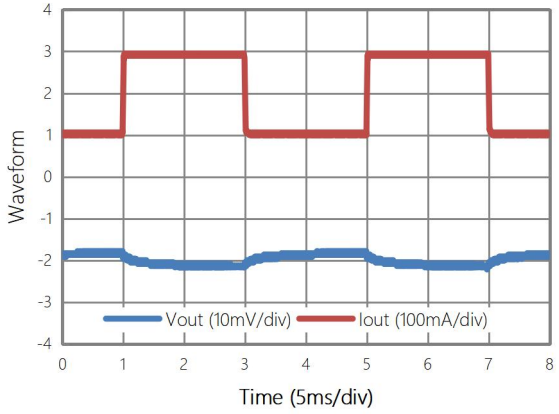
EN threshold Vs. Vin



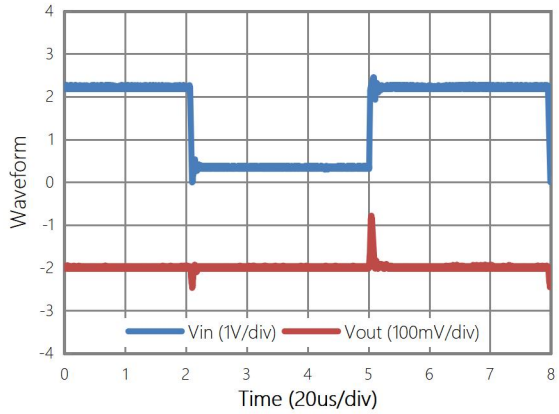
PSRR



Load Transient

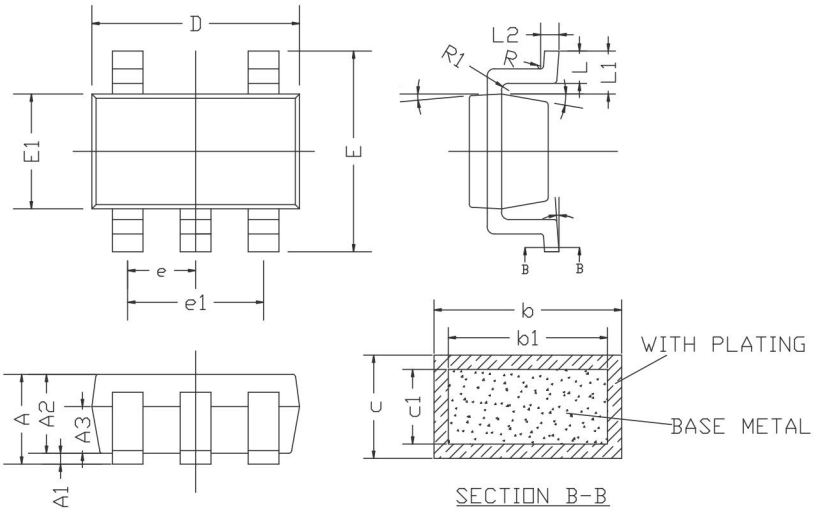


Line Transient



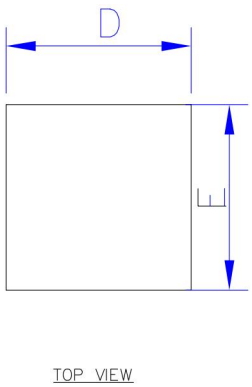
12.Package Information

(1) SOT23-5 Package Dimensions:

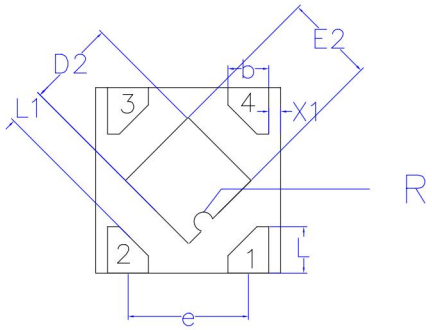


Symbol	Dimensions (mm)		
	Min	Typ	Max
A	—	—	1.25
A1	0.00	—	0.15
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.36	—	0.50
b1	0.36	0.38	0.45
c	0.14	—	0.20
c1	0.14	0.15	0.16
D	2.826	2.926	3.026
E	2.60	2.80	3.00
E1	1.526	1.626	1.726
e	0.90	0.95	1.00
e1	1.80	1.90	2.00
L	0.35	0.45	0.60
L1	0.59 REF		
L2	0.25 BSC		
R	0.05	—	—
R1	0.05	—	0.20
θ	0°	—	8°
θ1	3°	5°	7°
θ2	6°	—	14°

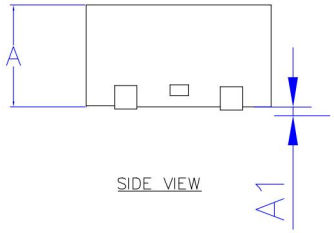
(2) DFN1×1-4L Package Dimensions:



TOP VIEW



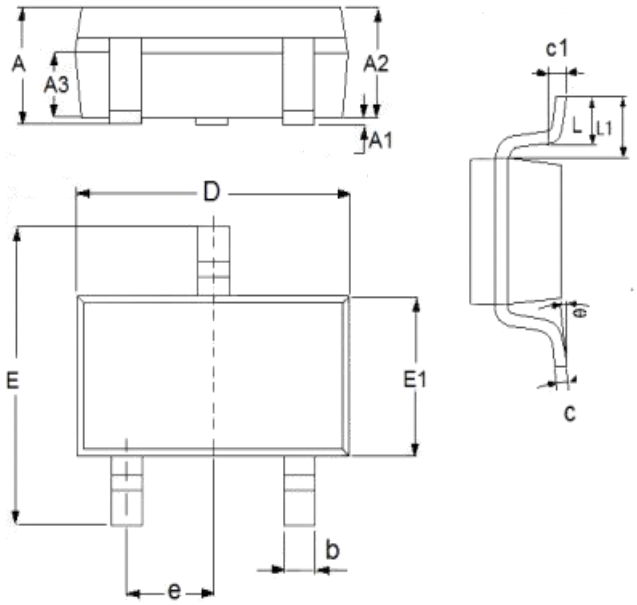
BOTTOM VIEW



SIDE VIEW

Symbol	Dimensions (mm)		
	Min	Typ	Max
A	0.35	0.375	0.40
D	0.95	1.00	1.05
E	0.95	1.00	1.05
b	0.20	0.25	0.30
L	0.20	0.25	0.30
e	0.60	0.65	0.70
R	—	0.05	—
L1	—	0.20	—
D2	0.43	0.48	0.53
E2	0.43	0.48	0.53
A1	0.020	—	0.080

(3) SOT-23-3 Package Dimensions:



Symbol	Dimensions (mm)		Dimensions (Inch)	
	Min	Max	Min	Max
A	1.05	1.45	0.0413	0.0571
A1	0	0.15	0.0000	0.0059
A2	0.9	1.3	0.0354	0.0512
A3	0.6	0.7	0.0236	0.0276
b	0.25	0.5	0.0098	0.0197
c	0.1	0.25	0.0039	0.0098
D	2.8	3.1	0.1102	0.1220
E	2.6	3.1	0.1023	0.1220
E1	1.5	1.8	0.0591	0.0709
e	0.95(typical.)		0.0374(typical.)	
L	0.25	0.6	0.0098	0.0236
L1	0.59(typical.)		0.0232(typical.)	
θ	0	8°	0.0000	8°
c1	0.2(typical.)		0.0079(typical.)	

12.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.

13.Version Modification Record

Version Number	Revision
first edition	
V1.0	1. Update the Features on page 1. 2. Update the Oder Information on page 2. 3. Update the Pin Configuration And Functions on page 3.
V1.1	1. Update the Electrical Characteristics on page 5.