

55V, 200mA, High PSRR, Low Dropout Voltage Linear Regulator

PRELIMINARY DATASHEET

Datasheet brief

Description

The FH68601 series are a group of low-dropout (LDO) voltage regulators offering the benefits of wide input voltage range, low dropout voltage, low power consumption, and miniaturized packaging.

Quiescent current of only 2.2μA makes these devices ideal for powering the battery-powered, always-on systems that require very little idle-state power dissipation to a longer service life. There is a shutdown mode by pulling the EN pin low. The shutdown current in this mode goes down to only 10nA (typical).

The FH68601 series of linear regulators are stable with the ceramic output capacitor over its wide input range from 2V to 55V and the entire range of output load current (0mA to 200mA).

Key Features

- Wide Operating Input Voltage Range: 2.0V ~ 55V
- Support Fixed Output Voltage 1.8V, 3.3V, 5V, 9V, 12V
- Dropout Voltage: 0.66V at 100mA/ V_{OUT} : 5V
- Adjustable Output Voltage Available by Specific Application
- Output Accuracy: ±1%
- Output Current: 200mA
- 2.2μA Ground Current at no Load
- Disable Current: 10nA
- Stable with Ceramic or Tantalum Capacitor
- Current Limit Protection
- Over-Temperature Protection
- SOT-23-5L&DFN1*1-4L&DFN2*2-6L Package Available

Simplified Application Circuit

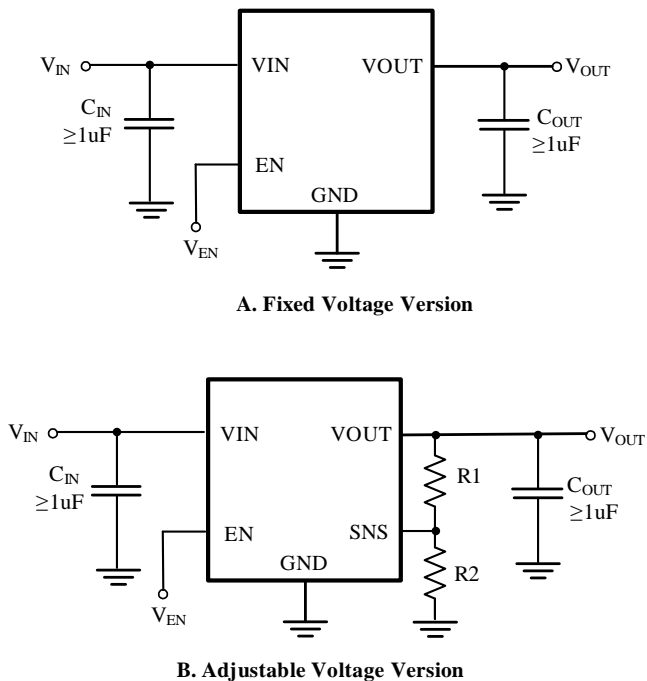


Figure 1. Simplified application circuit

Device Information ⁽¹⁾

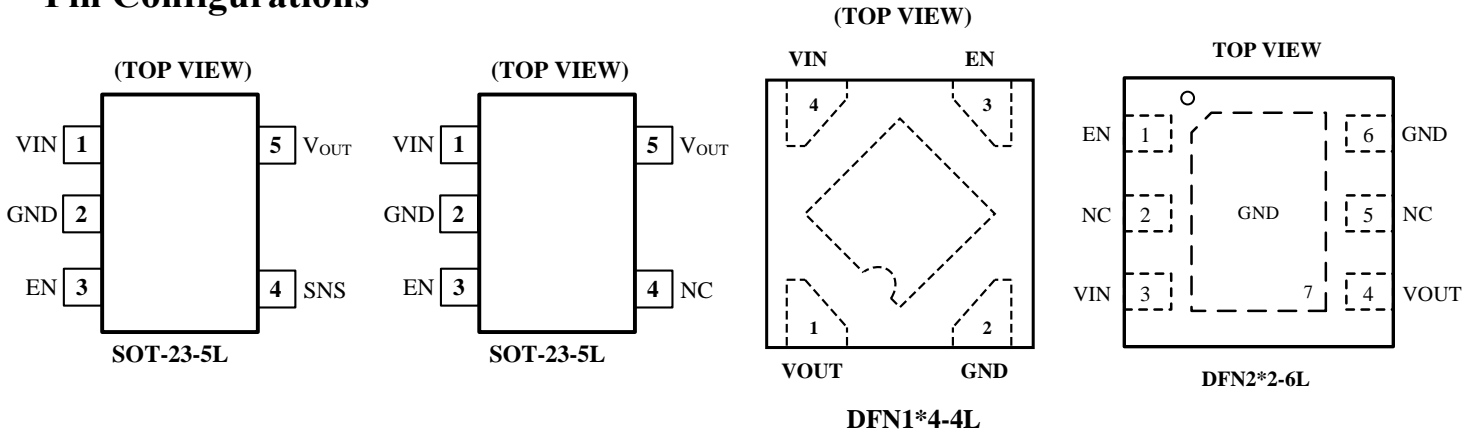
Part Number	Package	Body Size (NOM)
FH68601C**M5	SOT23(5L)	1.60mm * 2.92mm
FH68401C**D4	DFN(4L)	1.00mm * 1.00mm
FH68401C**D6	DFN(6L)	2.00mm * 2.00mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.

Applications

- Smart Power Network Equipment
- Portable Power Tools
- Motor Control System/Industrial Control System
- Power Meter/Instrument
- Vehicle-Mounted System
- Battery-Powered Equipment
- Automotive Head Unit
- Security Equipment
- Communication Equipment
- BMS Systems
- White Goods

Pin Configurations



Pin Description

(For with SNS pin)

Pin No				Pin Name	Pin Function
SOT-23-5L		DFN2*2-6L			
FH68601-Fixed	FH68601-FB	FH68601-Fixed	FH68601-FB		
1	1	1	1	VIN	Input of Supply Voltage
2	2	3	2	GND(VSS)	Ground
3	3	2	3	EN	Enable Control Input.
/	4	/	4	SNS	Sense of Output Voltage
4	/	4, 5	5	NC	No internal connection
5	5	6	6	V _{OUT}	Output of the Regulator
/	/	Exposed (7)		SGNG	Substrate of Chip. Leave floating or tie to GND

Notes : V_{OUT} = (R1 + R2) / R2 x 1.8V, And R2 < 36KΩ .

Pin No			Pin Name	Pin Function
SOT-23-5L	DFN1*1-4L	DFN2*2-6L		
FH68601-Fixed	FH68601-Fixed	FH68601-Fixed		
1	4	3	VIN	Input of Supply Voltage
2	2	6	GND(VSS)	Ground
3	3	1	EN(CE)	Enable Control Input.
4	/	2, 5	NC	No internal connection
5	1	4	V _{OUT}	Output of the Regulator
/	Exposed (5)	Exposed (7)	SGND	Substrate of Chip. Leave floating or tie to GND

Special Request: Any Voltage between 1.8V and 12V under specific business agreement.

器件概述

FH68601 系列是一组低压差 (LDO) 转换器, 具有 2V 至 55V 宽电压输入范围、低压差、低功耗和小型化封装的等特性。

FH68601 低至 2.2uA 低静态电流特性, 特别适用于电池供电、长时间待机系统设备应用, 能帮助降低系统设备的待机功耗, 有效延长待机时间和电池使用寿命。

FH68601 具有带 EN 使能功能, 将 EN 脚拉低可进入关断模式, 此关断模式下静态电流可降至仅 10nA (典型值)。

FH68601 系列支持输出电容采用陶瓷电容器, 在 2V 至 55V 的宽输入电压范围内和整个输出负载电流 0mA~200mA 范围内稳定工作。

典型应用电路

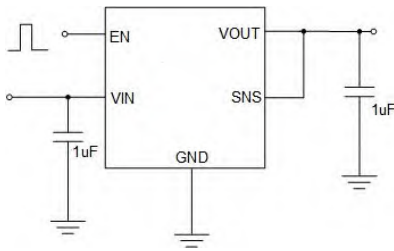


图 1、固定输出带使能功能和输出电压检测功能之应用电路

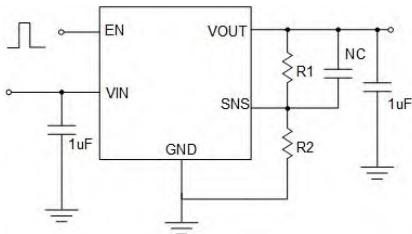


图 2、FH68601 可调输出电压应用电路

应用领域

- 手持式、电池供电设备
- 低功耗微处理器
- 笔记本电脑、掌上型电脑和 PDA
- 无线通讯设备
- 音频/视频设备
- 车载导航系统
- 工业控制
- 智能电表
- 智能家居

电气特性

- 宽范围输入电压: 2V 至 55V
- 200mA 输出电流能力
- 2.2uA 静态电流 (无负载)
- $\pm 1\%$ 输出电压精度
- 10nA 关断电流
- 低压差: 0.66V ($V_o=5V/I_o=100mA$ 条件下)
- 支持固定输出电压: 1.8V, 3.3V, 5V, 9V, 12V
- 支持可调电压输出
- 支持陶瓷电容或者钽电容
- 限流保护
- 过温保护
- 提供 SOT-23-5、DFN1x1-4L、DFN2x2-6L 封装

最大耐压值 (Note 1)

VIN, EN 至 GND	-0.3V to 60V
VOUT 至 GND	-0.3V to 14V
VOUT 至 VIN	-60V to 0.3V

封装热阻 (Note 2)

SOT-23-5L, θ_{JA}	200°C/W
DFN1*1-4L, θ_{JA}	195°C/W
DFN2*2-6L, θ_{JA}	95°C/W
引脚焊锡温度 (Soldering, 10 sec.)	260°C
结点温度	150°C
存储温度范围	-60°C to 150°C

建议应用条件

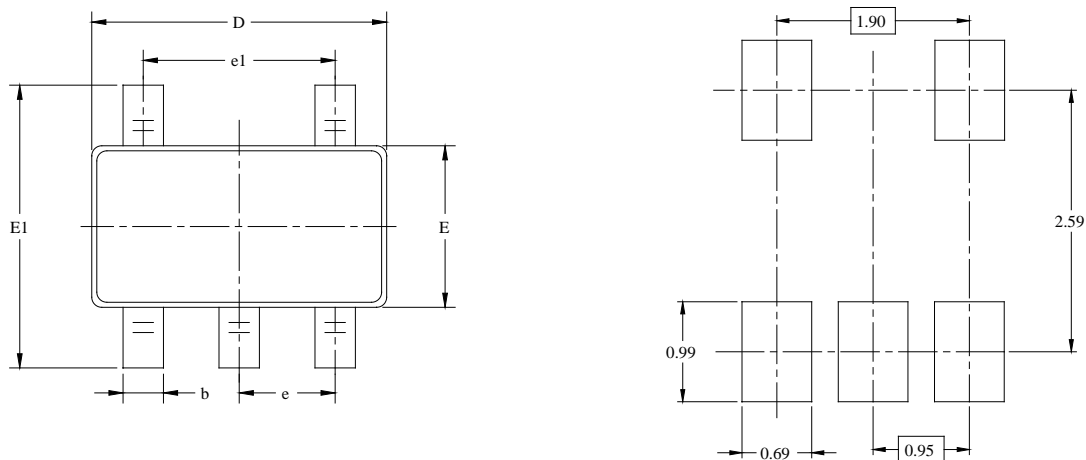
输入电压 VIN	2.0V to 55V
应用结温范围	-40°C to 125°C
应用环境温度	-40°C to 85°C

Note 1. 任何超过“最大耐压值”的应用可能会导致芯片遭受永久性损坏。这些是额定最大耐压值, 仅表示在这个范围内芯片不会损伤, 但不保证所有性指标都正常, 在任何超过“最大耐压值”的场合使用, 都可能导致芯片永久性损坏。在接近或等于最大耐压值情况下使用, 可能会影响产品可靠性。

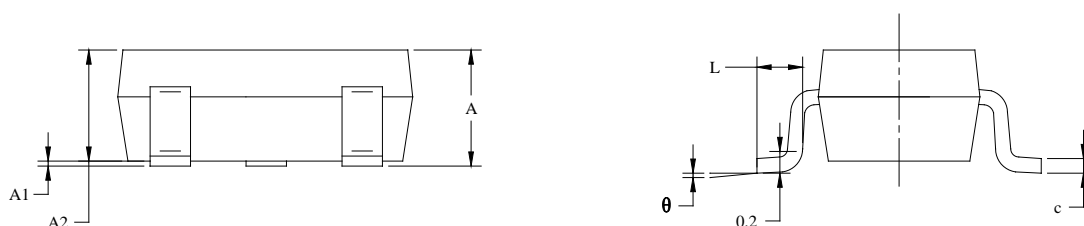
Note 2. θ_{JA} 测量条件: $T_A = 25^\circ C$, 使用 FOCMCU EVB 板。

Package Information

- Type: SOT-23-5L



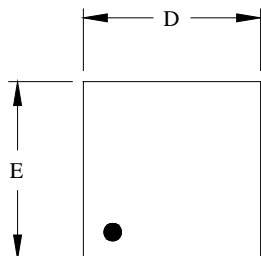
RECOMMENDED LAND PATTERN(Unit: mm)



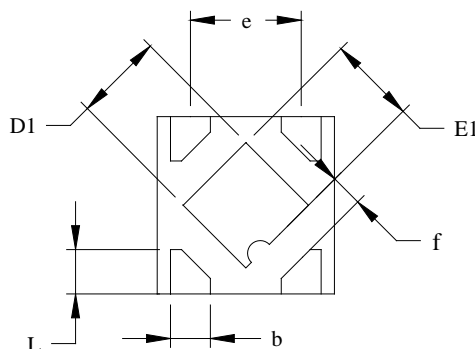
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.900BSC		0.075 BSC	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

Package Information

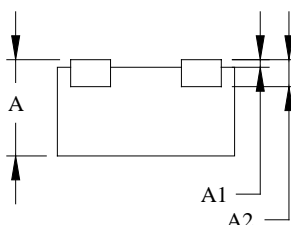
- Type: DFN1*1-4L



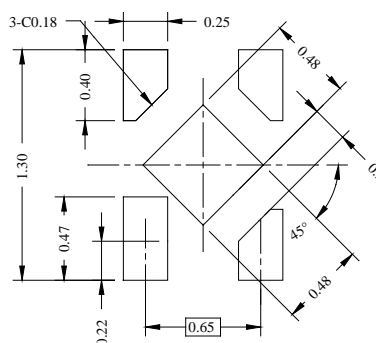
TOP VIEW



BOTTOM VIEW



SIDE VIEW

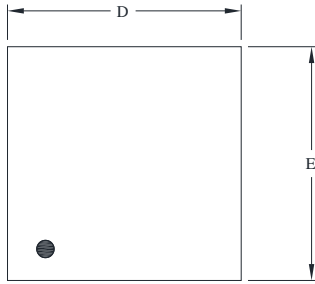


RECOMMENDED LAND PATTERN (Unit: mm)

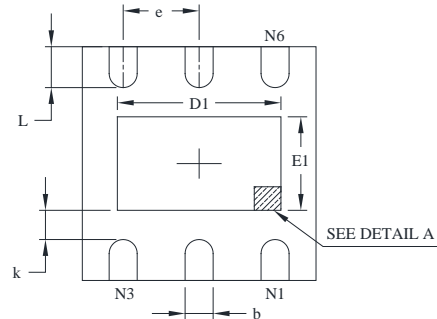
Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.500	0.550	0.600
A1	0.000		0.050
A2	0.152 REF		
D	0.950	1.000	1.050
D1	0.450	0.500	0.550
E	0.950	1.000	1.050
E1	0.450	0.500	0.550
b	0.175	0.225	0.275
e	0.625 BSC		
f	0.195 REF		
L	0.200	0.250	0.300

Packaging Information

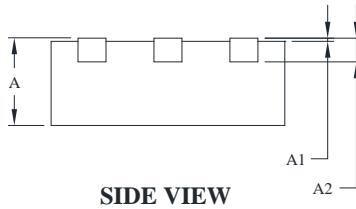
- Package Type: DFN2*2-6L



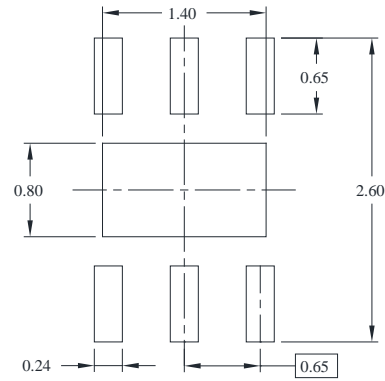
TOP VIEW



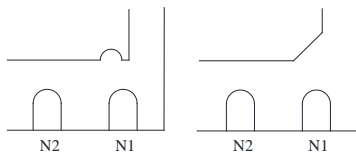
BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)



DETAIL A

DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	0.7	0.8	0.0276	0.0315
A1	0	0.05	0	0.002
A2	0.203(TYP)		0.008(TYP)	
b	0.2	0.35	0.0078	0.0138
D	1.9	2.1	0.0748	0.0827
E	1.9	2.1	0.0748	0.0827
E1	0.5	0.9	0.0197	0.0354
e	0.65(TYP)		0.0256(TYP)	
L	0.25	0.426	0.0098	0.0168
K	0.2	—	0.0079	—
D1	1	1.45	0.0393	0.0571

ORDERING INFORMATION

Part Number	Input Voltage	Output Function	Operating Temperature	Package Type	Top Mark	SPQ
FH68601C**M5	2.0 ~ 55.0V	<ul style="list-style-type: none"> ** → Output voltage e.g., 18 = 1.8V 33 = 3.3V 50 = 5.0V 90 = 9.0V A1 = 12V FB = Adjustable (For with SNS pin) 	-40°C to +85°C	SOT-23-5L	AA ** YML*	3000EA/Reel
FH68601C**D4 (Pre-order)	2.0 ~ 55.0V	<ul style="list-style-type: none"> The selectable voltage values are: 1.8V / 3.3V / 5.0V / 9.0V / 12V / Adjustable Enable can be set 	-40°C to +85°C	DFN1.0*1.0-6L	* * * *	10000EA/Reel
FH68601C**D6 (Pre-order)	2.0 ~ 55.0V	<ul style="list-style-type: none"> The selectable voltage values are: 1.8V / 3.3V / 5.0V / 9.0V / 12V / Adjustable Enable can be set 	-40°C to +85°C	DFN2.0*2.0-6L	* * * *	3000EA/Reel

Note:

- **FH68601C**M5 | FH68601C**D4 | FH68601C**D6** devices are Pb-free and RoHs compliant.
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