

PFM Synchronous Step-up DC/DC Converter

FEATURES

- Up to 90% efficiency
- Generates 3.3V at 150mA with 1.5V Input Voltage
- Low Startup Voltage: 0.8V
- Low hold-on Voltage: 0.55V
- Output Voltage Range: 2.5V to 5.5V
- Internal Synchronous Rectifier, No External Schottky Diode needed
- Output Voltage Accuracy: $\pm 2.5\%$
- Low Quiescent Current: 6uA
- SOT89-3, SOT23-3 and SOT23-5 Package

APPLICATIONS

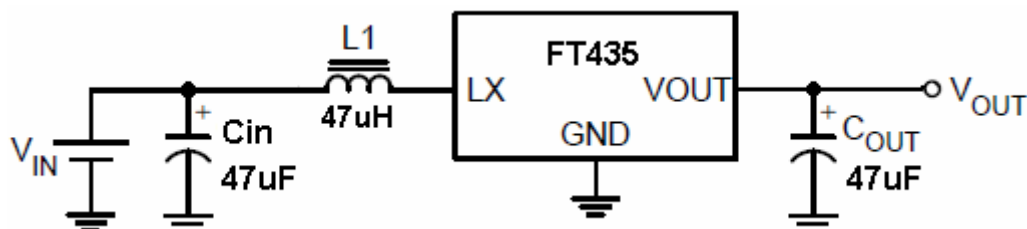
- All Single or Dual-Cell Battery-Powered Products
- Wireless Mouse
- Wireless Microphones
- PDAs
- Electronic Toys
- Personal Medical Products

DESCRIPTION

The FT435 is a high efficiency synchronous step-up DC/DC converter. The converter can start up by supply voltage as low as 0.8V, and capable of delivering maximum 150mA output current at 3.3V output with 1.5V input Voltage. Quiescent current drawn from power source is as low as 6uA. All of these features make FT435 series be suitable for the portable devices, which are supplied by a single battery to four-cell batteries. Only three external components are required to deliver a fixed output voltage. Pulse Frequency Modulation scheme brings optimized performance for applications with light output loading and low input voltages.

FT435 is available in SOT89-3 、SOT23-3 and SOT23-5 packages which is PB-free. And in SOT23-5 package, the device can be switch on or off by CE pin, to minimize the standby supply current.

TYPICAL APPLICATION CIRCUIT

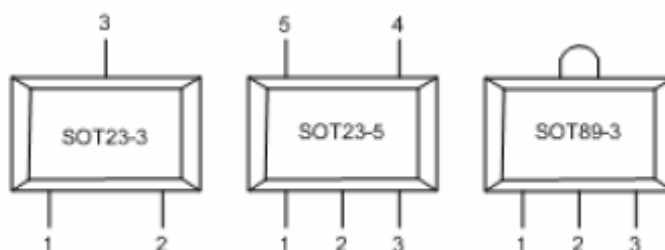


Typical Application Circuit

ABSOLUTE MAXIMUM RATINGS*

VOUT to GND.....	-0.3V to 6V
CE to GND.....	-0.3V to 6V
LX to GND.....	-0.3V to (Vout+0.3V)
Peak SW Sink and Source Current.....	Internally Limited
Maximum Power Dissipation, P _D @T=25°C	
SOT89-3.....	0.5W
SOT23-3.....	0.15W
SOT23-5.....	0.15W
Operating Temperature Range.....	-40°C to +85°C
Junction Temperature.....	-40°C to +150°C
Storage Temperature Range	-55°C to +150°C
Lead Temperature (Soldering, 10sec)	300°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

PIN CONFIGURATION

THERMINAL FUNCTION

Pin NO.			Pin Name	DESCRIPTION
SOT89-3	SOT23-3	SOT23-5		
--	--	1	CE	Chip Enable (Active High)
2	3	2	VOUT	Output Voltage
--	--	3	NC	No Connection
1	1	4	GND	Ground
3	2	5	LX	Switch Pin

Table 1

ORDERING INFORMATION

FT435-①②③

Designator	Symbol	Output Voltage
①②	25	2.5V
	27	2.7V
	28	2.8V
	30	3.0V
	33	3.3V
	35	3.5V
	37	3.7V
	40	4.0V
	45	4.5V
	50	5.0V
	55	5.5V
Designator	Symbol	Package
③	f	SOT89-3
	h	SOT23-3
	l	SOT23-5

Table 2
MARKING RULE

①②③④⑤⑥

① Represent Product Series

Symbol	Product Series
8	FT435xx

Table 3

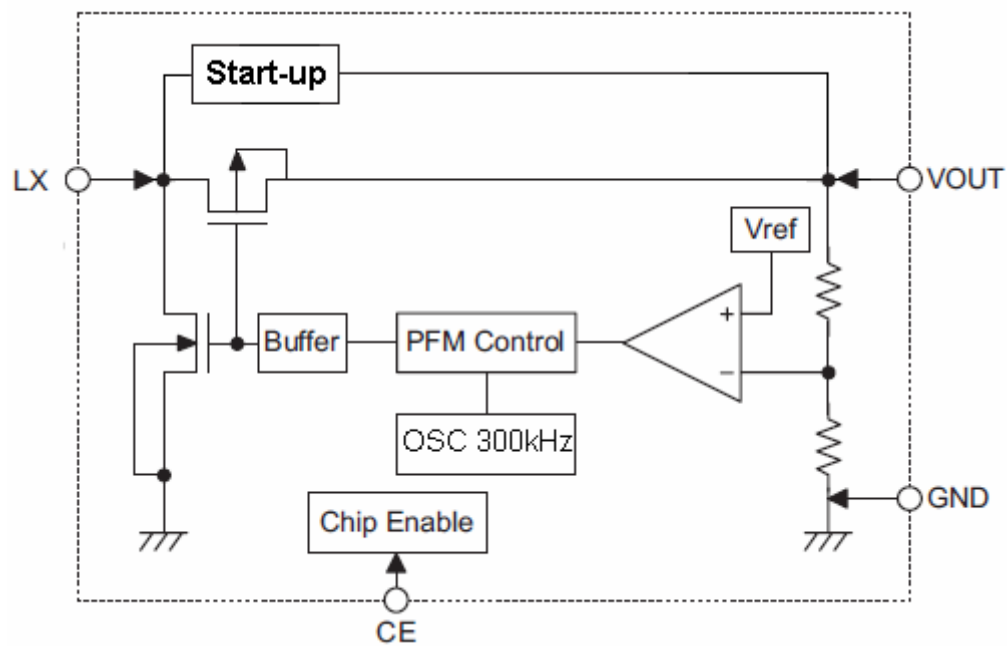
②③ Represent Output Voltage

④ Represent Package Tape

⑤⑥ For internal reference

Example: 833fxx

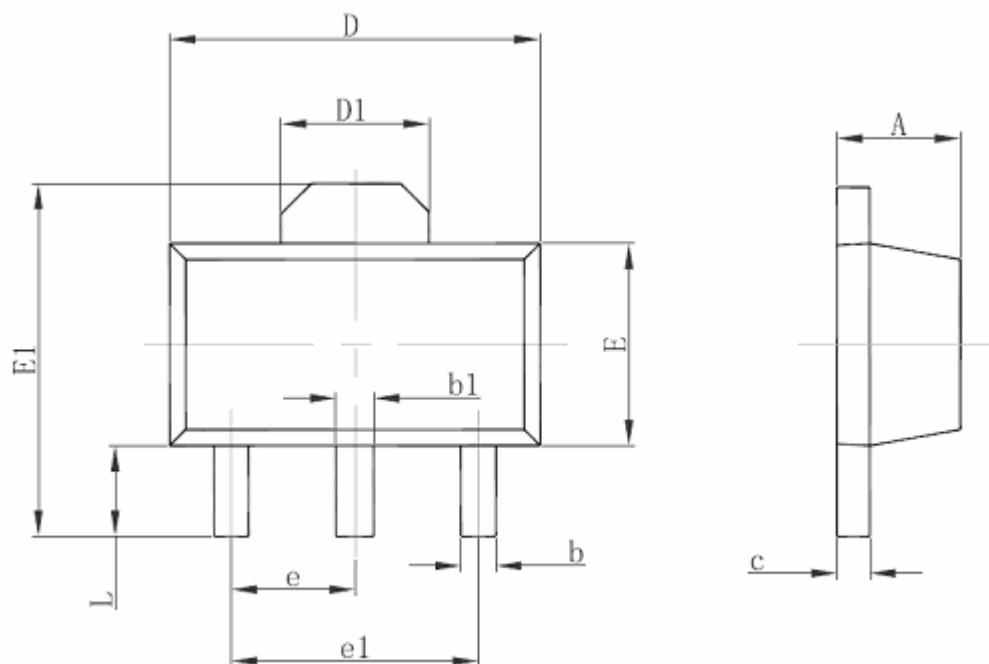
→ FT435, 3.3V, SOT89-3 package

BLOCK DIAGRAM**Block Diagram**

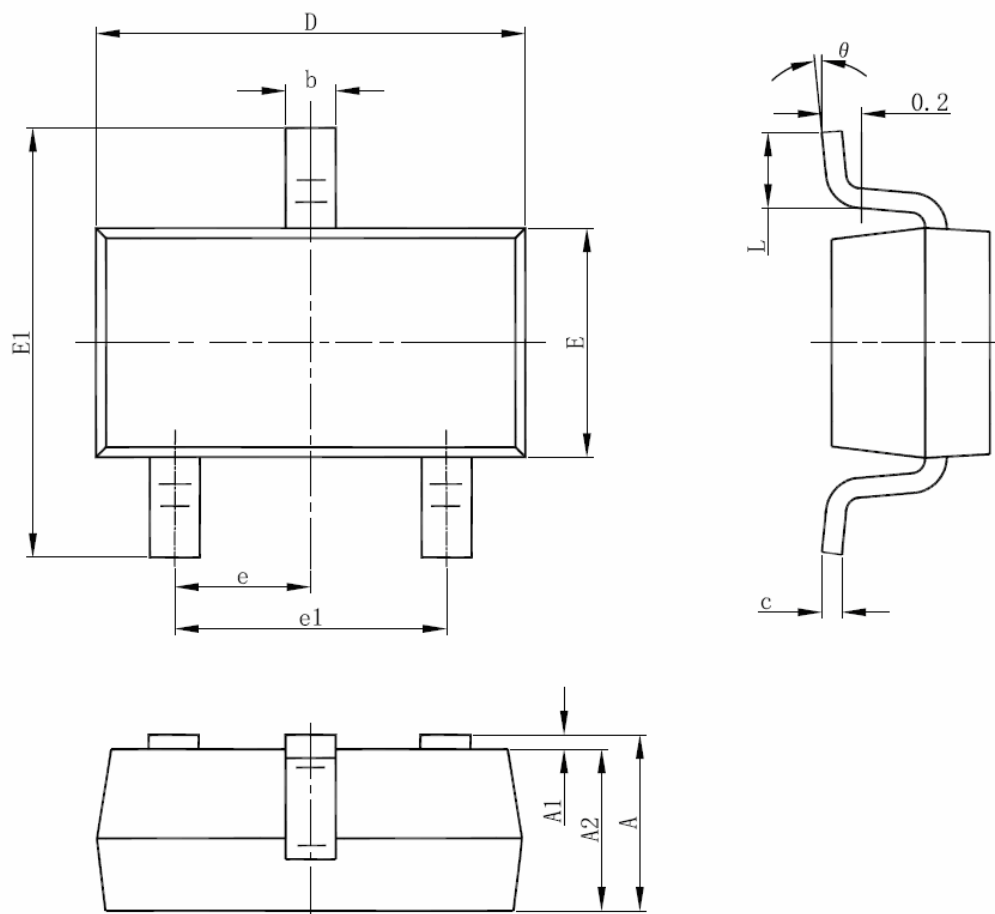


ELECTRICAL CHARACTERISTICS

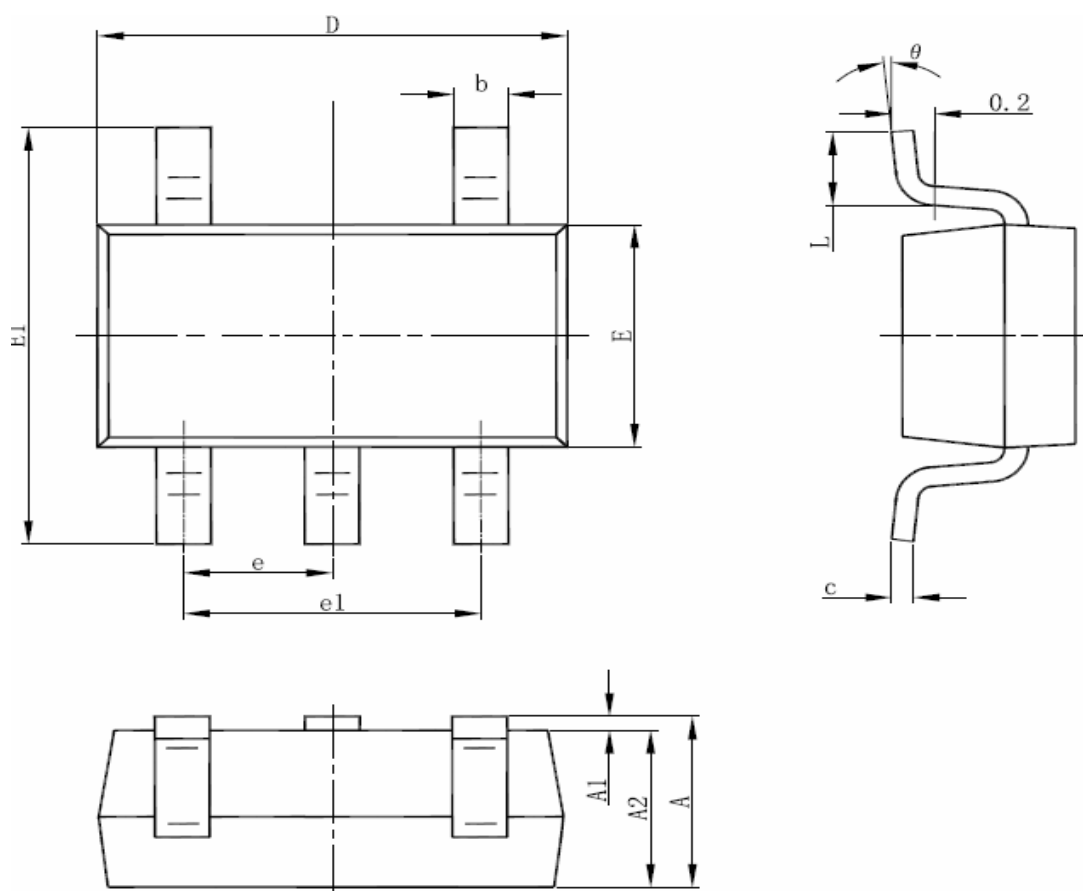
DC/DC STAGE						
PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
V _{OUT}	Output Voltage	FT435-25 Vin=1.8V	2.437	2.5	2.563	V
		FT435-27 Vin=1.8V	2.633	2.7	2.767	
		FT435-28 Vin=1.8V	2.73	2.8	2.87	
		FT435-30 Vin=1.8V	2.925	3.0	3.075	
		FT435-33 Vin=2V	3.218	3.3	3.382	
		FT435-37 Vin=2V	3.607	3.7	3.792	
		FT435-45 Vin=3V	4.387	4.5	4.613	
		FT435-50 Vin=3V	4.875	5.0	5.125	
		FT435-55 Vin=3V	5.363	5.5	5.638	
V _{ST}	Start-up Voltage	I _{out} =1mA, Vin: 0 → 2V		0.8	0.95	V
V _{HO}	Hold-on Voltage	I _{out} =1mA, Vin: 2 → 0V		0.55	0.7	V
I _{IN}	Input Current	I _{out} =0mA, Vin=V _{out} *0.6		11	16	uA
I _{DD}	Quiescent Current	To be measured at V _{out} in switch off condition		6	10	uA
R _{ON,SW}	Switch ON Resistance			0.4	0.5	Ω
R _{ON,RE}	Rectifier ON Resistance			0.5	0.6	Ω
I _{LX}	LX Leakage Current	V _{out} =VLX=6V			0.5	uA
F _{MAX}	Maximum Oscillator Frequency		180	300	400	KHz
D _{OSC}	Oscillator Duty Cycle		71	77	83	%
V _{CEH}	CE high threshold voltage	V _{CE} : 0 → 2V	0.6	0.9		V
V _{CEL}	CE low threshold voltage	V _{CE} : 2 → 0V		0.3	0.6	V
η	Efficiency			90		%

PACKAGING INFORMATION
SOT89-3


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

SOT23-3


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	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

SOT23-5


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	0.95 (BSC)		0.037 (BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	6°