1MHz, 3A Step Up Regulator

General Description

AP2004 is an asynchronous PWM boost converter using a constant frequency peak current mode. An external Schottky diode is needed. At light load, AP2004 works in the light load mode. The supply current during the light mode is 100uA and less than 1uA in shutdown mode, together with the 130mΩ internal NMOS power transistor guarantees high efficiency in the whole output load current range. Up to 3A peak current, Let AP2004 can provide 1A output load current, which is suitable to use as MID and mobile power supply. The input voltage 2.5~5.5V.The operating frequency is internally set at 1MHz.
The device is available in the small profile SOT23-6L package.

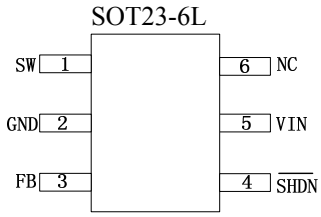
Applications

- WLED Drivers
- Networking cards powered from PCI or PCI-express slots
- MID and Mobile Power

Features

- High Efficiency: Up to 92%
- 1.0MHz Constant Switching Frequency
- Switch current up to 3A
- Low Rdson: 0.13Ω
- Accurate Reference:0.6V
- Tiny External Components
- <1μA Shutdown Current
- Space Saving 6-Pin SOT23 Package

Package



Typical Application Circuit

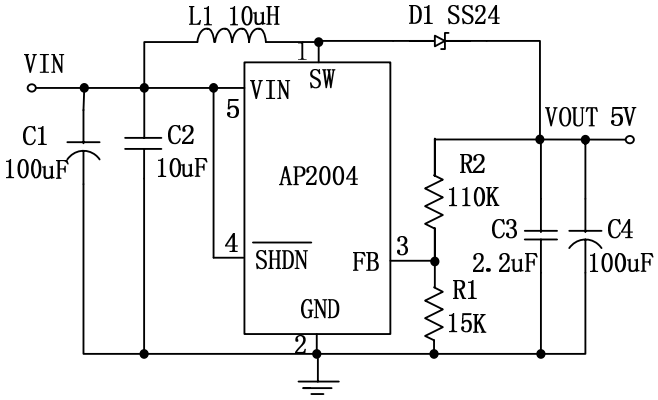


Figure 1. Basic Application Circuit with AP2004 Adjustable Version

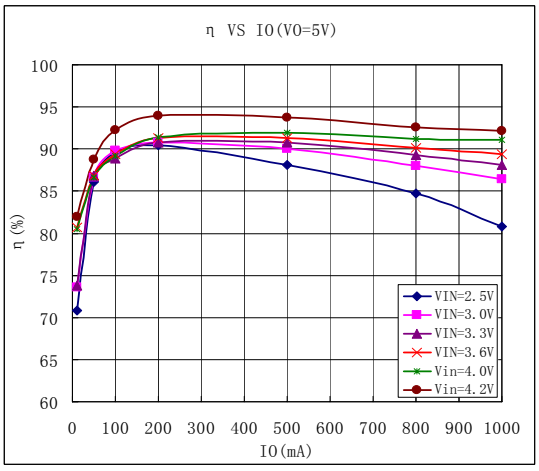


Figure 2. Typical Efficiency Curve

Pin Description

Pin No.	Pin Name	Pin Function
1	SW	Power Switch Pin. It is the switch node connection to Inductor.
2	GND	Ground Pin.
3	FB	Feedback Input Pin. Connect FB to the center point of the external resistor divider. The feedback threshold voltage is 0.6V.
4	$\overline{SHDN}$	Chip Shutdown Signal Input. Logic high is normal operation mode, Logic Low is Shutdown. Don't leave it floated.
5	VIN	Power Supply Input. Must be closely decoupled to GND, Pin 2, with a 10µF or greater ceramic capacitor.
6	NC	No Internal Connection.

Functional Block Diagram

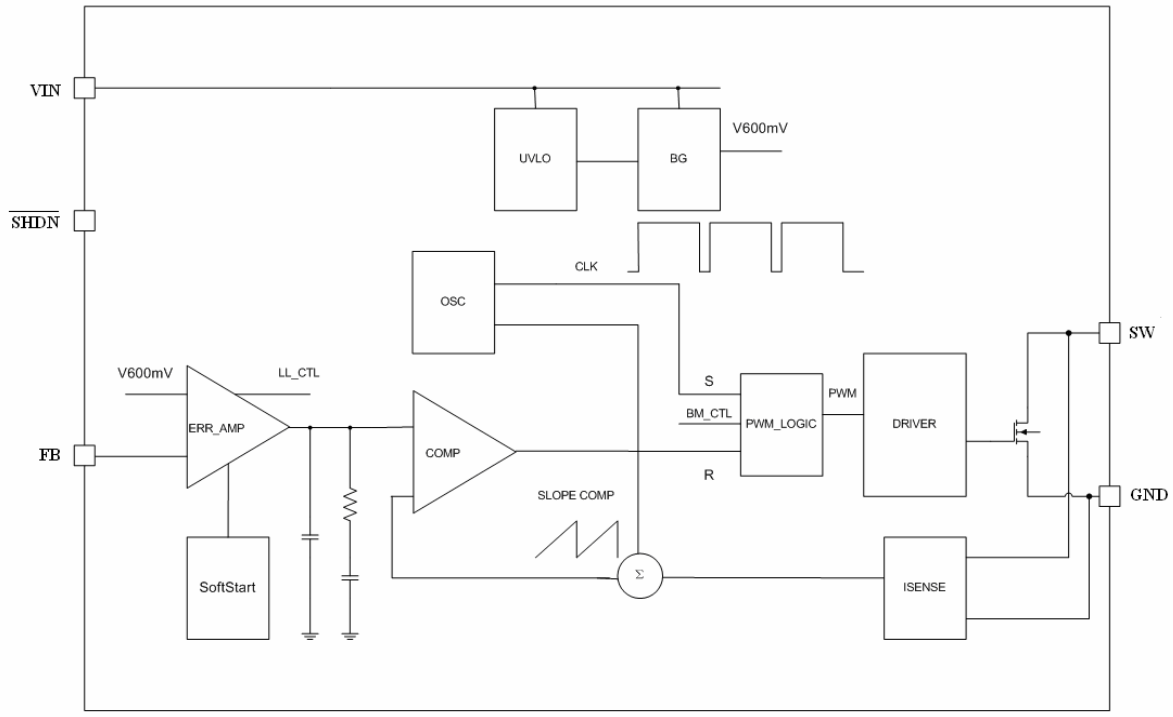


Figure 3. AP2004 Block Diagram

Absolute Maximum Rating (Note 1)

Input Supply Voltage……-0.3V to +6V
SW Voltage……-0.3V to +6V
FB, SHDN Voltages……...-0.3V to +6V

Package Thermal Resistance (Note 2)

Θ_{JA}.....220°C/W

Θ_{JC}.....110°C/W

Operating Temperature Range……-40°C to +85°C

Storage Temperature Range……-65°C to +150°C

Lead Temperature (Soldering, 10s)……+260°C

Electrical Characteristics (Note 3)

(V_{OUT}=5V, T_A = 25°C, Test Circuit of Figure 1,unless otherwise noted.)

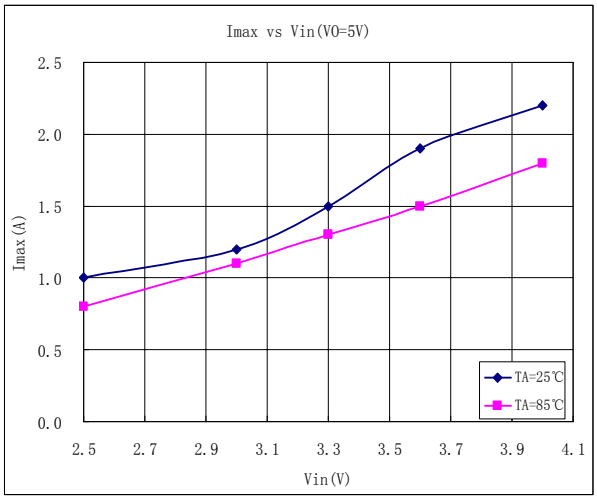
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	VIN		2.5		5.5	V
Quiescent Current	IQ	FB=0.66V		100		μA
Shutdown Current	I_{SHDN}	SHDN=0		3		μA
Low Side Main FET RON	RDS(ON)			130		mΩ
Main FET Current Limit	I_{LIM1}		3		3.5	A
Switching Frequency	Fsw		0.8	1	1.2	MHz
Feedback Reference Voltage	VREF		0.588	0.6	0.612	V
IN UVLO rising threshold	V_{UVLO}				2.7	V
UVLO hysteresis	$UVLO_{HYS}$			0.1		V
Thermal Shutdown Temperature	TSD			150		°C

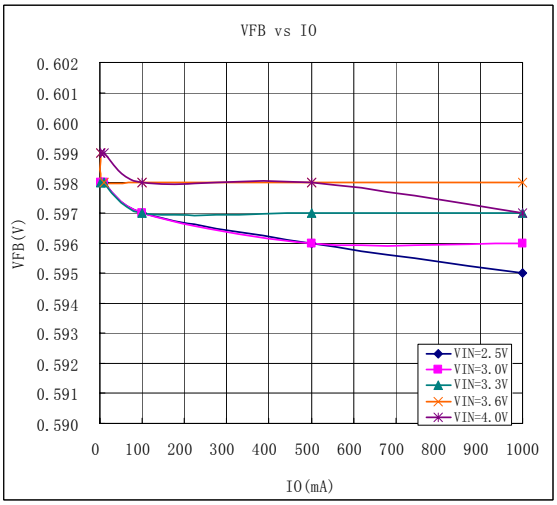
Note 1: Absolute Maximum Ratings are those values beyond which the life of a device may be impaired.

Note 2: Thermal Resistance is specified with approximately 1 square of 1oz copper.

Note 3: 100% production test at +25°C. Specifications over the temperature range are guaranteed by design and characterization.

Typical Performance Characteristics





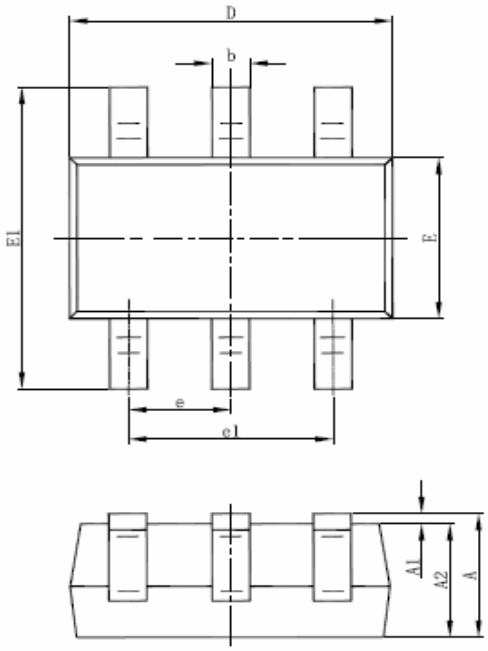
Ordering Information

Part number	Mark	Package
AP2004TCER-ADJ	T1XYP[1]	SOT-23-6L

1. XY=date code
2. P= Package factory

Package Information

SOT-23-6L PACKAGE OUTLINE DIMENSIONS



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°

Important Notice

Chipown Microelectronics Co. Ltd. reserves the right to make changes without further notice to any products or specifications herein. Chipown Microelectronics Co. Ltd. does not assume any responsibility for use of any its products for any particular purpose, nor does Chipown Microelectronics Co. Ltd assume any liability arising out of the application or use of any its products or circuits. Chipown Microelectronics Co. Ltd does not convey any license under its patent rights or other rights nor the rights of others.