DESCRIPTION

The A7120 is a high efficiency synchronous buck regulator. The device operates from an input voltage range of 3.6V to 5.5V and provides an output voltage from 0.8 to 5V while delivering up to 2A of output current.

The internal synchronous switches increase efficiency and eliminate the need for an external Schottky diode. The switching frequency is set by an external resistor or can be synchronized to an external clock. While switching frequency is set to 1.4MHz, A7120 can allow the use of small external components, such as ceramic input and output caps, as well as small inductors, while still providing low output ripples.

100% duty cycle provides low dropout operation extending battery life in portable systems.

The A7120 is available in SOP8 package.

ORDERING INFORMATION

Package Type	Part Number	
SOP8	M	A7120M8R-XX
		A7120M8VR-XX
Note	XX: ADJ=Adjustable V: Halogen free Package R : Tape & Reel	
AiT provides all RoHS products Suffix " V " means Halogen free Package		

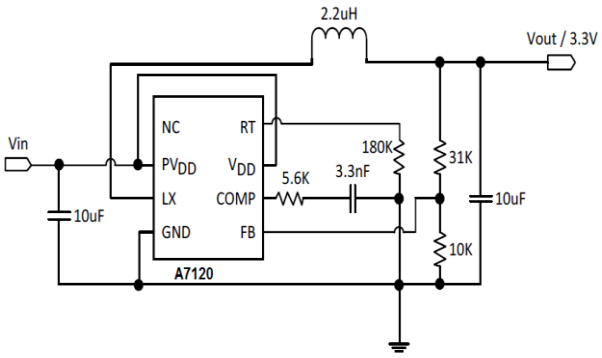
FEATURES

- Range of Input Voltage: 3.6V~5.5V
- 1μA Shutdown Current
- 100% Duty Cycle
- High Efficiency: 92%
- No Schottky Diode Required
- 3.5A Current Limit
- 0.8V Reference for Low Output Voltage
- Operating Temp. Range: -20°C~85°C
- Available in SOP8 Package

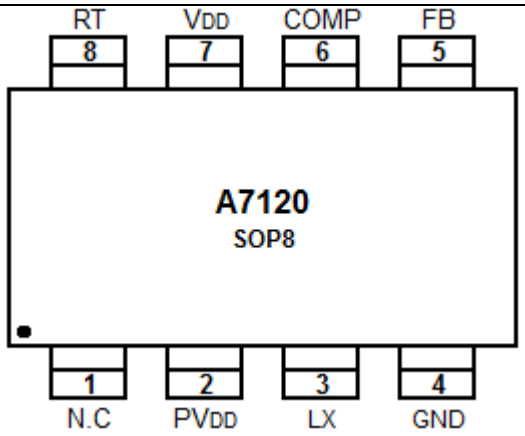
APPLICATIONS

- Cellular phones
- Digital Cameras
- MP3 and MP4 players
- Set top boxes
- Wireless and DSL Modems
- USB supplied Devices in Notebooks
- Portable Devices

TYPICAL APPLICATION



PIN DESCRIPTION



Top View

Pin #	Symbol	Function
1	N.C	Not Connected
2	PV_{DD}	Power Supply for internal power switch
3	LX	Switching Node: PWM output connection to inductor
4	GND	Ground Pin
5	FB	Pin for Feedback Voltage
6	COMP	Compensation Pin
7	V_{DD}	Power Supply for internal control circuit
8	RT	Oscillator Resistor Input Pin

ABSOLUTE MAXIMUM RATINGS

Max Input Voltage	5.5V
CE Pin Voltage	–0.3V to Vin+0.3V
FB Pin Voltage	–0.3V to Vin+0.3V
T_J, Max Operating Junction Temperature	125℃
T_A, Ambient Temperature	-40℃ - 85℃
Ts, Storage Temperature	-40℃ - 150℃
Lead Temperature & Time	260℃, 10S
HBM, ESD	>2000V
θ_{JA}, Thermal resistance	150°C/W

Stresses above may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

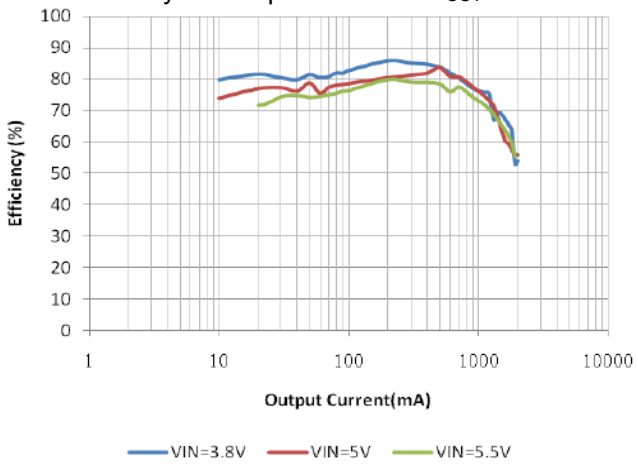
ELECTRICAL CHARACTERISTICS

Test condition is in 25ºC, V_{IN}=5V

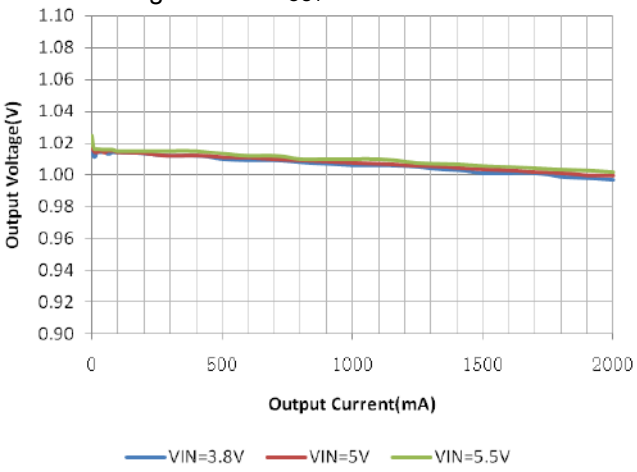
Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
Input Voltage Range	V_{DD}		3.6		5.5	V
Feedback Voltage	V_{REF}		0.784	0.8	0.816	V
Feedback Leakage current	I_{FB}			0.1	0.4	uA
Quiescent Current	Iq	Active, V_{FB}=0.65, No Switching		450		uA
		Shutdown		1		
Line Regulation	LnReg	V_{IN}=4V to 5.5V		0.1		%/V
Load Regulation	LdReg	I_{OUT}=0.1 to 2A		0.02		%/A
Switching Frequency	Fsoc	R3=180K		1.4		MHz
PMOS Rdson	RdsonP			150		mΩ
NMOS Rdson	RdsonN			130		mΩ
Peak Current Limit	Ilimit			3.8		A
SW Leakage Current	Iswlk	V_{OUT}=5.5V, V_{SW}=0 or 5.5V, EN=0V			10	uA
EN Leakage Current	Ienlk				1	uA
EN Input High Voltage	Vh_en		V_{IN}-0.6			V
EN Input Low Voltage	Vl_en				V_{IN}-0.8	V

TYPICAL PERFORMANCE CHARACTERISTICS

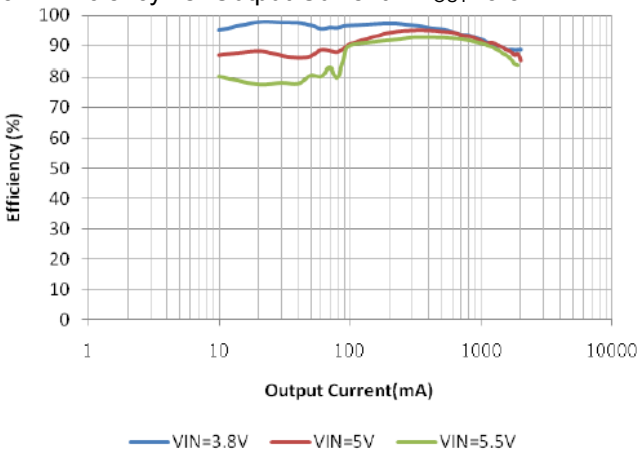
1. Efficiency vs. Output Current V_{OUT}=1.0V



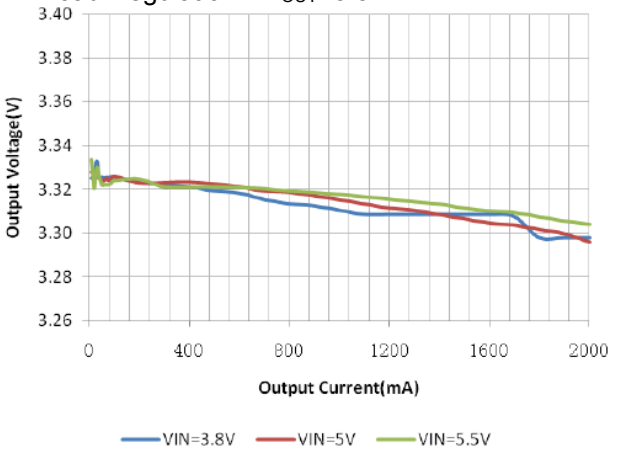
2. Load Regulation V_{OUT}=1.0V



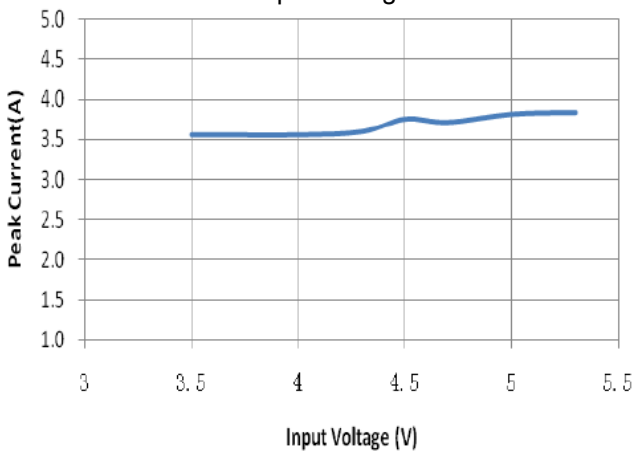
3. Efficiency vs. Output Current V_{OUT}=3.3V



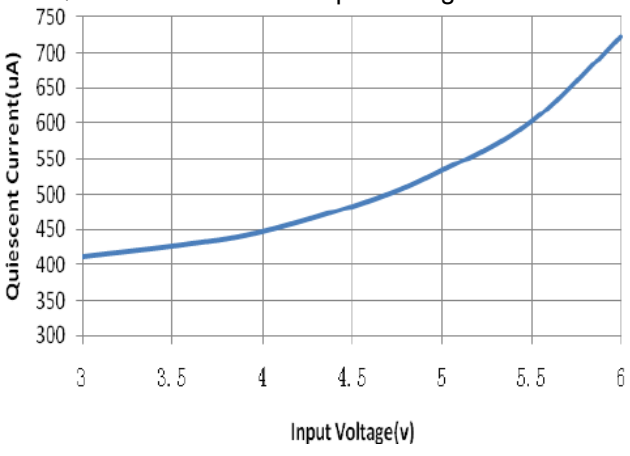
4. Load Regulation V_{OUT}=3.3V



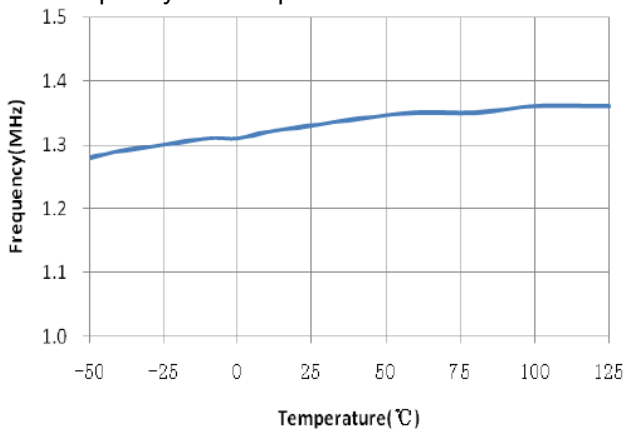
5. Peak Current vs. Input Voltage



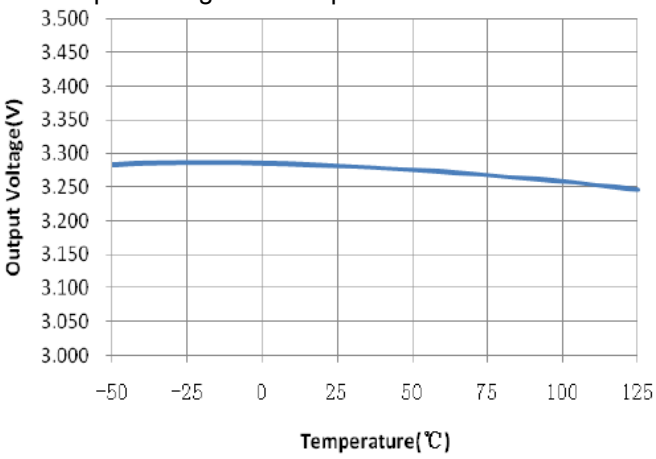
6. Quiescent Current vs. Input Voltage



7. Frequency vs. Temperature V_{IN}=5V



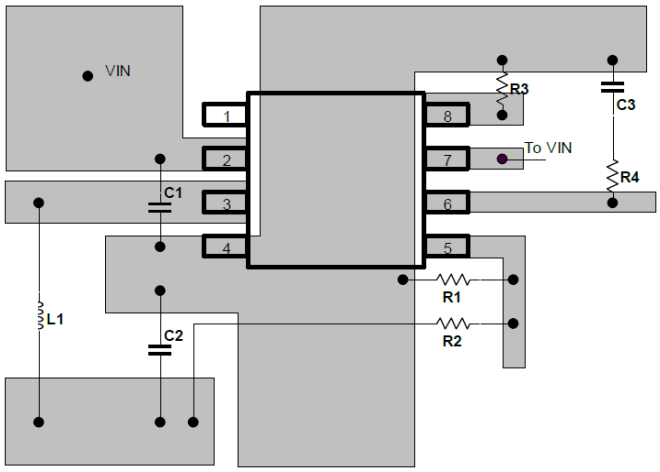
8. Output Voltage vs. Temperature V_{IN}=5V



APPLICATION INFORMATION

Layout is critical to achieve clean and stable operation. The switching power stage requires particular attention. Follow these guidelines for good PC board layout:

1) Place decoupling capacitors as close to the IC as possible
2) Connect input and output capacitors to the same power ground node with a star ground configuration then to IC ground.
3) Keep the high-current paths as short and wide as possible.
4) If possible, connect V_{DD}, LX, and GND separately to a large copper area to help cool the IC to further improve efficiency and long-term reliability.
5) Ensure all feedback connections are short and direct. Place the feedback resistors as close to the IC as possible.
6) Route high-speed switching nodes away from sensitive analog areas

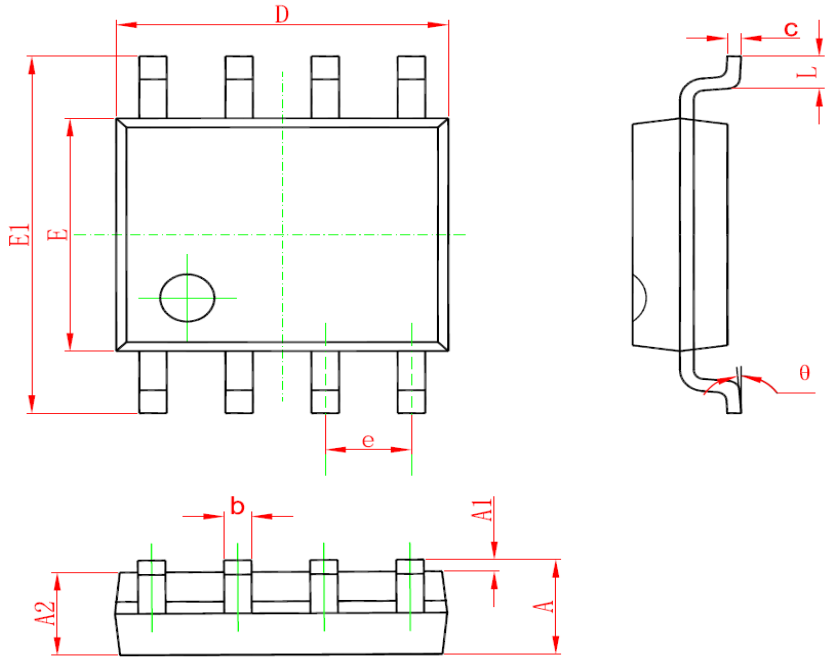


DEMO BOARD BOM

No.	Reference	Type	Specification	Note
1	C1	Capacitor	MLCC 10uF; SMD 0805	
2	C2	Capacitor	MLCC 10uF; SMD 0805	
3	C3	Capacitor	MLCC 3.3nF; SMD 0805	
4	L1	Inductor	2.2uH; 3A; SMD, Shielding	
5	U1	IC	A7120; SMD SOP-8	
6	R1	Resistor	10K;SMD 0805; 1%	
7	R2	Resistor	31K;SMD 0805; 1%	If V_{OUT} is 1.0V, R2 is 2.5K
8	R3	Resistor	180K;SMD 0805; 1%	
9	R4	Resistor	5.6K;SMD 0805; 5%	

PACKAGE INFORMATION

Dimension in SOP8 Package (Unit: mm)



Symbol	Min	Max
A	-	1.77
A1	0.08	0.28
A2	1.2	1.6
b	0.39	0.48
c	0.21	0.26
D	4.700	5.100
E	3.7	4.1
E1	5.800	6.200
e	1.270(BSC)	
L	0.5	0.8
θ	0°	8°

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