



DESCRIPTION

The A7320 is a monolithic IC designed for a step down DC/DC converter with low EMI signature, and own the ability of driving a 2A load without additional transistor. It saves board space.

The A7320 also can run at 100% duty cycle for low dropout operation, and Internal soft-start results in small inrush current extending battery life in portable systems. As a protection function, it has cycle by cycle peak current limit function, short protection function, thermal shutdown function and UVLO.

The device is available in a 6-pin small profile SOT-26 package.

FEATURES

- Wide input voltage Range: 4V~30V
- Adjustable Output Voltage from 0.6V to V_{IN}
- Low RDS(ON)Switches 160 mΩ / 105 mΩ
- 600KHzTypical Switching Frequency
- Internal Power-Save Mode (PFM/PWM)
- Low EMI Signature
- Duty Cycle up to 100%
- COT Mode
- Short Circuit Protection
- Over Current Protection
- Internal Soft Startup
- Thermal Shutdown Protection

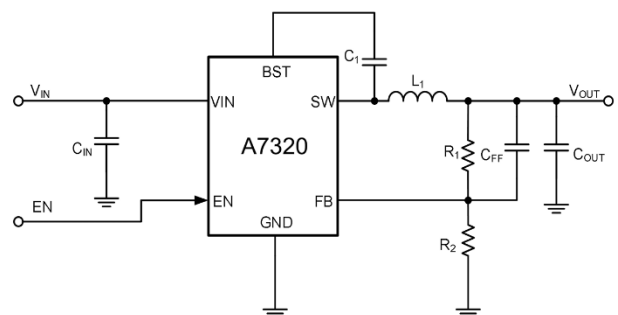
ORDERING INFORMATION

Package Type	Part Number	
SOT26 SPQ:3,000pcs/Reel	E6	A7320E6R
		A7320E6VR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

Application

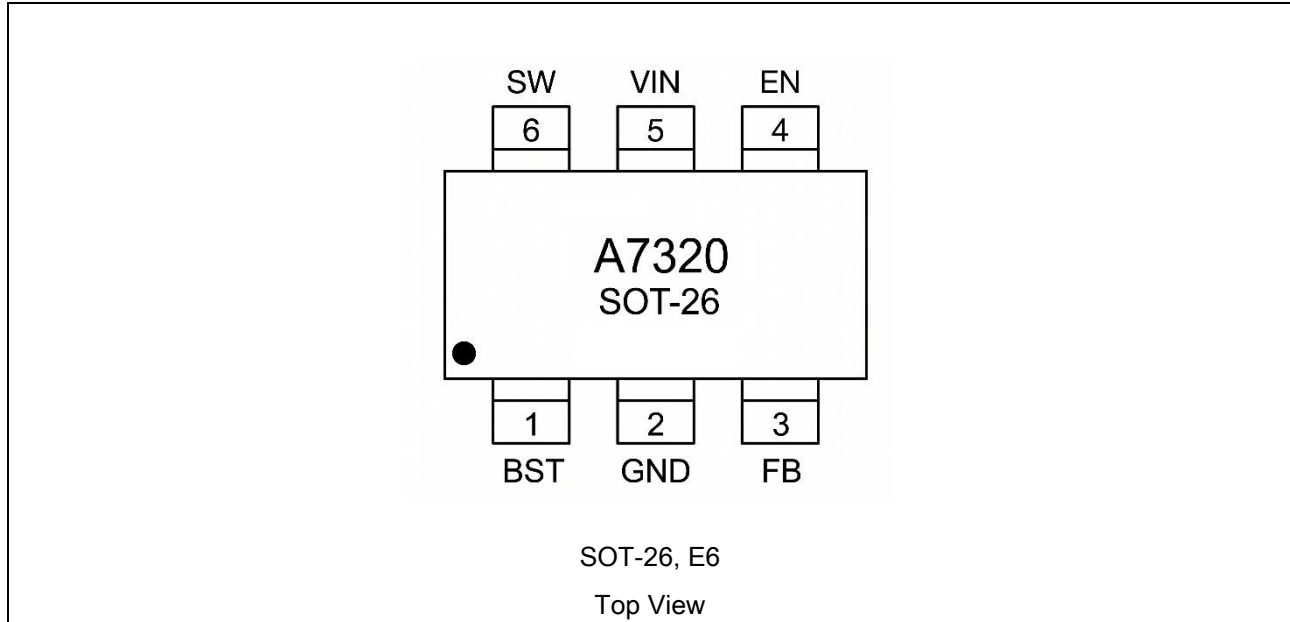
- LCD Monitor and LCDTV
- Battery-powered Equipment
- SDigital Home Appliances: Digital TVs
- ADSL Modem Portable Instruments

TYPICAL APPLICATION





PIN DESCRIPTION



PIN#	Symbol	Function
1	BST	Bootstrap. A capacitor connected between SW and BST pins is required to form a floating supply across the high-side switch driver.
2	GND	Ground pin.
3	FB	Feedback pin for the internal control loop. Connect this pin to an external feedback divider.
4	EN	Device enable logic input. Logic high enables the device, logic low disables the device and turns it into shutdown. Float this pin to enable A7320.
5	VIN	Power supply voltage input.
6	SW	Switch pin connected to the internal FET switches and inductor terminal. Connect the inductor of the output filter to this pin.

**ABSOLUTE MAXIMUM RATINGS**

over operating free-air temperature range (unless otherwise noted)

V _{IN} , and EN pin Voltage	-0.3V ~ 36V
BST, Voltage	V _{SW} +5V
SW (less than 10ns) , Voltage	-0.3V ~ V _{IN} +0.5V
FB, Voltage	- 0.3V ~ +6.5V
T _J , Operating Junction Temperature	-40°C ~ +150°C
T _{STG} , Storage Temperature	-65°C ~ +150°C
R _{θJA} , Junction-to-Ambient Thermal Resistance	240°C/W
R _{θJC(top)} , Junction-to-Case (Top) Thermal Resistance	140°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 are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

- (1) All voltage values are with respect to network ground terminal.
- (2) While switching.

RECOMMENDED OPERATING CONFITIONST_C= 25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating Junction Temperature	-	-	-40	-	125	°C/W
Operating temperature range	-	-	-40	-	85	°C/W
Input Voltage	V _{IN}	-	4.5	-	38	V
Output Voltage	-	-	0	-	1	A

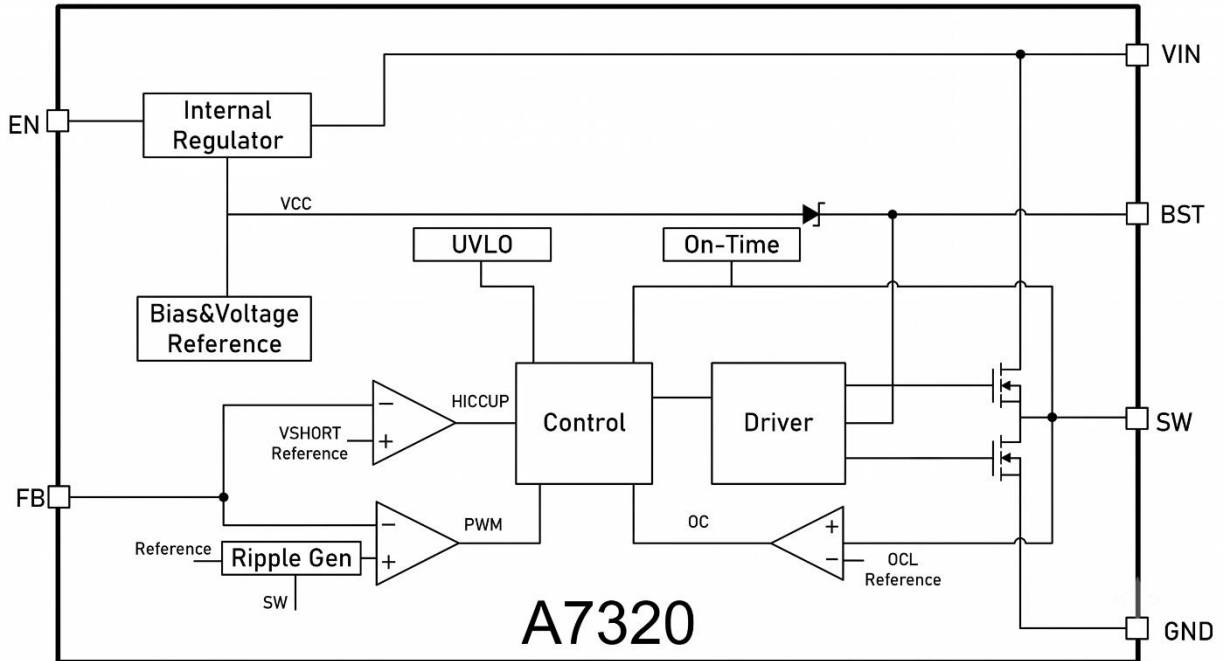
**ELECTRICAL CHARACTERISTICS**

$V_{IN} = 12V$, unless otherwise specified. Typical values are at $T_A = 25^\circ C$

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Units
Input voltage range	V_{IN}	-	4	-	30	V
Non switching quiescent current	I_Q	EN = 5V	200	300	800	μA
Shutdown current	I_{OFF}	EN = GND	-	-	3	μA
Regulated Feedback Voltage	V_{FB}	-	585	600	615	mV
V_{IN} under voltage lockout	$V_{IN(UVLO)}$	-	-	3.5	-	V
V_{IN} under voltage lockout Hysteresis		-	-	380	-	mV
ENABLE (EN PIN)						
Enable threshold	$V_{(EN_RISING)}$	Rising	1.2	-	-	V
	$V_{(EN_FALLING)}$	Falling	-	-	0.4	V
Threshold Hysteresis	$V_{(EN_HYS)}$	-	-	120	-	mV
POWER STAGE						
High-side FET on resistance	$R_{(HSD)}$	$I_{SW} = 1000mA$	-	160	-	m Ω
Low-side FET on resistance	$R_{(LSD)}$	$I_{SW} = -1000mA$	-	105	-	m Ω
CURRENT LIMIT						
FET current limit	$I_{(LIM_HS)}$	FB=90%	-	3.5	-	A
OSCILLATOR						
Centre switching frequency	F_{SW}	-	500	600	900	KHz
OVER TEMPERATURE PROTECTION						
Rising temperature	Thermal	-	-	160	-	$^\circ C$
Hysteresis	Shutdown	-	-	30	-	$^\circ C$
Soft start	-	-	-	2.5	-	ms



BLOCK DIAGRAM





DETAILED INFORMATION

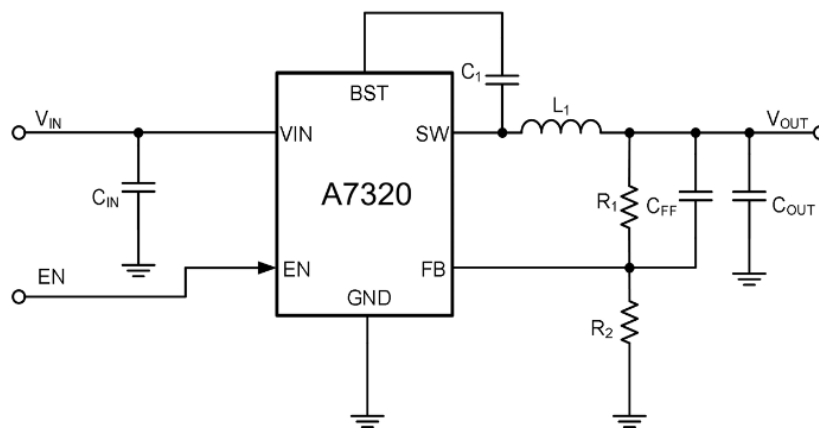
Overview

The A7320 DC/DC converter is designed to provide up to a 2A output from an input voltage source of 4V to 30V. The A7320 is a high output current monolithic switch-mode step-down DC DC converter. The A7320 operates at a fixed 600KHz switching frequency, and uses a slope compensated current mode architecture. The external shutdown function can be controlled by logic level and then come into standby mode. The internal compensation makes feedback control having good line and load regulation without external design. Regarding protected function, thermal shutdown is to prevent over temperature operating from damage, and current limit is against over current operating of the output switch. If current limit function occurs and VFB is down below 0.6V, the switching frequency will be reduced.

Application information

The A7320 is a 4V to 30V wide input voltage range, high performance with 2A output current, 650KHz monolithic step-down converter. The A7320 requires few external power components (CIN, COUT and L1). The output voltage can be programmed with external feedback to any voltage, ranging from 0.6V to the input voltage.

$$V_{OUT} = 0.6 \times \frac{R_1 + R_2}{R_2}$$



**Table 1. Recommended Component Values**

V _{OUT} (V)	L1 (μH)	C1(μF)	C _{IN} (μF)	C _{OUT} (μF)	C _{FF} Opt.(pF)	R1 (kΩ)	R2 (kΩ)
1.5	1.0 ~ 4.7	0.1	10	22	10 ~ 100	15	10
3.3	1.5 ~ 6.8	0.1	10	22	10 ~ 100	45	10
5	2.2 ~ 6.8	0.1	10	22	10 ~ 100	73.3	10
12	6.8 ~ 15	0.1	10	22	10 ~ 100	43	2.2

Power Supply Recommendations

The A7320 are designed to operate from an input voltage supply range between 4V and 30V. This input supply must be well regulated. If the input supply is located more than a few inches from the device or converter, additional bulk capacitance may be required in addition to the ceramic bypass capacitors. An electrolytic capacitor with a value of 47 μF is a typical choice.

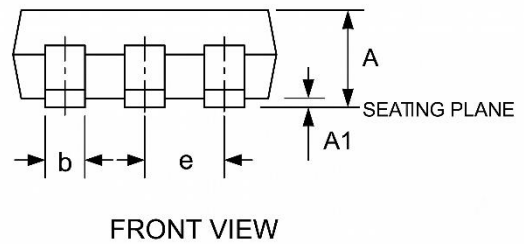
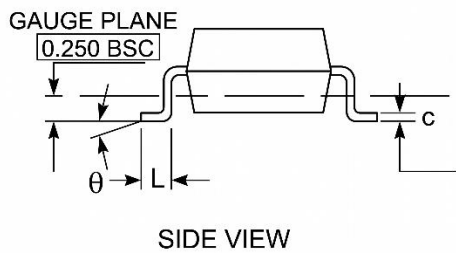
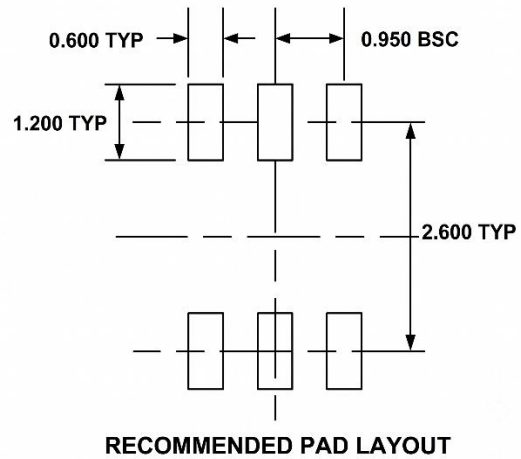
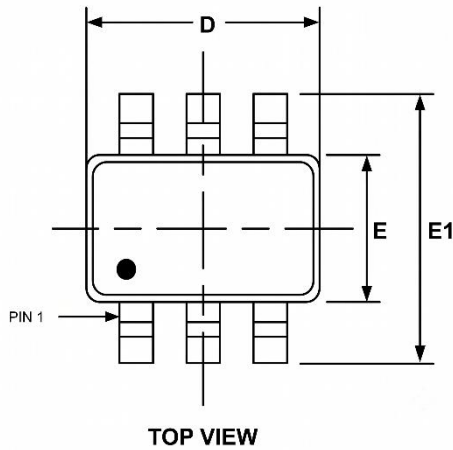
Layout Guidelines

- VIN and GND traces should be as wide as possible to reduce trace impedance. The wide areas are also of advantage from the viewpoint of heat dissipation.
- The input capacitor and output capacitor should be placed as close to the device as possible to minimize trace impedance.
- Provide sufficient vias for the input capacitor and output capacitor.
- Keep the SW trace as physically short and wide as practical to minimize radiated emissions.
- Do not allow switching current to flow under the device.
- A separate VOUT path should be connected to the upper feedback resistor.
- Make a Kelvin connection to the GND pin for the feedback path.
- Voltage feedback loop should be placed away from the high-voltage switching trace, and preferably has ground shield.
- The trace of the VFB node should be as small as possible to avoid noise coupling.
- The GND trace between the output capacitor and the GND pin should be as wide as possible to minimize its trace impedance.



PACKAGE INFORMATION

Dimension in SOT-26 (Unit: mm):



Symbol	Millimeters	
	Min	Max
A	-	1.450
A1	0.000	0.150
b	0.250	0.500
c	0.090	0.200
D	2.800	3.000
E	1.500	1.700
E1	2.600	3.100
e	0.950 BSC	
L	0.300	0.550
θ	0°	8°



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