DESCRIPTION

The A7110H is a monolithic integrated circuit designed for step-down (buck) DC/DC converter applications. It features a low EMI signature, making it ideal for noise-sensitive environments. The device supports up to 1A continuous output current with excellent load and line regulation, ensuring stable performance across varying conditions.

Key performance features include the ability to operate at up to 97% duty cycle, allowing for low dropout operation, which is critical for maximizing output voltage in low-input voltage scenarios. An internal soft start minimizes inrush current during startup, helping to extend battery life in portable applications.

Protection Features are Cycle-by-cycle peak current limit, Short-circuit protection, Thermal shutdown, and Under-voltage lockout (UVLO)

The A7110H is available in SOT-26 and PSOP8 packages.

ORDERING INFORMATION

Package Type	Part Number	
SOT-26 SPQ:3,000pcs/Reel	E6	A7110HE6VR
PSOP8 SPQ:4,000pcs/Reel	MP8	A7110HMP8VR-Z
Note	Z: Package Type See the pin description V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

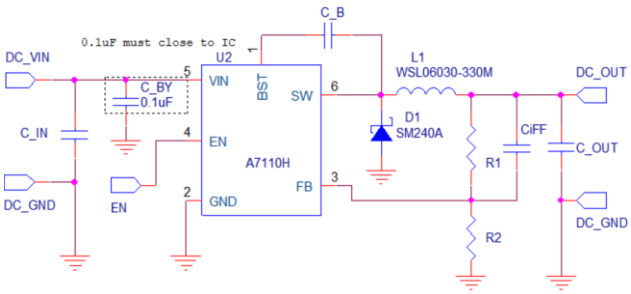
FEATURES

- Wide input voltage Range: 4.5V~100V
- Adjustable Output Voltage from 0.78V to V_{IN}
- Low $R_{DS(ON)}$ Switches 1.1Ω
- Typical Switching Frequency:450KHz
- High Duty Cycle: Up to 97%
- Short Circuit Protection
- Over Current Protection
- Internal Soft Startup
- Thermal Shutdown Protection

APPLICATION

- LCD Monitor and LCD TV
- Battery-powered Equipment
- Entertainment Devices
- Digital Home Appliances: Digital TVs
- ADSL Modem Portable Instruments

TYPICAL APPLICATION

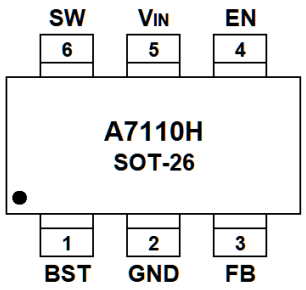


L1: 33uH: WSL06030-330M

47uH: WSL06030-470M

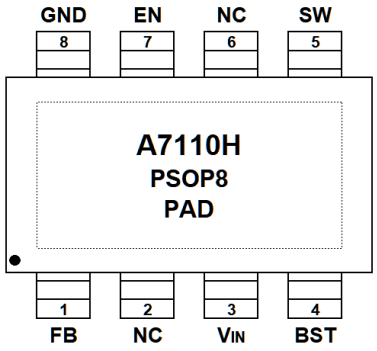
D1: SM240A (SS24)

PIN DESCRIPTION



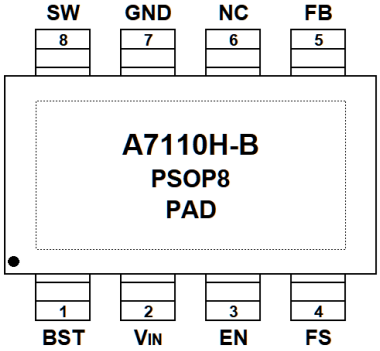
SOT-26, E6

Top View



PSOP8, MP8

Top View



PSOP8, MP8

Top View

PIN#			Symbol	Function
SOT-26	PSOP8			
A7110H	A7110H	A7110H-B		
1	4	1	BST	Bootstrap: A capacitor must be connected between the BST and SW pins to create a floating voltage supply that drives the high-side MOSFET gate.
2	8	7	GND	Ground pin.
3	1	5	FB	Feedback: Provides input to the internal control loop. Connect this pin to an external resistor divider from the output to set the regulated output voltage.
4	7	3	EN	Enable: Logic input for device enable control. A logic high enables the device, while a logic low disables it and places it into shutdown mode. This pin has an internal pull-up resistor and defaults to high when left floating.
5	3	2	V_{IN}	Power supply voltage input
6	5	8	SW	Switch: This pin is connected to the internal power MOSFETs and serves as the switching node. Connect the output filter inductor to this pin.
	2,6	6	NC	No conection
		4	FS	Switching Frequency Set
	PAD	PAD		Exposed pad must be connected to Ground

ABSOLUTE MAXIMUM RATINGS

Over operating temperature range(25°C) (unless otherwise noted)

Voltage (1)	V_{IN}	-0.3V ~ +110V
	V_{SW}	-0.3~V_{IN}+0.5V
	All other pins	-0.3~5.5V
	V_{BST}	V_{SW}+5.5V
I_{EN}, Max Input current to EN pin		100μA
T_J, Operating Junction Temperature		-40°C ~ +125°C
T_{STG}, Storage Temperature		-55°C ~ +150°C
$R_{\theta JA}$, Junction-to-Ambient Thermal Resistance		20 °C/W
$R_{\theta JC(top)}$, Junction-to-Case (top) Thermal Resistance		40 °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.

RECOMMENDED OPERATING CONDITIONS

	MIN.	MAX.	Units
V_{IN}, Input Voltage	4.5	100	V
V_{OUT}, Output Voltage	0.8	0.8~V_{IN}*D_{MAX} (1)	V
Operation Temperature range	-40	85	°C/W
Operation Iunction Temperature	-40	125	°C/W
Output Current	0	1.0	A
Output Current (Peak<100mS)	0	1.45	A

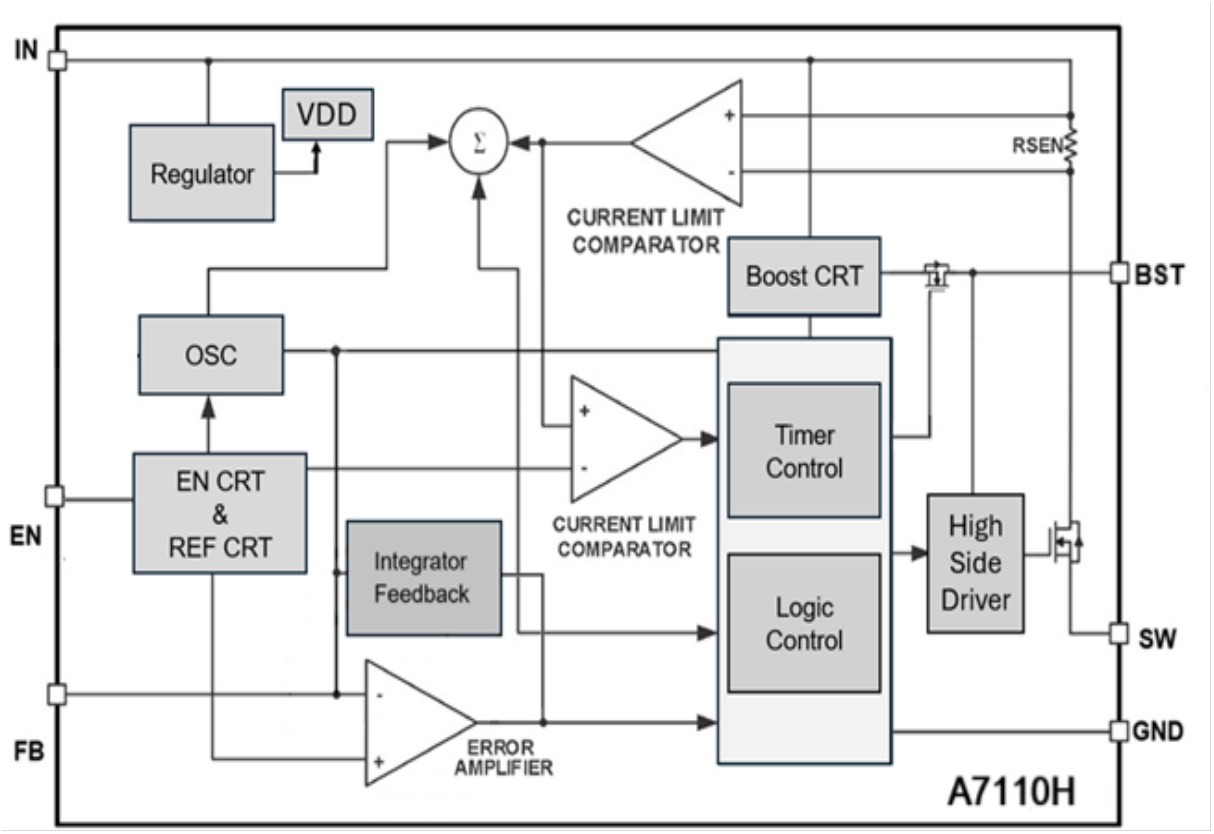
(1) D_{MAX} = T_{ON_MAX} / (T_{ON_MAX} + T_{OFF_MIN}). Typical value is 97%.

ELECTRICAL CHARACTERISTICS

V_{IN}=48V, T_A=25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
Input Voltage Range	V_{IN}		4.5	-	100	V
Non Switching Quiescent Current	I_Q	EN=5V V_{FB}=0.85V	-	170	300-	μA
Shut Down Current	I_{OFF}	EN = GND	-	3	-	μA
Regulated Feedback Voltage	V_{FB}		760	780	795	mV
V_{IN} Under Voltage Lockout	$V_{IN(UVLO)}$		-	4.3	-	V
V_{IN} Under Voltage Lockout Hysteresis			-	200	-	mV
ENABLE (EN PIN)						
Enable Threshold	$V_{(EN\_RISING)}$	Rising	1.5	-	-	V
	$V_{(EN\_FALLING)}$	Falling	-	-	0.4	V
Threshold Hysteresis	$V_{(EN\_HYS)}$		-	200	-	mV
EN Pull-Up Current	$I_{(ENPULL\_UP)}$	V_{EN}=HIGH	-	4	-	μA
		V_{EN}=LOW	--	1	-	μA
POWER STAGE						
High-Side FET on Resistance	$R_{(HSD)}$	V_{BST}-V_{SW}=5V	-	900	-	mΩ
CURRENT LIMIT						
High side FET Current Limit	$I_{(LIM\_HS)}$	FB=90%	-	2	-	A
OSCILLATOR						
Centre Switching Frequency	F_{SW}	FS=240K		270		kHz
		FS=75K		150		
		FS=NC		450		
OVER TEMPERATURE PROTECTION						
Rising Temperature	Thermal Shutdown		-	160	-	℃
Hysteresis			-	30	-	℃
Soft Start		V_{FB} from 10% to 90%	1	1.8	3	mS

BLOCK DIAGRAM



DETAILED INFORMATION

Operation Overview

The A7110H is a high-performance monolithic switch-mode step-down (buck) DC-DC converter capable of delivering up to 1A continuous output current from a wide input voltage range of 4.5V to 100V.
It features an adjustable high-frequency operation and is built on a slope-compensated current-mode control architecture, ensuring fast transient response and stable regulation. The internal feedback compensation provides excellent line and load regulation without the need for external components.
An external shutdown pin allows logic-level control for enabling or disabling the device, placing it into low-power standby mode when not in use.
Protection Features:

- Thermal shutdown prevents damage during high-temperature operation.
- Cycle-by-cycle current limiting protects the internal power switch during overcurrent conditions.
- If the feedback voltage V_{FB} drops below 0.78V due to a fault or overload, the switching frequency is automatically reduced, improving system stability and reducing thermal stress.

Application information

The A7110H is a high-performance step-down DC/DC converter with a wide input voltage range of 4.5V to 100V, capable of delivering up to 1 Amp continuous output current. It requires minimal external components, just input and output capacitors ($C_{\_IN}$, $C_{\_OUT}$) and an inductor (L_1)—making it ideal for space-constrained designs. The output voltage is adjustable via an external feedback network, allowing it to be set from 0.78V up to the input voltage, providing flexibility for a wide range of applications.

$$V_{OUT} = 0.78 \times \left(1 + \frac{R1}{R2}\right)$$

V_{OUT}(V)	L1 (μH)	$C_{\_B}$ (μF)	$C_{\_IN}$ (μF)	$C_{\_OUT}$(μF)	C_{iFF} Opt.(pF)	R1 (kΩ)	R2 (kΩ)	D1
5	33	0.1	4.7	47	47	54	10	SM240A
12	47	0.1	4.7	47	10	144	10	SM240A

Table 1. Recommended Component Values

Power Supply Recommendations

The devices are designed to operate with an input voltage supply ranging from 4.5 V to 100 V. To ensure stable operation, the input supply should be well-regulated.

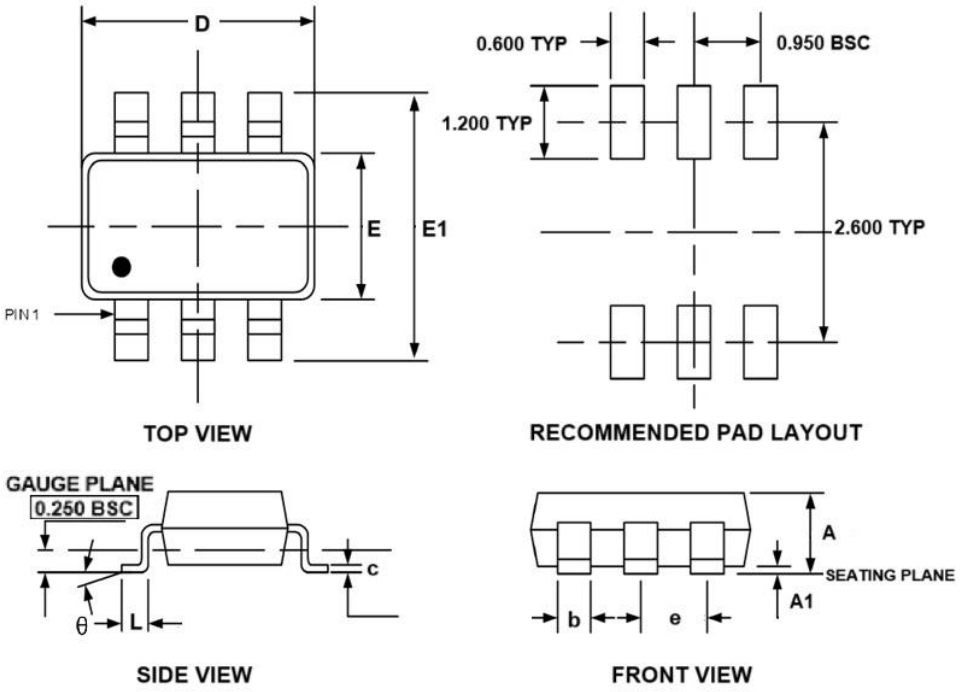
If the power source is located more than a few inches away from the device or converter, additional bulk capacitance is recommended to compensate for voltage drop and line impedance. In such cases, a 47μF electrolytic capacitor is typically used in parallel with ceramic bypass capacitors to maintain adequate input stability.

Layout Guidelines

- V_{IN} 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 a 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.

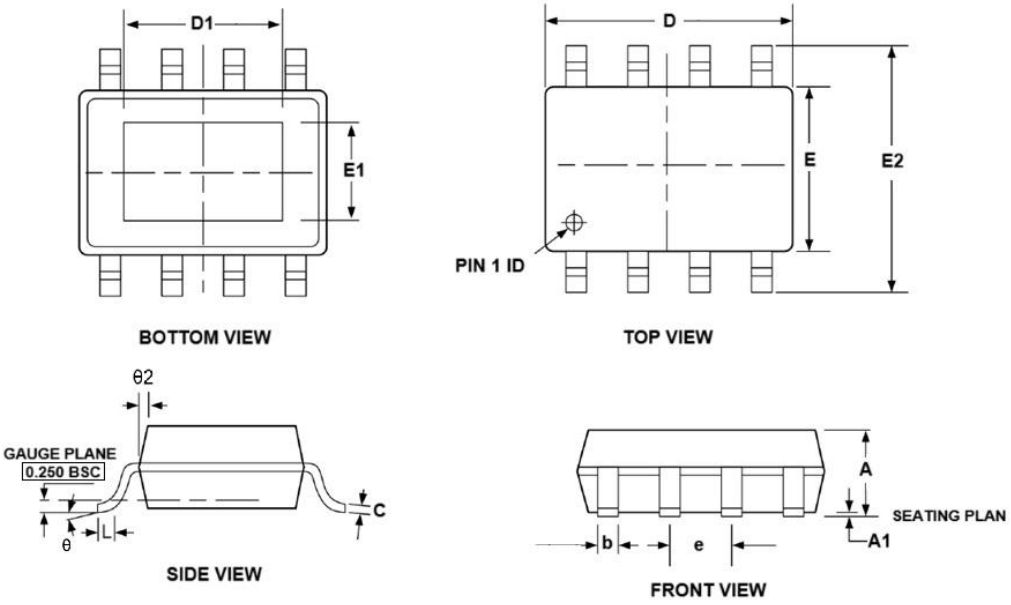
PACKAGE INFORMATION

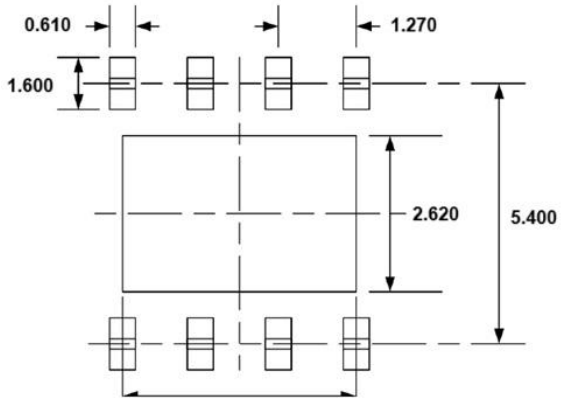
Dimension in SOT-26 (Unit: mm)



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°

Dimension in PSOP8 (Unit: mm)





Symbol	Millimeters	
	Min	Max
A	1.300	1.700
A1	0.000	0.150
b	0.330	0.510
c	0.190	0.250
D	4.800	5.000
E	3.800	4.000
E1	2.260	2.560
D1	3.150	3.450
E2	5.800	6.200
e	1.270 BSC	
L	0.410	1.270
θ	0°	8°
θ2	11.25°	22.5°

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