



DESCRIPTION

The A7162 is a high-voltage, high-efficiency step-down (buck) DC-DC switching converter operating at a fixed 150 kHz switching frequency and delivering up to 2 A of output current.

It supports a wide 4.5 V to 50 V input voltage range and allows a maximum duty cycle of up to 100%, enabling stable regulation when the input voltage approaches the output voltage. An integrated loop compensation network reduces external component count, minimizing system cost and PCB area.

The device is available in an adjustable output (ADJ) version and fixed output versions of 3.3 V, 5.0 V, and 12 V. Protection features include thermal shutdown, output current limiting, and short-circuit protection. When short-circuit protection is triggered, the switching frequency is reduced from 150 kHz to approximately 30 kHz to enhance device protection and reliability.

The A7162 is available in PSOP8 packages.

ORDERING INFORMATION

Package Type	Part Number	
PSOP8 SPQ:4,000pcs/Reel	MP8	A7162MP8R-XX
Note	XX: Output Voltage 33: 3.3V 50: 5.0V 12: 12.0V ADJ: Adjustable voltage R: Tape & Reel	
AiT provides all RoHS products		

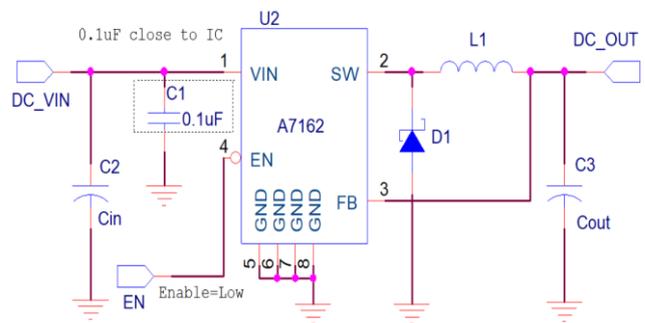
FEATURES

- Operating input voltage: 4.5 V to 50 V
- Output voltage options: ADJ, 3.3 V, 5.0 V, 12 V
- Adjustable output voltage range: 1.23 V to 48 V
- Maximum switching current: 2 A
- Fixed switching frequency: 150 kHz
- Efficiency: up to >90%
- Maximum duty cycle: 100%
- Feedback reference voltage accuracy: ±1.5%
- Minimum input-to-output voltage differential: 1.5V
- Excellent line regulation and load regulation
- Built-in thermal shutdown, Current limit, and Short Circuit protection
- Operating temperature: -40°C to + 125°C
- IC shutdown via EN pin.
- HBM ESD rating: Class 3B

APPLICATION

- Automotive electronics
- Industrial control
- Digital Home Appliances: Digital TVs
- Communication/ ADSL Modem Portable Instruments and IoT

TYPICAL APPLICATION



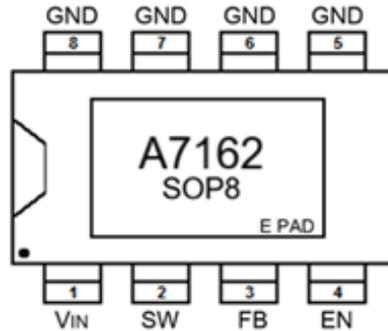
IC: A7162

L1: 47uH: WSL10040-470M

D1: SS36A



PIN DESCRIPTION



SOP8, MP8

Top View

PIN#	Symbol	Function
PSOP8		
1	VIN	This pin is the power supply input, supporting a wide input voltage range of DC 4.5 V to 50 V. It is recommended to place an electrolytic capacitor between VIN and GND to suppress input noise.
2	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.
3	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. $FB=1.23V$
4	EN	Enable: Logic input for device enable control. A logic Low enables the device, while a logic High disables it and places it into shutdown mode. This pin has an internal pull-down resistor and defaults to low when left floating.
5,6,7,8	GND	Power Ground pin.
EPAD	GND	Exposed pad must be connected to Ground

**ABSOLUTE MAXIMUM RATINGS**

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

Voltage*	V _{IN}	-0.3V ~+60V
	V _{SW}	-0.3V~V _{IN}
	V _{EN}	-0.3~5.5V
	V _{FB}	-0.3~18V
P _D , Power Dissipation		Inside limited mW
T _J , Operating Junction Temperature		-40°C ~ +150°C
T _{STG} , Storage Temperature		-55°C ~ +150°C
R _{θJA} , Junction-to-Ambient Thermal Resistance		60 °C/W
T _{solder} , Pin temperature during soldering (10 s)		260 °C
ESD (HBM)		8KV

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.

*All voltage values are with respect to network ground terminal.

RECOMMENDED OPERATING CONDITIONS

	MIN.	MAX.	Units
V _{IN} , Input Voltage	4.5	50	V
V _{OUT} , Output Voltage	1.23	48	V
Operation Junction Temperature	-40	150	°C
Output Current	0	2.0	A



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	-	50	V
Non Switching Quiescent Current	I _Q	V _{FB} =10V	-	1.3	2.0-	mA
Shut Down Current	I _{OFF}	EN = GND	-	46	100	µA
Regulated Feedback Voltage	V _{FB}	V _{er} =ADJ	-	1.23	-	V
ENABLE (EN PIN)						
Enable Threshold	V _(EN_RISING)	Rising	1.4	-	-	V
	V _(EN_FALLING)	Falling	-	-	0.8	V
EN Pull-Up Current	I _(ENPULL_UP)	V _{EN} =HIGH (OFF)	-	5	-	µA
		V _{EN} =LOW (ON)	--	5	-	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%	-	3	-	A
OSCILLATOR						
Centre Switching Frequency	F _{OSC}		135	150	165	kHz
OVER TEMPERATURE PROTECTION						
Rising Temperature	Thermal		-	180	-	°C
Hysteresis	Shutdown		-	50	-	°C

**A7162 -ADJ CHARACTERISTICS**T_A = 25°C, unless otherwise noted.

Symbol	Parameters	Condition	Min.	Typ.	Max.	unit
V _{FB}	Feedback Voltage	V _{IN} =12V ,V _{OUT} =5.0V I _{OUT} =0.5A	1.212	1.23	1.248	V
η	Efficiency	V _{IN} =12V ,V _{OUT} =5.0V I _{OUT} =1.5A	-	82.6	-	%
η	Efficiency	V _{IN} =24V ,V _{OUT} =15V I _{OUT} =0.7A	-	92.2	-	%

A7162 -3.3 CHARACTERISTICST_A = 25°C, unless otherwise noted.

Symbol	Parameters	Condition	Min.	Typ.	Max.	unit
V _{FB}	Output Voltage	V _{IN} =12V , I _{OUT} =0.5A	3.250	3.3	3.350	V
η	Efficiency	V _{IN} =12V ,V _{OUT} =3.3V I _{OUT} =1.5A	-	77.3	-	%

A7162 -5.0 CHARACTERISTICST_A = 25°C, unless otherwise noted.

Symbol	Parameters	Condition	Min.	Typ.	Max.	unit
V _{FB}	Output Voltage	V _{IN} =12V , I _{OUT} =0.5A	4.925	5.0	5.075	V
η	Efficiency	V _{IN} =12V ,V _{OUT} =5.0V I _{OUT} =1.5A	-	82.6	-	%

A7162 -12.0 CHARACTERISTICST_A = 25°C

Symbol	Parameters	Condition	Min.	Typ.	Max.	unit
V _{FB}	Output Voltage	V _{IN} =24V , I _{OUT} =0.25A	11.82	12	12.18	V
η	Efficiency	V _{IN} =12V ,V _{OUT} =12V I _{OUT} =0.7A	-	91.0	-	%



TYPICAL PERFORMANCE CHARACTERISTICS

Fig-1. A7162-ADJ Efficiency vs Output Current

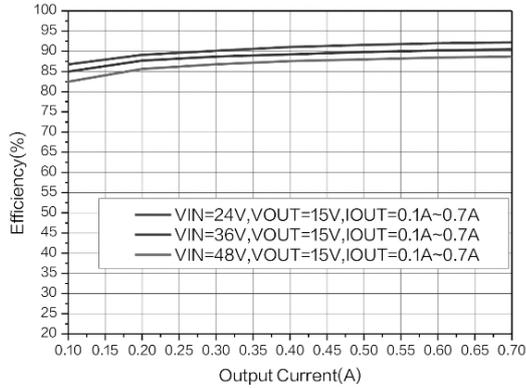


Fig-2. A7162-33 Efficiency vs Output Current

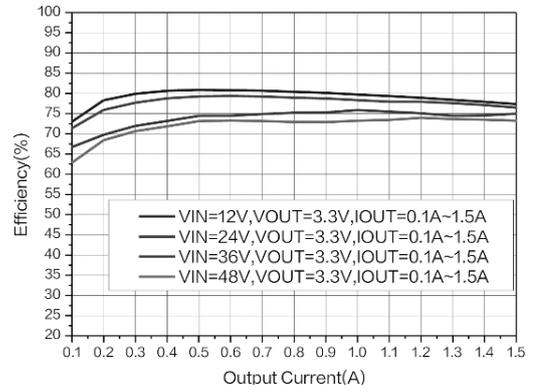


Fig-3. A7162-50 Efficiency vs Output Current

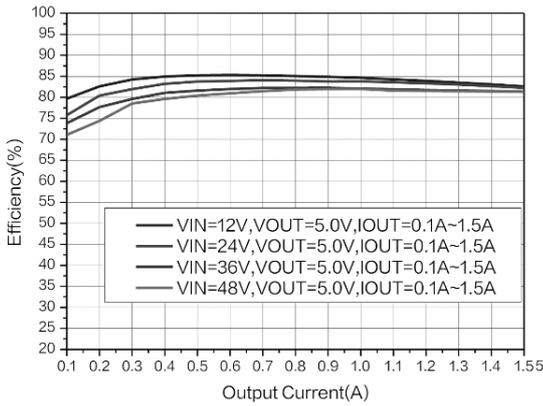


Fig-2. A7162-12 Efficiency vs Output Current

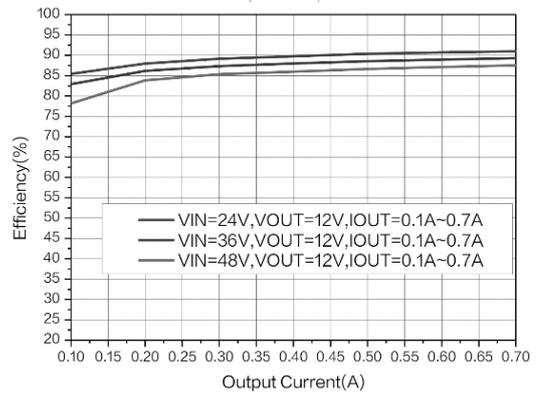


Fig-5. Output Voltage vs Input Current

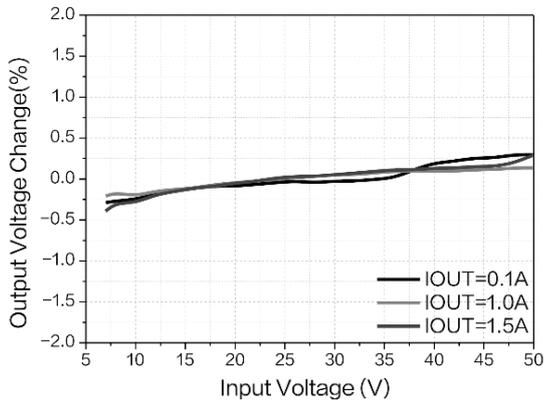


Fig-6. Load Current vs Output Voltage

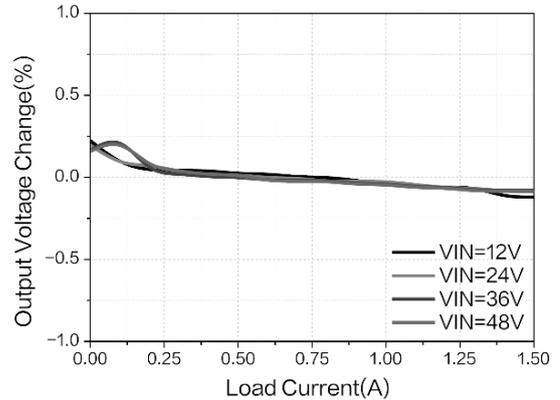




Fig-7. Shutdown Current vs Input Voltage

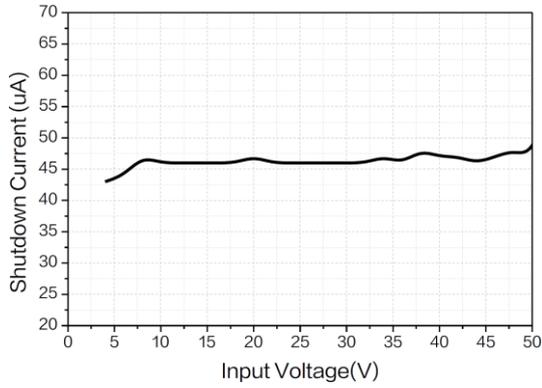


Fig-8. Quiescent Current vs Temperature

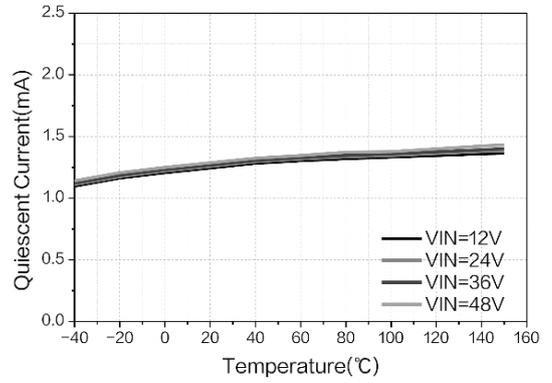


Fig-9. Maximum Output Current (Vout=5V)

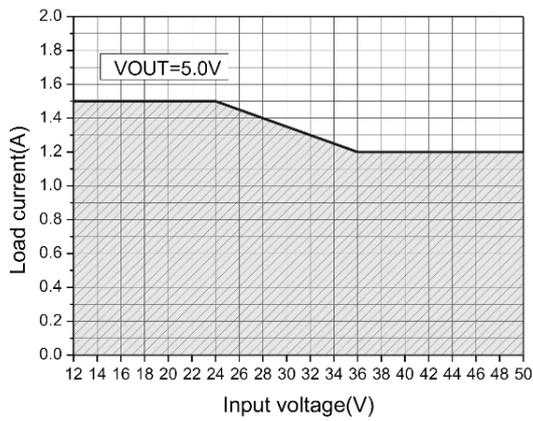
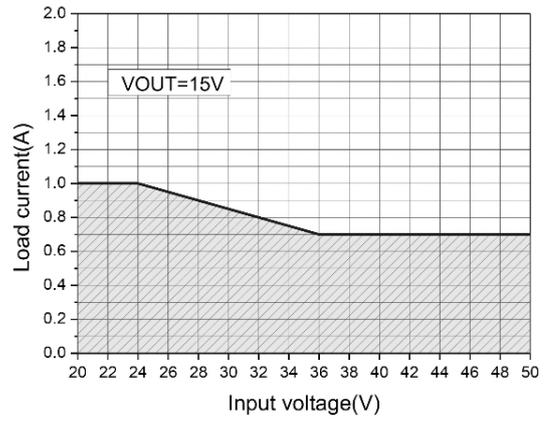
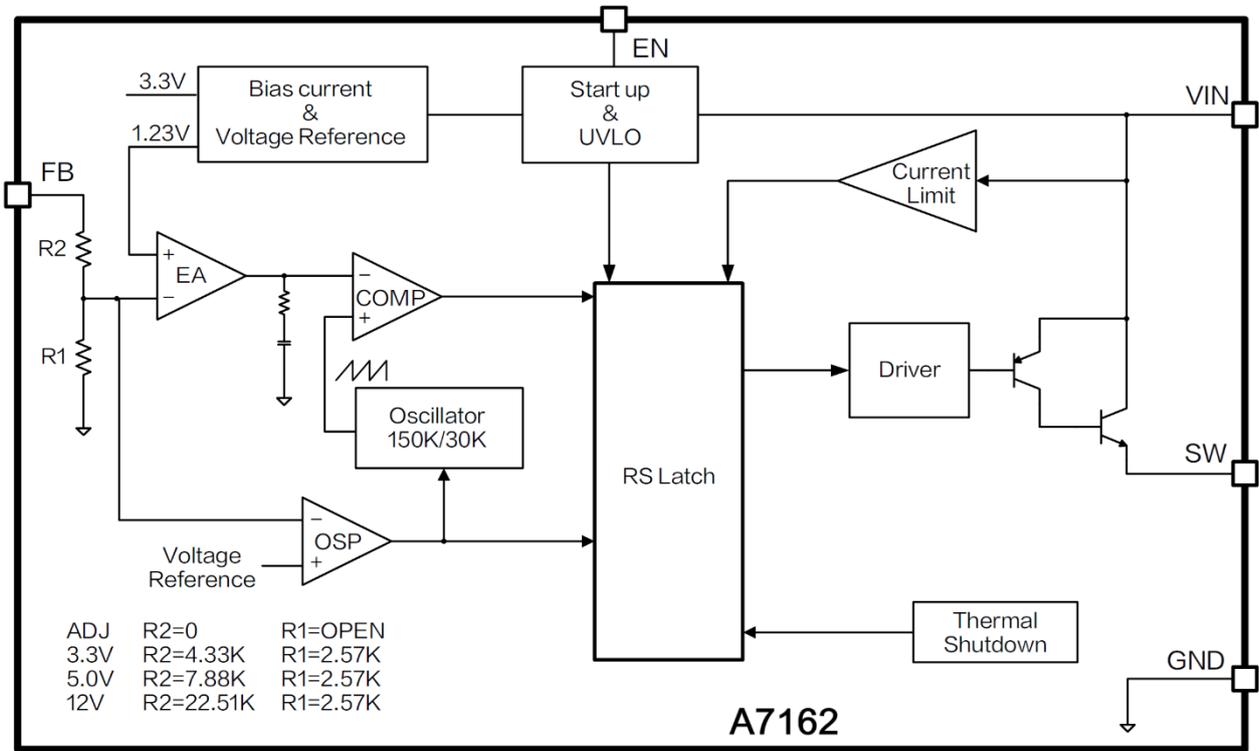


Fig-10. Maximum Output Current (Vout=15V)





BLOCK DIAGRAM





DETAILED INFORMATION

Operation Overview

The A7162 is a high-performance monolithic switch-mode step-down (buck) DC-DC converter capable of delivering up to 2A continuous output current from a wide input voltage range of 4.5V to 50V.

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.

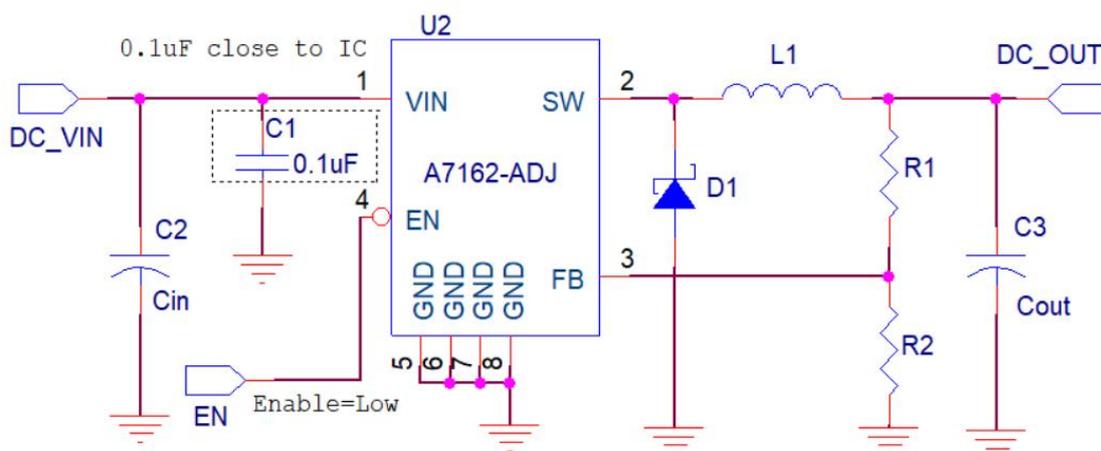
An external shutdown pin allows logic-level control for enabling or disabling the device, placing it into low-power standby mode when not in use.

Protection Features:

- Thermal shutdown prevents damage during high-temperature operation.
- Built in the overcurrent protection and short-circuit protection
- If the feedback voltage V_{FB} drops below reference voltage, due to a fault or overload, the switching frequency is automatically reduced, improving system stability and reducing thermal stress.

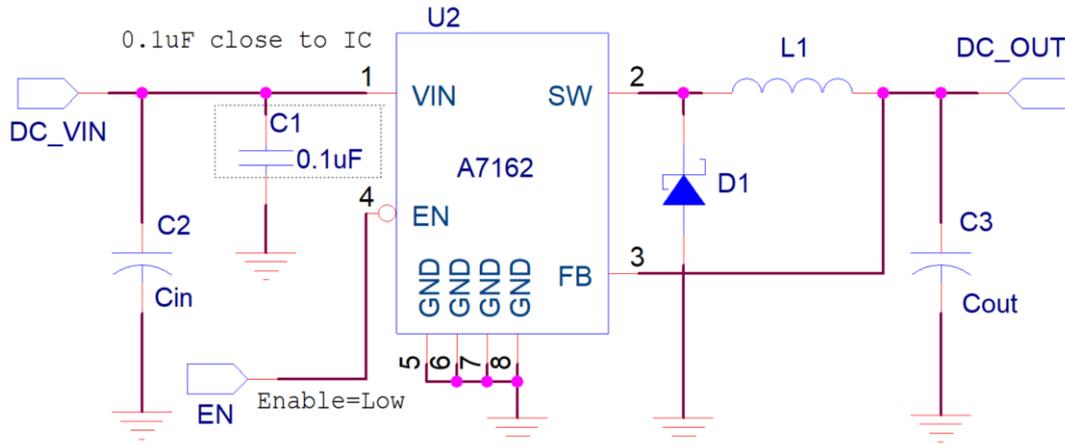
Application information

1. A7162-ADJ





2. A7162-3.3V/5.0V/12V



The A7162 is a high-performance step-down DC/DC converter with a wide input voltage range of 4.5V to 60V, capable of delivering up to 2 Amp continuous output current. It requires minimal external components, just input and output capacitors (C_{IN}, C_{OUT}), Schottky diode (D1), and an inductor (L₁)—making it ideal for space-constrained designs. The output voltage is fixed or adjustable via an external feedback network, allowing it to be set from 1.23V up to the input voltage, providing flexibility for a wide range of applications.

$$V_{out} = 1.23 \times \left(1 + \frac{R1}{R2} \right)$$

V _{out} (V)	L ₁ (μH)	C ₋₁ (μF)	C _{IN} (μF)	C _{OUT} (μF)	R ₁ (kΩ)	R ₂ (kΩ)	D ₁
ADJ (15V)	47μH/2A	0.1	47μF/63V	220μF/25V	27K	2.4K	SS36A
3.3	47μH/2A	0.1	47μF/63V	220μF/25V	-	-	SS36A
5	47μH/2A	0.1	47μF/63V	220μF/25V	-	-	SS36A
12	47μH/2A	0.1	47μF/63V	220μF/25V	-	-	SS36A

Note : L1: 47uH: WSL10040-470M, D1: SS36A

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 50 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 47 μ F electrolytic capacitor is typically used in parallel with ceramic bypass capacitors to maintain adequate input stability.

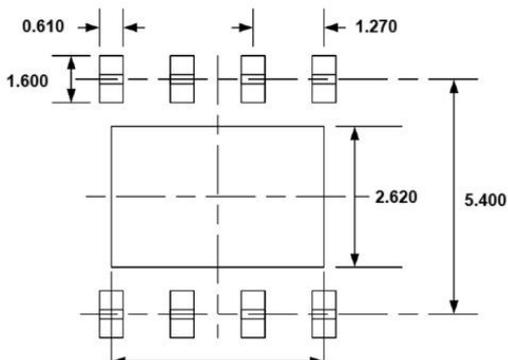
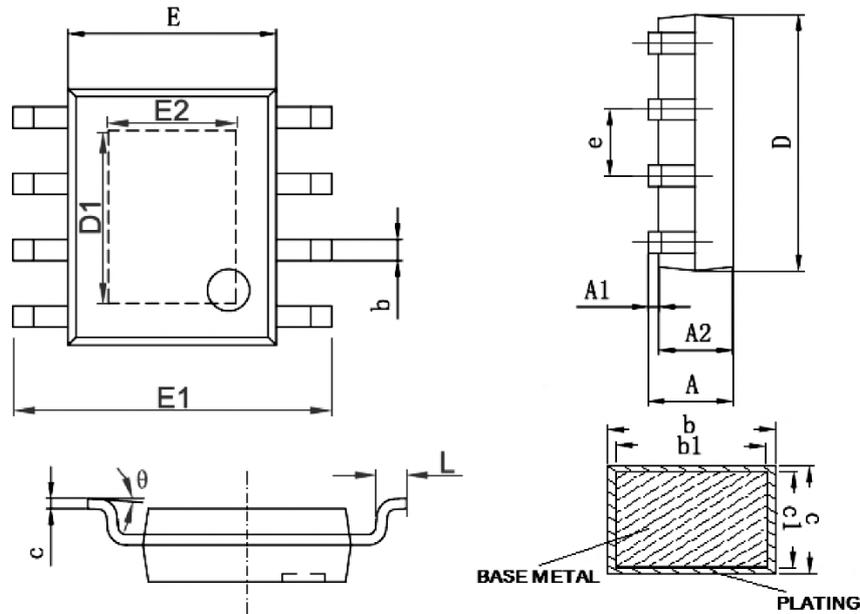
Layout Guidelines

- 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 PSOP8 (Unit: mm)



Symbol	Millimeters	
	Min	Max
A	1.350	1.750
A1	0.000	0.150
A2	1.250	1.650
b	0.306	0.510
b1	0.296	0.480
c	0.170	0.250
c1	0.170	0.250
D	4.700	5.100
E	3.800	4.000
E1	5.800	6.200
D1	2.650	3.467
E2	1.930	2.534
e	1.1400	1.400
L	0.450	0.800
θ	0°	8°



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