DESCRIPTION

A7335 is a full function and high performance, high reliability fix 5V output Buck DC-DC converter.

A7335 operates in either CV (Constant Output Voltage) mode or CC (Constant Output Current) mode.

The A7335 operation input voltage from 8.5V to 32V.

A7335 built-in 50mΩ High-Side and 30mΩ Low-Side MOSFET, is able to deliver up to 3.5A of continuous output current and the output current accurate to within ±7%.

A7335 consists of inside line compensation function with 170mV at V_{IN}=12V, I_{OUT} =3.5A. No external compensation components needed.

The A7335 is available in SOP8 package.

FEATURES

- Max output current: 3.5A
- Constant output voltage: 5V
- Excellent constant current accurate: ±7%
- Constant voltage accurate: ±2%
- No external compensation needed
- Jitter function
- Efficiency: up to 95%
- Line compensation:
  Typ.170mV@ V_{IN}=12V, I_{OUT} =3.5A
- Build in high-side and low-side MOSFET
- Short circuit protection
- Over voltage protection
- Thermal shutdown protection
- Under voltage lock-out
- ESD HBM : 5KV

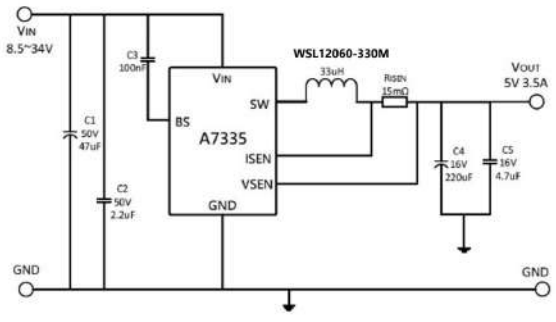
APPLICATION

- Car Charger
- Solar Charger
- Car DVD
- Car Black Box
- Industry Application

ORDERING INFORMATION

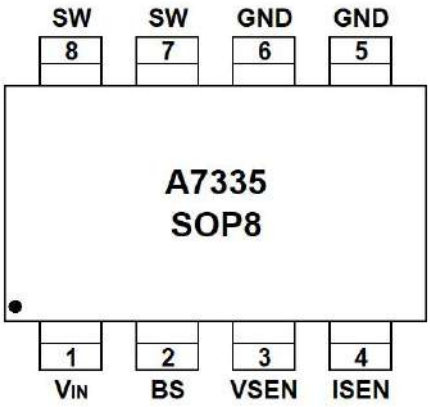
Package Type	Part Number	
SOP8 SPQ: 4,000psc/Reel	M8	A7335M8VR-50
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

TYPICAL APPLICATION



A7335 + WSL12060-330M

PIN DESCRIPTION



SOP8, M8

Top View

SOT-26	Symbol	Function
1	V_{IN}	Power Supply Input. Place a 2.2μF ceramic capacitor between V_{IN} and GND as close as possible.
2	BS	Power to the internal high-side MOSFET gate driver. Connect a 100nF capacitor from BS to V_{IN}.
3	VSEN	Current Sense Input_N.
4	ISEN	Current Sense Input_P.
5	GND	Ground.
6	GND	Ground.
7	SW	Power Switching Output Connect to External Inductor.
8	SW	Power Switching Output Connect to External Inductor.

ABSOLUTE MAXIMUM RATINGS

V_{IN} to GND		-0.3V ~ +35V
SW to GND		-0.3V ~ +34V
BS to GND		-0.3V ~ +35V
ISEN, VSEN		-0.3V ~ +25V
T_J, Max Operating Junction Temperature		+125°C
T_A, Ambient Temperature		-40°C ~ +85°C
θ_{JC}, Package Thermal Resistance	SOP8	45°C/W
T_S, Storage Temperature		-40°C ~ +150°C
Lead Temperature & Time		260°C,10S
ESD (HBM)		5000V

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

V_{IN}=12V, T_A = +25°C, unless otherwise noted.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Voltage	V_{IN}	-	8.5	-	34	V
Input OVP Threshold	$V_{OVP-VIN}$	-	31	32	33	V
UVLO Voltage	V_{UVLO}	-	7.0	8.5	9.0	V
UVLO Hysteresis		-	-	1	-	V
Quiescent Current	I_{CCQ}	V_{SENSE}=5.8V	-	1.5	2.5	mA
Standby Current	I_{SB}	No load, V_{IN}>8.5V	-	1.6	3.0	mA
Output Voltage	V_{OUT}	I_{OUT}=1A	4.9	5.0	5.1	V
Output OVP Detect Voltage	V_{OVP}	Internal define	-	6	-	V
Switching Frequency	F_{SW}	I_{OUT}=1A	-	135	-	KHz
Reference Voltage of Constant Current	Reference Of V_{ISEN}-V_{VSEN}	2.4V<V_{OUT}<4.5V, V_{SEN}>2.6V	46.5	50.0	53.5	mV
$V_{OUT-Short}$	V_{SEN}	-	2.0	2.4	2.6	V
Line Compensation		V_{IN}=12V, I_{OUT}=3.5A	-	170	-	mV
R_{DSON} of power MOS	High side	I_{OUT}=1A	-	50	70	mΩ
	Low side	I_{OUT}=1A	-	30	45	mΩ
Thermal Shutdown Temp	T_{SD}	-	-	155	-	℃
Thermal Shutdown Hysteresis	T_{SH}	-	-	30	-	℃

TYPICAL PERFORMANCE CHARACTERISTICS

Fig.1 Efficiency & I_{OUT} (%)

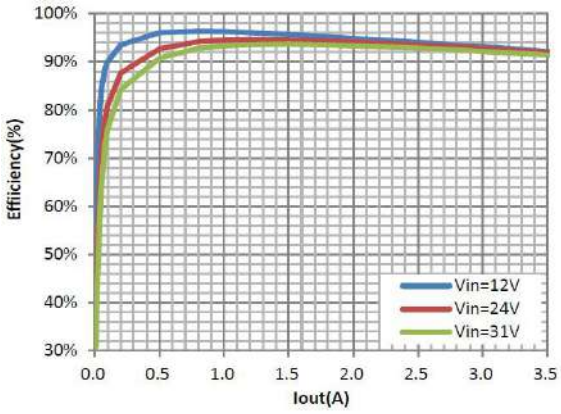


Fig.2 Line Compensation

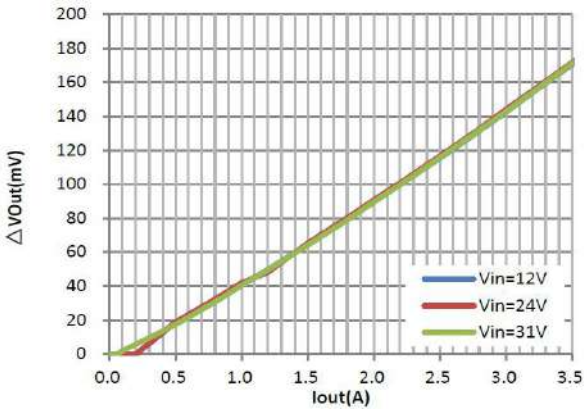


Fig.3 Switch Frequency vs. Input Voltage

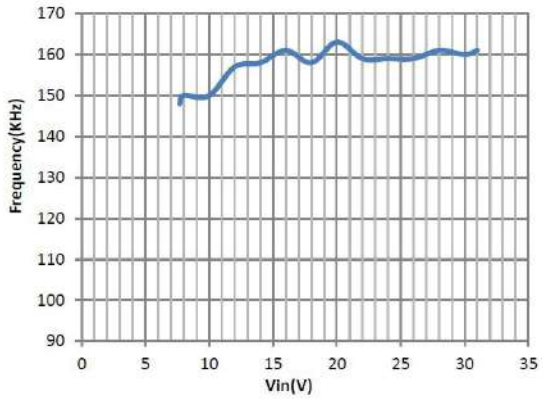


Fig.4 Supply Current vs. Input Voltage

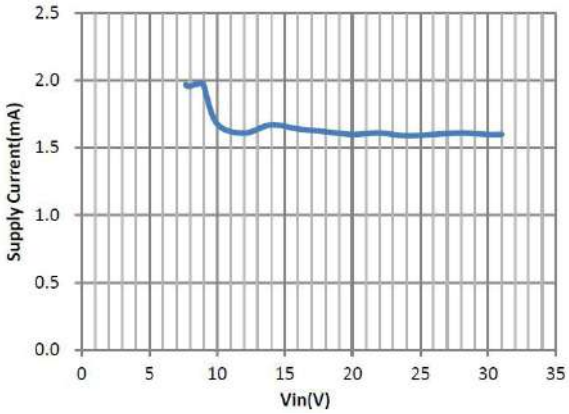


Fig.5 Short Circuit

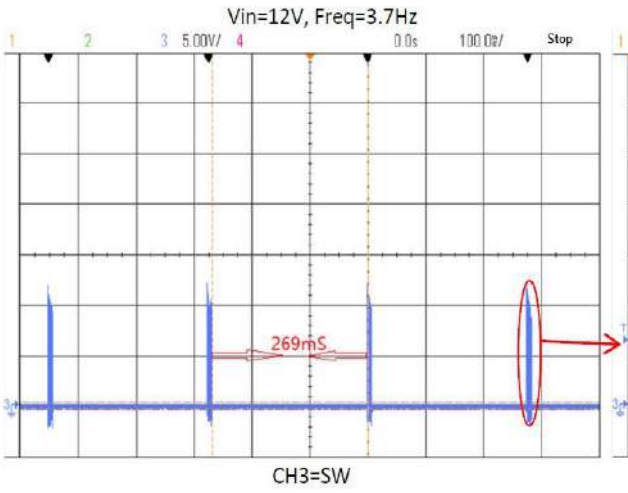


Fig.6 Short Circuit

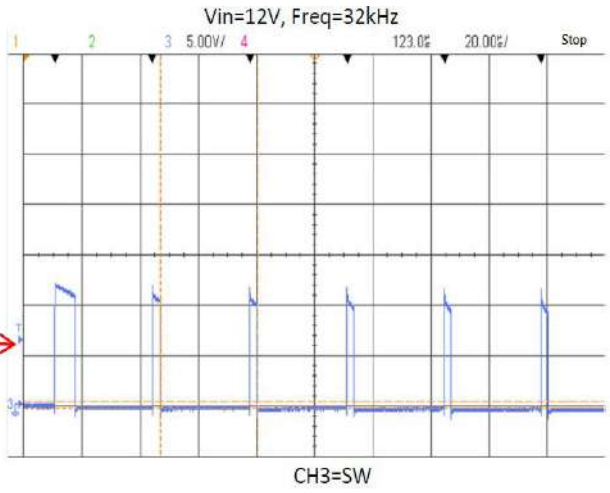


Fig.7 Power On

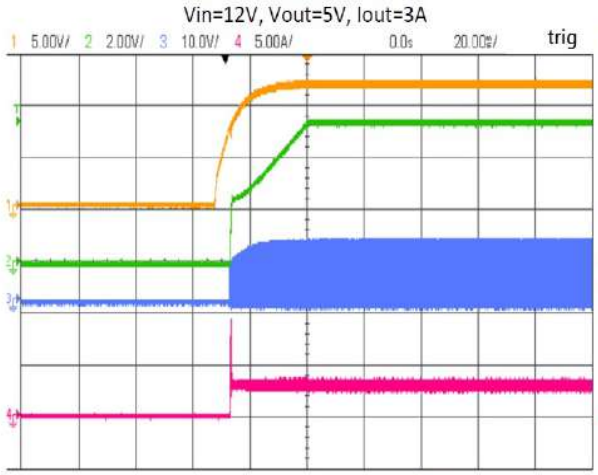


Fig.8 Power Off

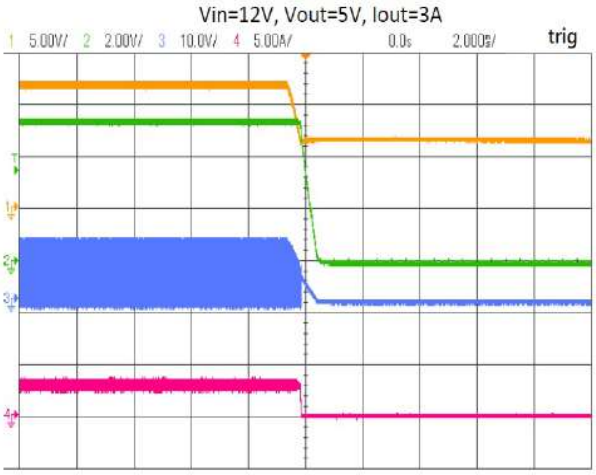


Fig.9 Power On

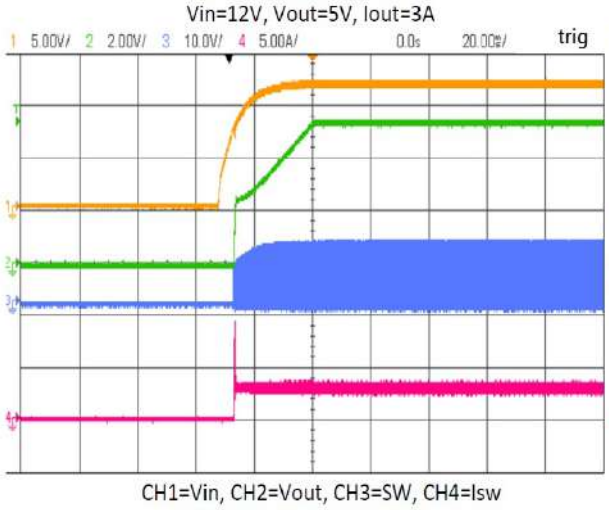


Fig.10 Power Off

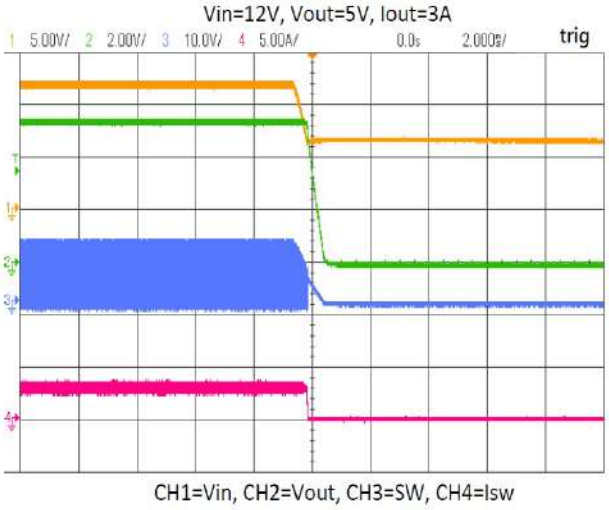


Fig.11 Output Voltage Ripple

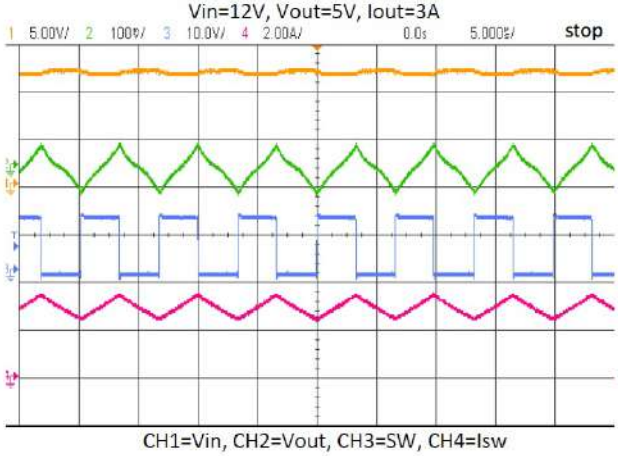
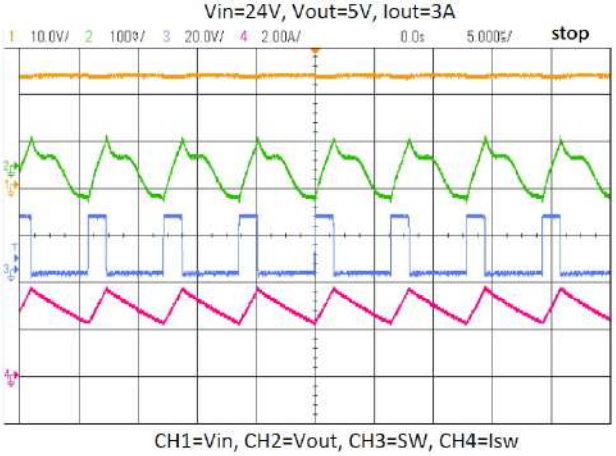


Fig.12 Output Voltage Ripple



DETAILED INFORMATION

Input Under Voltage Protection

A7335 provides an input voltage up to 34V and operates from an input voltage range of 8.5V to 32V. If V_{IN} drops below 6.8V, the UVLO circuit inhibits switching. Once V_{IN} rises above 8.5V, the UVLO clears, and the soft-start sequence activates.

Input Over Voltage Protection

If V_{IN} rises above 32V, the UVLO circuit inhibits switching. A7335 will not be damaged until the voltage exceeds 34V. Once V_{IN} drops below 30V, the UVLO clears, and the soft-start sequence activates.

Soft-Start

A7335 has an internal soft-start circuitry to reduce supply inrush current during startup conditions. When the device exits under-voltage lockout (UVLO), shutdown mode, or restarts following a thermal-overload event, the soft-start circuitry slowly ramps up current available after 300us.

Constant Voltage Output

A7335 presets the output voltage to 5V.

Constant Current Output

A7335 senses the current by sampling the voltage difference between ISEN and VSEN, and adjusts the output current to the default value by the loop.

$$I_{OUT} = \frac{50mV}{R_{ISEN}}$$

Constant current operates normally when V_{SEN} is higher than 2.4V. When V_{SEN} is below 2V causing by overload, A7335 will enter short circuit protection mode.

Short Circuit Protection

When V_{SEN} drops below 2V since too heavy load, A7335 will enter short circuit protection function, and the system will enter hit-cup mode, and frequency drop to 32KHz per cycle and stop switching for 269mS.

Line Compensation

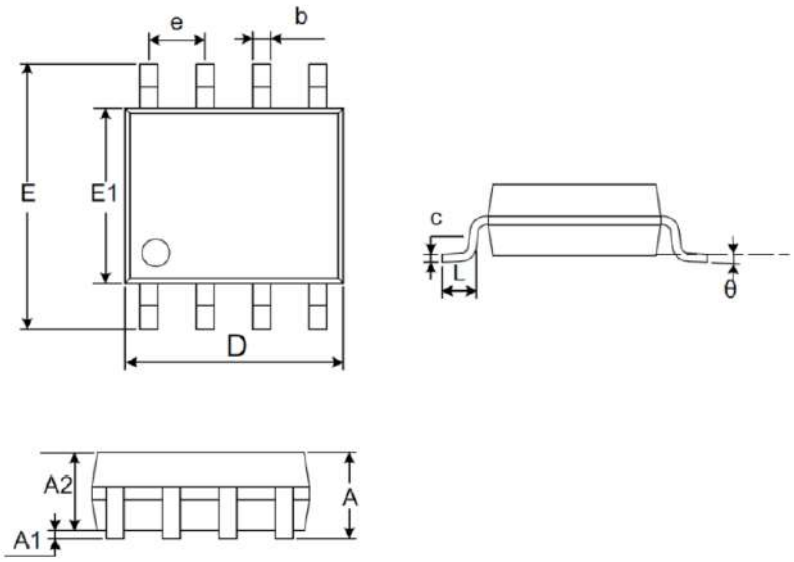
When output current from 0mA to full load, Output voltage will be increased 170mV (Typ.) for line compensation.

Thermal Shutdown

The junction temperature of the IC is monitored internally. If the junction temperature exceeds the threshold value (typically 155°C), the converter shuts off. This is non-latch protection. There is about 30°C hysteresis. Once the junction temperature drops around 125°C, it initiates a Soft-start.

PACKAGE INFORMATION

Dimension in SOP8 Package (Unit: mm)



Symbol	Min	Max
A	1.350	1.750
A1	0.100	0.250
A2	1.250	1.500
b	0.300	0.510
c	0.170	0.250
D	4.800	5.000
E	5.800	6.200
E1	3.800	4.000
e	1.270 BSC	
L	0.450	0.800
θ	0°	8°

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