DESCRIPTION

A7335A is a full function and high performance, high reliability buck DC-DC converter, has an optimum input voltage, step-down converter that operates in either CV (Constant Output Voltage) mode or CC (Constant Output Current) mode. The maximum input voltage is up to 34V and the operation input voltage from 8.5V to 32V.

Built-in 50mΩ high-side and 30mΩ low-side MOSFET, could deliver up to 3.5A of continuous output current and the output current accurate to within ±7%.

No external compensation component requirement. The line compensation and the constant current can be set by an external resistance.

Independent output voltage protection suits for BC1.2 and QC2.0/3.0 dual channel output voltage.

The A7335A is available in SOP8 package.

FEATURES

- 100% duty cycle car charge scheme
- Build in high-side and low-side MOSFET
- Max output current: 3.5A
- Adjustable output voltage, V_{FB}=1V
- Excellent constant current accurate: ±7%
- Constant voltage accurate: ±2%
- No external compensation needed
- Jitter function
- Efficiency: up to 95%
- Adjustable line compensation
- Short circuit protection
- Over voltage protection
- Thermal shutdown protection
- Under voltage lock-out
- ESD HBM >5KV

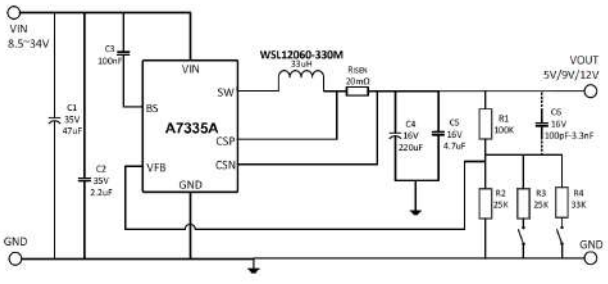
APPLICATION

- Car DVD
- Black box
- Car charger
- Industry application

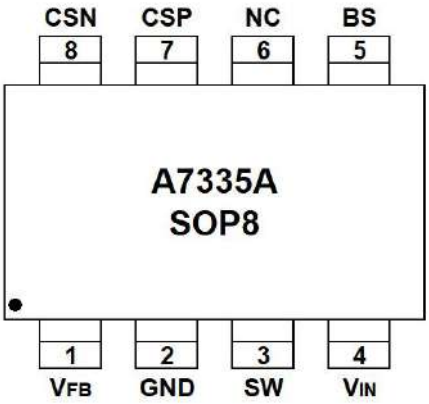
ORDERING INFORMATION

Package Type	Part Number	
SOP8 SPQ: 4,000psc/Reel	M8	A7335AM8VR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

TYPICAL APPLICATION



PIN DESCRIPTION



SOP8, M8

Top View

SOT-26	Symbol	Function
1	V_{FB}	Feedback Voltage.
2	GND	Ground.
3	SW	Power switching output. Connect to external inductor.
4	V_{IN}	Power supply input. Place a 2.2μF ceramic capacitor between V_{IN} and GND as close as possible.
5	BS	Power to the internal high-side MOSFET gate driver. Connect a 100nF capacitor from BS to V_{IN}.
6	NC	Not Connected.
7	CSP	Current Sense Input_P.
8	CSN	Current Sense Input_N.

ABSOLUTE MAXIMUM RATINGS

V_{IN} to GND		-0.3V ~ +35V
SW to GND		-0.3V ~ +34V
BS to GND		-0.3V ~ +35V
CSP, CSN, PRO to GND		-0.3V ~ +25V
V_{FB} to GND		-0.3V ~ +6V
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

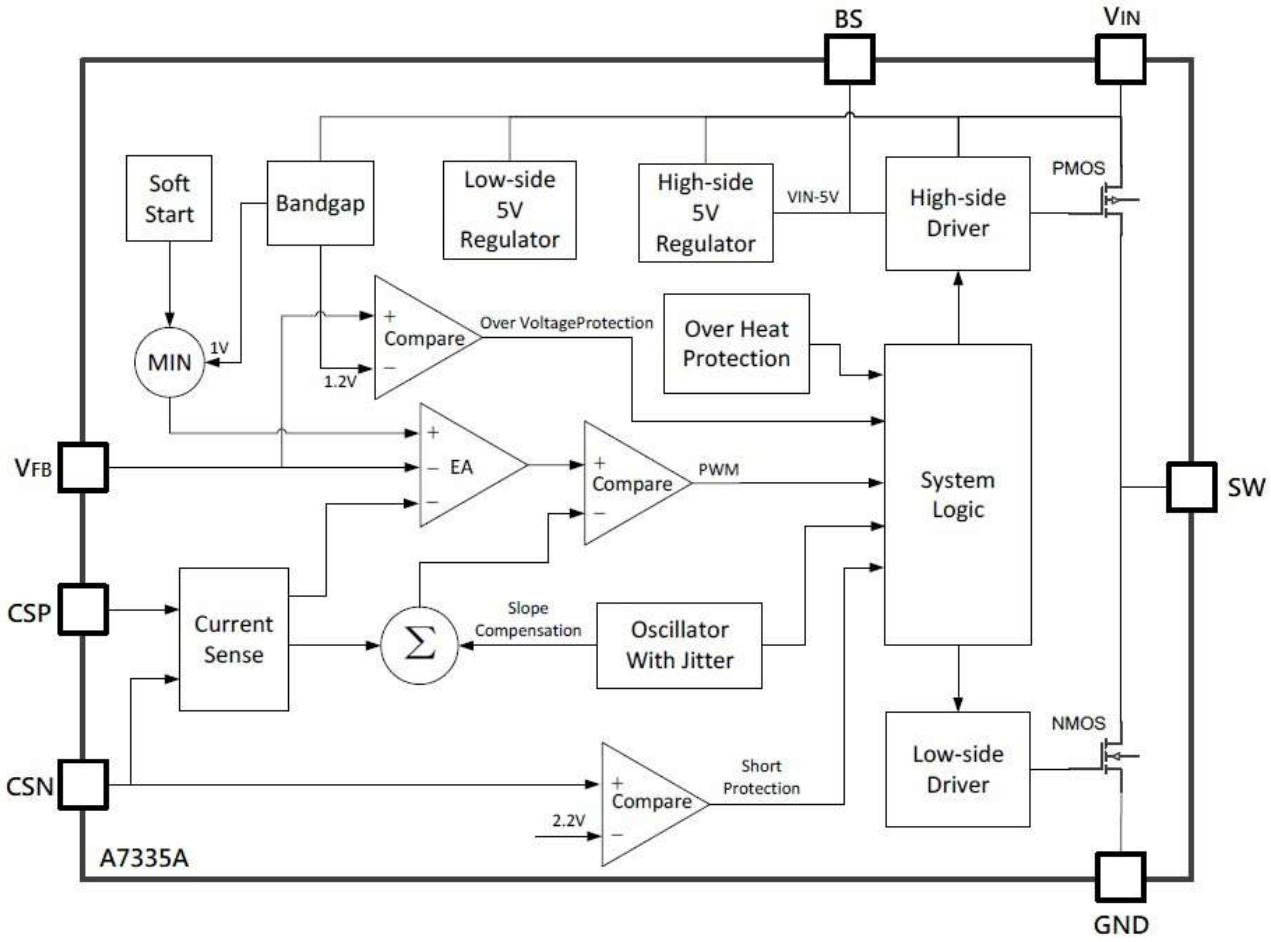
Stresses above may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics is not implied. Exposure to absolute maximum rating conditions for extended periods 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_{FB} = 1.5V, force driver off.	-	1.5	2.5	mA
Standby Current	I_{SB}	No load, V_{IN}>8.5V	-	1.6	3.0	mA
Feedback Voltage	V_{FB}	-	0.98	1.00	1.02	V
FB OVP Detect Voltage	V_{OVP}	Internal define	-	1.2	-	V
Switching Frequency	F_{SW}	I_{OUT}=1A	-	135	-	KHz
Maximum Duty Cycle	D_{MAX}	-	-	100	-	%
Minimum On-Time		-	-	250	-	ns
Reference Voltage of Constant Current	Reference of CSP-CSN	0.4V<V_{FB}<0.95V, V_{CSN}:2.6V	46.5	50.0	53.5	mV
$V_{OUT-Short}$	V_{CSN}	-	2.2	2.4	2.6	V
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	-	℃

BLOCK DIAGRAM



TYPICAL PERFORMANCE CHARACTERISTICS

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

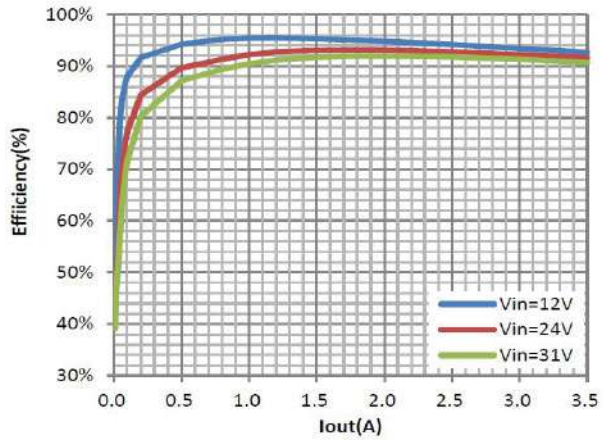


Fig.2 Line Compensation

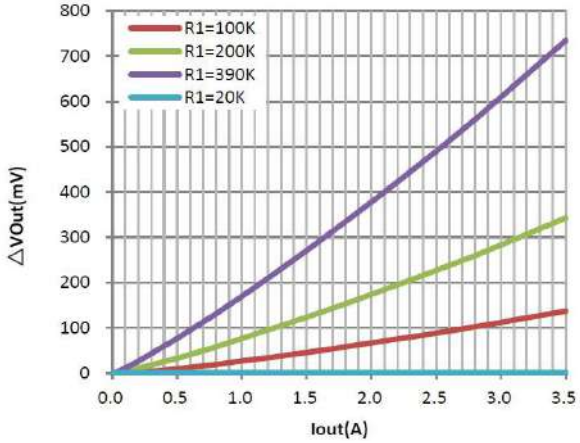


Fig.3 Switch Frequency vs. Input Voltage

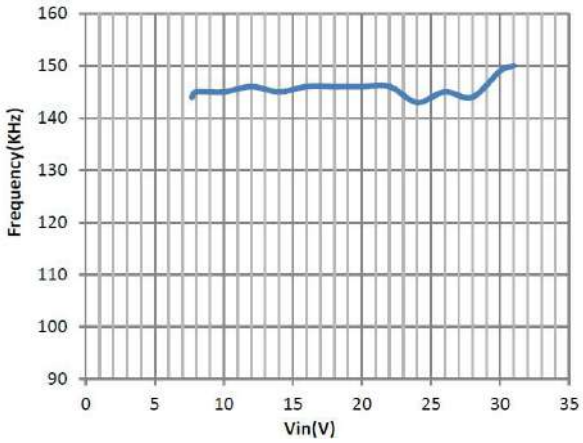


Fig.4 Supply Current vs. Input Voltage

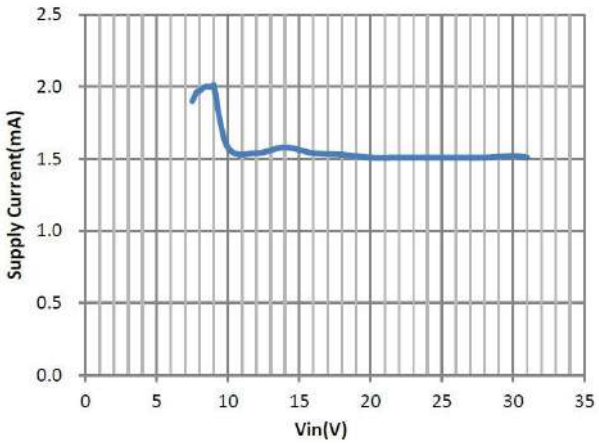


Fig.5 Short Circuit

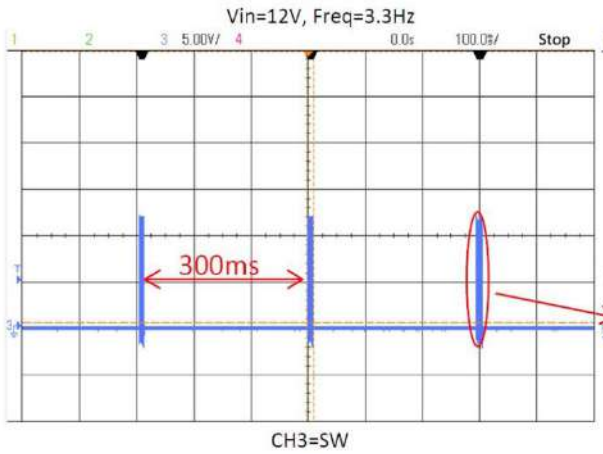


Fig.6 Short Circuit

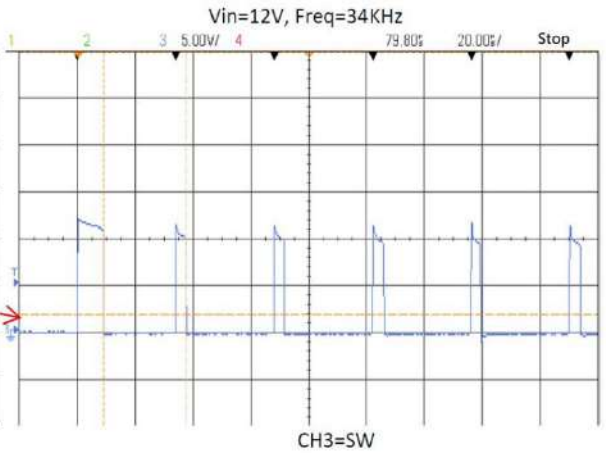


Fig.7 Power On

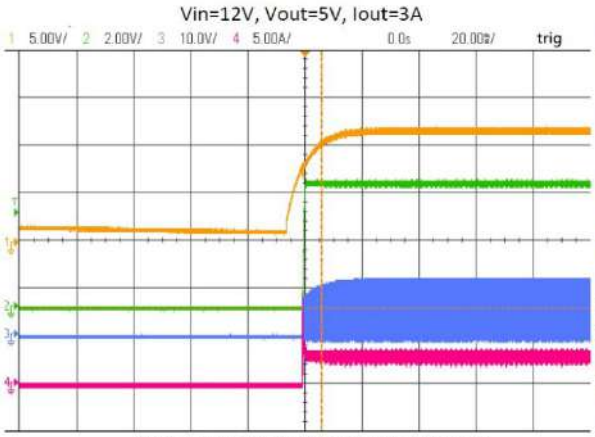


Fig.8 Power Off

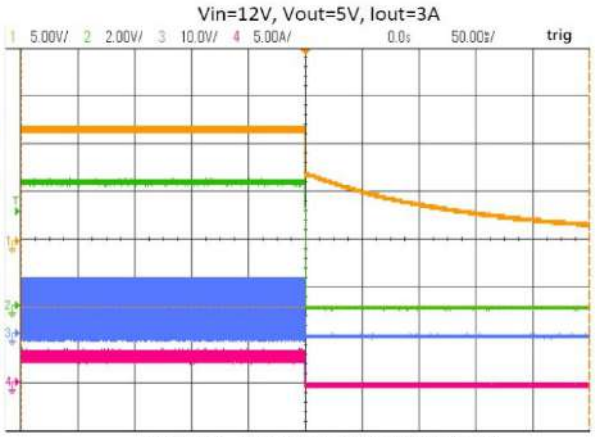


Fig.9 Power On

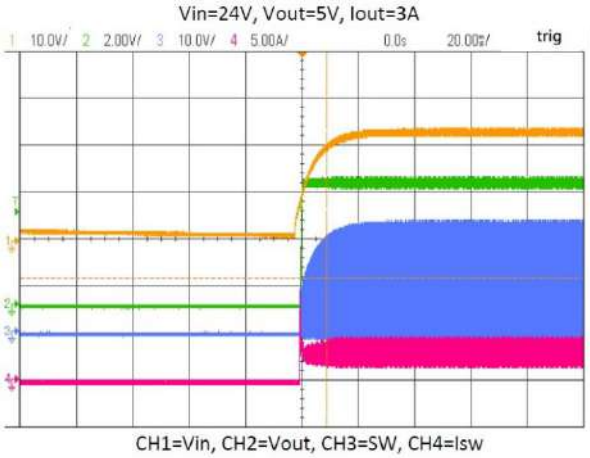


Fig.10 Power Off

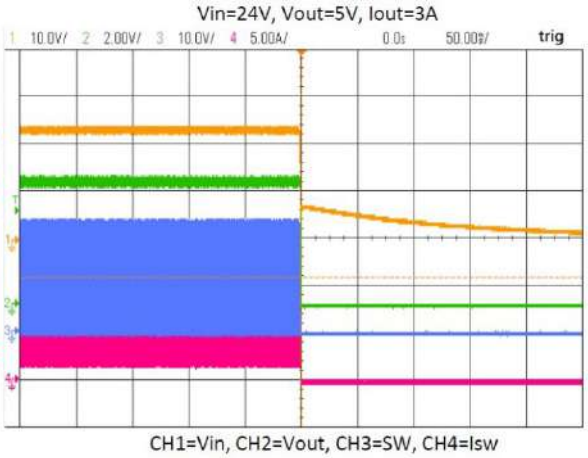


Fig.11 Output Voltage Ripple

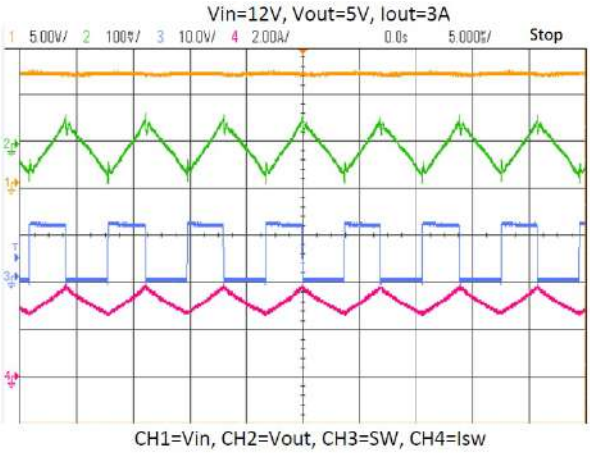
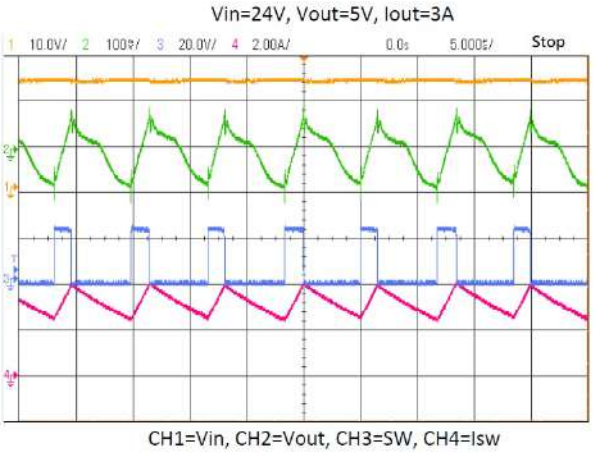


Fig.12 Output Voltage Ripple



DETAILED INFORMATION

Input Under Voltage Protection

A7335A provides an input voltage up to 34V and operates from an input voltage range of 8.5V to 32V. If V_{IN} drops below 7.5V, 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. A7335A 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

A7335A 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

A7335A presets the V_{FB} voltage to 1V. The Output Voltage can be set by extra resistance.

Output Over Voltage Protection

Once V_{FB} rises above 1.2V, A7335A shuts down to avoid damage caused by abnormal use of electrical equipment.

Constant Current Output

A7335A senses the current by sampling the voltage difference between the CSP and the CSN, and adjusts the output current to the default value by the loop.

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

Constant current operates normally when CSN is higher than 2.4V. When CSN is below 2.4V causing by overload, A7335A will enter short circuit protection mode.

Short Circuit Protection

When CSN drops below 2.4V since too heavy load, A7335A will enter short circuit protection function, and the system will enter hit-cup mode, and frequency drop to 34KHz per cycle and stop switching for 300mS.

Line Compensation

When users use different cables, it will produce different voltage drop, the users can set their own cable compensation voltage according to the need:

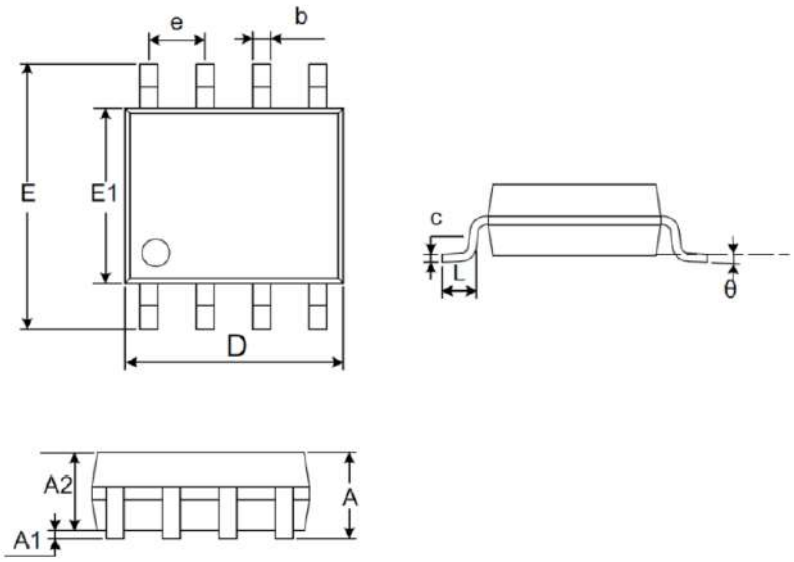
$$V_{\text{cable compensation}} = 1.6\mu A \times R1 \times \frac{V_{CSP} - V_{CSN}}{50mV}$$

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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