DESCRIPTION

The A7142 series of regulators are monolithic integrated circuits that provide all the active functions for a step-down (buck) switching regulator, capable of driving a 2A load with excellent line and load regulation. These devices are available in fixed output voltage of 5V and adjustable output version.

The A7142 operates at a switching frequency of 150KHz thus allowing smaller sized filter components than what would be needed with lower frequency switching regulators.

Other features include a guaranteed ±3% tolerance on output voltage under specified input voltage and output load conditions, and ±15% on the oscillator frequency. External shutdown is included, featuring typically 100μA standby current.

The A7142 is available in SOP8 and PSOP8 packages.

ORDERING INFORMATION

Package Type	Part Number	
SOP8	M8	A7142M8R-XX
		A7142M8VR-XX
PSOP8	MP8	A7142MP8R-XX
		A7142MP8VR-XX
Note	XX: 50=5.0V, ADJ=Adjustable R: Tape & Reel V: Halogen free Package	
AiT provides all RoHS products Suffix " V " means Halogen free Package		

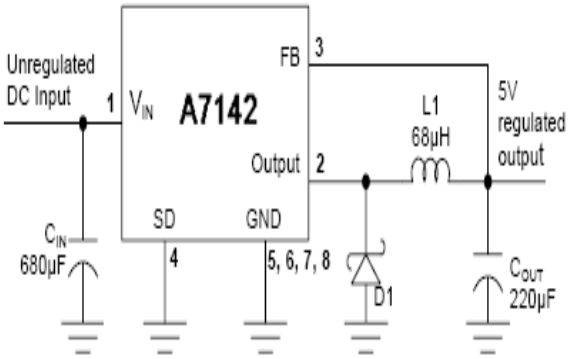
FEATURES

- 5V and adjustable output versions
- Adjustable version output voltage range 1.23V to 37V
- Input voltage range up to 40V
- Guaranteed 2A output current
- 150KHz fixed frequency internal oscillator
- Built-in thermal shutdown and current limit protection
- Available in SOP8 and PSOP8 Packages

APPLICATION

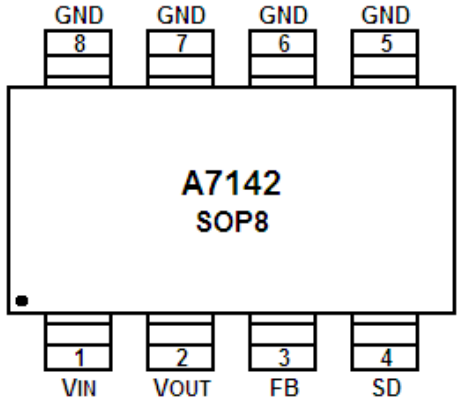
- Fixed voltage power supply for LCD monitor and LCD TV
- On-Card switching regulation
- Simple high efficiency Step-down regulator

TYPICAL APPLICATION

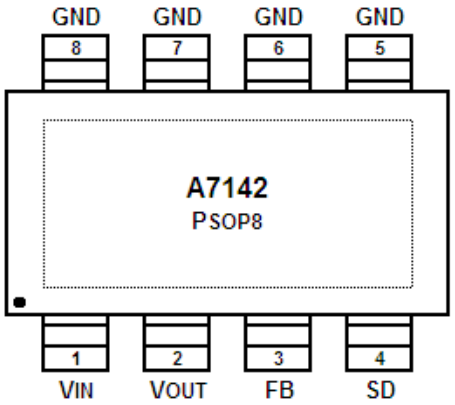


A7142-50 (Fixed Output)

PIN DESCRIPTION



Top View



Top View

Pin #	Symbol	Function
1	V_{IN}	Input Voltage Pin
2	V_{OUT}	Output Voltage Pin
3	FB	Feed Back Pin
4	SD	Shutdown
5,6,7,8	GND	Ground Pin

ABSOLUTE MAXIMUM RATINGS

T_A = 25°C, Unless otherwise noted

P_D, Power Dissipation	Internally Limited(W)
V_{IN}, Maximum Supply Voltage	45V
SD, SD Pin Input Voltage	-0.3V < V < + V_{IN}
θ_{JT}, Thermal resistance junction to Case	3.0°C /W
θ_{JA}, Thermal resistance junction to Ambient	36°C /W
T_J, Operating Junction Temperature Range	-40°C~+125°C
T_{STG}, Storage Temperature Range	-65°C~+150°C
ESD, Minimum EDS Rating	2KV
T_{LEAD}, Lead Soldering Temperature (Soldering, 10 sec)	260°C

Stress beyond above listed “Absolute Maximum Ratings” may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

NOTE1: θ_{JA}: Thermal Resistance-Junction to Ambient, Junction Temperature Calculation: $T_J = T_A + (P_D \times \theta_{JA})$

The θ_{JA} numbers are guidelines for the thermal performance of the device/PC-board system.

All of the above assume no ambient airflow.

NOTE2: θ_{JT}: Thermal Resistance-Junction to Ambient

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ.	Max	Units
Input Voltage	V_{IN}			40	V
Peak Current	I_{PC}	3.4			A
Maximum Load Current	I_{OUT}		2		A
Junction Temperature	T_J	-40		150	°C

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, These specifications apply V_{IN} = 12V for 5.0V options, and V_{IN} = 24V for ADJ option, and the operating ambient temperatures T_A = 25°C

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Output Voltage NOTE1	V_{OUT}	4.5V≦V_{IN}≦40V 0.2A≦I_{OUT}≦2A	ADJ	1.193	1.230	1.267	V
		7V≦V_{IN}≦40V 0.2A≦I_{OUT}≦2A	5.0	4.850	5.000	5.150	
Efficiency	η	V_{IN}=12V, I_{LOAD}=2A	ADJ		90		%
		V_{IN}=12V, I_{LOAD}=2A	5.0		80		
Feedback Bias Current	I_B	V_{FB}=1.3V (Adjustable Version Only)			10	50	nA
Saturation Voltage	V_{SAT}	I_{OUT}=2A NOTE3,4			1.16	1.4	V
Duty Cycle (ON)	DC	NOTE4			100		%
Duty Cycle (OFF)	DC	NOTE5			0		%
Oscillator Frequency	f_O	NOTE6		127	150	173	KHz
Output Leakage Current	I_L	Output=0V NOTE3,5				100	μA
		Output=-0.9V NOTE7			2		mA
Quiescent Current	I_Q	NOTE5			5		mA
Standby Current	I_{STBY}	SD Pin=5V			100	200	μA
SD Pin Input Level	V_{IH}	Low (ON)			1.3	0.6	V
	V_{IL}	High (OFF)		2.0	1.4		
	I_H	V_{LEVEL}= 2.5V (OFF)			5	15	μA
	I_L	V_{LEVEL}= 0.5V (ON)			0.02	5	

NOTE3: No diode, inductor or capacitor connected to output pin.

NOTE4: Feedback pin removed from output and connected to 0V to force the output transistor switch ON.

NOTE5: Feedback pin removed from output and connected to 5V and the ADJ version

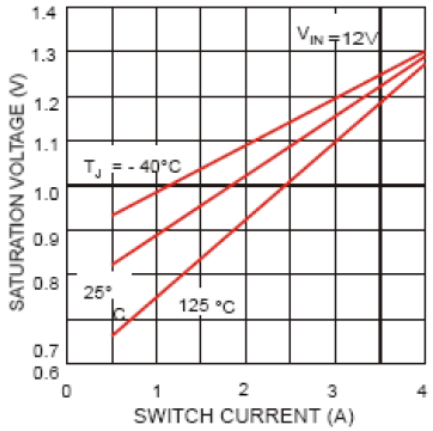
NOTE6: The switching frequency is reduced when the second stage current limit is activated.

NOTE7: V_{IN} = 40V.

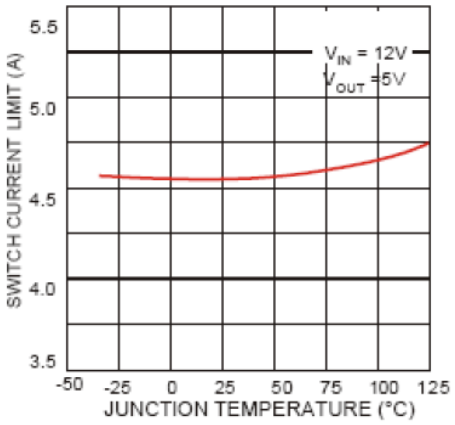
TYPICAL PERFORMANCE CHARACTERISTICS

25℃ Unless Note

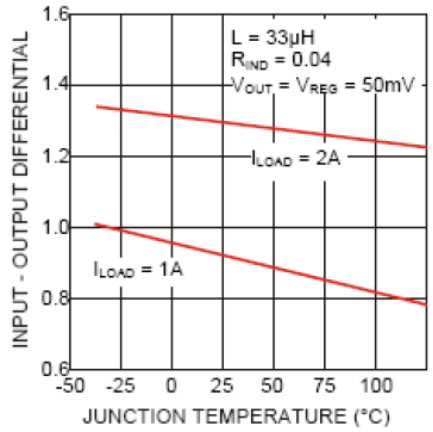
1. Switch Saturation Voltage



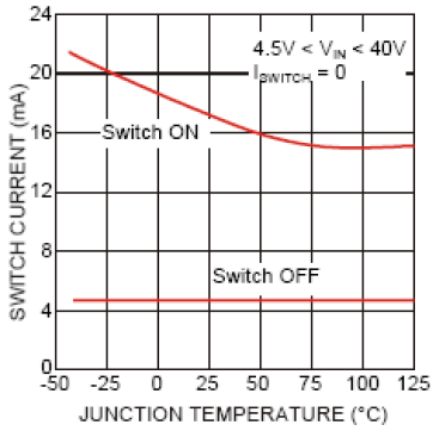
2. Switch Current Limit



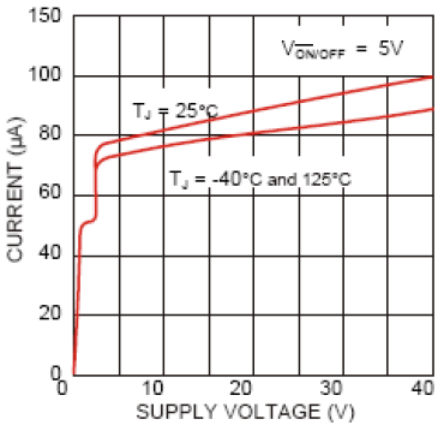
3. Dropout Voltage



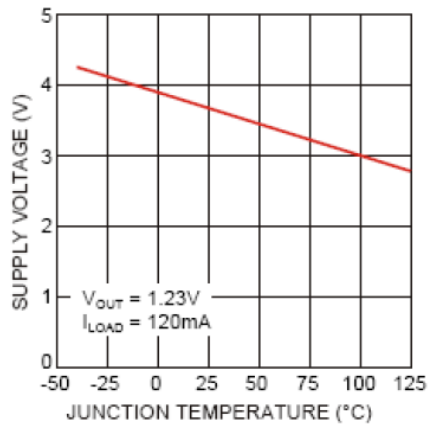
4. Operating Quiescent Current



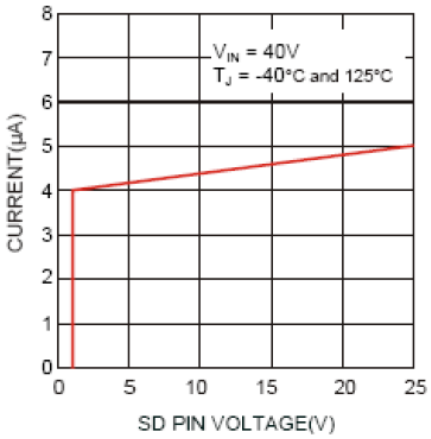
5. Shutdown Quiescent Current



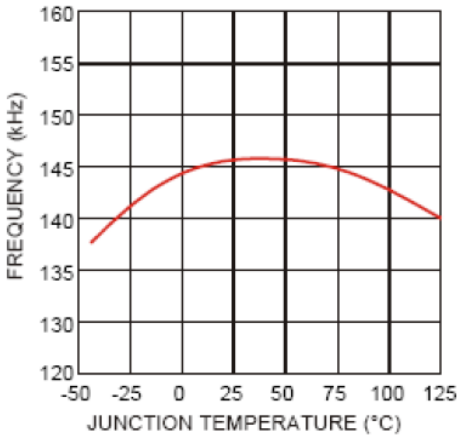
6. Minimum Operating Supply Voltage



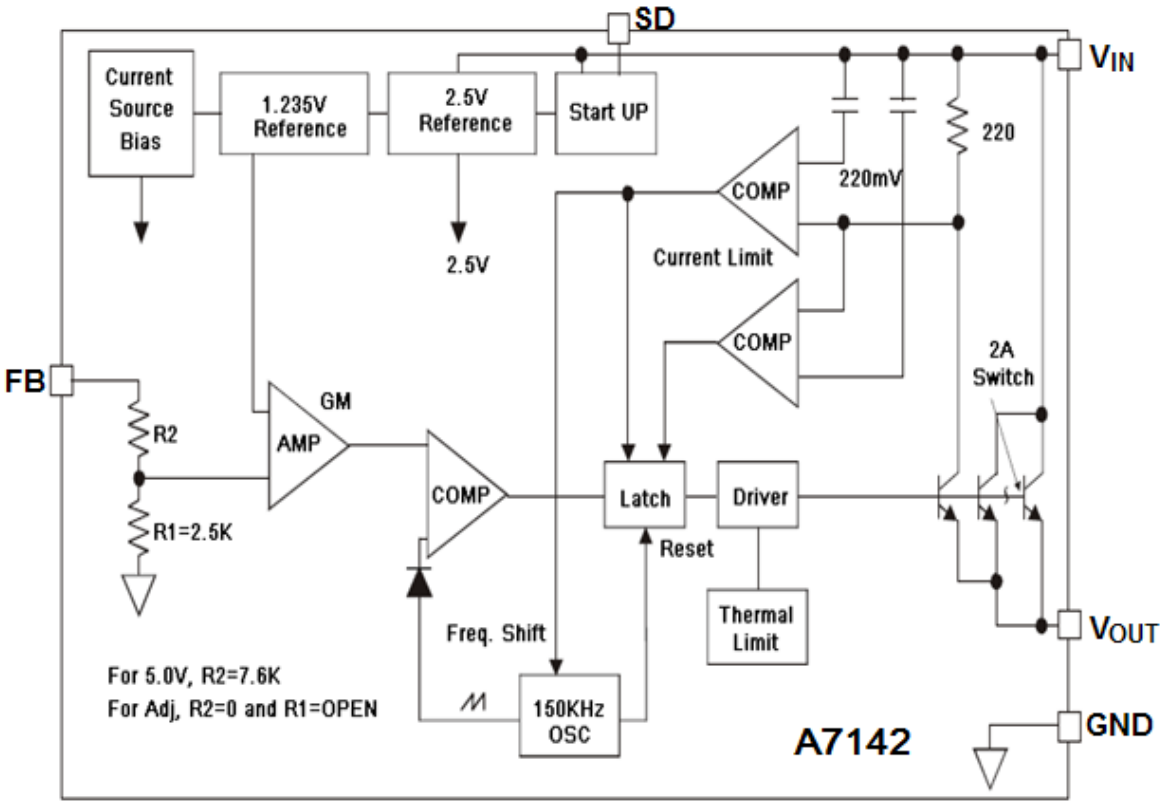
7. SD Pin Current (Sinking)



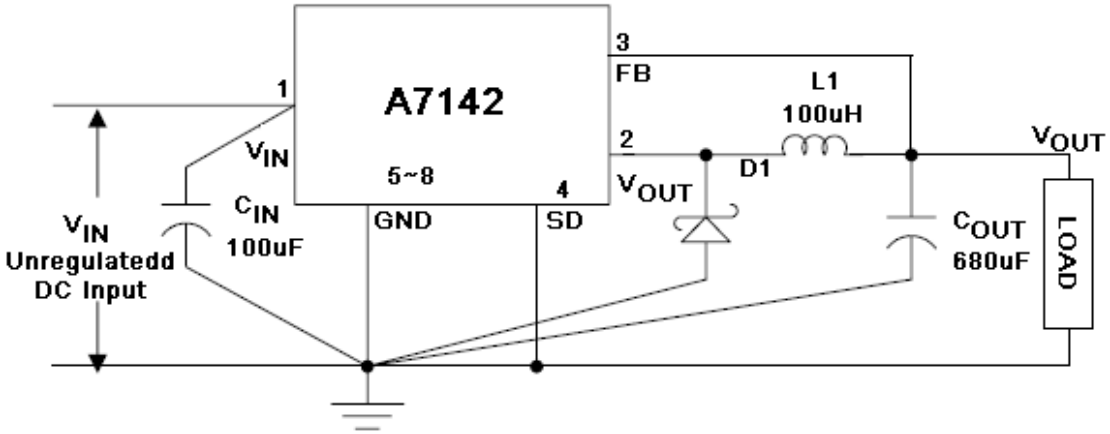
8. Switching Frequency



BLOCK DIAGRAM

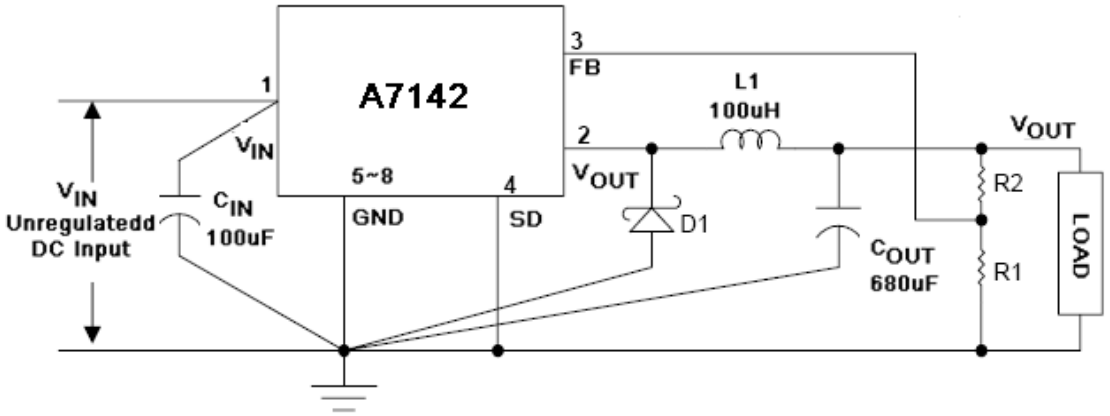


DETAILED INFORMATION



C_{IN} = 100µF, Aluminum Electrolytic, C_{OUT} = 220µF, 25V, Aluminum Electrolytic, D1 = Schottky, 5A/40V
L1 = 33µH

Figure 1 Fixed Output Voltage Versions

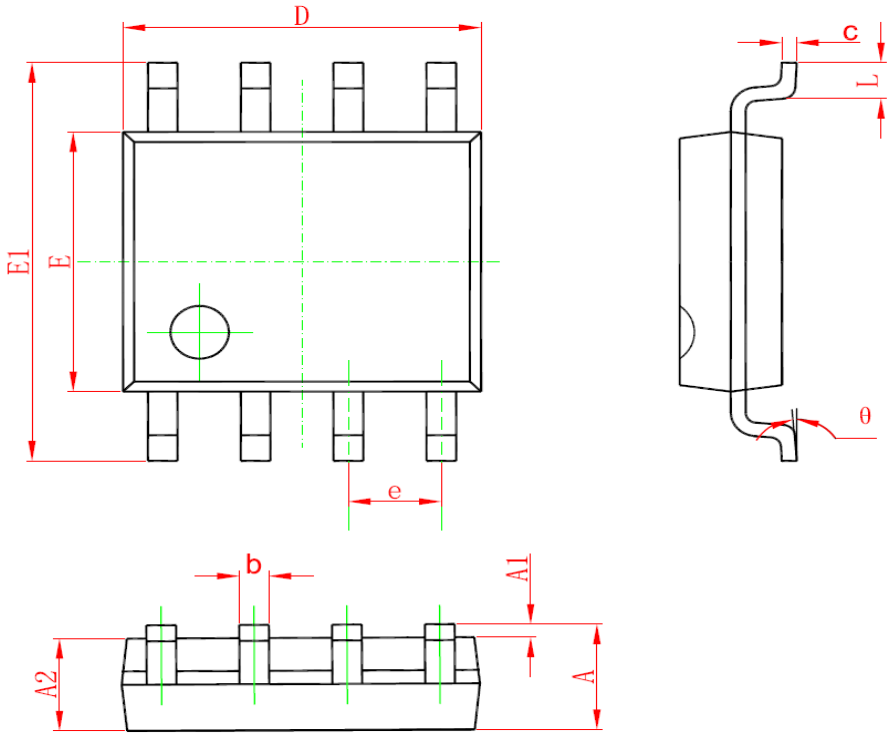


C_{IN} = 100µF, Aluminum Electrolytic, C_{OUT} = 220µF, 25V, Aluminum Electrolytic, D1 = Schottky, 5A/40V
L1 = 33µH, V_{OUT} = 1.23V x (1 + R2/R1)

Figure 2 Adjustable Output Voltage Versions

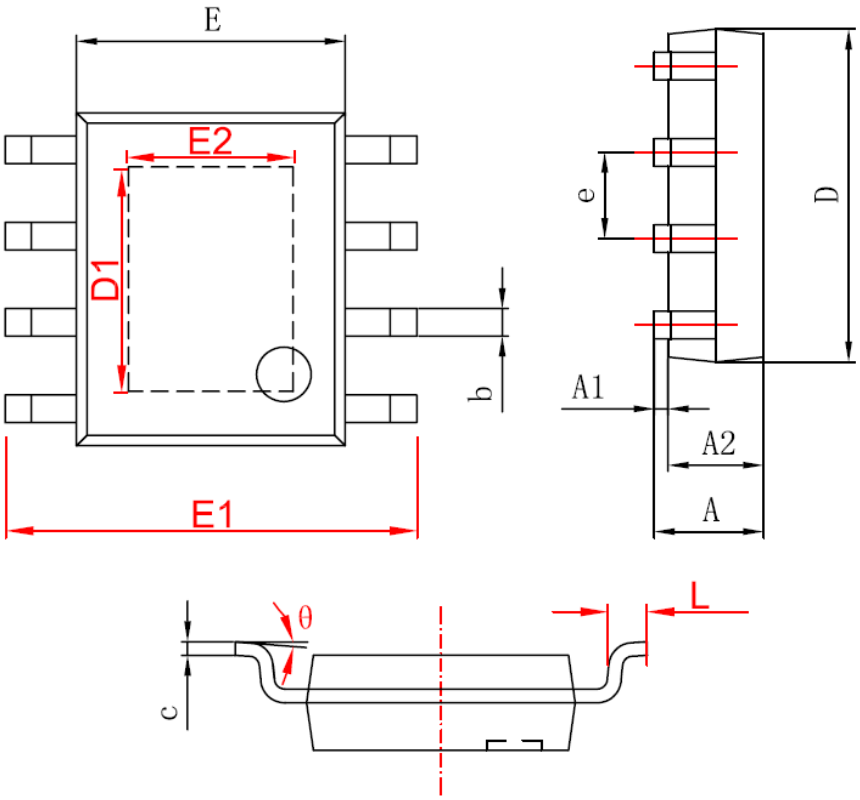
PACKAGE INFORMATION

Dimension in SOP8 Package (Unit: mm)



Symbol	Min	Max
A	1.350	1.750
A1	0.100	0.250
A2	1.350	1.550
b	0.330	0.510
c	0.170	0.250
D	4.700	5.100
E	3.800	4.000
E1	5.800	6.200
e	1.270(BSC)	
L	0.400	1.270
θ	0°	8°

Dimension in PSOP8 Package (Unit: mm)



Symbol	Min	Max
A	1.350	1.750
A1	0.050	0.150
A2	1.350	1.550
b	0.330	0.510
c	0.170	0.250
D	4.700	5.100
D1	3.202	3.402
E	3.800	4.000
E1	5.800	6.200
E2	2.313	2.513
e	1.270(BSC)	
L	0.400	1.270
θ	0°	8°

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