DESCRIPTION

The A7210 is a CMOS-based PWM step-down DC-DC Controller. The device offers the following advantages: lower supply current and wider operating input-voltage range.

The A7210 consists of an oscillator, a PWM control circuit, a reference voltage unit, an error amplifier, a soft-start circuit, a protection circuit, a PWM/PFM alternative circuit, a Chip Enable circuit, and under voltage lockout circuit. A low ripple, high efficiency step-down DC-DC converter can be easily composed of this IC. Output Voltage can be adjusted with external resistors.

The A7210 uses voltage type PWM/PFM mixed operation mode. When the load current is small, the operation will switch into the PFM mode from PWM mode. Therefore the efficiency at small load is improved, and then the chip works on PWM mode.

The A7210 embeds reset type protection circuit. If the term of maximum duty cycle keeps on a certain time, the protection circuit restarts the operation with soft-start and repeat this operation until maximum duty cycle condition is released. When the cause of large load current is removed, the chip returns to normal condition.

The A7210 is available in SOT-25 Package.

ORDERING INFORMATION

Package Type	Part Number	
SOT-25	E5	A7210E5R
		A7210E5VR
Note	R: Tape & Reel V: Green Package	
AiT provides all Pb free products Suffix " V " means Green Package		

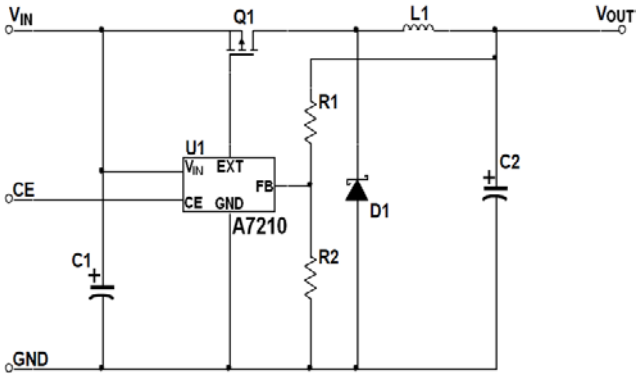
FEATURES

- Range of Input Voltage: 3V ~ 16V
- Built-in Soft-start Function and Protection Function(Reset type protection)
- <1μA Shutdown Current and 80uA Quiescent Current
- Oscillation Frequency: 500KHz
- High efficiency: 95%
- High Accuracy Output Voltage:±2.0%
- Low Temperature Coefficient: ±100ppm/°C
- Operating Temperature Range: -40°C ~ 85°C
- Available in SOT-25 Package

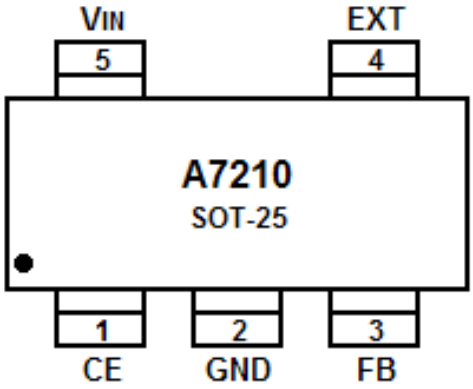
APPLICATION

- Power source for hand-held communication equipment, cameras, video instruments such as VCRs, camcorders
- Power source for battery-powered equipment
- Power source for household electrical appliance

TYPICAL APPLICATION



PIN DESCRIPTION



Top View

Pin #	Symbol	Function
1	CE	Chip Enable Pin (Active with “H”)
2	GND	Ground Pin
3	FB	Pin for Feedback Voltage
4	EXT	Switching Pin
5	V_{IN}	Power Supply Pin

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	-0.3V to 18V
CE Pin Voltage	-0.3V to V_{IN}+0.3V
EXT Pin Voltage	-0.3V to V_{IN}+0.3V
FB Pin Voltage	-0.3V to 6V
Operating Ambient Temperature Range	-40°C to 85°C
Storage Temperature Range	-65°C to150°C
Lead Temperature (Soldering, 10 sec)	260°C
Thermal resistance: θ_{JA}	150°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.

ELECTRICAL CHARACTERISTICS

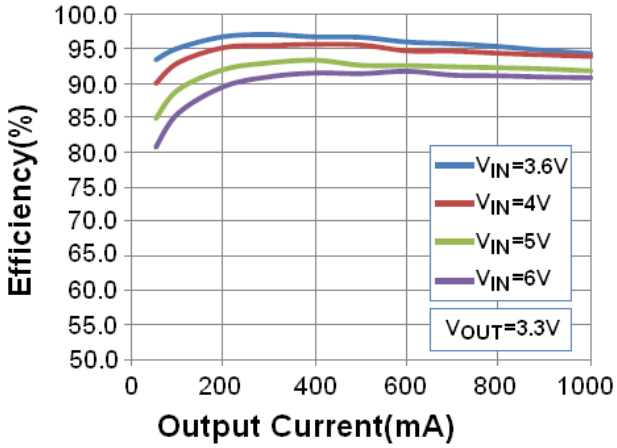
T_A = 25℃, V_{IN} = 12V, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating Input Voltage	V_{IN}		3	-	16	V
Feedback Voltage	V_{FB}	V_{IN} = V_{CE} = 12V, I_{OUT} = 100mA	1.196	1.221	1.246	V
Feedback Voltage Temperature Coefficient	$\Delta V_{FB}/\Delta T$	-25℃ ≤ Topt ≤ 85℃	-	±100	-	ppm/℃
Oscillator Frequency	F_{OSC}	V_{IN} = V_{CE} = 12V, I_{OUT} = 100mA	300	500	700	KHz
Oscillator Frequency Temperature Coefficient	$\Delta F_{OSC}/\Delta T$	-25℃ ≤ Topt ≤ 85℃	-	±0.2	-	%/℃
Supply Current 1	I_{DD1}	V_{IN} = V_{CE} = 12V, V_{FB} = 1.4V	-	80	-	μA
Standby Current	Istb	V_{IN} = 12V, V_{CE} = 0V	-	0	1	μA
CE “H” Input Current	I_{CEH}	V_{IN} = V_{CE} = 12V	-	0	0.5	μA
CE “L” Input Current	I_{CEL}	V_{IN} = 12V, V_{CE} = 0V	-0.5	0	-	μA
CE “H” Input Voltage	V_{CEH}	V_{IN} = 12V	1.5	-	-	V
CE “L” Input Voltage	V_{CEL}	V_{IN} = 12V	-	-	0.3	V
UVLO Threshold Voltage	V_{UVLO1}	V_{IN} = V_{CE} = 5V to 0V	1.5	1.9	2.3	V
UVLO Release Voltage	V_{UVLO2}	V_{IN} = V_{CE} = 0V to 5V	1.6	2.0	2.4	V
Oscillator Maximum Duty Cycle	Maxdty		-	-	100	%
Delay Time by Soft-start function	Tstart	V_{IN} = 12V, V_{CE} = 0 → 8V	2	5	10	ms
Delay Time for protection circuit	Tprot	V_{IN} = V_{CE} = 12V, V_{FB} = 2.5V → 0V	150	200	250	μs

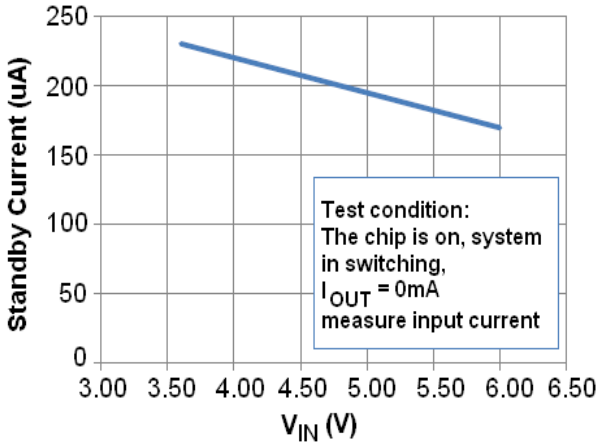
TYPICAL CHARACTERISTICS

T_A = 25°C, configuration as what is listed in above demo board BOM, unless otherwise specified.

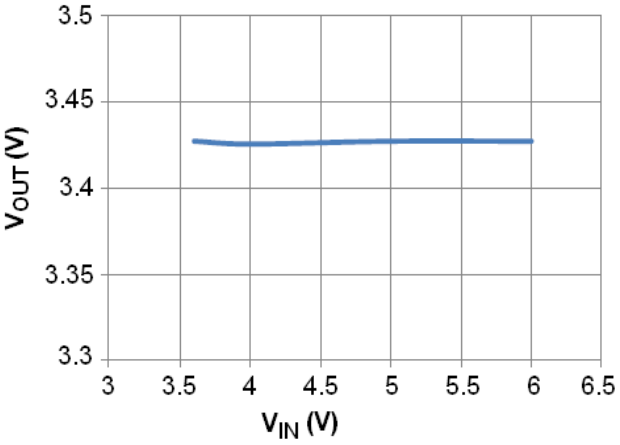
1. Efficiency Vs. Output Current



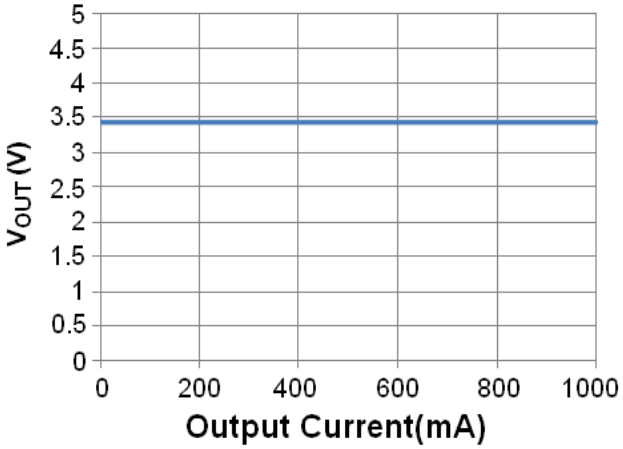
2. Standby Current Vs. V_{IN}



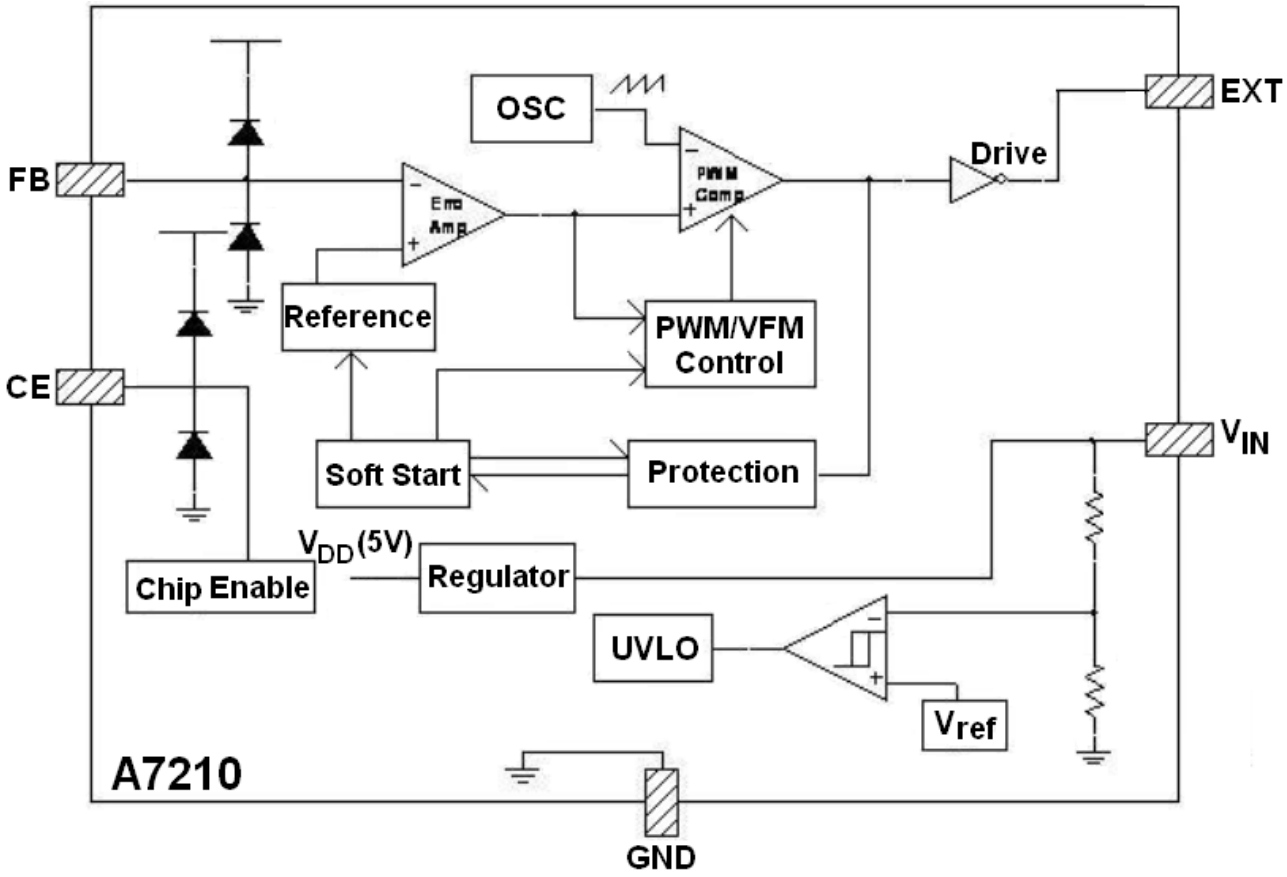
3. Line Regulation at I_{OUT} = 500mA



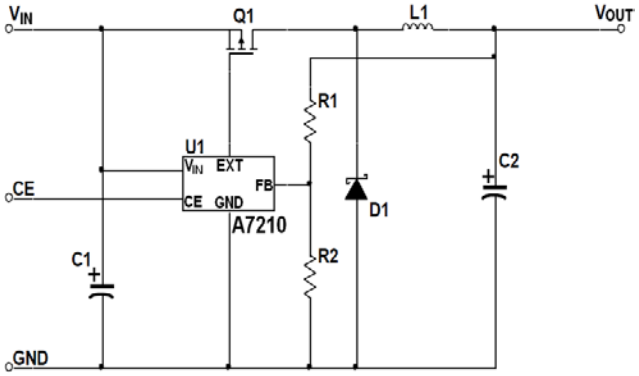
4. Load regulation at V_{IN} = 6V



BLOCK DIAGRAM



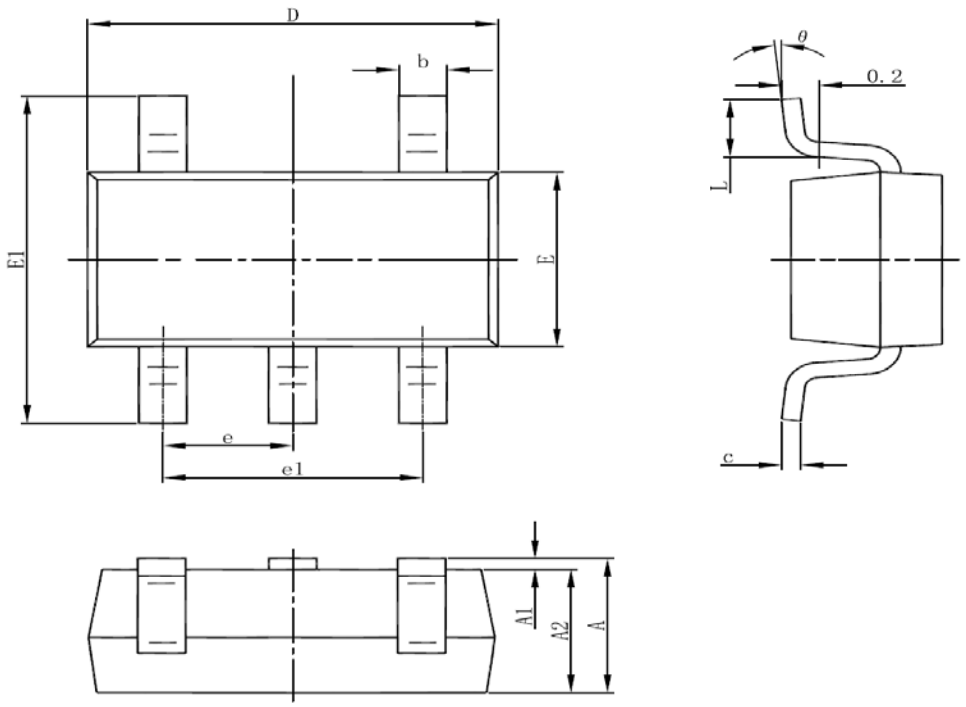
DEMOBOARD BOM



No.	Reference	Type	Specification
1	C1	Capacitor	Tantalum Capacitor; 25V/47uF; SMD
2	C2	Capacitor	Tantalum Capacitor; 25V/47uF; SMD
3	D1	Diode	SM340C (AiT-Components)
4	L1	Inductor	LPH10Q28-100NA001 (AiT-Components) 10uH; 3A; SMD, Shielding
5	U1	IC	A7210E5R, SOT-25 (AiT-Semi)
6	R1	Resistor	SMD 0805; 1%
7	R2	Resistor	SMD 0805; 1%
8	Q1	MOSFET	AM2301E3VR (AiT-Semi)

PACKAGE INFORMATION

Dimension in SOT-25 (Unit: mm)



Symbol	Min	Max
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.820	3.020
E	1.500	1.700
E1	2.650	2.950
e	0.950(BSC)	
e1	1.800	2.000
L	0.300	0.600
θ	0°	8°

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