400mA Low-dropout Linear Voltage Regulator with Voltage Detector Function

FEATURES

- Including MOSFET for V_{OUT1}, LDO for V_{OUT2}, voltage detector and shutdown control
- Low dropout voltage of 550mV (typ.) at 400mA output current (V_{OUT2})
- Guaranteed 700mA output current for V_{OUT1} and 400mA for V_{OUT2}
- Low ground current of 120µA
- Output voltage accuracy of 2% for V_{OUT2}
- Current limit function
- Built-in voltage detector
- Shutdown control for V_{OUT1} and V_{OUT2}

APPLICATIONS

- Volyage Regulator for DVD-ROM and CD-ROM Drives
- Voltage Regulator for HDD and Floppy Drives
- Voltage Regulator for circuits with Stepping Motors or Servo Motors

DESCRIPTION

The SS6729 is a low dropout linear regulator with voltage detection function.

It can be divided into four main functional blocks, including a MOSFET for V_{OUT1}, an LDO for VOUT2, a voltage detector and two shutdown controls.

The voltage detector can be used to detect V_{CC}. The detecting voltage of the voltage detector is from 3.0V to 4.6V in 0.1V steps, and the output (D_{OUT}) of the VCC voltage detection has an adjustable delay time before indicating V_{CC}. The user only needs to add one external capacitor to implement it. When Vcc is below the set detection voltage, DOUT is at logic-low.

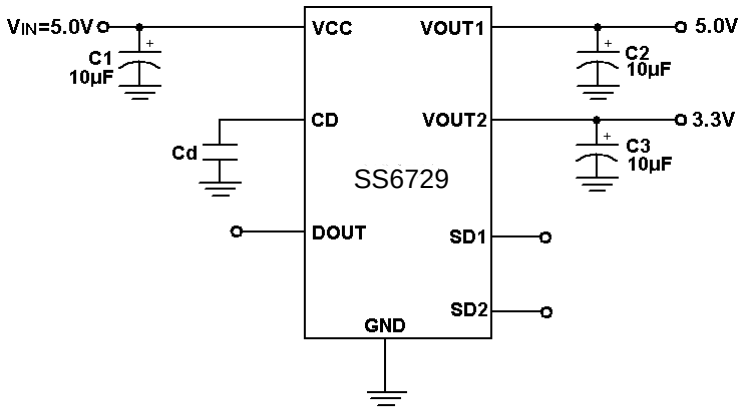
V_{OUT1} is controlled by the SD1 pin. When SD1 is logic-high, the internal MOSFET for V_{OUT1} is switched off, and vice versa.

The LDO output voltage (V_{OUT2}) is from 1.8V to 4.0V with 0.1V step for different application. It is also controlled by SD2 pin. When SD2 is logic high, the internal LDO for V_{OUT2} will be shutdown, vice versa.

The superior characteristics of the SS-6729 include very low dropout voltage, and 2% accuracy output voltage. Typical ground current remains 120µA, from no load to maximum loading conditions. Dropout voltage of V_{OUT2} is 550mV at 400mA output current. Output current limiting is provided at V_{OUT1} and V_{OUT2}.

SS6729 comes in the popular SO8 package.

TYPICAL APPLICATION CIRCUIT



Power Source for CD-drivers and DVD-drivers

ORDERING INFORMATION

SS6729XXXX-CXXX

Packing type
TB: tubes (PDIP is only available in tubes)
TR: tape and reel

Package type
N: plastic DIP
S: small outline

LDO output voltage
18: 1.8V
:
:
40: 4.0V

Voltage detector voltage
30: 3.0V
:
:
46: 4.6V

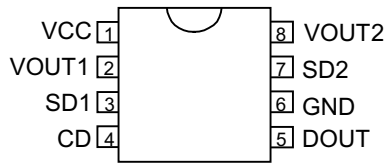
LDO output voltage and voltage detector are available on 0.1V increments

Example: SS6729-3018CSTR

→ 3.0V voltage detector, 1.8V LDO output voltage, in SO-8, shipped on tape and reel

PIN CONFIGURATION

Top view



ABSOLUTE MAXIMUM RATINGS

Input Supply Voltage ..... -0.3~8V

Operating Ambient Temperature Range ..... -40°C~ 85°C

Storage Temperature Range ..... -65°C~150°C

Thermal Resistance θ_{JA}

SOIC Package ..... 100°C/W

SOIC Package (with 3 square inches of Copper)..... 90°C/W

ELECTRICAL CHARACTERISTICS

(T_A = 25°C, V_{IN} = 5.0V, I_{OUT1} = I_{OUT2} = 400mA, SD1 = SD2 = low, unless otherwise specified)

PARAMETER	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Ground Current	I_{OUT1}=0.1mA~700mA I_{OUT2}=0.1mA~400mA V_{IN}= 4.0V~8.0V		120	200	μA
Output Voltage Temperature Coefficiency	(Note 1)		100		PPM/°C
VOUT1					
Output MOSFET Resistance	V_{IN}= 5.0V		370	450	mΩ
Current Limit(Note 3)		700	950		mA
Output Turn-on Rise Delay			100		μs
Output Turn-on Rise Time			1000		μs
SD1 Pin Voltage	V_{SD}=Logic"0"			0.8	V
	V_{SD}=Logic"1"	2.4			
VOUT2 (1.8V ~ 4.0V with 0.1V step)					
LDO Output Voltage	No Load	V_{SET} × 0.98	V_{SET}	V_{SET} × 1.02	V
Line Regulation	I_L=1mA,V_{IN}=4.0V~8.0V		3	10	mV
Load Regulation (Note 2)	V_{IN}=5V,I_L=0.1mA~400mA		50	90	mV
Current Limit (Note 3)		400	650		mA

ELECTRICAL CHARACTERISTICS (cont'd.)

PARAMETER	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Dropout Voltage (Note 4)	$V_{OUT} \geq 3.3V$	I_L=100mA		140	200	mV
		I_L=200mA		280	350	
		I_L=300mA		420	500	
		I_L=400mA		550	700	
	2.5V $\leq V_{OUT}$<3.3V	I_L=100mA		250	300	
		I_L=200mA		420	500	
		I_L=300mA		600	700	
		I_L=400mA		780	900	
	V_{OUT} < 2.5V	I_L=100mA		700	800	
		I_L=200mA		880	950	
		I_L=300mA		1050	1150	
		I_L=400mA		1220	1400	
SD2 Pin Voltage	V_{SD}=Logic"0"				0.8	V
	V_{SD}=Logic"1"		2.4			
Voltage Detector (3.0V ~ 4.6V with 0.1V step)						
Detect Voltage(V_{DET})			V_{DSET} × 0.98	V_{DSET}	V_{DSET} × 1.02	V
Detect Threshold Hysteresis				V_{DET} × 1.05		V
V_{DOUT}	When V_{DET} is Detected				0.6	V
	When V_{DET} is not Detected		1.65			
Delay Time	CD Pin Open			1	3	ms

Note 1: Guaranteed by design.
Note 2: Regulation is measured at constant junction temperature, using pulse testing with a low ON time.
Note 3: Current limit is measured by pulsing a short time.
Note 4: Dropout voltage is defined as the input to output differential at which the output voltage drops 100mV below the value measured with a 1V differential.

TYPICAL PERFORMANCE CHARACTERISTICS

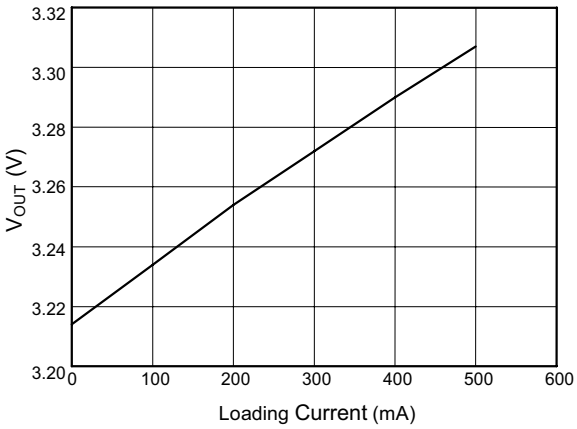


Fig. 1 Output voltage vs. Loading Current

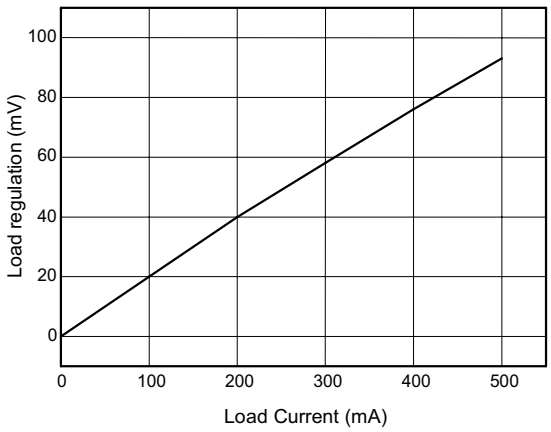


Fig. 2 Load Regulation

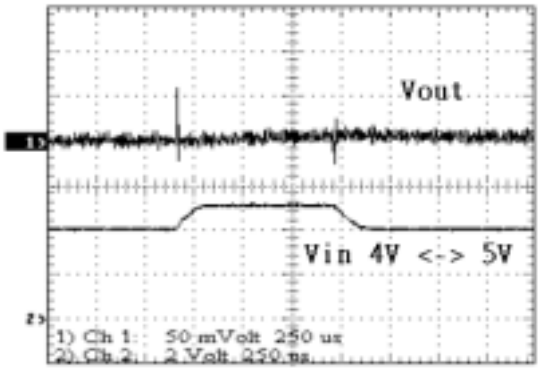


Fig. 3 Line Transient

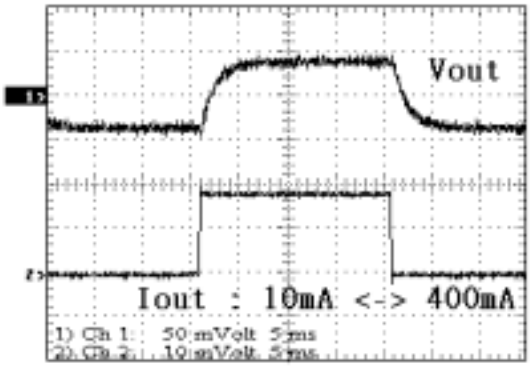


Fig. 4 Load Transient

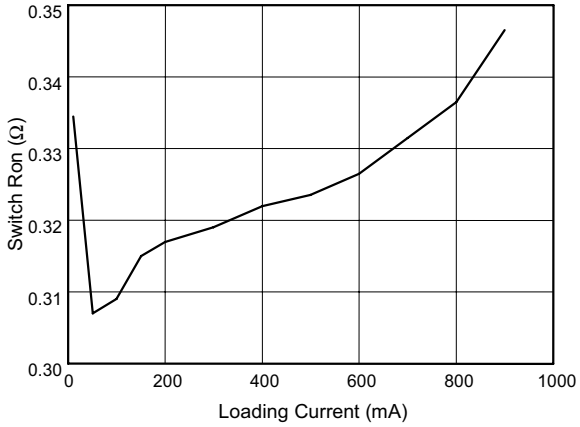


Fig. 5 Switch Ron vs. Loading current (mA)

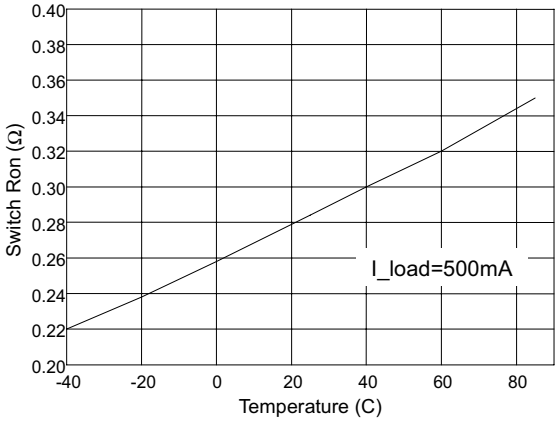


Fig. 6 Switch Ron vs. Temperature

TYPICAL PERFORMANCE CHARACTERISTICS (cont'd.)

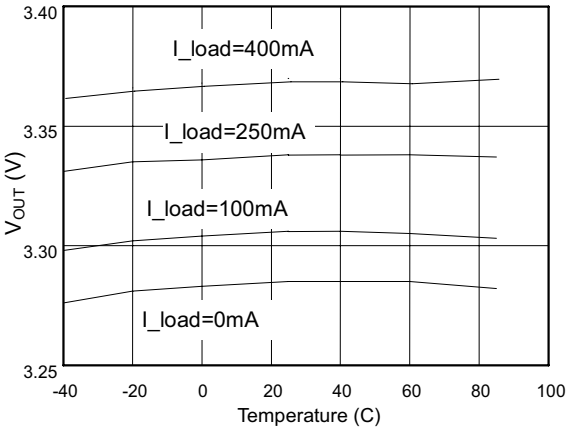


Fig. 7 Output voltage vs. Temperature

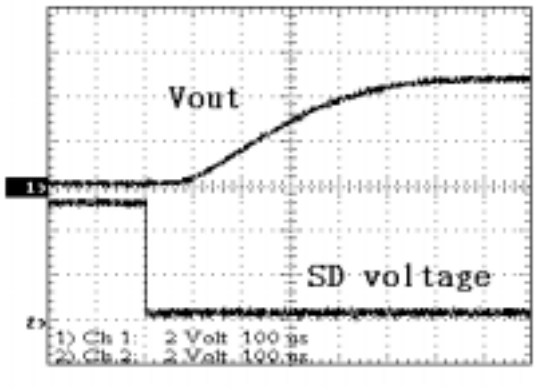


Fig. 8 Output Turn-on Rise Time

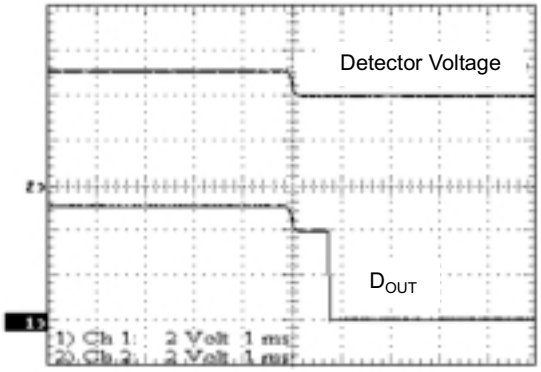


Fig. 9 Built-in Delay Time Waveform

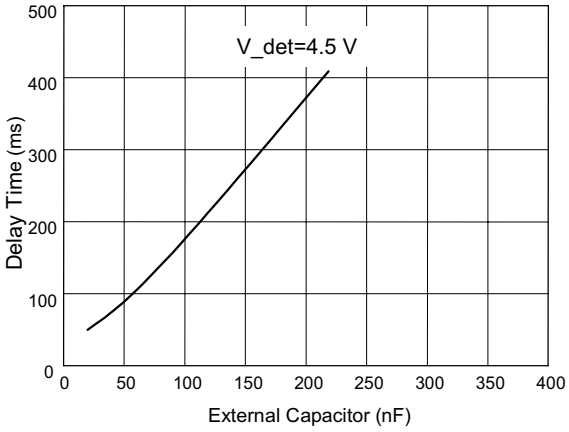
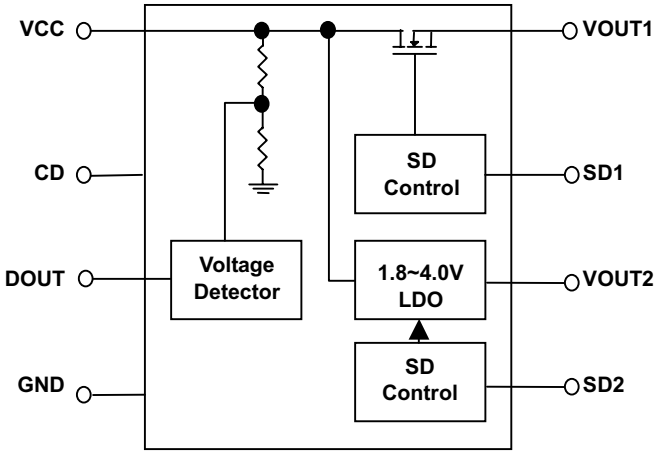


Fig. 10 Delay Time vs. External Capacitor

BLOCK DIAGRAM



PIN DESCRIPTION

PIN 1: VCC- This pin is the main input supply for the IC, normally 5V

PIN 2: VOUT1- This pin is the voltage output which is connected to Vcc directly via internal MOSFET switch, normally 5V

PIN 3: SD1- VOUT1 shutdown pin. Logic high input for disabling the internal MOS Switch.

PIN 4: CD- This pin is to determine delay time by attaching a capacitor

PIN 5: DOUT- This pin is voltage detector output, pulled low when V_{IN} detected

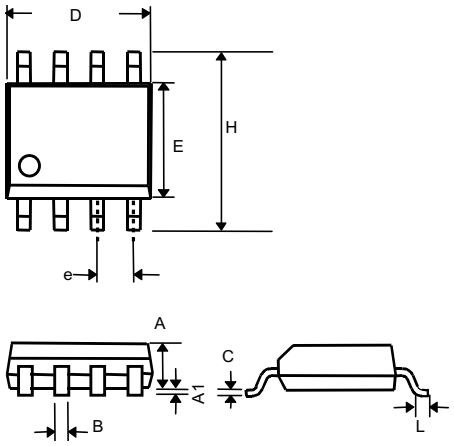
PIN 6: GND- IC ground pin

PIN 7: SD2- VOUT2 shutdown pin. Logic high input for disabling LDO output.

PIN 8: VOUT2- This pin is 3.3V LDO voltage output

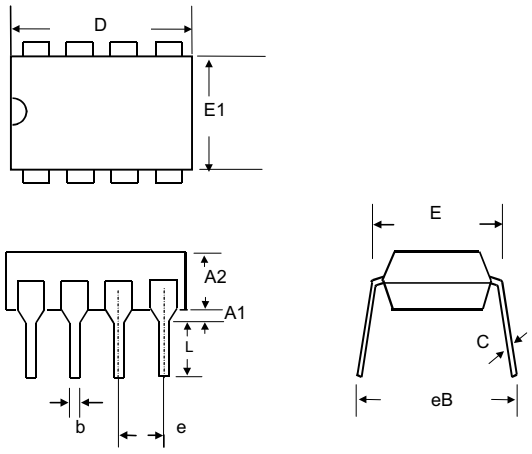
PHYSICAL DIMENSIONS

8-lead plastic SO (units: mm)



SYMBOL	MIN	MAX
A	1.35	1.75
A1	0.10	0.25
B	0.33	0.51
C	0.19	0.25
D	4.80	5.00
E	3.80	4.00
e	1.27(TYP)	
H	5.80	6.20
L	0.40	1.27

8 lead plastic DIP (units: mm)



SYMBOL	MIN	MAX
A1	0.381	—
A2	2.92	4.96
b	0.35	0.56
C	0.20	0.36
D	9.01	10.16
E	7.62	8.26
E1	6.09	7.12
e	2.54 (TYP)	
eB	—	10.92
L	2.92	3.81