

# 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 120 $\mu$ A
- Output voltage accuracy of 2% for  $V_{OUT2}$
- Current limit function
- Built-in voltage detector
- Shutdown control for  $V_{OUT1}$  and  $V_{OUT2}$

## APPLICATIONS

- Voltage 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  $V_{OUT2}$ , 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  $V_{CC}$  voltage detection has an adjustable delay time before indicating  $V_{CC}$ . The user only needs to add one external capacitor to implement it. When  $V_{CC}$  is below the set detection voltage,  $D_{OUT}$  is at logic-low.

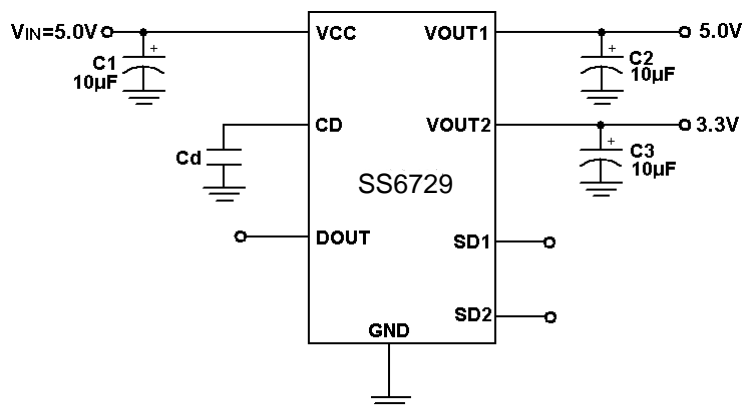
$V_{OUT1}$  is controlled by the SD1 pin. When SD1 is logic-high, the internal MOSFET for  $V_{OUT1}$  is switched off, and vice versa.

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 120 $\mu$ A, 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

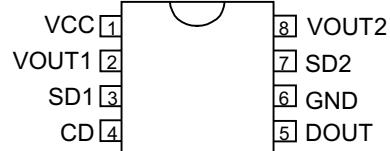
LDO output voltage  
 18: 1.8V  
 :  
 :  
 40: 4.0V

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

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

## PIN CONFIGURATION

Top view



Example: SS6729-3018CSTR

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

## 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 $\theta_{JA}$	
SOIC Package .....	100°C/W
SOIC Package (with 3 square inches of Copper).....	90°C/W

## ELECTRICAL CHARACTERISTICS

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

PARAMETER	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Ground Current	$I_{OUT1}=0.1\text{mA}\sim 700\text{mA}$ $I_{OUT2}=0.1\text{mA}\sim 400\text{mA}$ $V_{IN}= 4.0\text{V}\sim 8.0\text{V}$		120	200	$\mu\text{A}$
Output Voltage Temperature Coefficiency	(Note 1)		100		PPM/ $^\circ\text{C}$
<b>VOUT1</b>					
Output MOSFET Resistance	$V_{IN}= 5.0\text{V}$		370	450	$\text{m}\Omega$
Current Limit(Note 3)		700	950		mA
Output Turn-on Rise Delay			100		$\mu\text{s}$
Output Turn-on Rise Time			1000		$\mu\text{s}$
SD1 Pin Voltage	$V_{SD}=\text{Logic}''0''$			0.8	V
	$V_{SD}=\text{Logic}''1''$	2.4			
<b>VOUT2 ( 1.8V ~ 4.0V with 0.1V step )</b>					
LDO Output Voltage	No Load	$V_{SET} \times 0.98$	$V_{SET}$	$V_{SET} \times 1.02$	V
Line Regulation	$I_L=1\text{mA}, V_{IN}=4.0\text{V}\sim 8.0\text{V}$		3	10	mV
Load Regulation (Note 2)	$V_{IN}=5\text{V}, I_L=0.1\text{mA}\sim 400\text{mA}$		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	$V_{SD}=\text{Logic}^{\prime}0^{\prime}$			0.8	V
	$V_{SD}=\text{Logic}^{\prime}1^{\prime}$	2.4			
<b>Voltage Detector ( 3.0V ~ 4.6V with 0.1V step )</b>					
Detect Voltage( $V_{DET}$ )		$V_{DSET} \times 0.98$	$V_{DSET}$	$V_{DSET} \times 1.02$	V
Detect Threshold Hysteresis			$V_{DET} \times 1.05$		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**

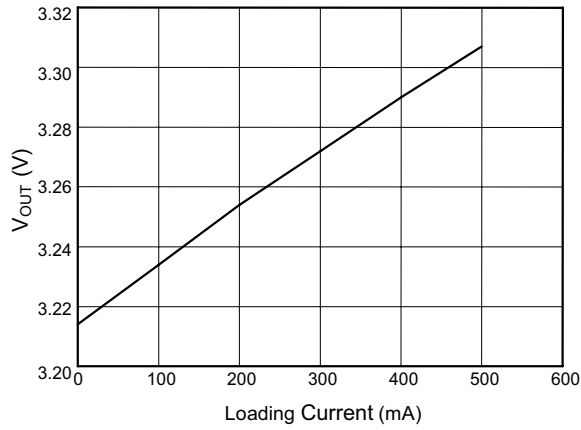


Fig. 1 Output voltage vs. Loading Current

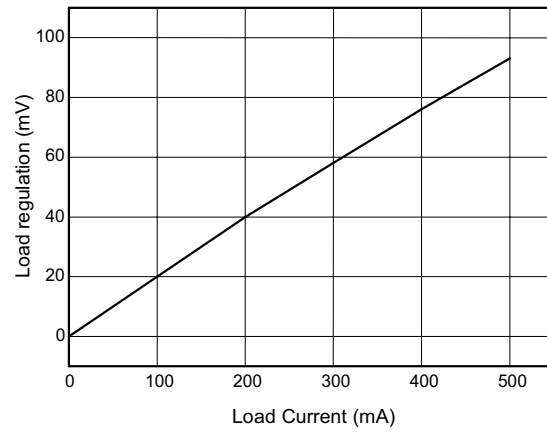


Fig. 2 Load Regulation

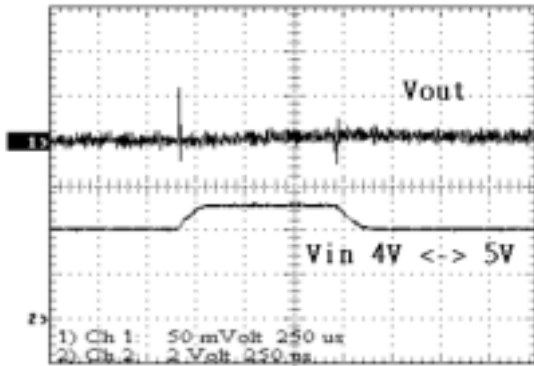


Fig. 3 Line Transient

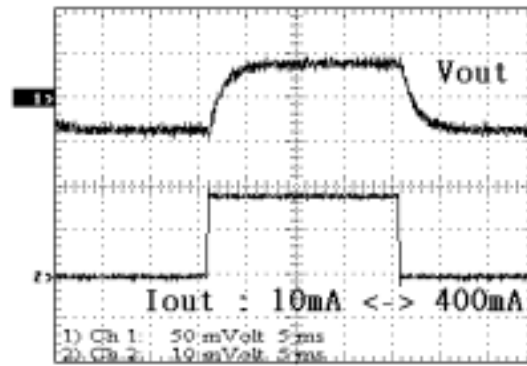


Fig. 4 Load Transient

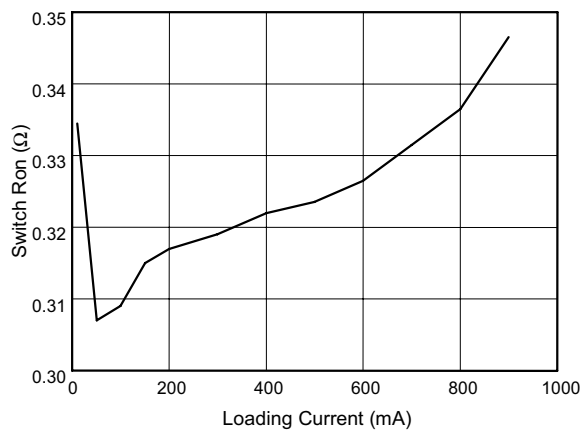


Fig. 5 Switch Ron vs. Loading current (mA)

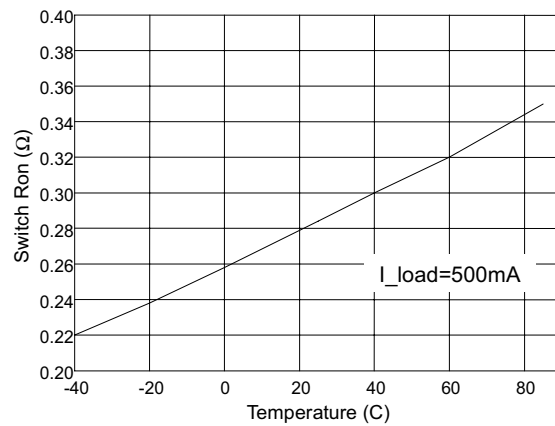


Fig. 6 Switch Ron vs. Temperature

**TYPICAL PERFORMANCE CHARACTERISTICS (cont'd.)**

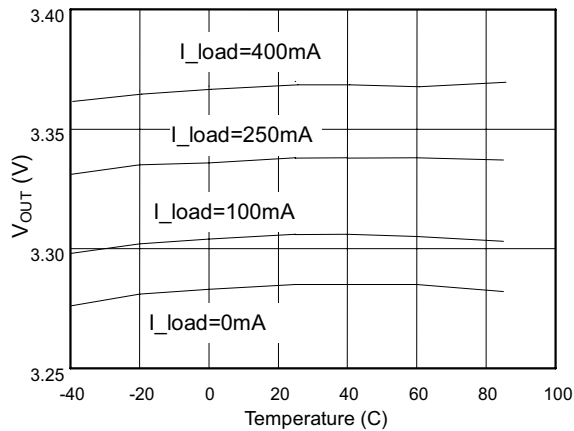


Fig. 7 Output voltage vs. Temperature

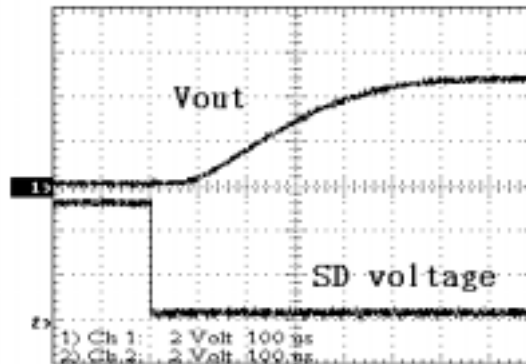


Fig. 8 Output Turn-on Rise Time

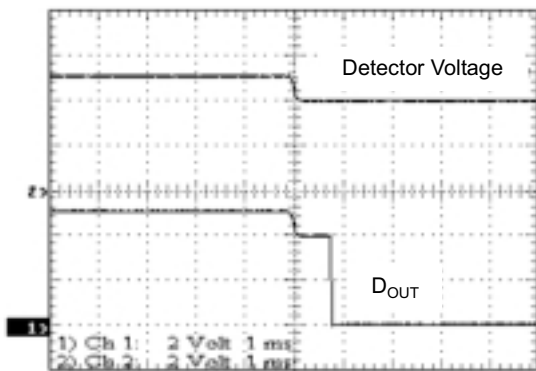


Fig. 9 Built-in Delay Time Waveform

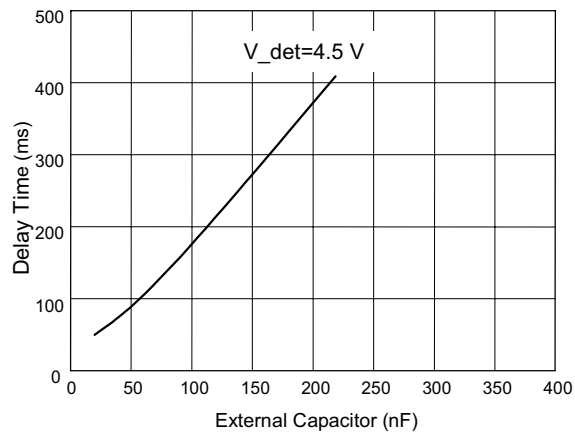
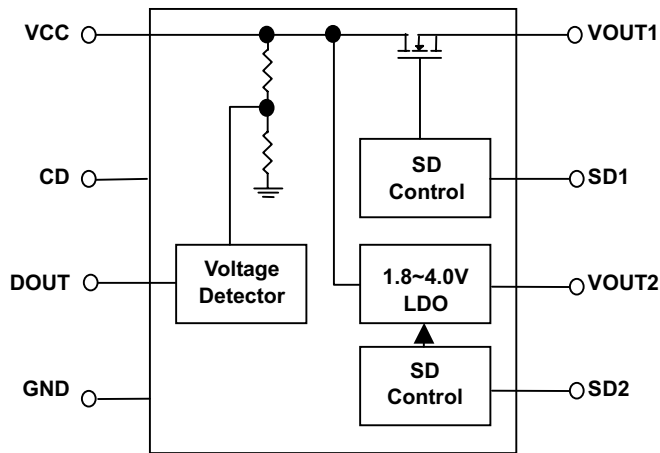


Fig. 10 Delay Time vs. External Capacitor

**BLOCK DIAGRAM**

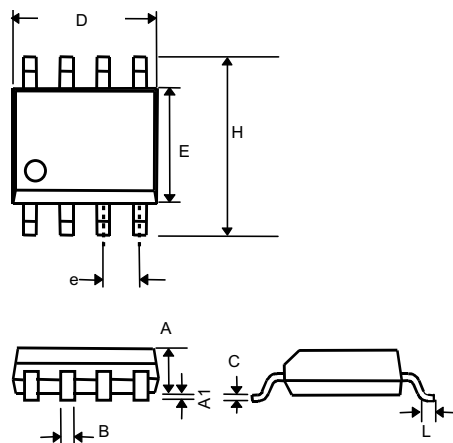


## PIN DESCRIPTION

PIN 1: VCC-	This pin is the main input supply for the IC, normally 5V	PIN 4: CD-	This pin is to determine delay time by attaching a capacitor
PIN 2: VOUT1-	This pin is the voltage output which is connected to Vcc directly via internal MOSFET switch, normally 5V	PIN 5: DOUT-	This pin is voltage detector output, pulled low when $V_{IN}$ detected
PIN 3: SD1-	VOUT1 shutdown pin. Logic high input for disabling the internal MOS Switch.	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

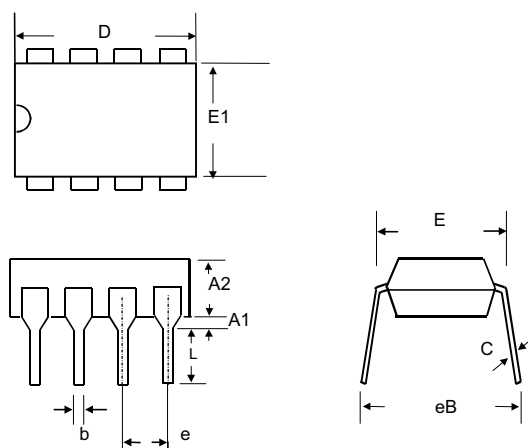
## PHYSICAL DIMENSIONS

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

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