

## 400mA Low Dropout Linear 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 at 120 $\mu$ A.
- 2% Accuracy Output Voltage of  $V_{OUT2}$ .
- Current Limit Function.
- Built in Voltage Detector
- Shutdown Control for  $V_{OUT1}$  and  $V_{OUT2}$

### ■ APPLICATIONS

- Voltage Regulator for DVD-ROM and CD-ROM Drivers.
- Voltage Regulator for HDD and Floppy Drivers.
- Voltage Regulator for circuits with Stepping Motor or Servo Motor.

### ■ DESCRIPTION

The AIC1729 is a low dropout linear regulator with voltage detection function.

It can be divided into 4 main function blocks, including MOSFET for  $V_{OUT1}$ , LDO for  $V_{OUT2}$ , voltage detector, and two shutdown controls.

Voltage detector can be use to detect  $V_{CC}$ . The detecting voltage of the voltage detector is from 3.0V to 4.6V with 0.1V step. And the output (DOUT) of detecting voltage for  $V_{CC}$  with delay time adjustment function to indicate  $V_{CC}$  low. User only adds one external capacitor to finish it. When  $V_{CC}$  pin is under the set detection voltage. DOUT pin is logic low.

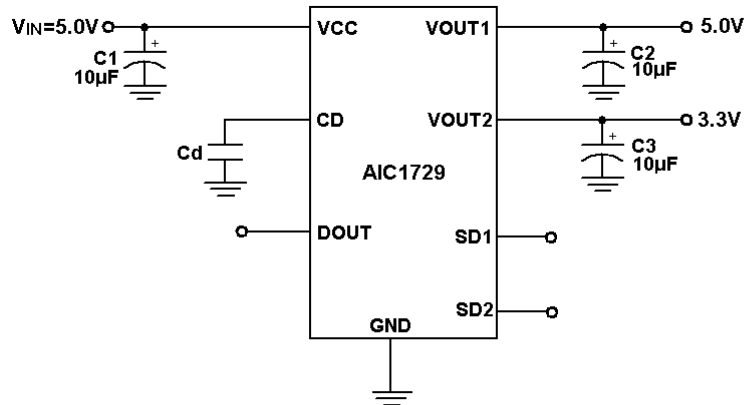
$V_{OUT1}$  is controlled by SD1 pin. When SD1 is logic high, the internal MOSFET for  $V_{OUT1}$  will be switched off, vice versa.

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 AIC1729 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  $V_{OUT2}$ .

AIC1729 comes in the popular SO8 package.

## TYPICAL APPLICATION CIRCUIT



Power Source for CD-drivers and DVD-drivers

## ORDERING INFORMATION

AIC1729-XX XXCXXX

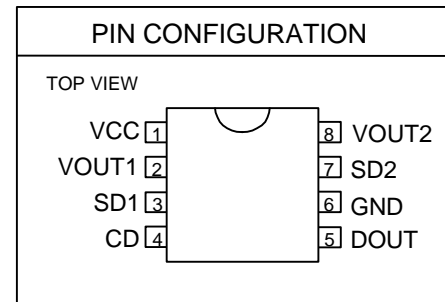
PACKING TYPE  
 TB: TUBE  
 TR: TAPE & REEL (not available for CN package)

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 voltage with every 0.1V a step.



Example: AIC1729-3018CN

→ 3.0V Voltage Detector Voltage, 1.8V LDO Output Voltage, in DIP-8 Package Type

**■ 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 (Continued)**

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	$V_{SD}=\text{Logic}''0''$			0.8	V
	$V_{SD}=\text{Logic}''1''$	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

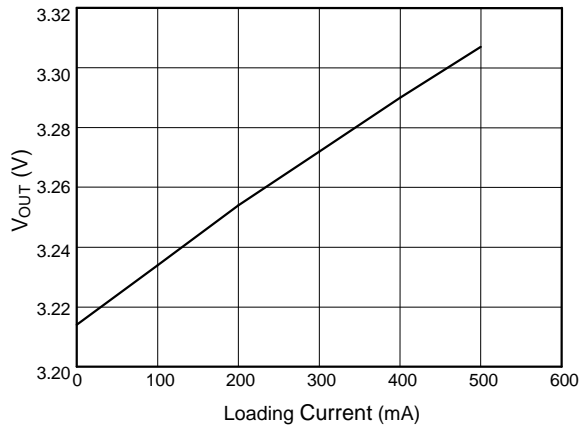


Fig. 1 Output voltage vs. Loading Current

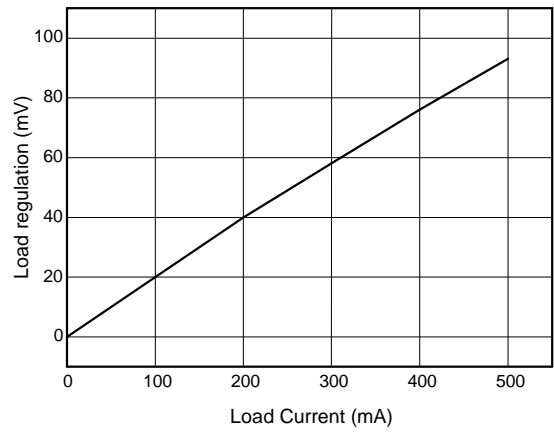


Fig. 2 Load Regulation

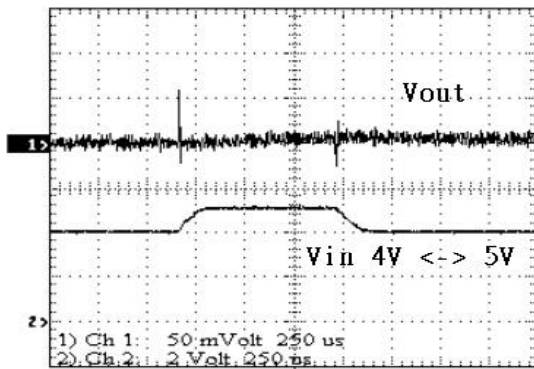


Fig. 3 Line Transient

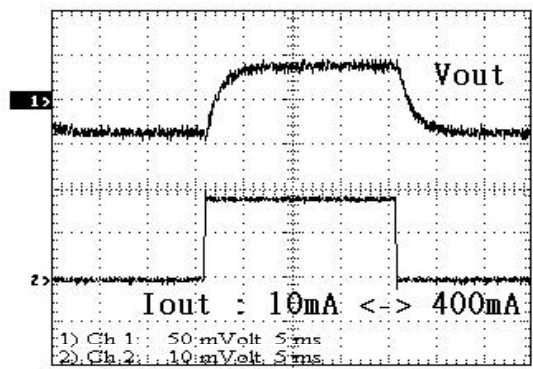


Fig. 4 Load Transient

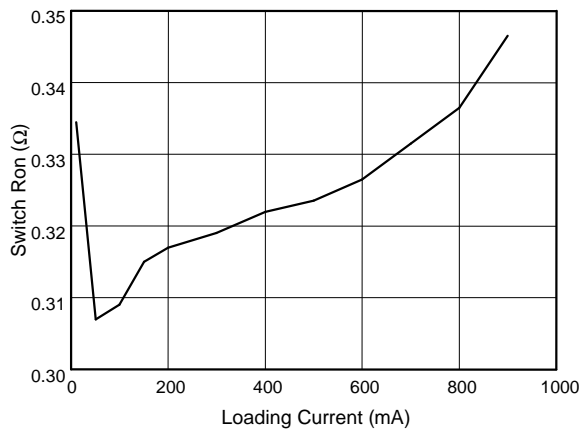


Fig. 5 Switch Ron vs. Loading current (mA)

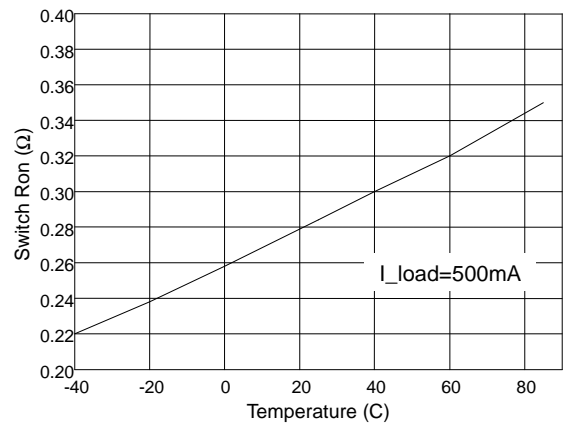


Fig. 6 Switch Ron vs. Temperature

**TYPICAL PERFORMANCE CHARACTERISTICS (Continued)**

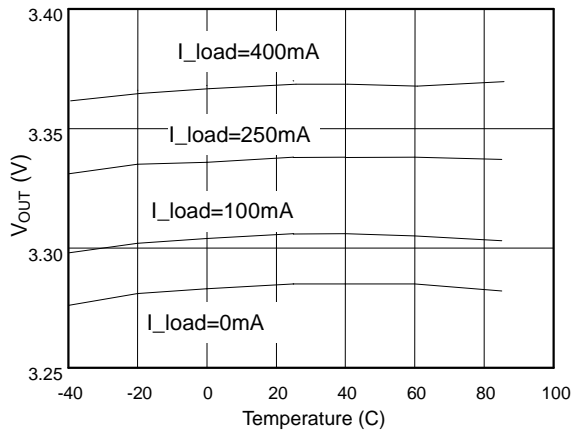


Fig. 7 Output voltage vs. Temperature

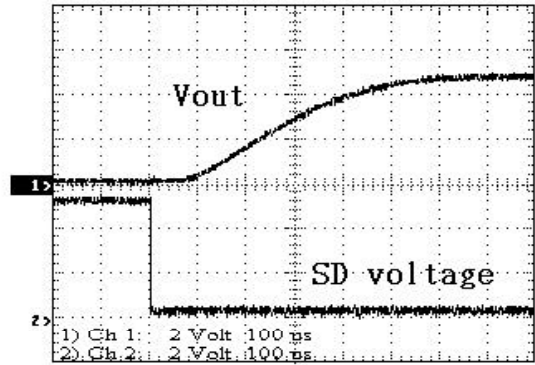


Fig. 8 Output Turn-on Rise Time

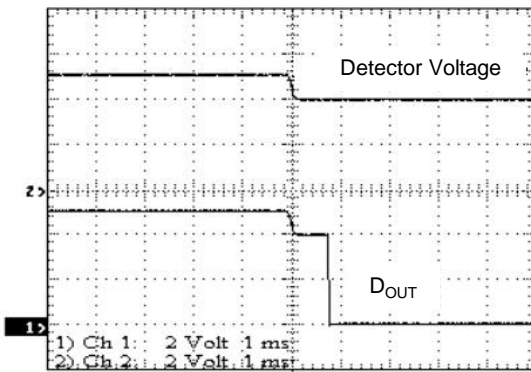


Fig. 9 Built-in Delay Time Waveform

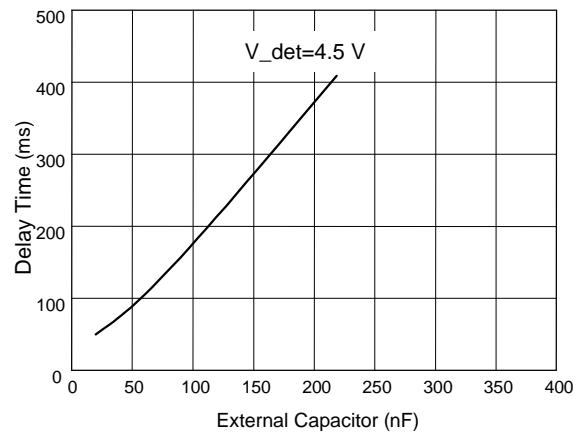
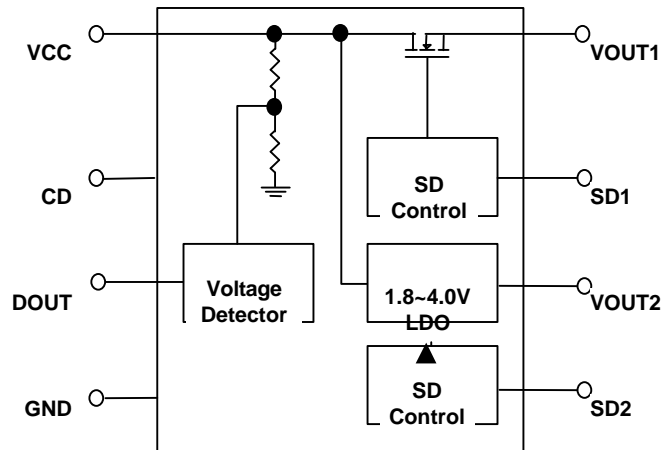


Fig. 10 Delay Time vs. External Capacitor

**BLOCK DIAGRAM**

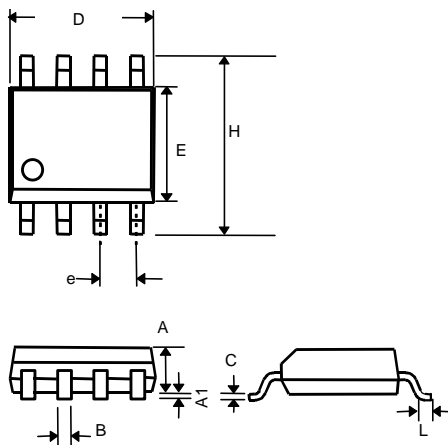


## ■ PIN DESCRIPTION

- 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

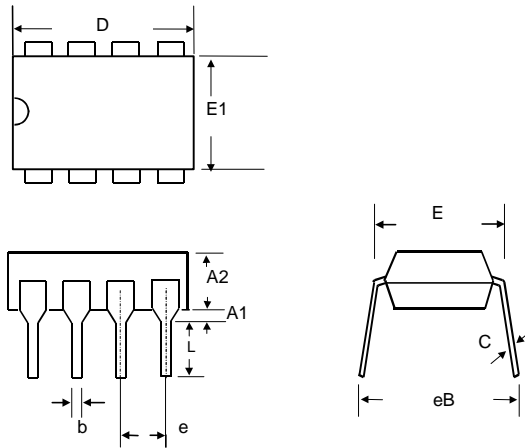
## ■ PHYSICAL DIMENSIONS

- 8 LEAD PLASTIC SO (unit: 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 (unit: 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

**Note:**

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