

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 μ 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. D_{OUT} pin is logic low.

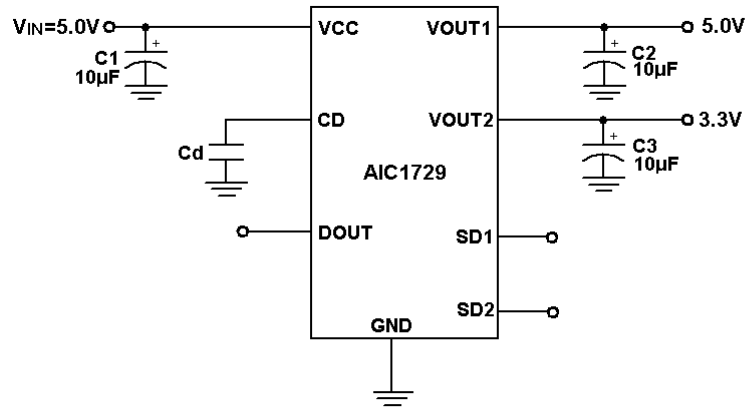
V_{OUT1} is controlled by SD1 pin. When SD1 is logic high, the internal MOSFET for V_{OUT1} will be switched off, vice versa.

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 μ 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

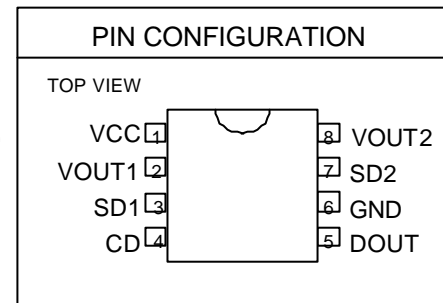
PACKING TYPE
 TB: TUBE
 TR: TAPE & REEL (not available for CN package)

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 θ_{JA}	
SOIC Package	100°C/W
SOIC Package (with 3 square inches of Copper)	90°C/W

■ ELECTRICAL CHARACTERISTICS (TA=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 (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			
Voltage Detector (3.0V ~ 4.6V with 0.1V step)					
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

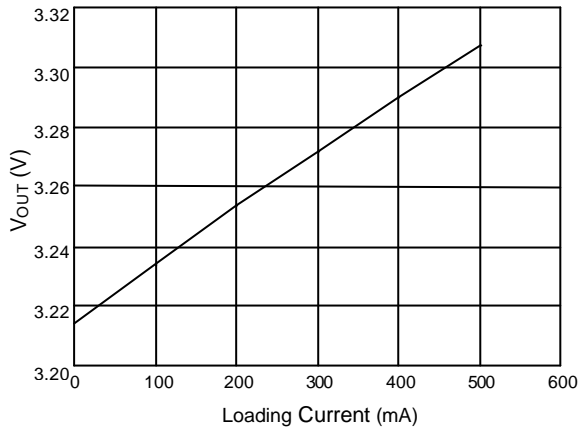


Fig. 1 Output voltage vs. Loading Current

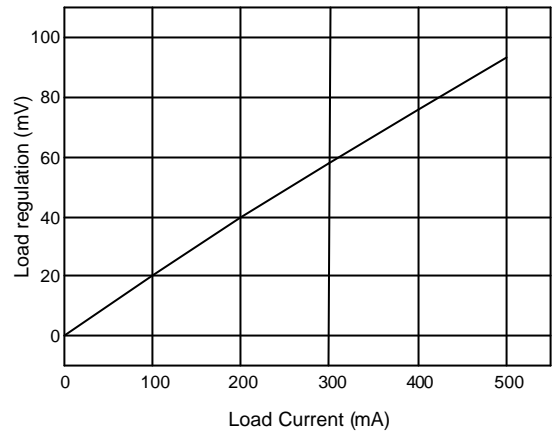


Fig. 2 Load Regulation

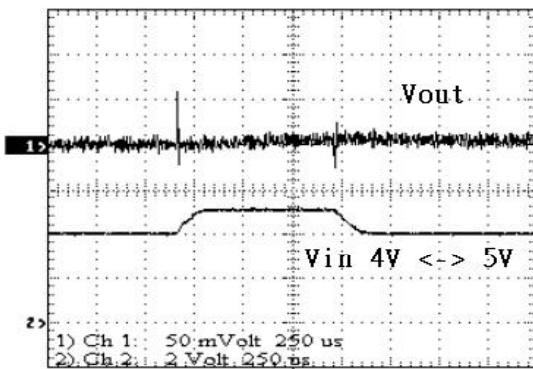


Fig. 3 Line Transient

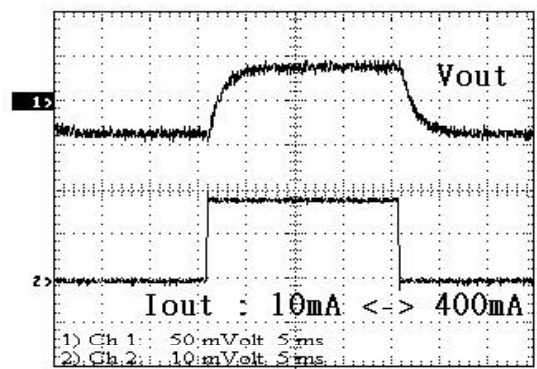


Fig. 4 Load Transient

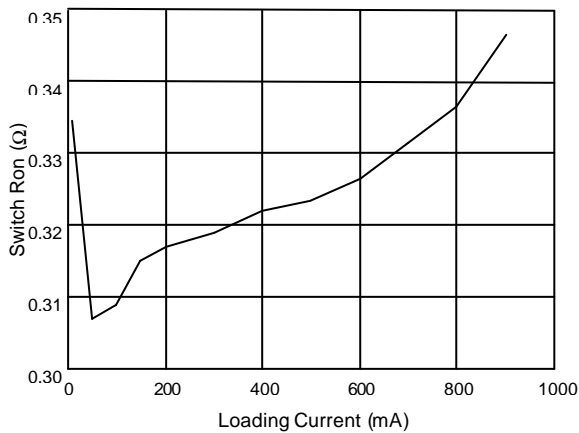


Fig. 5 Switch Ron vs. Loading current (mA)

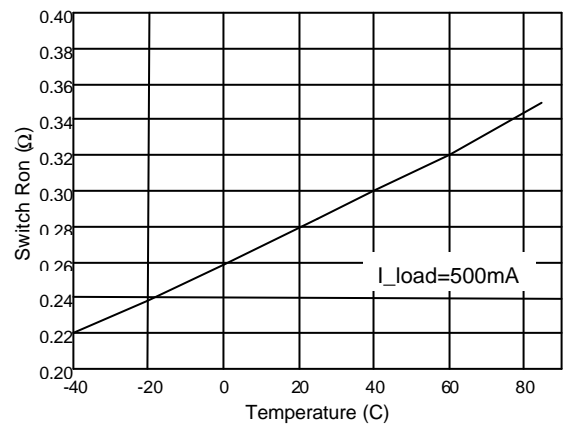


Fig. 6 Switch Ron vs. Temperature

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

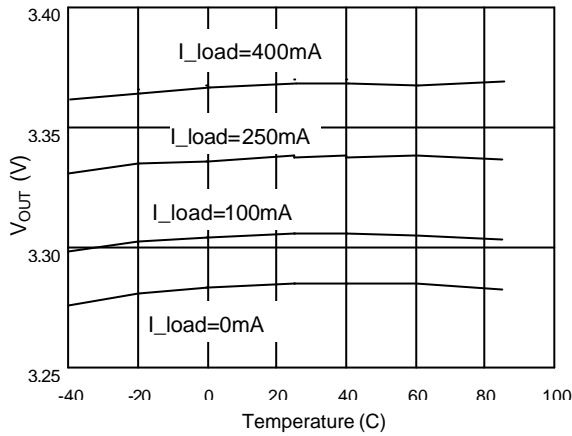


Fig. 7 Output voltage vs. Temperature

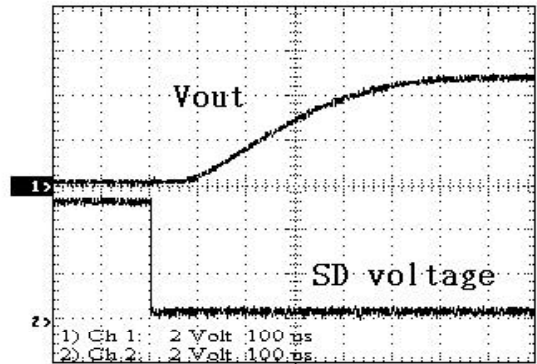


Fig. 8 Output Turn-on Rise Time

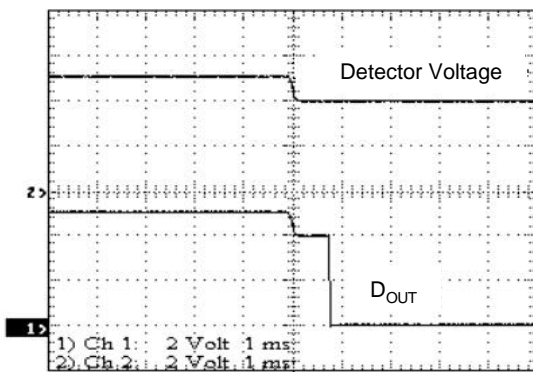


Fig. 9 Built-in Delay Time Waveform

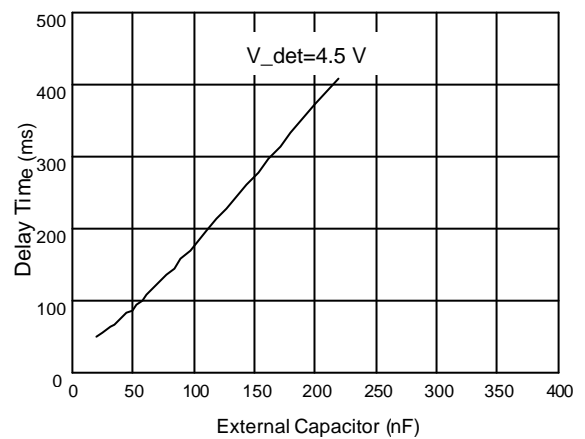
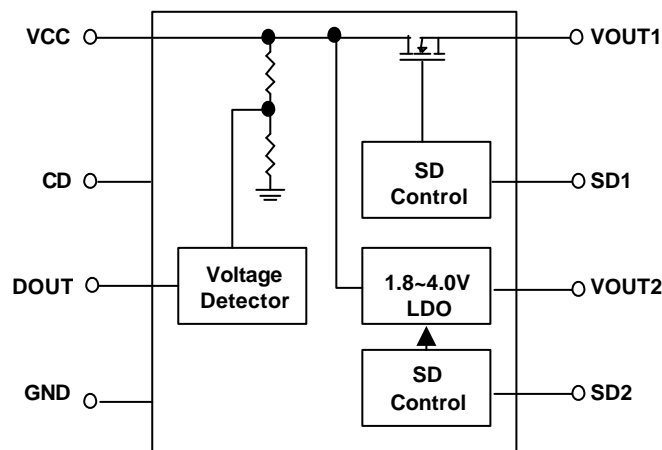


Fig. 10 Delay Time vs. External Capacitor

BLOCK DIAGRAM

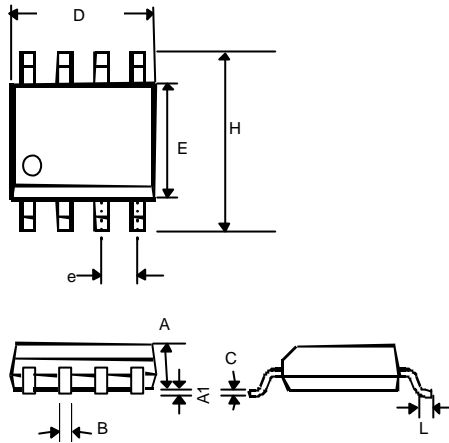


■ PIN DESCRIPTION

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

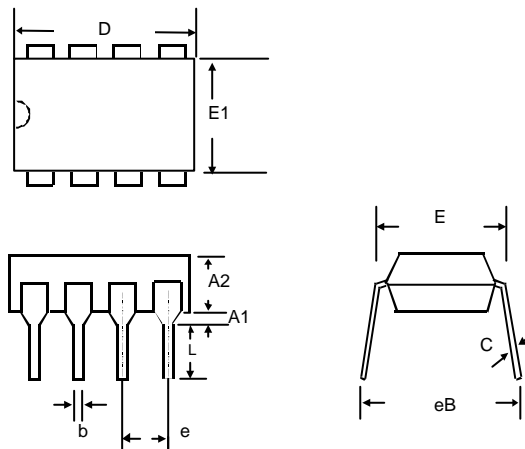
■ PHYSICAL DIMENSIONS

- 8 LEAD PLASTIC SO (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