1.5A Termination Regulator

FEATURES

- 1.5A Source and Sink Current Ability
- Support DDR1 ($1.25V_{TT}$) and DDR2 ($0.9V_{TT}$) Requirements
- Low Output Voltage Offset, ±20mV
- High Accuracy Output Voltage at Full-Load
- Adjustable V_{OUT} by External Resistor
- Low External Component Count
- Current Limit protection
- Thermal Protection
- SOP-8 Package

APPLICATIONS

- Mother Board
- Graphic Cards
- DDR Termination Voltage Supply

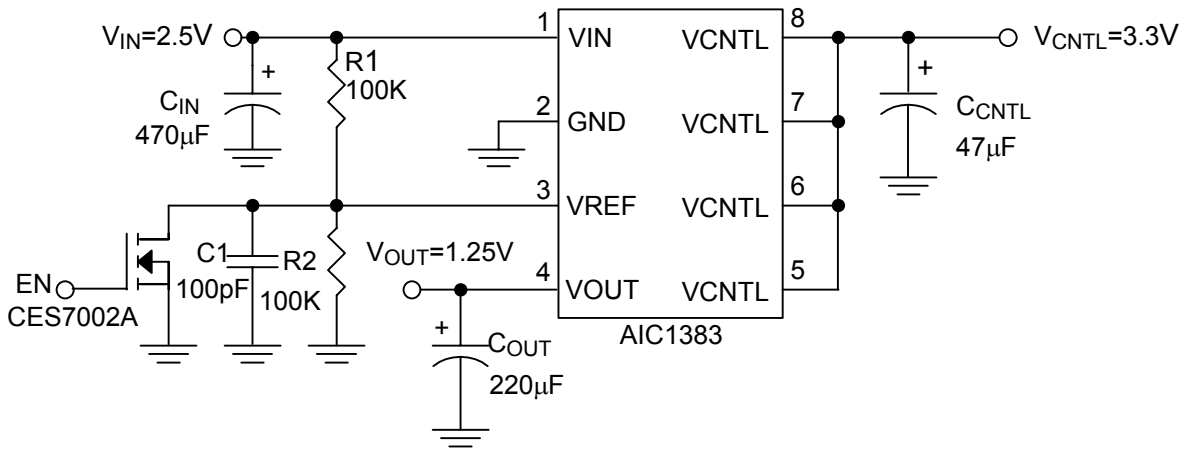
DESCRIPTION

AIC1383 linear regulator is designed to achieve 1.5A source and sink current while regulating an output voltage to within 25mV.

AIC1383 converts voltage supplies range from 1.6V to 6V into an output voltage that adjusts by two external voltage divider resistors. It provides an excellent voltage source for active termination schemes of high-speed transmission lines as those seen in high-speed memory buses, and it meets the JEDEC SSTL-2 and SSTL-3 specifications for termination of DDR-SRAM.

Built-in current limiting in source and sink mode, with thermal shutdown provide maximal protection to the AIC1383 against fault conditions.

TYPICAL APPLICATION CIRCUIT



ORDERING INFORMATION

AIC1383XXXX

- PACKING TYPE
  TR: TAPE & REEL
- PACKAGE TYPE
  S: SOP-8
- C: COMMERCIAL
  P: LEAD FREE COMMERCIAL

Example: AIC1383CSTR

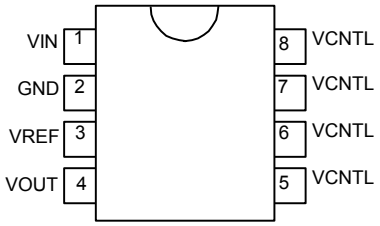
→ 1.5A Version, in SOP-8 Package, Tape & Reel Packing Type

AIC1383PSTR

→ 1.5A Version, in Lead Free SOP-8 Package, Tape & Reel Packing Type

PIN CONFIGURATION

SOP-8
TOP VIEW



ABSOLUTE MAXIMUM RATINGS

Supply Voltage ..... -0.4V to 7V

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

Junction Temperature Range ..... 125°C

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

Lead Temperature (Solder, 10sec) ..... 260°C

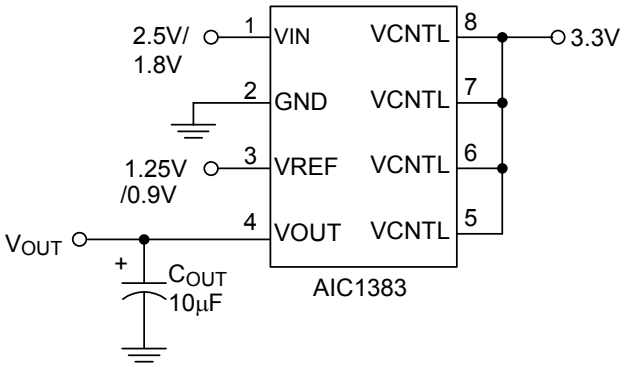
Thermal Resistance θ_{JC} SO-8 ..... 40°C /W

Thermal Resistance θ_{JA} SO-8 ..... 160°C /W

(Assume no ambient airflow, no heatsink)

Absolute Maximum Ratings are those values beyond which the life of a device may be impaired.

TEST CIRCUIT



ELECTRICAL CHARACTERISTICS (V_{CNTL}=3.3V, V_{IN}=2.5V, V_{REF}=0.5V_{IN}, C_{OUT}=10μF, T_A=25°C, unless otherwise specified) (Note 1)

PARAMETER	TEST CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Input Voltage (DDR1/2)	Keep operate $V_{CNTL} \geq V_{IN}$ at power on and off sequences	V_{IN}	1.6	2.5/1.8		V
		V_{CNTL}	3.0	3.3	6	
Output Voltage	I_{OUT} = 0mA	V_{OUT}		V_{REF}		V
Output Voltage Offset	I_{OUT} = 0mA	V_{OS}	-20		20	mV
Load Regulation (DDR1/2)	I_{OUT} =0.1mA ~ +1.5A	ΔV_{LOR}		10	25	mV
	I_{OUT} = 0.1mA ~ -1.5A			10	25	
Quiescent Current	V_{REF}<0.2V, V_{OUT} = OFF	I_Q		8	30	μA
Operating Current of V_{CNTL}	No load	I_{CNTL}		3	10	mA
V_{REF} Bias Current	V_{REF}=1.25V				1	μA
Current Limit		I_{IL}	2.1	3	4.5	A
THERMAL PROTECTION						
Thermal Shutdown Temperature	3.3V≤V_{CNTL}≤5V	T_{SD}	125	150		°C
Thermal Shutdown Hysteresis	Guaranteed by design			30		°C
SHUTDOWN SPECIFICATIONS						
Shutdown Threshold	Output ON (V_{REF}=0V→1.25V)		0.8			V
	Output OFF (V_{REF}=1.25V→0V)				0.2	

Note 1: Specifications are production tested at T_A=25°C. Specifications over the -40°C to 85°C operating temperature range are assured by design, characterization and correlation with Statistical Quality Controls (SQC).

Note 2: V_{OS} is the voltage measurement, which is defined as V_{OUT} subtracted V_{REF}.

Note 3: Load regulation is measured at constant junction temperature, using pulse testing with a low ON time.

Note 4: Current limit is measured by pulsing a short time.

Note 5: For operate system safely; V_{CNTL} must be always greater than V_{IN}.

TYPICAL PERFORMANCE CHARACTERISTICS

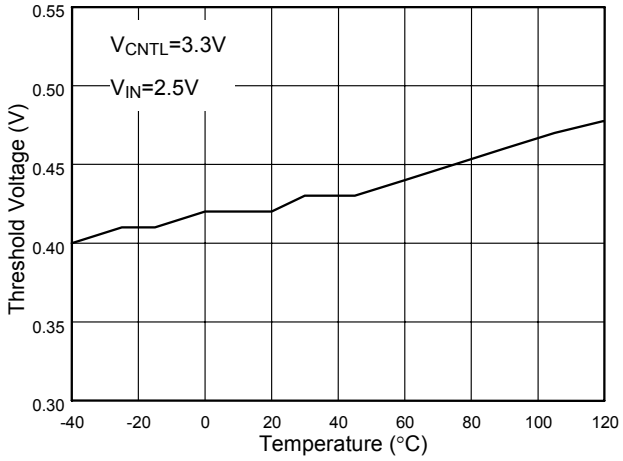


Fig. 1 Turn-On Threshold vs. Temp.

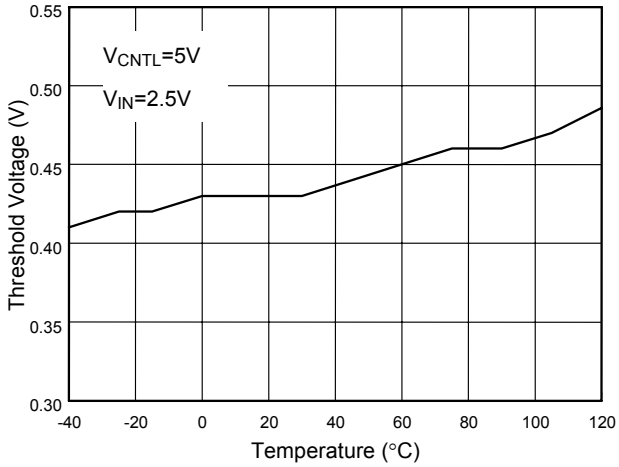


Fig. 2 Turn-On Threshold vs. Temp

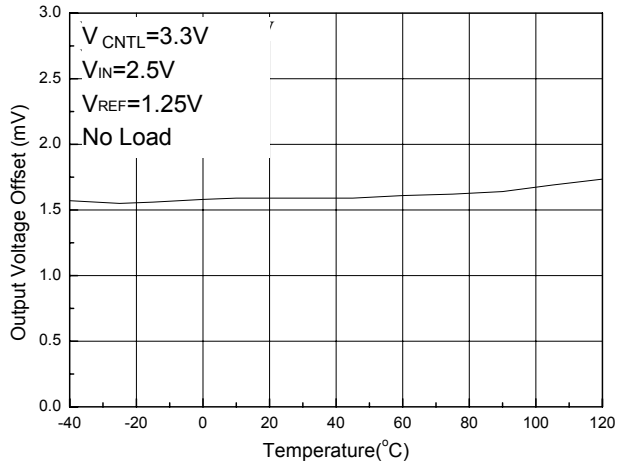


Fig. 3 Output Voltage Offset vs. Temperature

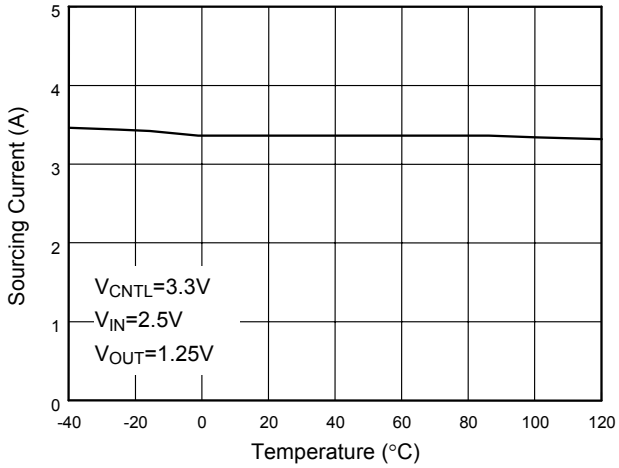


Fig. 4 Current-Limit (Sourcing) vs. Temperature

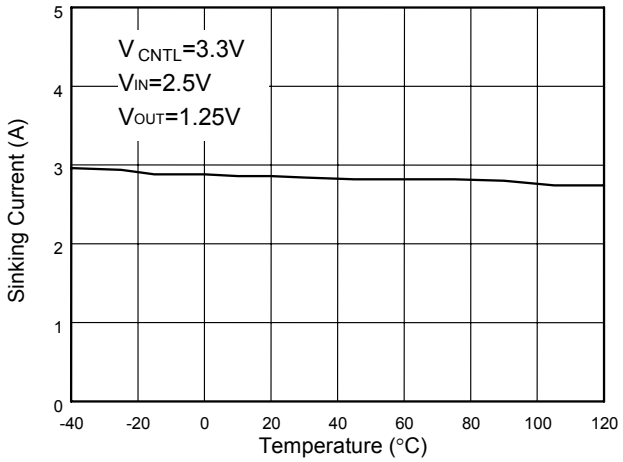


Fig. 5 Current-Limit (Sinking) vs. Temperature

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

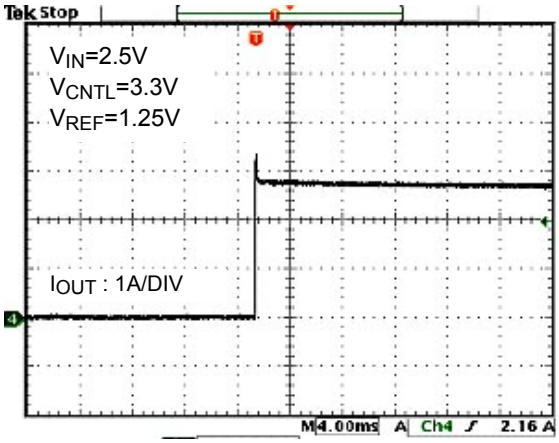


Fig. 6 Output Short-Circuit (Sinking)

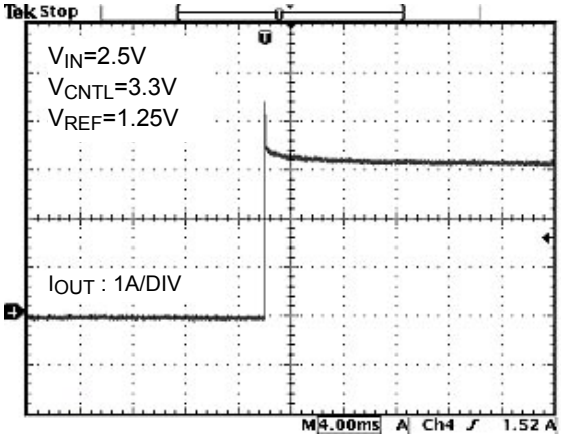


Fig. 7 Output Short-Circuit Protection (Sourcing)

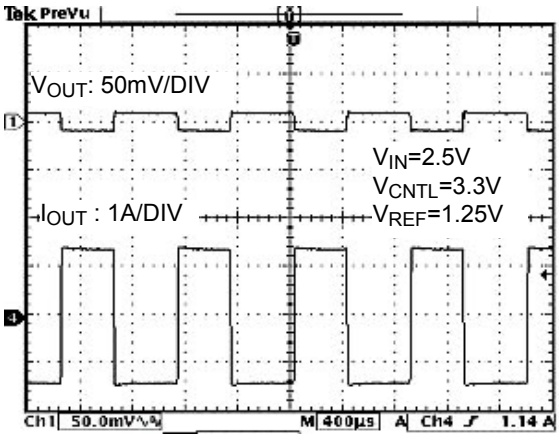


Fig. 8 Transient Response at $1.25V_{TT}$/1.5A

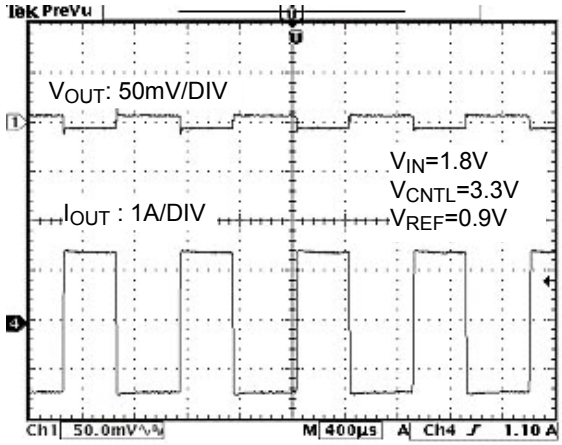
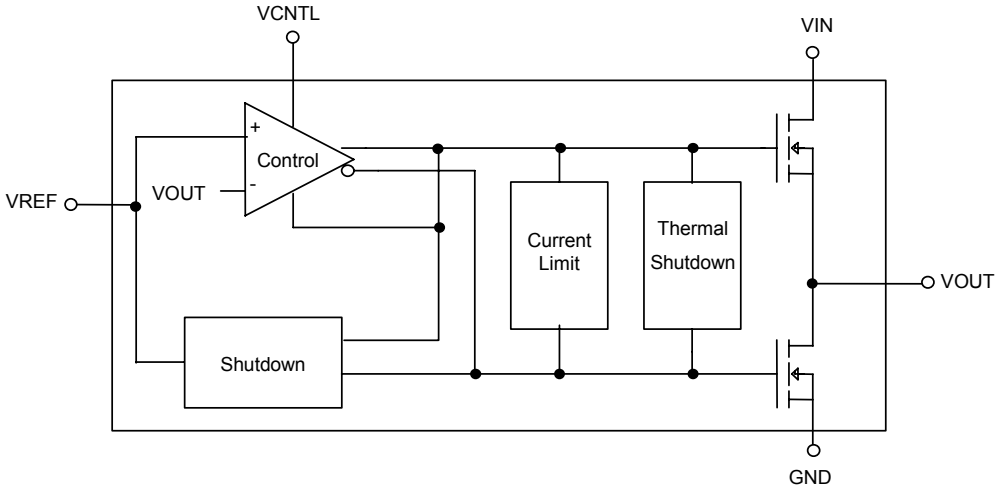


Fig. 9 Transient Response at $0.9V_{TT}$/1.5A

BLOCK DIAGRAM



PIN DESCRIPTIONS

PIN 1: VIN - Input supply pin. It provides main power to create the external reference voltage by divider resistors for regulating V_{REF} and V_{OUT}.

PIN 2: GND - Ground pin.

PIN 3: VREF - Reference voltage input. Pull this pin low to shutdown device.

PIN 4: VOUT - Output pin.

PIN 5~8: VCNTL - Input supply pin. It is used to supply all the internal control circuitry.

APPLICATION INFORMATION

Layout Consideration

AIC1383 is in SOP-8 package resulting in unable to dissipate heat easily when it operates in high current. In order to prevent maximum junction temperature exceeded, the suitable copper area has to use.

The large copper at V_{CNTL} pins is available, and the heat dissipation is relieved. Using via to lead heat into the bottom layer to strengthen as below figures show.

All capacitors should be placed as close as possible to relative pins.

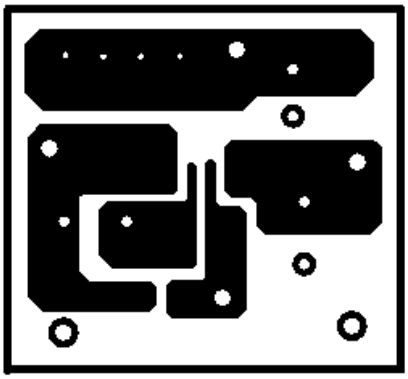


Fig. 10. Top layer

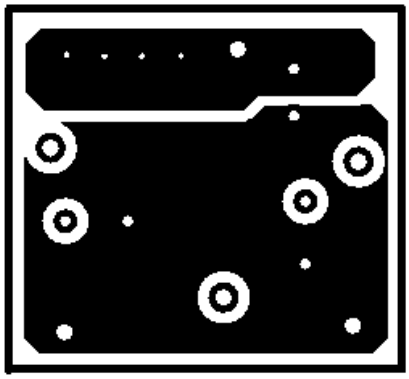


Fig. 11. Bottom layer

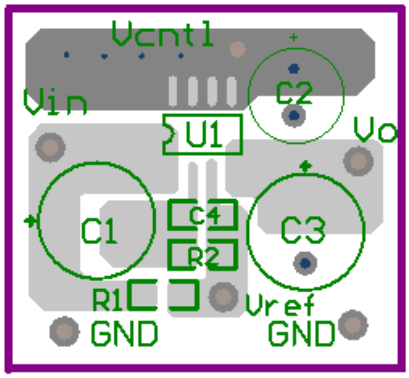
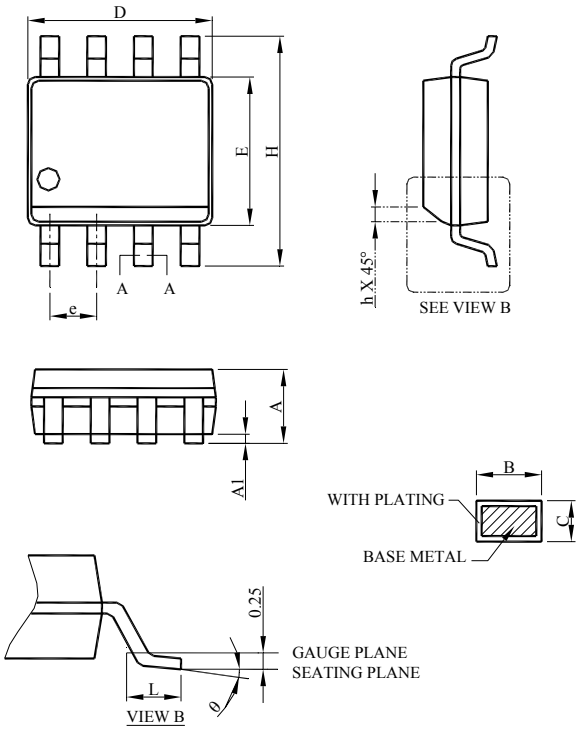


Fig. 12. Placement

PHYSICAL DIMENSIONS (unit: mm)

- **SOP-8**



SYMBOL	SOP-8	
	MILLIMETERS	
	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 BSC	
H	5.80	6.20
h	0.25	0.50
L	0.40	1.27
θ	0°	8°

Note:

Information provided by AIC is believed to be accurate and reliable. However, we cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in an AIC product; nor for any infringement of patents or other rights of third parties that may result from its use. We reserve the right to change the circuitry and specifications without notice.

Life Support Policy: AIC does not authorize any AIC product for use in life support devices and/or systems. Life support devices or systems are devices or systems which, (I) are intended for surgical implant into the body or (ii) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.