

100V 50mA Very High Voltage Linear Regulator

FEATURES

- VIN Range 7 to 100V
- Output Current of 50mA
- Low Quiescent Current 25 μ A
- Quiescent Current at Shutdown 4 μ A
- Dropout Voltage 2.4V at I_{OUT} = 50mA
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limit
- Adjustable Output Voltage from 1.2 to 90V
- Available in SOT23-5 and SOP-8 Exposed Pad Package

APPLICATIONS

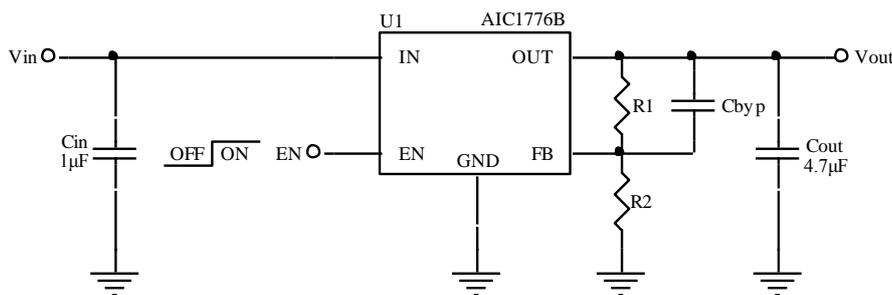
- Microprocessors, Microcontrollers Powered by Industrial Busses With High Voltage Transients
- Industrial Automation
- Telecom Infrastructure
- Automotive
- Power over Ethernet(PoE)
- LED Lighting

DESCRIPTION

The AIC1776B device is a very high voltage-tolerant linear regulator that offers the benefits of a thermally-enhanced package (SOP-8 Exposed Pad), and is able to withstand continuous DC or transient input voltages of up to 100 V. The AIC1776B device is stable with output capacitance greater than 4.7 μ F and any input capacitance greater than 1 μ F (over temperature and tolerance). Therefore, implementations of this device require minimal board space because of its miniaturized packaging (SOT23-5 and SOP-8) and a potentially small output capacitor. In addition, the AIC1776B device offers an enable pin (EN) compatible with standard CMOS logic to enable a low-current shutdown mode.

The AIC1776B device has an internal thermal shutdown and current limiting to protect the system during fault conditions. In addition, the AIC1776B device is ideal for generating a low-voltage supply from intermediate voltage rails in telecom and industrial applications; not only can it supply a well-regulated voltage rail, but it can also withstand and maintain regulation during very high and fast voltage transients. These features translate to simpler and more cost-effective electrical surge-protection circuitry for a wide range of applications, including PoE, bias supply, and LED lighting.

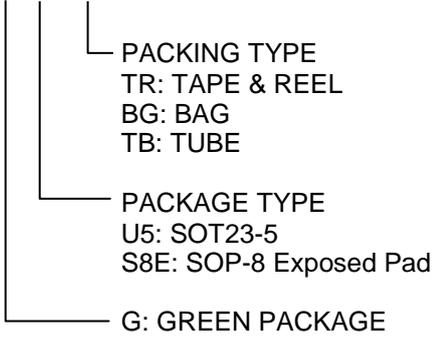
TYPICAL APPLICATION CIRCUIT



AIC1776B Typical Application Circuit

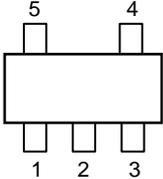
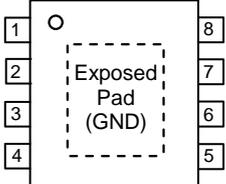
ORDERING INFORMATION

AIC1776BXXXXX



Example: AIC1776BGS8ETR

→ in Green SOP-8 Exposed Pad
Package and Tape & Reel Packing
Type

PIN CONFIGURATION	
<p>SOT23-5(U5) TOP VIEW</p> <p>1: IN 2: GND 3: EN 4: FB 5: OUT</p>	 <p>Diagram showing the SOT23-5(U5) package with pins 1, 2, 3 on the bottom and pins 4, 5 on the top.</p>
<p>SOP-8 Exposed Pad TOP VIEW</p> <p>1: OUT 2: FB 3: NC 4: GND 5: EN 6: NC 7: NC 8: IN</p>	 <p>Diagram showing the SOP-8 Exposed Pad package with pins 1-4 on the left and pins 5-8 on the right. A dashed box indicates the 'Exposed Pad (GND)'.</p>
<p>Note: The exposed pad should be connected with GND pin.</p>	

■ ABSOLUTE MAXIMUM RATINGS

IN Pin Voltage	-0.3V to 105V
OUT Pin Voltage	-0.3V to 105V
FB Pin Voltage	-0.3V to 5.5V
EN Pin Voltage	-0.3V to 105V
Storage Temperature Range	-60°C~150°C
Lead Temperature (Soldering, 10 sec)	260°C
Junction Temperature	125°C
Operating Ambient Temperature Range T _A	-40°C~85°C
Thermal Resistance Junction to Case, R _{θJC}	SOT23-5 115°C/W
	SOP-8 Exposed Pad* 15°C/W
Thermal Resistance Junction to Ambient, R _{θJA}	SOT23-5 250°C/W
	SOP-8 Exposed Pad* 60°C/W

(Assume no Ambient Airflow)

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

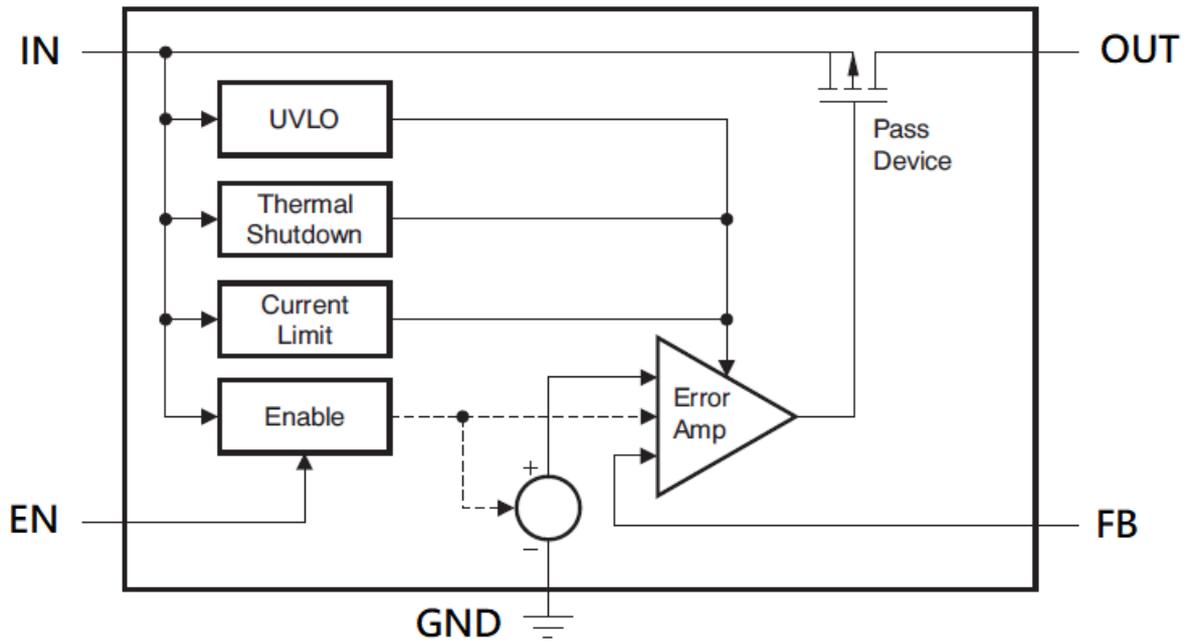
*The package is place on a two layers PCB with 2 ounces copper and 2 square inch, connected by 8 vias.

■ ELECTRICAL CHARACTERISTICS

($V_{IN}=V_{OUT}+3$ or $V_{IN}=7V$ (whichever is greater), $I_{OUT}=100\mu A$, $C_{IN}=1\mu F$, $C_{OUT}=4.7\mu F$, $T_J=25^\circ C$, unless otherwise specified) (Note 1)

PARAMETER	TEST CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Input Voltage		V_{IN}	7		100	V
Internal Reference		V_{REF}	TBD	0.928	TBD	V
Line Regulation	$V_{IN}=7V$ to 100V	ΔV_{LINE}		0.03		% V_{OUT}
Load Regulation	$100\mu A < I_{OUT} < 50mA$	ΔV_{LOAD}				% V_{OUT}
Dropout Voltage	$V_{IN}=17V$, $I_{OUT}=20mA$	V_{DROP}		1000		mV
	$V_{IN}=17V$, $I_{OUT}=50mA$			2400		
Quiescent Current	$I_{OUT}=0mA$	I_Q		25	65	μA
Shutdown Current	$V_{EN}=0V$	I_{SD}		4	20	μA
Current Limit	$V_{OUT}=90\%V_{OUT(NOM)}$	I_{CL}	55	120	200	mA
Enable High Level		V_{ENHI}	1.5		V_{IN}	V
Enable Low Level		V_{ENLO}	0		0.4	V
Enable Pin Current	$7V < V_{IN} < 100V$, $V_{IN}=V_{EN}$	I_{EN}		0.02	1	μA
Feedback Pin Current		I_{FB}		0.01	0.11	μA
Thermal Shutdown	Shutdown, Temperature Increasing	T_{SD}		160		$^\circ C$
	Reset, Temperature Decreasing			140		$^\circ C$

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

■ BLOCK DIAGRAM


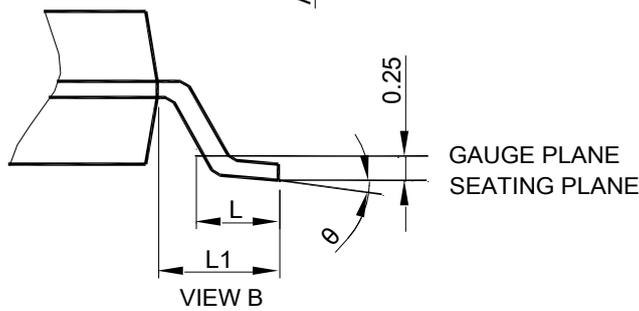
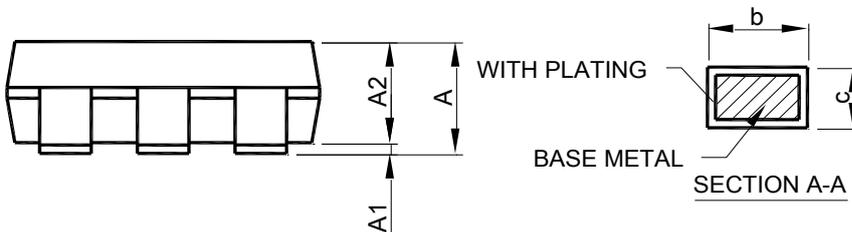
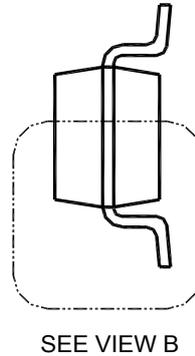
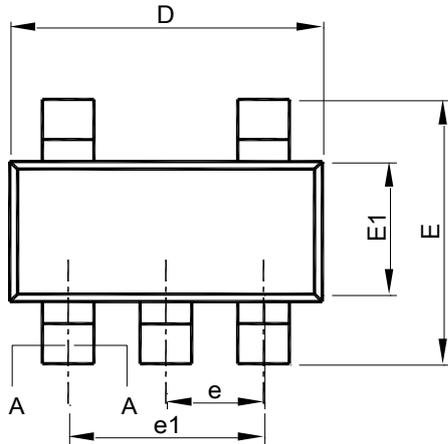
Functional Block Diagram of AIC1776B

■ PIN DESCRIPTION

- IN - Input Voltage Pin.
- GND - Ground.
- OUT - Output Voltage Pin.
- EN - Enable.
- FB - Feedback.
- NC - No Internal Connection.

■ PHYSICAL DIMENSIONS

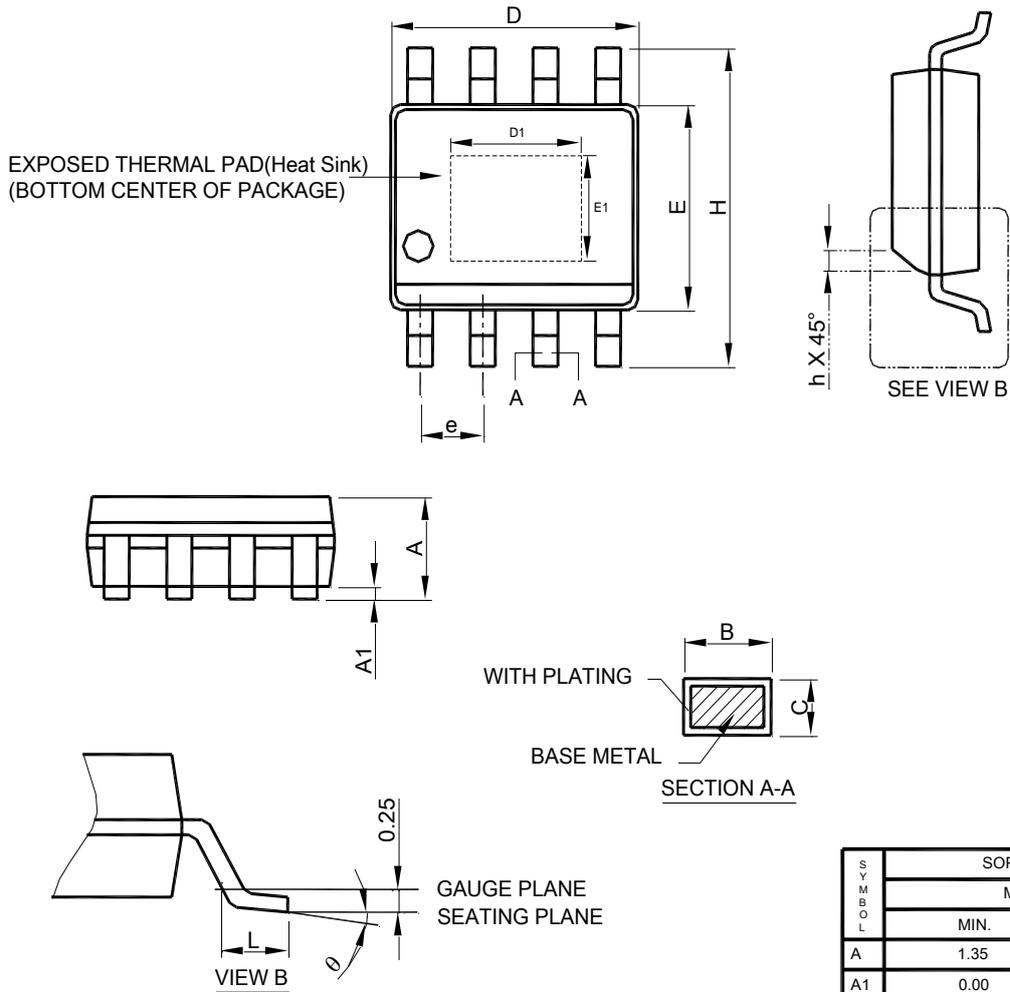
● SOT23-5



SYMBOL	SOT23-5	
	MILLIMETERS	
	MIN.	MAX.
A	0.95	1.45
A1	0.00	0.15
A2	0.90	1.30
b	0.30	0.50
c	0.08	0.22
D	2.80	3.00
E	2.60	3.00
E1	1.50	1.70
e	0.95 BSC	
e1	1.90 BSC	
L	0.30	0.60
L1	0.60 REF	
θ	0°	8°

- Note :
1. Refer to JEDEC MO-178AA.
 2. Dimension "D" does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 10 mil per side.
 3. Dimension "E1" does not include inter-lead flash or protrusions.
 4. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

● SOP-8 Exposed Pad



- Note : 1. Refer to JEDEC MS-012E.
 2. Dimension "D" does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side .
 3. Dimension "E" does not include inter-lead flash or protrusions.
 4. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

SYMBOL	SOP-8 Exposed Pad	
	MILLIMETERS	
	MIN.	MAX.
A	1.35	1.75
A1	0.00	0.15
B	0.31	0.51
C	0.17	0.25
D	4.80	5.00
D1	1.50	3.50
E	3.80	4.00
E1	1.0	2.55
e	1.27 BSC	
H	5.80	6.20
h	0.25	0.50
L	0.40	1.27
θ	0°	8°

Note:

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