

## ■ General Description

The AME8826 family of positive, linear regulators feature low quiescent current (45 $\mu$ A typ.) with low dropout voltage, making them ideal for battery applications.

Output voltages are set at the factory and trimmed to 1.5% accuracy.

These rugged devices have both Thermal Shutdown, and Current Fold-back to prevent device failure under the "Worst" of operating conditions.

In applications requiring a low noise, regulated supply, place a 1000pF capacitor between Bypass and Ground.

The AME8826 is stable with an output capacitance of 4.7 $\mu$ F or greater.

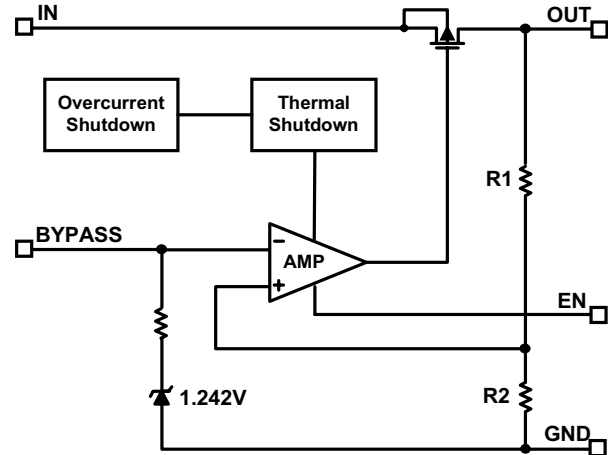
## ■ Features

- Very Low Dropout Voltage
- Guaranteed 1.55A Output
- Accurate to within 1.5%
- 45 $\mu$ A Quiescent Current Typically
- Over-Temperature Shutdown
- Current Limiting
- Noise Reduction Bypass Capacitor (Fixed Versions)
- Power-Saving Shutdown Mode
- Space-Saving DDPAK-5, SO-8 Package
- 6 Factory Pre-set Output Voltages
- Low Temperature Coefficient
- Adjustable Version

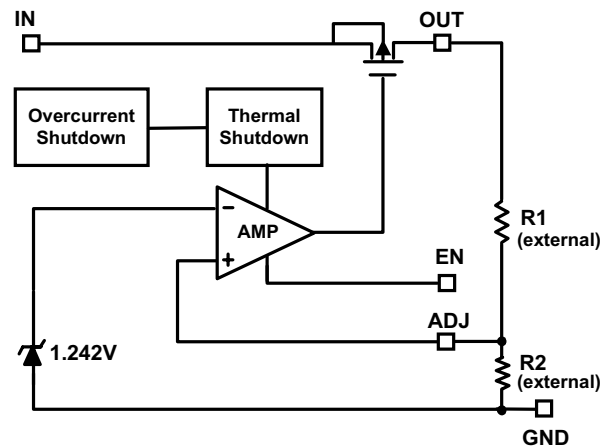
## ■ Applications

- Instrumentation
- Portable Electronics
- Wireless Devices
- PC Peripherals
- Battery Powered Widgets

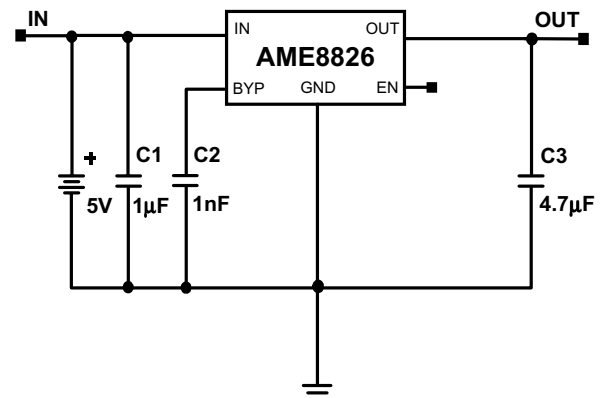
## ■ Functional Block Diagram (Fixed Versions)



## ■ Functional Block Diagram (Adjustable Version)



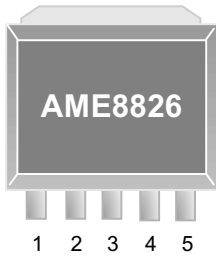
## ■ Typical Application





### ■ Pin Configuration

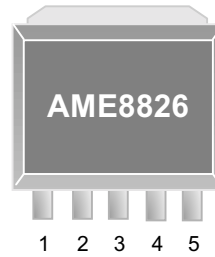
TO-263(DDPAK-5)  
Top View



AME 8826AEDVxxx

- 1. EN
- 2.  $V_{IN}$
- 3. GND
- 4.  $V_{OUT}$
- 5. BYP

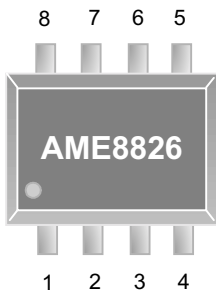
TO-263(DDPAK-5)  
Top View



AME8826BEDVADJ

- 1. EN
- 2.  $V_{IN}$
- 3. GND
- 4.  $V_{OUT}$
- 5. ADJ

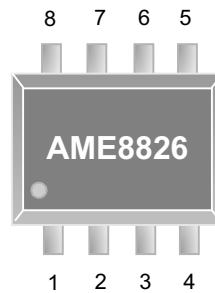
SO-8  
Top View



AME 8826AEHAxxx

- 1. BYP
- 2. GND
- 3. GND
- 4. EN
- 5.  $V_{IN}$
- 6. GND
- 7. GND
- 8.  $V_{OUT}$

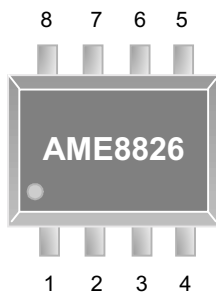
SO-8  
Top View



AME 8826BEHAADJ

- 1. ADJ
- 2. GND
- 3. GND
- 4. EN
- 5.  $V_{IN}$
- 6. GND
- 7. GND
- 8.  $V_{OUT}$

SO-8  
Top View



AME 8826CEHAADJ

- 1. EN
- 2.  $V_{IN}$
- 3.  $V_{OUT}$
- 4. ADJ
- 5. GND
- 6. GND
- 7. GND
- 8. GND

**■ Ordering Information**

Part Number	Marking	Output Voltage	Package	Operating Temp. Range
AME8826AEDV150	AME8826 AEDV150 yyww	1.50	DDPAK-5	- 40°C to + 85°C
AME8826AEDV180	AME8826 AEDV180 yyww	1.80	DDPAK-5	- 40°C to + 85°C
AME8826AEDV250	AME8826 AEDV250 yyww	2.50	DDPAK-5	- 40°C to + 85°C
AME8826AEDV330	AME8826 AEDV330 yyww	3.30	DDPAK-5	- 40°C to + 85°C
AME8826AEDV475	AME8826 AEDV475 yyww	4.75	DDPAK-5	- 40°C to + 85°C
AME8826AEDV500	AME8826 AEDV500 yyww	5.00	DDPAK-5	- 40°C to + 85°C
AME8826BEDVADJ	AME8826 BEDVADJ yyww	ADJ	DDPAK-5	- 40°C to + 85°C
AME8826AEHA150	AME8826 AEHA150 yyww	1.50	SO-8	- 40°C to + 85°C
AME8826AEHA180	AME8826 AEHA180 yyww	1.80	SO-8	- 40°C to + 85°C
AME8826AEHA250	AME8826 AEHA250 yyww	2.50	SO-8	- 40°C to + 85°C
AME8826AEHA330	AME8826 AEHA330 yyww	3.30	SO-8	- 40°C to + 85°C
AME8826AEHA475	AME8826 AEHA475 yyww	4.75	SO-8	- 40°C to + 85°C



■ Ordering Information (contd.)

Part Number	Marking	Output Voltage	Package	Operating Temp. Range
AME8826AEHA500	AME8826 AEHA500 yyww	5.00	SO-8	- 40°C to + 85°C
AME8826BEHAADJ	AME8826 BEHAADJ yyww	ADJ	SO-8	- 40°C to + 85°C
AME8826CEHAADJ	AME8826 CEHAADJ yyww	ADJ	SO-8	- 40°C to + 85°C

Please consult AME sales office or authorized Rep./Distributor for other output voltage and package type availability.



■ Absolute Maximum Ratings

Parameter	Maximum	Unit
Input Voltage	8	V
Output Current	$P_D / (V_{IN} - V_O)$	mA
Output Voltage	GND - 0.3 to $V_{IN} + 0.3$	V
ESD Classification	B	

Caution: Stress above the listed absolute maximum rating may cause permanent damage to the device

■ Recommended Operating Conditions

Parameter	Rating	Unit
Ambient Temperature Range	- 40 to + 85	°C
Junction Temperature	- 40 to + 125	°C

■ Thermal Information

Parameter		Maximum	Unit
Thermal Resistance ( $\theta_{jc}$ )	TO-263 (DDPAK-5)	5	°C / W
	SO-8	20**	
Internal Power Dissipation ( $P_D$ ) ( $\Delta T = 100^\circ\text{C}$ )*	TO-263 (DDPAK-5)	3.00	W
	SO-8	2.5	
Maximum Junction Temperature		150	°C
Maximum Lead Temperature (10 Sec)		300	°C

\* Assuming a heat sink capable of twice times ( $\theta_{jc}$ )

\*\* Estimated

## ■ Electrical Specifications

TA = 25°C unless otherwise noted

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Input Voltage	$V_{IN}$		Note 1		7	V
Output Voltage Accuracy	$V_O$	$I_O=1mA$	-1.5		1.5	%
Dropout Voltage	$V_{DROPOUT}$	$I_O=1.55A$ $V_O=V_{O(NOM)}-2.0\%$	$1.5V \leq V_{O(NOM)} \leq 2.0V$	See chart	1000	mV
			$2.0V < V_{O(NOM)} \leq 2.8V$		800	
			$2.8V < V_{O(NOM)} < 3.8V$		600	
Output Current	$I_O$	$V_O > 1.2V$	1550			mA
Current Limit	$I_{LIM}$	$V_O > 1.2V$	1550	2000		mA
Quiescent Current (For Fixed Output Voltage Options)	$I_Q$	$I_O=0mA$		45	70	$\mu A$
Ground Pin Current	$I_{GND}$	$I_O=1mA$ to 1.5A		45		$\mu A$
Line Regulation	$REG_{LINE}$	$I_O=1mA$ $V_{IN}=V_O+1$ to $V_O+2$	$V_O < 2.0V$		0.15	%
			$V_O \geq 2.0V$	0.02	0.1	%
Load Regulation	$REG_{LOAD}$	$I_O=1mA$ to 1.5A		0.2	1	%
Over Temperature Shutdown	OTS			150		°C
Over Temperature Hysteresis	OTH			30		°C
$V_O$ Temperature Coefficient	TC			30		ppm/°C
ADJ Input Bias Current	$I_{ADJ}$			1		$\mu A$
ADJ Reference Voltage	$V_{REF}$		1.223	1.242	1.261	V
Power Supply Rejection	PSRR	$I_O=100mA$ $C_O=4.7\mu F$ ceramic	$f=1kHz$		50	dB
			$f=10kHz$		20	
			$f=100kHz$		15	
Power Supply Rejection	PSRR	$I_O=100mA$ $C_O=4.7\mu F$ ceramic $C_{BYP}=0.01\mu F$	$f=1kHz$		75	dB
			$f=10kHz$		55	
			$f=100kHz$		30	
Output Voltage Noise	eN	$f=10Hz$ to 100kHz $I_O=10mA, C_{BYP}=0\mu F$	$C_O=4.7\mu F$		30	$\mu V_{rms}$
Output Voltage Noise	eN	$f=10Hz$ to 100kHz $I_O=10mA, C_{BYP}=0.01\mu F$	$C_O=4.7\mu F$		30	$\mu V_{rms}$
EN Input Threshold	$V_{EH}$	$V_{IN}=2.7V$ to 7V	2.0		$V_{IN}$	V
	$V_{EL}$	$V_{IN}=2.7V$ to 7V	0		0.4	V
EN Input Bias Current	$I_{EH}$	$V_{EN}=V_{IN}, V_{IN}=2.7V$ to 7V			0.1	$\mu A$
	$I_{EL}$	$V_{EN}=0V, V_{IN}=2.7V$ to 7V			0.5	$\mu A$
Shutdown Supply Current	$I_{SD}$	$V_{IN}=5.0V, V_O=0V, V_{EN}<V_{EL}$		30		$\mu A$
		$V_{IN}=2.5V, V_O=0V, V_{EN}<V_{EL}$		0.5	2	$\mu A$

Note1:  $V_{IN(min)} = V_{OUT} + V_{DROPOUT}$



## ■ Detailed Description

The AME8826 family of CMOS regulators contain a PMOS pass transistor, voltage reference, error amplifier, over-current protection, and thermal shutdown.

The P-channel pass transistor receives data from the error amplifier, over-current shutdown, and thermal protection circuits. During normal operation, the error amplifier compares the output voltage to a precision reference. Over-current and Thermal shutdown circuits become active when the junction temperature exceeds 140°C, or the current exceeds 2.2A. During thermal shutdown, the output voltage remains low. Normal operation is restored when the junction temperature drops below 120°C.

## ■ External Capacitors

The AME8826 is stable with an output capacitor to ground of 4.7µF or greater. Ceramic capacitors have the lowest ESR, and will offer the best AC performance. Conversely, Aluminum Electrolytic capacitors exhibit the highest ESR, resulting in the poorest AC response. Unfortunately, large value ceramic capacitors are comparatively expensive. One option is to parallel a 0.1µF ceramic capacitor with a 10µF Aluminum Electrolytic. The benefit is low ESR, high capacitance, and low overall cost.

A second capacitor is recommended between the input and ground to stabilize  $V_{in}$ . The input capacitor should be at least 0.1µF to have a beneficial effect.

A third capacitor can be connected between the BY-PASS pin and GND. This capacitor can be a low cost Polyester Film variety between the value of 0.001 ~ 0.01µF. A larger capacitor improves the AC ripple rejection, but also makes the output come up slowly. This "Soft" turn-on is desirable in some applications to limit turn-on surges.

All capacitors should be placed in close proximity to the pins. A "Quiet" ground termination is desirable. This can be achieved with a "Star" connection.

## ■ Enable

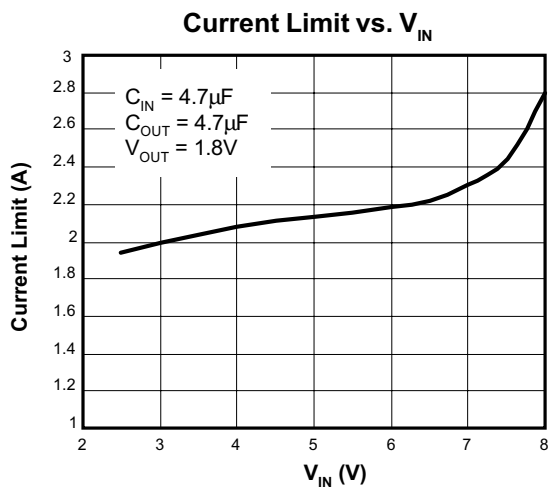
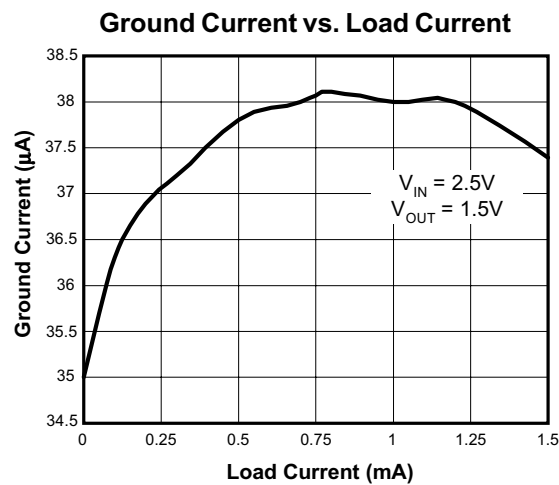
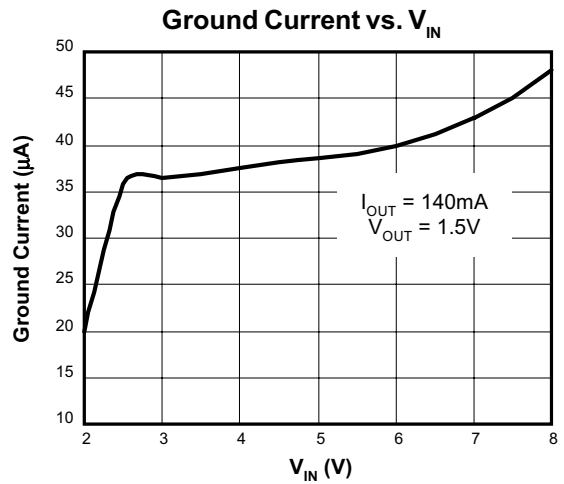
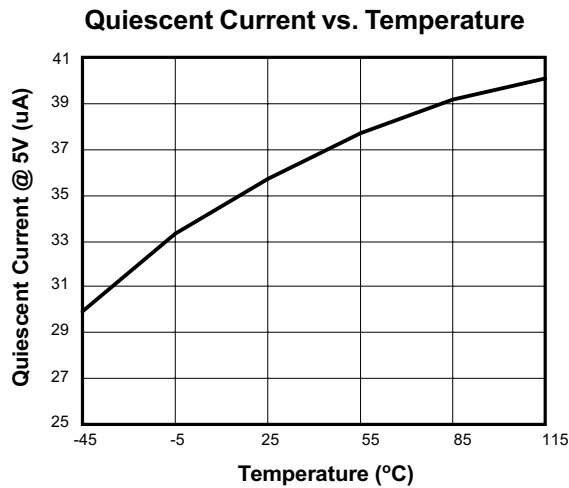
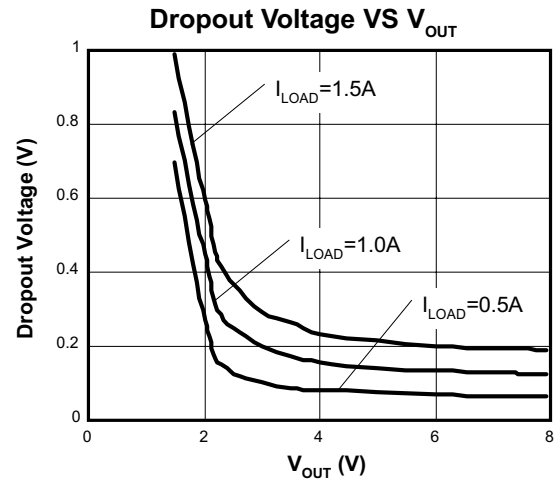
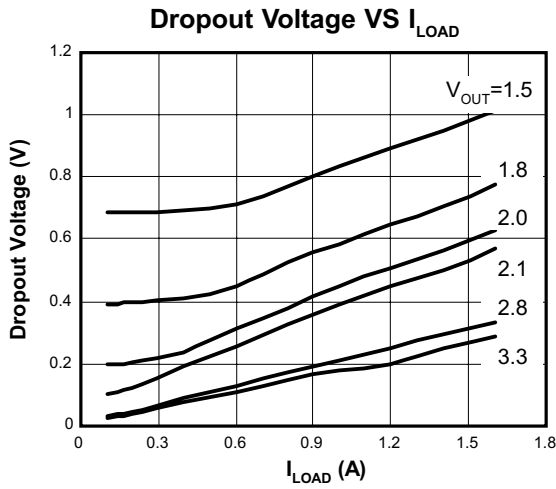
When pulled low, the PMOS pass transistor shuts off, and all internal circuits are powered down. In this state, the quiescent current is less than 1µA. This pin behaves much like an electronic switch.

## ■ Adjustable Version

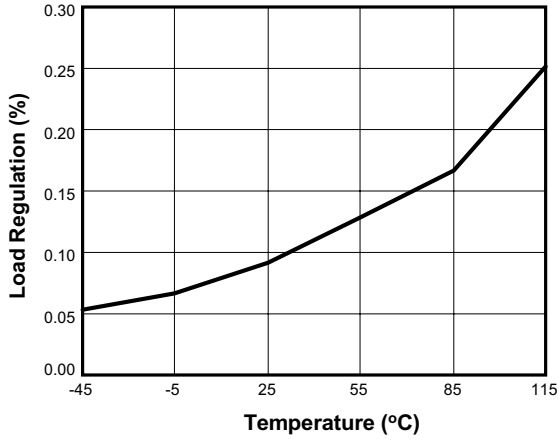
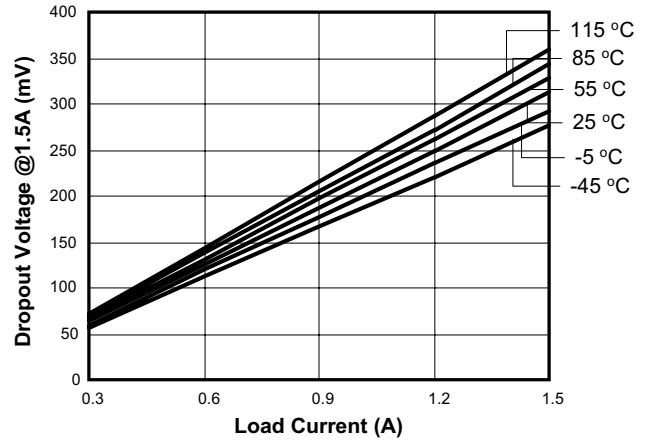
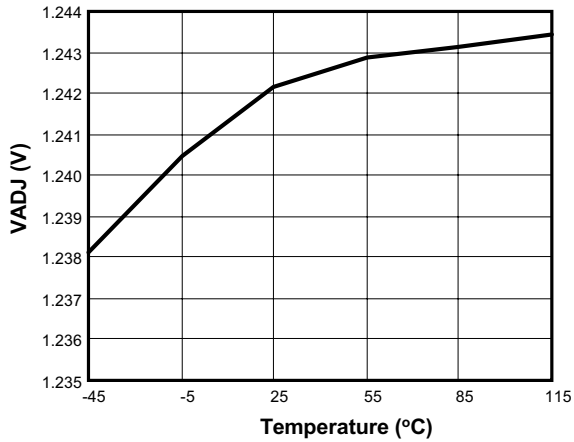
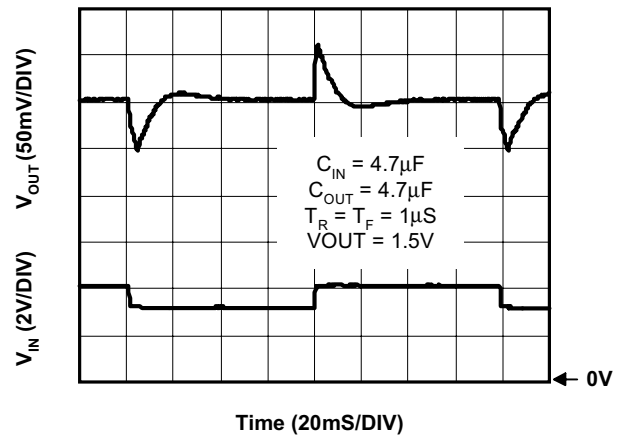
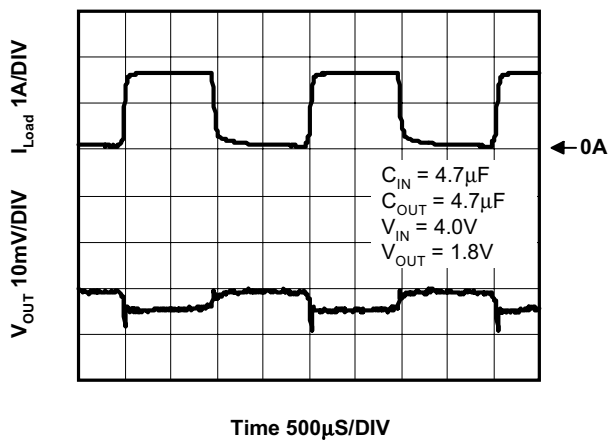
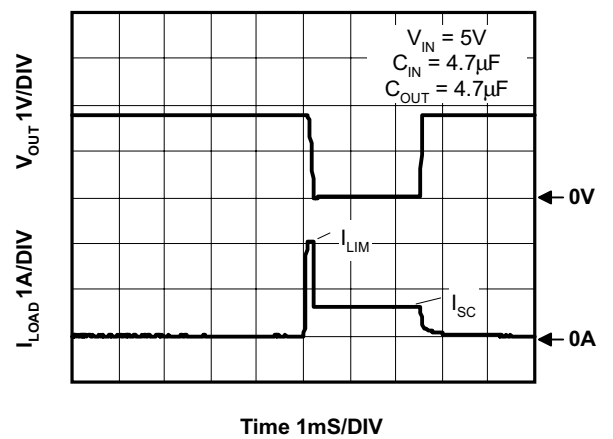
The adjustable version uses external feedback resistors to generate an output voltage anywhere from 1.5V to 5.0V.  $V_{adj}$  is trimmed to 1.242V and  $V_{OUT}$  is given by the equation:

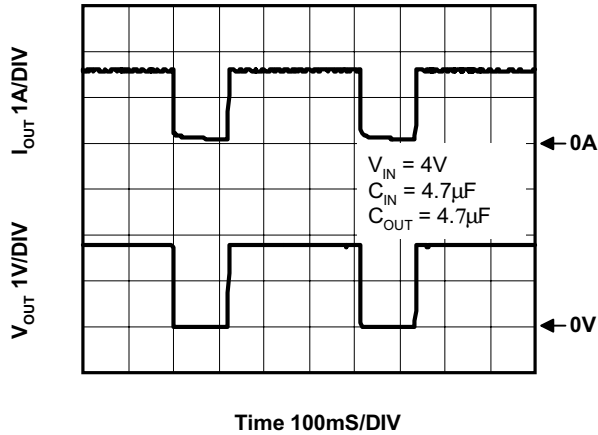
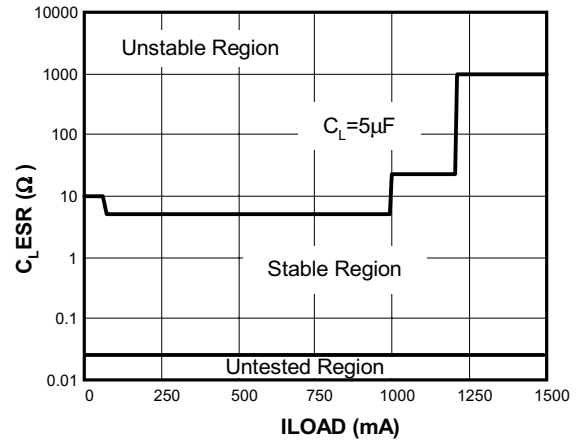
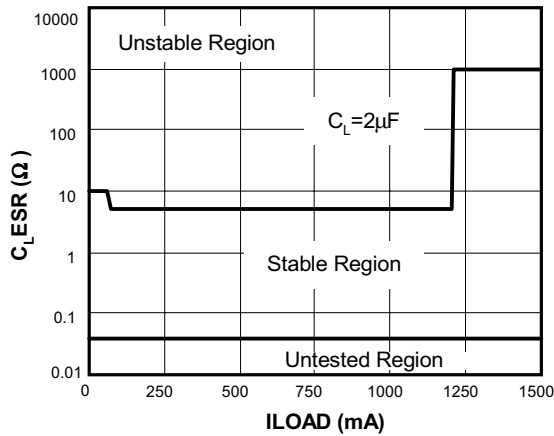
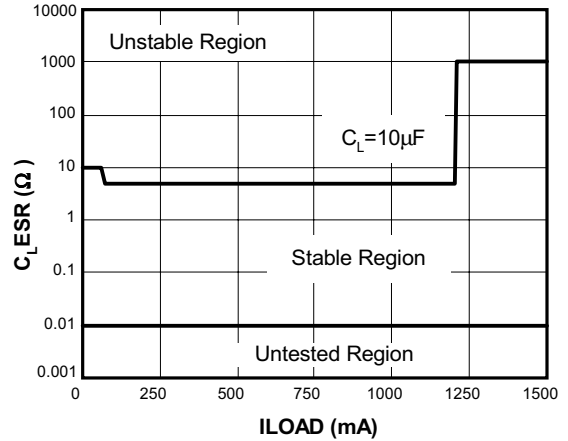
$$V_{OUT} = V_{adj} ( 1 + R1 / R2 )$$

Feedback resistors R1 and R2 should be high enough to keep quiescent current low, but increasing  $R1 + R2$  will reduce stability. In general, R1 and R2 in the 10's of kΩ will produce adequate stability, given reasonable layout precautions. To improve stability characteristics, keep parasitics on the ADJ pin to a minimum, and lower R1 and R2 values.





**Load Regulation vs. Temperature**

**Dropout Voltage vs. Load Current(2.5V)**

**AME8826CEHAADJ vs. Temperature**

**Line Transient Response**

**Load Step 40mA to 1.5A**

**Current Limit Response**


**Overtemperature Shutdown**

**Stability vs. ESR vs. I<sub>Load</sub>**

**Stability vs. ESR vs. I<sub>Load</sub>**

**Stability vs. ESR vs. I<sub>Load</sub>**




External Resistor Divider Table

R1 (K Ohm)	1	2	5	10	20	50	100	200	500	1000
Vout	$R2(kohm)=(1.242*R1(kohm))/(Vout-1.242)$									
1.30	21.41	42.83	107.07	214.14	428.28	1070.69				
1.35	11.50	23.00	57.50	115.00	230.00	575.00				
1.40	7.86	15.72	39.30	78.61	157.22	393.04				
1.45	5.97	11.94	29.86	59.71	119.42	298.56	597.55			
1.50	4.81	9.63	24.07	48.14	96.28	240.70	481.68	962.79		
1.55	4.03	8.06	20.16	40.32	80.65	201.62	403.44	806.49		
1.60	3.47	6.94	17.35	34.69	69.39	173.46	347.07	693.85		
1.65	3.04	6.09	15.22	30.44	60.88	152.21	304.52	608.82		
1.70	2.71	5.42	13.56	27.12	54.24	135.59	271.27	542.36		
1.75	2.44	4.89	12.22	24.45	48.90	122.24	244.56	488.98		
1.80	2.23	4.45	11.13	22.26	44.52	111.29	222.64	445.16		
1.85	2.04	4.09	10.21	20.43	40.86	102.14	204.33	408.55		
1.90	1.89	3.78	9.44	18.88	37.75	94.38	188.80	377.51		
1.95	1.75	3.51	8.77	17.54	35.08	87.71	175.46	350.85	877.12	
2.00	1.64	3.28	8.19	16.39	32.77	81.93	163.88	327.70	819.26	
2.05	1.54	3.07	7.69	15.37	30.74	76.86	153.74	307.43	768.56	
2.10	1.45	2.90	7.24	14.48	28.95	72.38	144.78	289.51	723.78	
2.15	1.37	2.74	6.84	13.68	27.36	68.39	136.81	273.57	683.92	
2.20	1.30	2.59	6.48	12.96	25.93	64.82	129.67	259.29	648.23	
2.25	1.23	2.46	6.16	12.32	24.64	61.61	123.23	246.43	616.07	
2.30	1.17	2.35	5.87	11.74	23.48	58.70	117.41	234.78	586.96	
2.35	1.12	2.24	5.60	11.21	22.42	56.05	112.11	224.19	560.47	
2.40	1.07	2.15	5.36	10.73	21.45	53.63	107.27	214.51	536.27	
2.45	1.03	2.06	5.14	10.28	20.56	51.41	102.83	205.63	514.07	
2.50	0.99	1.97	4.94	9.87	19.75	49.36	98.74	197.46	493.64	
2.55	0.95	1.90	4.75	9.50	18.99	47.48	94.97	189.91	474.77	
2.60	0.91	1.83	4.57	9.15	18.29	45.73	91.47	182.92	457.29	914.58
2.65	0.88	1.76	4.41	8.82	17.64	44.11	88.22	176.42	441.05	882.10
2.70	0.85	1.70	4.26	8.52	17.04	42.59	85.19	170.37	425.93	851.85
2.75	0.82	1.65	4.12	8.24	16.47	41.18	82.37	164.72	411.80	823.61
2.80	0.80	1.59	3.99	7.97	15.94	39.86	79.73	159.44	398.59	797.18
2.85	0.77	1.54	3.86	7.72	15.45	38.62	77.25	154.48	386.19	772.39
2.90	0.75	1.50	3.75	7.49	14.98	37.45	74.92	149.82	374.55	749.10
2.95	0.73	1.45	3.64	7.27	14.54	36.36	72.72	145.43	363.58	727.17
3.00	0.71	1.41	3.53	7.06	14.13	35.32	70.65	141.30	353.24	706.48
3.05	0.69	1.37	3.43	6.87	13.74	34.35	68.70	137.39	343.47	686.95
3.10	0.67	1.34	3.34	6.68	13.37	33.42	66.85	133.69	334.23	668.46



■ External Resistor Divider Table (contd.)

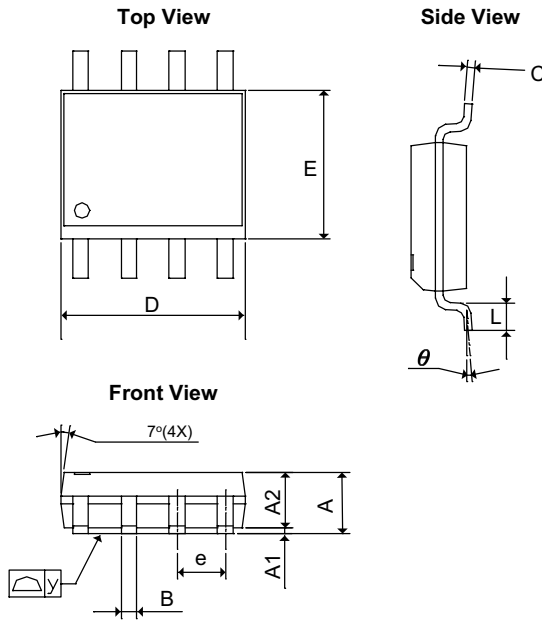
R1 (K Ohm)	1	2	5	10	20	50	100	200	500	1000
Vout	$R2(kohm)=(1.242*R1(kohm))/(Vout-1.242)$									
3.15	0.65	1.30	3.25	6.51	13.02	32.55	65.09	130.19	325.47	650.94
3.20	0.63	1.27	3.17	6.34	12.69	31.72	63.43	126.86	317.16	634.32
3.25	0.62	1.24	3.09	6.19	12.37	30.93	61.85	123.71	309.26	618.53
3.30	0.60	1.21	3.02	6.03	12.07	30.17	60.35	120.70	301.75	603.50
3.35	0.59	1.18	2.95	5.89	11.78	29.46	58.92	117.84	294.59	589.18
3.40	0.58	1.15	2.88	5.76	11.51	28.78	57.55	115.11	287.77	575.53
3.45	0.56	1.13	2.81	5.63	11.25	28.13	56.25	112.50	281.25	562.50
3.50	0.55	1.10	2.75	5.50	11.00	27.50	55.00	110.01	275.02	550.04
3.55	0.54	1.08	2.69	5.38	10.76	26.91	53.81	107.63	269.06	538.13
3.60	0.53	1.05	2.63	5.27	10.53	26.34	52.67	105.34	263.36	526.72
3.65	0.52	1.03	2.58	5.16	10.32	25.79	51.58	103.16	257.89	515.78
3.70	0.51	1.01	2.53	5.05	10.11	25.26	50.53	101.06	252.64	505.29
3.75	0.50	0.99	2.48	4.95	9.90	24.76	49.52	99.04	247.61	495.22
3.80	0.49	0.97	2.43	4.86	9.71	24.28	48.55	97.11	242.77	485.54
3.85	0.48	0.95	2.38	4.76	9.52	23.81	47.62	95.25	238.11	476.23
3.90	0.47	0.93	2.34	4.67	9.35	23.36	46.73	93.45	233.63	467.27
3.95	0.46	0.92	2.29	4.59	9.17	22.93	45.86	91.73	229.32	458.64
4.00	0.45	0.90	2.25	4.50	9.01	22.52	45.03	90.07	225.16	450.33
4.05	0.44	0.88	2.21	4.42	8.85	22.12	44.23	88.46	221.15	442.31
4.10	0.43	0.87	2.17	4.35	8.69	21.73	43.46	86.91	217.28	434.57
4.15	0.43	0.85	2.14	4.27	8.54	21.35	42.71	85.42	213.55	427.10
4.20	0.42	0.84	2.10	4.20	8.40	20.99	41.99	83.98	209.94	419.88
4.25	0.41	0.83	2.06	4.13	8.26	20.64	41.29	82.58	206.45	412.90
4.30	0.41	0.81	2.03	4.06	8.12	20.31	40.61	81.23	203.07	406.15
4.35	0.40	0.80	2.00	4.00	7.99	19.98	39.96	79.92	199.81	399.61
4.40	0.39	0.79	1.97	3.93	7.87	19.66	39.33	78.66	196.64	393.29
4.45	0.39	0.77	1.94	3.87	7.74	19.36	38.72	77.43	193.58	387.16
4.50	0.38	0.76	1.91	3.81	7.62	19.06	38.12	76.24	190.61	381.22
4.55	0.38	0.75	1.88	3.75	7.51	18.77	37.55	75.09	187.73	375.45
4.60	0.37	0.74	1.85	3.70	7.40	18.49	36.99	73.97	184.93	369.86
4.65	0.36	0.73	1.82	3.64	7.29	18.22	36.44	72.89	182.22	364.44
4.70	0.36	0.72	1.80	3.59	7.18	17.96	35.92	71.83	179.58	359.17
4.75	0.35	0.71	1.77	3.54	7.08	17.70	35.40	70.81	177.02	354.05
4.80	0.35	0.70	1.75	3.49	6.98	17.45	34.91	69.81	174.54	349.07
4.85	0.34	0.69	1.72	3.44	6.88	17.21	34.42	68.85	172.12	344.24
4.90	0.34	0.68	1.70	3.40	6.79	16.98	33.95	67.91	169.76	339.53
4.95	0.33	0.67	1.67	3.35	6.70	16.75	33.50	66.99	167.48	334.95
5.00	0.33	0.66	1.65	3.30	6.61	16.52	33.05	66.10	165.25	330.49

Note: Small load(greater than 2 mA) is necessary as R1 or R2 is larger than 50 K Ohm. Otherwise, outputvoltage probably cannot be pulled down to 0 V on disable mode.



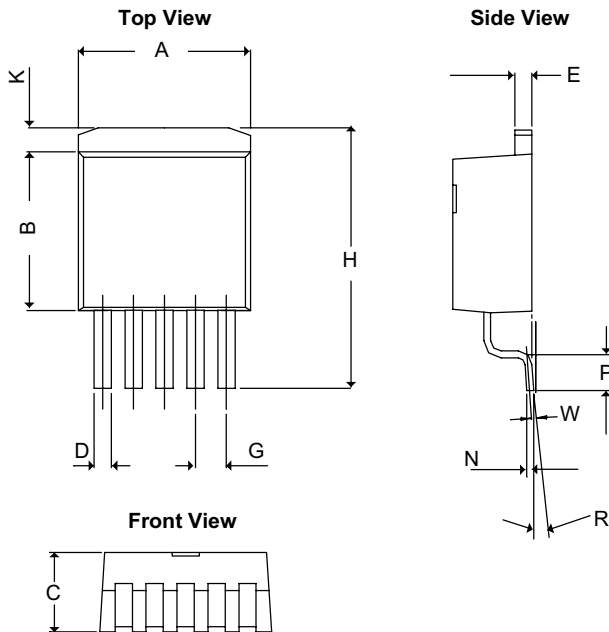
■ Package Dimension

SO-8



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
<b>A</b>	1.35	1.75	0.05315	0.0689
<b>A<sub>1</sub></b>	0.10	0.25	0.00394	0.00984
<b>A<sub>2</sub></b>	1.473 REF		0.058 REF	
<b>B</b>	0.33	0.51	0.01299	0.02008
<b>C</b>	0.19	0.25	0.00748	0.00984
<b>D</b>	4.80	5.00	0.18898	0.19685
<b>E</b>	3.80	4.00	0.14961	0.15748
<b>e</b>	1.27 BSC		0.050 BSC	
<b>L</b>	0.40	1.27	0.01575	0.05
<b>y</b>	-	0.10	-	0.004
<b>θ</b>	0°	8°	0°	8°

TO-263-5



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
<b>A</b>	10.050	10.668	0.396	0.420
<b>B</b>	8.280	9.169	0.326	0.361
<b>C</b>	4.310	4.597	0.170	0.181
<b>D</b>	0.660	0.910	0.026	0.036
<b>E</b>	1.140	1.400	0.045	0.055
<b>G</b>	1.70 REF		0.067 REF	
<b>H</b>	14.605	15.875	0.575	0.625
<b>K</b>	1.143	1.680	0.045	0.066
<b>L</b>	0.000	0.305	0.000	0.012
<b>N</b>	0.330	0.580	0.013	0.023
<b>P</b>	2.280	2.800	0.090	0.110
<b>R</b>	0°	8°	0°	8°
<b>W</b>	0.25 REF		0.01 REF	



Life Support Policy:

These products of AME, Inc. are not authorized for use as critical components in life-support devices or systems, without the express written approval of the president of AME, Inc.

AME, Inc. reserves the right to make changes in the circuitry and specifications of its devices and advises its customers to obtain the latest version of relevant information.

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