



■ General Description

The AME8807 family of positive, linear regulators feature low quiescent current (30µA typ.) with low dropout voltage, making them ideal for battery applications. The space-saving SO-8 package is attractive for "Pocket" and "Hand Held" applications.

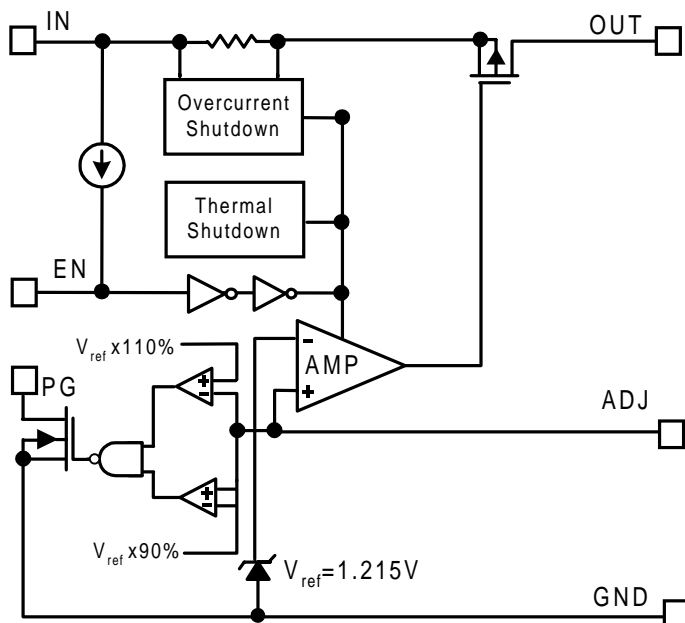
These rugged devices have both Thermal Shutdown, and Current Fold-back to prevent device failure under the "Worst" of operating conditions.

The AME8807 is stable with an output capacitance of 2.2µF or greater.

■ Features

- Very Low Dropout Voltage
- Guaranteed 600mA Output
- Accurate to within 1.5%
- 30µA Quiescent Current
- Over-Temperature Shutdown
- Current Limiting
- Short Circuit Current Fold-back
- Power-Saving Shutdown Mode
- Space-Saving SO-8 Package
- User Adjustable Output Voltages
- Low Temperature Coefficient

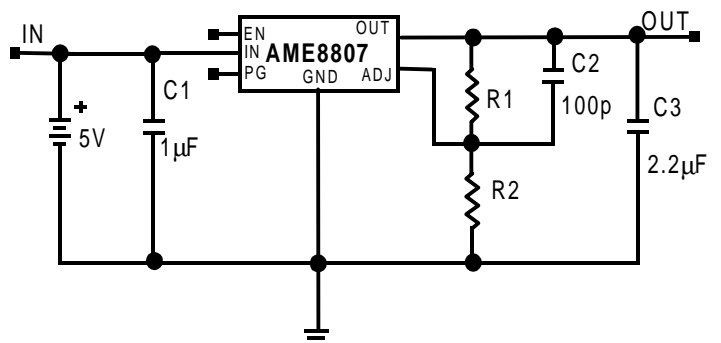
■ Functional Block Diagram



■ Applications

- Instrumentation
- Portable Electronics
- Wireless Devices
- Cordless Phones
- PC Peripherals
- Battery Powered Widgets
- Electronic Scales

■ Typical Application



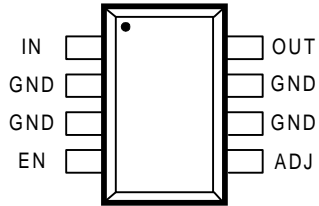
$$V_{OUT} = 1.215 (R1/R2 + 1)$$

C2 is unnecessary if R1 or R2 < 20kohms



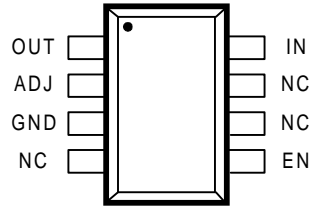
■ Pin Configuration

SO-8 Top View



AME8807AEHA

SO-8 Top View



AME8807BEHA

■ Ordering Information

Part Number	Marking	Output Voltage	Package	Operating Temp. Range
AME8807AEHA	8807 AEHA yyww	Adjustable	SO-8	-40°C to +85°C
AME8807BEHA	8807 BEHA yyww	Adjustable	SO-8	-40°C to +85°C

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



■ **Absolute Maximum Ratings:**

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

■ **Recommended operating Conditions:**

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

■ **Thermal Information**

Parameter	Package	Maximum	Unit
Thermal Resistance (θ_{ja})	8807AEHA	124	°C / W
	8807BEHA	124	
Internal Power Dissipation (P_D) ($\Delta T = 100^\circ\text{C}$)	8807AEHA	810	mW
	8807BEHA	810	
Maximum Junction Temperature		150	°C
Maximum Lead Temperature (10 Sec)		300	°C

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



■ Electrical Specifications

$T_A = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Test Condition		Min	Typ	Max	Units
Input Voltage	V_{IN}			Note 1		8	V
Output Voltage Accuracy	V_O	$I_O=1\text{mA}$		-1.5		1.5	%
Dropout Voltage	$V_{DROPOUT}$	$I_O=600\text{mA}$ $V_O=V_{ONOM}-2.0\%$	$1.5\text{V}<V_{O(NOM)}\leq 2.0\text{V}$	See chart		1400	mV
			$2.0\text{V}<V_{O(NOM)}\leq 2.8\text{V}$			800	
			$2.8\text{V}<V_{O(NOM)}<3.8\text{V}$			600	
Output Current	I_O	$V_O>1.2\text{V}$		600			mA
Current Limit	I_{LIM}	$V_O>1.2\text{V}$		600	800		mA
Short Circuit Current	I_{SC}	$V_O<0.8\text{V}$			300	600	mA
Quiescent Current	I_Q	$I_O=0\text{mA}$			30	50	μA
Ground Pin Current	I_{GND}	$I_O=1\text{mA}$ to 600mA			30	50	μA
Line Regulation	REG_{LINE}	$I_O=5\text{mA}$ $V_{IN}=V_O+1$ to V_O+2	$V_O < 2.0\text{V}$			0.15	%
			$V_O \geq 2.0\text{V}$		0.02	0.1	%
Load Regulation	REG_{LOAD}	$I_O=1\text{mA}$ to 600mA			0.2	1	%
Over Temperature Shutdown	OTS				150		$^\circ\text{C}$
Over Temperature Hysteresis	OTH				30		$^\circ\text{C}$
V_O Temperature Coefficient	TC				30		ppm/ $^\circ\text{C}$
Power Supply Rejection	PSRR	$I_O=100\text{mA}$ $C_O=2.2\mu\text{F}$	$f=1\text{kHz}$		50		dB
			$f=10\text{kHz}$		20		
			$f=100\text{kHz}$		15		
Output Voltage Noise	eN	$f=10\text{Hz}$ to 100kHz $I_O=10\text{mA}$	$C_O=2.2\mu\text{F}$		30		μVrms
			$C_O=100\mu\text{F}$		20		
ADJ Input Bias Current	I_{ADJ}			0.02		0.04	μA
ADJ Reference Voltage	V_{REF}			1.203	1.215	1.227	V
EN Input Threshold	V_{EH}	$V_{IN}=2.7\text{V}$ to 8V		2.0		V_{in}	V
	V_{EL}	$V_{IN}=2.7\text{V}$ to 8V		0		0.4	V
EN Input Bias Current	I_{EH}	$V_{EN}=V_{IN}$, $V_{IN}=2.7\text{V}$ to 8V				0.1	μA
	I_{EL}	$V_{EN}=0\text{V}$, $V_{IN}=2.7\text{V}$ to 8V				0.5	μA
Shutdown Supply Current	I_{SD}	$V_{IN}=5\text{V}$, $V_O=0\text{V}$, $V_{EN}<V_{EL}$			0.5	1	μA

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



■ Detailed Description

The AME8807 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 150°C, or the current exceeds 600mA. During thermal shutdown, the output voltage remains low. Normal operation is restored when the junction temperature drops below 120°C.

The AME8807 switches from voltage mode to current mode when the load exceeds the rated output current. This prevents over-stress. The AME8807 also incorporates current foldback to reduce power dissipation when the output is short circuited. This feature becomes active when the output drops below 0.8 volts, and reduces the current flow by 65%. Full current is restored when the voltage exceeds 0.8 volts.

■ External Capacitors

The AME8807 is stable with an output capacitor to ground of 2.2 μ F 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 0.1 μ F ceramic capacitor with a 10 μ F 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 0.1 μ F to have a beneficial effect.

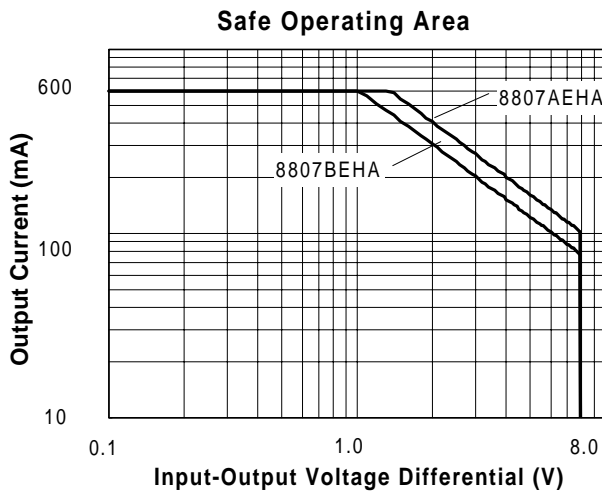
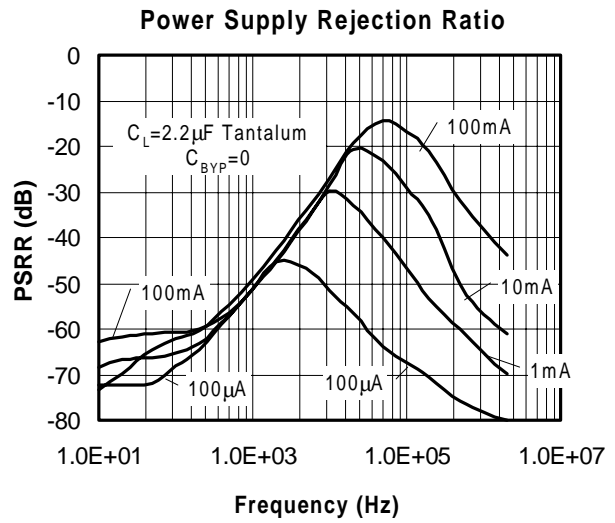
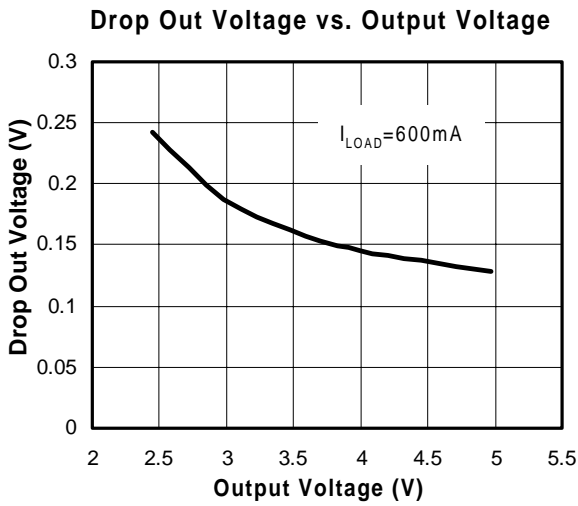
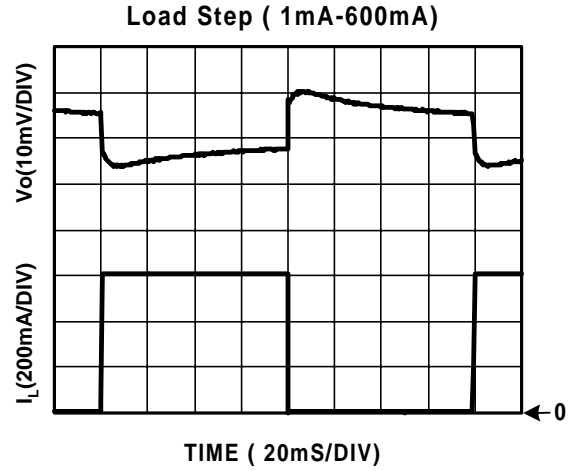
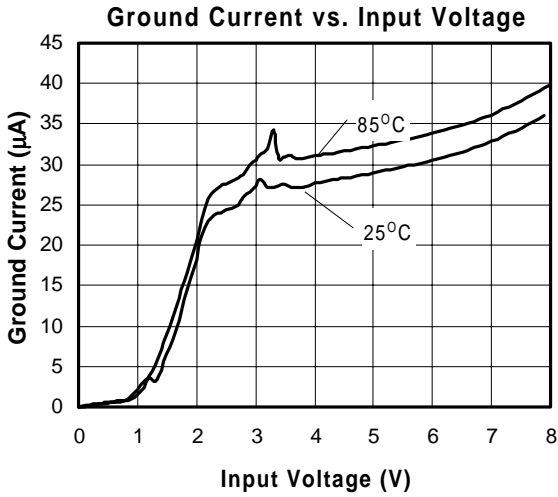
All capacitors should be placed in close proximity to the pins. A "Quiet" ground termination is desirable. This can be achieved with a "Star" connection.

■ Enable

The Enable pin normally floats high. When actively, pulled low, the PMOS pass transistor shuts off, and all internal circuits are powered down. In this state, the quiescent current is less than 1 μ A. This pin behaves much like an electronic switch.

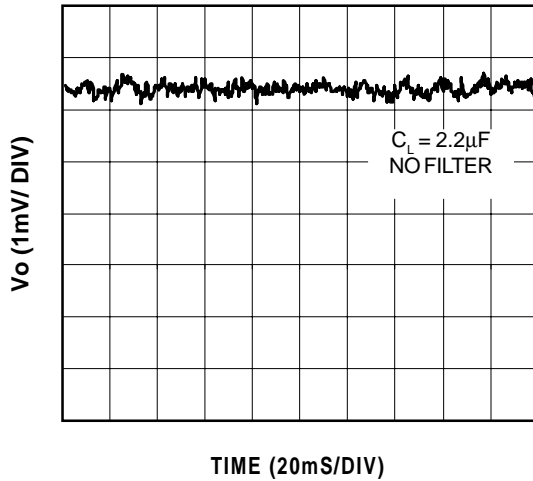
■ ADJ

The ADJ pin is the positive input to the error amplifier which, due to the pmos pass element inversion, means it is actually the negative input of the LDO feedback loop. The feedback works to keep the voltage at the ADJ pin 1.215V with respect to ground. Since the internal circuitry at the ADJ pin is essentially an ESD protected CMOS gate the input current at the ADJ pin is virtually zero.

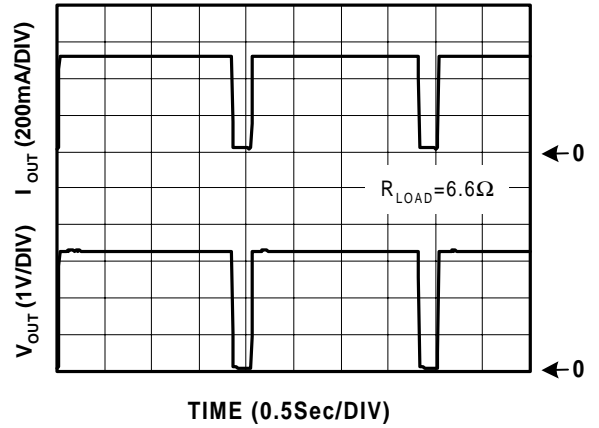




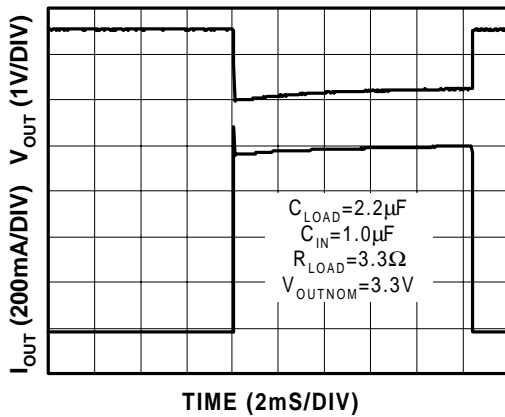
Noise Measurement



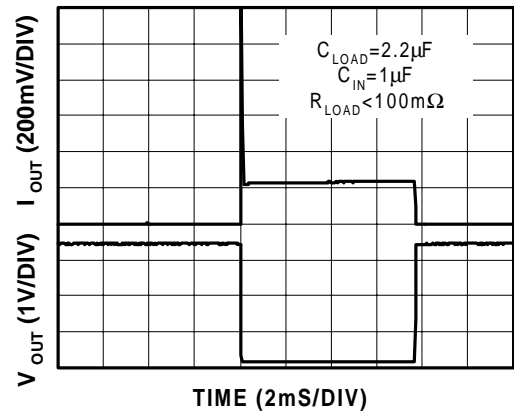
Overtemperature Shutdown



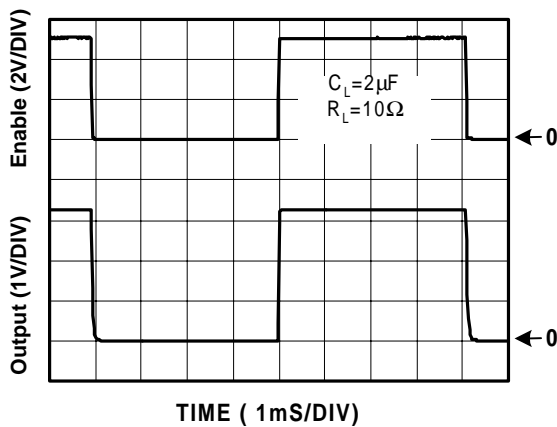
Current Limit Response



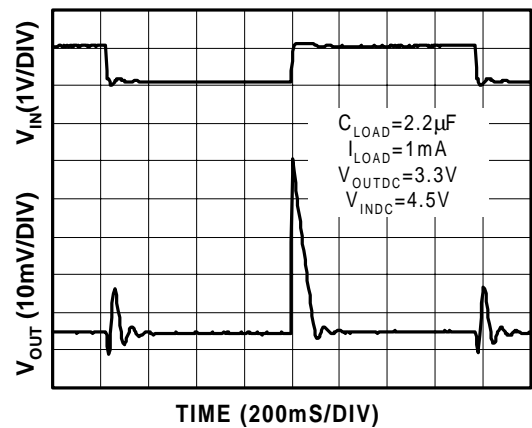
Short Circuit Response



Chip Enable Transient Response



Line Transient Response





External Resistor Divider Table

R1(kohm)	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
Vout	$R2(kohm)=(1.215 \cdot R1(kohm))/(Vout-1.215)$									
1.30	14.29	28.59	42.88	57.18	71.47	85.76	100.06	114.35	128.65	142.94
1.35	9.00	18.00	27.00	36.00	45.00	54.00	63.00	72.00	81.00	90.00
1.40	6.57	13.14	19.70	26.27	32.84	39.41	45.97	52.54	59.11	65.68
1.45	5.17	10.34	15.51	20.68	25.85	31.02	36.19	41.36	46.53	51.70
1.50	4.26	8.53	12.79	17.05	21.32	25.58	29.84	34.11	38.37	42.63
1.55	3.63	7.25	10.88	14.51	18.13	21.76	25.39	29.01	32.64	36.27
1.60	3.16	6.31	9.47	12.62	15.78	18.94	22.09	25.25	28.40	31.56
1.65	2.79	5.59	8.38	11.17	13.97	16.76	19.55	22.34	25.14	27.93
1.70	2.51	5.01	7.52	10.02	12.53	15.03	17.54	20.04	22.55	25.05
1.75	2.27	4.54	6.81	9.08	11.36	13.63	15.90	18.17	20.44	22.71
1.80	2.08	4.15	6.23	8.31	10.38	12.46	14.54	16.62	18.69	20.77
1.85	1.91	3.83	5.74	7.65	9.57	11.48	13.39	15.31	17.22	19.13
1.90	1.77	3.55	5.32	7.09	8.87	10.64	12.42	14.19	15.96	17.74
1.95	1.65	3.31	4.96	6.61	8.27	9.92	11.57	13.22	14.88	16.53
2.00	1.55	3.10	4.64	6.19	7.74	9.29	10.83	12.38	13.93	15.48
2.05	1.46	2.91	4.37	5.82	7.28	8.73	10.19	11.64	13.10	14.55
2.10	1.37	2.75	4.12	5.49	6.86	8.24	9.61	10.98	12.36	13.73
2.15	1.30	2.60	3.90	5.20	6.50	7.80	9.10	10.40	11.70	12.99
2.20	1.23	2.47	3.70	4.93	6.17	7.40	8.63	9.87	11.10	12.34
2.25	1.17	2.35	3.52	4.70	5.87	7.04	8.22	9.39	10.57	11.74
2.30	1.12	2.24	3.36	4.48	5.60	6.72	7.84	8.96	10.08	11.20
2.35	1.07	2.14	3.21	4.28	5.35	6.42	7.49	8.56	9.63	10.70
2.40	1.03	2.05	3.08	4.10	5.13	6.15	7.18	8.20	9.23	10.25
2.45	0.98	1.97	2.95	3.94	4.92	5.90	6.89	7.87	8.85	9.84
2.50	0.95	1.89	2.84	3.78	4.73	5.67	6.62	7.56	8.51	9.46
2.55	0.91	1.82	2.73	3.64	4.55	5.46	6.37	7.28	8.19	9.10
2.60	0.88	1.75	2.63	3.51	4.39	5.26	6.14	7.02	7.90	8.77
2.65	0.85	1.69	2.54	3.39	4.23	5.08	5.93	6.77	7.62	8.47
2.70	0.82	1.64	2.45	3.27	4.09	4.91	5.73	6.55	7.36	8.18
2.75	0.79	1.58	2.37	3.17	3.96	4.75	5.54	6.33	7.12	7.92
2.80	0.77	1.53	2.30	3.07	3.83	4.60	5.37	6.13	6.90	7.67
2.85	0.74	1.49	2.23	2.97	3.72	4.46	5.20	5.94	6.69	7.43
2.90	0.72	1.44	2.16	2.88	3.61	4.33	5.05	5.77	6.49	7.21
2.95	0.70	1.40	2.10	2.80	3.50	4.20	4.90	5.60	6.30	7.00
3.00	0.68	1.36	2.04	2.72	3.40	4.08	4.76	5.45	6.13	6.81
3.05	0.66	1.32	1.99	2.65	3.31	3.97	4.63	5.30	5.96	6.62
3.10	0.64	1.29	1.93	2.58	3.22	3.87	4.51	5.16	5.80	6.45



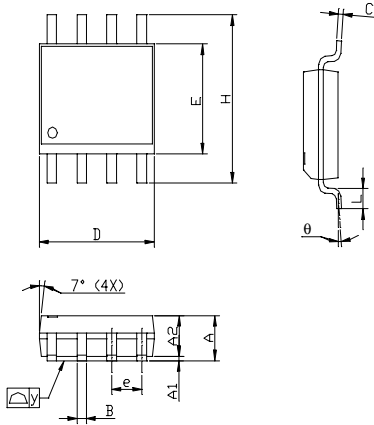
■ External Resistor Divider Table (contd.)

R1(kohm)	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
Vout	$R2(kohm)=(1.215*R1(kohm))/(Vout-1.215)$									
3.15	0.63	1.26	1.88	2.51	3.14	3.77	4.40	5.02	5.65	6.28
3.20	0.61	1.22	1.84	2.45	3.06	3.67	4.28	4.90	5.51	6.12
3.25	0.60	1.19	1.79	2.39	2.99	3.58	4.18	4.78	5.37	5.97
3.30	0.58	1.17	1.75	2.33	2.91	3.50	4.08	4.66	5.24	5.83
3.35	0.57	1.14	1.71	2.28	2.85	3.41	3.98	4.55	5.12	5.69
3.40	0.56	1.11	1.67	2.22	2.78	3.34	3.89	4.45	5.00	5.56
3.45	0.54	1.09	1.63	2.17	2.72	3.26	3.81	4.35	4.89	5.44
3.50	0.53	1.06	1.60	2.13	2.66	3.19	3.72	4.25	4.79	5.32
3.55	0.52	1.04	1.56	2.08	2.60	3.12	3.64	4.16	4.68	5.20
3.60	0.51	1.02	1.53	2.04	2.55	3.06	3.57	4.08	4.58	5.09
3.65	0.50	1.00	1.50	2.00	2.49	2.99	3.49	3.99	4.49	4.99
3.70	0.49	0.98	1.47	1.96	2.44	2.93	3.42	3.91	4.40	4.89
3.75	0.48	0.96	1.44	1.92	2.40	2.88	3.36	3.83	4.31	4.79
3.80	0.47	0.94	1.41	1.88	2.35	2.82	3.29	3.76	4.23	4.70
3.85	0.46	0.92	1.38	1.84	2.31	2.77	3.23	3.69	4.15	4.61
3.90	0.45	0.91	1.36	1.81	2.26	2.72	3.17	3.62	4.07	4.53
3.95	0.44	0.89	1.33	1.78	2.22	2.67	3.11	3.55	4.00	4.44
4.00	0.44	0.87	1.31	1.75	2.18	2.62	3.05	3.49	3.93	4.36
4.05	0.43	0.86	1.29	1.71	2.14	2.57	3.00	3.43	3.86	4.29
4.10	0.42	0.84	1.26	1.68	2.11	2.53	2.95	3.37	3.79	4.21
4.15	0.41	0.83	1.24	1.66	2.07	2.48	2.90	3.31	3.73	4.14
4.20	0.41	0.81	1.22	1.63	2.04	2.44	2.85	3.26	3.66	4.07
4.25	0.40	0.80	1.20	1.60	2.00	2.40	2.80	3.20	3.60	4.00
4.30	0.39	0.79	1.18	1.58	1.97	2.36	2.76	3.15	3.54	3.94
4.35	0.39	0.78	1.16	1.55	1.94	2.33	2.71	3.10	3.49	3.88
4.40	0.38	0.76	1.14	1.53	1.91	2.29	2.67	3.05	3.43	3.81
4.45	0.38	0.75	1.13	1.50	1.88	2.25	2.63	3.00	3.38	3.76
4.50	0.37	0.74	1.11	1.48	1.85	2.22	2.59	2.96	3.33	3.70
4.55	0.36	0.73	1.09	1.46	1.82	2.19	2.55	2.91	3.28	3.64
4.60	0.36	0.72	1.08	1.44	1.79	2.15	2.51	2.87	3.23	3.59
4.65	0.35	0.71	1.06	1.41	1.77	2.12	2.48	2.83	3.18	3.54
4.70	0.35	0.70	1.05	1.39	1.74	2.09	2.44	2.79	3.14	3.49
4.75	0.34	0.69	1.03	1.37	1.72	2.06	2.41	2.75	3.09	3.44
4.80	0.34	0.68	1.02	1.36	1.69	2.03	2.37	2.71	3.05	3.39
4.85	0.33	0.67	1.00	1.34	1.67	2.01	2.34	2.67	3.01	3.34
4.90	0.33	0.66	0.99	1.32	1.65	1.98	2.31	2.64	2.97	3.30
4.95	0.33	0.65	0.98	1.30	1.63	1.95	2.28	2.60	2.93	3.25
5.00	0.32	0.64	0.96	1.28	1.61	1.93	2.25	2.57	2.89	3.21



■ Package Dimension

SO-8



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.053	0.069
A ₁	0.10	0.25	0.004	0.010
A ₂	—	—	—	—
B	0.33	0.51	0.013	0.020
C	0.19	0.25	0.007	0.010
D	4.80	5.00	0.189	0.1970
E	3.80	4.00	0.150	0.157
e	—	—	—	—
H	5.80	6.20	0.228	0.244
L	0.40	1.27	0.016	0.050
y	—	0.10	—	0.004
θ	0°	8°	0°	8°



www.analogmicro.com
E-Mail: info@analogmicro.com

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Corporate Headquarters
Analog Microelectronics, Inc.

3100 De La Cruz Blvd. Suite 201
Santa Clara, CA. 95054-2046
Tel : (408) 988-2388
Fax: (408) 988-2489

Asia Pacific Headquarters
AME, Inc.

2F, 187 Kang-Chien Road, Nei-Hu District
Taipei 114, Taiwan, R.O.C.
Tel : 886 2 2627-8687
Fax: 886 2 2659-2989