



### ■ 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.

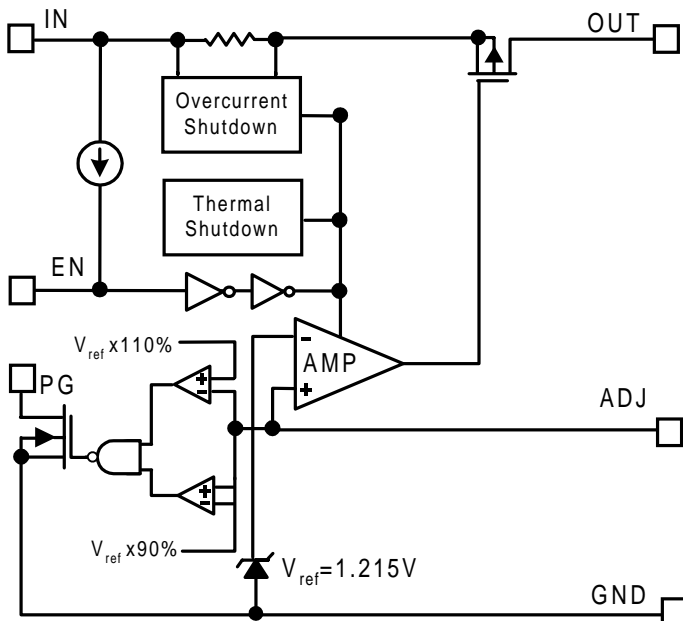
These rugged devices have both Thermal Shutdown, and Current Fold-back to prevent device failure under the "Worst" of operating conditions.

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

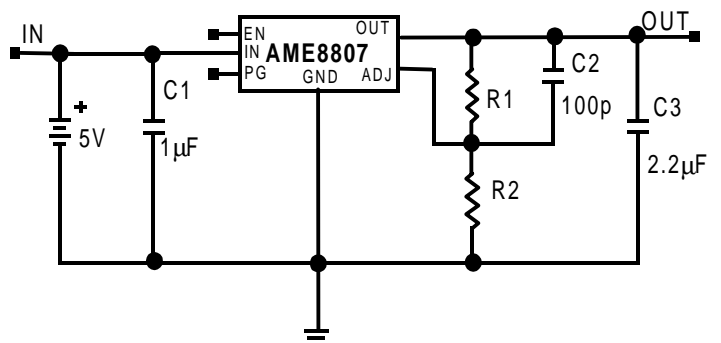
### ■ Functional Block Diagram



### ■ Applications

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

### ■ Typical Application



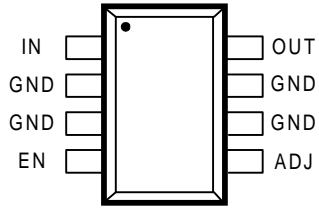
$$V_{OUT} = 1.215 (R1/R2 + 1)$$

C2 is unnecessary if R1 or R2 < 20kohms



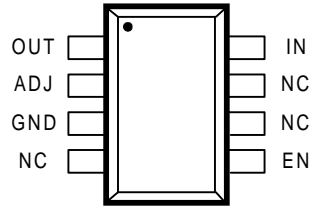
### ■ Pin Configuration

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 ( $\theta_{ja}$ )	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

TA = 25°C unless otherwise noted

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

Note1: V<sub>IN(min)</sub>=V<sub>OUT</sub>+V<sub>DROPOUT</sub>



### ■ 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 $\mu$ 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 $\mu$ F ceramic capacitor with a 10 $\mu$ 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 $\mu$ F to have a beneficial effect.

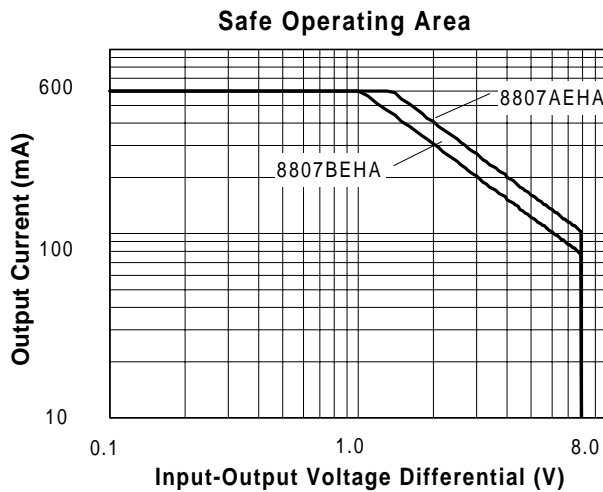
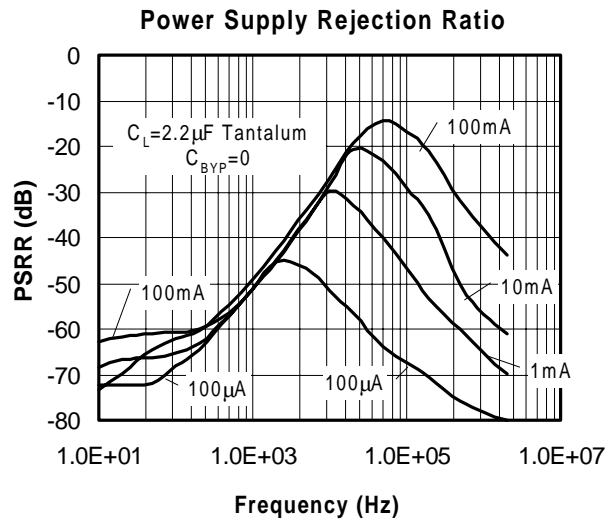
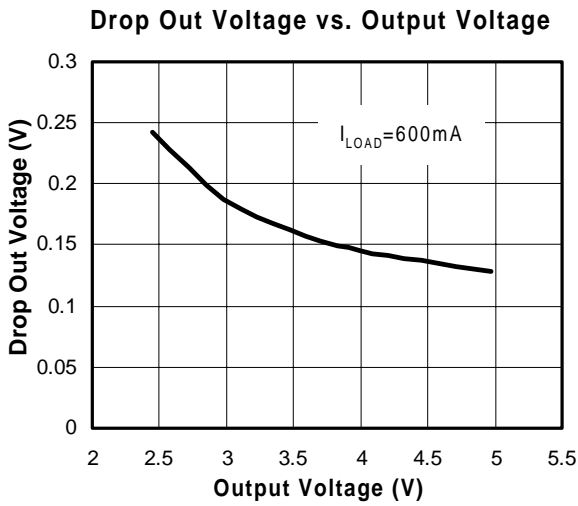
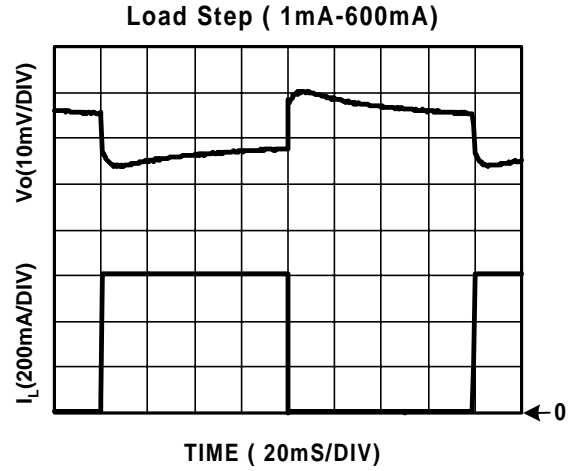
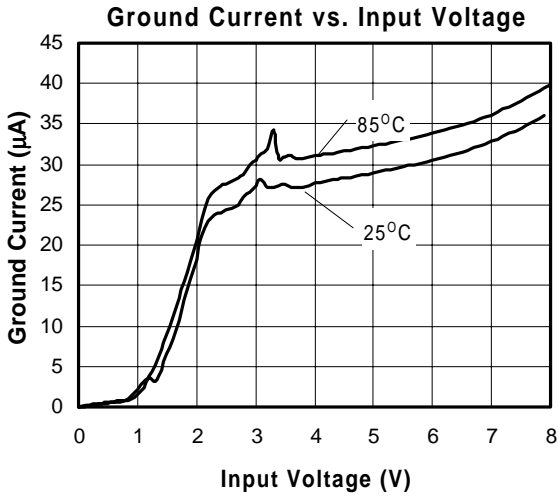
All capacitors should be placed in close proximity to the pins. A "Quiet" ground termination is desirable. This can be achieved with a "Star" connection.

### ■ 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 $\mu$ A. This pin behaves much like an electronic switch.

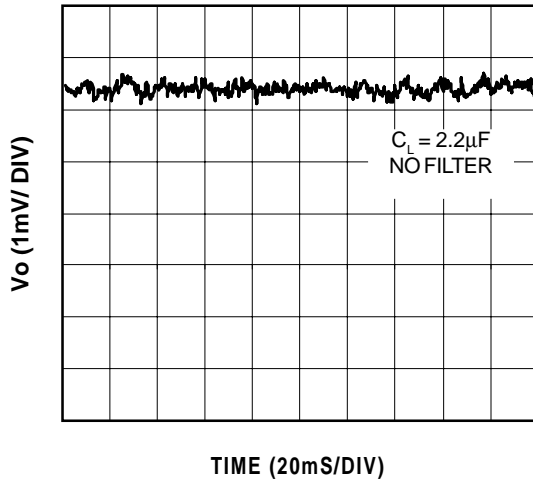
### ■ ADJ

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.

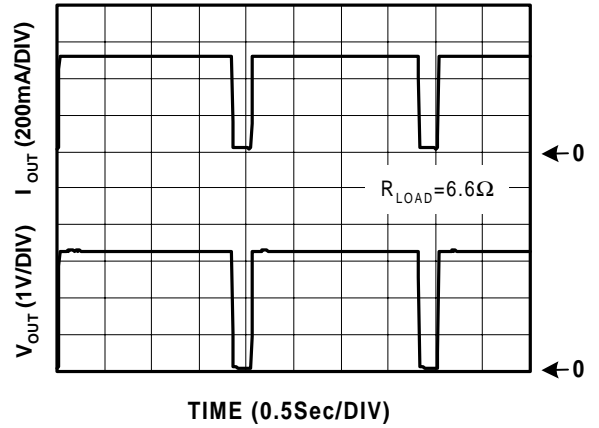




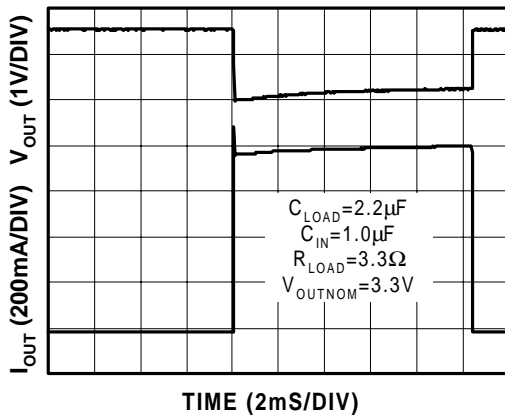
Noise Measurement



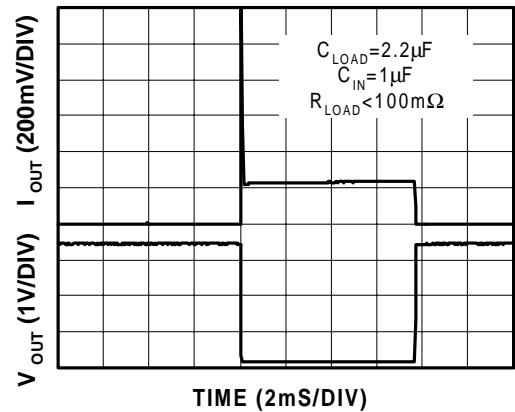
Overtemperature Shutdown



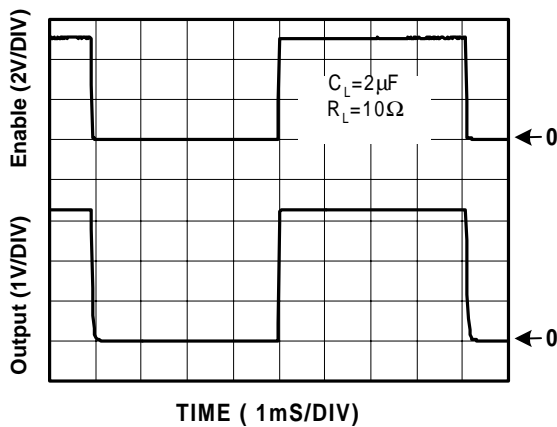
Current Limit Response



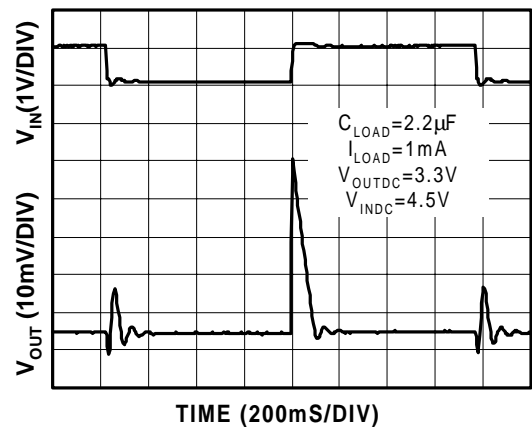
Short Circuit Response



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	$R2(kohm)=(1.215*R1(kohm))/(Vout-1.215)$									
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





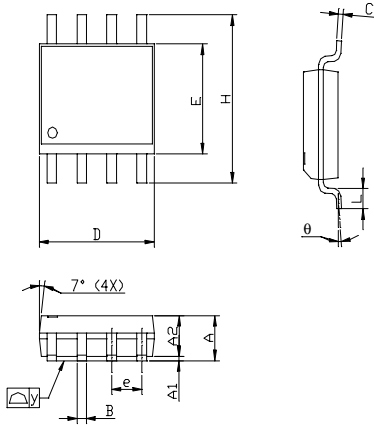
■ External Resistor Divider Table (contd.)

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 <sub>1</sub>	0.10	0.25	0.004	0.010
A <sub>2</sub>	—	—	—	—
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°



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