AME

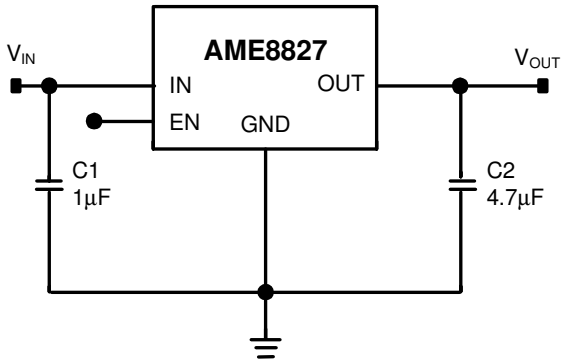
AME8827 Low Dropout 1A CMOS Regulator

■ General Description

The AME8827 family of positive, CMOS linear regulators and provide low dropout voltage (340mV @ 1A) and excellent PSRR, thus making them ideal for power-saving systems. These rugged devices have both Thermal Shutdown, and Current limit to prevent device failure under the "Worst" of operating conditions.

The AME8827 is stable with an output capacitance of 4.7μF or larger.

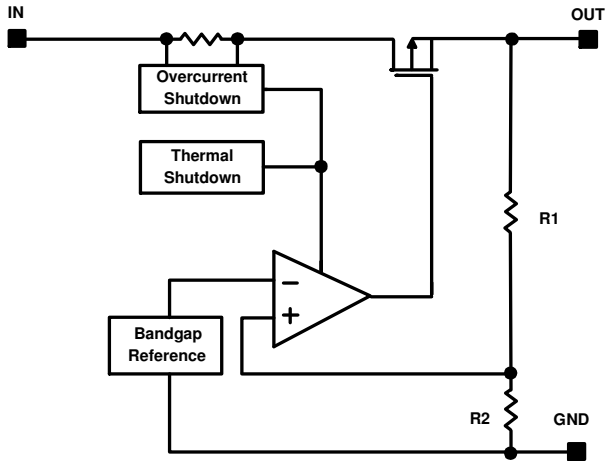
■ Typical Application



■ Features

- Low Dropout Voltage:340mV @ 1A
- Guaranteed 1A Drive current
- Over-Temperature Shutdown
- Current Limiting protection
- Excellent PSRR : 60dB(typ.)
- Factory Pre-set Output Voltages
- Low Temperature Coefficient
- Input Voltage Range (2.5V - 5.5V)
- Output Voltage Range (1.2V - 3.6V)
- All AME's Green Products Meet RoHS Standards

■ Function Block Diagram

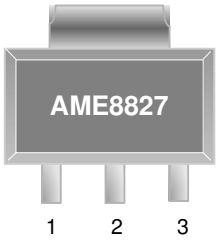


■ Applications

- Motherboard, Desktop, and Computer Peripherals
- LCD monitor
- Handheld Device
- Data-communication

■ Pin Configuration

SOT-223
Top View



AME8827-AGTxxx
1. IN
2. GND (TAB)
3. OUT

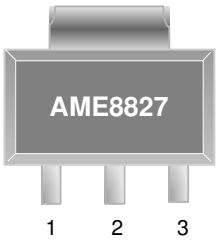
Die Attach:
Conductive Epoxy

TO-252-2
Top View

AME8827-ACSxxx
1. IN
2. GND (TAB)
3. OUT

Die Attach:
Conductive Epoxy

SOT-223
Top View



AME8827-BGTxxx
1. GND
2. OUT (TAB)
3. IN

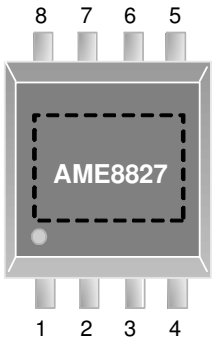
Die Attach:
Non-Conductive Epoxy

SOP-8
Top View

AME8827-AHAxxx
1. EN
2. IN
3. OUT
4. NC
5. GND
6. GND
7. GND
8. GND

Die Attach:
Conductive Epoxy

SOP-8/PP
Top View



AME8827-BZAxxx
1. EN
2. IN
3. OUT
4. NC
5. GND
6. GND
7. GND
8. GND

Die Attach:
Conductive Epoxy

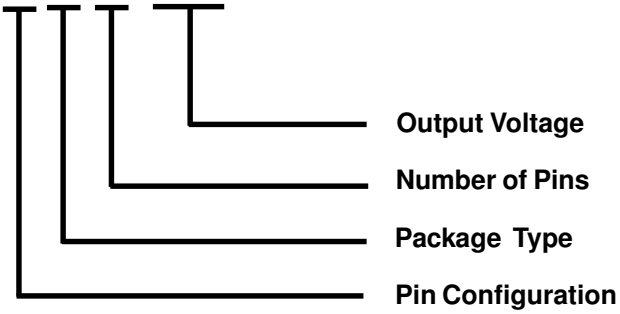
Note: The area enclosed by dashed line represents Exposed Pad and connect to GND.

■ Pin Description

Pin Name	Pin Description
IN	Input voltage pin; should be decoupled with 1μF or greater capacitor.
GND	Ground connection pin.
OUT	LDO voltage regulator output pin; should be decoupled with a 4.7μF or greater value low ESR ceramic capacitor.
EN	Enable pin. When pulled low, the PMOS pass transistor turns off, current consuming less than 10μA.
NC	No connection.

■ Ordering Information

AME8827 - x x x xxx



Pin Configuration	Package Type	Number of Pins	Output Voltage
A (SOT-223) 1. IN 2. GND 3. OUT A (TO-252-2) 1. IN 2. GND 3. OUT B (SOT-223) 1. GND 2. OUT 3. IN A (SOP-8) 1. EN 2. IN 3. OUT 4. NC 5. GND 6. GND 7. GND 8. GND B (SOP-8/PP) 1. EN 2. IN 3. OUT 4. NC 5. GND 6. GND 7. GND 8. GND	G: SOT-223 C: TO-252 H: SOP Z: SOP/PP	T: 3 S: 2 A: 8	120: 1.2V 125: 1.25V 150: 1.5V 180: 1.8V 250: 2.5V 300: 3.0V 330: 3.3V

■ Available Options

Part Number	Marking*	Output Voltage	Package	Operating Ambient Temperature Range
AME8827-AGT120	A8827 AKyMXX	1.2V	SOT-223	-40^{O}C to +85^{O}C
AME8827-AGT180	A8827 AIyMXX	1.8V	SOT-223	-40^{O}C to +85^{O}C
AME8827-AGT250	A8827 AGyMXX	2.5V	SOT-223	-40^{O}C to +85^{O}C
AME8827-AGT330	A8827 AByMXX	3.3V	SOT-223	-40^{O}C to +85^{O}C
AME8827-ACS120	A8827 BKyMXX	1.2V	TO-252-2	-40^{O}C to +85^{O}C
AME8827-ACS125	A8827 BRyMXX	1.25V	TO-252-2	-40^{O}C to +85^{O}C
AME8827-ACS180	A8827 BIyMXX	1.8V	TO-252-2	-40^{O}C to +85^{O}C
AME8827-ACS250	A8827 BGyMXX	2.5V	TO-252-2	-40^{O}C to +85^{O}C
AME8827-ACS330	A8827 BByMXX	3.3V	TO-252-2	-40^{O}C to +85^{O}C
AME8827-BGT120	A8827 EKyMXX	1.2V	SOT-223	-40^{O}C to +85^{O}C
AME8827-BGT150	A8827 EJyMXX	1.5V	SOT-223	-40^{O}C to +85^{O}C
AME8827-BGT180	A8827 EIyMXX	1.8V	SOT-223	-40^{O}C to +85^{O}C
AME8827-BGT250	A8827 EGyMXX	2.5V	SOT-223	-40^{O}C to +85^{O}C
AME8827-BGT330	A8827 EByMXX	3.3V	SOT-223	-40^{O}C to +85^{O}C
AME8827-AHA330	A8827 FByMXX	3.3V	SOP-8	-40^{O}C to +85^{O}C
AME8827-BZA330	A8827 GByMXX	3.3V	SOP-8/PP	-40^{O}C to +85^{O}C

Note:
1. The first 2 places represent product code. It is assigned by AME such as AK.
2. y is year code and is the last number of a year. Such as the year code of 2008 is 8.
3. A bar on top of first letter represents Green Part such as $\overline{A}$8827.
4. The last 3 places MXX represent Marking Code. It contains M as date code in "month", XX as LN code and that is for AME internal use only. Please refer to date code rule section for detail information.
5. Please consult AME sales office or authorized Rep./Distributor for the availability of output voltage and package type.

■ Absolute Maximum Ratings

Parameter	Symbol	Maximum	Unit
Input Voltage	V_{IN}	-0.3 to 6	V
Output Current	I_{OUT}	$P_D/(V_{IN}-V_{OUT})$	mA
Output Voltage	V_{OUT}	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.
* HBM B:2000V~3999V

■ Recommended Operating Conditions

Parameter	Symbol	Rating	Unit
Ambient Temperature Range	T_A	-40 to +85	°C
Junction Temperature Range	T_J	-40 to +125	
Storage Temperature Range	T_{STG}	-65 to +150	

■ Thermal Information

Parameter	Package	Die Attach	Symbol	Maximum	Unit
Thermal Resistance* (Junction to Case)	SOT-223	Conductive Epoxy	θ_{JC}	25	°C / W
		Non-Conductive Epoxy		31	
Thermal Resistance (Junction to Ambient)		Conductive Epoxy	θ_{JA}	120	
		Non-Conductive Epoxy		135	
Internal Power Dissipation		Conductive Epoxy	P_D	900	mW
		Non-Conductive Epoxy		800	
Thermal Resistance* (Junction to Case)	TO-252-2	Conductive Epoxy	θ_{JC}	5	°C / W
Thermal Resistance (Junction to Ambient)			θ_{JA}	90	
Internal Power Dissipation			P_D	1200	mW
Thermal Resistance** (Junction to Case)	SOP-8	Conductive Epoxy	θ_{JC}	60	°C / W
Thermal Resistance (Junction to Ambient)			θ_{JA}	150	
Internal Power Dissipation			P_D	810	mW
Thermal Resistance* (Junction to Case)	SOP-8/PP	Conductive Epoxy	θ_{JC}	19	°C / W
Thermal Resistance (Junction to Ambient)			θ_{JA}	84	
Internal Power Dissipation			P_D	1450	mW
Solder Iron (10 Sec)***				350	°C

* Measure θ_{JC} on backside center of tab.
** Measure θ_{JC} on center of molding compound if IC has no tab.
*** MIL-STD-202G 210F

■ Electrical Specifications

V_{IN} = $V_{OUT(NOM)}$ + 0.5V, (for V_{OUT} < 2V, V_{IN}=2.5V), V_{EN}=V_{IN}, I_{OUT} =1mA, and C_{OUT} = 4.7µF, C_{IN}=1µF unless otherwise noted. Typical values are at T_A = 25°C.

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Input Voltage	V_{IN}		(Note 1)		5.5	V
Output Accuracy	$V_{OUT,ACC}$		-2		2	%
Dropout Voltage	V_{DROP}	I_O=1A, $V_{OUT(NOM)} \leqq$ 2.0V		(Note2)		mV
		I_O=1A, 2.0V<$V_{OUT(NOM)} \leqq$ 2.5V		430	500	
		I_O=1A, 2.6V $\leqq V_{OUT(NOM)} \leqq$ 3.0V		380	450	
		I_O=1A, $V_{OUT(NOM)}$>3.1V		340	400	
Quiescent Current	I_Q	V_{IN}=5.5V, I_{OUT}=1mA		70	110	µA
Line Regulation $\frac{\frac{\Delta V_{OUT}}{\Delta V_{IN}} \times 100\%}{V_{OUT}}$	REG_{LINE}	for $V_{OUT} \leqq$ 2.0 2.5V<V_{IN}<3.5V	-0.15	0.1	0.15	%/V
		for 2.0V<$V_{OUT} \leqq$ 2.8V V_{OUT}+1V<V_{IN}<V_{OUT}+2V	-0.1	0.02	0.1	
		for V_{OUT}>2.8V V_{OUT}+1V<V_{IN}<V_{OUT}+2V	-0.055	0.02	0.055	
Load Regulation $\frac{\frac{\Delta V_{OUT}}{V_{OUT}} \times 100\%}{\Delta I_{OUT}}$	REG_{LOAD}	V_{IN}=V_{OUT}+1V 10mA< I_{LOAD}<1A	-0.001	0.0005	0.001	%/mA
Output Current Limit	I_{LIM}	V_{OUT}=0.9 x $V_{OUT(NOM)}$	1.3	1.5		A
Short Circuit Current	Isc	V_{IN}=$V_{OUT(NOM)}$+1V, Vo<0.6V		0.6		A
Power Supply Rejection Ratio	PSRR	C_{OUT}=4.7µF, F=1KHz, I_{OUT}=100mA		60		dB
Enable High (enabled)	$V_{EN(HI)}$	$V_{IN(MIN)} \leqq V_{IN} \leqq$ 5.5V	1.4		V_{IN}	V
Enable Low (shutdown)	$V_{EN(LO)}$	$V_{IN(MIN)} \leqq V_{IN} \leqq$ 5.5V	0		0.4	V
Enable Pin Current (enabled)	I_{EN}	V_{EN} = V_{IN}		0.1	1	µA
Shutdown Current	I_{SHDN}	V_{EN}=0V, $V_{IN(MIN)} \leqq V_{IN} \leqq$ 5.5V		5	10	µA

■ Electrical Specifications (Contd.)

V_{IN} = $V_{OUT(NOM)}$ + 0.5V, (for V_{OUT} < 2V, V_{IN}=2.5V), V_{EN}=V_{IN}, I_{OUT} =1mA, and C_{OUT} = 4.7µF, C_{IN}=1µF unless otherwise noted. Typical values are at T_A = 25°C.

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Thermal Shutdown Temperature	T_{SHDN}	Shutdown, temperature increasing		150		°C
		Restore, temperature decreasing		130		

Note 1: $V_{IN(MIN)}$=V_{OUT}+V_{DROP} or $V_{IN(MIN)}$=2.5V, whichever is greater.
Note 2: For V_{OUT} below 2.0V, Dropout Voltage is the input$_{(MIN)}$ to output differential.

■ Detailed Description

The AME8827 is low-dropout; low quiescent current linear regulator designed for motherboard, notebook and LCD monitor applications. The output voltage range from 1.2V to 3.6V, and can drive 1A loading current.

Capacitor Selection and Regulator Stability

Use 1μF for input capacitor and 4.7μFor great for output capacitor on the AME8827. Larger input capacitor value and low ESR provide better supply noise rejection and improve line transient response. To reduce output noise and load transient response, use output capacitor greater than 4.7μF.

Calculating the Maximum Output Power

The maximum output power of the AME8827 is limited by the maximum power dissipation of the package. By calculation the power dissipation of the package as a function of the input voltage, output voltage and output current, the maximum input voltage can be obtained. The maximum power dissipation should not exceed the package's maximum power rating.

$$P_{MAX} = (V_{IN.MAX} - V_{OUT}) \times I_{OUT}$$

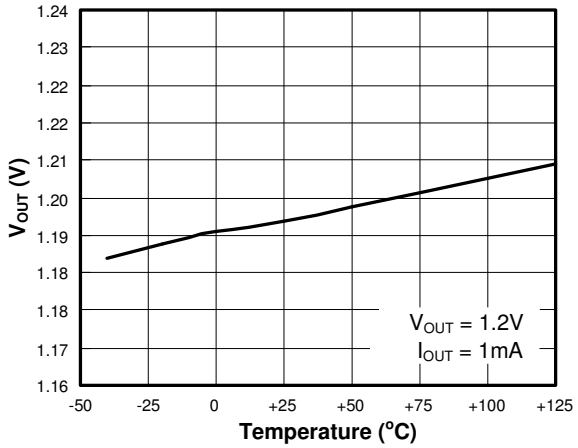
Where:

$V_{IN.MAX}$ = maximum input voltage

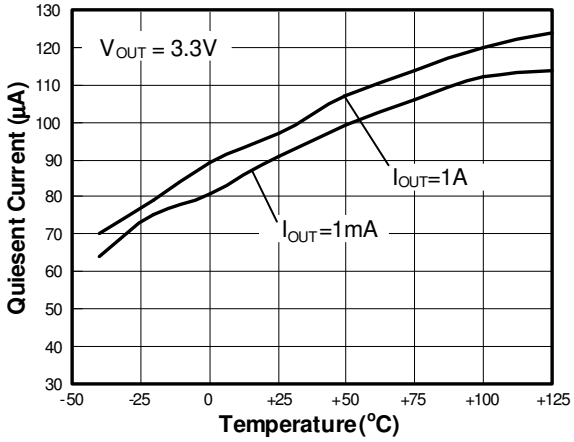
P_{MAX} = maximum power dissipation of the package

■ Characterization Curve(For reference only)

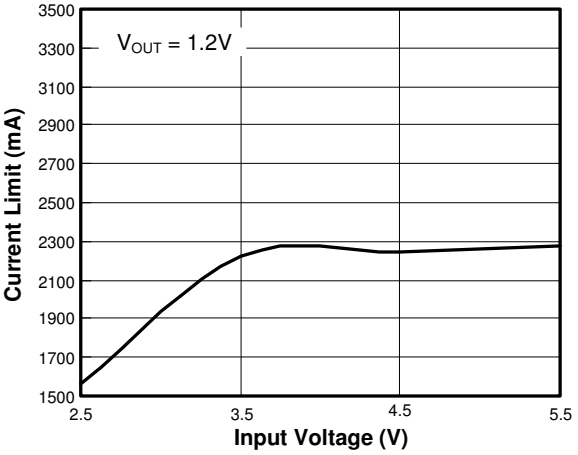
V_{OUT} vs. Temperature



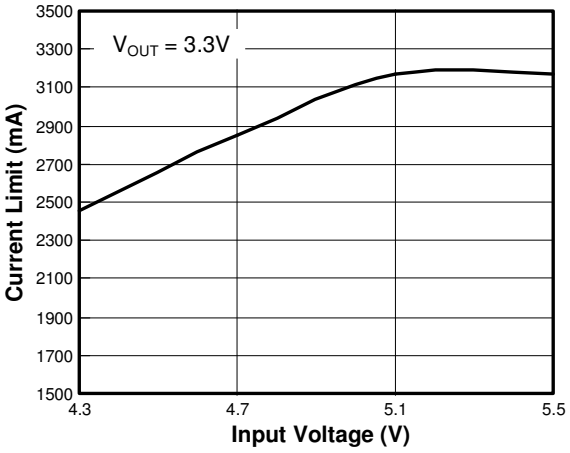
Quiesent Current vs Temperature



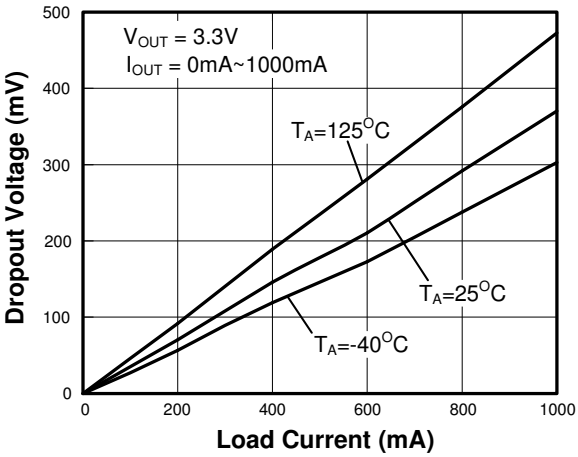
Current Limit vs Input Voltage



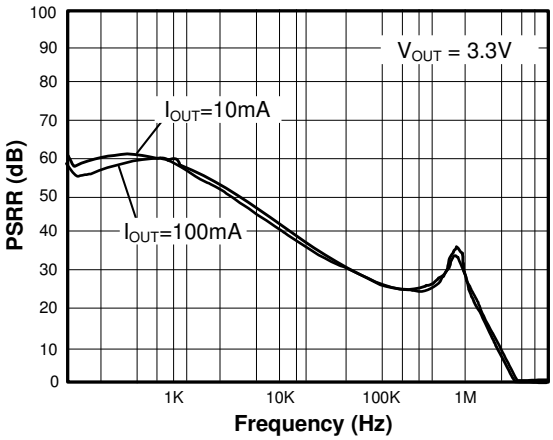
Current Limit vs Input Voltage



Dropout Voltage vs Load Current

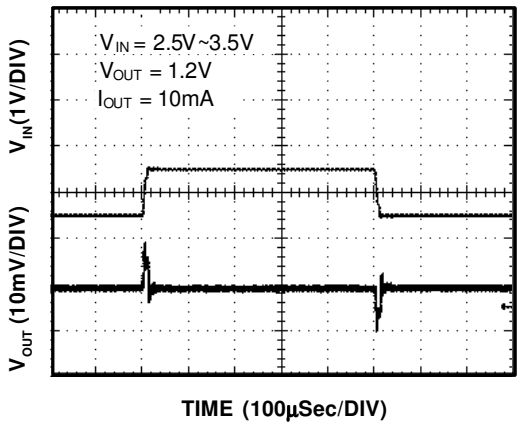


Power Supply Rejection Ratio

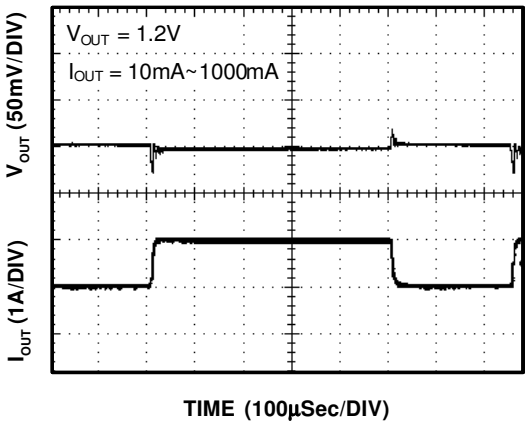


■ Characterization Curve(For reference only)

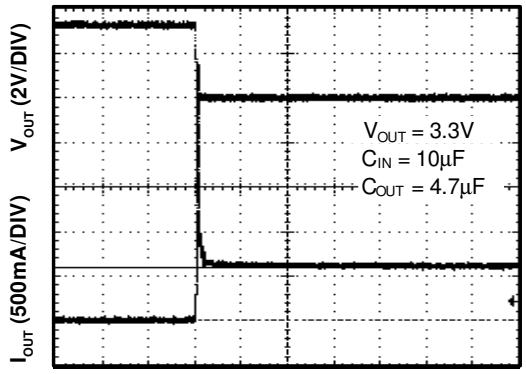
Line Transient Response



Load Transient Response



Short Circuit Current

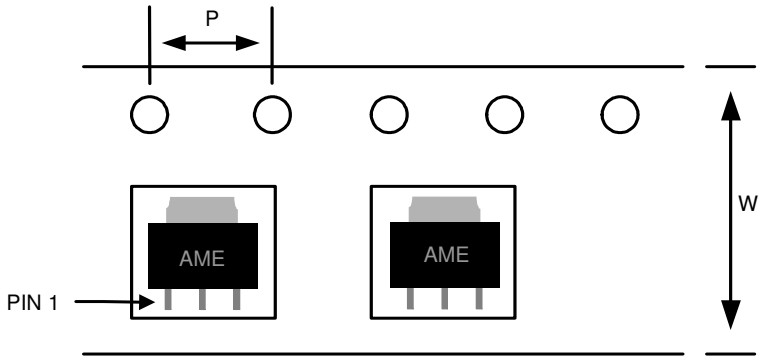


■ Date Code Rule

Month Code	
1: January	7: July
2: February	8: August
3: March	9: September
4: April	A: October
5: May	B: November
6: June	C: December

■ Tape & Reel Dimensions

SOT-223

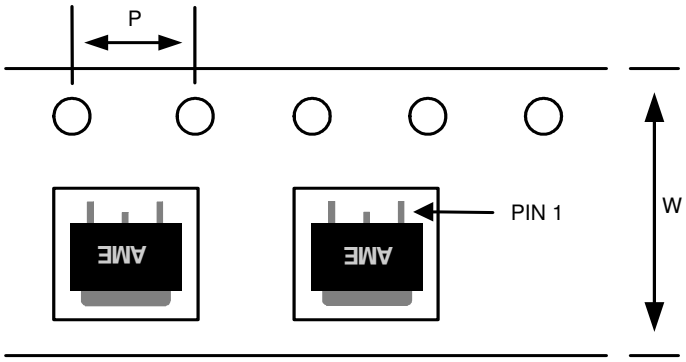


Carrier Tape, Number of Components Per Reel and Reel Size

Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
SOT-223	12.0±0.1 mm	4.0±0.1 mm	2500pcs	330±1 mm

■ Tape & Reel Dimensions

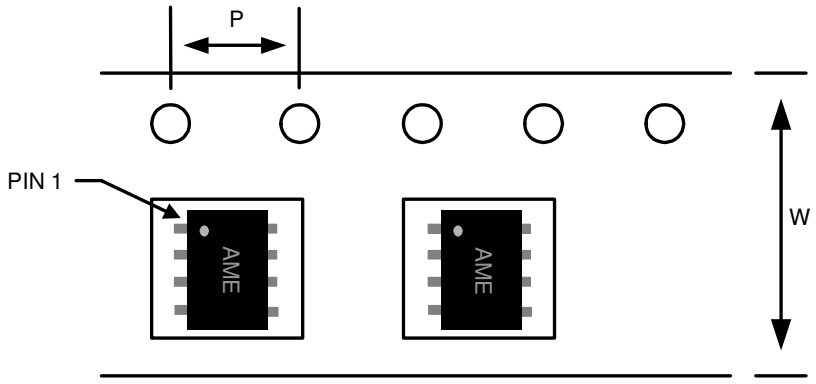
TO-252-2



Carrier Tape, Number of Components Per Reel and Reel Size

Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
TO-252-2	16.0±0.1 mm	4.0±0.1 mm	2500pcs	330±1 mm

SOP-8

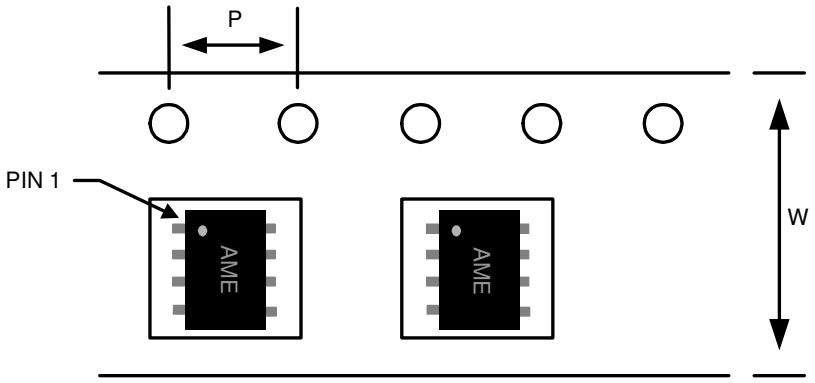


Carrier Tape, Number of Components Per Reel and Reel Size

Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
SOP-8	12.0±0.1 mm	4.0±0.1 mm	2500pcs	330±1 mm

■ Tape & Reel Dimensions

SOP-8/PP

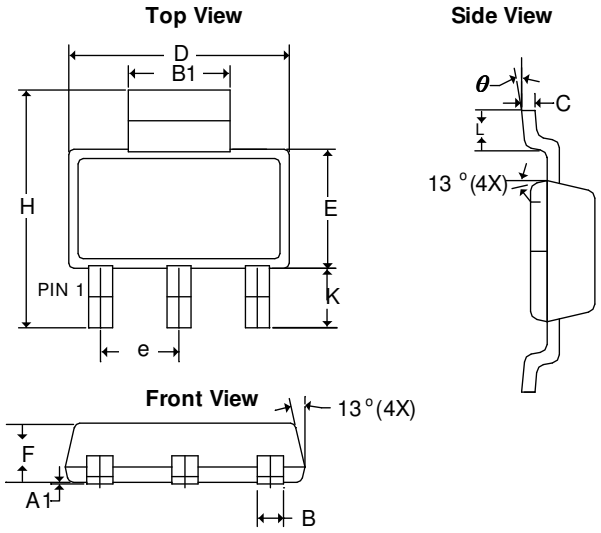


Carrier Tape, Number of Components Per Reel and Reel Size

Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
SOP-8/PP	12.0±0.1 mm	4.0±0.1 mm	2500pcs	330±1 mm

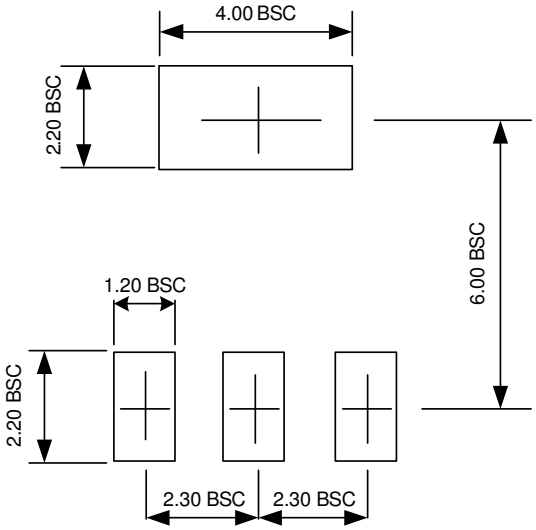
■ Package Dimension

SOT-223



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A_1	0.01	0.10	0.0004	0.0039
B	0.60	0.84	0.0236	0.0330
B_1	2.90	3.15	0.1140	0.1240
C	0.23	0.38	0.0091	0.0150
D	6.20	6.71	0.2441	0.2640
E	3.30	3.71	0.1299	0.1460
e	2.30 BSC		0.0906 BSC	
F	1.40	1.80	0.0551	0.0709
H	6.70	7.30	0.2638	0.2874
K	1.665	1.669	0.0656	0.0657
L	0.900	1.150	0.0354	0.0453
θ	0°	10°	0°	10°

■ Lead Pattern

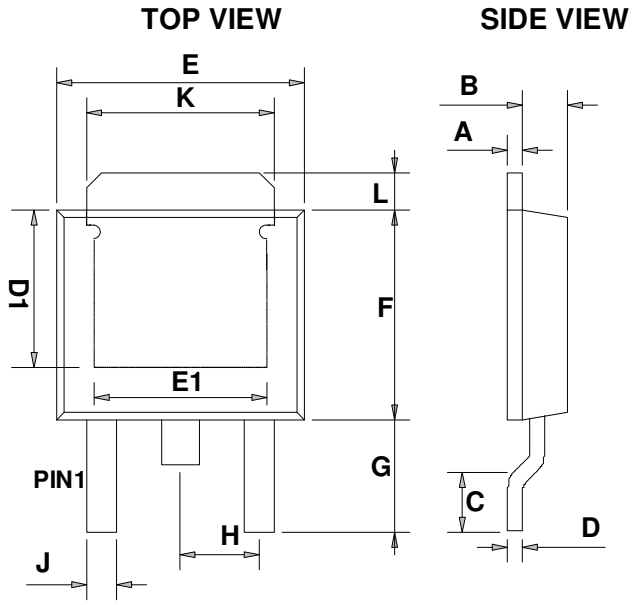


Note:

1. Lead pattern unit description:
   BSC: Basic. Represents theoretical exact dimension or dimension target.
2. Dimensions in Millimeters.
3. General tolerance ±0.05mm unless otherwise specified.

■ Package Dimension

TO-252-2



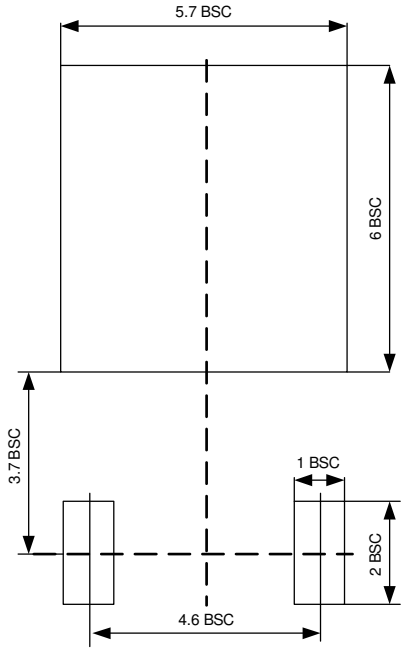
SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.43	0.58	0.0169	0.0230
B	1.60	1.95	0.0630	0.0768
C	0.51	1.78	0.0200	0.0701
D	0.43	0.60	0.0169	0.0236
E	6.35	6.80	0.2500	0.2677
F	5.36	7.20	0.2110	0.2835
G	2.20	3.00	0.0866	0.1181
H		* 2.30		*0.0906
J	0.50	0.97	0.0197	0.0380
K	5.20	5.50	0.2047	0.2165
L	1.35	1.65	0.0531	0.0650
D1	3.80 REF		0.1496 REF	
E1	3.81	5.10	0.1500	0.2008

***: Typical Value**

Notes:

1. Controlling dimension: Millimeters.
2. Maximum lead thickness includes lead finish thickness Minimum lead thickness is the minimum thickness of base material.

■ Lead Pattern



Note:

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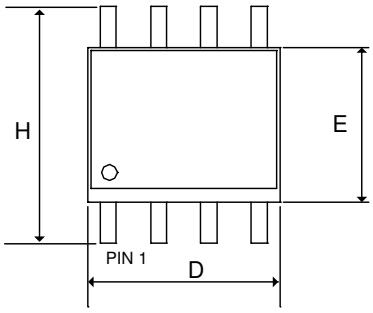
2. Dimensions in Millimeters.
3. General tolerance ±0.05mm unless otherwise specified.

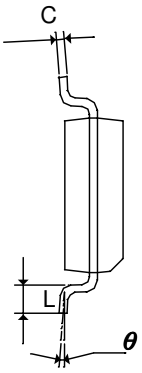
■ Package Dimension

SOP-8

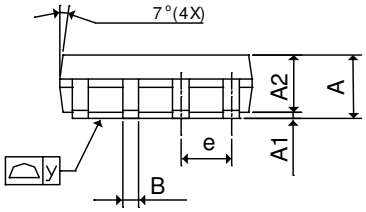
Top View



Side View



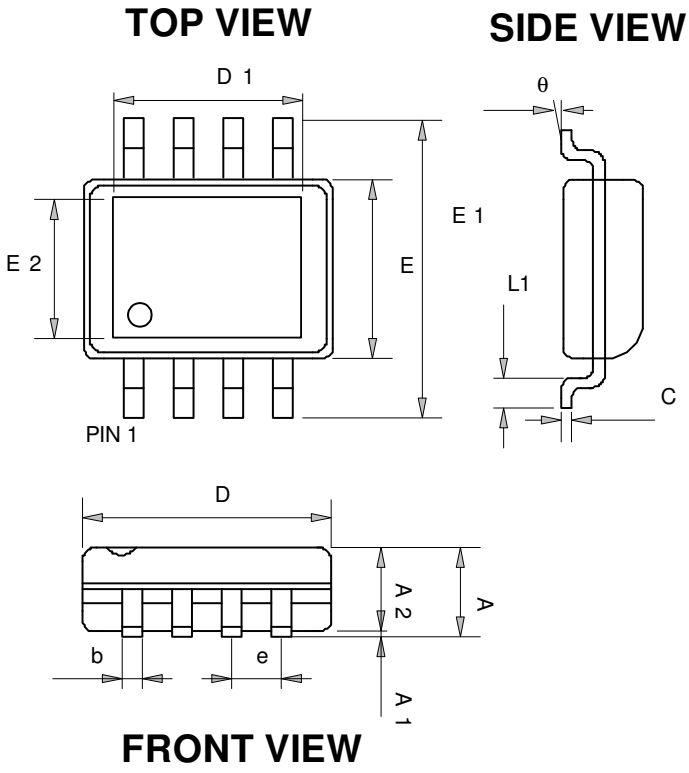
Front View



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.0531	0.0689
A_1	0.10	0.30	0.0039	0.0118
A2	1.473 REF		0.0580 REF	
B	0.33	0.51	0.0130	0.0201
C	0.17	0.25	0.0067	0.0098
D	4.70	5.33	0.1850	0.2098
E	3.80	4.00	0.1496	0.1575
e	1.27 BSC		0.0500 BSC	
L	0.40	1.27	0.0157	0.0500
H	5.80	6.30	0.2283	0.2480
y	-	0.10	-	0.0039
θ	0^o	8^o	0^o	8^o

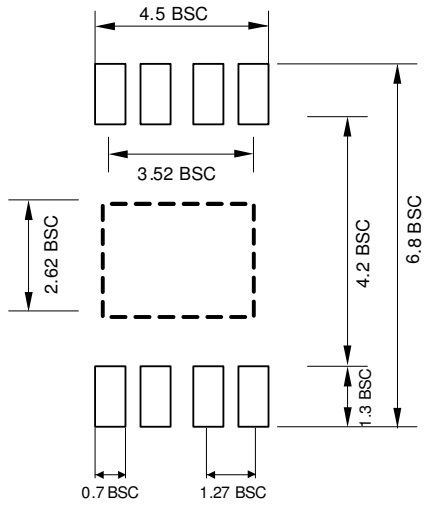
■ Package Dimension

SOP-8/PP



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.000	0.150	0.000	0.006
A2	1.350	1.600	0.053	0.063
C	0.100	0.250	0.004	0.010
E	3.750	4.150	0.148	0.163
E1	5.700	6.300	0.224	0.248
L1	0.300	1.270	0.012	0.050
b	0.310	0.510	0.012	0.020
D	4.720	5.120	0.186	0.202
e	1.270 BSC		0.050 BSC	
θ	0°	8°	0°	8°
E2	2.150	2.513	0.085	0.099
D1	2.150	3.402	0.085	0.134

■ Lead Pattern



Note:

1. Lead pattern unit description:
   BSC: Basic. Represents theoretical exact dimension or dimension target.
2. Dimensions in Millimeters.
3. General tolerance ±0.05mm unless otherwise specified.

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Document: 1271-DS8827-B.01

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