

■ General Description

The AME8818 is a CMOS linear regulator. It operated from 2.5V to 5.5V input voltage and delivers up to 300mA output current. The AME8818 provide low quiescent current (70uA typ) low dropout voltage (230mV @ 300mA typ), and excellent PSRR, thus marking them ideal for Data-Communications and battery applications.

The AME8818 provide over temperature and over current protected functions. It is stable with an output capacitance of 1uF or larger.

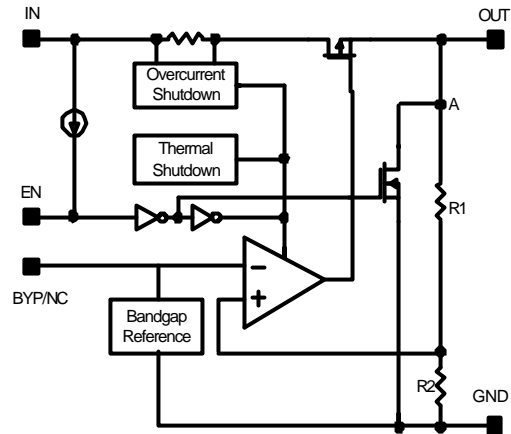
■ Features

- Input voltage range is from 2.5V to 5.5V
- Output voltage range is from 1.2V to 4.5V
- Low Dropout: 230mV @ 300mA
- Guaranteed 300mA Drive Current
- Factory Pre-set output voltage
- Only 1uF Output Capacitor Required for Stability
- Provided OTP, current limit
- All AME' s Green Products Meet RoHS Standards

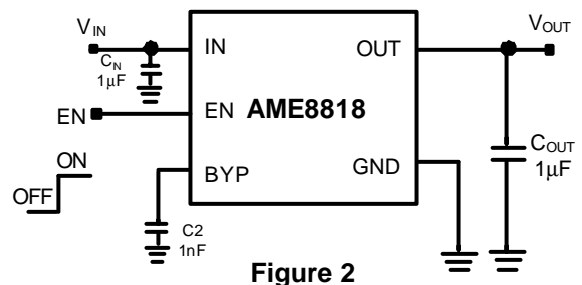
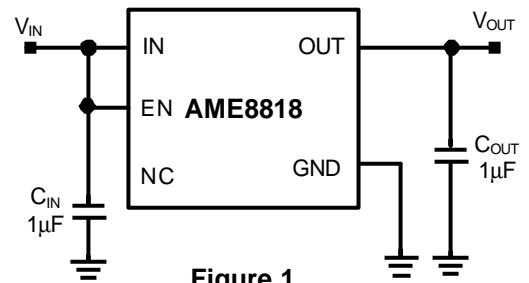
■ Applications

- Data-Communication
- Laptop, Palmtops, Notebook computers
- Battery Power Equipment
- Handheld Device
- PCMCIA Cards

■ Functional Block Diagram

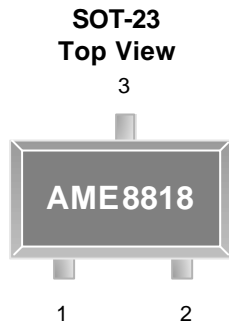


■ Typical Application



AME8818

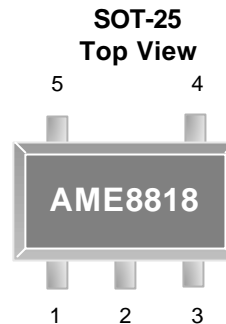
■ Pin Configuration



AME8818AEET

1. GND
2. OUT
3. IN

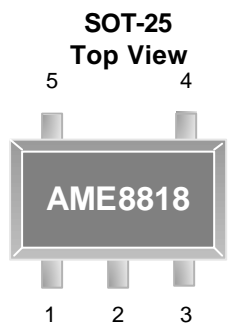
**Die Attach:
Non-Conductive Epoxy**



AME8818AEEV

1. IN
2. GND
3. EN
4. BYP
5. OUT

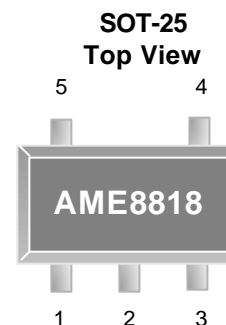
**Die Attach:
Conductive Epoxy**



AME8818BEEV

1. IN
2. GND
3. EN
4. NC
5. OUT

**Die Attach:
Conductive Epoxy**



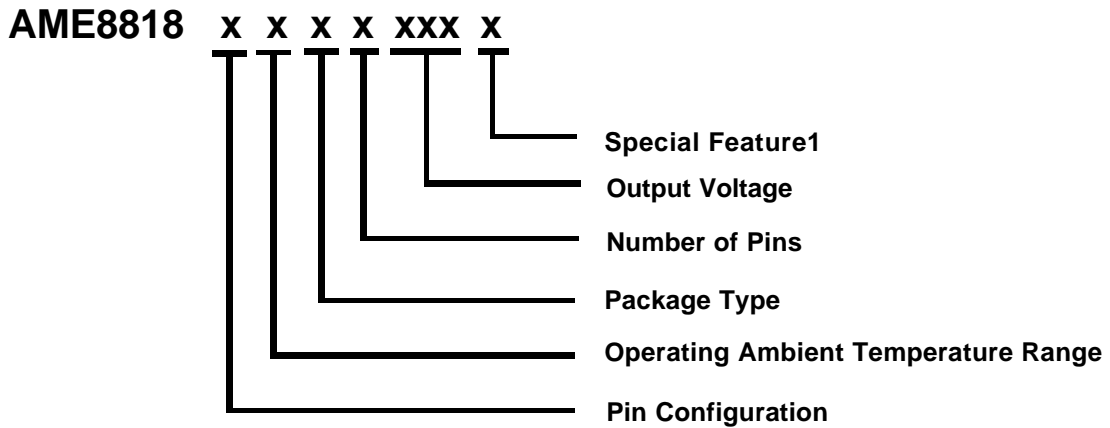
AME8818CEEV

1. EN
2. GND
3. IN
4. OUT
5. NC

**Die Attach:
Conductive Epoxy**

■ Pin Description

Pin Name	Pin Description
IN	Input voltage pin. It should be decoupled with 1 μ F or greater capacitor.
GND	Ground connection pin.
OUT	LDO voltage regulator output pin. It should be decoupled with a 1 μ F or greater value low ESR ceramic capacitor.
EN	The Enable pin normally floats high. When pulled low, the PMOS pass transistors shut off, and all internal circuit are powered down.
NC	No Internal Connection
BYP	Bypass capacitor connection. In AME8818BEEV and AME8818CEEV, IC will select internal circuit to improve ESR. In AME8818AEEV, IC will select external circuit to improve ESR and AC ripple rejection.

■ Ordering Information


Pin Configuration	Operating Ambient Temperature Range	Package Type	Number of Pins	Output Voltage	Special Feature 1
A: 1. GND <small>(SOT-23)</small> 2. OUT 3. IN A: 1.IN <small>(SOT-25)</small> 2.GND 3.EN 4.BYP 5.OUT B: 1.IN <small>(SOT-25)</small> 2.GND 3.EN 4.NC 5.OUT C: 1.EN <small>(SOT-25)</small> 2.GND 3.IN 4.OUT 5.NC	E: -40°C to +85°C	E: SOT-2X	T: 3 V: 5	120: V=1.2V 150: V=1.5V 180: V=1.8V 250: V=2.5V 280: V=2.8V 285: V=2.85V 290: V=2.9V 300: V=3.0V 310: V=3.1V 320: V=3.2V 330: V=3.3V 360: V=3.6V 390: V=3.9V	Z: Green

AME8818
■ Available Options

Part Number	Marking	Output Voltage	Package	Operating Ambient Temperature Range
AME8818AEET120Z	BVPMXX	1.2V	SOT-23	-40°C to +85°C
AME8818AEET150Z	BVQMXX	1.5V	SOT-23	-40°C to +85°C
AME8818AEET250Z	BVSMXX	2.5V	SOT-23	-40°C to +85°C
AME8818AEET300Z	BVWMXX	3.0V	SOT-23	-40°C to +85°C
AME8818AEET310Z	BVXMXX	3.1V	SOT-23	-40°C to +85°C
AME8818AEEV120Z	BWAMXX	1.2V	SOT-25	-40°C to +85°C
AME8818AEEV180Z	BWCMXX	1.8V	SOT-25	-40°C to +85°C
AME8818AEEV320Z	BYEMXX	3.2V	SOT-25	-40°C to +85°C
AME8818BEEV120Z	BWOMXX	1.2V	SOT-25	-40°C to +85°C
AME8818BEEV330Z	BWXMXX	3.3V	SOT-25	-40°C to +85°C
AME8818CEEV390Z	BYLMXX	3.9V	SOT-25	-40°C to +85°C

Note:

1. The first 3 places represent product code. It is assigned by AME such as BVP.
2. A bar on top of first letter represents Green Part such as $\overline{\text{BVP}}$.
3. 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.
4. 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
EN Voltage	V_{EN}	-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	

AME8818
■ Thermal Information

Parameter	Package	Die Attach	Symbol	Maximum	Unit	
Thermal Resistance* (Junction to Case)	SOT-25 SOT-23	Conductive Epoxy	θ_{JC}	81	$^{\circ}\text{C} / \text{W}$	
		Non-Conductive Epoxy		140		
Thermal Resistance (Junction to Ambient)		Conductive Epoxy	θ_{JA}	260		
		Non-Conductive Epoxy		280		
Internal Power Dissipation		Conductive Epoxy	P_D	400		mW
		Non-Conductive Epoxy		400		
Maximum Junction Temperature				150	$^{\circ}\text{C}$	
Solder Iron (10Sec)**				350	$^{\circ}\text{C}$	

* Measure θ_{JC} on center of molding compound if IC has no tab.

** MIL-STD-202G 210F

■ Electrical Specifications

$V_{IN} = V_{OUT(NOM)} + 1V$ or $V_{IN} = 2.5V$, if $V_{OUT(NOM)} \leq 2.0V$, $I_{OUT} = 1mA$, $V_{EN} = V_{IN}$ and $C_{OUT} = C_{IN} = 1\mu F$, Typical values at $T_A = 25^\circ C$, unless otherwise noted.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units	
Input Voltage	V_{IN}		(Note1)		5.5	V	
Output Voltage Accuracy	$V_{OUT,ACC}$		-2		2	%	
Output Voltage Range	V_{OUT}		1.2		4.5	V	
Output Current	I_{OUT}		300			mA	
Quiescent Current	I_Q	$V_{IN} = 5.5V, I_{OUT} = 1mA$		70	100	μA	
Dropout Voltage	V_{DROPP}	$I_{OUT} = 300mA$	$V_{OUT} = 2.0V$	(Note2)		mV	
			$2.0V < V_{OUT} < 2.5V$		370		500
			$2.6V < V_{OUT} < 3.0V$		280		400
			$V_{OUT} = 3.1V$		230		330
Output Voltage Line Regulation [$(\Delta V_{OUT} / \Delta V_{IN}) \times 100\%$] / V_{OUT}	REG _{LINE}	$V_{IN(min)} \quad V_{IN} \quad V_{IN(max)}$	1.2V $V_{OUT} < 2.5V$	-0.4	0.1	0.4	% / V
		$V_{IN(min)} \quad V_{IN} \quad V_{IN(max)}$	2.5 $V_{OUT} < 3.3V$	-0.2	0.03	0.2	
		$V_{OUT} + 0.3V \quad V_{IN} \quad V_{IN(max)}$	3.3V $V_{OUT} < 4.5V$	-0.1	0.01	0.1	
Output Voltage Load Regulation [$(\Delta V_{OUT} / V_{OUT}) \times 100\%$] / ΔI_{OUT}	REG _{LOAD}	1mA $I_{OUT} = 300mA$	$V_{OUT} = 3.3V$	-0.003		0.002	% / mA
			2.5V $V_{OUT} < 3.3V$	-0.005		0.004	
			1.2V $V_{OUT} < 2.5V$	-0.015		0.01	
Output Current Limit	I_{LIM}	$V_{OUT} = 0.8 \times V_{OUT(NOM)}$	330	500		mA	
Shutdown Current	I_{SHDN}	$V_{EN} = 0V, V_{IN(min)} \quad V_{IN} = 5.5V$		5	10	μA	
Power Supply Ripple Rejection	PSRR	$f = 1KHz, I_{OUT} = 100mA, C_{out} = 1\mu F$ (Note3)		60		dB	
Enable High (enabled)	$V_{EN(HI)}$	$V_{IN(min)} \quad V_{IN} = 5.5V$	1.4		V_{IN}	V	
Enable Low (shutdown)	$V_{EN(LO)}$	$V_{IN(min)} \quad V_{IN} = 5.5V$	0		0.4	V	
Enable Pin Current (enabled)	I_{EN}	$V_{EN} = V_{IN}$		0.1	1	μA	
Thermal Shutdown Temperature	T_{SHDN}	Shutdown, temperature increasing		150		$^\circ C$	
	T_{RS}	Restore, temperature decreasing		130			

Note 1: $V_{IN(MIN)} = V_{OUT} + V_{DROPP}$ or $V_{IN(MIN)} = 2.5V$, whichever is greater.

Note 2: For V_{OUT} below 2.0V, Dropout Voltage is the input to output differential.

Note 3: For V_{OUT} below 1.5V, the minimum input voltage is 3.0V.

AME8818

■ Detailed Description

The AME8818 is low-dropout, low quiescent-current linear regulator designed primarily for battery-powered applications. It is available with present output voltage ranging from 1.2V to 4.5V, and can supply loads up to 300mA.

■ Shutdown Mode

The AME8818 has enable-control-pin. Drive EN low to shutdown OUT. Drive EN to shutdown the entire chip, reducing supply current to 5 μ A. Connected EN to logic-high or IN for normal operation.

■ Circuit Limit

The AME8818 contains current limiters which monitor and control the pass transistor's Gate voltage, limiting the guaranteed maximum output current to 330mA minimum. The output can be shorted to ground for an indefinite time without damaging the part.

■ Thermal-Overload Protection

Thermal-overload protection limits total power dissipation in the AME8818. When the junction temperature arrive $T_j = 160^{\circ}\text{C}$ approximately, the thermal sensor signals the shutdown logic, turning off the pass transistor and allowing the IC to cool.

■ Capacitor Selection and Regulator Stability

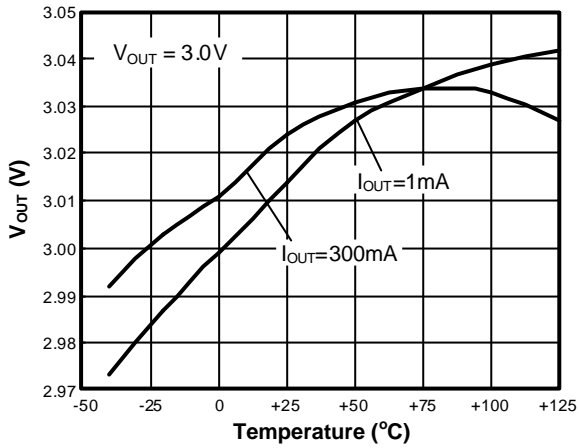
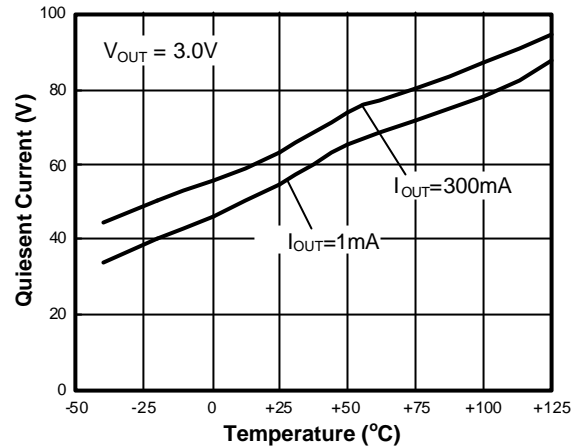
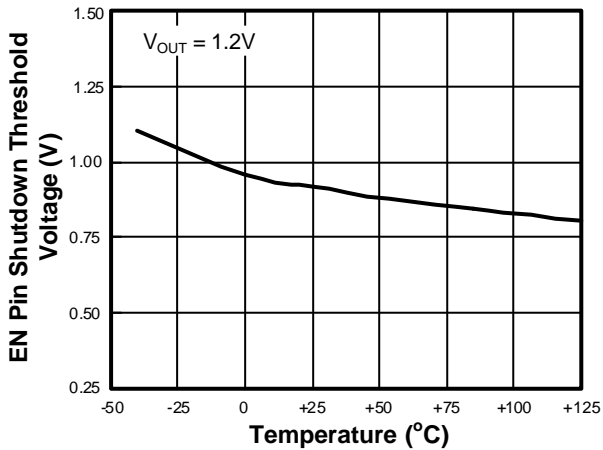
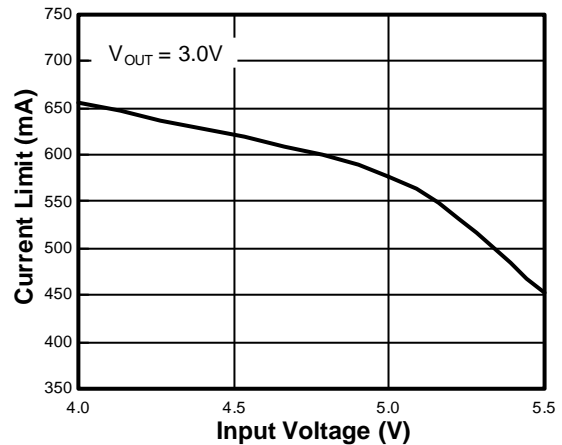
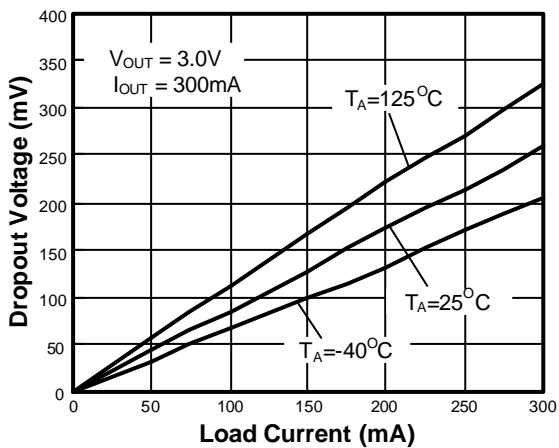
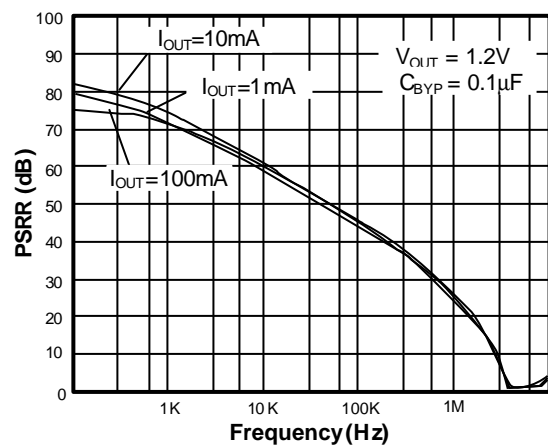
Use a 1 μ F capacitor on the AME8818 input and a 1 μ F capacitor on the OUT. Larger input capacitor values and lower ESR provide better supply noise rejection and line transient response. To reduce output noise and improve load transient voltage dips, use larger output capacitors up to 4.7 μ F. For stable operation over the full temperature range with load currents up to 300mA, input and output capacitors should be a minimum of 1 μ F by X7R.

Note that some ceramic dielectrics large capacitance and ESR variation with temperature. With dielectrics such as Z5U and Y5V, it may be necessary to use 2.2 μ F or more for up to 300mA load current to ensure stability at temperatures below -10°C . With X7R or X5R dielectrics, 1 μ F is sufficient at all operating temperatures. These regulators are optimized for ceramic capacitors. Tantalum capacitors are not recommended.

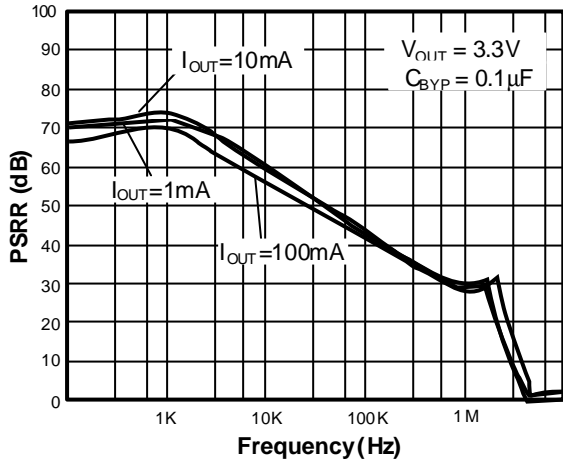
Bypass capacitor can be in between 0.1 μ F~0.001 μ F. A larger capacitor improves AC ripple rejection, but also make the output come up slowly.

■ PSRR and Operation from sources Other than Batteries

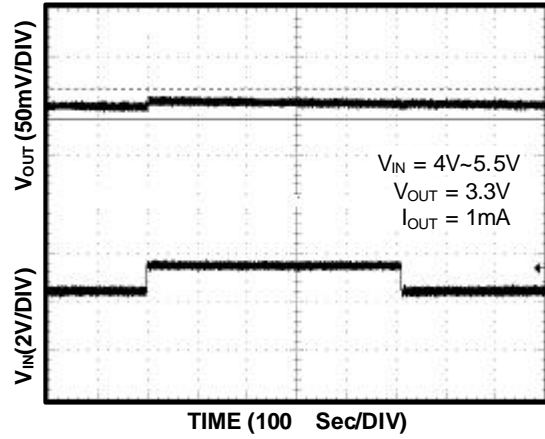
The AME8818 is designed to deliver low-dropout voltage and low quiescent currents in battery-powered system. Power-supply rejection ratio is 60dB (Typ.) at 1KHz. When operating from sources other than batteries, PSRR and transient response can be improved by increasing input, output and bypass capacitors(see PSRR vs Frequency Curve).

V_{OUT} vs. Temperature

Quiescent Current vs Temperature

EN Pin Shutdown Threshold Voltage vs Temperature

Current Limit vs Input Voltage

Dropout Voltage vs Load Current

**AME8818AEEV
Power Supply Rejection Ratio**


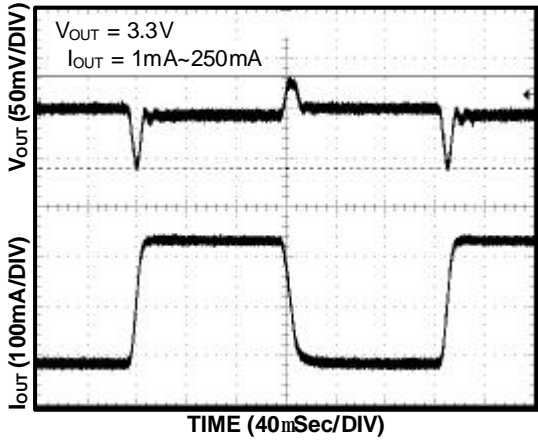
AME8818AEEV
Power Supply Rejection Ratio



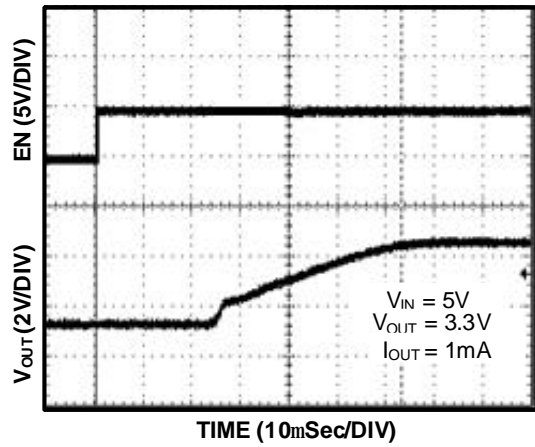
Line Transient Response



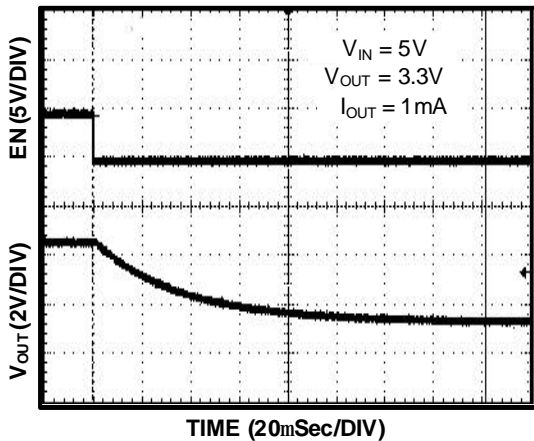
Load Transient Response



AME8818BEEV
Start Up delay time



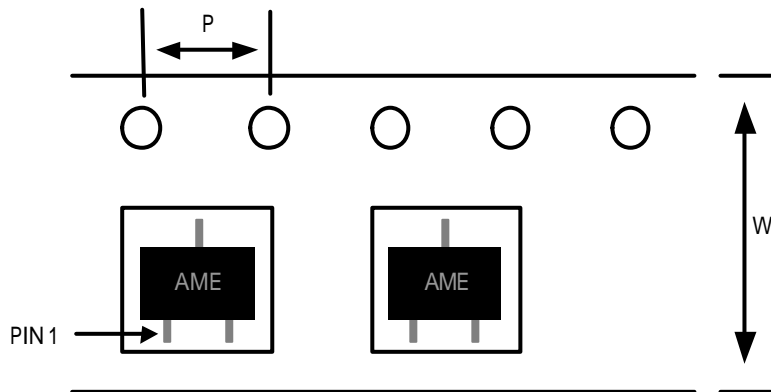
AME8818BEEV
EN Pin shutdown Response



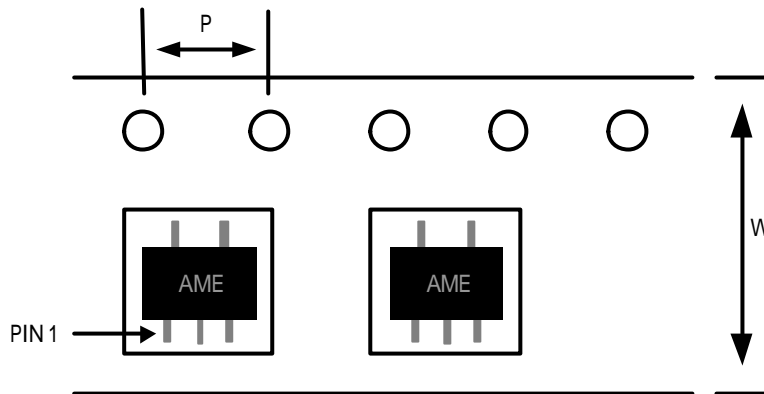
■ Date Code Rule

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

Marking						Year
A	A	A	M	X	X	xxx0
A	A	A	M	X	<u>X</u>	xxx1
A	A	A	M	<u>X</u>	X	xxx2
A	A	A	M	<u>X</u>	<u>X</u>	xxx3
A	A	A	<u>M</u>	X	X	xxx4
A	A	A	<u>M</u>	X	<u>X</u>	xxx5
A	A	A	<u>M</u>	<u>X</u>	X	xxx6
A	A	A	<u>M</u>	<u>X</u>	<u>X</u>	xxx7
A	A	<u>A</u>	M	X	X	xxx8
A	A	<u>A</u>	M	X	<u>X</u>	xxx9

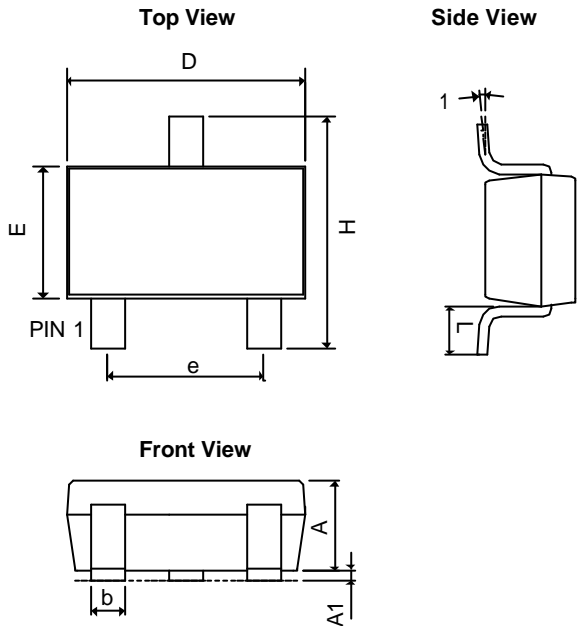
■ Tape and Reel Dimension
SOT-23

Carrier Tape, Number of Components Per Reel and Reel Size

Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
SOT-23	8.0±0.1 mm	4.0±0.1 mm	3000pcs	180±1 mm

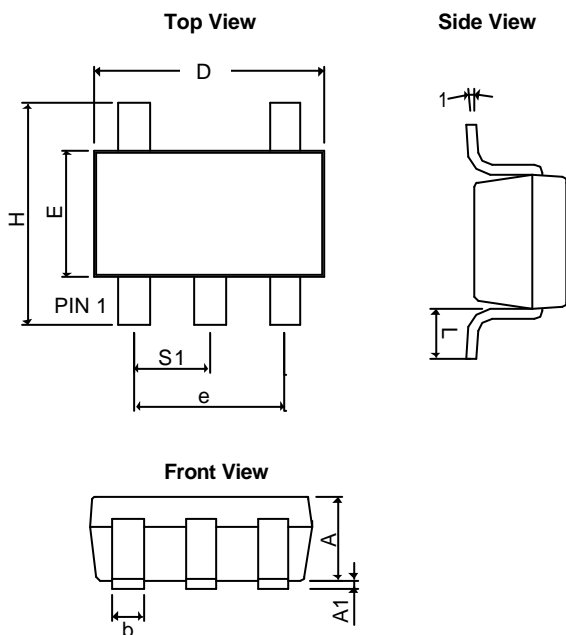
AME8818
■ Tape and Reel Dimension
SOT-25


Carrier Tape, Number of Components Per Reel and Reel Size

Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
SOT-25	8.0±0.1 mm	4.0±0.1 mm	3000pcs	180±1 mm

■ Package Dimension
SOT-23


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.90	1.40	0.0354	0.0551
A ₁	0.00	0.15	0.0000	0.0059
b	0.30	0.50	0.0118	0.0197
D	2.70	3.10	0.1063	0.1220
E	1.40	1.80	0.0551	0.0709
e	1.90 BSC		0.0748 BSC	
H	2.40	3.00	0.0945	0.1181
L	0.35BSC		0.0138BSC	
q1	0°	10°	0°	10°

SOT-25


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.90	1.30	0.0354	0.0512
A ₁	0.00	0.15	0.0000	0.0059
b	0.30	0.55	0.0118	0.0217
D	2.70	3.10	0.1063	0.1220
E	1.40	1.80	0.0551	0.0709
e	1.90 BSC		0.07480 BSC	
H	2.60	3.00	0.10236	0.11811
L	0.37BSC		0.0146BSC	
q1	0°	10°	0°	10°
S ₁	0.95BSC		0.0374BSC	



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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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Document: 1261-DS8818-A.01

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