AME8500 / 8501 **Micropower µP Reset Family**

■ General Description

The AME8500 family allows the user to customize the CPU reset function without any external components. The user has a large choice of reset voltage thresholds, reset time intervals, and output driver configurations, all of which are preset at the factory. Each wafer is trimmed to the customer's specifications.

These circuits monitor the power supply voltage of µP based systems. When the power supply voltage drops below the voltage threshold a reset is asserted immediately (within an interval T_{D1}). The reset remains asserted after the supply voltage rises above the voltage threshold for a time interval, T_{D2}. The reset output may be either active high (RESET) or active low (RESETB). The reset output may be configured as either push/pull or open drain. The state of the reset output is guaranteed to be correct for supply voltages greater than 1V.

The AME8501 includes all the above functionality plus an overtemperature shutdown function. When the ambient temperature exceeds 80^{0}C a reset is asserted and remains asserted until the temperature falls below 60^{0}C.

Space saving SOT23 packages and micropower quiescent current (<3.0µA) make this family a natural for portable battery powered equipment.

■ Features

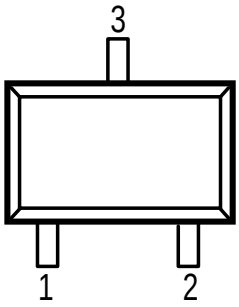
- Small packages: SOT-23, SOT-89
- 11 voltage threshold options
- Tight voltage threshold tolerance ---±1.50%
- 4 reset interval options
- 4 output configuration options
- Wide temperature range -------- -40^{o}C to 85^{o}C
- Low temperature coefficient --- 100ppm/^{o}C (max)
- Low quiescent current < 3.0µA
- Thermal shutdown option (AME8501)

■ Applications

- Portable electronics
- Power supplies
- Computer peripherals
- Data acquisition systems
- Applications using CPUs
- Consumer electronics

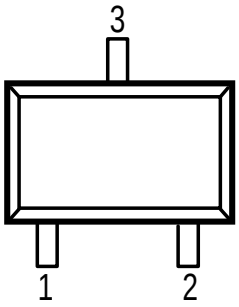
■ Pin Configuration

AME8500AEET
AME8501AEET



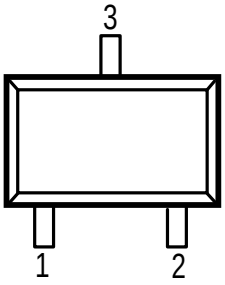
1: GND
2: Reset/ResetB
3: V_{DD}

AME8500BEET
AME8501BEET



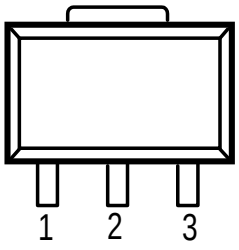
1: Reset/ResetB
2: GND
3: V_{DD}

AME8500CEET
AME8501CEET



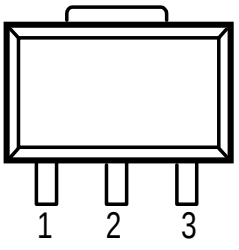
1: Reset/ResetB
2: V_{DD}
3: GND

AME8500AEFT
AME8501AEFT



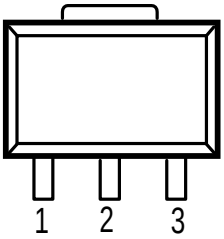
1: GND
2: V_{DD}
3: Reset/ResetB

AME8500BEFT
AME8501BEFT



1: Reset/ResetB
2: V_{DD}
3: GND

AME8500CEFT
AME8501CEFT



1: V_{DD}
2: GND
3: Reset/ResetB

■ Ordering Information

AME8500xEET X X XX (SOT-23)
AME8501xEET X X XX (SOT-23)
AME8500xEFT X X XX (SOT-89)
AME8501xEFT X X XX (SOT-89)

VDD Threshold Voltage (V_{TH})

21: V_{TH}=2.1V
24: V_{TH}=2.4V
26: V_{TH}=2.63V
27: V_{TH}=2.7V
28: V_{TH}=2.8V
29: V_{TH}=2.93V
31: V_{TH}=3.08V
40: V_{TH}=4.0V
42: V_{TH}=4.20V
44: V_{TH}=4.38V
46: V_{TH}=4.63V

note: Please contact AME sales dept. for other voltage options.

Reset Time (TD_{2NOM})

A: T_D=1.5mS
D: T_D=30mS
E: T_D=150mS
F: T_D=210mS

Output Driver Option

	characteristic of RESET or RESETB pin	
	Polarity	*
A:	RESETB	PP
B:	RESETB	OD
C:	RESET	PP
D:	RESET	OD

--For example--
AME8500AEETAF27 means:
Output is RESETB, push pull
Reset time is 210mS
V_{DD} threshold voltage is 2.7V
No temperature shutdown

* Output Driver Chart Explanation:
PP = Push pull output
OD = Open drain output
Polarity
RESET = Active high

Note: AME8500 without over-temperature thermal shutdown function.
AME8501 with over-temperature thermal shutdown function.

■ Absolute Maximum Ratings

Parameter	Maximum	Unit
Supply Voltage	7	V
ESD Classification	B	
Input Current, V_{DD}	20	mA
Output Current, RESET, ResetB	20	mA
Rate of Rise, V_{DD}	100	V/μs

■ Recommended Operating Conditions

Parameter	Rating
Supply Voltage	1.6 - 5 V
Ambient Temperature Range	-40 to +85 ^{o}C
Junction Temperature	-40 to +125 ^{o}C
Storage Temperature	-65 to 150 ^{O}C

■ Thermal Information

Parameter	Maximum	Unit
Thermal Resistance (SOT-23)	325	^{o}C/W
Thermal Resistance (SOT-89)	180	
Power Dissipation (SOT-23)	350	mW
Power Dissipation (SOT-89)	650	
Maximum Junction Temperature	150	^{o}C
Maximum Lead Temperature (10 Sec)	300	^{o}C

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

■ Electrical Specifications

T_A = 25^o C unless otherwise noted

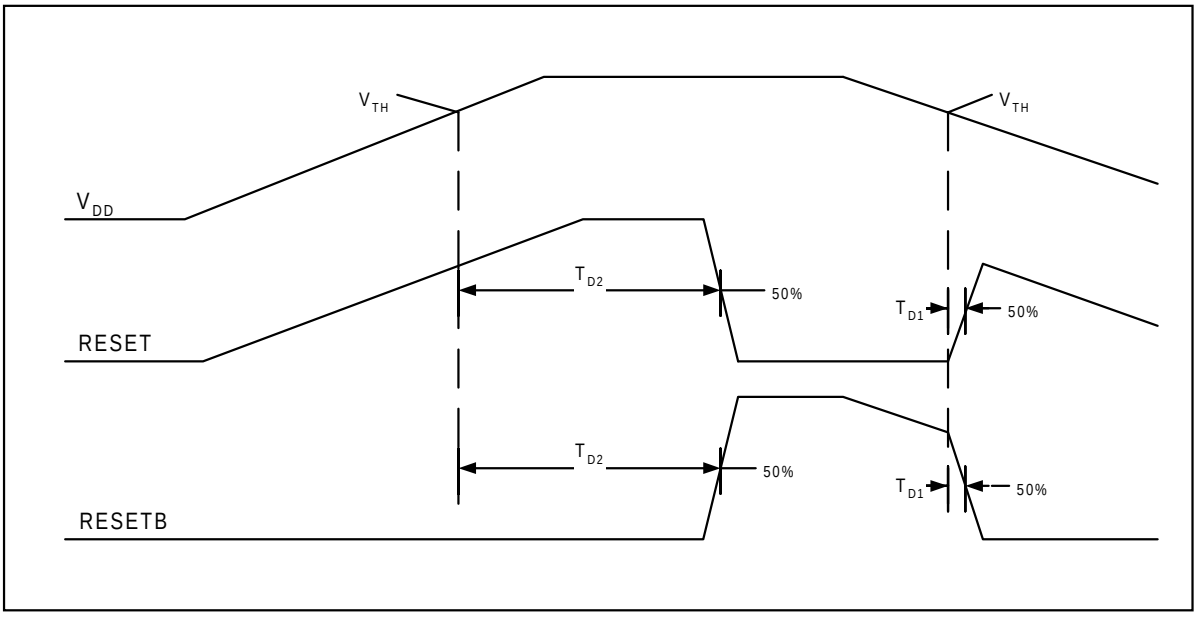
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNITS
V_{DD} Range*	V_{RANGE}			1		5.5	V
		TA=-40~85^{O}C		1		5.5	
Supply Current	I_{DD}	V_{DD}=3.0V				3.0	µA
		V_{DD}=3.0V, TA=-40~85^{O}C				5.0	
Reset Threshold	V_{TH}			V_{THNOM}-1.5%		V_{THNOM}+1.5%	mV
		TA=-40~85^{O}C		V_{THNOM}-2.0%		V_{THNOM}+2.0%	
Hysteresis Range	V_{HYST}	$V_{Release}$ - V_{TH}, note1			20		mV
RESET Threshold Tempco					30		ppm
RESETB Output Voltage Low	V_{OL}	V_{DD}<Vth min	I_{SINK}=1.2mA, TA= -40~85^{O}C			0.5	V
RESET Output Voltage Low		V_{DD}>Vth max					
RESETB Output Voltage High	V_{OH}	V_{DD}>Vth max	I_{SOURCE}=0.5mA, TA= -40~85^{O}C	0.8V_{DD}			V
RESET Output Voltage High		V_{DD}<Vth min					
V_{DD} to Reset Delay	T_{D1}	V_{DD}= V_{TH} - 100mV, TA= -40 ~ 85^{O}C			40	200	µS
Reset Timeout Period*	T_{D2}	TA= -40 ~ 85^{O}C	Version A	0.5	1.5	5	mS
			Version D	15	30	50	mS
			Version E	80	150	230	mS
			Version F	140	210	500	mS
Temperature Shutdown	T_{OFF}	AME8501 only			80		^{o}C
Temperature Shutdown Hysteresis	T_{HYS}	AME8501 only			20		^{o}C

Note1: The data based on V_{TH}=2.7V part type.

■ AME8500/01 pin description

Name	Description
GND	Ground
RESETB/ RESET	This pin can be ordered as RESET or RESETB. RESET is active high. RESETB is active low. It is also available with an open drain or pushpull output.
V_{DD}	Positive power supply. A reset is asserted after this voltage drops below a predetermined level. After V_{DD} rises above that level the reset output remains asserted until the end of the reset timeout period.

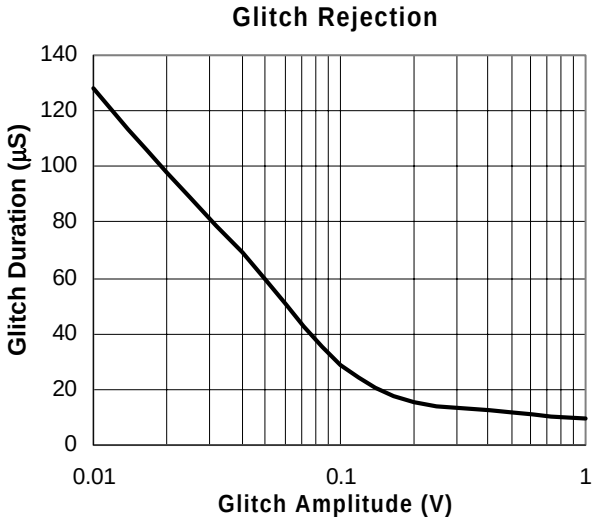
Timing Diagram



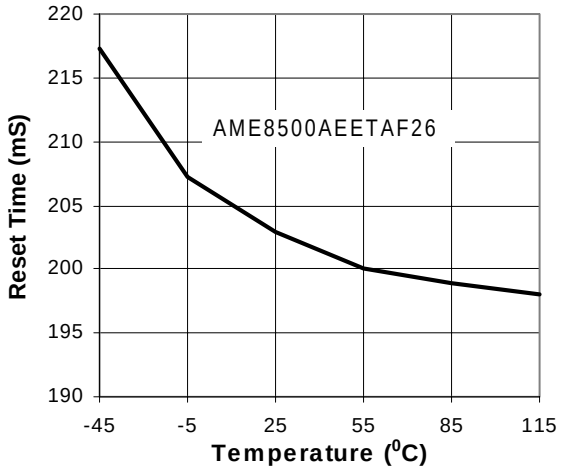
Applications information

Supply Transients

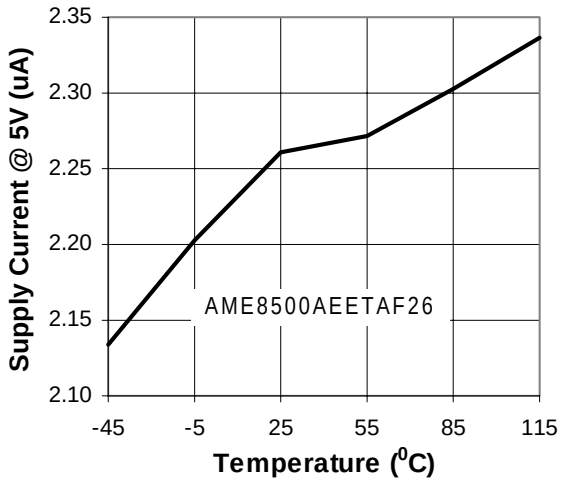
These devices have a certain immunity to fast negative going transients. In the following pages the graph titled “Glitch Rejection” indicates the maximum allowable glitch amplitude and duration to avoid triggering an unintended reset. As shown in the graph shorter transients can have larger amplitudes without triggering resets.



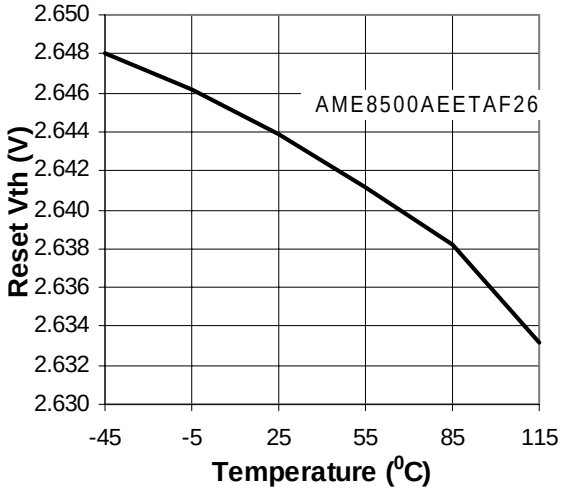
Reset Time vs. Temperature



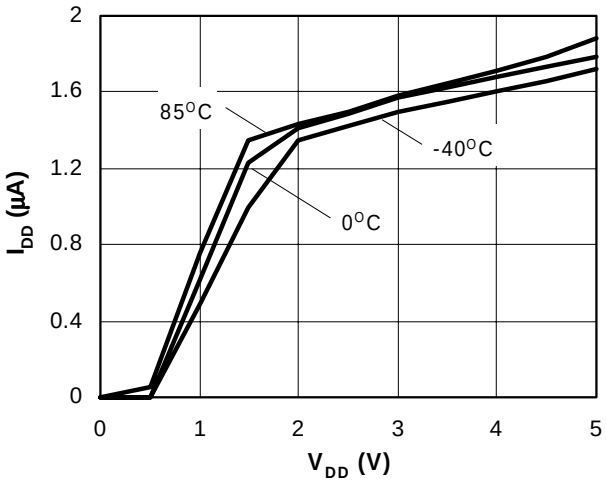
I_{DD} vs. Temperatrue



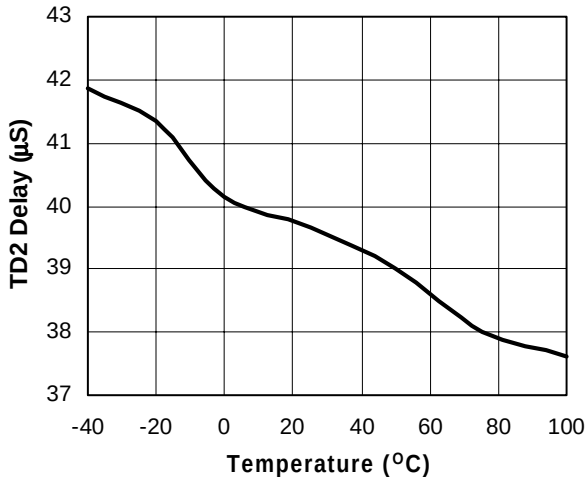
Reset Vth vs. Temperature



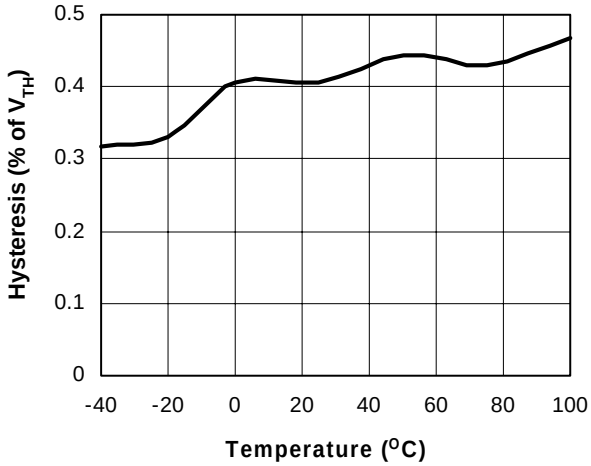
I_{DD} vs. V_{DD}

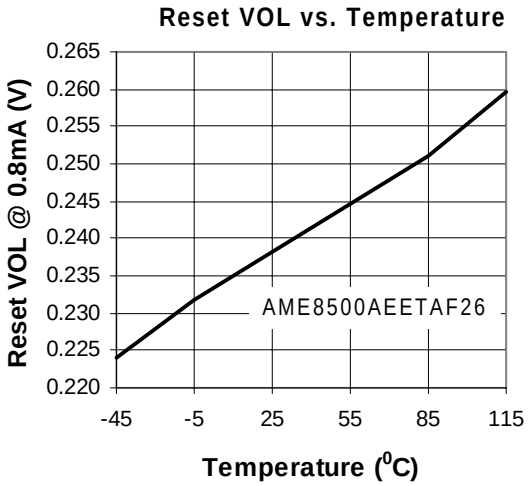


TD1 Delay vs. Temperature



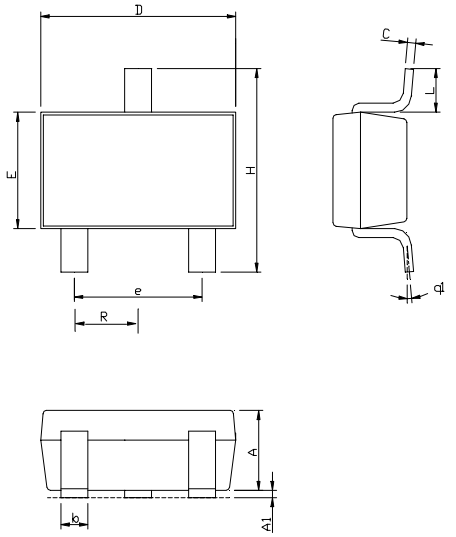
Threshold Hysteresis vs. Temperature




Reset VOL vs. Temperature
Reset VOL @ 0.8mA (V)
0.265
0.260
0.255
0.250
0.245
0.240
0.235
0.230
0.225
0.220
AME8500AEETAF26
-45
-5
25
55
85
115
Temperature (0C)

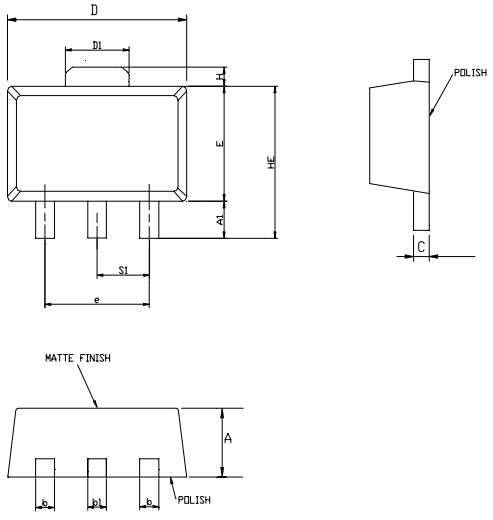
■ Package Dimension

SOT-23



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.00	1.40	0.0394	0.0551
A_1	0.00	0.15	0.0000	0.0059
A_2	0.70	1.25	0.0276	0.0492
b	0.35	0.50	0.0138	0.0197
C	0.09	0.25	0.0035	0.0098
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	2.60	3.00	0.1024	0.1181
L	0.35	0.55	0.0138	0.0197
θ1	0^o	9^o	0^o	9^o

SOT-89



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.40	1.60	0.0551	0.0630
A_1	0.89	-	0.0350	-
b	0.36	0.52	0.0142	0.0205
b_1	0.41	0.56	0.0161	0.0220
C	0.35	0.44	0.0138	0.0173
D	4.40	4.60	0.1732	0.1811
D_1	1.35	1.83	0.0531	0.0720
HE	-	4.25	-	0.1673
E	2.29	2.60	0.0902	0.1024
e	2.90	3.10	0.1142	0.1220
H	0.35	0.70	0.0138	0.0276
S1	1.40	1.60	0.0551	0.0630

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