ASM1834, ASM1834A, ASM1834D

Dual 5 V and 3.3 V μP Power Supply Supervisor with Manual Reset

ON Semiconductor®

Description

The ASM1834 supervisors simultaneously monitor both 3.3 V and 5 V power sources and generate reset signals when either supply is out of tolerance. When an out−of−tolerance condition is detected, the output−reset signal of the affected supply becomes active and resets the system microprocessor/microcontroller. On power−up and after the supply voltage returns to an in−tolerance condition, the reset signal remains active for approximately 350 ms. This allows the power supply and system microprocessor to stabilize.

Tolerance levels are independently selectable for both supplies. Tolerance options are 5% and 10% for the 5 V supply and 10% and 20% for the 3.3 V supply.

The ASM1834 and ASM1834D have push−pull reset output stages. The ASM1834A reset outputs are open drain devices that can both be connected to either 5 V or 3.3 V supply. The ASM1834 and ASM1834A have active LOW reset outputs. The ASM1834D has active HIGH reset outputs.

All devices can generate reset signals through an internally debounced pushbutton reset input that affects both reset outputs.

All devices operate over the extended industrial temperature range. Devices are available in 8−pin DIP, surface mount 8−pin SO and 8−Pin MicroSO packages. Die are also available.

Features

- Monitors 5 V and 3.3 V Supplies Simultaneously
- 5 V and 3.3 V Power−on Reset
- 350 ms Reset Time
- Debounced Pushbutton Reset Input
- Push−pull CMOS Output
  ASM1834, ASM1834D
  Eliminates External Pull−up Resistors
  Active LOW (ASM1834), HIGH (ASM1834D)
- Open Drain Output
  ASM1834A
  Active LOW
- Selectable 5 V and 3.3 V Trip Point Tolerance
- Internal Power Drawn from Highest Input Voltage, 5 V or 3.3 V
- Precision Temperature−compensated Voltage Reference and Comparator
- Low Cost Surface Mount SO, Compact MicroSO and DIP Packages
- Wide Operating Temperature: −40°C to +85°C
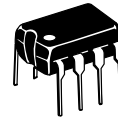
Package	Suffix	Case
PDIP−8	NO SUFFIX	CASE 646AA
MICRO−8	U SUFFIX	CASE 846AA
SOIC−8	S SUFFIX	CASE 751BD

PIN CONFIGURATION

Pin	ASM1834 / ASM1834A / ASM1834D	Pin
5V$_{IN}$	1	3.3V$_{IN}$
$\overline{5V\ RESET}$*		3.3V RESET*
5V TOL		3.3V TOL
GND		PBRST

(Top View)
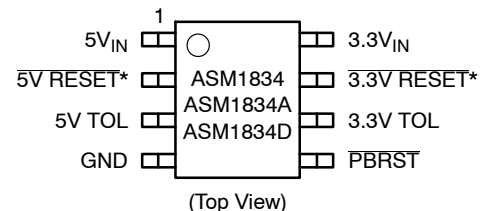
*AS1834D reset outputs are active HIGH (5V RESET and 3.3V RESET) Outputs are open−drain for AS1834A.

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 11 of this data sheet.

Applications

- Microprocessors
- PDAs, Hand−held PCs
- Embedded Controllers
- Telecommunication Systems
- Power Supplies
- Wireless / Cellular Systems
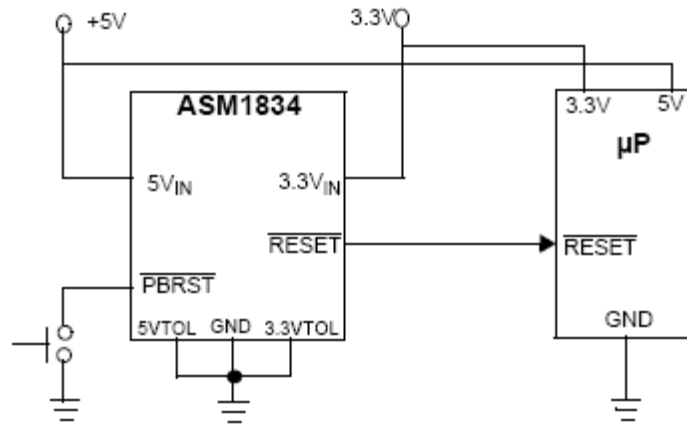- Networking Hardware

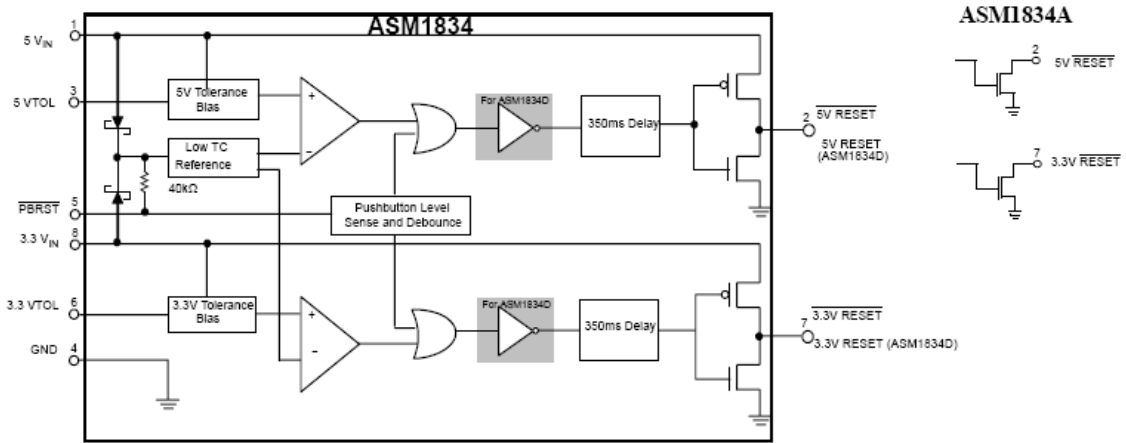# ASM1834, ASM1834A, ASM1834D

Figure 1. Typical Operating Circuit

Figure 2. Block Diagram

ASM1834, ASM1834A, ASM1834D

Table 1. PIN DESCRIPTION

Pin #	Pin Name	Function
1	$5V_{IN}$	5 V power supply input.
2	$\overline{\text{5V RESET}}$ 5V RESET	5 V reset output (Active LOW, ASM1834, ASM1834A. Open drain outputs for ASM1834A). 5 V reset output (Active HIGH, AS1834D).
3	5V TOL	5 V input tolerance select: 10% tolerance for 5VTOL = 5 V_{IN} and 5% tolerance for 5VTOL = GND
4	GND	Ground.
5	$\overline{\text{PBRST}}$	Debounced manual pushbutton reset input (40 kΩ internal pull–up).
6	3.3V TOL	3.3 V input tolerance select: 20% tolerance for 3.3VTOL = 3.3 V_{IN} and 10% tolerance for 3.3VTOL = GND.
7	$\overline{\text{3.3V RESET}}$ 3.3V RESET	3.3 V reset output (Active LOW, ASM1834, ASM1834A. Open drain outputs for ASM1834A). 3.3 V reset output (Active HIGH, ASM1834D).
8	$3.3V_{IN}$	3.3 V power supply input.

Table 2. ABSOLUTE MAXIMUM RATINGS

Parameter		Min	Max	Unit
Voltage on V_{CC} (Note 1)		−0.5	7	V
Voltage on $\overline{\text{5V RESET}}$ (Note 1)		−0.5	$+5V_{IN}$ + 0.5 V	V
Voltage on $\overline{\text{3.3V RESET}}$ (Note 1)		−0.5	$+3.3V_{IN}$ + 0.5 V	V
Voltage on $\overline{\text{PBRST}}$ and reset outputs (Note 1)		−0.5	($+5V_{IN}$ + 0.5 V) or ($+3.3V_{IN}$ + 0.5 V) whichever is greater	V
Operating Temperature Range		−40	+85	°C
Soldering Temperature (for 10 sec)			+260	°C
Storage Temperature		−55	+125	°C
ESD rating	HBM		2	KV
	MM		200	V

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.
1. Voltages are measured with respect to ground.

Table 3. RECOMMENDED DC OPERATING CONDITIONS (Recommended DC operating condition over the operating temperature range of −40°C to +85°C. All voltages are referenced to ground.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
5 V Supply Voltage	$5V_{IN}$		1.2		5.5	V
3.3 V Supply Voltage	$3.3V_{IN}$		1.2		5.5	V
$\overline{PBRST}$ Input High Level	V_{IH}		2		$V_{INMAX} + 0.3$	V
$\overline{PBRST}$ Input High Level	V_{IH}	Both $3.3V_{IN}$ and $5V_{IN} \geq 2.7$ V	$V_{INMAX} - 0.4$			V
$\overline{PBRST}$ Input Low Level	V_{IL}	Both $3.3V_{IN}$ and $5V_{IN} \leq 2.7$ V	−0.3		0.5	V

Table 4. DC ELECTRICAL CHARACTERISTICS (Unless otherwise noted, V_{IN} = 1.2 V to 5.5 V and specifications are over the operating temperature range of −40°C to +85°C. (Note: $3.3V_{IN}$ is always $\leq 5V_{IN}$))

| Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Current	I_{OH}	Output = 2.4 V. Either $3.3V_{IN}$ or $5.5V_{IN} \geq 2.7$ V (ASM1834/1834D only)		350		μA
Output Current	I_{OL}	Output = 0.4 V. Either $3.3V_{IN}$ or $5.5V_{IN} \geq 2.7$ V (ASM1834/1834D only)	10			mA
Output Voltage	V_{OH}			$V_{IN} - 0.1V$		V
Input Leakage	I_{IL}		−1.0		+1.0	μA
5 V Operating Current	I_{CC}	$3.3V_{IN}$ and $5V_{IN} \leq 5.5$ V, RESET outputs open.		16	30	μA
3.3 V Operating Current	I_{CC}	$3.3V_{IN}$ and $5V_{IN} \leq 3.6$ V, RESET outputs open.		12	25	μA
5 V Trip Point	V_{INTP}	5VTOL = GND	4.50	4.63	4.75	V
5 V Trip Point	V_{INTP}	5VTOL = $5V_{IN}$	4.25	4.38	4.49	V
3.3 V Trip Point	V_{INTP}	3.3VTOL = GND	2.80	2.88	2.97	V
3.3 V Trip Point	V_{INTP}	3.3VTOL = $3.3V_{IN}$	2.47	2.55	2.64	V
Output Capacitance	C_{OUT}				10	pF
$\overline{PBRST}$ Manual Reset Minimum Low Time	t_{PB}		2			ms
$\overline{PBRST}$ Stable LOW to reset Active	t_{PDLY}				2	ms
Reset Active Time	t_{RST}		200	350	500	ms
V_{CC} Slew Rate	t_F	$V_{INTP}(MAX)$ to $V_{INTP}(MIN)$	300			μs
V_{CC} Slew Rate	t_R	$V_{INTP}(MIN)$ to $V_{INTP}(MAX)$	0			ns
V_{CC} Detect to RESET or $\overline{RESET}$	t_{RPU}	t_{rise} = 5 μs	200	350	500	ms
V_{CC} Detect Noise Immunity	t_{RPD}				2	μs

ASM1834, ASM1834A, ASM1834D

Detailed Description

Operation Power Monitor

The ASM1834 supervisors simultaneously detect out−of−tolerance power supply conditions on both 3.3 V and 5 V power supplies. If the voltages at $5V_{IN}$ or $3.3V_{IN}$ are outside the tolerance band, the reset for the falling supply voltage becomes active. When the monitored supply returns to an intolerance state, the reset remains active for approximately 350 ms before returning to the inactive state.

On power−up, the reset signals are kept active for approximately 350 ms after the power supply voltages have reached the selected tolerance. This allows the power supply and microprocessor to stabilize before the reset is removed.

All supply current for the ASM1834 devices is drawn from the input ($5V_{IN}$ or $3.3V_{IN}$) with the highest voltage level. The outputs draw current from their input supplies $5V_{IN}$ and $3.3V_{IN}$.
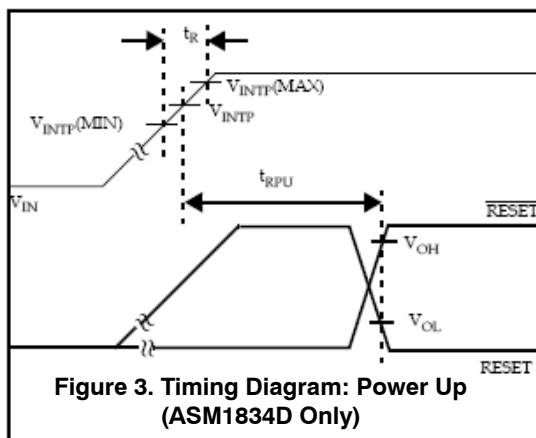
Figure 3. Timing Diagram: Power Up (ASM1834D Only)
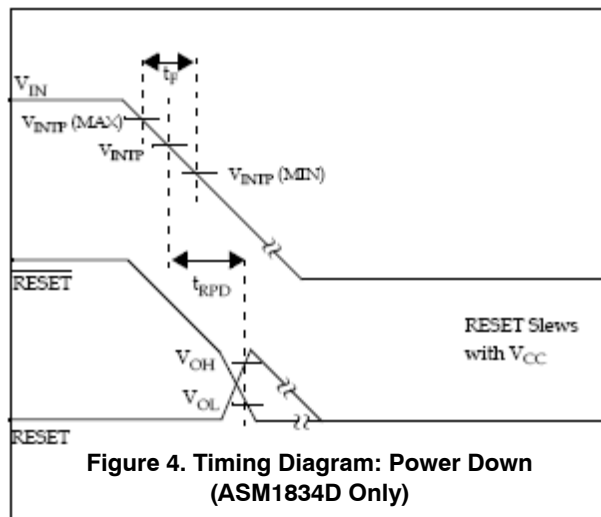
Figure 4. Timing Diagram: Power Down (ASM1834D Only)

Reset Signal Polarity and Output Stage Structure

The ASM1834 and the ASM1834A supervisors have active LOW reset signals. The ASM1834D reset outputs are active HIGH.

The ASM1834 and the ASM1834D have CMOS push−pull output stages. The ASM1834A has open drain reset outputs.

Table 5.

Part #	RESET Polarity	Output Stage Configuration
ASM1834	LOW	Push−Pull
ASM1834U	LOW	Push−Pull
ASM1834S	LOW	Push−Pull
ASM1834A	LOW	Open Drain
ASM1834AU	LOW	Open Drain
ASM1834AS	LOW	Open Drain
ASM1834D	HIGH	Push−Pull
ASM1834DU	HIGH	Push−Pull
ASM1834DS	HIGH	Push−Pull

### Manual Reset Operation

Push−button switch input, $\overline{PBRST}$, allows the user to override the internal trip point detection circuits and issue reset signals. The pushbutton input is debounced and is pulled HIGH through an internal 40 kΩ resistor.

When at least one of the reset outputs is not asserted, a push button initiated reset signal can be issued by holding $\overline{PBRST}$ LOW for at least 2 ms. When $\overline{PBRST}$ is held LOW, both resets become active and remain active for approximately 350 ms after $\overline{PBRST}$ returns HIGH. (See *Figures 5* and *6*.)

Figure 5. Pushbutton Reset
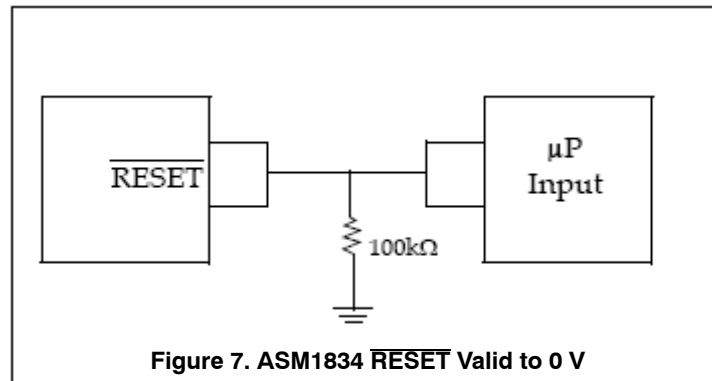

Figure 6. Timing Diagram: Pushbutton Reset
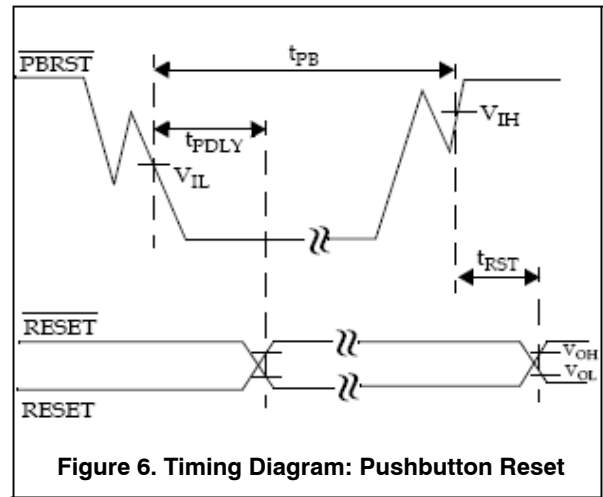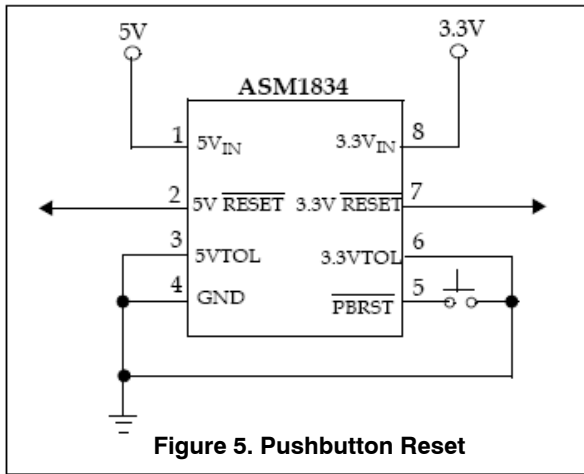
Reset Output Signal

Reset output signals are valid as long as either voltage at $5V_{IN}$ or $3.3V_{IN}$ is above 1.2 V. In addition, the ASM1834 has push−pull outputs that can remain valid below a 1.2 V input level. To sink current below 1.2 V, a resistor should be connected from the $\overline{RESET}$ output to ground. This resistor guarantees a valid reset signal down to 0 V. A 100 kΩ value is suggested.
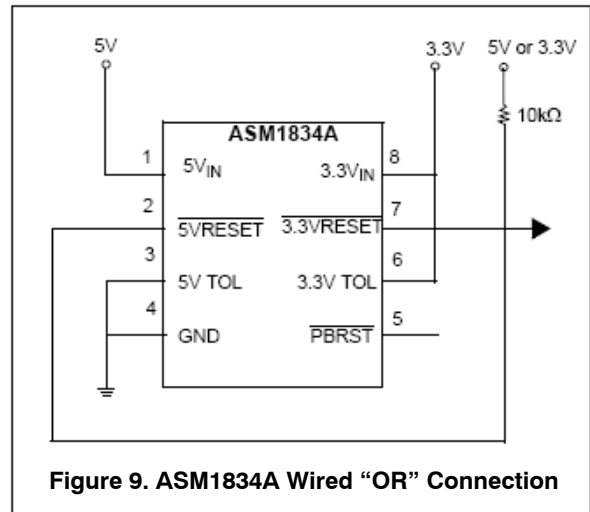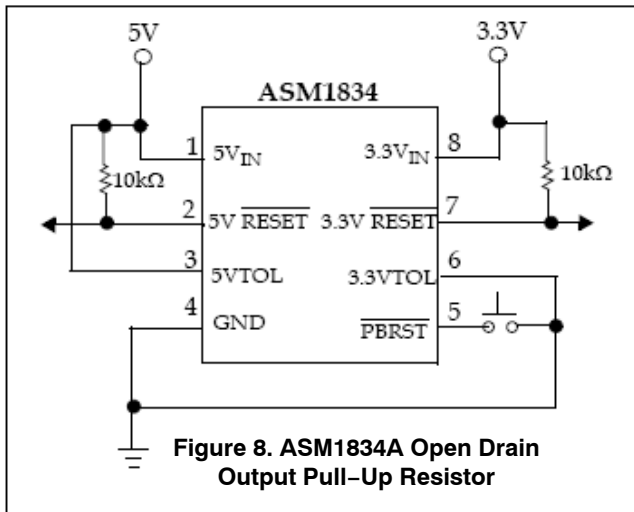
The AS1834A open drain reset outputs require pull−up resistors and must be low enough in value to pull the output into a HIGH state. Resistor value is not critical in most applications and a value of 10 kΩ is suggested. (See *Figures 7* and *8*.)

The ASM1834A open drain reset outputs can be connected to the same potential through a single pull−up resistor. In this configuration a failure on either supply will generate an active LOW reset. If the inputs are pulled−up to different voltages, the reset outputs (pin 2 and pin 7) cannot be connected to form a wired "AND" (see *Figure 9*).

Figure 7. ASM1834 $\overline{RESET}$ Valid to 0 V

Figure 8. ASM1834A Open Drain Output Pull–Up Resistor

Figure 9. ASM1834A Wired "OR" Connection

Trip Point Tolerance Selection

The 3.3VTOL and 5VTOL inputs allow independent selection of the reset trip points. If 5VTOL is connected to the 5 V supply input, a 10% tolerance is selected. If 5VTOL is grounded, a 5% tolerance is selected.

If 3.3VTOL is connected to the 3.3 V supply input, a 20% tolerance is selected. If 3.3VTOL is grounded, a 10% tolerance is selected. (Refer to Table 6.) The 3.3VTOL and 5VTOL tolerance select inputs should be tied to the ground or to the respective input supply voltage pin, $3.3V_{IN}$ or $5V_{IN}$.

Table 6.

Tolerance Select	3.3 V Input				5 V Input			
	3.3 V Tolerance	TRIP Point (V)			5 V Tolerance	TRIP Point (V)		
		Min	Nom	Max		Min	Nom	Max
5VTOL = $5V_{IN}$					10%	4.25	4.38	4.49
5VTOL = GND					5%	4.5	4.63	4.75
3.3VTOL = $3.3V_{IN}$	20%	2.47	2.55	2.64				
3.3VTOL = GND	10%	2.80	2.88	2.97				

PACKAGE DIMENSIONS

Micro8™/TSSOP8 3x3
CASE 846AA–01
ISSUE O
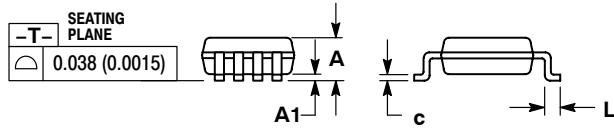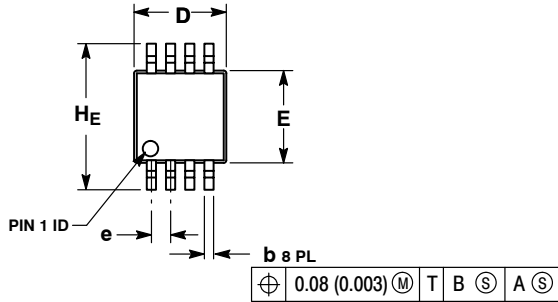
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
5. 846A–01 OBSOLETE, NEW STANDARD 846A–02.

PIN 1 ID

$\oplus$ | 0.08 (0.003) Ⓜ | T | B Ⓢ | A Ⓢ

b 8 PL

SEATING PLANE
–T–
△ | 0.038 (0.0015)

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	––	––	1.10	––	––	0.043
A1	0.05	0.08	0.15	0.002	0.003	0.006
b	0.25	0.33	0.40	0.010	0.013	0.016
c	0.13	0.18	0.23	0.005	0.007	0.009
D	2.90	3.00	3.10	0.114	0.118	0.122
E	2.90	3.00	3.10	0.114	0.118	0.122
e	0.65 BSC			0.026 BSC		
L	0.40	0.55	0.70	0.016	0.021	0.028
H_E	4.75	4.90	5.05	0.187	0.193	0.199

SOLDERING FOOTPRINT*

8X $\frac{1.04}{0.041}$ $\frac{0.38}{0.015}$ 8X

$\frac{3.20}{0.126}$ $\frac{4.24}{0.167}$ $\frac{5.28}{0.208}$

6X $\frac{0.65}{0.0256}$

SCALE 8:1 $\left(\frac{mm}{inches}\right)$
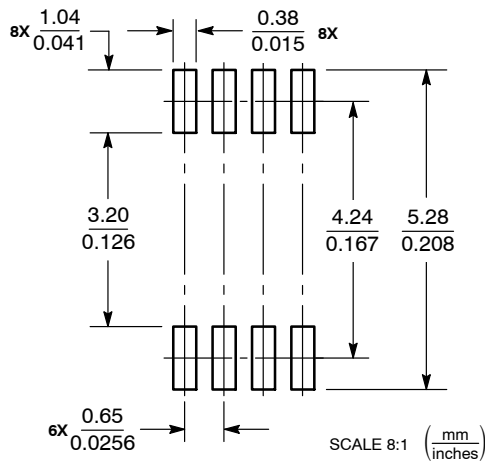
*For additional information on our Pb–Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

ASM1834, ASM1834A, ASM1834D

PACKAGE DIMENSIONS

PDIP−8, 300 mils
CASE 646AA−01
ISSUE A
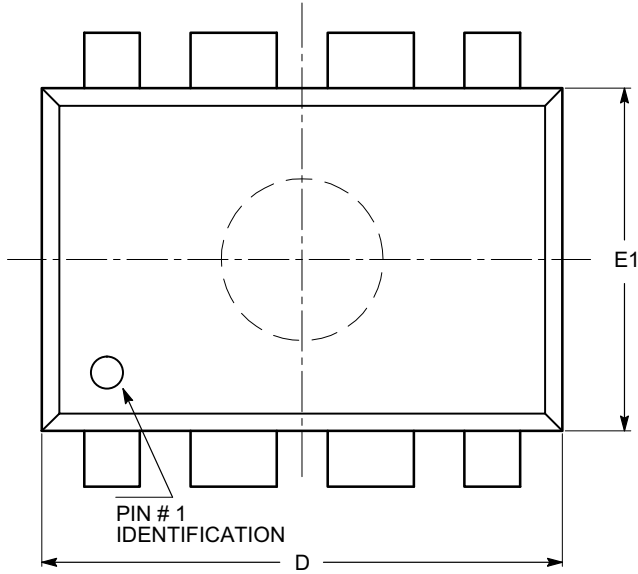
SYMBOL	MIN	NOM	MAX
A			5.33
A1	0.38		
A2	2.92	3.30	4.95
b	0.36	0.46	0.56
b2	1.14	1.52	1.78
c	0.20	0.25	0.36
D	9.02	9.27	10.16
E	7.62	7.87	8.25
E1	6.10	6.35	7.11
e	2.54 BSC		
eB	7.87		10.92
L	2.92	3.30	3.80

PIN # 1
IDENTIFICATION
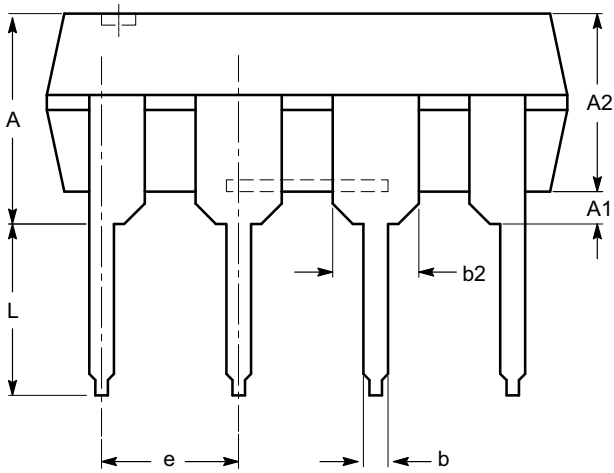
TOP VIEW

SIDE VIEW

END VIEW

Notes:

(1) All dimensions are in millimeters.
(2) Complies with JEDEC MS-001.

ASM1834, ASM1834A, ASM1834D

PACKAGE DIMENSIONS

SOIC 8, 150 mils
CASE 751BD−01
ISSUE O

TOP VIEW

PIN # 1
IDENTIFICATION
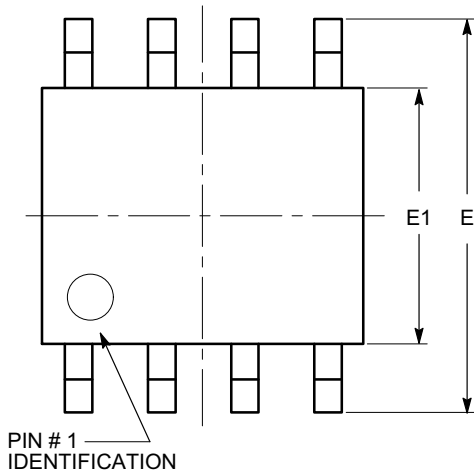
SYMBOL	MIN	NOM	MAX
A	1.35		1.75
A1	0.10		0.25
b	0.33		0.51
c	0.19		0.25
D	4.80		5.00
E	5.80		6.20
E1	3.80		4.00
e		1.27 BSC	
h	0.25		0.50
L	0.40		1.27
θ	0°		8°
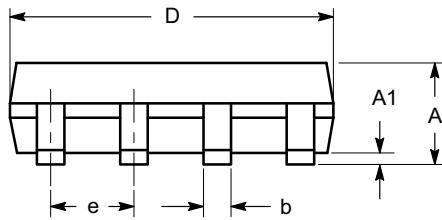
SIDE VIEW
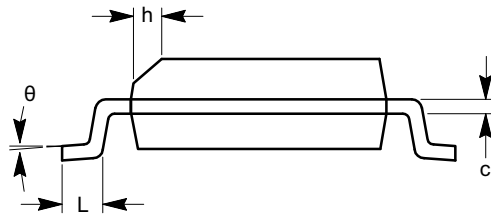
END VIEW

Notes:

(1) All dimensions are in millimeters. Angles in degrees.
(2) Complies with JEDEC MS-012.

Table 7. ORDERING INFORMATION

Part Number (Note 2)	Reset Polarity	Operating Temperature Range	Output Stage	Package	Package Marking
TIN − LEAD DEVICES					
ASM1834	LOW	−40°C TO +85°C	Push−Pull	8−DIP	ASM1834
ASM1834U	LOW	−40°C TO +85°C	Push−Pull	MicroSO	ASM1834U
ASM1834S	LOW	−40°C TO +85°C	Push−Pull	8−SO	ASM1834S
ASM1834A	LOW	−40°C TO +85°C	Open Drain	8−DIP	ASM1834A
ASM1834AU	LOW	−40°C TO +85°C	Open Drain	MicroSO	ASM1834AU
ASM1834AS	LOW	−40°C TO +85°C	Open Drain	8−SO	ASM1834AS
ASM1834D	HIGH	−40°C TO +85°C	Push−Pull	8−DIP	ASM1834D
ASM1834DU	HIGH	−40°C TO +85°C	Push−Pull	MicroSO	ASM1834DU
ASM1834DS	HIGH	−40°C TO +85°C	Push−Pull	8−SO	ASM1834DS
LEAD FREE DEVICES					
ASM1834F	LOW	−40°C TO +85°C	Push−Pull	8−DIP	ASM1834F
ASM1834UF	LOW	−40°C TO +85°C	Push−Pull	MicroSO	ASM1834UF
ASM1834SF	LOW	−40°C TO +85°C	Push−Pull	8−SO	ASM1834SF
ASM1834AF	LOW	−40°C TO +85°C	Open Drain	8−DIP	ASM1834AF
ASM1834AUF	LOW	−40°C TO +85°C	Open Drain	MicroSO	ASM1834AUF
ASM1834ASF	LOW	−40°C TO +85°C	Open Drain	8−SO	ASM1834ASF
ASM1834DF	HIGH	−40°C TO +85°C	Push−Pull	8−DIP	ASM1834DF
ASM1834DUF	HIGH	−40°C TO +85°C	Push−Pull	MicroSO	ASM1834DUF
ASM1834DSF	HIGH	−40°C TO +85°C	Push−Pull	8−SO	ASM1834DSF

2. For parts to be packed in Tape and Reel, add "-T" at the end of the part number.