

■ General Description

The AME8504 family allows the user to customize the CPU reset function without any external components. The user has several choices of reset voltage thresholds, reset time intervals, and output driver configurations, all of which are preset at the factory.

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. The state of the reset output is guaranteed to be correct only when supply voltage is greater than 1V.

The AME8504 also provides a reset manually by pulling the MRB input to ground. Space saving SC-70 package and micropower quiescent current ($<3.0\mu A$) make this family a natural for portable battery powered equipment.

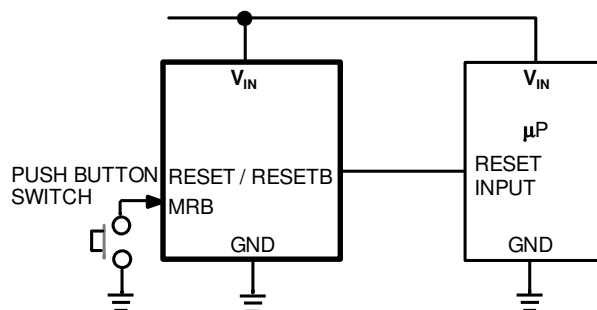
■ Features

- Internally Fixed Threshold 1.2V to 4.5V in 0.1V Step
- High Accuracy $\pm 1.5\%$
- Low Supply Current $3\mu A$
- No External Components Required
- Quick Reset within $20\mu s$
- Built-in Recovery Delay Include 0ms, 55ms, 220ms, 450ms
- Low Functional Supply Voltage 0.9V
- Push-Pull Output
- Small SOT-143, SC-70-4, SOT-25 and TSOT-25A Package
- RoHS Compliant and Halogen Free

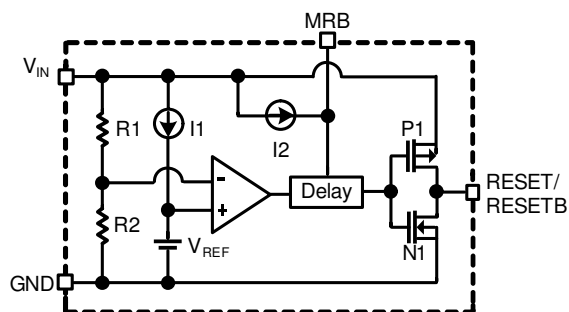
■ Application

- Portable Electronics
- Power Supplies
- Computer Peripherals
- Data Acquisition Systems
- Applications using CPUs
- Consumer Electronics

■ Typical Application

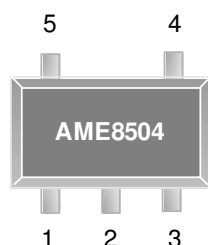


■ Functional Block Diagram



■ Pin Configuration

SOT-25/TSOT-25A
Top View

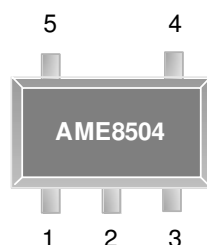


AME8504-AEVxxxxxx

1. RESET/RESETB
2. IN
3. GND
4. MRB
5. NC

*** Die Attach:**
Non-Conductive Epoxy

SOT-25/TSOT-25A
Top View

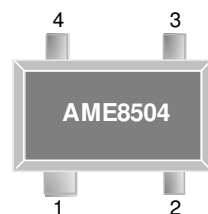


AME8504-BEVxxxxxx

1. NC
2. GND
3. RESET/RESETB
4. MRB
5. IN

*** Die Attach:**
Conductive Epoxy

SOT-143
Top View

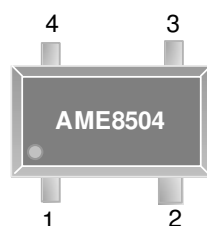


AME8504-A4Uxxxxx

1. GND
2. RESET/RESETB
3. MRB
4. IN

*** Die Attach:**
Conductive Epoxy

SC-70-4
Top View



AME8504-AIUxxxxx

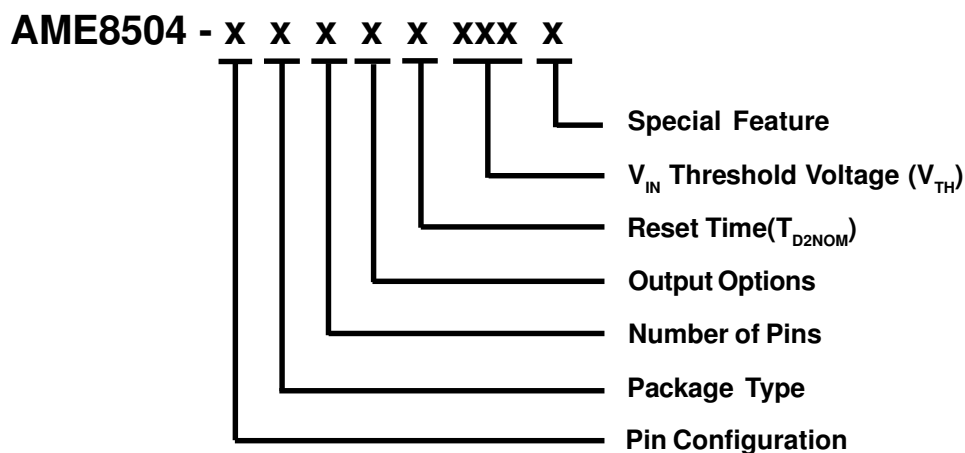
1. GND
2. RESET/RESETB
3. MRB
4. IN

*** Die Attach:**
Non-Conductive Epoxy

■ Pin Description

Pin No.				Pin Name	Pin Description
SOT-25 TSOT-25A		SOT-143	SC-70-4		
A	B				
1	3	2	2	RESET/ RESETB	This pin can be ordered as RESET or RESETB. Reset is active high. RESETB is active low. It is also available with a push-pull.
2	5	4	4	IN	Positive power supply. A reset is asserted after this voltage drops below a predetermined level. After V _{IN} rises above that level the reset output remains asserted until the end of the reset timeout period.
3	2	1	1	GND	Ground.
4	4	3	3	MRB	Manual RESET. Active low. Pulling this pin low forces a reset. After a low to high transition reset, remains asserted for exactly one reset timeout period. This pin is internally pulled high. The pin is floating or tied to V _{IN} , if it is unused.
5	1	N/A	N/A	NC	No connection. Not internally connected. Can left floating or connected to GND.

■ Ordering Information



Pin Configuration	Package Type	Number of Pins	Output Options	Reset Time (T_{D2NOM})	V_{IN} Threshold Voltage (V_{TH})	Special Feature
A (SOT-25) (TSOT-25A) 1. RESET/RESETB 2. IN 3. GND 4. MRB 5. NC	E: SOT-2X I: SC-70 4: SOT-143	U: 4 V: 5	A: RESETB B: RESET	B: 0ms C: 55ms D: 220ms G: 450ms	120: 1.2V 130: 1.3V 140: 1.4V : : : : : : 480: 4.8V 490: 4.9V 500: 5.0V	N/A: SOT-25 K: 0.9mm max (for TSOT-2XA Only)
B (SOT-25) (TSOT-25A) 1. NC 2. GND 3. RESET/RESETB 4. MRB 5. IN						
A (SOT-143) 1. GND 2. RESET/RESETB 3. MRB 4. IN						
A (SC-70-4) 1. GND 2. RESET/RESETB 3. MRB 4. IN						

■ Absolute Maximum Ratings

Parameter		Maximum	Unit
Supply Voltage		6	V
Input Current, V_{IN}		20	mA
Output Current, RESET, RESETB		20	mA
ESD Classification	HBM	2	kV
	MM	200	V

■ Recommended Operating Conditions

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

■ Thermal Information

Parameter	Package	Die Attach	Symbol	Maximum	Unit
Thermal Resistance* (Junction to Case)	SOT-23 TSOT-23A	Conductive Epoxy	θ_{JC}	81	°C / W
	SOT-143			130	
	SOT-23 SOT-25	Non-Conductive Epoxy		140	
	TSOT-23A TSOT-25A			130	
	SC-70-4			120	
Thermal Resistance (Junction to Ambient)	SOT-23	Conductive Epoxy	θ_{JA}	260	°C / W
	TSOT-23A			230	
	SOT-143			350	
	SOT-23 SOT-25	Non-Conductive Epoxy		280	
	TSTO-23A TSOT-25A			250	
	SC-70-4			400	
Internal Power Dissipation	SOT-23	Conductive Epoxy	P_D	400	mW
	TSOT-23A			455	
	SOT-143			285	
	SOT-23 SOT-25	Non-Conductive Epoxy		400	
	TSTO-23A TSOT-25A			400	
	SC-70-4			300	
Lead Temperature (soldering 10 sec)**				260	°C

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

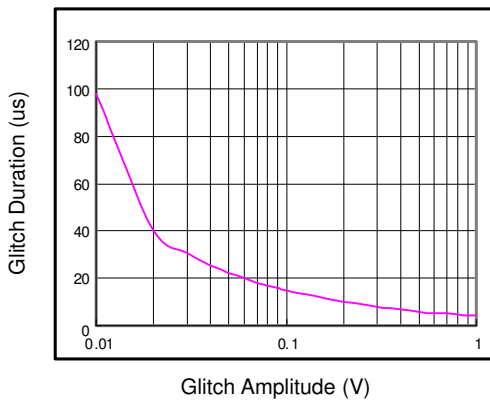
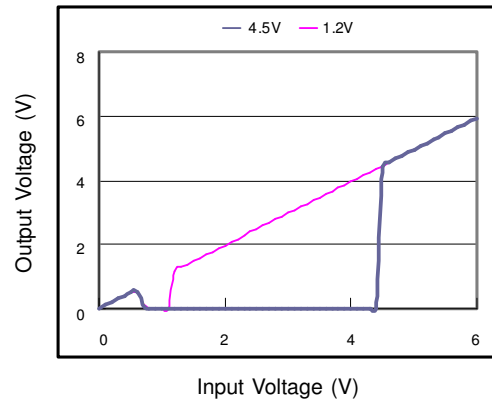
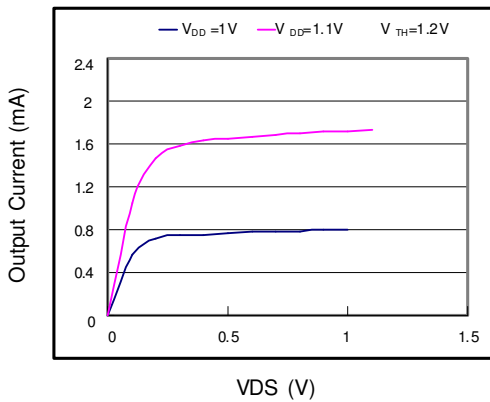
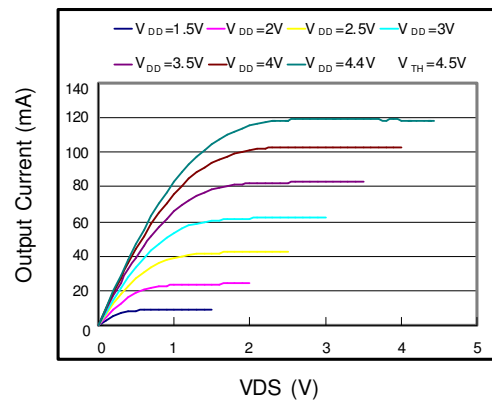
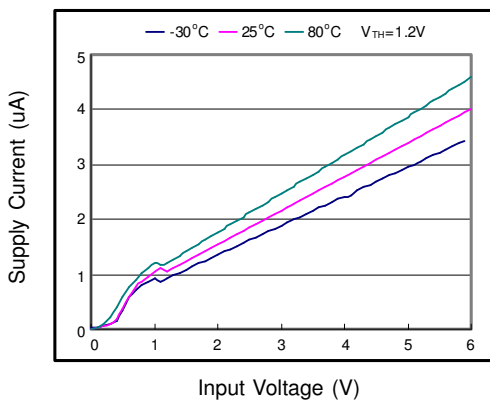
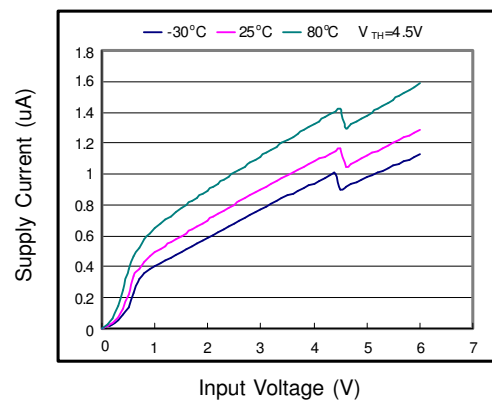
** MIL-STD-202G210F.

■ Electrical Specifications

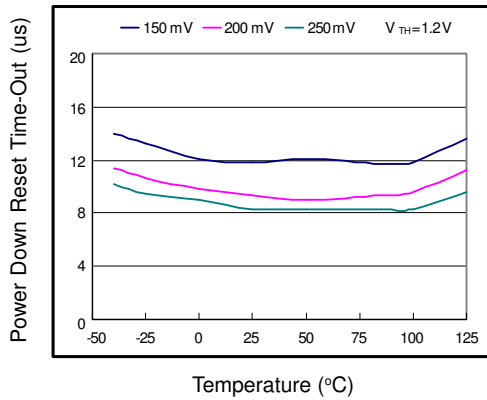
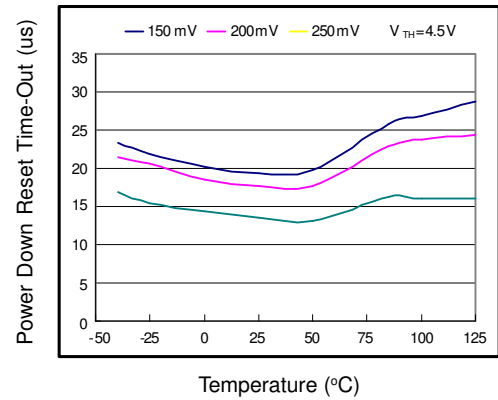
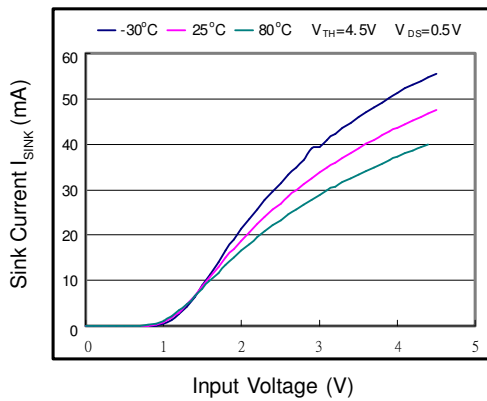
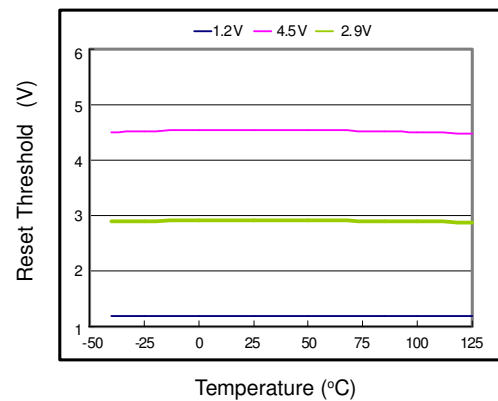
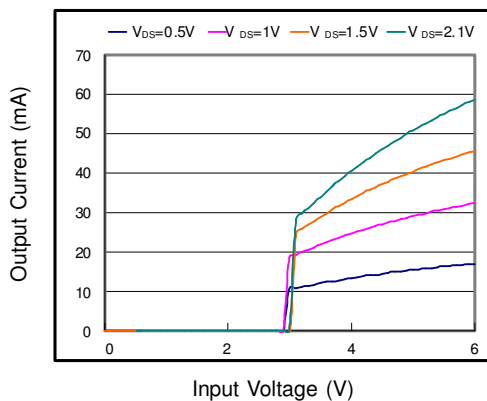
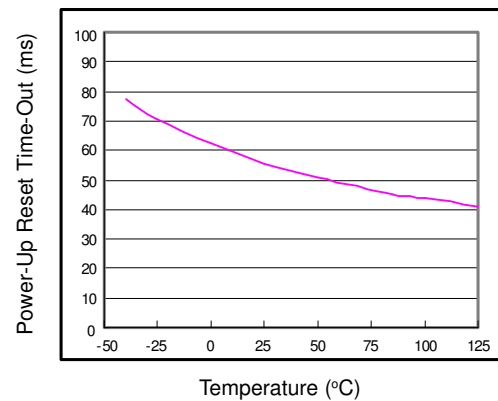
$T_A=27^{\circ}\text{C}$, unless otherwise specified.

Parameter		Symbol	Test Condition	Min	Typ	Max	Units
Operating $V_{DD}(V_{OUT})$ Range		V_{DD}	$\overline{\text{RESET}}$	0.9		6	V
			RESET	1.1		6	
Supply Current		I_{DD}	$V_{DD}=5\text{V}$, $T_A=27^{\circ}\text{C}$		3	8	μA
Reset Threshold		V_{TH}	$T_A=27^{\circ}\text{C}$		1.2 to 4.5		V
Threshold Voltage Accuracy		ΔV_{TH}	$T_A=27^{\circ}\text{C}$	-1.5		1.5	%
V_{DD} Drop to Reset Delay		t_{RD}	Drop= $V_{TH}-125\text{mV}$		20		μs
Reset Active Time Out Period	Version B	t_{RP}	$V_{DD} \geq 1.02 \times V_{TH}$	0	0	0	ms
	Version C			35	55	75	
	Version D			143	220	297	
	Version G			292	450	608	
MR Input Threshold		V_{IL}	$T_A=27^{\circ}\text{C}$			0.3	V
		V_{IH}		0.8			
$\overline{\text{RESET}}$ Output Voltage Low		V_{OL}	$V_{DD}<V_{TH(MIN)}$, $I_{SINK}=3.5\text{mA}$, $V_{TH} \geq 3\text{V}$			0.4	V
			$V_{DD}<V_{TH(MIN)}$, $I_{SINK}=1.2\text{mA}$, $V_{TH} \geq 1.8\text{V}$			0.3	
			$V_{TH(MIN)}>V_{DD}>1\text{V}$, $I_{SINK}=0.5\text{mA}$			0.3	
$\overline{\text{RESET}}$ Output Voltage High		V_{OH}	$V_{DD}>V_{TH(MAX)}$, $I_{SOURCE}=800\mu\text{A}$, $V_{TH} \geq 3\text{V}$	$V_{DD}-1.5$			V
			$V_{DD}>V_{TH(MAX)}$, $I_{SOURCE}=500\mu\text{A}$, $V_{TH} \geq 1.8\text{V}$	$0.8 V_{DD}$			
			$V_{DD}>V_{TH(MAX)}$, $I_{SOURCE}=200\mu\text{A}$, $V_{TH} \geq 1.1\text{V}$	$0.8 V_{DD}$			
RESET Output Voltage Low		V_{OL}	$V_{DD}>V_{TH(MAX)}$, $I_{SINK}=3.5\text{mA}$, $V_{TH} \geq 3\text{V}$			0.4	V
			$V_{DD}>V_{TH(MAX)}$, $I_{SINK}=1.2\text{mA}$, $V_{TH} \geq 1.8\text{V}$			0.3	
			$V_{DD}>V_{TH(MAX)}$, $I_{SINK}=0.5\text{mA}$, $V_{TH} \geq 1.2\text{V}$			0.3	
RESET Output Voltage High		V_{OH}	$1.1\text{V}<V_{DD}<V_{TH(MIN)}$, $I_{SOURCE}=200\mu\text{A}$	$0.8 V_{DD}$			V
			$1.8\text{V}<V_{DD}<V_{TH(MIN)}$, $I_{SOURCE}=500\mu\text{A}$	$0.8 V_{DD}$			
			$3\text{V}<V_{DD}<V_{TH(MIN)}$, $I_{SOURCE}=800\mu\text{A}$	$V_{DD}-1.5$			
Hysteresis Width		V_{HYS}			$0.01V_{TH}$		V

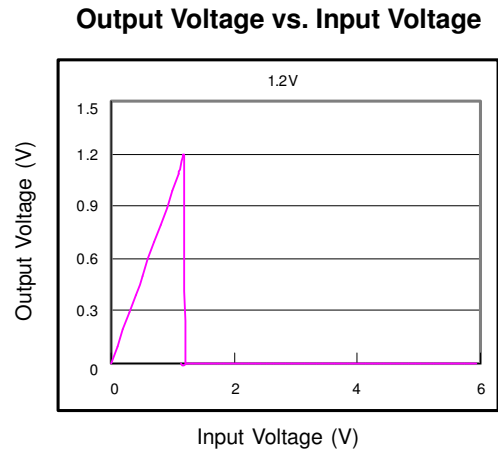
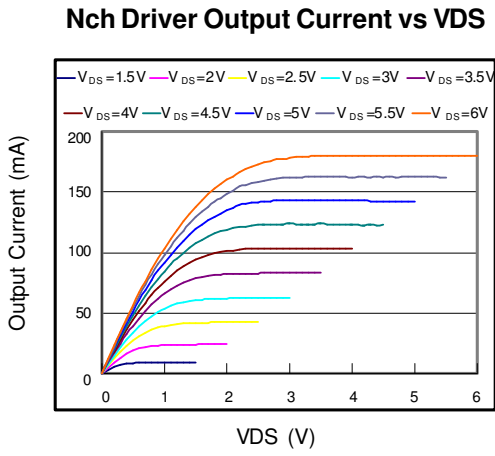
■ Characterization Curve

Glitch Rejection

Output Voltage vs. Input Voltage

Nch Driver Output Current vs VDS

Nch Driver Output Current vs VDS

Supply Current vs Input Voltage

Supply Current vs Input Voltage


■ Characterization Curve (Contd.)

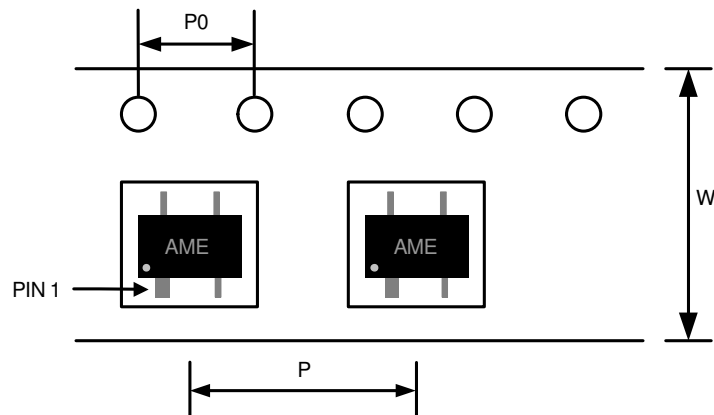
Power-Down Reset vs. Temperature

Power-Down Reset vs. Temperature

Nch Driver Sink Current vs. Input Voltage

Reset Threshold Derivation vs. Temperature

Pch Driver Output Current vs. Input Voltage

Power-Up Reset Time-Out vs. Temperature


■ Characterization Curve (Contd.)



■ Tape and Reel Dimension

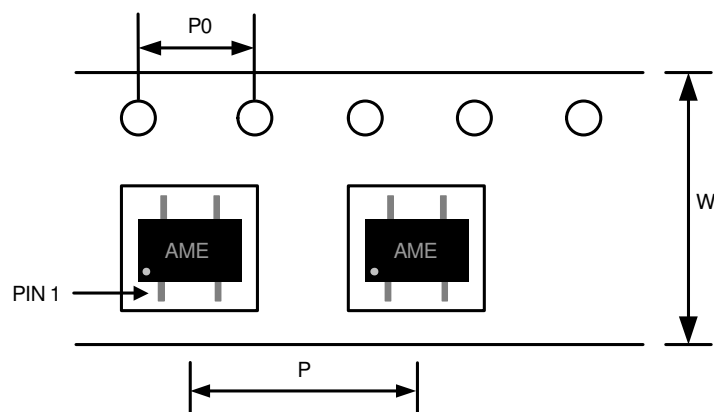
SOT-143



Carrier Tape, Number of Components Per Reel and Reel Size

Package	Carrier Width (W)	Pitch (P)	Pitch (P0)	Part Per Full Reel	Reel Size
SOT-143	8.0±0.1 mm	4.0±0.1 mm	4.0±0.1 mm	3000pcs	180±1 mm

SC-70-4

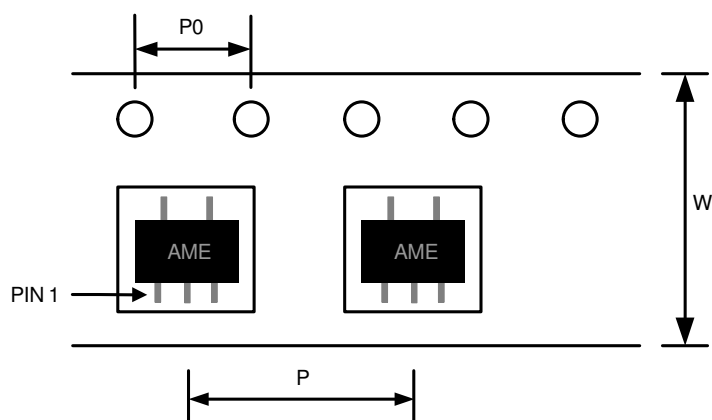


Carrier Tape, Number of Components Per Reel and Reel Size

Package	Carrier Width (W)	Pitch (P)	Pitch (P0)	Part Per Full Reel	Reel Size
SC-70-4	8.0±0.1 mm	4.0±0.1 mm	4.0±0.1 mm	3000pcs	180±1 mm

■ Tape and Reel Dimension (Contd.)

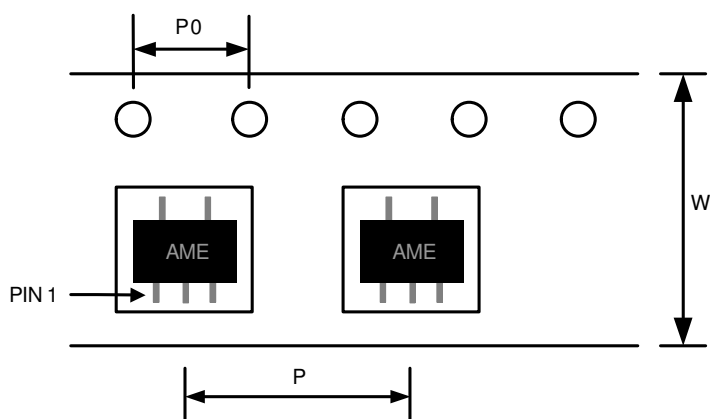
SOT-25



Carrier Tape, Number of Components Per Reel and Reel Size

Package	Carrier Width (W)	Pitch (P)	Pitch (P0)	Part Per Full Reel	Reel Size
SOT-25	8.0±0.1 mm	4.0±0.1 mm	4.0±0.1 mm	3000pcs	180±1 mm

TSOT-25A

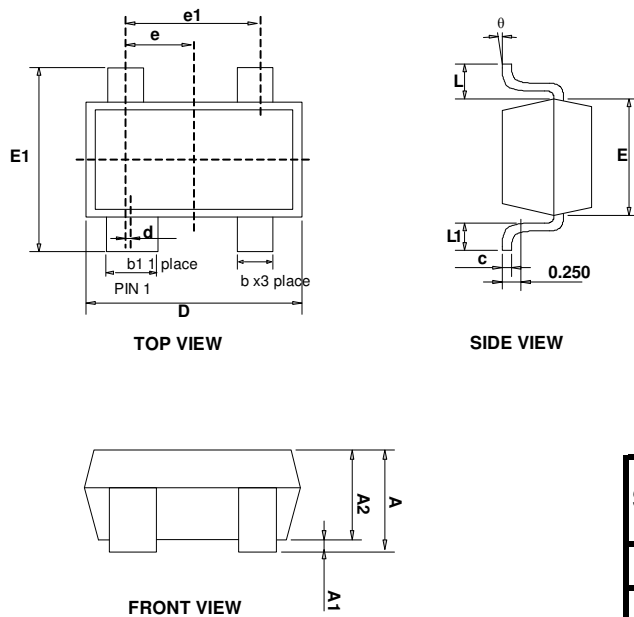


Carrier Tape, Number of Components Per Reel and Reel Size

Package	Carrier Width (W)	Pitch (P)	Pitch (P0)	Part Per Full Reel	Reel Size
TSOT-25A	8.0±0.1 mm	4.0±0.1 mm	4.0±0.1 mm	3000pcs	180±1 mm

■ Package Dimension

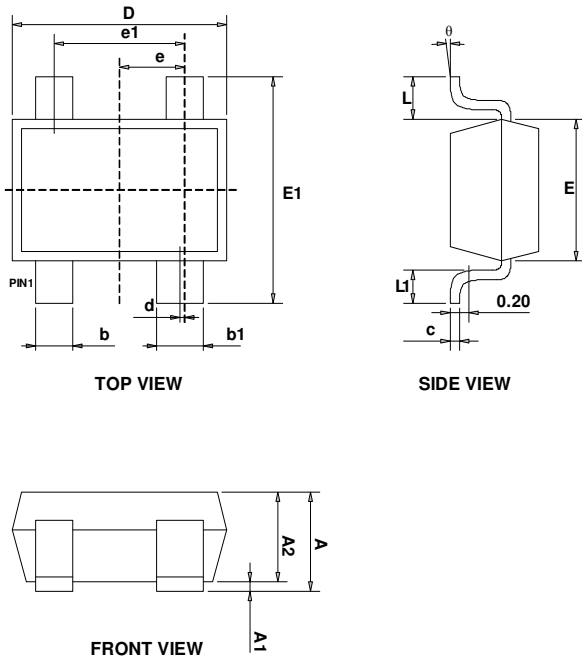
SOT-143



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
b1	0.750	0.900	0.030	0.035
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
d	0.200 TYP		0.008 TYP	
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

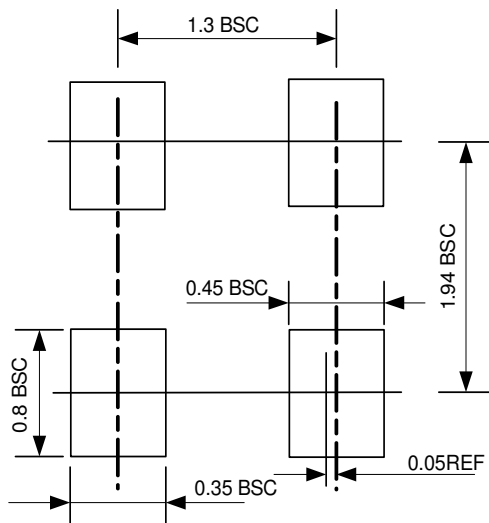
■ Package Dimension (Contd.)

SC-70-4



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.250	0.400	0.010	0.016
b1	0.350	0.500	0.014	0.020
c	0.080	0.150	0.003	0.006
d	0.050 TYP		0.002 TYP	
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

■ Lead Pattern Drawing



Note:

1. Lead pattern unit description:

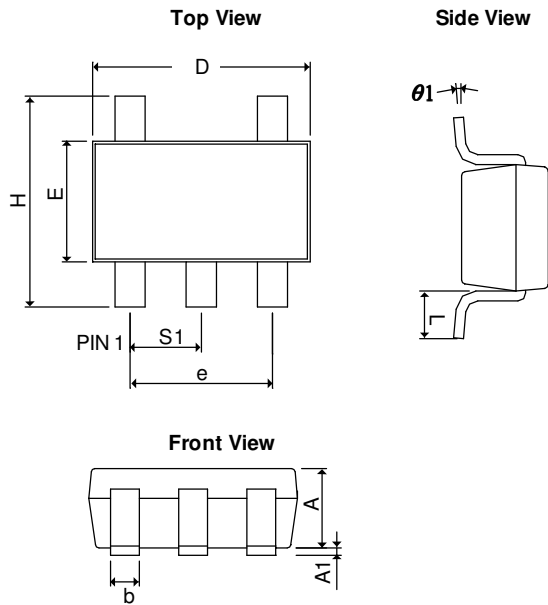
BSC: Basic. Represents theoretical exact dimension or dimension target.

2. Dimensions in Millimeters.

3. General tolerance $\pm 0.05\text{mm}$ unless otherwise specified.

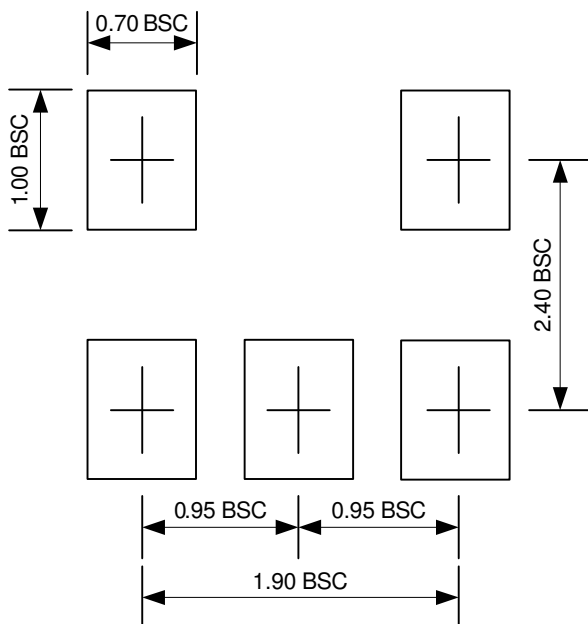
■ Package Dimension (Contd.)

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		0.0748 BSC	
H	2.60	3.00	0.1024	0.1181
L	0.37 BSC		0.0146 BSC	
$\theta 1$	0°	10°	0°	10°
S ₁	0.95 BSC		0.0374 BSC	

■ Lead Pattern Drawing

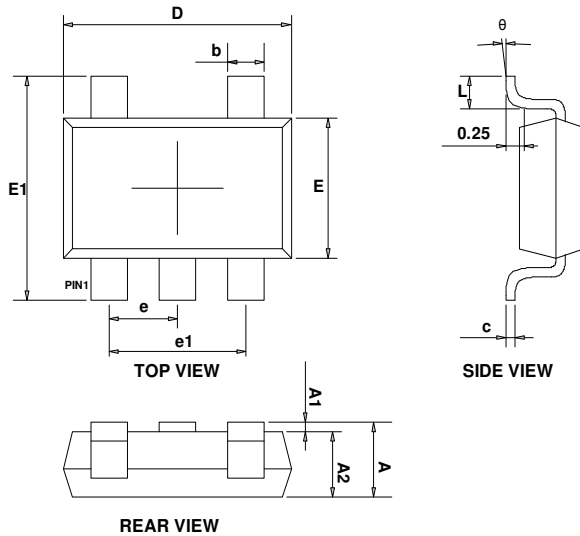


Note:

- Lead pattern unit description:
BSC: Basic. Represents theoretical exact dimension or dimension target.
- Dimensions in Millimeters.
- General tolerance $\pm 0.05\text{mm}$ unless otherwise specified.

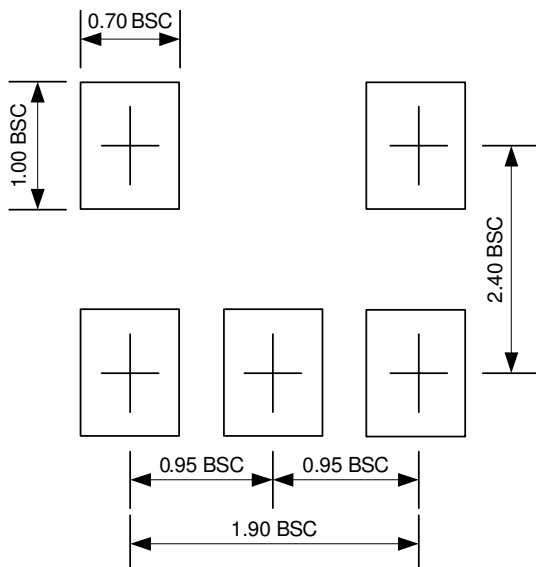
■ Package Dimension (Contd.)

TSOT-25A



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.700	0.900	0.028	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
b	0.350	0.500	0.014	0.020
c	0.080	0.200	0.003	0.008
D	2.820	3.020	0.111	0.119
E	1.600	1.700	0.063	0.067
E1	2.650	2.950	0.104	0.116
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0.075 BSC	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

■ Lead Pattern Drawing



Note:

1. Lead pattern unit description:

BSC: Basic. Represents theoretical exact dimension or dimension target.

2. Dimensions in Millimeters.

3. General tolerance $\pm 0.05\text{mm}$ unless otherwise specified.



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