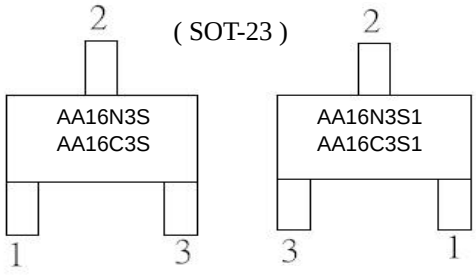
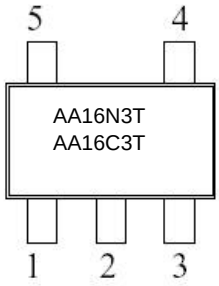
Agamem Mircoelectronics Inc. AA16 Series

PRELIMINARY **Voltage detector with delay**

■ FEATURES

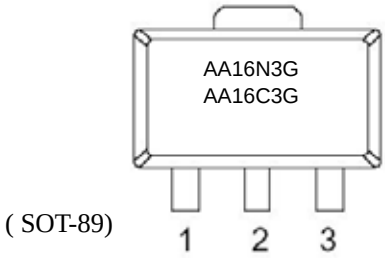
- High accuracy in 5% voltage detection.
- Typical 150mv/200mv hysteresis width between power reset and reset disable detection point for 3.3v and 5v, respectively.
- Low power consumption typical at 1.3uA at Vcc=5v.
- With about 3.5us and 40us delay time at power reset disable and reset procedure.
- Open-Drain output type. (AA16N series)
- Inverter output type. (AA16C series)
- Low temperature coefficient.





■ APPLICATIONS

- Reset for microprocessor or DSP
- Power failure detector



(SOT-89)

■ DESCRIPTION

AA16 Series is a three terminal power reset generator processed in a standard CMOS. It detects a particle fixed voltage at the power up or down procedure to generate a reset signal for initializing the following systems or devices, such as MCU. There is a typical 150/200mv hysteresis range for different 3.3v/5v system to prevent the system from crashing during power supply fluctuation.

AA16 Series consists of a reference voltage generator, a comparator with hysteresis function and an ‘open-drain’ type (AA16N series) or ‘Inverter’ type (AA16C series) output driver. The Volt level of output is flexible to the various application power systems. Low power consumption, typical at 1uA and maximum is lower than 2uA.

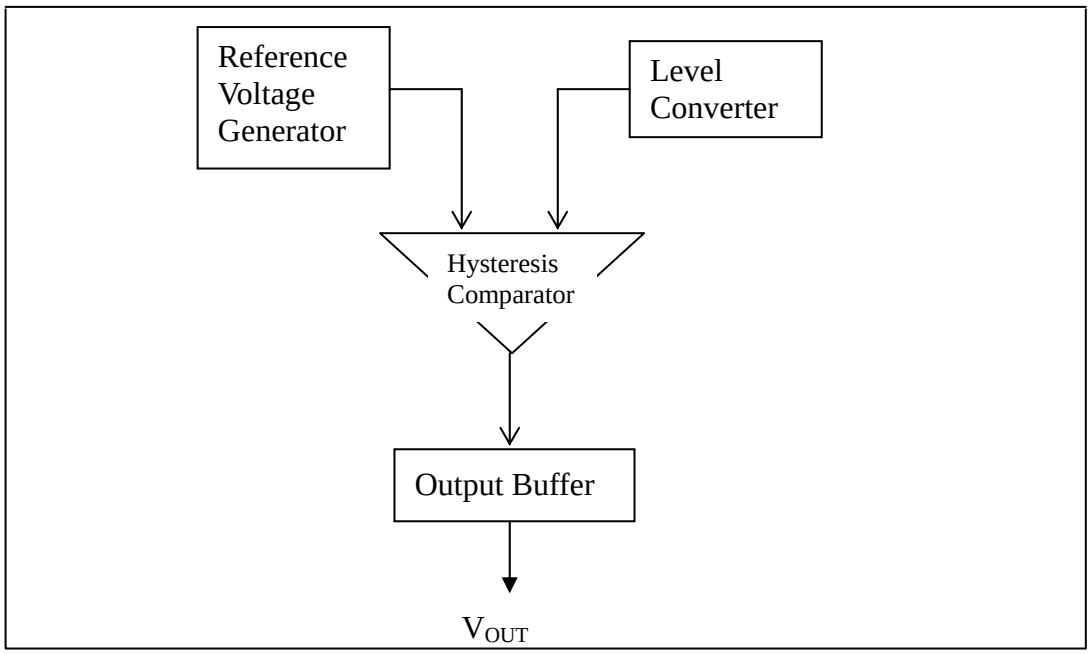
■ SOT-23、SOT-89 PIN DESCRIPTION

Symbol	Pin-No	Type	Function
Vout	1	O	Power Reset signal output. It's an Open –Drain or Inverter output type. Its output state level like below Reset : Low ; Reset disable : High Impedance
Vcc	2		Supply Power
GND	3		Ground

■ SOT-25 PIN DESCRIPTION

Symbol	Pin-No	Type	Function
Nc	1	O	Not Connect
Sub	2		substrate
GND	3		Ground
Vout	4		Power Reset signal output. It's an Open –Drain or Inverter output type. Its output state level like below Reset : Low ; Reset disable : High Impedance
Vcc	5		Supply Power

■ BLOCK DIAGRAM



■ ELECTRICAL CHARACTERISTICS

ABSOLUTE MAXIMUM RATINGS (See NOTE)

Parameter	Symbol	Rating			UNIT	CONDITION
		MIN	TYP	MAX		
Supply Volateg	Vcc	-0.3		7	V	
Output Volatge	V_{OUT}	-0.3		Vcc+0.3	V	Ta = +25℃; GND = 0V
Operating Ambient Temperature	Ta	-20		70	℃	
Storage Temperature	Ts	-55		125	℃	

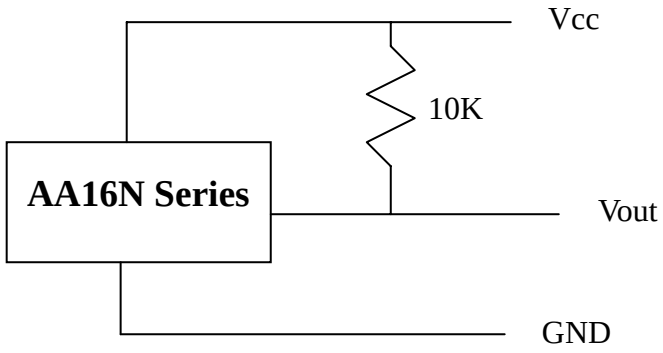
NOTE: Stress above those listed under "Absolute Maximum Rating" may cause the device permanent damage. This is a stress rating only factor and functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for an extending period of time may affect the reliability of the device.

RECOMMENDED OPERATING CONDITIONS Ta = 25℃

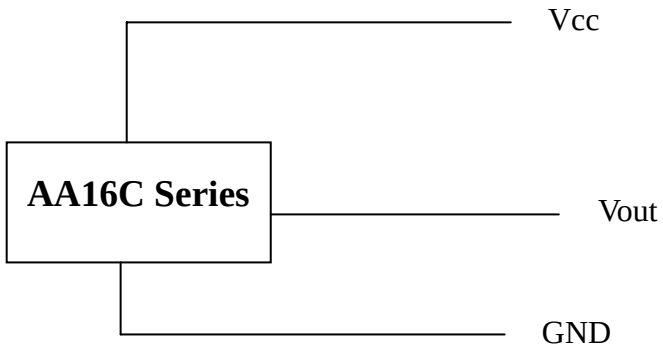
Parameter	Symbol	Value			Unit	Condition
		Min	Typ	Max		
Power Supply	Vcc	1.5*		6	V	
Supply Current	Icc(3.3V)		1.3	2	uA	Vcc=5V Rload=10K
	Icc(5V)		1	2	uA	
Reset Voltage	V_{RS}(3.3V)	2.8		3.1	V	Fig-1; Fig-3
	V_{RS}(5V)	4		4.3	V	
Hysteresis Width	V_{HS}(3.3V)	90		210	mV	Fig-2
	V_{HS}(5V)	130		270	mV	
Output Low	V_{OL}			0.2	V	I_{OL}=0.7mA ; Vcc=1.8V
Reset disable Time	T_{RSD}		3.5		uS	RL=100K, CL=100P; Measured Voltage = 1.5V Fig-1; Fig-3
Reset Time	T_{RS} (3.3v)		44		uS	
	T_{RS} (5v)		40		uS	

* Output can't be described because the system isn't stable when the supply voltage Vcc is less than 1.5V

■ SUPPLY CURRENT MEASUREMENT CHART

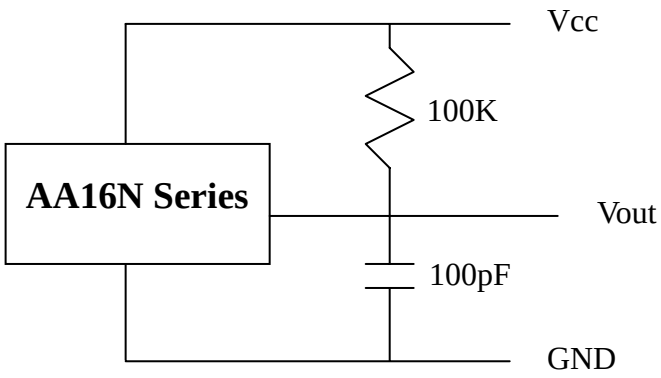


* Vout is an 'Open-Drain' output type. A resistance between it and Vcc is necessary to pick it up.

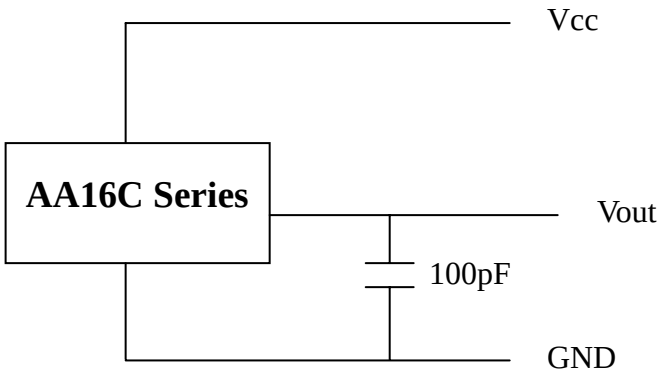


* Vout is an 'Inverter' output type. No resistance between it and Vcc.

■ OUTPUT CHARACTERISTIC TESTING CONDITION

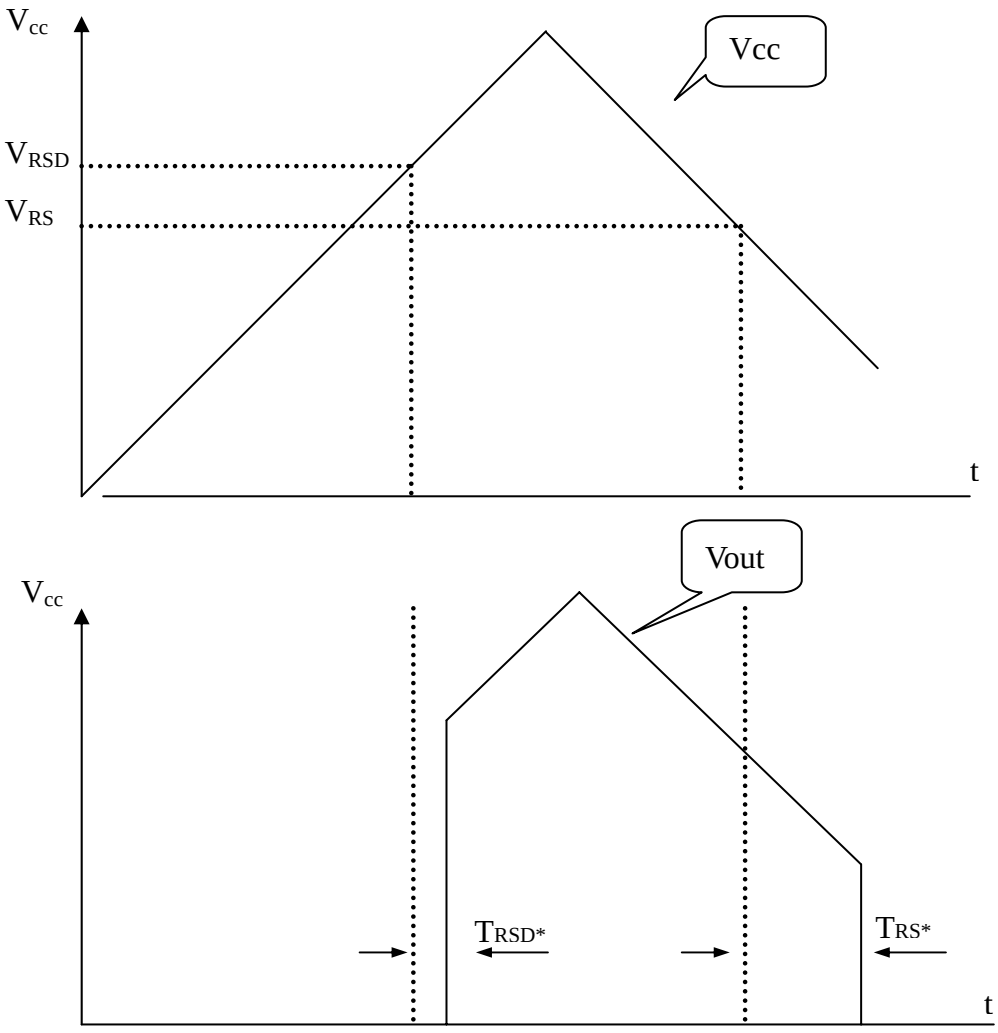


* Vout is an 'Open-Drain' output type. A resistance between it and Vcc is necessary to pick it up.



* Vout is an 'Inverter' output type. No resistance between it and Vcc.

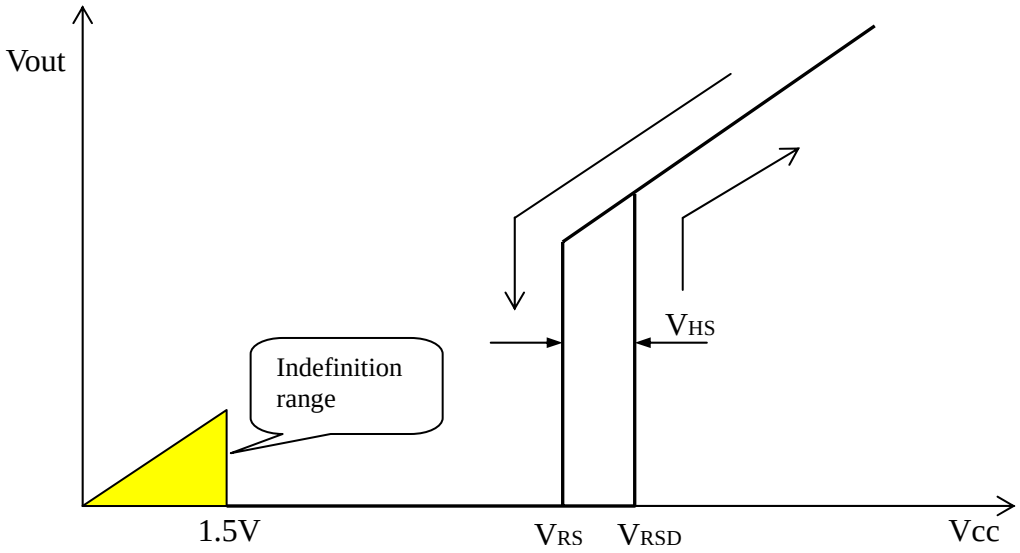
Fig-1 : Reset & Reset Disable Transfer Point



* V_{RSD}, reset disable voltage, is the detected output point when Vcc is increasing. V_{RS}, reset voltage, is the detected output point when Vcc is decreasing. T_{RSD} and T_{RS} is the c t ɔnding delay time between the V_{RSD} and V_{RS} to the rising edge and falling edge of Vout.

** After Vout is settled, its rising and falling slope should be equal to the slope of Vcc because there is only a resistance between Vcc and Vout. The maximum value of Vout is equal to the one of Vcc, too.

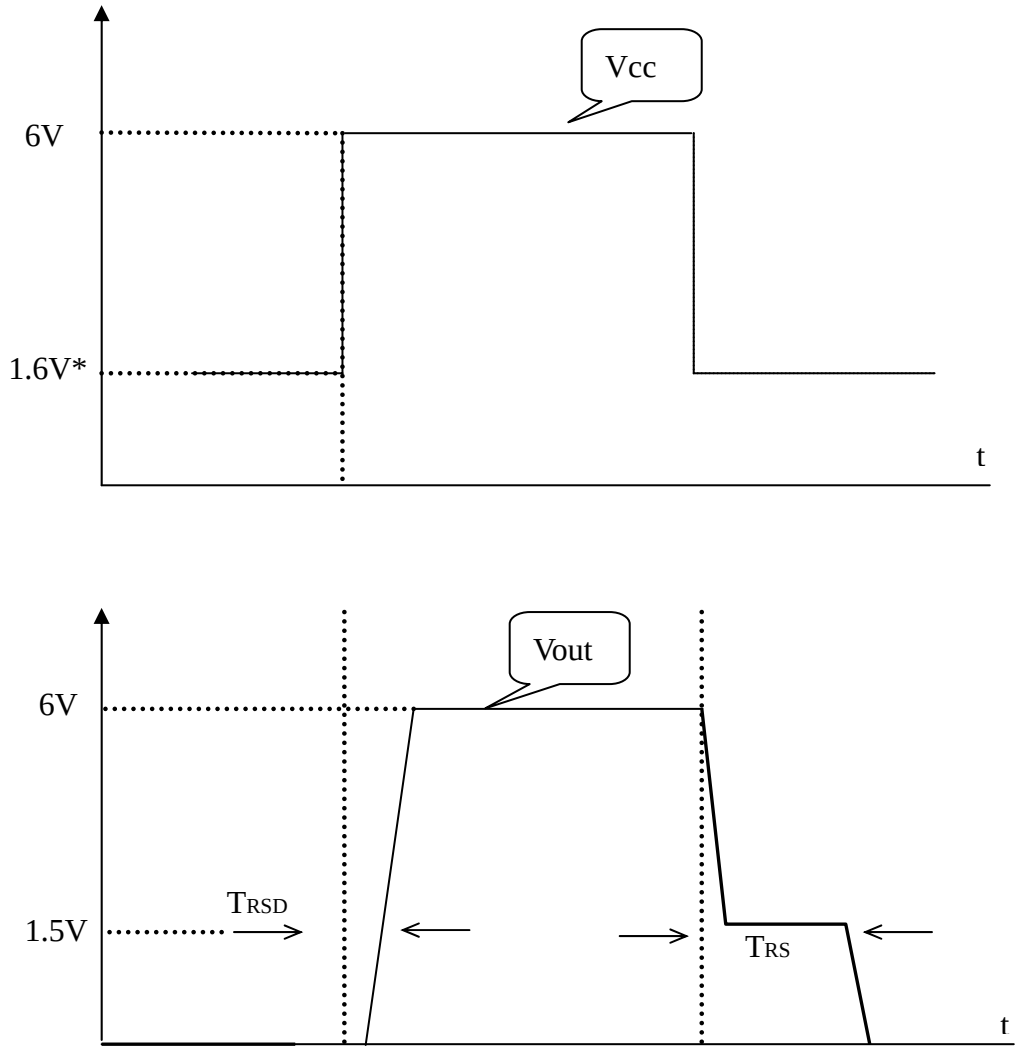
Fig-2 : Hysteresis Chart



* Output can't be described correctly because the system isn't stable when the supply voltage Vcc is less than 1.5V

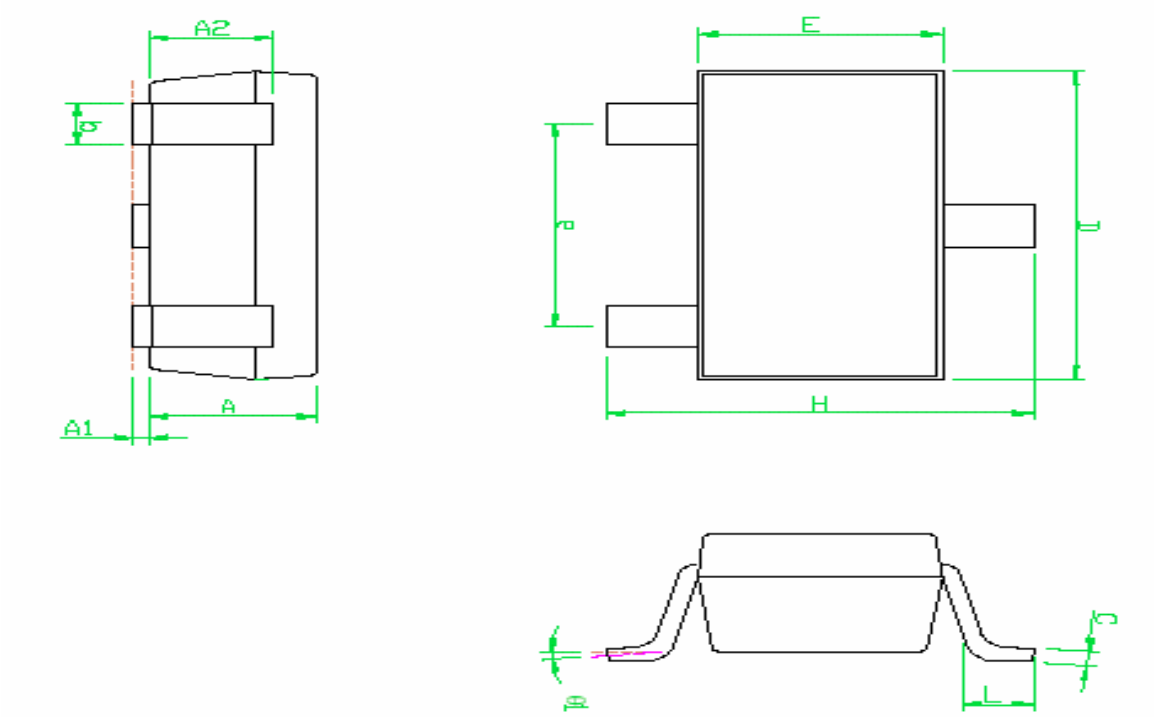
** In the Vcc increasing procedure, Vout equal to Vcc as Vcc is larger than V_{RSD}. In the Vcc decreasing procedure, Vout won't be change to Vcc until Vcc is smaller than V_{RS}. The width between V_{RS} and V_{RSD} is so called 'Hysteresis range'

Fig-3 : Output Delay Timing Chart



∗ There existing an output identification range as Vcc is less than 1.5V so under the testing condition this area should be keep off.

■ SOT-23 OUTLINE DRAWING

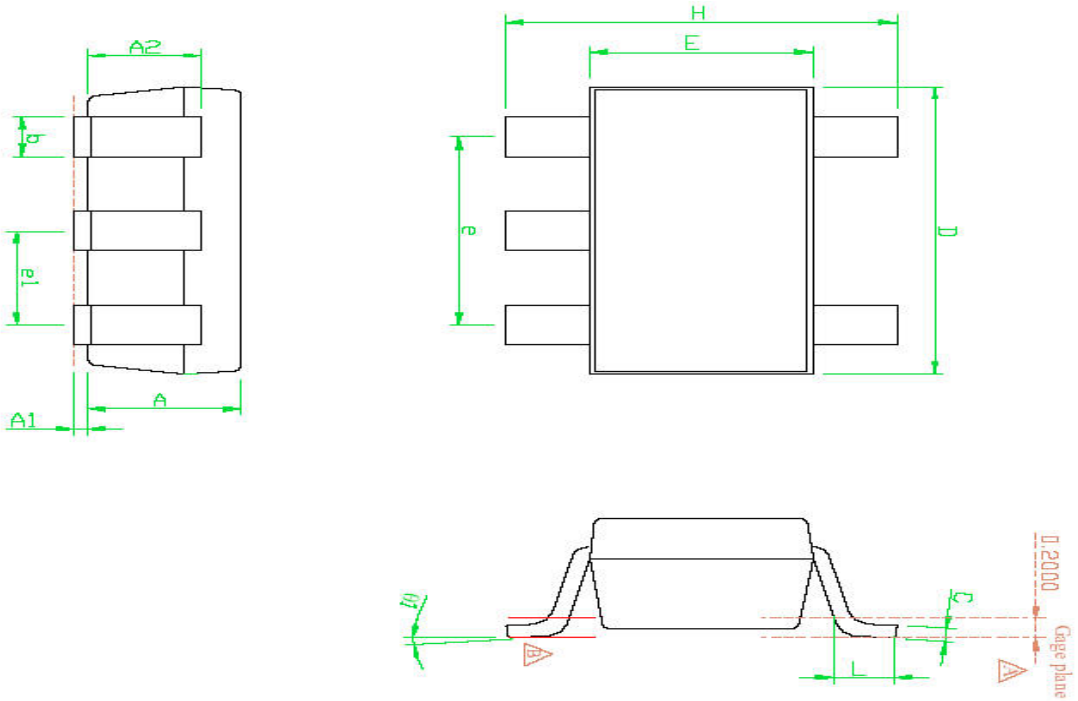


SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	1.00	1.10	1.30
A1	0.00	- - -	0.10
A2	0.70	0.80	0.90
b	0.35	0.40	0.50
C	0.10	0.15	0.25
D	2.70	2.90	3.10
E	1.40	1.60	1.80
e	- - -	1.90(TYP)	- - -
H	2.60	2.80	3.00
L	0.37	- - -	- - -
θ1	1	5	9

NOTES:

1. Package body sizes exclude mold flash protrusions or gate burrs
2. Tolerance ± 0.1000 ㎜ (4 mil) unless otherwise specified
3. Coplanarity:0.1000 ㎜
4. Dimension l is measured in gage plane

■ SOT-25 OUTLINE DRAWING

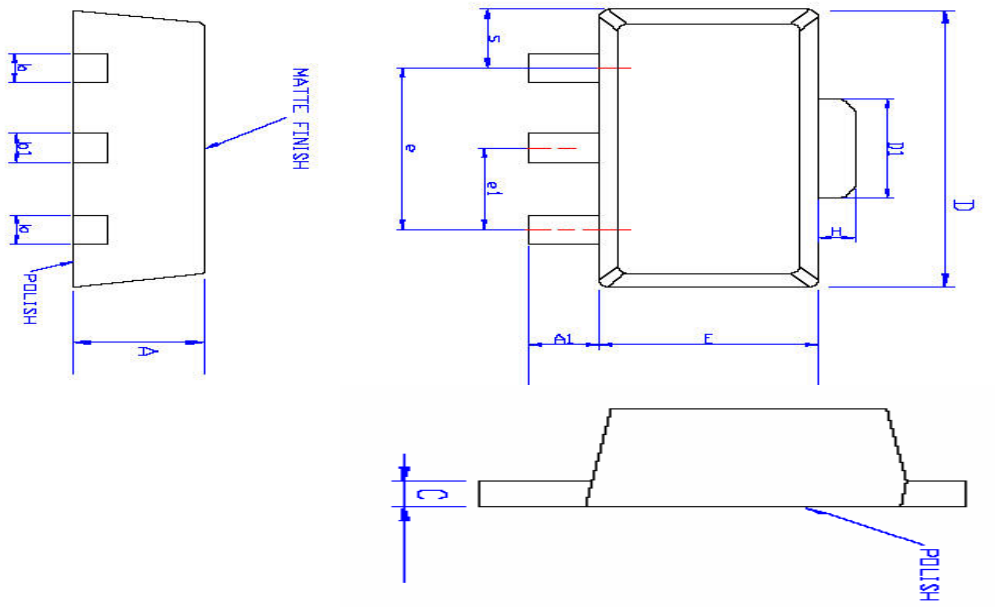


SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	1.00	1.10	1.30
A1	0.00	- - -	0.10
A2	0.70	0.80	0.90
b	0.35	0.40	0.50
C	0.10	0.15	0.25
D	2.70	2.90	3.10
E	1.50	1.60	1.80
e	- - -	1.90(TYP)	- - -
H	2.60	2.80	3.00
L	0.37	- - -	- - -
θ 1	1°	5°	9°
e 1	- - -	0.95(TYP)	- - -

NOTES:

1. Package body sizes exclude mold flash protrusions or gate burrs
2. Tolerance ± 0.1000 ㎜ (4 mil) unless otherwise specified
3. Coplanarity:0.1000 ㎜
4. Dimension l is measured in gage plane

■ SOT-89 OUTLINE DRAWING



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.40	1.50	1.60	0.055	0.059	0.063
A1	0.80	1.04	---	0.031	0.041	---
b	0.36	0.42	0.48	0.014	0.016	0.018
b1	0.41	0.47	0.53	0.016	0.018	0.020
C	0.38	0.40	0.43	0.014	0.015	0.017
D	4.40	4.50	4.60	0.173	0.177	0.181
D1	1.40	1.60	1.75	0.055	0.062	0.069
HE	---	---	4.25	---	---	0.167
E	2.40	2.50	2.60	0.094	0.098	0.102
e	2.90	3.00	3.10	0.114	0.118	0.122
H	0.35	0.40	0.45	0.014	0.016	0.018
S	0.65	0.75	0.85	0.026	0.030	0.034
e1	1.40	1.50	1.60	0.054	0.059	0.063

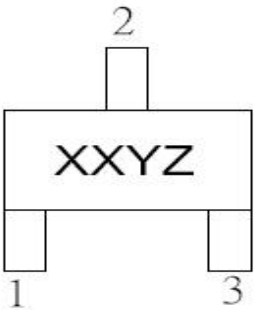
NOTES:

1. Package body sizes exclude mold flash protrusions or gate burrs
2. Tolerance ± 0.1000 ㎜ (4 mil) unless otherwise specified
3. Coplanarity:0.1000 ㎜
4. Dimension l is measured in gage plane

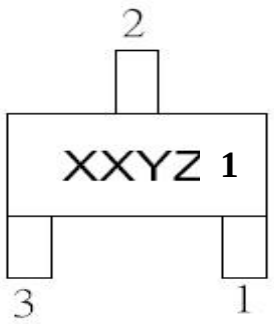
■ ORDERING INFORMATION

Note: For there being two kinds of pin assignment in SOT-23 package, we mark S and S1 to distinguish.

S



S1



AA16 X Y Z

DESIGNATOR	DESCRIPTION
X	Output Configuration C=Inverter output N=N-ch open drain output
Y	Operation Voltage 3=3.3V 5=5.0V
Z	Package Type for 3.3V and 5V S/S1=SOT-23 T=SOT-25 G=SOT-89

Ex： AA16N3S(S1、T、G)

Package

3.3V Operation Voltage

N-ch open drain output