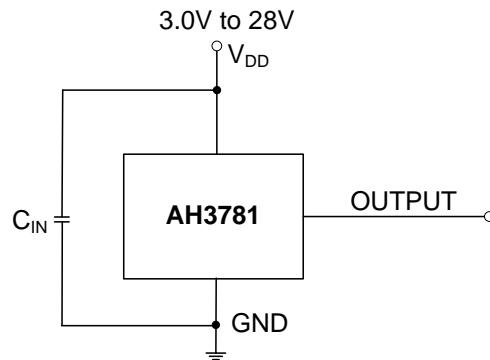


Typical Applications Circuit



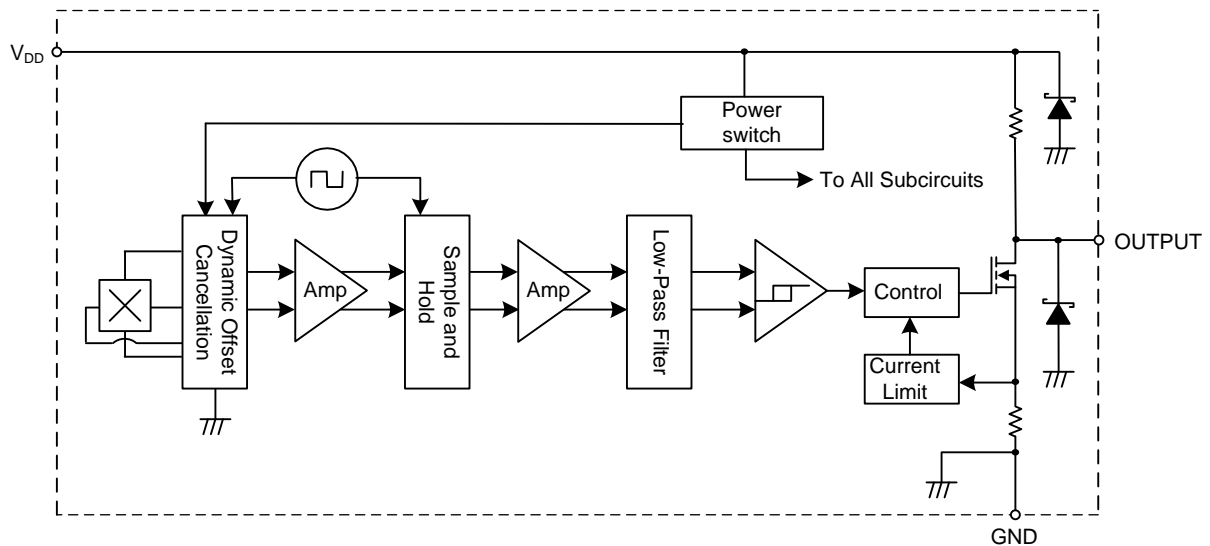
Note: 4. C_{IN} is for power stabilization and to strengthen the noise immunity, the recommended capacitance is 10nF ~ 100nF. R_L is the pull-up resistor.

Pin Descriptions

Package: SOT23

Pin Number	Pin Name	Function
1	V_{DD}	Power Supply Input
2	GND	Ground
3	OUTPUT	Output Pin

Functional Block Diagram



Absolute Maximum Ratings (Notes 5 & 6) (@T_A = +25°C, unless otherwise specified.)

Symbol	Characteristic	Value	Unit
V _{DD}	Supply Voltage (Note 6)	32	V
V _{DDR}	Reverse Supply Voltage	-0.3	V
V _{OUT_MAX}	Output Off Voltage (Note 6)	32V	V
I _{OUT}	Continuous Output Current	60	mA
B	Magnetic Flux Density	Unlimited	
P _D	Package Power Dissipation	SIP-3	550 mW
		SOT23	230 mW
T _s	Storage Temperature Range	-65 to +165	°C
T _J	Maximum Junction Temperature	+150	°C
ESD	Electrostatic Discharge Withstand Capability - Human Body Model	6	kV

- Notes:
- Stresses greater than the 'Absolute Maximum Ratings' specified above may cause permanent damage to the device. These are stress ratings only; functional operation of the device at these or any other conditions exceeding those indicated in this specification is not implied. Device reliability may be affected by exposure to absolute maximum rating conditions for extended periods of time.
 - The absolute maximum V_{DD} of 32V is a transient stress rating and is not meant as a functional operating condition. It is not recommended to operate the device at the absolute maximum rated conditions for any period of time.

Recommended Operating Conditions (@T_A = -40°C to +125°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Rating	Unit
V _{DD}	Supply Voltage	Operating	3.0 to 28	V
T _A	Operating Temperature Range	Operating	-40 to +125	°C

Electrical Characteristics (Note 7 & 8) (@T_A = -40°C to +125°C, V_{DD} = 3V to 28V, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{OUT_ON}	Output On Voltage	I _{OUT} = 20mA, B > B _{OP}	-	0.2	0.4	V
I _{OUT_OFF}	Output Leakage Current	V _{OUT} = 28V, B < B _{RP} , Output off	-	<0.1	15	μA
I _{DD}	Supply Current	Output open, V _{DD} = 12V, T _A = +25°C	-	3.8	4.9	mA
		Output open, T _A = -40°C to +125°C	-	3.8	5.8	mA
R _{PU}	Internal Pull-Up Resistance	T _A = -40°C to +125°C	10	14	18	kΩ
t _{ST}	Device Start-Up Time	V _{DD} ≥ 3V, B > B _{OP} (Note 7)	-	10		μs
f _c	Chopping Frequency	V _{DD} = 3V to 28V	-	800	-	kHz
t _d	The time delay from magnetic threshold reached to the start of the output rise or fall	(Note 9)	-	3.75	-	μs
t _r	Output Rising Time (external pull-up resistor R _L and load capacitance dependent)	R _L = 1kΩ, C _L = 20pF	-	0.2	1	μs
t _f	Output Falling Time (Internal switch resistance and load capacitance dependent)	R _L = 1kΩ, C _L = 20pF	-	0.1	1	μs
I _{OCL}	Output Current Limit	B > B _{OP} , (Note 10)	30	-	55	mA
V _Z	Zener Clamp Voltage	I _{DD} = 5mA	28	-	-	V

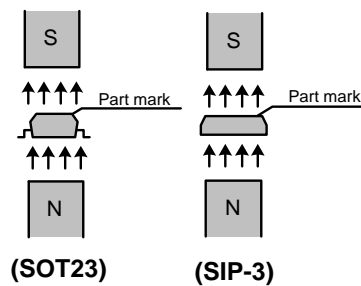
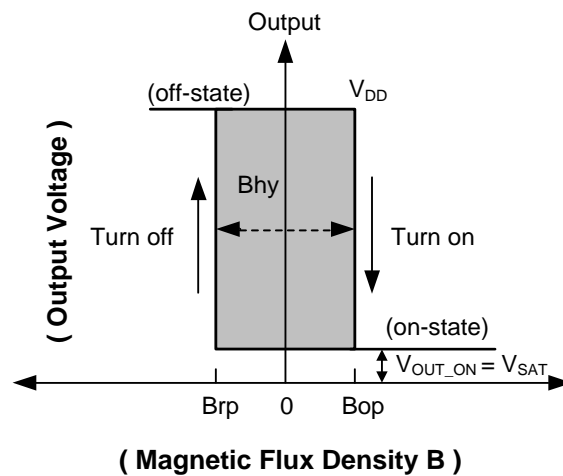
- Notes:
- When power is initially turned on, V_{DD} must be within its correct operating range (3.0V to 28V) to guarantee the output sampling. The output state is valid after the start-up time of 10μs typical from the operating voltage reaching 3V.
 - Typical values are defined at T_A = +25°C, V_{DD} = 12V. Maximum and minimum values over the operating temperature range is not tested in production but guaranteed by design, process control and characterization.
 - Guaranteed by design, process control and characterization. Not tested in production.
 - The device will limit the output current I_{OUT} to current limit of I_{OCL}.

Magnetic Characteristics (Notes 11 & 12) ($T_A = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, $V_{DD} = 3.0\text{V}$ to 28V , unless otherwise specified)

(1mT=10 Gauss)

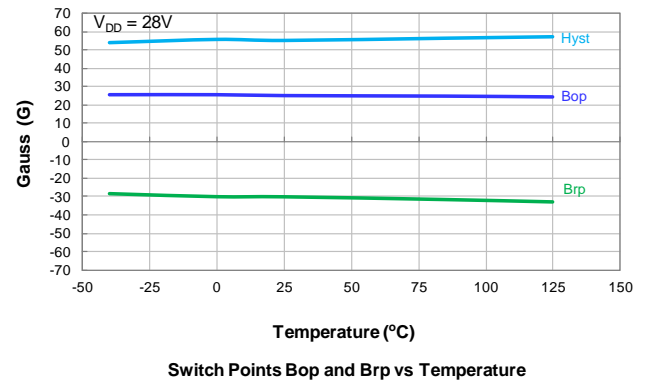
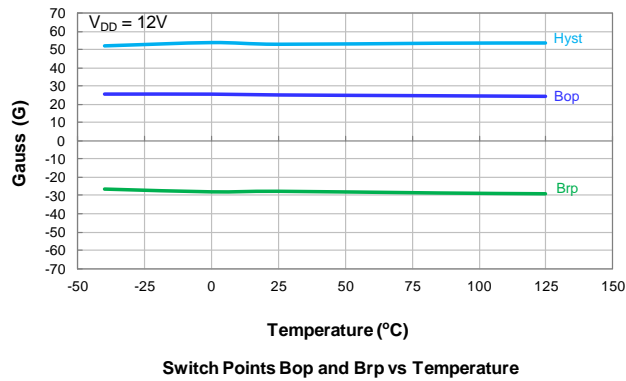
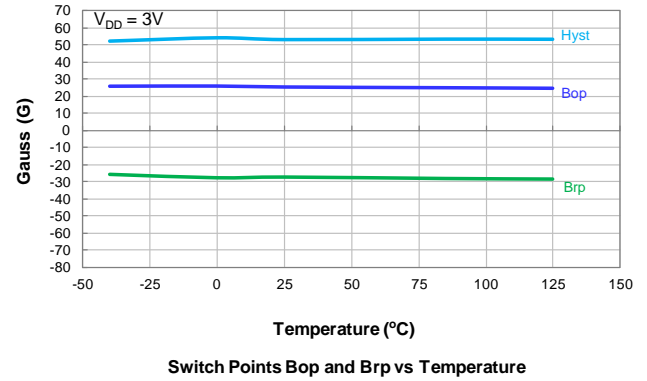
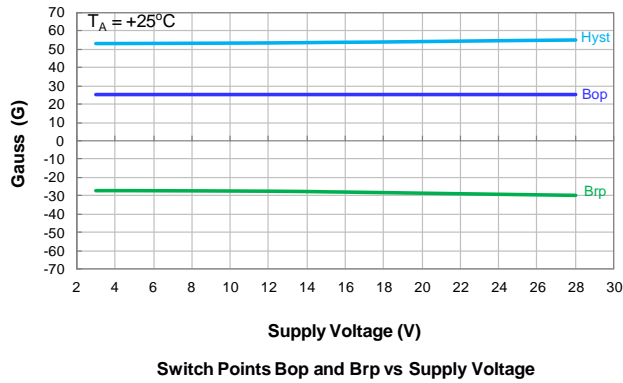
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
B_{OP} (South pole to part marking side)	Operation Point	$V_{DD} = 12\text{V}$, $T_A = +25^{\circ}\text{C}$	-	25	-	Gauss
		$T_A = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$	10	25	40	
B_{RP} (North pole to part marking side)	Release Point	$V_{DD} = 12\text{V}$, $T_A = +25^{\circ}\text{C}$	-	-25	-	
		$T_A = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$	-40	-25	-10	
B_{HY} ($ B_{OPX} - B_{RPX} $)	Hysteresis (Note 13)	$V_{DD} = 12\text{V}$, $T_A = +25^{\circ}\text{C}$	-	50	-	
		$T_A = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$	20	50	80	

- Notes:
- When power is initially turned on, V_{DD} must be within its correct operating range (3.0V to 28V) to guarantee the output sampling. The output state is valid after the start-up time of 10 μs typical from the operating voltage reaching 3V.
 - Typical values are defined at $T_A = +25^{\circ}\text{C}$, $V_{DD} = 12\text{V}$. Maximum and minimum values over the operating temperature range is not tested in production but guaranteed by design, process control and characterization
 - Maximum and minimum hysteresis is guaranteed by design, process control and characterization.

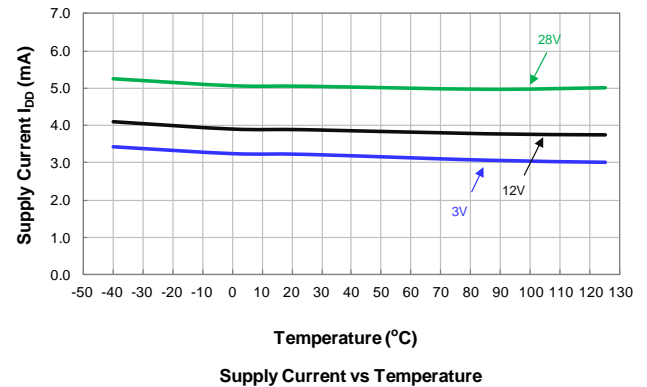
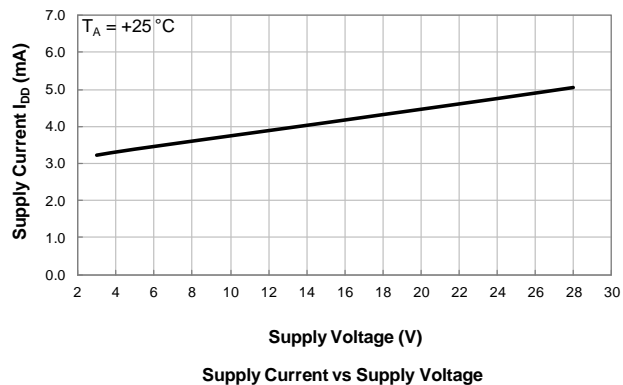


Typical Operating Characteristics

Magnetic Operating Switch Points – B_{OP} and B_{RP}

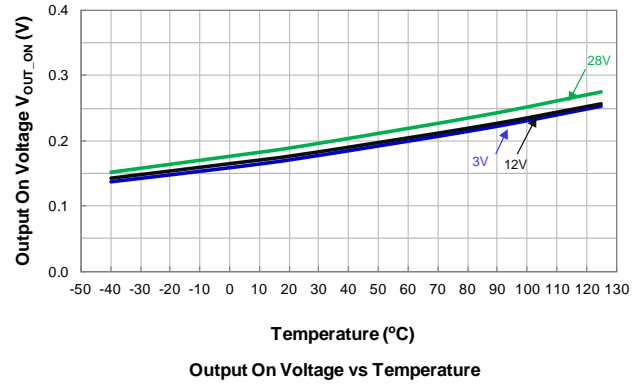
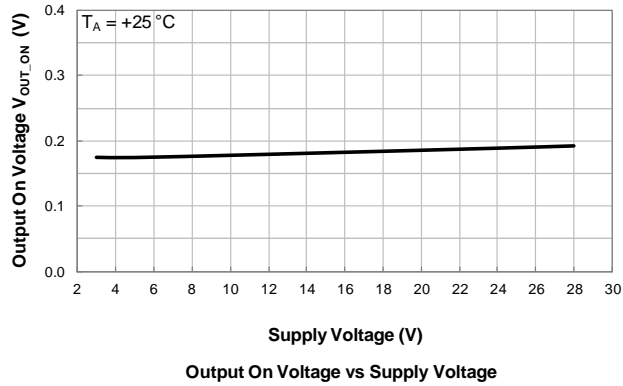


Supply Current

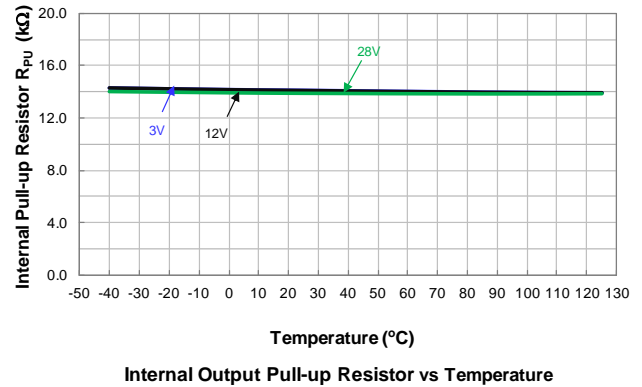
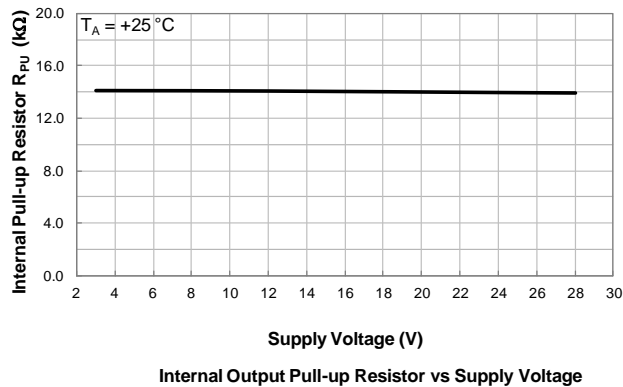


Typical Operating Characteristics

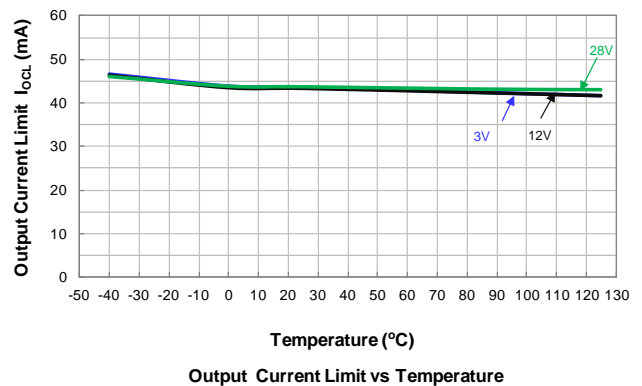
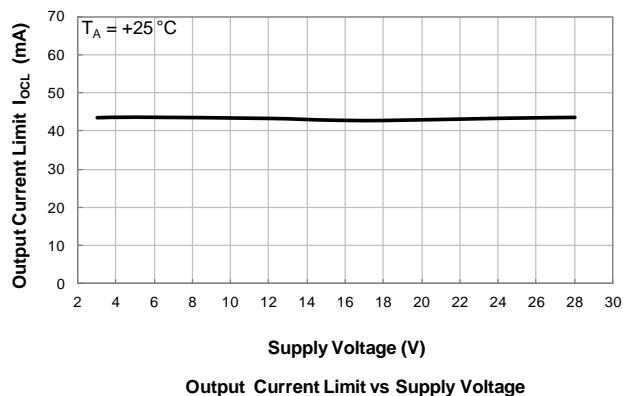
Output Switch On Voltage



Output Pull-Up Resistor (Internal)



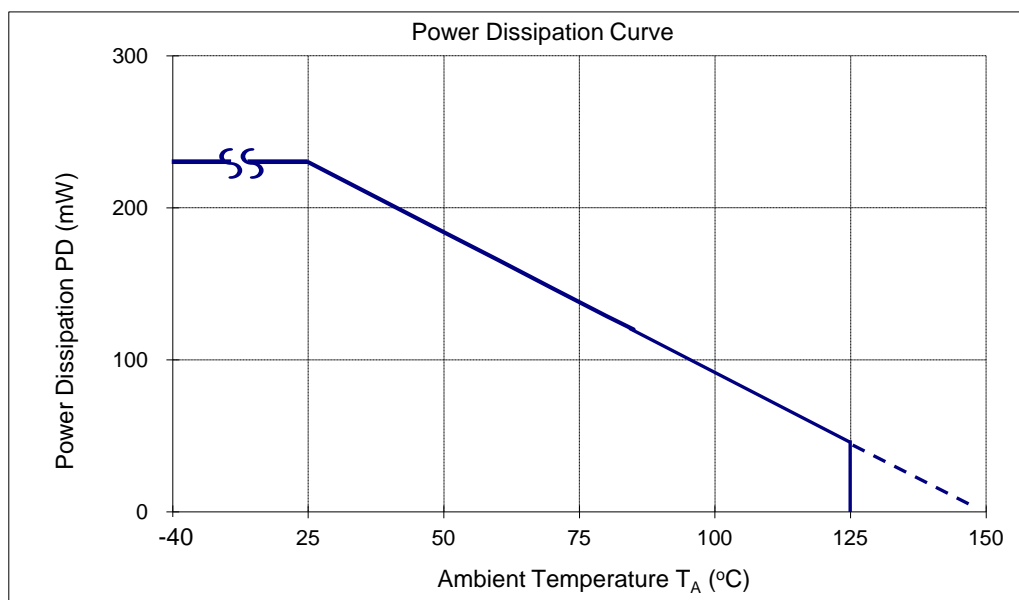
Output Current Limit



Thermal Performance Characteristics

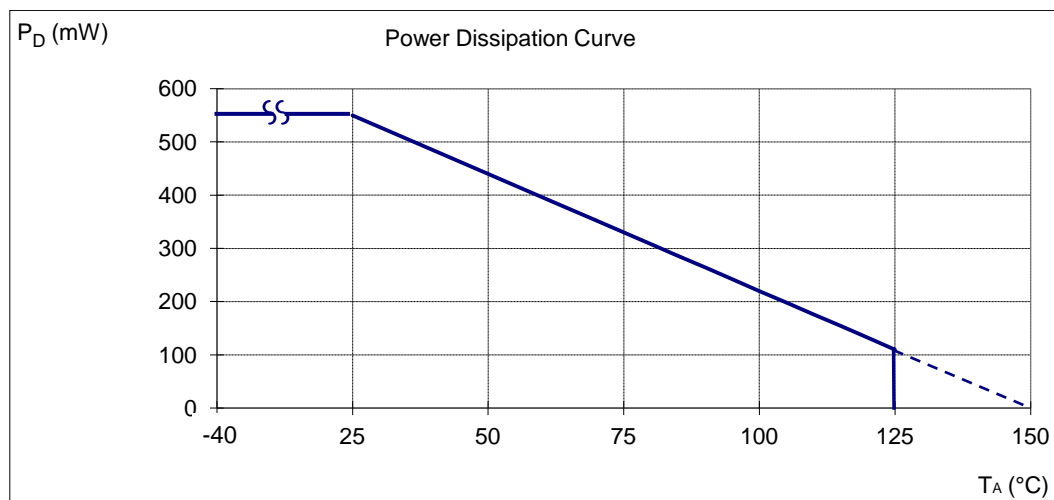
(1) Package Type: SOT23

T _A (°C)	25	50	60	70	80	85	90	100	105	110	120	125	130	140	150
P _D (mW)	230	184	166	147	129	120	110	92	83	74	55	46	37	18	0

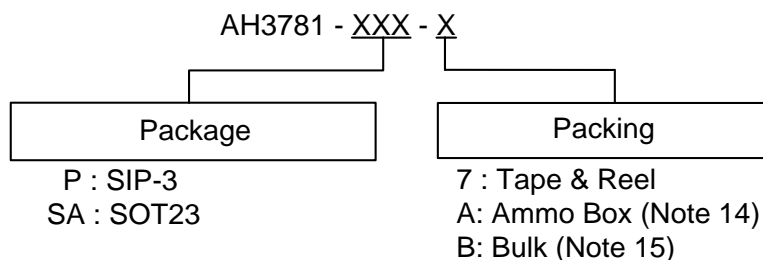


(2) Package type: SIP-3

T _A (°C)	25	50	60	70	80	85	90	100	105	110	120	125	130	140	150
P _D (mW)	550	440	396	362	308	286	264	220	198	176	132	110	88	44	0



Ordering Information



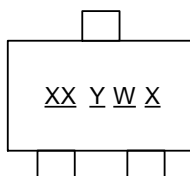
Part Number	Package Code	Packaging	Bulk		7" Tape and Reel		Ammo Box	
			Quantity	Part Number Suffix	Quantity	Part Number Suffix	Quantity	Part Number Suffix
AH3781-P-A	P	SIP-3	NA	NA	NA	NA	4,000/Box	-A
AH3781-P-B	P	SIP-3	1,000	-B	NA	NA	NA	NA
AH3781-SA-7	SA	SOT23	NA	NA	3,000/Tape & Reel	-7	NA	NA

Notes: 14. Ammo Box is for SIP-3 Spread Lead.
15. Bulk is for SIP-3 Straight Lead.

Marking Information

(1) Package Type: SOT23

(Top View)

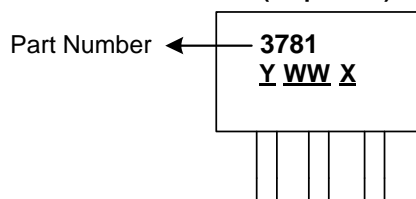


XX : Identification code
Y : Year 0 to 9
W : Week : A to Z : 1 to 26 week;
a to z : 27 to 52 week; z represents
52 and 53 week
X : Internal code

Part Number	Package	Identification Code
AH3781	SOT23	WX

(2) Package Type: SIP-3

(Top View)



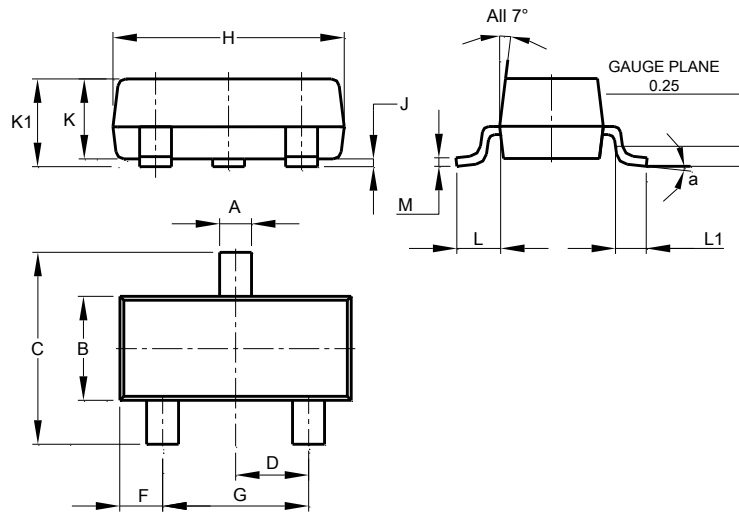
Y : Year : 0~9
WW : Week : 01~52, "52" represents
52 and 53 week
X : Internal Code

Part Number	Package	Identification Code
AH3781	SIP-3	3781

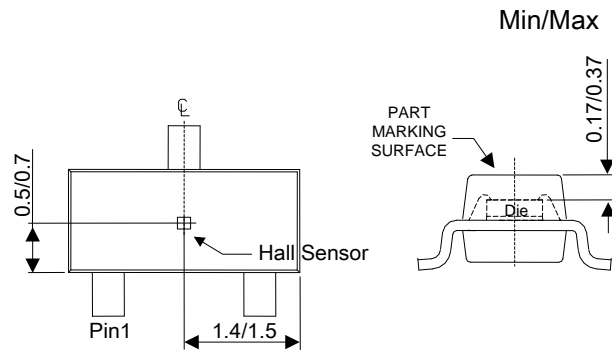
Package Outline Dimensions (All dimensions in mm.)

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.

(1) Package Type: SOT23



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	8°		
All Dimensions in mm			

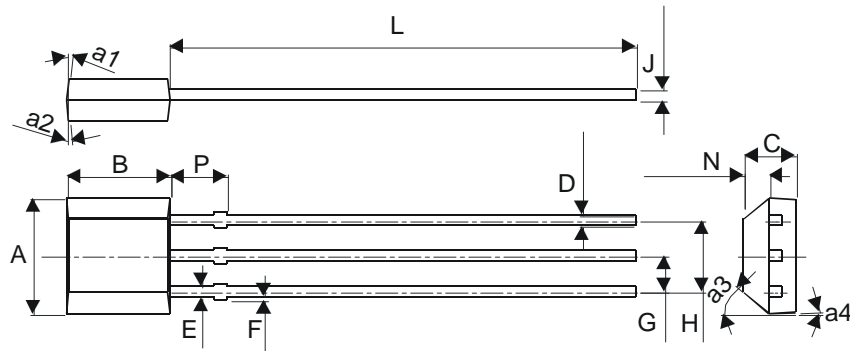


Sensor Location

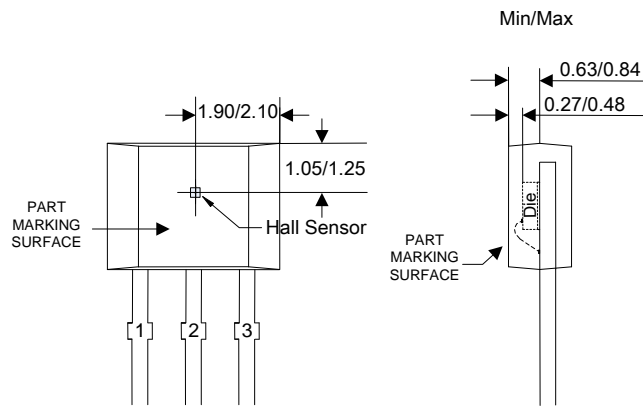
Package Outline Dimensions (cont.) (All dimensions in mm.)

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.

(2) Package Type: SIP-3 Bulk



SIP-3 (Bulk)		
Dim	Min	Max
A	3.9	4.3
a1	5° Typ	
a2	5° Typ	
a3	45° Typ	
a4	3° Typ	
B	2.8	3.2
C	1.40	1.60
D	0.33	0.432
E	0.40	0.508
F	0	0.2
G	1.24	1.30
H	2.51	2.57
J	0.35	0.43
L	14.0	15.0
N	0.63	0.84
P	1.55	-
All Dimensions in mm		

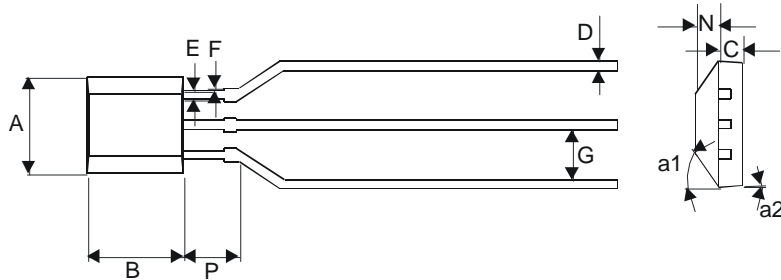


Sensor Location

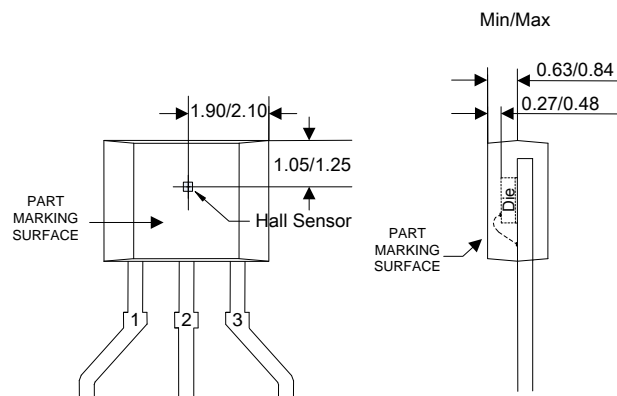
Package Outline Dimensions (cont.) (All dimensions in mm.)

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.

(3) Package Type: SIP-3 Ammo Pack



SIP-3 (Ammo Pack)		
Dim	Min	Max
A	3.9	4.3
a1	45° Typ	
a2	3° Typ	
B	2.8	3.2
C	1.40	1.60
D	0.35	0.41
E	0.43	0.48
F	0	0.2
G	2.4	2.9
N	0.63	0.84
P	1.55	-
All Dimensions in mm		

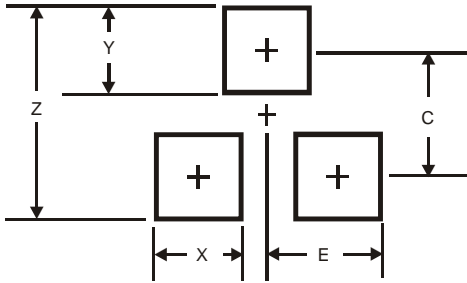


Sensor Location

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

(1) Package Type: SOT23



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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