Micropower Ultra-Sensitive Hall Effect Switch

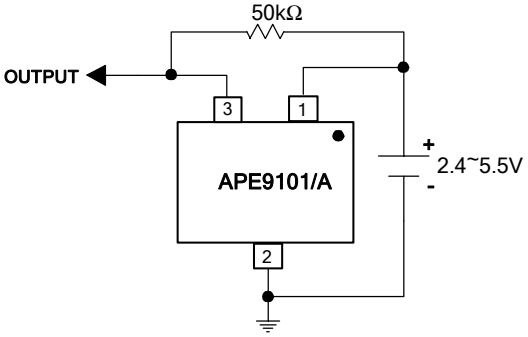
FEATURES

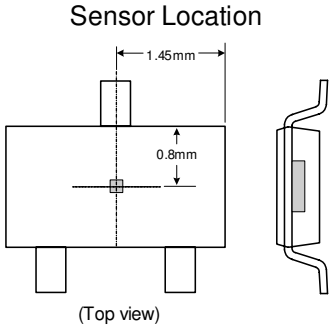
- Battery Operation from 2.4V to 5.5V
- Chopper Stabilized Technology
- Micro Power Operation for Battery Applications
- Operation with North or South Pole
- High Sensitivity and High Stability of the Magnetic Switching Points
- Small RoHS-compliant, halogen-free SOT-23 or TSOT-23 packages

DESCRIPTION

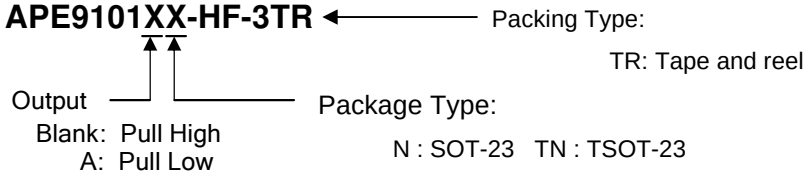
The APE9101/A-HF-3 is a three-terminal Hall Effect sensor device with an output driver, mainly designed for battery operated hand-held equipment (such as cellular and cordless phones, PDAs). After power-on, the APE9101/A-HF-3 will detect and setup the operating pole (North or South) to avoid another side magnetic noise. (Patent pending). For the APE9101-HF-3, the output will be turned off in the absence of a magnetic field. While the magnetic flux density B is larger than the operating point, Bop, the output will be turned on. The output remains latched on until the flux density B drops below the release point, Brp.

Typical Application





Ordering information



Example:

APE9101ATN-HF-3TR : output pull low, in RoHS-compliant, halogen-free TSOT-23, shipped on tape and reel (3000 pcs/reel).

Absolute Maximum Ratings (at T_A = 25℃)

Supply Voltage Pin (V_{DD}) ---------- -0.3 to 6V
Output Voltage Pin(V_{OUT}) ---------- -0.3 to 6V
Output Current Pin (I_{OUT}) ---------- 2mA
Power Dissipation(P_D) ---------- 230mW
Storage Temperature Range(T_{ST}) ---------- -65℃ To 150℃
Operating Temperature Range(T_{OP}) ---------- -40℃ To 85℃
Junction Temperature(T_J) ---------- 125℃
Thermal Resistance from Junction to Ambient(Rth_{JA}) 550℃/W

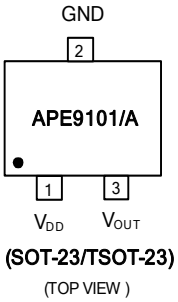
Note. Rth_{JA} is measured with the PCB copper area of approximately 1 in^2(Multi-layer).

Electrical Specifications

(V_{DD}=2.75V, T_A=25℃, unless otherwise specified)

Parameter	SYM	TEST CONDITION	MIN	TYP	MAX	UNITS
Supply Voltage	V_{DD}		2.4	-	5.5	V
Input Current		Awake State	-	2	4	mA
		Sleep State	-	7	12	uA
		Average	-	9	16	uA
Output Saturation Voltage	V_{OSAT}	I_O=1mA	-	0.1	0.3	V
Output Leakage Current	I_{O-LEAK}	VOUT=5.5V, B<Brp	-	0.01	1	uA
Output Wake-Up Time	$T_{wake-up}$		-	70	120	us
Period	T_{Period}		-	70	120	ms
Duty Cycle			-	0.1	-	%
North or South Pole Detection and Setup Time	T_{Set}	Continuous >B_{OPS} or <B_{OPN}	-	210	400	ms

Pin Assignment



(SOT-23/TSOT-23)
(TOP VIEW)

Pin Functional Descriptions

PIN SYMBOL	PIN DESCRIPTION
VDD	Power Input Pin
GND	Ground
OUTPUT	APE9101 B>Bops or B<Bopn, Output is Low. B<Brps or B> Brpn, Output is High. APE9101A B>Bops or B<Bopn, Output is High. B<Brps or B> Brpn, Output is Low.

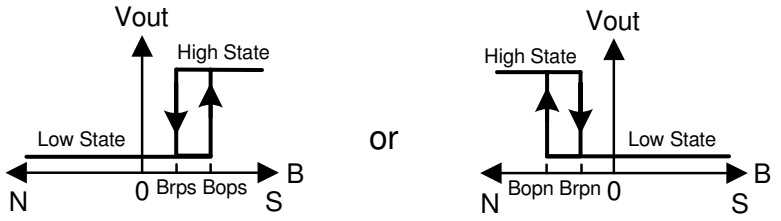
Magnetic Characteristics

(V_{DD} = 2.75V, T_A=25℃, unless otherwise specified)

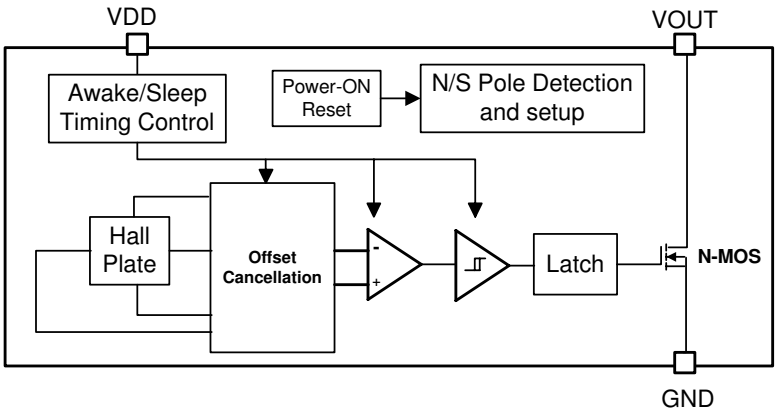
Parameter	SYM	TEST CONDITION	MIN	TYP	MAX	UNITS
Operating Points	B_{OPS}		-	35	55	Gauss
	B_{OPN}		-55	-35	-	
Release Points	B_{RPS}		10	25	-	
	B_{RPN}		-	-25	-10	
Hysteresis	B_{hys}		-	10	-	

1.APE9101

2.APE9101A

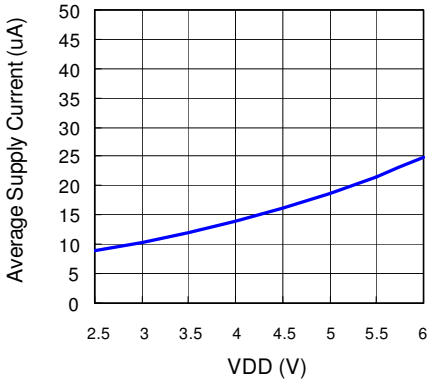


Block Diagram

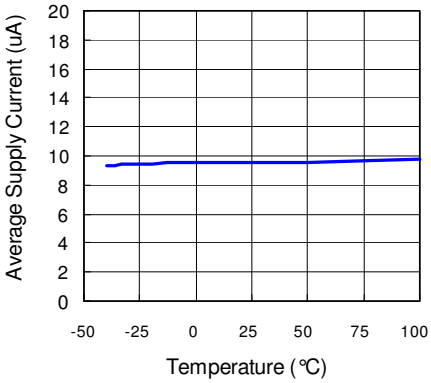


Typical Performance Characteristics

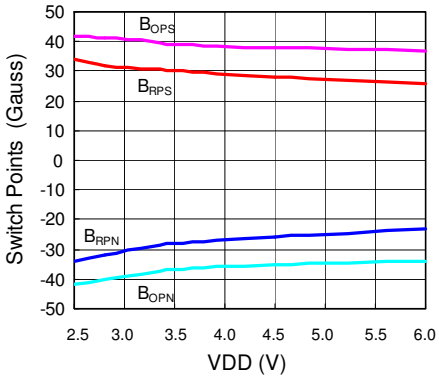
Average Supply Current vs. VDD



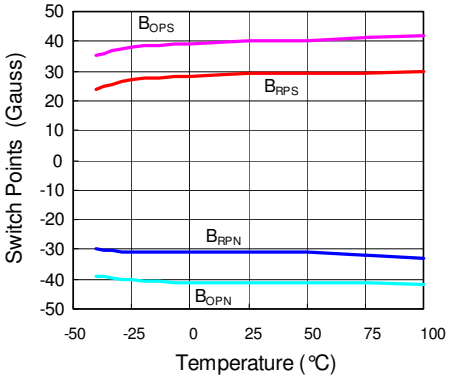
Average Supply Current vs. Temperature



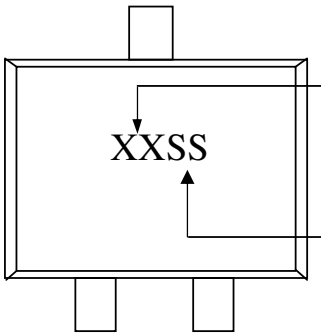
Switch Points vs. VDD



Switch Points vs. Temperature



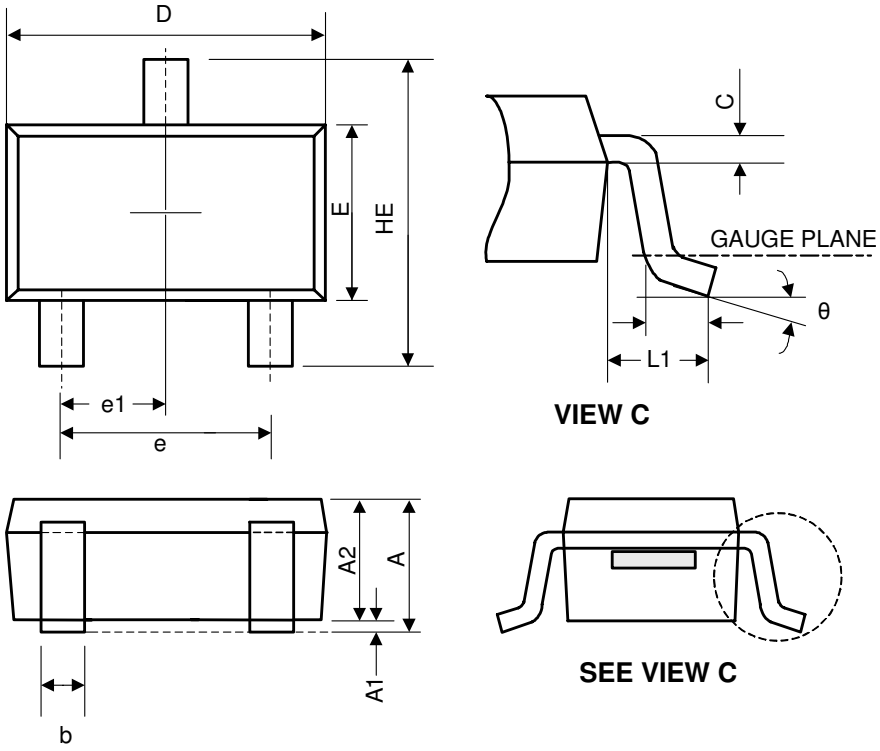
Marking Information: SOT-23 and TSOT-23



Part Number
H1 : APE9101AN/ATN-HF-3
H2 : APE9101N/TN-HF-3

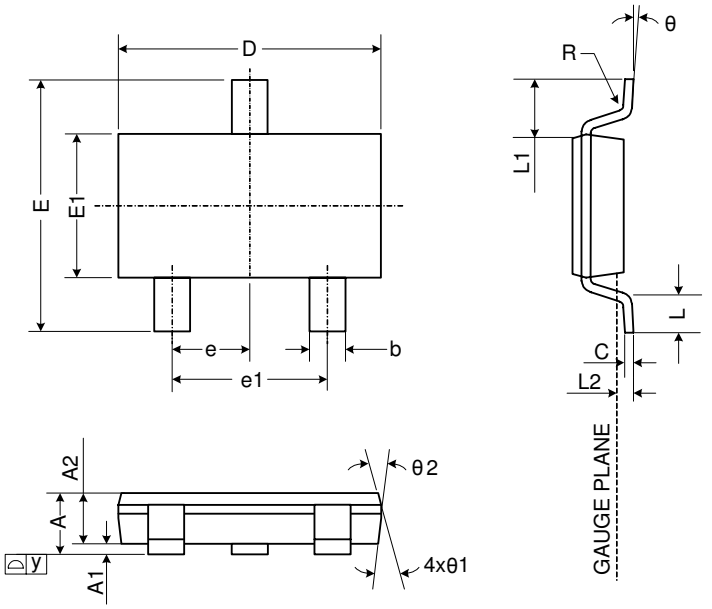
Date/lot code
For details of how to convert this to standard YYWW date code format, please contact us directly.

Package Dimensions: SOT-23



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.05	-	1.35	0.041	-	0.053
A1	0.05	-	0.15	0.002	-	0.006
A2	1.00	1.10	1.20	0.039	0.043	0.047
b	0.25	-	0.50	0.010	-	0.020
C	0.08	-	0.20	0.003	-	0.008
D	2.70	2.90	3.00	0.106	0.114	0.118
E	1.50	1.60	1.70	0.059	0.063	0.067
HE	2.60	2.80	3.00	0.102	0.110	0.118
L	0.30	-	0.60	0.012	-	0.024
L1	0.50	0.60	0.70	0.020	0.024	0.028
e	1.80	1.90	2.00	0.071	0.075	0.079
e1	0.85	0.95	1.05	0.033	0.037	0.041
θ	0°	5°	10°	0°	5°	10°

Package Dimensions: TSOT-23



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.75	-	0.90	0.030	-	0.035
A1	0.00	-	0.10	0.000	-	0.004
A2	0.70	0.75	0.80	0.028	0.030	0.031
b	0.35	-	0.51	0.014	-	0.020
C	0.10	-	0.25	0.004	-	0.010
D	2.80	2.90	3.00	0.110	0.114	0.118
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.50	1.60	1.70	0.059	0.063	0.067
e	0.95 BSC.			0.037		
e1	1.90 BSC.			0.075		
L	0.37	-	-	0.015	-	-
L1	0.60 REF.			0.024		
L2	0.25 BSC.			0.010		
y	-	-	0.10	-	-	0.004
R	0.10	-	-	0.004	-	-
θ	0°	-	8°	0°	-	8°
θ1	7° NOM.			7° NOM.		
θ2	5° NOM.			5° NOM.		