

High Sensitivity Hall Effect Sensor IC with Reverse Voltage Protection

Features

- On-chip Reverse Voltage Protection
- On-chip Hall Sensor
- Low Operating Supply Voltage : 3 V
- High Output Sinking Capability up to 400mA
- Versatile sensitivity and hysteresis setting
- Reliable and Rugged
- 4 pin TO-92M Package
- Build-in Output Zener Diodes to Clamp the Peak Output Voltage
- High Sensitivity Hall Effect Sensor IC: $\pm 50\text{G}$, $\pm 65\text{G}$, and $\pm 90\text{G}$

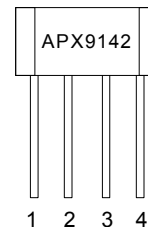
Applications

- Brushless DC Fan
- Revolution Counting
- Brushless DC Motor
- Speed Measurement

General Description

The APX9142 is an integrated Hall Effect Sensor IC designed for electric commutation of DC brushless motor applications. The APX9142 still can operate at as low as 3 volts. The APX9142 is available in low cost TO-92M4 package with 3 different magnetic ranks.

Pin Description



Front View

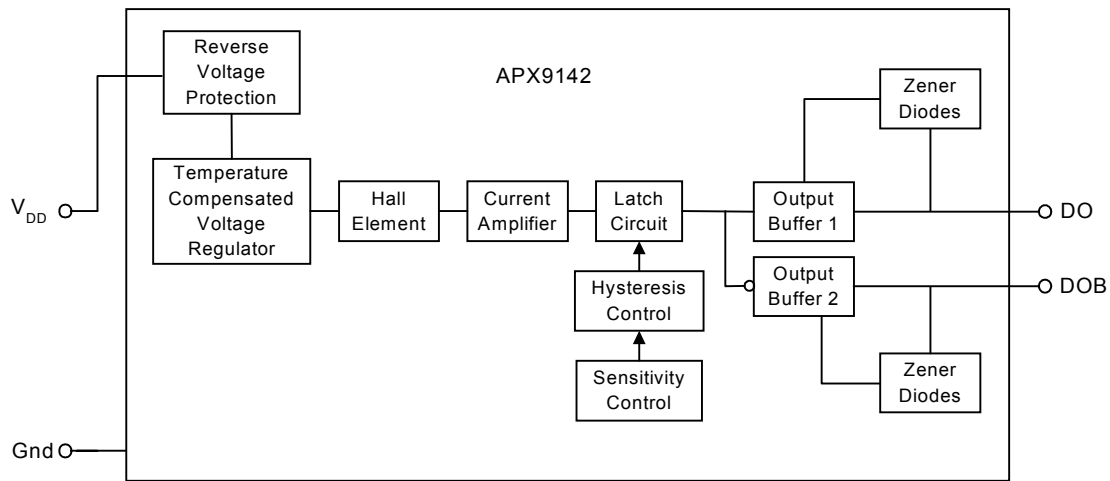
- 1 : V_{DD}
- 2 : DO
- 3 : DOB
- 4 : GND

Ordering and Marking Information

APX9142 □□□-□□ □□□□□□□□ Handling Code Temp. Range Package Code Magnetic Rank	Magnetic Rank AT : Bop , Brp < 50 Gauss A : Bop , Brp < 65 Gauss B : Bop , Brp < 90 Gauss Package Code E : TO - 92M4 Temp. Range E : - 20 to 85 °C Handling Code PB : Plastic Bag TR : Tape & Reel TB : Tape & Box
APX9142 E : APX 9142 XXXXX	XXXXX - Date Code

ANPEC reserves the right to make changes to improve reliability or manufacturability without notice, and advise customers to obtain the latest version of relevant information to verify before placing orders.

Block Diagram



Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Unit
V_{DD}	Supply Voltage	20	V
I_{DD}	Supply Current	15	mA
I_{OUT}	Output Current – Continuous Hold Current Peak (Start Up)	400 600 800	mA
P_D	Maximum Power Dissipation	500	mW
T_A	Operating Ambient Temperature	-20 to 85	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-65 to 150	
T_{SOL}	Soldering Temperature (10 Sec.)	260	

Electrical Characteristics $T_A = 25^\circ\text{C}$, $V_{DD} = 12\text{V}$ unless otherwise noted

Symbol	Parameter	Test Condition	APX9142			Unit
			Min.	Typ.	Max.	
V_{DD}	Supply Voltage	Operating	3		20	V
V_{SAT}	Output Saturation Voltage	$I_{OUT}=400\text{mA}$, $B>Bop$		600	800	mV
		$I_{OUT}=200\text{mA}$, $B>Bop$		250	350	
V_{Clamp}	Clamp Output Voltage			30		V
I_{DD}	Supply Current	$V_{DD}=20\text{V}$, Output Open		10	15	mA
I_{Leak}^a	Output Leakage Current	$V_{OUT}=20\text{V}$, $V_{DD}=20\text{V}$, $B<Brp$		<0.1	10	μA
t_r^b	Output Rise Time	$R_L=820\Omega$, $C_L=20\text{pF}$		0.8	5	μs
t_f^b	Output Fall Time			0.1	1	μs
Δt^b	Switch Time Different			2.5	7	μs

Notes ^a : No leakage current spike when IC start-up

^b : use Figure 1

Magnetic Characteristics $T_A = 25^\circ\text{C}$, $V_{DD} = 12\text{V}$ unless otherwise noted

Rank	Maximum Operate Point Bop	Maximum Release Point Brp	Unit
AT	+40	-40	Gauss
A	+55	-55	Gauss
B	+80	-80	Gauss

Test Information

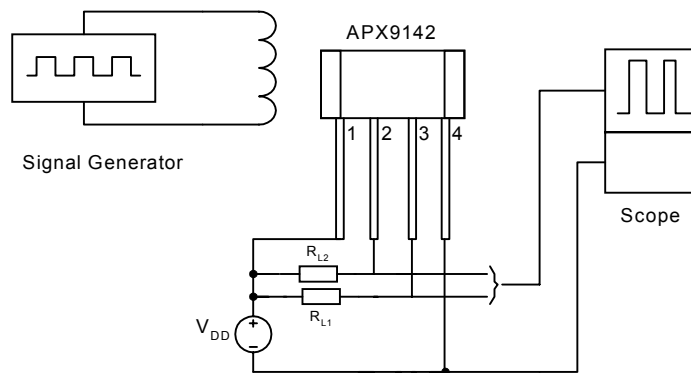


Figure 1 : Switching Circuit for Output Rise Time and Fall Time Measurement

Application Circuit

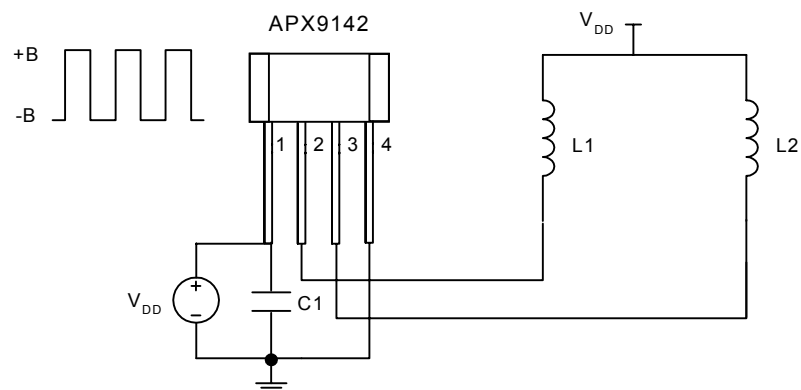
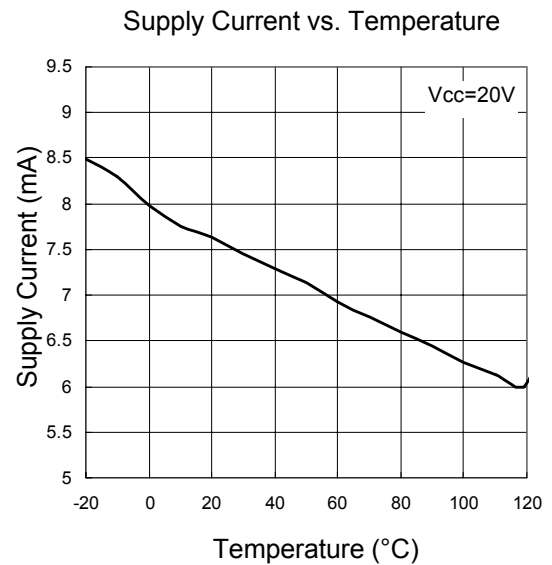
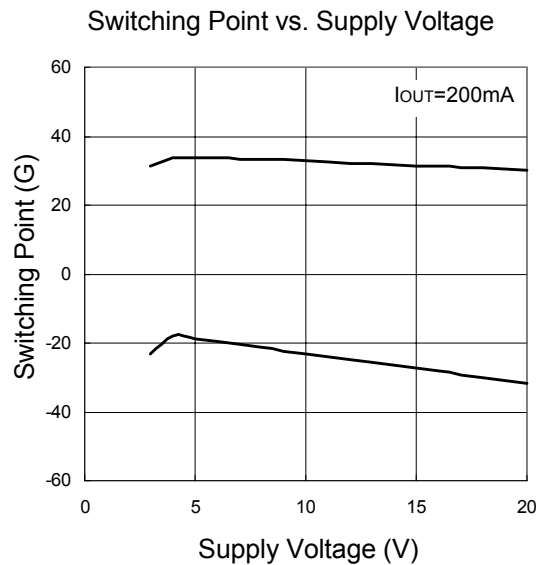
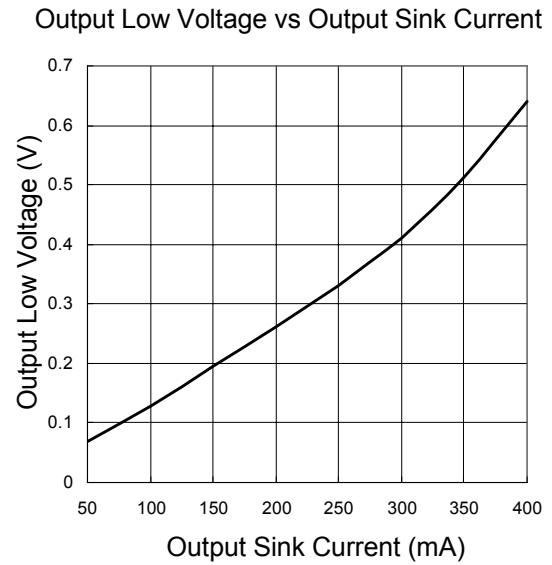
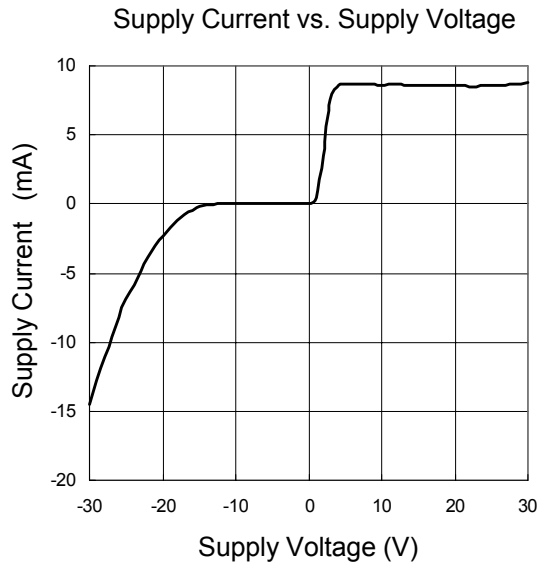
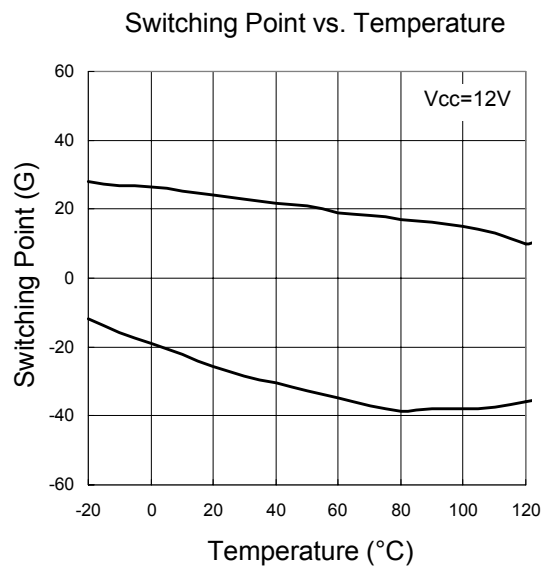


Figure 2 Typical DC brushless fan application circuit

Typical Characteristics

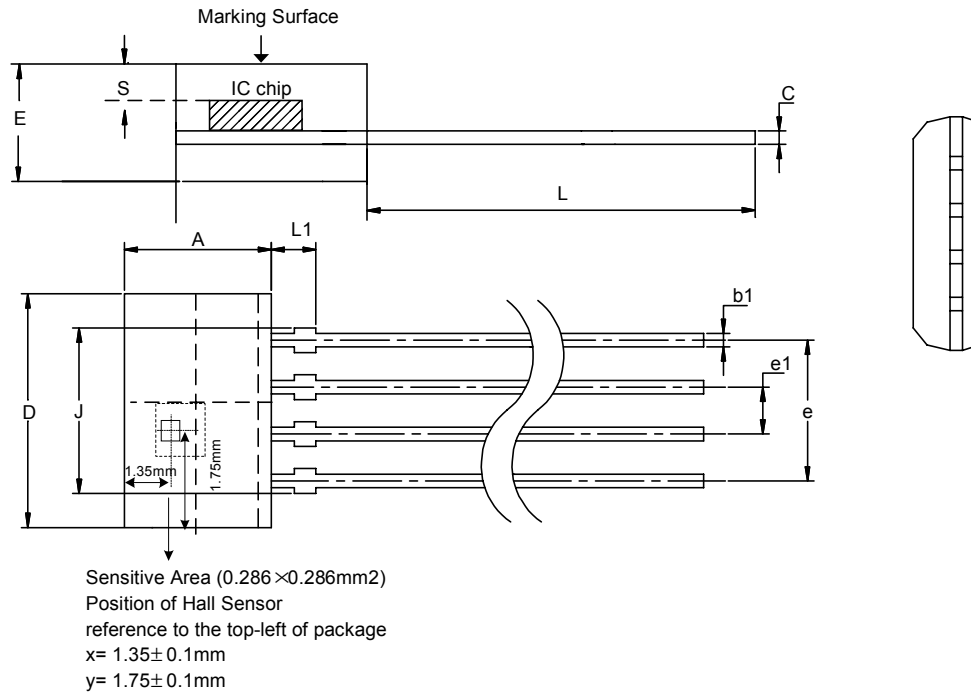


Typical Characteristics (Cont.)



Package Information

TO-92M4



Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	3.60	3.70	0.141	0.145
b1	0.35	0.41	0.014	0.016
C	0.351	0.411	0.014	0.016
D	5.17	5.27	0.203	0.207
e	3.78	3.84	0.148	0.150
e1	1.24	1.30	0.049	0.051
E	1.50	1.60	0.059	0.063
J	4.04	4.34	0.158	0.170
L	14.0	15.0	0.549	0.588
L1	1.342	1.542	0.053	0.060
S	0.45	0.55	0.018	0.022

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