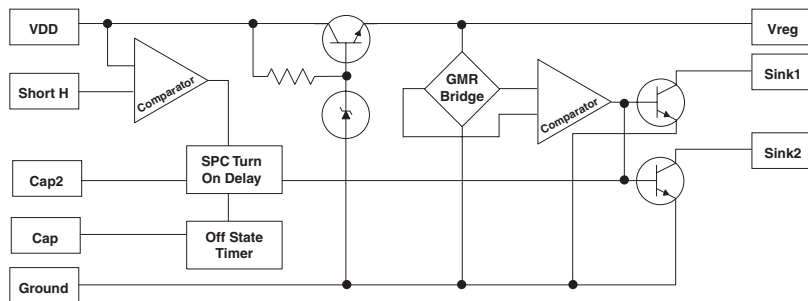


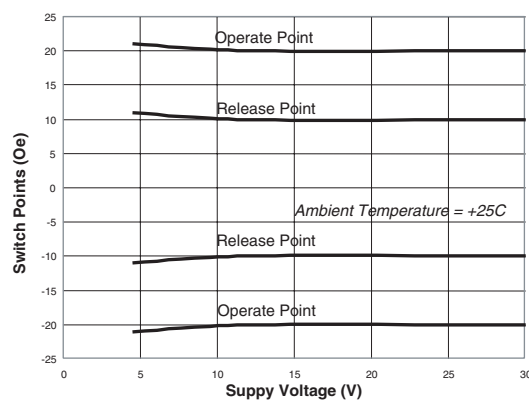
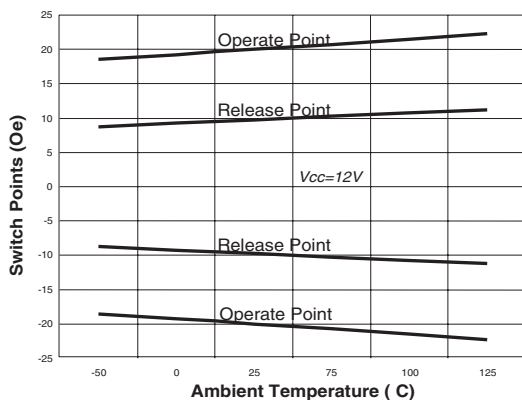
NVE offers these products specifically for use with an external high current output transistor in industrial control environments. These parts provide the same precise magnetic performance that NVE's GMR Digital Switch is known for, with the additional functionality of short circuit protection (SCP) for the output stage of the circuit. The protection circuit is designed to shut off the output stage when a short circuit condition exists; after a time interval specified by the user, the circuit turns back on. If the short circuit condition still exists, the output stage is again shut off and the cycle repeats. The use of this sensor, along with external reverse battery protection and overvoltage protection, results in a 'bulletproof' sensor assembly.

These digital sensors with SCP are available for use with current sinking or current sourcing outputs, in a range of magnetic field operate points. They are provided in a TSSOP 8 pin package, with the cross-axis direction of sensitivity (see NVE Digital Switch brochure for package dimensions and definition of cross axis direction). An LED driver to indicate the presence of the magnetic field is also standard on these products. An SOIC package, and standard direction of sensitivity, are available on a special order basis.

Functional Block Diagram



Typical Magnetic Performance for AD821-00 and AD921-00



Magnetic Characteristics @ 12V, +25°C

Part Number	Operating Point (Oe)		Differential (Oe) ¹		Output ²	Marking ³	Orientation	Package ⁴
	min	max	min	max				
AD821-00	15	25	5	–	Sink+Sink	MBB	Cross-axis	TSSOP
AD824-00	21	34	5	20	Sink+Sink	MBF	Cross-axis	TSSOP
AD822-00	30	50	5	25	Sink+Sink	MBC	Cross-axis	TSSOP
AD823-00	60	100	5	35	Sink+Sink	MBD	Cross-axis	TSSOP
AD921-00	15	25	5	–	Sink+Source	NBB	Cross-axis	TSSOP
AD924-00	21	34	5	20	Sink+Source	NBF	Cross-axis	TSSOP
AD922-00	30	50	5	25	Sink+Source	NBC	Cross-axis	TSSOP
AD923-00	60	100	5	35	Sink+Source	NBD	Cross-axis	TSSOP

Electrical Characteristics @-40°C to +125°C⁸, unless otherwise noted.

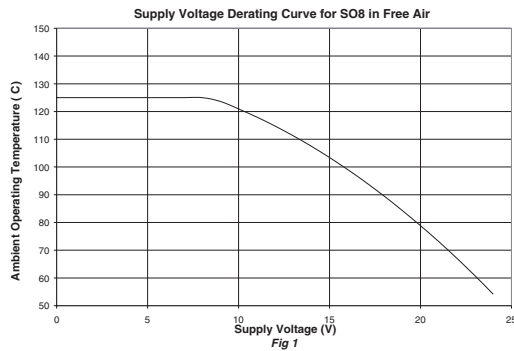
Parameter	Test Conditions	Min	Max	Units
Supply Voltage(VCC)	Operating	4.5	30	Volts
Supply Current	Output Off, VCC=12	1.75	3.5	mA
Current Sinking Output	Operating	0	2.0	mA
Current Sourcing Output	Operating	0	2.0	mA
Output Leakage	Output Off, Vout=30V		10	uA
Sinking Output Saturation Voltage	Output On, Iol=3mA		0.4	Volts
Sourcing Output Saturations Voltage	Output On, Iol=3mA		Vcc – 2.0	Volts
Regulated Output Voltage	Operating	3.5	6	Volts
Regulated Output Current	Operating		3.0	mA
Short High Voltage	Output On	0.12	0.17	Volt
Short Low Voltage	Output On	0.12	0.17	Volts

Absolute maximum ratings

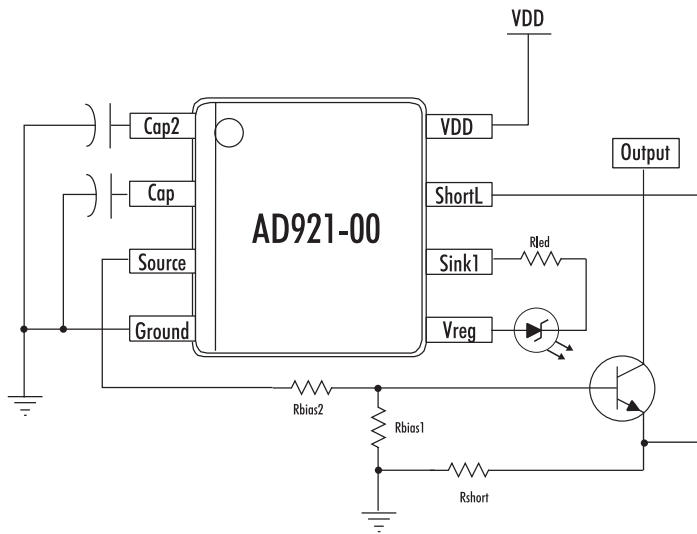
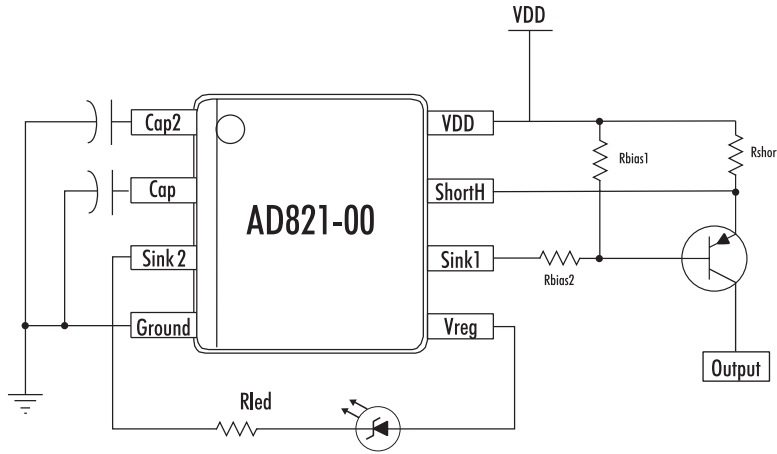
Parameter	Limit
Supply Voltage(VCC)	33.0 V
Reverse Battery Voltage	-0.5
Magnetic Flux Density	300 Oe
Output Off Voltage	33 V
Reverse Output Voltage ⁶	-0.5 V
Continuous Output Current	5 mA
Operating Temperature Range	-40°C to +150°C ⁷
Storage Temperature Range	-65°C to +150°C

Notes:

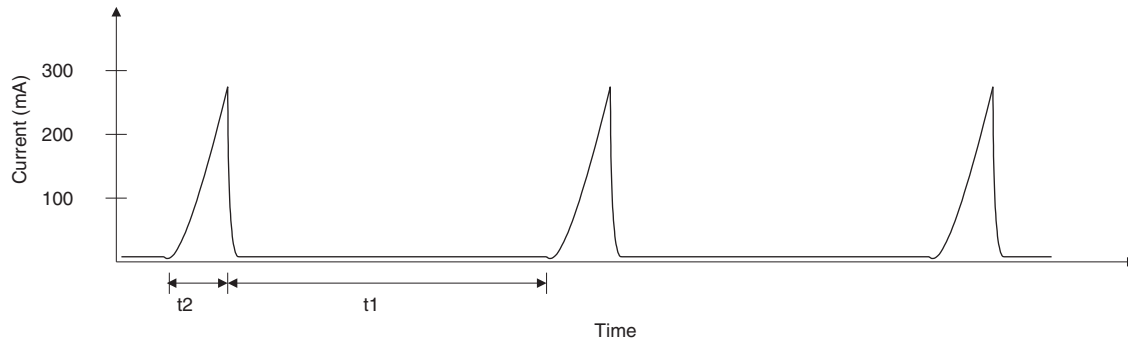
- Differential = (Operate Point) - (Release Point). Minimum Release Point for AD821-00 or AD921-00 is 5 Oe
- The Sink output must be connected through a series resistor to a positive power supply and the Source output through a series resistor to ground. Deviations from specified current could result in damage to part.
- Due to package size, TSSOP package contains company name (NVE) and three-letter code to designate part type.
- See Package Dimensions Bulletin.
- Large Magnetic Fields WILL NOT cause permanent damage to NVE GMR Sensors**
- This part does not have a reverse battery protection.
- See Figure 4.



Typical Circuit Configurations



Output Transistor Current in Short Circuit Mode



Notes:

1. T2 Cap is used to delay the startup of the SCP circuitry, in order to avoid triggering the SCP circuitry on normal startup transients: See t_2 on the graph above. Typical value is 16V, 0.001uF, for a 35us delay.
2. T1 Cap is used to set the "Off" time of the SCP circuitry; See t_1 on the graph above. Typical value is 16V, 0.01uF, for a 15ms Off time.
3. The voltage across Rshort is monitored by the IC; if this voltage exceeds 145mV (typical), the SCP circuitry is activated. Typical value of Rshort is 0.47 Ohms, 1/16 watt. This will result in SCP circuitry turning on at about 300mA of output current.
4. Rbias1 and Rbias2 are used to bias the output transistor, typically a Darlington. Typical values for Rbias 1 and Rbias 2 are 16K and 3K, respectively, to supply 1mA drive to the output transistor .
5. Rled is sized for whatever LED current is required by the user; maximum of 3 mA. Voltage supplied to this portion of the circuit by the IC is 5.8V for $VDD \geq 6.5V$, and $VDD-1V$ for $VDD < 6.5V$