

## Solid State Hall Effect Sensors

High Performance Miniature Ratiometric Linear

*SS490 Series*

### FEATURES

- Small size (.160 x .118 in)
- Power consumption of 7 mA at 5 VDC for energy efficiency
- Single current sinking or current sourcing output
- Linear output for circuit design flexibility
- Built-in thin film resistors are laser trimmed for precise sensitivity and temperature compensation
- Rail-to-rail operation provides more useable signal for higher accuracy
- Temperature range of -40°C to +150°C
- Responds to either positive or negative gauss
- Quad Hall sensing element for stable output

### TYPICAL APPLICATIONS

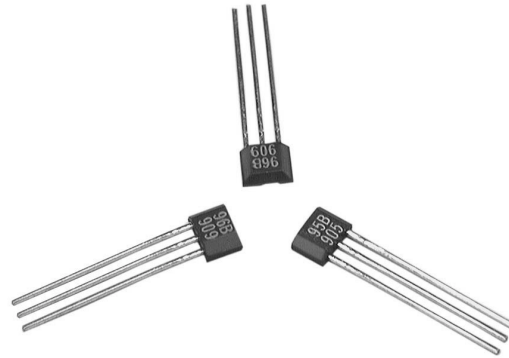
- Current sensing
- Motor control
- Position sensing
- Magnetic code reading
- Rotary encoder
- Ferrous metal detector
- Vibration sensing
- Liquid level sensing
- Weight sensing

### **⚠ WARNING**

#### PERSONAL INJURY

- DO NOT USE these products as safety or emergency stop devices, or in any other application where failure of the product could result in personal injury.

**Failure to comply with these instructions could result in death or serious injury.**



The SS490 Series MRL (Miniature Ratiometric Linear) sensors are small, versatile linear Hall effect devices which are operated by the magnetic field from a permanent magnet or an electromagnet. The ratiometric output voltage is set by the supply voltage and varies in proportion to the strength of the magnetic field.

The integrated circuitry provides increased temperature stability and sensitivity. Laser trimmed thin film resistors provide high accuracy (null to  $\pm 3\%$ , sensitivity up to  $\pm 3\%$ ) and temperature compensation. These linear position sensors have an operating temperature range of -40°C to +150°C, appropriate for industrial and automotive environments. They respond to either positive or negative gauss, monitoring either or both magnetic poles. The quad Hall sensing element minimizes the effects of mechanical or thermal stress on the output. The positive temperature coefficient of the sensitivity (+0.02%/°C typical) helps compensate for the negative temperature coefficients of low cost magnets, providing a robust design over a wide temperature range. Rail-to-rail operation (over full voltage range) provides a more usable signal for higher accuracy.

The recent extension to the product line, the SS490B Series, offers cost-effective MRL sensing solutions with slightly wider specifications than the SS490 high-performance products. Like the SS490 Series, the SS490B has a typical sinking or sourcing output of 1.5 mA continuous, uses 7 mA of supply current at 5.0 volts and 25°C, and provides predictable performance over the full temperature range. The SS490B Series sensors have wider null and sensitivity tolerances and a wider drift over temperature.

The SS490B Series sensors are a new lower cost product line extension. They complement the SS490 Series of small size, high accuracy and high performance miniature linear products.

### **⚠ WARNING**

#### MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as product installation information.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

**Failure to comply with these instructions could result in death or serious injury.**

# Solid State Hall Effect Sensors

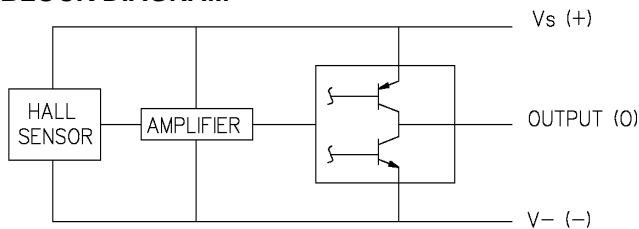
High Performance Miniature Ratiometric Linear

SS490 Series

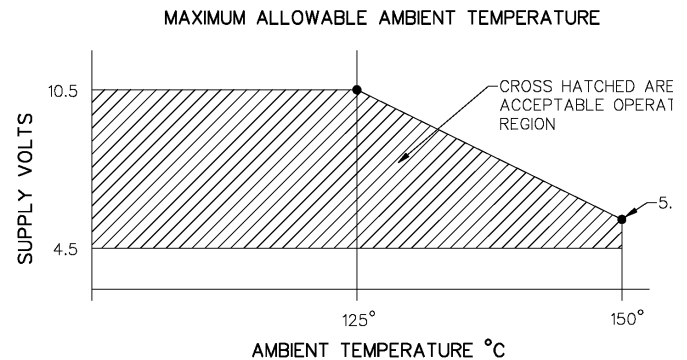
## SPECIFICATIONS ( $V_s = 5.0 \text{ V}$ , $t_a = -40 \text{ to } +125^\circ\text{C}$ , unless otherwise noted)

Catalog Listing Type		SS495A	SS495A1	SS495A2	SS495B	SS496A	SS496A1	SS496B
Supply Voltage (VDC)		4.5 to 10.5						
Supply Current @ $25^\circ\text{C}$ (mA)	Typ.	7.0						
	Max.	8.7						
Output Type (Sink or Source)		Ratiometric						
Output Current (mA)	Typ. Sink or Source	$V_s > 4.5 \text{ V}$						
	Min. Source	$V_s > 4.5 \text{ V}$						
	Min. Sink	$V_s > 4.5 \text{ V}$						
	Min. Sink	$V_s > 5.0 \text{ V}$						
Operating Temperature		$-40 \text{ to } +150^\circ\text{C}$ ( $-40 \text{ to } +302^\circ\text{F}$ )						
Magnetic Range, Gauss	Typ.	$\pm 670$	$\pm 670$	$\pm 670$	$\pm 670$	$\pm 840$	$\pm 840$	$\pm 840$
	Min.	$\pm 600$	$\pm 600$	$\pm 600$	$\pm 600$	$\pm 750$	$\pm 750$	$\pm 750$
Output Voltage Span	Typ.	0.2 to $(V_s - 0.2)$						
	Min.	0.4 to $(V_s - 0.4)$						
Null (Output @ 0 Gauss, V)		$2.50 \pm 0.075$	$2.50 \pm 0.075$	$2.50 \pm 0.100$	$2.50 \pm 0.150$	$2.50 \pm 0.075$	$2.50 \pm 0.075$	$2.50 \pm 0.150$
Sensitivity (mV/G)		$3.125 \pm 0.125$	$3.125 \pm 0.094$	$3.125 \pm 0.156$	$3.125 \pm 0.250$	$2.50 \pm 0.100$	$2.50 \pm 0.075$	$2.50 \pm 0.200$
Linearity, % of Span	Typ.	-1.0						
	Max.	-1.5						
Temperature Error	Null Drift	(%/°C)	$\pm 0.06$	$\pm 0.04$	$\pm 0.07$	$\pm 0.08$	$\pm 0.048$	$\pm 0.03$
	Sensitivity Drift	(%/°C)						
		$\geq 25^\circ\text{C}$ Max.	-0.01, +0.05	-0.02, +0.06	-0.02, +0.06	-0.01, +0.05	-0.01, +0.05	-0.02, +0.06
		$< 25^\circ\text{C}$ Max.	0.0, +0.06	0.0, +0.06	-0.01, +0.07	-0.02, +0.06	0.0, +0.06	-0.02, +0.06

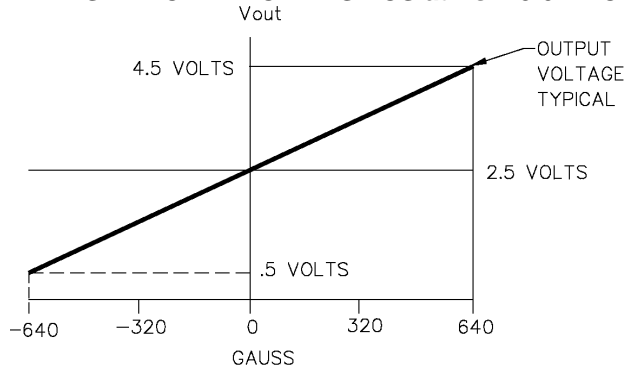
## BLOCK DIAGRAM



## MAXIMUM SUPPLY VOLTAGE vs. TEMPERATURE



## TRANSFER CHARACTERISTICS at $V_s = 5.0 \text{ VDC}$



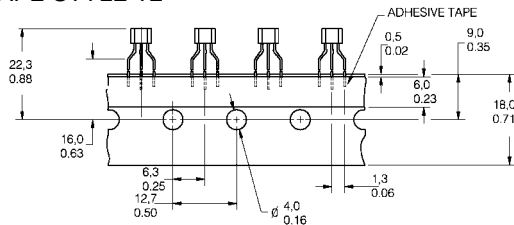
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High Performance Miniature Ratiometric Linear

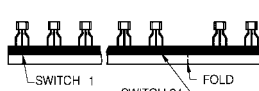
SS490 Series

## MOUNTING DIMENSIONS (for reference only) mm/in

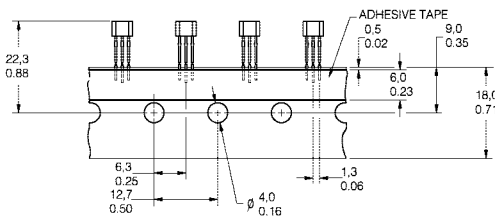
### TAPE STYLE T2



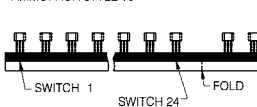
### AMMOPACK STYLE T2



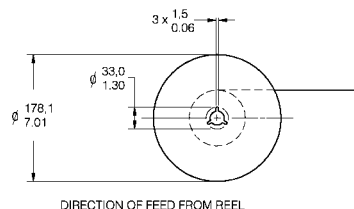
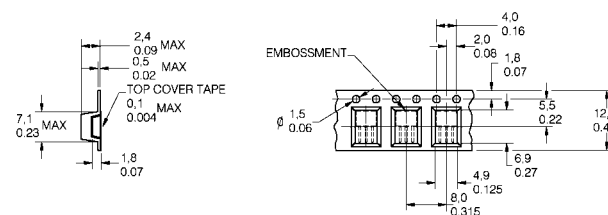
### TAPE STYLE T3



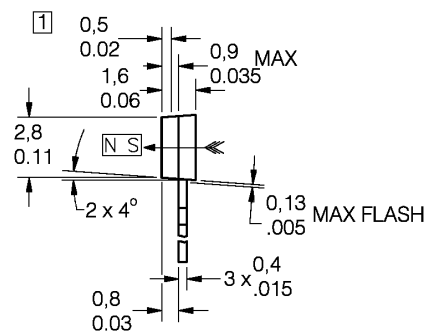
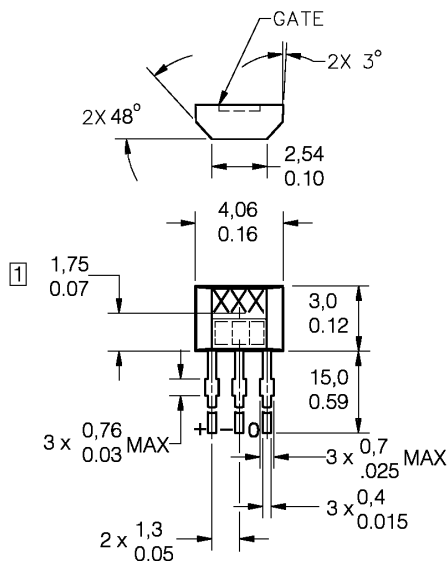
### AMMOPACK STYLE T3



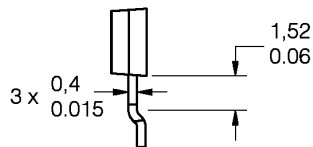
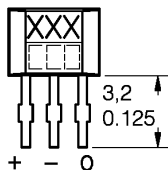
### TAPE STYLE P



## SENSOR PACKAGE ( 1 Centerline of Hall cell)



## OPTIONAL SURFACE MOUNT



# Solid State Hall Effect Sensors

## High Performance Miniature Ratiometric Linear

*SS490 Series*

### ABSOLUTE MAXIMUM RATINGS\*

Supply voltage ( $V_s$ )	-0.5 to +11 VDC
Output current (mA)	10 mA
Operating temperature	-40°C to +150°C (-40°F to +302°F)
Storage temperature	-55°C to +165°C (-67°F to +329°F)
Magnetic flux	No limit. Circuit cannot be damaged by magnetic over-drive

\* Absolute maximum ratings are the extreme limits that the device will withstand without damage to the device. However, the electrical and mechanical characteristics are not guaranteed as the maximum limits (above recommended operating conditions) are approached, nor will the device necessarily operate at absolute maximum ratings.

### NOTICE

Products ordered in bulk packaging (plastic bags) may not have perfectly straight leads as a result of normal handling and shipping operations. Please order a tape packaging option for applications with critical requirements for straight leads.

### WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

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