



SS495A



Actual product appearance may vary.

**SS490 Series Standard Miniature
Ratiometric Linear Hall-Effect Sensor;
radial lead IC package**

Features

- Small size
- Low power consumption
- Single current sinking or current sourcing linear output
- Built-in thin-film resistors - laser trimmed for precise sensitivity and temperature compensation
- Rail-to-rail operation provides more useable signal for higher accuracy
- Responds to either positive or negative gauss
- Quad Hall sensing element for stable output)

Potential Applications

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

Description

SS490 Series MRL (Miniature Ratiometric Linear) sensors have a ratiometric output voltage, set by the supply voltage. It varies in proportion to the strength of the magnetic field.

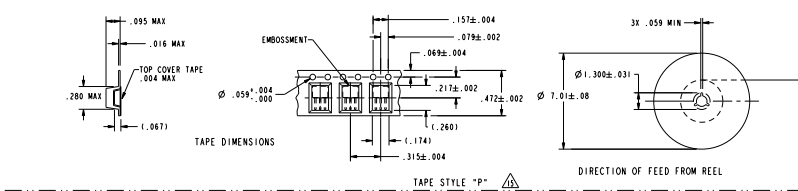
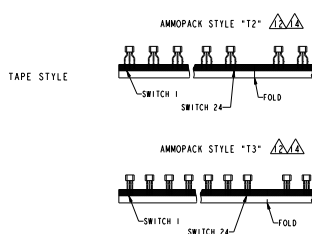
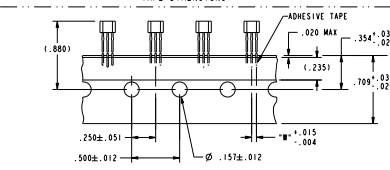
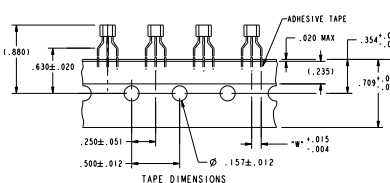
A new Hall effect integrated circuit chip provides increased temperature stability and sensitivity. Laser trimmed thin film resistors on the chip provide high accuracy and temperature compensation to reduce null and gain shift over temperature.

The quad Hall sensing element minimizes the effects of mechanical or thermal stress on the output. The positive temperature coefficient of the sensitivity helps compensate for the negative temperature coefficients of low cost magnets, providing a robust design over a wide temperature range.

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

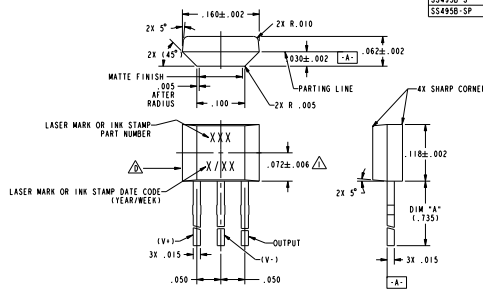
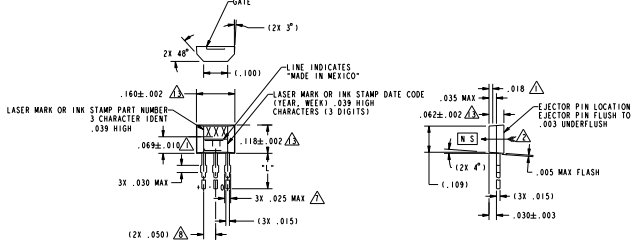
Product Specifications	
Product Type	Hall-Effect Digital Position Sensor IC
Package Quantity/Type	Available in 1,000/Bag
Package Style	Radial Lead IC
Supply Voltage	4.5 Vdc to 10.5 Vdc
Output Type	Sink/Source
Termination Type	PC Board
Magnetic Actuation Type	Ratiometric
Operating Temperature Range	-40 °C to 150 °C [-40 °F to 302 °F]
Storage Temperature	-55 °C to 165 °C [-67 °F to 329 °F]
Output Voltage	0.2 Vdc to ($V_S - 0.2$ Vdc) typ., 0.4 Vdc to ($V_S - 0.4$ Vdc) min.
Linearity (% of Span)	-1.0 % typ.
Output Voltage Span (min.)	0.4 Vdc to ($V_S - 0.4$ Vdc)
Availability	Global
Supply Current (max. @ 25 °C)	8.7 mA @ 5 Vdc
Sensitivity @ 25 °C	3.125 mV \pm 0.125 mV/G
Output Voltage Swing (Negative G)	0.4 Vdc
Output Voltage Swing (Positive G)	$V_S - 0.4$ Vdc
Temperature_Error_25_Null_Shift_2	\pm 0.06.
Temperature_Error_25_Sensitivity_1	-0.01 min., 0.05 max.
Output_Current_Typical_Source_45	1.5 mA
Output_Current_Minimum_Source_45	1 mA
Output_Current_Minimum_Sink_45	0.6 mA
Output_Current_Minimum_Sink_5	1 mA
Magnetic Range (typ.)	-67 mT to 67 mT [-670 G to 670 G]
Magnetic Range (min.)	-60 mT to 60 mT [-600 G to 600 G]
Output Voltage Span (typ.)	0.2 Vdc to ($V_S - 0.2$ Vdc)
Null (Output @ 0 G)	2.50 Vdc \pm 0.075 Vdc
Response Time (μ s)	3 μ s
Series Name	SS490

MS495 SERIES CHART 1



- NOTES**
- 1 - CENTERLINE OF HALL CELL
 - 2 - THE MAGNETIC FLUX IS IN THE DIRECTION SHOWN (THIS ASSUMES THE CONVENTION THAT THE DIRECTION OF THE EXTERNAL FLUX OF A MAGNET IS FROM THE NORTH TO THE SOUTH POLE OF THE MAGNET)
 - 3 - THE DEVICE CANNOT BE DAMAGED BY MAGNETIC OVERDRIVE
 - 4 - OUTPUT TYPE - RATIOMETRIC
 - 5 - LEADS MUST BE ADEQUATELY SUPPORTED DURING ANY FORMING/SHEERING OPERATION TO ASSURE THAT THE LEADS ARE NOT STRESSED WITHIN THE PLASTIC
 - 6 - PCB MFG: SOLDERING GUIDELINES ARE AS FOLLOWS:
 250°C PEAK FOR 10 S MAX OR 260°C PEAK FOR 5 S MAX.
 BURRS ARE ALLOWED ONLY IF FULL LENGTH OF LEAD WILL PASS THROUGH ∅ .023 HOLE.
 - 7 - LEAD REFERENCE DIMENSIONS DO NOT INCLUDE SOLDER THICKNESS
 - 8 - DIMENSION REFERS TO THE LOCATION OF LEAD CENTERLINES AS THE EXIT THE PLASTIC PACKAGE
 - 9 - SOME COMBINATIONS OF BASIC LISTING AND PACKAGE OPTIONS MAY NOT BE AVAILABLE
 - 10 - ABSOLUTE MAXIMUM RATINGS ARE THE EXTREME LIMITS THE DEVICE WILL MOMENTARILY WITHSTAND WITHOUT DAMAGE TO THE DEVICE. ELECTRICAL AND MAGNETIC CHARACTERISTICS ARE NOT GUARANTEED IF THE RATED VOLTAGE AND/OR CURRENTS ARE EXCEEDED NOR WILL THE DEVICE NECESSARILY OPERATE AT ABSOLUTE MAXIMUM RATINGS
 - 11 - LEAD STRAIGHTNESS MAY BE DEGRADED ON SOME UNITS BY BULK PACKAGING. APPLICATIONS HAVING A CRITICAL LEAD STRAIGHTNESS REQUIREMENT SHOULD USE A TAPE PACKAGING OPTION
 - 12 - AMMPACK STYLE "T2" & "T3" - 24 SWITCHES BETWEEN FOLDS, SKIP 1 SPACE AT FOLD. MAY BE REFERRED TO AS "FAN FOLD"
 - 13 - WELDED PART DIMENSIONS DO NOT INCLUDE FLASH. FLASH IS LIMITED TO .005 MAX
 - 14 - TAPE AND AMMPACK PER EIA-468
 - 15 - POCKET TAPE PER EIA-481

CATALOG LISTING	TAPE STYLE	DIM "L"	DIM "W"	COMMENTS
SS495A	NONE	.590	.050	BULK - 1000/BAG
SS495A-T2	T2	.590	.100	5000/BOX
SS495A-T3	T3	.590	.050	5000/BOX
SS495A-S	NONE	.125	.050	BULK - 1000/BAG
SS495A-SP	P	.125	.050	1000/PACKET TAPE AND REEL
SS495A1	NONE	.590	.050	BULK - 1000/BAG
SS495A1-T2	T2	.590	.100	5000/BOX
SS495A1-T3	T3	.590	.050	5000/BOX
SS495A1-S	NONE	.125	.050	BULK - 1000/BAG
SS495A1-SP	P	.125	.050	1000/PACKET TAPE AND REEL
SS495A2	NONE	.590	.050	BULK - 1000/BAG
SS495A2-S	P	.125	.050	1000/PACKET TAPE AND REEL
SS495A2-T2	T2	.590	.100	5000/BOX
SS495A2-T3	T3	.590	.050	5000/BOX
SS495A-L	NONE	.735	.050	BULK - 1000/BAG
SS495A1-L	NONE	.735	.050	BULK - 1000/BAG
SS495A2-L	NONE	.735	.050	BULK - 1000/BAG
SS495B	NONE	.590	.050	BULK - 1000/BAG
SS495B-T2	T2	.590	.100	5000/BOX
SS495B-T3	T3	.590	.050	5000/BOX
SS495B-S	NONE	.125	.050	BULK - 1000/BAG
SS495B-SP	P	.125	.050	1000/PACKET TAPE AND REEL



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MICRO SWITCH MINIMATURE RATIOMETRIC LINEAR HALL EFFECT SENSOR
SS495 SERIES CHART 1

THIRD ANGLE PROJECTION

SCALE 10:1

DO NOT SCALE PRINT

UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:

ONE PLACE 1.03 ± .030
 TWO PLACE 1.001 ± .015
 THREE PLACE 1.0001 ± .005
 ANGLES .2°

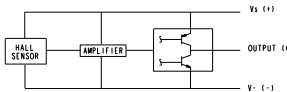
WEIGHT

CHARACTERISTICS ARE AT $V_s=5.0$ WITH 4.7K OUTPUT TO MINUS WITH $T_A=-40^{\circ}\text{C}$ TO 125°C UNLESS OTHERWISE SPECIFIED

SS495A

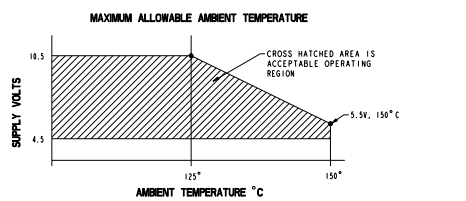
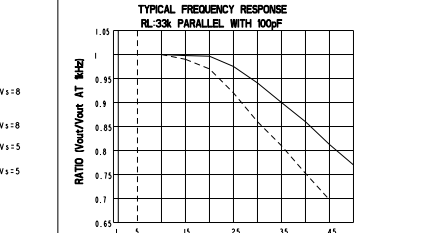
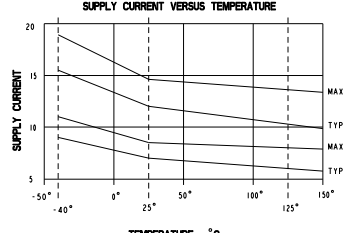
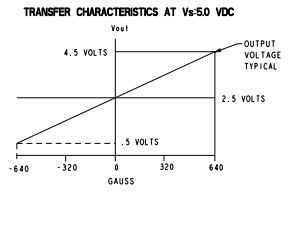
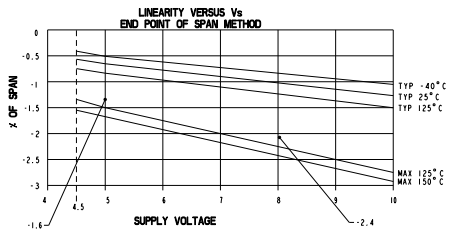
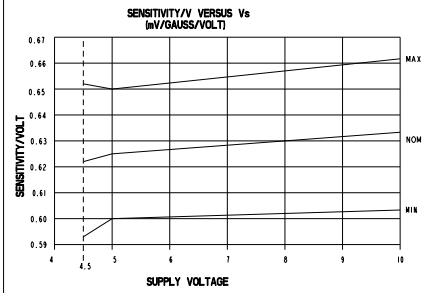
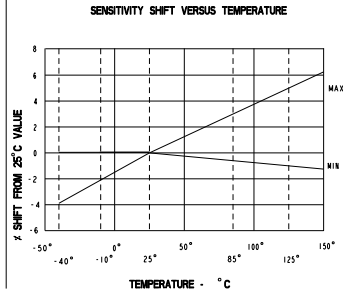
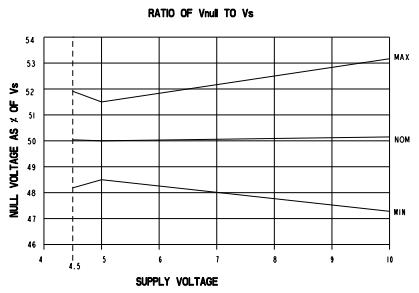
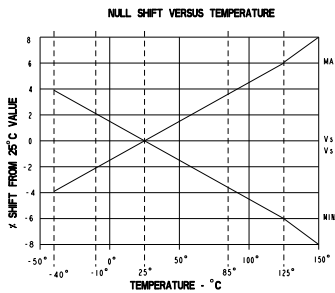
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
SENSITIVITY	$T_A = 25^{\circ}\text{C}$	3.00	3.125	3.25	mV/GAUSS
NULL	$T_A = 25^{\circ}\text{C}$	2.425	2.50	2.575	VOLTS
SUPPLY CURRENT	$T_A = 25^{\circ}\text{C}$		7	8.7	mA
OUTPUT CURRENT SOURCE	$V_s > 4.5$	1mA	1.5mA		
OUTPUT CURRENT SINK	$V_s > 4.5$	5mA	1.5mA		
OUTPUT CURRENT SINK	$V_s > 5.0$	1mA	1.5mA		
RESPONSE TIME			3 μs		
OUTPUT VOLTAGE SWING					
VOM -	-B APPLIED	.4	.2		VOLTS
VOM +	+B APPLIED	$V_s - .4$	$V_s - .2$		VOLTS
B LIMITS FOR LINEAR OPERATION					GAUSS
-B MAX		+600	+670		
+B MAX		+600	+670		
V_{null} DRIFT	$B = 0, T_A = 25^{\circ}\text{C}$ TO 125°C	- .06		+ .06	% / $^{\circ}\text{C}$
V_{null} DRIFT	$B = 0, T_A = -125^{\circ}\text{C}$ TO $+150^{\circ}\text{C}$	- .08		+ .08	% / $^{\circ}\text{C}$
SENSITIVITY DRIFT	$T_A = 25^{\circ}\text{C}$ TO $+150^{\circ}\text{C}$	- .01		+ .05	% / $^{\circ}\text{C}$
SENSITIVITY DRIFT	$T_A = -40^{\circ}\text{C}$ TO $+25^{\circ}\text{C}$	0		+ .06	% / $^{\circ}\text{C}$
LINEARITY	$B = -600$ TO $+600$	0	-1.0	+1.5	% OF SPAN
SUPPLY VOLTAGE	-40°C TO $+125^{\circ}\text{C}$	4.5	5.0	10.5	VOLTS
OPERATING TEMP	SEE MAX TEMPERATURE CHART	-40		+150	$^{\circ}\text{C}$

BLOCK DIAGRAM CURRENT SINKING OR SOURCING OUTPUT



ABSOLUTE MAXIMUM CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	MAX	UNITS
SUPPLY VOLTAGE	V_{cc}		-0.5	11	V
OUTPUT VOLTAGE	V_{out}		-0.5	11	V
OUTPUT CURRENT	I_{out}	SOURCE OR SINK	10	10	mA
TEMPERATURE	T_A	OPERATING	-55	150	$^{\circ}\text{C}$
		STORAGE ($V_{cc}=0$)	-55	165	$^{\circ}\text{C}$



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 MICRO SWITCH MINATURE RATIOMETRIC LINEAR HALL EFFECT SENSOR SS495 SERIES CHART 1
 UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:
 ONE PLACE 1.0% ± 0.30
 TWO PLACE 1.00% ± 0.15
 THREE PLACE 1.000% ± 0.05
 ANGLES ± 2°
 WEIGHT

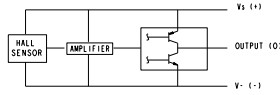
CHARACTERISTICS ARE AT $V_s=5.00$ WITH 4.7K OUTPUT TO MINUS WITH $T_A=-40^{\circ}\text{C}$ TO 125°C UNLESS OTHERWISE SPECIFIED

SS495A1

SS495 SERIES CHART 1

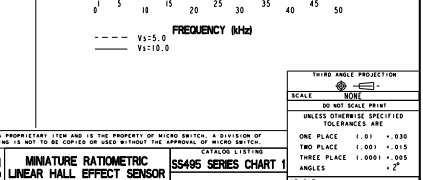
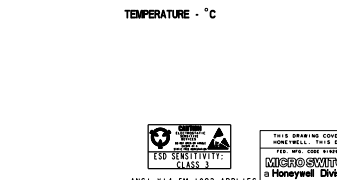
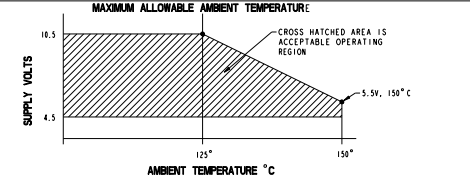
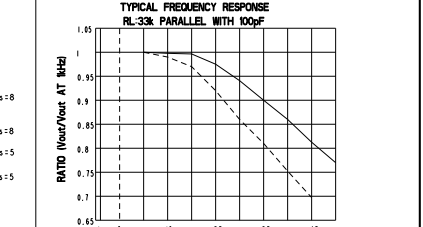
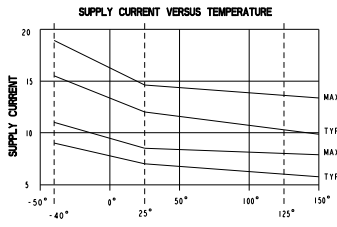
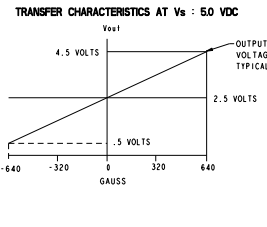
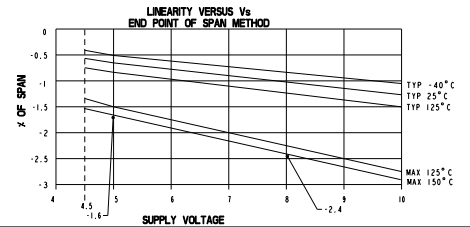
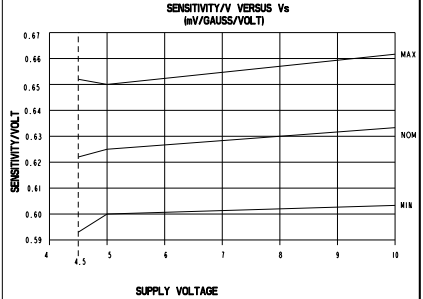
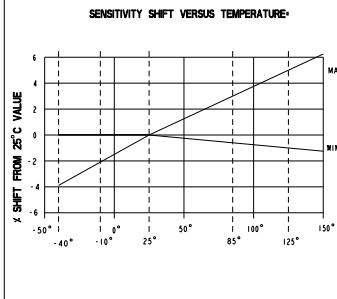
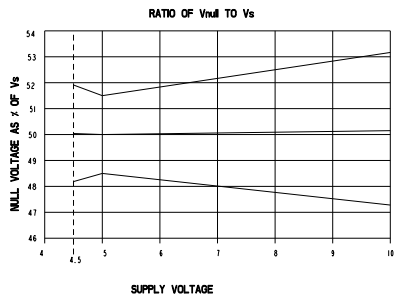
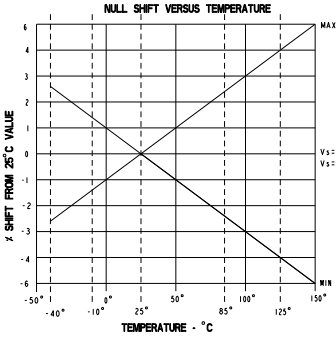
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
SENSITIVITY	$T_A = 25^{\circ}\text{C}$	3.031	3.125	3.219	mV/GAUSS
NULL	$T_A = 25^{\circ}\text{C}$	2.425	2.50	2.575	VOLTS
SUPPLY CURRENT	$T_A = 25^{\circ}\text{C}$		7	8.7	mA
OUTPUT CURRENT SOURCE	$V_s > 4.5$	1mA	1.5mA		
SINK	$V_s > 4.5$.6mA	1.5mA		
SINK	$V_s > 5.0$	1mA	1.5mA		
RESPONSE TIME			3μS		
OUTPUT VOLTAGE SWING					
VOM -	-B APPLIED	.4	.2		VOLTS
VOM +	+B APPLIED	$V_s - .4$	$V_s - .2$		VOLTS
B LIMITS FOR LINEAR OPERATION	+B MAX	+6.00	+6.70		GAUSS
V _{NULL} DRIFT	B = 0, $T_A = 25^{\circ}\text{C}$ TO 125°C	-0.04		+0.04	μV/°C
V _{NULL} DRIFT	B = 0, $T_A = +125^{\circ}\text{C}$ TO $+150^{\circ}\text{C}$	-0.08		+0.08	μV/°C
SENSITIVITY DRIFT	$T_A = +25^{\circ}\text{C}$ TO $+150^{\circ}\text{C}$	-0.01		+0.05	%/°C
SENSITIVITY DRIFT	$T_A = -40^{\circ}\text{C}$ TO $+25^{\circ}\text{C}$	0		+0.06	%/°C
LINEARITY	B = -6.00 TO +6.00	0	-1.0	-1.5	% OF SPAN
SUPPLY VOLTAGE	-40°C TO +125°C	4.5	5.0	10.5	VOLTS
OPERATING TEMP	SEE MAX TEMPERATURE CHART	-40		+150	°C

BLOCK DIAGRAM CURRENT SINKING OR SOURCING OUTPUT



ABSOLUTE MAXIMUM CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	MAX	UNITS
SUPPLY VOLTAGE	V_{CC}		-0.5	11	V
OUTPUT VOLTAGE	V_{out}	SOURCE OR SINK	0	10	V
OUTPUT CURRENT	I_{out}	SOURCE OR SINK	0	10	mA
TEMPERATURE	T_A	OPERATING	-55	150	°C
	T_s	STORAGE ($V_{CC}=0$)	-55	165	°C



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 TYPICAL DIMENSIONS
 MICRO SWITCH MINIMATURE RATIOMETRIC SS495 SERIES CHART 1
 HONEYWELL Division LINEAR HALL EFFECT SENSOR

THIRD ANGLE PROJECTION
 SCALE: DO NOT SCALE PRINT
 UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:
 ONE PLACE 0.50 ± 0.30
 TWO PLACE 0.001 ± 0.015
 THREE PLACE 0.0001 ± 0.005
 ANGLES ± 2°
 WEIGHT

ANSI Y14.5M-1982 APPLIES

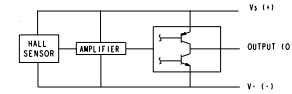
CHARACTERISTICS ARE AT $V_s=5.0$ WITH 4.7% OUTPUT TO MINUS WITH $T_A = -40^\circ\text{C}$ TO $+125^\circ\text{C}$ UNLESS OTHERWISE SPECIFIED

SS495A2

SS495 SERIES CHART 1

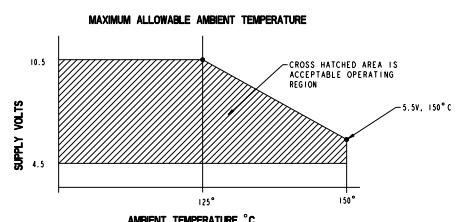
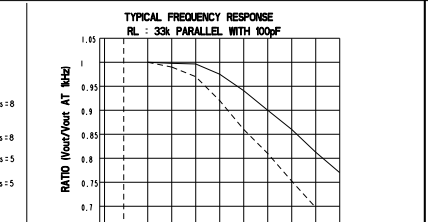
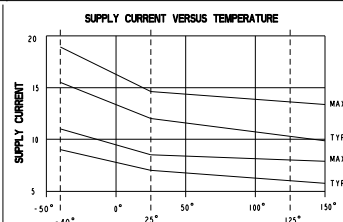
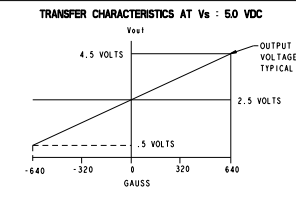
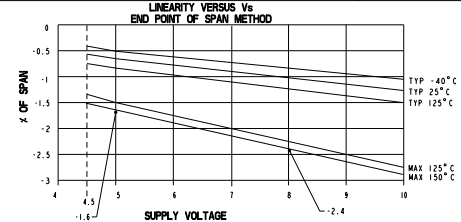
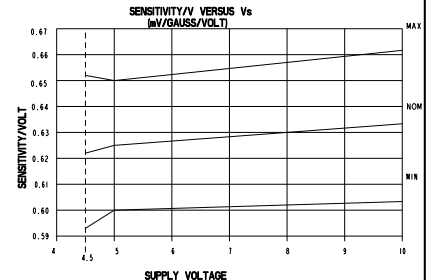
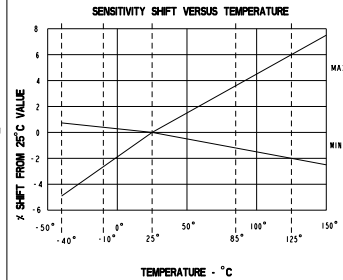
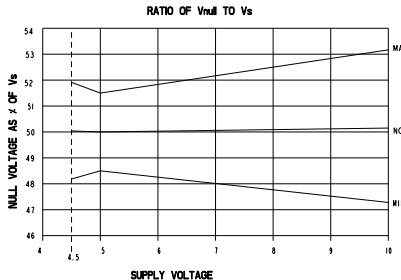
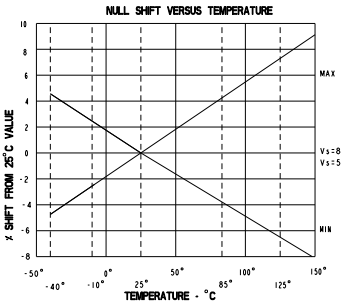
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
SENSITIVITY	$T_A = 25^\circ\text{C}$	2.969	3.125	3.281	mV/GAUSS
NULL	$T_A = 25^\circ\text{C}$	2.400	2.50	2.600	VOLTS
SUPPLY CURRENT	$T_A = 25^\circ\text{C}$	7	8.7		mA
OUTPUT CURRENT SOURCE	$V_s > 4.5$	1mA	1.5mA		
SINK	$V_s > 4.5$	1mA	1.5mA		
SINK	$V_s > 5.0$	1mA	1.5mA		
RESPONSE TIME					$3\mu\text{S}$
OUTPUT VOLTAGE SWING					
VOM +	-B APPLIED	.4	2		VOLTS
VOM -	+B APPLIED	$V_s - .4$	$V_s - 2$		VOLTS
B LIMITS FOR LINEAR OPERATION					
-B MAX		-600	-670		GAUSS
+B MAX		+600	+670		GAUSS
V_{null} DRIFT	$B = 0, T_A = 25^\circ\text{C}$ TO 125°C	-0.07		+0.07	%/°C
V_{null} DRIFT	$B = 0, T_A = +125^\circ\text{C}$ TO $+150^\circ\text{C}$	-0.08		+0.08	%/°C
SENSITIVITY DRIFT	$T_A = +25^\circ\text{C}$ TO $+150^\circ\text{C}$	-0.02		+0.06	%/°C
SENSITIVITY DRIFT	$T_A = -40^\circ\text{C}$ TO $+25^\circ\text{C}$	-0.01		+0.07	%/°C
LINEARITY	$B = -600$ TO $+600$	0	-1.0	-1.5	% OF SPAN
SUPPLY VOLTAGE	-40°C TO $+125^\circ\text{C}$	4.5	5.0	10.5	VOLTS
OPERATING TEMP	SEE MAX TEMPERATURE CHART	-40		+150	°C

BLOCK DIAGRAM CURRENT SINKING OR SOURCING OUTPUT



ABSOLUTE MAXIMUM CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	MAX	UNITS
SUPPLY VOLTAGE	V_{cc}		-0.5	10	V
OUTPUT VOLTAGE	V_{out}		-0.5	10	V
OUTPUT CURRENT	I_{out}	SOURCE OR SINK	10	10	mA
TEMPERATURE	T_A	OPERATING	-55	150	°C
	T_s	STORAGE ($V_{cc}=0$)	-55	163	°C



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 MICRO SWITCH
 Honeywell Division
 MINATURE RATIOMETRIC
 LINEAR HALL EFFECT SENSOR
 SS495 SERIES CHART 1

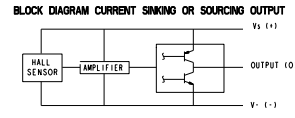
SCALE	TOLERANCES ARE
DO NOT SCALE PRINT	UNLESS OTHERWISE SPECIFIED
	TOLERANCES ARE
	ONE PLACE ±0.3
	TWO PLACE ±0.01
	THREE PLACE ±0.001
	ANGLES ±2°

CHARACTERISTICS ARE AT $V_s=5.0$ WITH 4.7K OUTPUT TO MINUS WITH $T_A=-40^{\circ}\text{C}$ TO $+125^{\circ}\text{C}$ UNLESS OTHERWISE SPECIFIED

SS495B

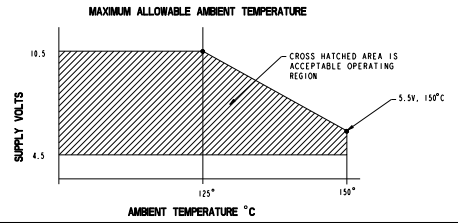
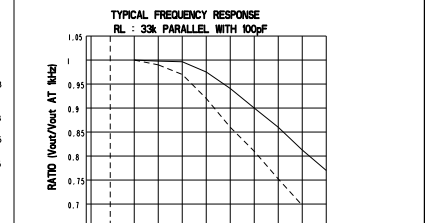
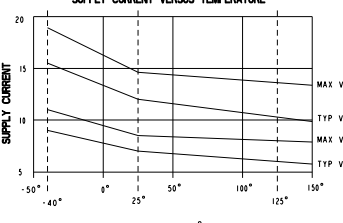
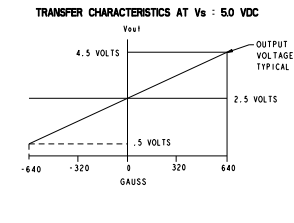
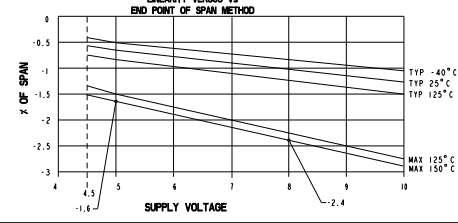
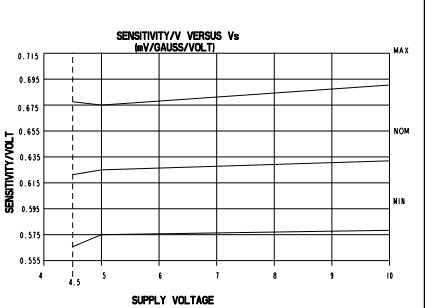
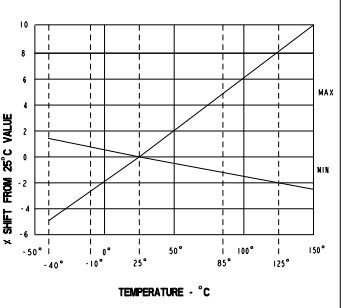
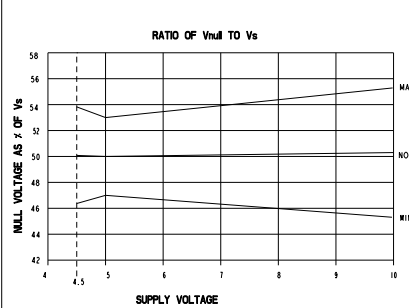
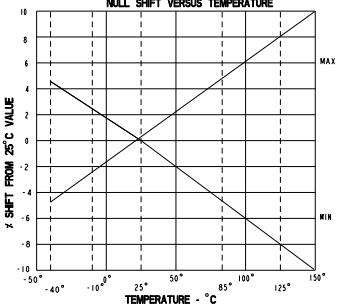
SS495 SERIES CHART 1

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
SENSITIVITY	$T_A = 25^{\circ}\text{C}$	2.875	3.125	3.375	mV/GAUSS
NULL	$T_A = 25^{\circ}\text{C}$	2.35	2.50	2.650	VOLTS
SUPPLY CURRENT	$T_A = 25^{\circ}\text{C}$	7	8.7		mA
OUTPUT CURRENT SOURCE	$V_s > 4.5$	1mA	1.5mA		
SINK	$V_s > 4.5$	6mA	1.5mA		
SINK	$V_s > 5.0$	1mA	1.5mA		
RESPONSE TIME			3μs		
OUTPUT VOLTAGE SWING					
VOM -	-B APPLIED	4	2		VOLTS
VOM +	+B APPLIED	$V_s - 4$	$V_s - 2$		VOLTS
B LIMITS FOR LINEAR OPERATION					
-B MAX		-600	-670		GAUSS
+B MAX		+600	+670		GAUSS
V _{nu11} DRIFT	$B = 0, T_A = 25^{\circ}\text{C}$ TO 125°C	-0.8		+0.8	% / °C
V _{nu11} DRIFT	$B = 0, T_A = +125^{\circ}\text{C}$ TO $+150^{\circ}\text{C}$	-0.8		+0.8	% / °C
SENSITIVITY DRIFT	$T_A = +25^{\circ}\text{C}$ TO $+150^{\circ}\text{C}$	-0.2		+0.8	% / °C
SENSITIVITY DRIFT	$T_A = -40^{\circ}\text{C}$ TO $+25^{\circ}\text{C}$	-0.2		+0.8	% / °C
LINEARITY	$B = -600$ TO $+600$	0	-1.0	-1.5	% OF SPAN
SUPPLY VOLTAGE	-40°C TO $+125^{\circ}\text{C}$	4.5	5.0	10.5	VOLTS
OPERATING TEMP	SEE "MAX TEMPERATURE GRAB"	-40		+150	°C



ABSOLUTE MAXIMUM CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	MAX	UNITS
SUPPLY VOLTAGE	V_{cc}		-0.5	11	V
OUTPUT VOLTAGE	V_{out}		-0.5	11	V
OUTPUT CURRENT	I_{out}	SOURCE OR SINK	10	10	mA
TEMPERATURE	T_A	OPERATING	-55	150	°C
	T_s	STORAGE ($V_{cc}=0$)	-55	165	°C



100% SENSITIVITY CLASS 3

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MINIATURE RATIO-METRIC LINEAR HALL EFFECT SENSOR

ANSI Y14.5M-1982 APPLIES

SCALE	TOLERANCES ARE
ONE PLACE	±0.030
TWO PLACE	±0.015
THREE PLACE	±0.005
ANGLES	±2°