



### SS40A



*Actual product appearance may vary.*

#### SS40A Low-Cost Bipolar Hall-Effect Sensor; radial lead IC package

#### Features

- Miniature construction: 3.0 mm x 4.0 mm [0.12 in x 0.16 in] plastic package
- Power consumption of only 5 mA max at 4.5 Vdc for energy efficiency
- Digital current sinking output
- Bipolar magnetics for ring magnet applications
- High output current capability (20 mA)
- High speed—Operates from 0 kHz to over 100 kHz
- Broad temperature range of -40 °C to 125 °C [-40 °F to 257 °F]
- Built-in reverse polarity protection

#### Potential Applications

- Speed and RPM sensor
- Brushless DC motor commutation
- Motor and fan control
- Magnetic encoding
- Tachometer, counter pickup
- Disc speed, tape rotation sensing
- Flow-rate sensing

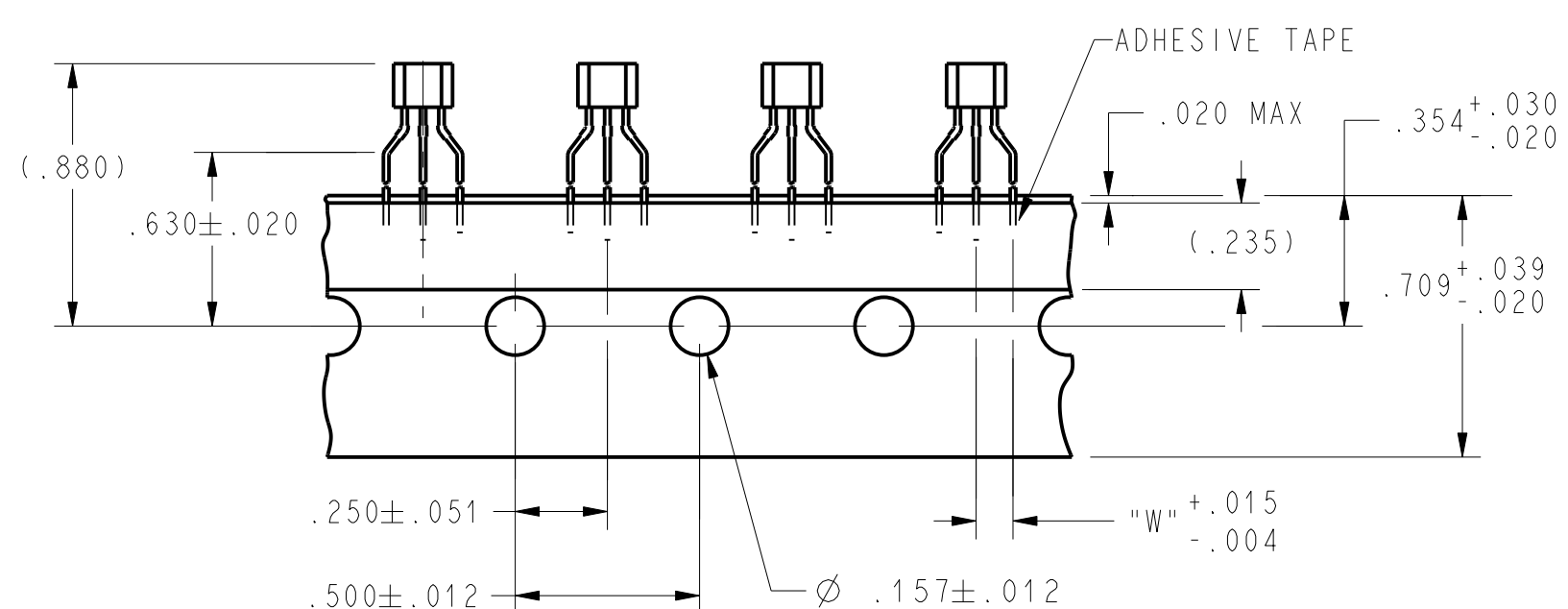
#### Description

SS40A-Series Low-Cost Bipolar Hall Effect sensors have a thermally balanced integrated circuit over full temperature range. The bipolar magnetics respond to alternating North and South poles.

A built-in regulator provides very stable operation over 4.5 Vdc to 24 Vdc supply voltage range, and internal circuitry prevents sensor damage in case the supply voltage polarity is accidentally reversed. The SS40A Series Low-Cost Bipolar Hall-effect sensors are small, versatile digital Hall-effect devices that are operated by the magnetic field from a permanent magnet or an electromagnet. The open-collector sinking output voltage is easily interfaced with a wide variety of electronic circuits.

**NOTE:** The integrated circuitry provides excellent temperature stability and accuracy in a robust design. These digital Hall sensors have an operating temperature range of -40 °C to 125 °C [-40 °F to 257 °F], appropriate for commercial, consumer, and industrial environments.

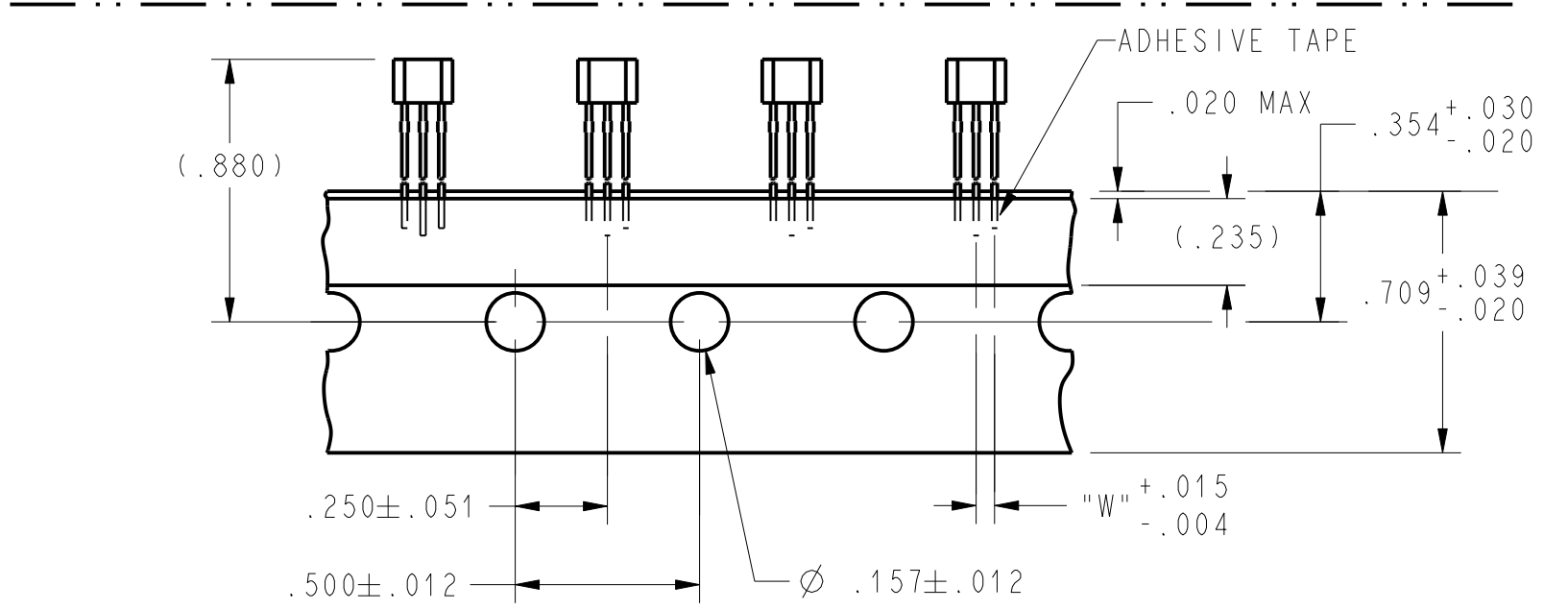
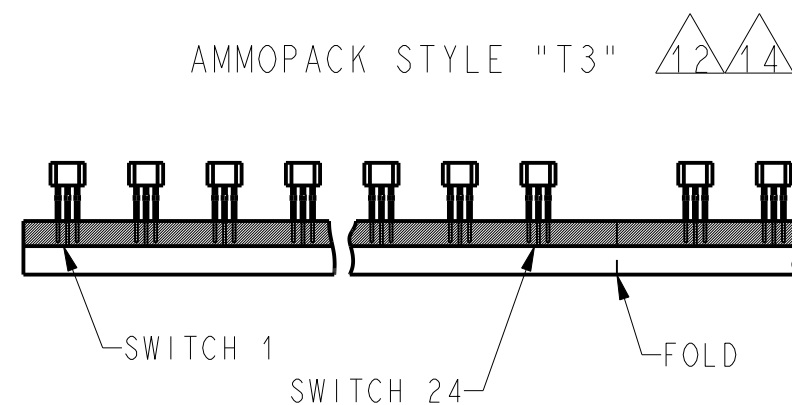
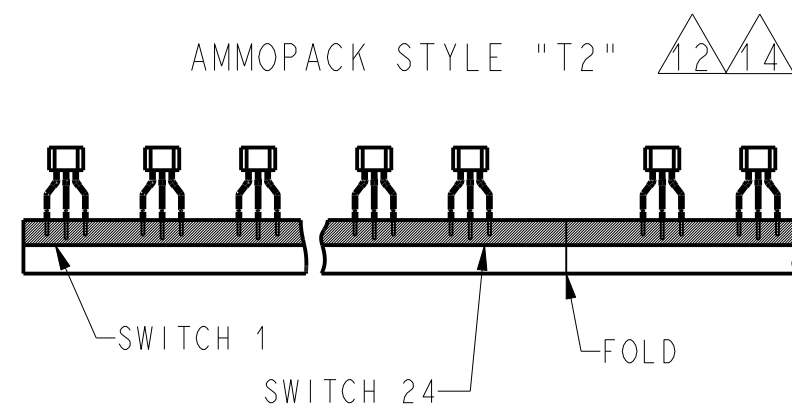
Product Specifications	
Product Type	Low-Cost Bipolar Hall-Effect Sensor
Package Quantity/Type	Available in 1,000/Bag
Package Style	Radial Lead IC
Supply Voltage	4.5 Vdc to 24.0 Vdc
Output Type	Sink
Magnetic Actuation Type	Bipolar
Operating Temperature Range	-40 °C to 125 °C [-40 °F to 257 °F]
Output Voltage	0.4 Vdc max.
Availability	Global
Supply Current (max. @ 25 °C)	10 mA
Output Current (max.)	20.0 mA max.
Operate Point @ 25 °C	45 G typ.
Release Point @ 25 °C	-45 G typ.
Leakage Current max.	10 µA
Response Time (µs)	4 µs (typ.)
Series Name	SS40
Supply Current (typ. @ 25 °C, 24 Vdc)	6.5 mA
Operate Point -40 °C to 85 °C	110 G max.
Release Point -40 °C to 85 °C	-110 G max.
Differential (typ. @ 25 °C)	90 G



TAPE DIMENSIONS

TAPE PACKING OPTIONS

TAPE STYLE

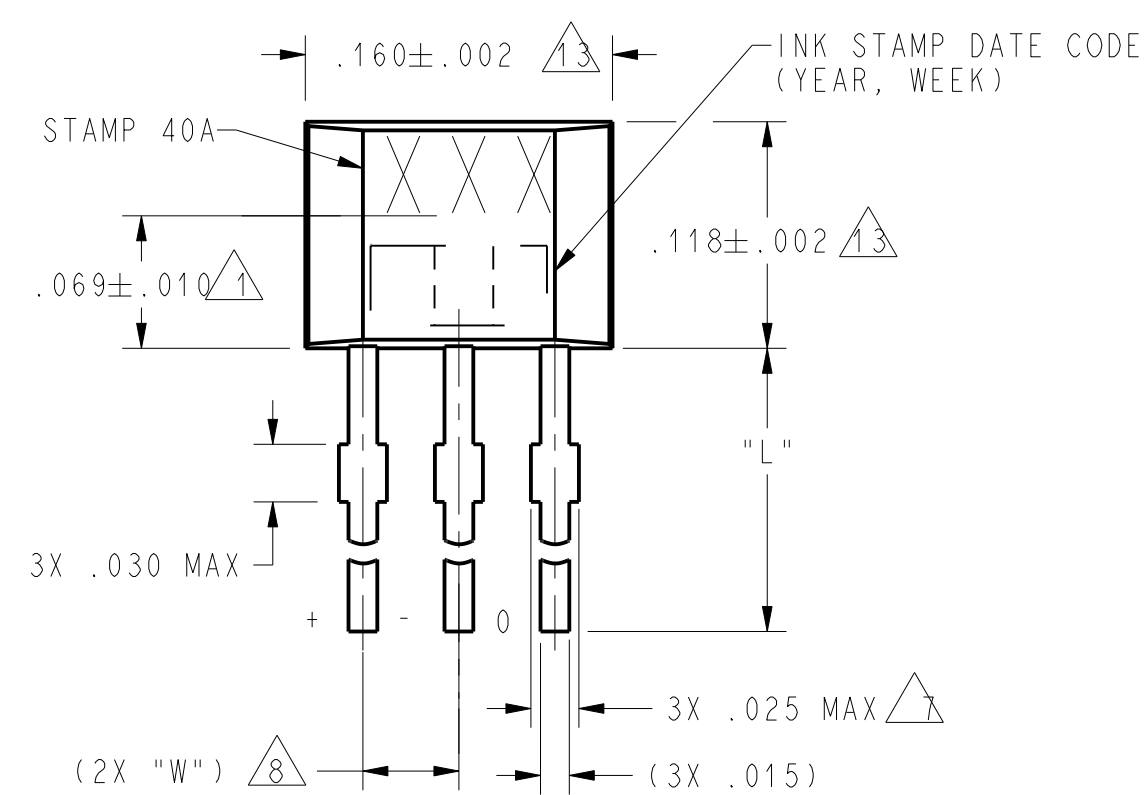
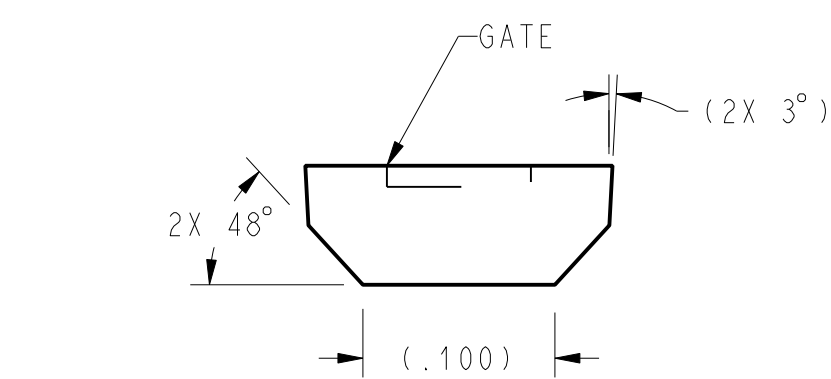


TAPE DIMENSIONS

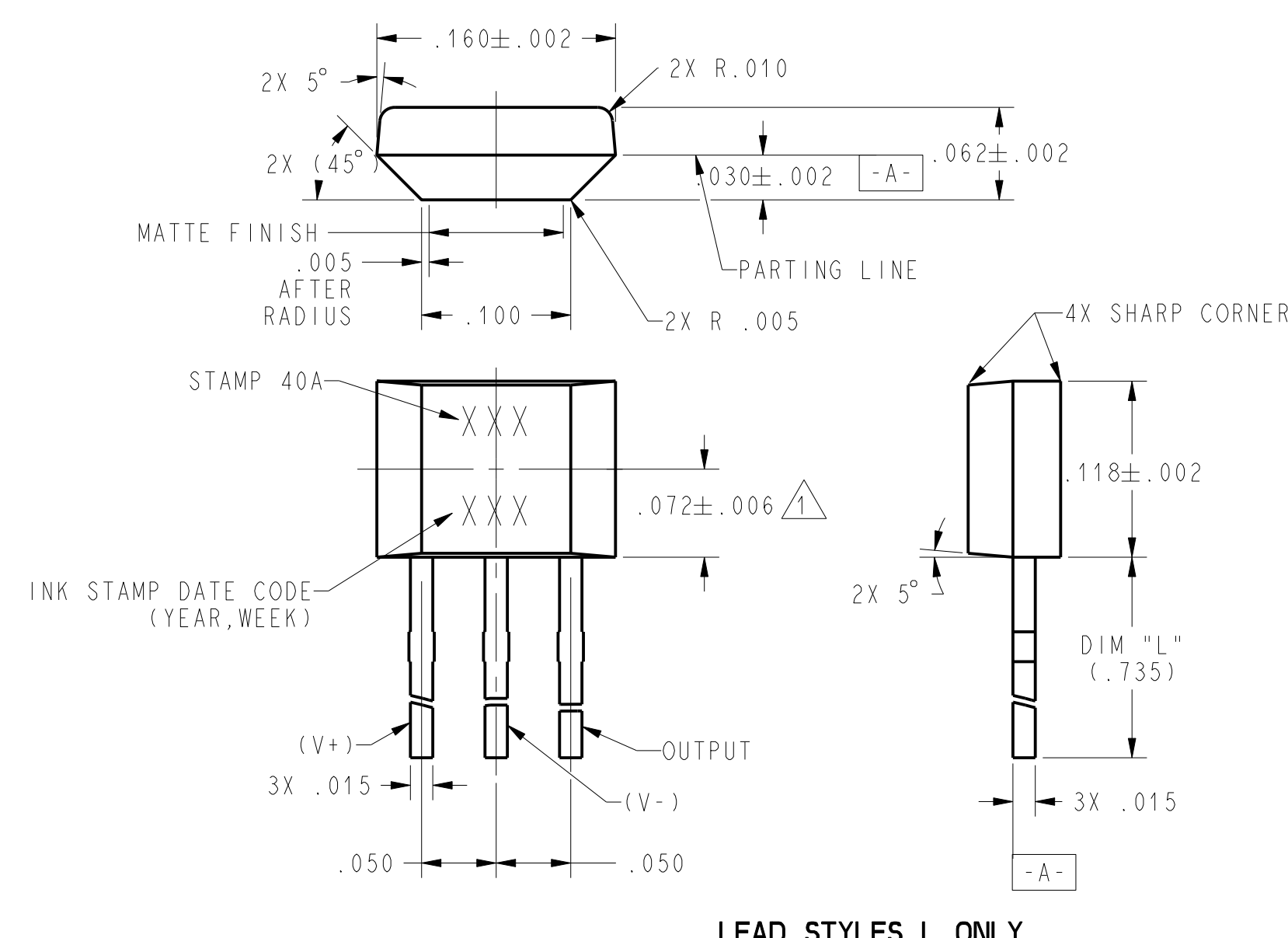
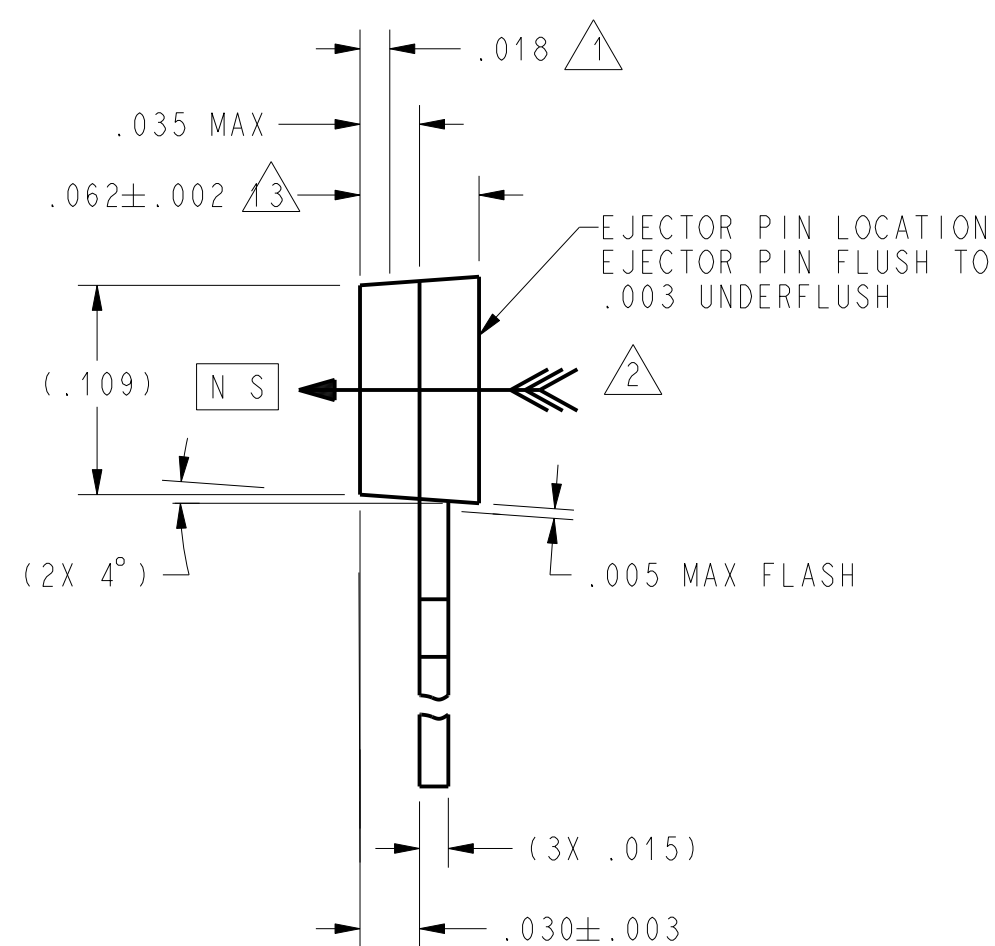
NOTES

- 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 - THE MAGNETIC FIELD STRENGTH (GAUSS) REQUIRED TO CAUSE THE SWITCH TO CHANGE STATE (OPERATE AND RELEASE) WILL BE AS TABULATED. TO TEST THE SWITCH AGAINST THE SPECIFIED LIMITS, THE SWITCH MUST BE PLACED IN A UNIFORM MAGNETIC FIELD
- 5 - LEADS MUST BE ADEQUATELY SUPPORTED DURING ANY FORMING/SHEERING OPERATION TO ASSURE THAT THE LEADS ARE NOT STRESSED WITHIN THE PLASTIC
- 6 - PCB WAVE SOLDERING GUIDELINES ARE AS FOLLOWS:  
250°C TO 260°C SOLDERING TEMPERATURE 3 SECONDS MAX SOLDERING TIME
- 7 BURRS ARE ALLOWED ONLY IF FULL LENGTH OF LEADS WILL PASS THROUGH Ø .023 HOLE. LEAD REFERENCE DIMENSIONS DO NOT INCLUDE SOLDER THICKNESS
- 8 DIMENSION REFERS TO THE LOCATION OF LEAD CENTERLINES AS THEY 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 DETERIORATED ON SOME UNITS BY BULK PACKAGING. APPLICATIONS HAVING A CRITICAL LEAD STRAIGHTNESS REQUIREMENT SHOULD USE A TAPE PACKAGING OPTION
- 12 AMMOPACK STYLE "T2" & "T3". 24 SWITCHES BETWEEN FOLDS, SKIP 1 SPACE AT FOLD. MAY BE REFERRED TO AS "FAN FOLD"
- 13 MOLDED PART DIMENSIONS DO NOT INCLUDE FLASH. FLASH IS LIMITED TO .005 MAX
- 14 TAPE AND AMMOPACK PER EIA-468
- 15 - THESE HALL EFFECT SENSORS MAY HAVE AN INITIAL OUTPUT IN EITHER THE ON OR OFF STATE IF POWERED UP WITH AN APPLIED MAGNETIC FIELD IN THE DIFFERENTIAL ZONE (APPLIED MAGNETIC FIELD > Brp AND < Bop). MICRO SWITCH RECOMMENDS THAT THE APPLICATION CIRCUIT DESIGNER ALLOW 10 MICROSECONDS AFTER SUPPLY VOLTAGE HAS REACHED 5 VOLTS FOR THE OUTPUT VOLTAGE TO STABILIZE

CATALOG LISTING	TAPE STYLE	DIM "L"	DIM "W"	COMMENTS
SS40A	NONE	.590	.050	BULK - 1000/BAG
SS40A-T2	T2	.590	.100	5000/BOX
SS40A-T3	T3	.590	.050	5000/BOX
SS40A-L	NONE	.735	.050	BULK - 1000/BAG
SS40A-F	NONE	.590	.100	BULK - 500/BAG



LEAD STYLES "STD", "T2", "T3"



LEAD STYLES L ONLY

PTC/CAD 2D  
 DRAWN  
 CVS 24MAR03  
 CHECKED  
 SB 24MAR03  
 RELEASE NO. 0004092  
 REVISIONS  
 ISSUE  
 A  
 SS40A SERIES CHART 1  
 PAGE 1 OF 2



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FED. MFG. CODE 91929

**MICRO SWITCH**  
a Honeywell Division

**SOLID STATE SENSOR**

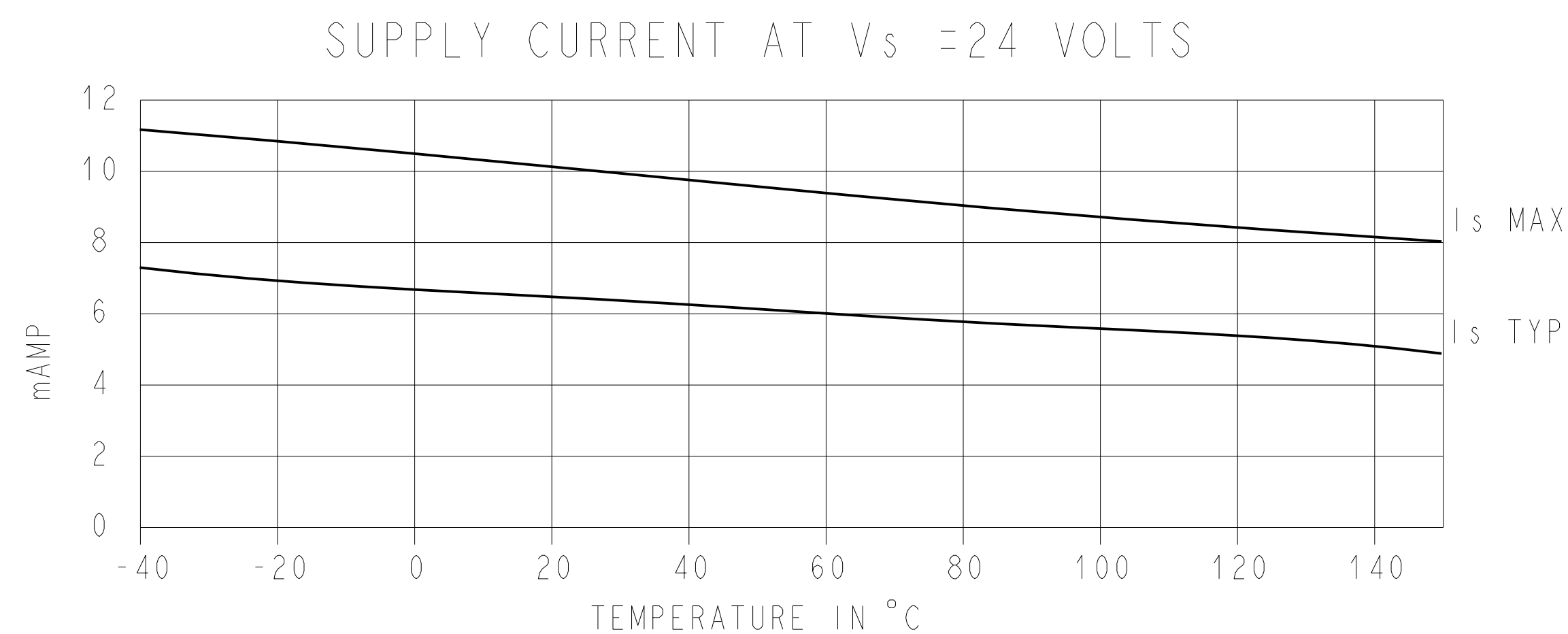
CATALOG LISTING  
**SS40A SERIES CHART 1**

ONE PLACE	(.0)	+ .030
TWO PLACE	(.00)	+ .015
THREE PLACE	(.000)	+ .005
ANGLES		+ 2°
WEIGHT		

THIRD ANGLE PROJECTION  
SCALE 10:1  
DO NOT SCALE PRINT  
UNLESS OTHERWISE SPECIFIED TOLERANCES ARE

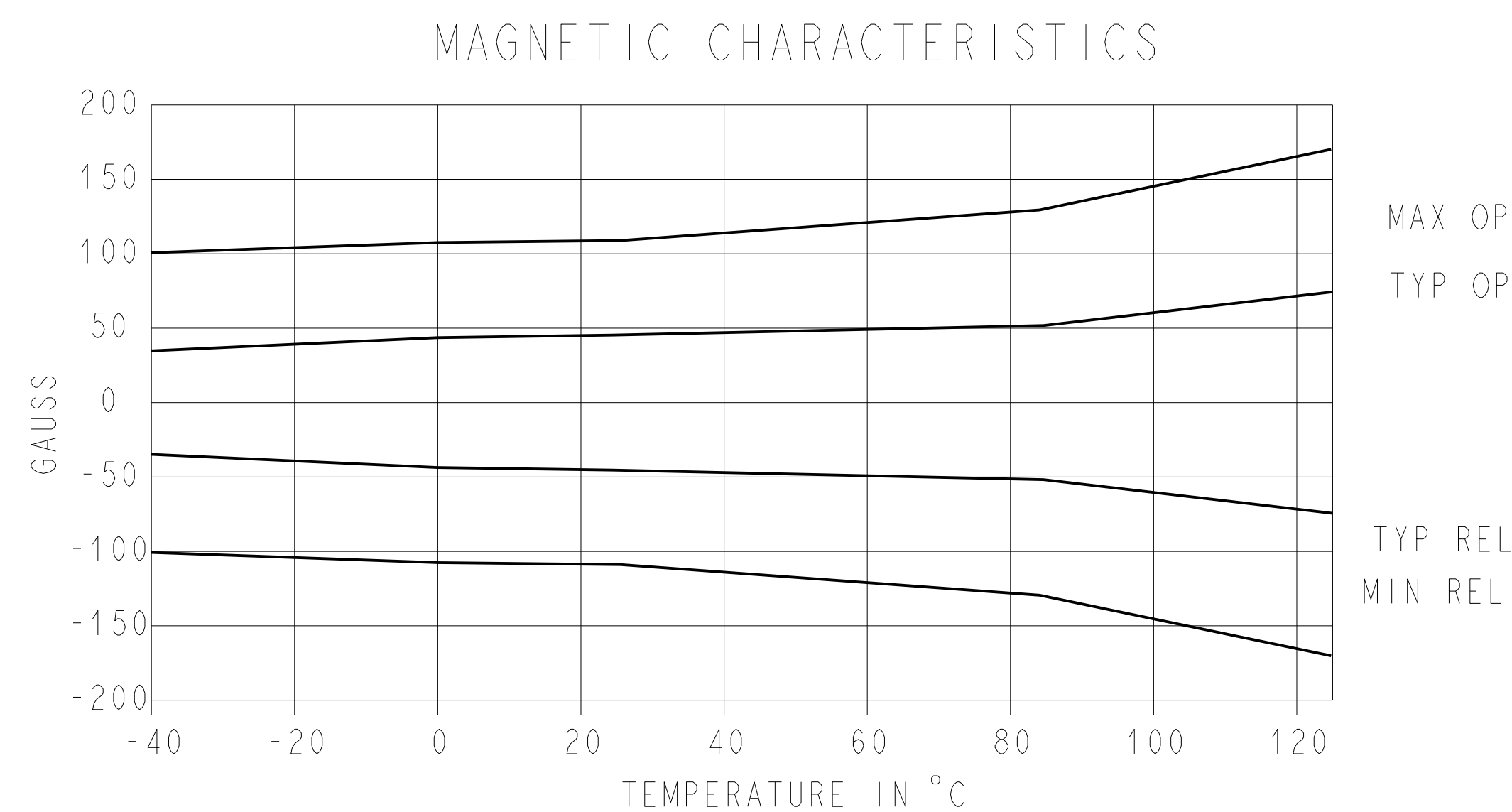
CHARACTERISTICS ARE AT  $V_s=4.5$  TO 24 VOLTS WITH 20mA LOAD WITH  $\triangle 4 \triangle 15$   
 $T_A=-40^\circ\text{C}$  TO  $+125^\circ\text{C}$  UNLESS OTHERWISE NOTED

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
SUPPLY VOLTAGE		4.5		24.0	VOLTS
SUPPLY CURRENT	25°C		6.8	10.0	mA
SUPPLY CURRENT				11.3	mA
OUTPUT CURRENT				20.0	mA
$V_{sat}$ AT 15mA	GAUSS > 170			0.4	VOLTS
OUTPUT LEAKAGE	GAUSS < -170			10.0	$\mu\text{A}$
RISE TIME	25°C		0.5	1.5	$\mu\text{S}$
FALL TIME	25°C		0.2	1.5	$\mu\text{S}$
RESPONSE TIME	25°C		4.0	5.0	$\mu\text{S}$
MAX OPERATE	25°C		45	110	GAUSS
MAX OPERATE	-40°C TO 85°C		50	130	GAUSS
MAX OPERATE			55	170	GAUSS
MIN RELEASE	25°C	-110	-45		GAUSS
MIN RELEASE	-40°C TO 85°C	-130	-50		GAUSS
MIN RELEASE		-170	-55		GAUSS
MIN DIFFERENTIAL		50			GAUSS
OPERATING TEMP		-40		+125	°C
STORAGE TEMP		-55		+165	°C

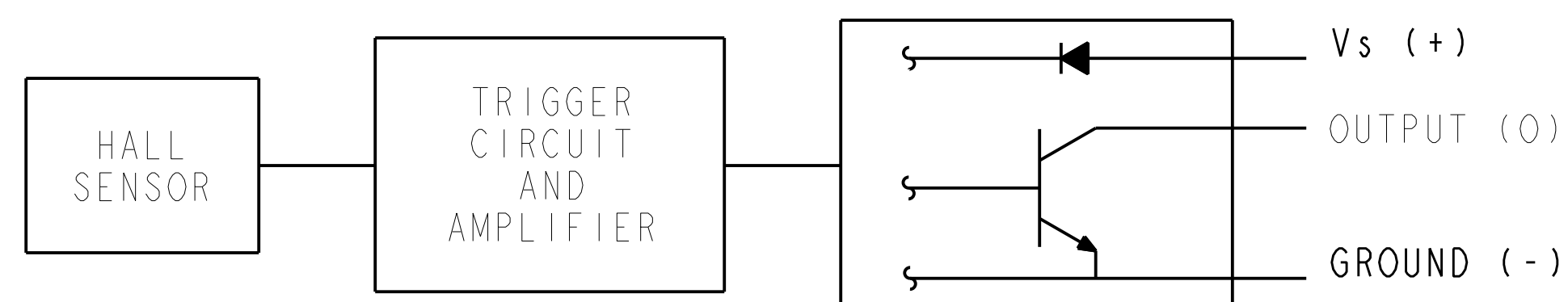


ABSOLUTE MAXIMUM RATING  $\triangle 10$

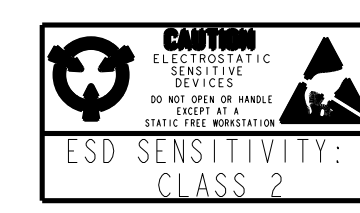
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
SUPPLY VOLTAGE		-28		28	VOLTS
APPLIED OUTPUT VOLTAGE		-0.5		28	VOLTS
OUTPUT CURRENT				20	mA
MAGNETIC FLUX				NO LIMIT	GAUSS



BLOCK DIAGRAM CURRENT SINKING OUTPUT



PTC/CAD 2D  
 DRAWN  
 CVS 24MAR03  
 CHECK  
 SB 24MAR03  
 CHECK  
 REVISIONS  
 ISSUE  
 A  
 DRAWING NUMBER  
 M SS40A SERIES CHART 1  
 PAGE 2 OF 2  
 RELEASE NO. 0004092  
 REVISIONS



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FED. MFG. CODE 91929	MICRO SWITCH a Honeywell Division	SOLID STATE SENSOR	SS40A SERIES CHART 1
ANSI Y14.5M-1982 APPLIES		THIRD ANGLE PROJECTION	
ESD SENSITIVITY: CLASS 2		SCALE NONE	
		DO NOT SCALE PRINT	
		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE	
		ONE PLACE (.0) +.030	
		TWO PLACE (.00) +.015	
		THREE PLACE (.000) +.005	
		ANGLES +	
		WEIGHT	