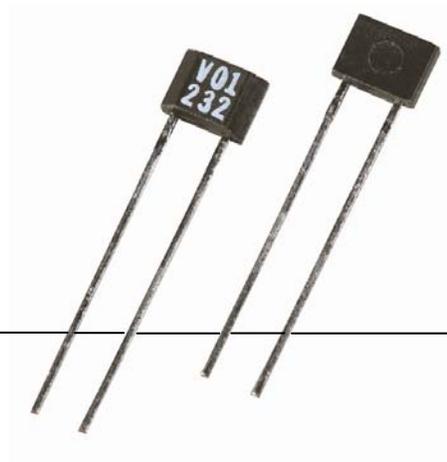


## VF401

### 2-Wire Solid State Switch



#### DESCRIPTION

The VF401 is a 2-wire MR (magnetoresistive) bridge array in a miniature plastic package, designed for sensing fine pitch ring magnets.

#### FEATURES

- Wide operating temperature range
- 2-wire operation means less wiring
- Enhanced sensitivity,  $\pm 7$  gauss typical
- Output pattern independent of gap between target and sensor

The VF401 allows a greater air gap between the target and the sensor with reduced loss in sensor signal or accuracy.

Patent number 6,297,628.

#### POTENTIAL APPLICATIONS

- Speed encoding using a multipole ring magnet
- Enhanced accuracy cam and crank position sensing
- Wheel speed sensing
- Window lift applications

# VF401

## ABSOLUTE MAXIMUM RATINGS<sup>1</sup>

Parameter	Minimum	Typical	Maximum	Unit
Supply voltage <sup>2</sup>	-18	-	+18	V
Magnetic flux gauss	no limit			
Temperature	-	-	175 [347] for 10 min. at 10 cycles	°C [°F]
Frequency	-	-	3000	Hz

### Notes:

1. 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.
2. Customer supplied sense resistor required for negative reverse voltage.

## PERFORMANCE SPECIFICATIONS (Established using a 65,00 mm [2.559 in] diameter, 48 pole pair ring magnet.)

Parameter	Condition	Minimum	Typical	Maximum	Unit
V <sub>cc</sub> <sup>1</sup>	-	-	-	-	V
V <sub>h</sub> (V+ to V-)	-	4.5	-	16	V
I <sub>cc</sub> operate	-	11.8	14	16.80	mA
I <sub>cc</sub> released	-	5.9	7	8.40	mA
I <sub>cc</sub> ratio (op/rel)	-	1.9	2.0	2.3	-
Rise time at 25 °C [77 °F] 10% to 90%	V <sub>cc</sub> = 12 V, R <sub>L</sub> : = 150 Ohm, C <sub>L</sub> = 1000 pf	-	1.5	-	µs
Fall time at 25 °C [77 °F] 10% to 90%	V <sub>cc</sub> = 12 V, R <sub>L</sub> : = 150 Ohm, C <sub>L</sub> = 1000 pf	-	1.5	-	µs
Operating temperature	-	-40 [-40]	-	150 [302]	°C [°F]
Differential magnetic field over entire MR bridge area operate release	-	-	+7 -7	-	gauss
Air gap <sup>2</sup>	-	0.75	-	2.5	mm
Duty cycle	-	30	50	70	%

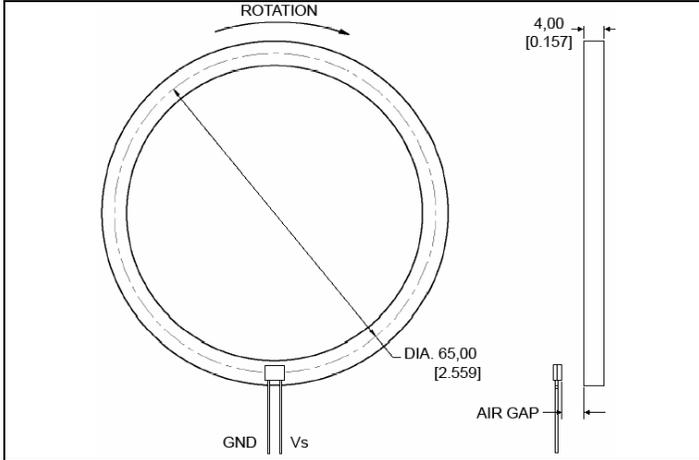
### Notes:

1. V<sub>cc</sub> is limited by V<sub>h</sub> and the value chosen for the sense resistor.
2. Sensor operation at limits for air gap is dependent on ring magnet.

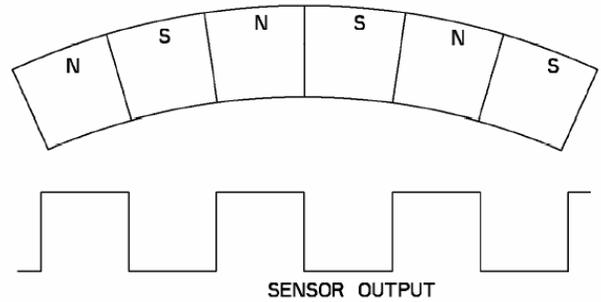


# 2-Wire Solid State Switch

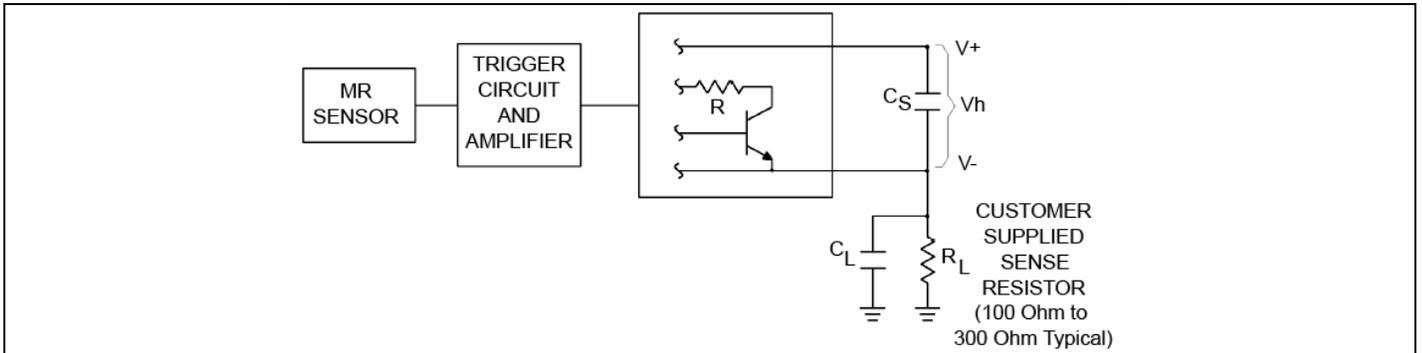
## ELECTRICAL SPECIFICATION TEST CONDITION



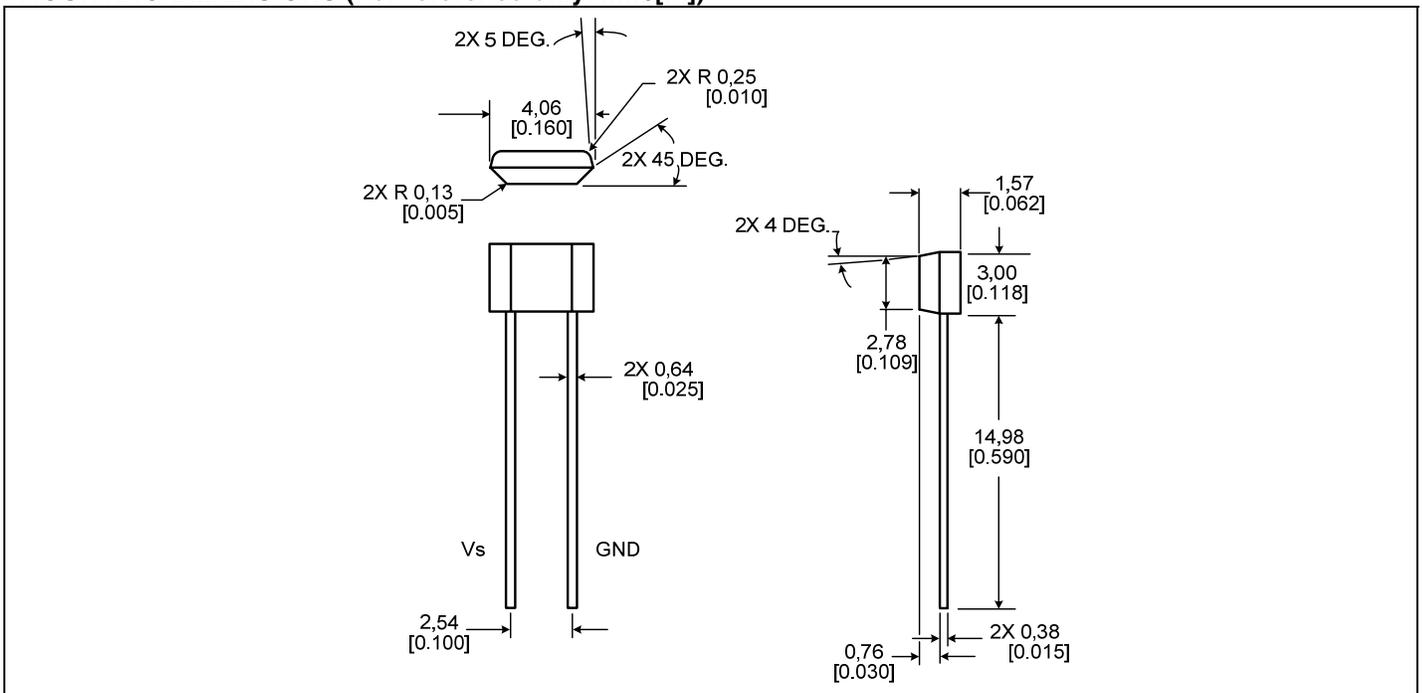
## SENSOR OUTPUT



## BLOCK DIAGRAM



## MOUNTING DIMENSIONS (For reference only. mm/[in])



## ORDER GUIDE

Catalog Listing	Description
VF401	2-wire solid state switch, standard bulk pack, 500 units per bag

### Note:

Bulk packaging process may affect lead straightness on some units.

### WARNING

#### MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- 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.**

### WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, 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. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

### 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.**

### SALES AND SERVICE

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

**E-mail:** [info.sc@honeywell.com](mailto:info.sc@honeywell.com)

**Internet:** [www.honeywell.com/sensing](http://www.honeywell.com/sensing)

#### Phone and Fax:

Asia Pacific	+65 6355-2828
	+65 6445-3033 Fax
Europe	+44 (0) 1698 481481
	+44 (0) 1698 481676 Fax
Latin America	+1-305-805-8188
	+1-305-883-8257 Fax
USA/Canada	+1-800-537-6945
	+1-815-235-6847
	+1-815-235-6545 Fax

### Automation and Control Solutions

Sensing and Control

Honeywell

1985 Douglas Drive North

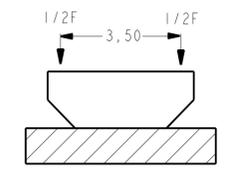
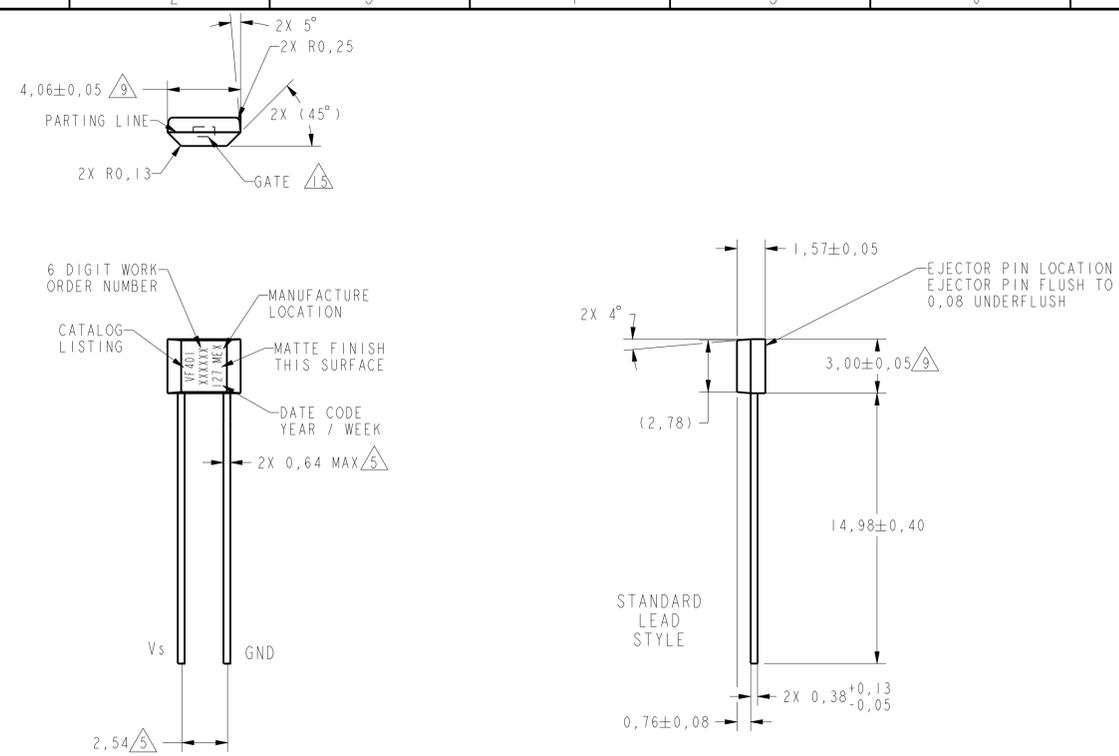
Minneapolis, MN 55422

[www.honeywell.com/sensing](http://www.honeywell.com/sensing)

005884-1-EN IL50 GLO Printed in USA  
April 2007

© 2007 Honeywell International Inc. All rights reserved.

# Honeywell

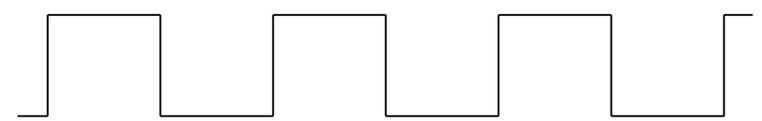
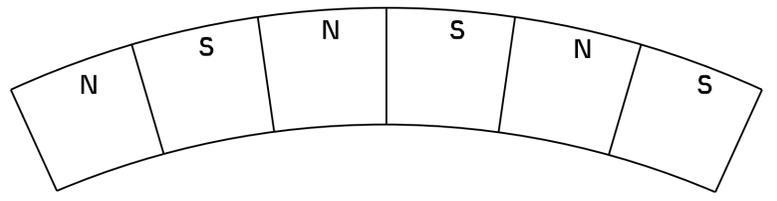
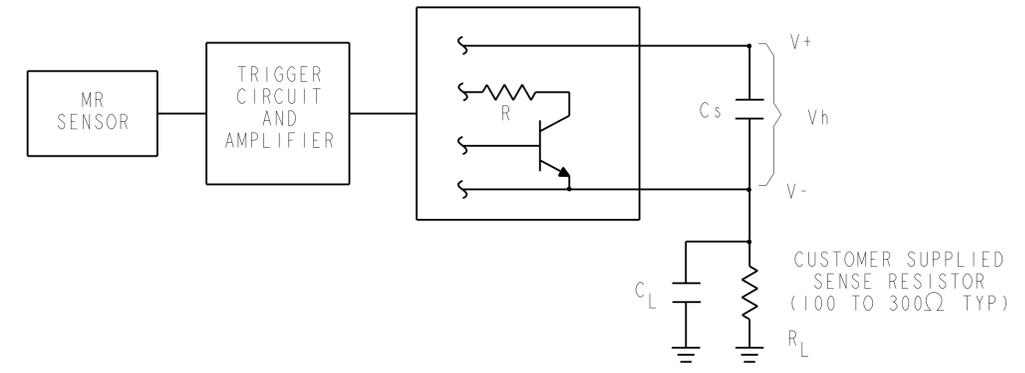


ELECTRICAL SPECIFICATIONS				
	MIN	TYP	MAX	UNITS
Vcc				V
Vh (V+ TO V-)	4.5		16	V
Icc OPERATE	11.8	14	16.80	mA
Icc RELEASED	5.9	7	8.40	mA
Icc RATIO (OP/REL)	1.9	2.0	2.3	-
RISE TIME @ 25°C		1.5		μS
10% TO 90%				
FALL TIME @ 25°C		1.5		μS
90% TO 10%				
OPERATING TEMPERATURE	-40		150	°C
AIR GAP	0.75		2.5	mm
DUTY CYCLE	30	50	70	%

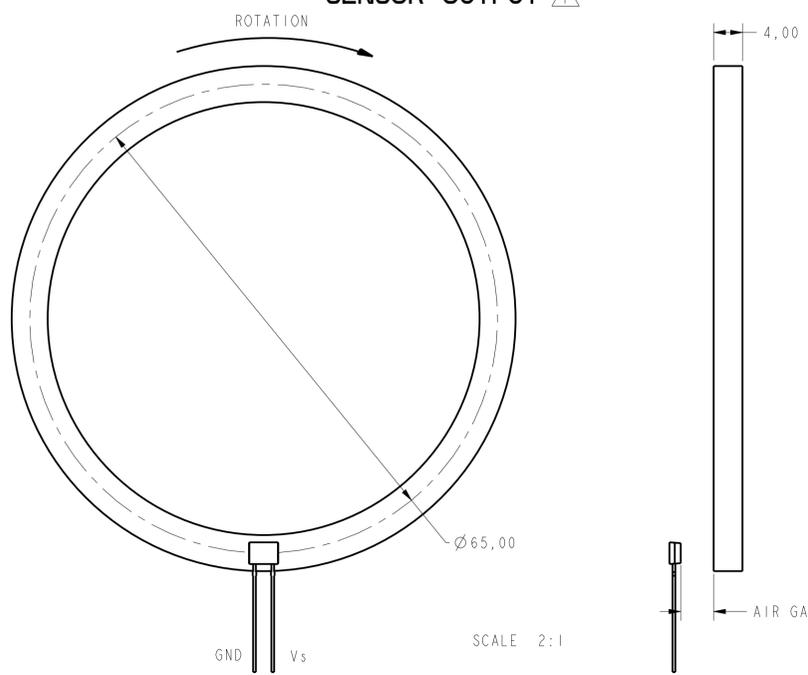
ABSOLUTE LIMITS	
SUPPLY VOLTAGE	-18 TO +18
MAGNETIC FLUX GAUSS	NO LIMIT
MAX TEMPERATURE	175°C FOR 10 MINUTES AT 10 CYCLES
MAX FREQUENCY	3000 Hz

CATALOG LISTING	DESCRIPTION	PARTS PER CONTAINER
VF401	STANDARD, BULK PACK	500 / BAG

**BLOCK DIAGRAM**



**SENSOR OUTPUT**



- NOTES**
- THE ELECTRICAL SPECIFICATIONS WERE ESTABLISHED USING A 65mm DIAMETER, 48 POLE PAIR RING MAGNET
  - INTEGRATED CIRCUIT LOCATION WITH TOLERANCES
  - LEADS MUST BE ADEQUATELY SUPPORTED DURING ANY FORMING/SHEARING OPERATION TO ASSURE THAT THE LEADS ARE NOT STRESSED WITHIN THE PLASTIC
  - PCB WAVE SOLDERING GUIDELINES ARE AS FOLLOWS:  
250°C TO 260°C SOLDERING TEMPERATURE, 3 SECONDS MAX SOLDERING TIME
  - BURRS ARE ALLOWED ONLY IF FULL LENGTH OF LEADS WILL PASS THROUGH Ø0,58 HOLE
  - DIMENSION REFERS TO THE LOCATION OF LEAD CENTERLINES AS THEY EXIT THE PLASTIC PACKAGE
  - Vcc IS LIMITED BY Vh AND THE VALUE CHOSEN FOR THE SENSE RESISTOR
  - LEAD STRAIGHTNESS MAY BE DETERIORATED ON SOME UNITS BY BULK PACKAGING
  - MOLDED PART DIMENSIONS DO NOT INCLUDE FLASH. FLASH IS LIMITED TO 0,13 MAX
  - 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
  - TEST CONDITIONS: Vcc = 12V, RL = 150 OHM, CL = 1000pf
  - SENSOR OPERATION AT LIMITS FOR AIRGAP IS DEPENDENT ON RING MAGNET
  - CUSTOMER SUPPLIED SENSE RESISTOR REQUIRED FOR NEGATIVE REVERSE VOLTAGE
  - LEADFRAME IS C155 COPPER ALLOY WITH 60/40 SOLDER DIPPED PLATING. NICKEL BARRIER BETWEEN COPPER LEADFRAME AND SOLDER DIPPED PLATING DOES NOT EXIST. STORAGE AT ELEVATED TEMPERATURE FOR EXTENDED PERIODS OF TIME MAY AFFECT SOLDERABILITY
  - GATE VESTIGE: APPROXIMATELY .050" BY .008" AND .005" MAXIMUM HEIGHT
  - OPERATE GAUSS LEVELS: DIFFERENTIAL MAGNETIC FIELD OVER ALL OF MR BRIDGE AREA.  
OPERATE TYPICAL: +7 GAUSS  
RELEASE TYPICAL: -7 GAUSS
  - COVERED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS, PAT. NO. 6,297,628



UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:	<table border="1"> <tr> <td>NO PLACE</td> <td>X</td> <td>±.040</td> <td>±.1</td> </tr> <tr> <td>ONE PLACE</td> <td>.X</td> <td>±.030</td> <td>±.04</td> </tr> <tr> <td>TWO PLACE</td> <td>.XX</td> <td>±.015</td> <td>±.015</td> </tr> <tr> <td>THREE PLACE</td> <td>.XXX</td> <td>±.005</td> <td>±</td> </tr> <tr> <td>ANGLES</td> <td></td> <td>±</td> <td>±</td> </tr> <tr> <td>RAW MATERIAL-COMMERCIAL STANDARD</td> <td></td> <td>±</td> <td>±</td> </tr> </table>	NO PLACE	X	±.040	±.1	ONE PLACE	.X	±.030	±.04	TWO PLACE	.XX	±.015	±.015	THREE PLACE	.XXX	±.005	±	ANGLES		±	±	RAW MATERIAL-COMMERCIAL STANDARD		±	±	DRAWN: TSM 29MAR01 CHECK: SAV 29MAR01	<b>Honeywell</b>	
NO PLACE	X	±.040	±.1																									
ONE PLACE	.X	±.030	±.04																									
TWO PLACE	.XX	±.015	±.015																									
THREE PLACE	.XXX	±.005	±																									
ANGLES		±	±																									
RAW MATERIAL-COMMERCIAL STANDARD		±	±																									
THIS DRAWING COVERS A PROPRIETARY ITEM AND IS THE PROPERTY OF HONEYWELL. THIS DRAWING IS NOT TO BE COPIED OR USED WITHOUT THE PERMISSION OF HONEYWELL.		TITLE: SWITCH SOLID STATE																										
THIRD ANGLE PROJECTION	DIMENSIONS ARE TO BE MET BEFORE PROTECTIVE COATINGS ARE APPLIED.	SIZE: D DWG TYPE: I DRAWING NAME: VF401 SCALE: 5 : 1	REV: 8 SHEET: 1 OF 1																									
PTC 3D ASME Y14.5M-1994		WEIGHT: -																										