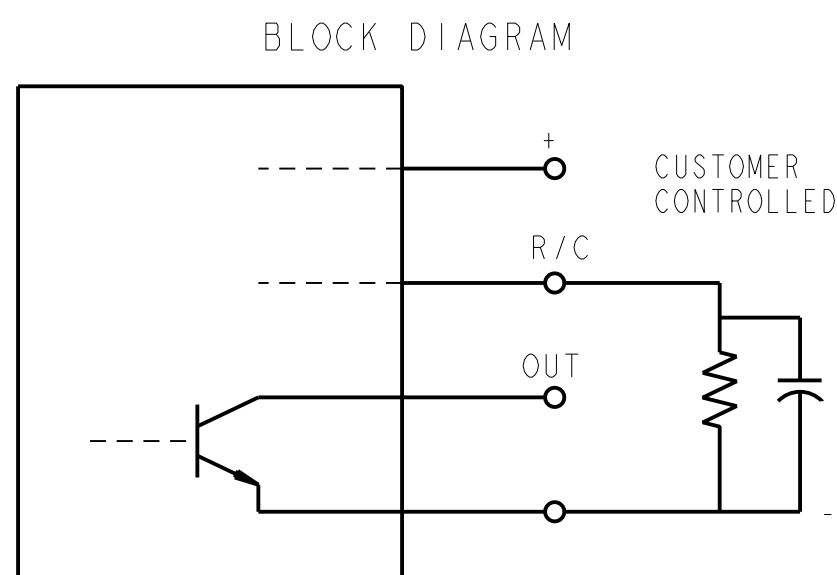
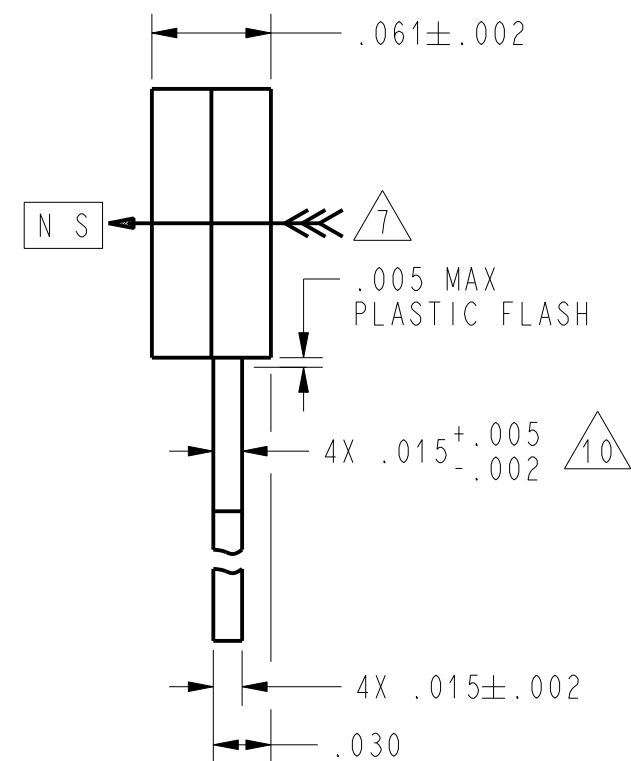
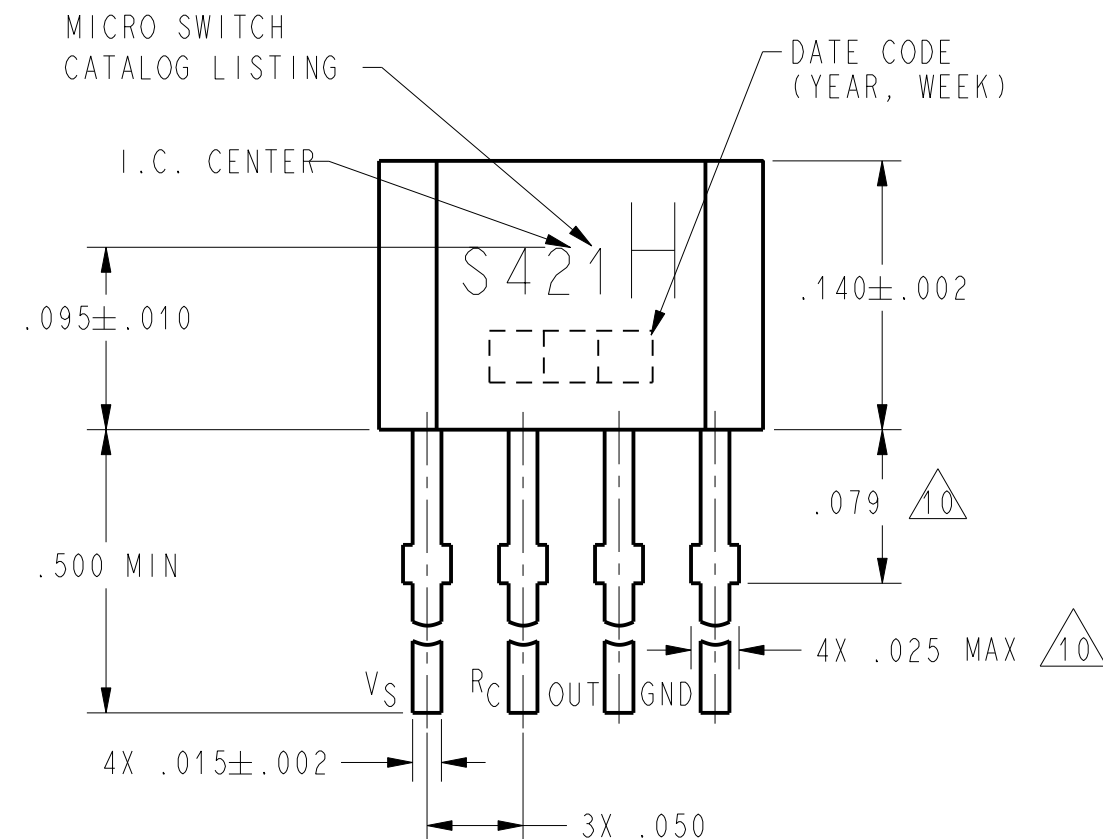


## SS421H



- | ITEM | PARAMETER                | MIN | MAX      | UNIT     | CONDITIONS                                       |
|------|--------------------------|-----|----------|----------|--------------------------------------------------|
| 2.1  | SUPPLY VOLTAGE ( $V_s$ ) | 4.5 | 16       | VDC      |                                                  |
| 2.2  | SUPPLY CURRENT ( $I_s$ ) |     | 15<br>15 | mA<br>mA | Output released, $V_s=16V$<br>$T_J=+25^{\circ}C$ |
| 2.3  | SUPPLY CURRENT ( $I_s$ ) |     | 15<br>15 | mA<br>mA | Output operated, $V_s=16V$<br>$T_J=+25^{\circ}C$ |
| 2.4  | OUTPUT VOLTAGE           |     | 0.4      | VDC      | Sinking 15mA, $V_{sat}$                          |
| 2.5  | OUTPUT LEAKAGE CURRENT   |     | 10       | $\mu A$  | Output at 25V                                    |
| 2.6  | RISE TIME (10% TO 90%)   |     | 1.5      | $\mu s$  | $V_s=12V$ , $R=800\Omega$ , $C=50pF$             |
| 2.7  | FALL TIME (90% TO 10%)   |     | 1.5      | $\mu s$  | $V_s=12V$ , $R=800\Omega$ , $C=50pF$             |

- | ITEM | PARAMETER     | MIN  | MAX | UNIT | CONDITIONS                     |
|------|---------------|------|-----|------|--------------------------------|
| 3.1  | OPERATE POINT |      | 250 | G    | Ta=+25°C (See note 3.1)        |
| 3.2  | OPERATE POINT |      | 250 | G    | -25°C TO +105°C (See note 3.1) |
| 3.3  | RELEASE POINT | -250 |     | G    | Ta=+25°C                       |
|      | RELEASE POINT | -250 |     | G    | -25°C TO +105°C (See note 3.2) |
| 3.4  | DIFFERENTIAL  | 50   |     | G    | Operate minus release          |

$$\text{FTP} = \frac{60}{\text{RC} \log \left( \frac{V_{r1} - I_{cR}}{V_{r2} - I_{cR}} \right)}$$
$$DST = 7RC \log \left[ \frac{V_{r2}}{V_{r1}} \right] + \left[ \frac{720}{FTP} \right]$$

WHERE,  
R,C ARE EXTERNAL COMPONENTS  
Vr1=2 VOLTS      Vr2=4 VOLTS  
Ic=196  $\mu$ A  
LOG IS NATURAL LOG

NOTES

- 7 THE MAGNETIC FLUX USED TO OPERATE THE SWITCH MUST BE IN THE DIRECTION AND LOCATION 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)
- 8 THE MAGNETIC FIELD STRENGTH (GAUSS) REQUIRED TO CAUSE THE SWITCH TO CHANGE STATE (OPERATE AND RELEASE) WILL BE AS SPECIFIED IN THE MAGNETIC CHARACTERISTICS. TO TEST THE SWITCH AGAINST THE SPECIFIED MAGNETIC CHARACTERISTICS THE SWITCH MUST BE PLACED IN A UNIFORM MAGNETIC FIELD
- 9 ABSOLUTE MAXIMUM RATINGS ARE THE EXTREME LIMITS THAT THE DEVICE WILL WITHSTAND WITHOUT DAMAGE TO THE DEVICE. HOWEVER, THE ELECTRICAL AND MAGNETIC CHARACTERISTICS ARE NOT GUARANTEED AS THE MAXIMUM LIMITS (ABOVE RECOMMENDED OPERATING CONDITIONS) ARE APPROACHED NOR WILL THE DEVICE NECESSARILY OPERATE AT ABSOLUTE MAXIMUM RATING
- 10 DIMENSIONS NOTED ARE DUE TO TIE BAR REMOVAL AND ARE VALID ONLY IN .079 DIMENSION.  
BURRS EXTEND BACK FROM FRONT SURFACE ONLY

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**MICRO SWITCH**  
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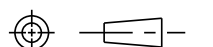
## SOLID STATE SWITCH

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CATALOG LISTING

SS421H

THIRD ANGLE PROJECTION



SCALE 10:1

DO NOT SCALE PRINT

UNLESS OTHERWISE SPECIFIED  
TOLERANCES ARE

ONE PLACE      (.0)       $\pm .030$

TWO PLACES (.00)  $\pm .015$ 

THREE PLACES (.000)  $\pm .005$

WEIGHT

ANSI Y14.5M-1982 APPLIES

FED. MFG. CODE 91929

(over operating temperature and voltage range unless otherwise noted. Does not include R & C shifts over temperature)  
REQUIRED -25°C TO +105°C AMBIENT

3.1 Operate point is defined as the gauss level above which the internal circuitry will always be indicating the presence of a south pole at the IC surface.

3.2 Release point is defined as the gauss level below which the internal circuitry will always be indicating the presence of a north pole at the IC surface.

4.1 Trip point is the frequency in PPM (pulses per minute) that causes the output to change state. A non-inverted output is high when speed is greater than the the trip point. For example, a 2 pole magnet translates to 1 pulse/revolution while the 4 pole magnet translates into 2 pulses/revolution.

The trip point is externally adjustable by varying the value of R and C. Maximum required value of the external capacitor is 3.3  $\mu$ F.

4.2 This is the accuracy required from unit to unit and includes R and C each varying  $\pm 5\%$ , over speed, supply voltage, and temperature.

4.3 Trip point delay is the delay in output response to an input frequency below the trip point. The time delay is determined by the value of the external resistor and capacitor. Delayed version powers up in the passing condition.

4.5 Passing delay tolerance is based on delay set time, its tolerance is proportional to delay set time tolerance.

4.6 Capacitor leakage coefficient is used to calculate leakage current in the following formula:

Leakage Current = Leakage Coefficient x Capacitance x Capacitor Voltage  
where capacitance is value of the external capacitor.

Capacitor Voltage is the actual variable voltage across the capacitor in operation.

5.1 The open collector output can be used to drive external circuitry that applies a latching voltage to the program/oscillator pin to latch the IC output in the fail state. This latch mode is to be used only on products with delay set times greater than 5 seconds and with inverted output version of the SS421H.  $V_a$  is externally applied voltage on the RC pin. (Not applicable on this non-inverted device)

5.2 Latching current is the sourcing current required of the applied external voltage to maintain the latch. (Not applicable on this non-inverted device)

6.3 Leakage coefficient is the external capacitor leakage current coefficient such that:

$$\text{Leakage Current} = \text{Leakage Coefficient} \times \text{Capacitance} \times \text{Capacitor Voltage}$$

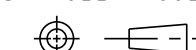
For example: Leakage Coefficient = 0.05; Capacitance = 3.3 uF;  
Capacitor Voltage at 3V; DC leakage current 0.49 uA.

(Cover operating temperature and voltage range unless otherwise noted. External components must be connected between the output and the program/oscillator pin)

REQUIRED -25°C TO +105°C AMBIENT

(over operating temperature and voltage range unless otherwise noted)  
REQUIRED -25°C TO +105°C AMBIENT

THIRD ANGLE PROJECTION



|       |      |
|-------|------|
| SCALE | NONE |
|-------|------|

DO NOT SCALE PRINT

UNLESS OTHERWISE SPECIFIED  
TOLERANCES ARE

ONE PLACE (0)  $\pm 0.30$

|            |       |        |
|------------|-------|--------|
| ONE PLACE  | (.0)  | ± .030 |
| TWO PLACES | (.00) | ± .015 |

TWO PLACES (.00)  $\pm .015$ THREE PLACES (.000)  $\pm .005$ 

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## SOLID STATE SWITCH

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CATALOG LISTING

SS421H

55D M5C CODE 01030

ANSI Y14.5M-1982 APPLICABLE

TIMING TABLE

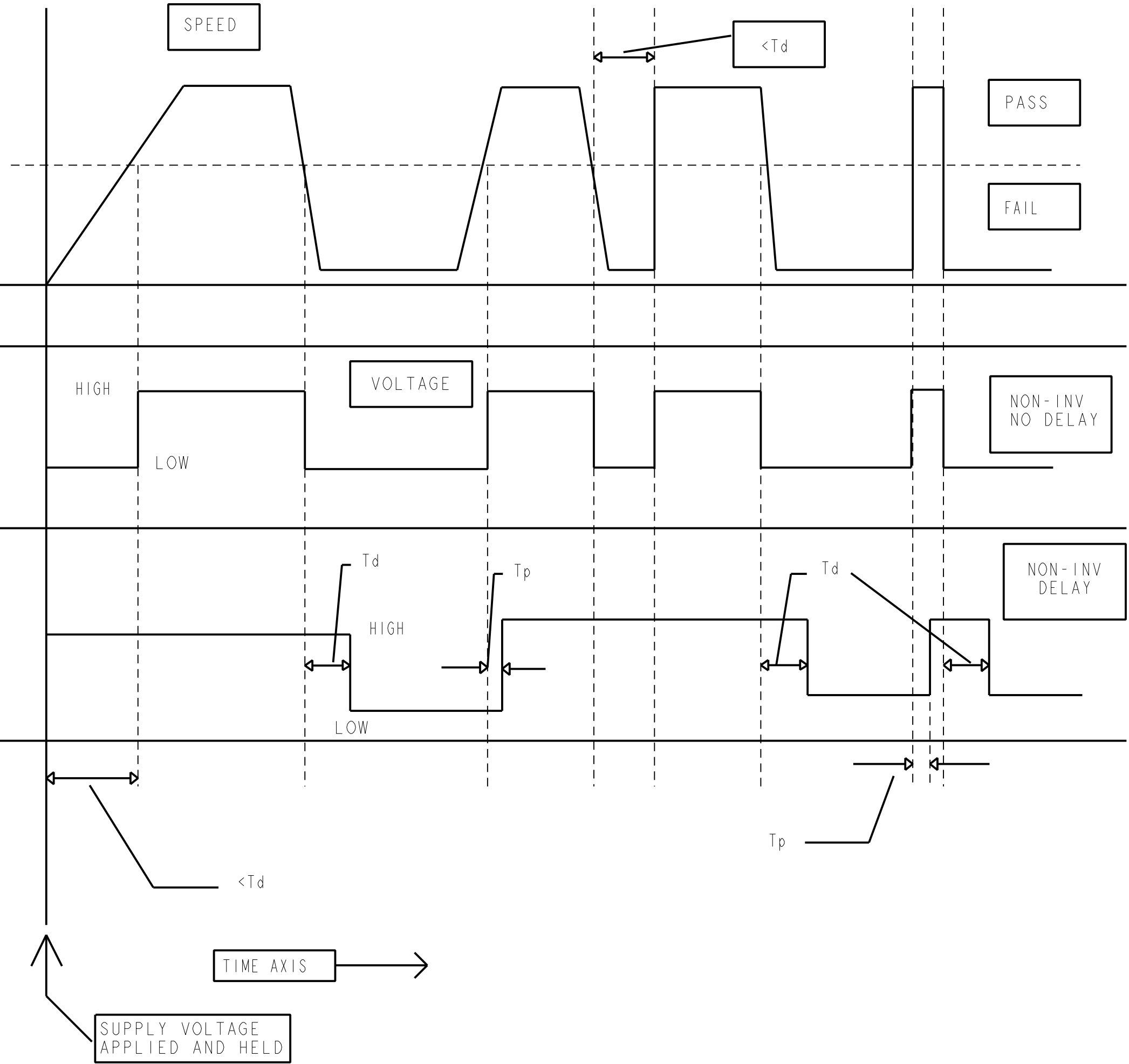
FREQUENCY TRIP POINT FTP = 60/(RCln((Vr1-IcR)/(Vr2-IcR)))  
INERTIAL DELAY SET TIME DST = 7RCln(Vr2/Vr1)+N\*60/FTP  
In is the natural log

WHERE NOMINAL VALUE OF:

Vr1 = 2V  
Vr2 = 2Vr1=4V  
Ic = 196uA  
N = 12  
R,C = exterior components

External components: R (Kohm) and C (uF)  
Target Timings: Frequency Trip Point (PPM)/Inertial Delay Set Time(s)#

| R/C  | 1          | 1.2        | 1.5        | 1.8        | 2.2        | 2.7        | 3.3        |
|------|------------|------------|------------|------------|------------|------------|------------|
| 39   | 3516/0.39  | 2930/0.47  | 2344/0.59  | 1954/0.71  | 1598/0.87  |            |            |
| 43   | 3744/0.40  | 3120/0.48  | 2496/0.60  | 2080/0.72  | 1702/0.88  |            |            |
| 47   | 3931/0.41  | 3276/0.49  | 2620/0.62  | 2184/0.74  | 1787/0.90  |            |            |
| 51   | 4087/0.42  | 3406/0.51  | 2725/0.64  | 2271/0.76  | 1858/0.93  |            |            |
| 56   | 4250/0.44  | 3542/0.53  | 2834/0.66  | 2361/0.79  | 1932/0.97  |            |            |
| 62   | 4411/0.46  | 3676/0.56  | 2940/0.70  | 2450/0.84  |            |            |            |
| 68   | 4542/0.49  | 3785/0.59  | 3028/0.73  | 2523/0.88  |            |            |            |
| 75   | 4669/0.52  | 3890/0.62  | 3112/0.78  | 2594/0.93  |            |            |            |
| 82   | 4773/0.55  | 3978/0.66  | 3182/0.82  | 2652/0.99  |            |            |            |
| 91   | 4884/0.59  | 4070/0.71  | 3256/0.88  |            |            |            |            |
| 100  | 4974/0.63  | 4145/0.76  | 3316/0.94  |            |            |            |            |
| 110  | 5057/0.68  | 4214/0.81  |            |            |            |            |            |
| 120  | 5126/0.72  | 4272/0.87  |            |            |            |            |            |
| 130  | 5184/0.77  | 4320/0.92  |            |            |            |            |            |
| 150  | 5277/0.86  |            |            |            |            |            | 1681/4.75  |
| 300  | 5315/0.91  |            |            |            |            |            | 1691/5.23  |
| 330  |            |            |            |            | 2077/4.67  | 1699/5.71  |            |
| 360  |            |            |            |            | 2085/5.06  | 1706/6.19  |            |
| 390  |            |            |            |            | 2092/5.45  | 1712/6.67  |            |
| 430  |            |            |            |            | 2577/4.87  | 2100/5.98  | 1718/7.30  |
| 470  |            |            |            |            | 2586/5.30  | 2107/6.50  | 1724/7.94  |
| 510  |            |            |            | 3169/4.68  | 2592/5.72  | 2112/7.02  | 1728/8.58  |
| 560  |            |            |            | 3177/5.12  | 2600/6.25  | 2118/7.68  | 1733/9.38  |
| 620  |            |            | 3823/4.70  | 3186/5.64  | 2607/6.89  | 2124/8.46  | 1738/10.34 |
| 680  |            |            | 3832/5.14  | 3193/6.16  | 2613/7.53  | 2129/9.25  | 1742/11/30 |
| 750  |            |            | 3840/5.65  | 3200/6.78  | 2618/8.28  | 2133/10.16 | 1745/12/42 |
| 820  |            | 4808/4.92  | 3847/6.16  | 3206/7.39  | 2623/9.03  | 2137/11.08 | 1749/13.54 |
| 910  |            | 4818/5.45  | 3854/6.81  | 3212/8.17  | 2628/9.99  | 2141/12.26 | 1752/14.98 |
| 1000 | 5790/4.98  | 4825/5.97  | 3860/7.46  | 3217/8.96  | 2632/10.95 | 2144/13.44 | 1755/16.42 |
| 1100 | 5798/5.46  | 4832/6.55  | 3865/8.19  | 3221/9.83  | 2636/12.02 | 2147/14.75 |            |
| 1200 | 5805/5.95  | 4837/7.14  | 3870/8.92  | 3225/10.70 | 2639/13.08 | 2150/16.06 |            |
| 1300 | 5811/6.43  | 4842/7.72  | 3874/9.65  | 3228/11.58 | 2641/14.15 | 2152/17.37 |            |
| 1500 | 5820/7.40  | 4850/8.88  | 3880/11.10 | 3233/13.32 | 2645/16.28 |            |            |
| 1600 | 5824/7.89  | 4853/9.46  | 3882/11.83 | 3235/14.20 |            |            |            |
| 1800 | 5830/8.86  | 4858/10.63 | 3887/13.29 | 3239/15.94 |            |            |            |
| 2000 | 5835/9.83  | 4862/11.79 | 3890/14.74 | 3242/17.69 |            |            |            |
| 2200 | 5839/10.80 | 4866/12.96 | 3893/16.20 |            |            |            |            |
| 2400 | 5842/11.77 | 4869/14.12 |            |            |            |            |            |



Td is the time delay after the pulses/min. go below the trip point. Td is set by the external RC.

Tp is the time delay after the pulses/min. go above the trip point. Tp is less than 20% of Td.

PTC/CAD 20

ISSUE 6

DRAWING NUMBER

SS421H

PAGE 3 OF 3

REPLACES X99395-SS

RELEASE NO. PR-21852

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SS421H

FED. MFG. CODE 91929

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ONE PLACE (.0) ±.030

TWO PLACES (.00) ±.015

THREE PLACES (.000) ±.005

ANGLES ± 2°

WEIGHT