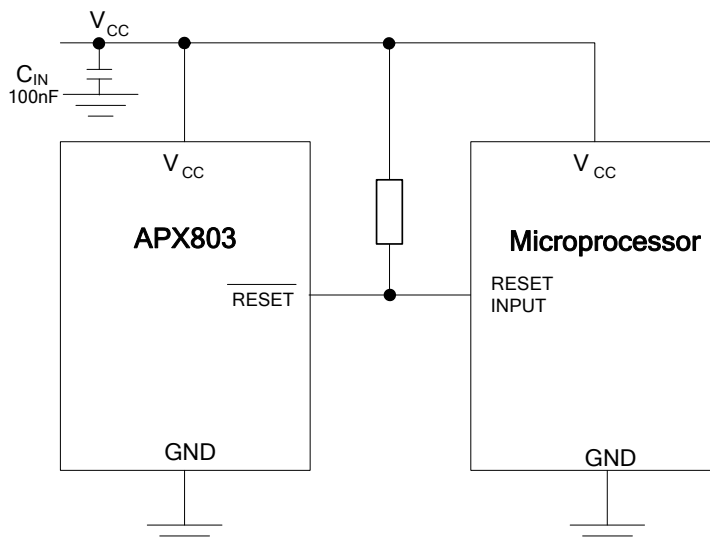


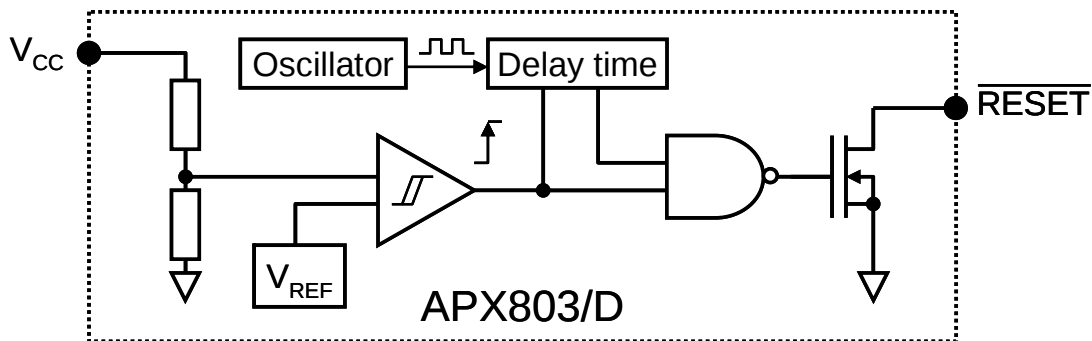
## Typical Application Circuit



## Pin Descriptions

| Pin Name                  | Description                               |
|---------------------------|-------------------------------------------|
| GND                       | Ground                                    |
| $\overline{\text{RESET}}$ | Reset Output Pin<br>Active Low Open Drain |
| V <sub>CC</sub>           | Operating Voltage Input                   |

## Functional Block Diagram



### Absolute Maximum Ratings

| Symbol             | Parameter                                                                         | Rating       | Unit |
|--------------------|-----------------------------------------------------------------------------------|--------------|------|
| ESD HBM            | Human Body Model ESD Protection                                                   | 2            | kV   |
| ESD MM             | Machine Model ESD Protection                                                      | 200          | V    |
| V <sub>CC</sub>    | Supply Voltage                                                                    | -0.3 to +6.0 | V    |
| V <sub>RESET</sub> | $\overline{\text{RESET}}$ (open drain)                                            | -0.3 to 6    | V    |
| I <sub>CC</sub>    | Input Current, V <sub>CC</sub>                                                    | 20           | mA   |
| I <sub>O</sub>     | Output Current, $\overline{\text{RESET}}$                                         | 20           | mA   |
| P <sub>D</sub>     | Continuous Power Dissipation (T <sub>A</sub> = +70°C), de-rate 4mW/°C above +70°C | 400          | mW   |
| T <sub>OP</sub>    | Operating Junction Temperature Range                                              | -40 to +105  | °C   |
| T <sub>ST</sub>    | Storage Temperature Range                                                         | -65 to +150  | °C   |

### Recommended Operating Conditions

| Symbol               | Parameter                                                          | Min | Max                    | Unit |
|----------------------|--------------------------------------------------------------------|-----|------------------------|------|
| V <sub>CC</sub>      | Supply Voltage                                                     | 1.1 | 5.5                    | V    |
| V <sub>IN</sub>      | Input Voltage                                                      | 0   | (V <sub>CC</sub> +0.3) | V    |
| V <sub>RESET</sub>   | $\overline{\text{RESET}}$ output voltage                           | 0   | 5.5                    | V    |
| T <sub>A</sub>       | Operating Ambient Temperature Range                                | -40 | 85                     | °C   |
| dV <sub>CC</sub> /dt | V <sub>CC</sub> Rate of rise (V <sub>CC</sub> = 0~V <sub>T</sub> ) |     | 100                    | V/μs |

### Electrical Characteristics ( $T_A = 25^\circ\text{C}$ )

$T_A = -40$  to  $85^\circ\text{C}$  unless otherwise note. Typical values are at  $T_A = +25^\circ\text{C}$ .

| Symbol        | Parameter                              |            | Test Conditions                                  | Min  | Typ. | Max  | Unit                  |
|---------------|----------------------------------------|------------|--------------------------------------------------|------|------|------|-----------------------|
| $I_{CC}$      | Supply Current                         |            | $V_{TH} + 0.2V$                                  |      | 30   | 40   | $\mu\text{A}$         |
| $V_{TH}$      | Reset Threshold                        | APX803-23  | $T_A = 25^\circ\text{C}$                         | 2.21 | 2.25 | 2.30 | V                     |
|               |                                        | APX803-26  |                                                  | 2.59 | 2.63 | 2.66 |                       |
|               |                                        | APX803-29  |                                                  | 2.89 | 2.93 | 2.96 |                       |
|               |                                        | APX803D-29 |                                                  | 2.89 | 2.93 | 2.96 |                       |
|               |                                        | APX803-31  |                                                  | 3.04 | 3.08 | 3.13 |                       |
|               |                                        | APX803-40  |                                                  | 3.94 | 4.00 | 4.06 |                       |
|               |                                        | APX803-44  |                                                  | 4.31 | 4.38 | 4.45 |                       |
|               |                                        | APX803-46  |                                                  | 4.56 | 4.63 | 4.70 |                       |
|               | Reset Threshold hysteresis             |            | $V_{TH-H} - V_{TH-L}$                            |      | 40   |      | mV                    |
|               | Reset Threshold Tempco                 |            |                                                  |      | 30   |      | ppm/ $^\circ\text{C}$ |
| $t_S$         | $V_{CC}$ to RESET delay                |            | $V_{CC} = V_{TH}$ to $(V_{TH} - 100\text{mV})$   |      | 20   |      | $\mu\text{s}$         |
| $t_{DELAY}$   | Reset Active Timeout Period            | APX803-XX  | $T_A = 0^\circ\text{C}$ to $+85^\circ\text{C}$   | 140  | 200  | 280  | ms                    |
|               |                                        | APX803D-29 |                                                  | 1    |      | 3.3  |                       |
| $V_{OL}$      | RESET Output Voltage Low               |            | $V_{CC} = V_{TH} - 0.2, I_{SINK} = 1.2\text{mA}$ |      |      | 0.3  | V                     |
|               |                                        |            | $V_{CC} = V_{TH} - 0.2, I_{SINK} = 3.5\text{mA}$ |      |      | 0.4  |                       |
|               |                                        |            | $V_{CC} > 1.0V, I_{SINK} = 50\mu\text{A}$        |      |      | 0.3  |                       |
| $I_{OH}$      | RESET Output High leakage current      |            | $V_{CC} > V_{TH} + 0.2$                          |      |      | 1    | $\mu\text{A}$         |
| $\theta_{JA}$ | Thermal Resistance Junction-to-Ambient |            | SOT23/SOT23R (Note 2)                            |      | 201  |      | $^\circ\text{C/W}$    |
| $\theta_{JC}$ | Thermal Resistance Junction-to-Case    |            | SOT23/SOT23R (Note 2)                            |      | 56   |      | $^\circ\text{C/W}$    |

- Notes:
2. Test condition for SOT23 and SOT23R: Devices mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  3. Final datasheet limits to be determined by characterization and correlation.

## Typical Performance Characteristics

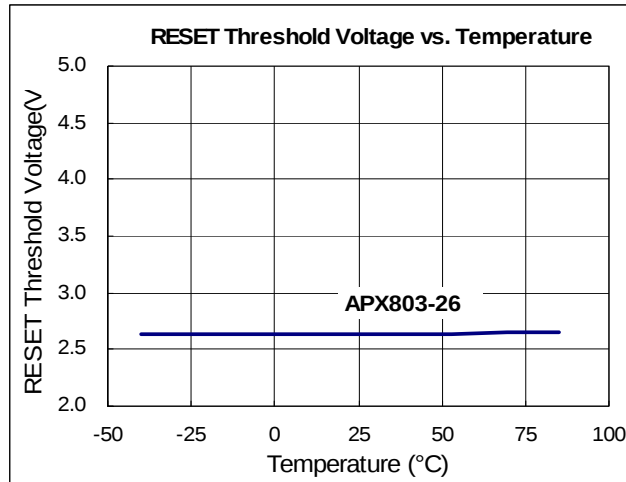


Figure 1

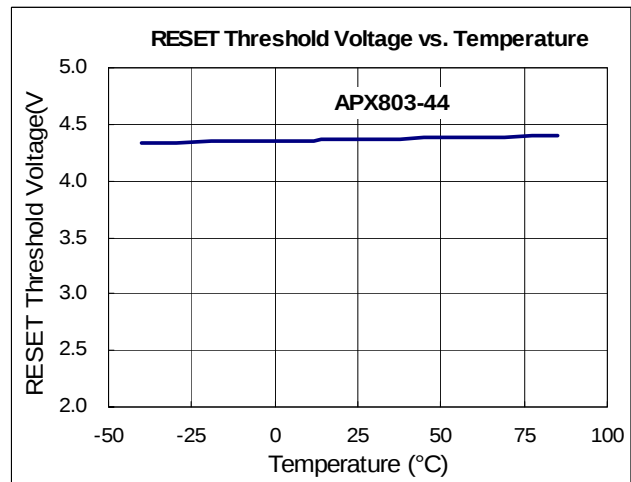


Figure 2

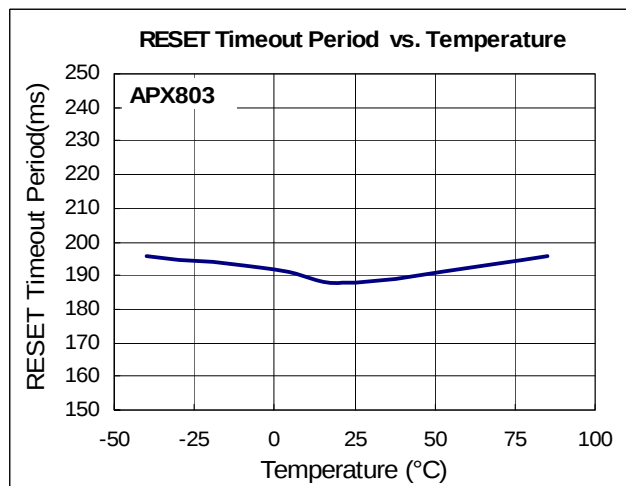


Figure 3

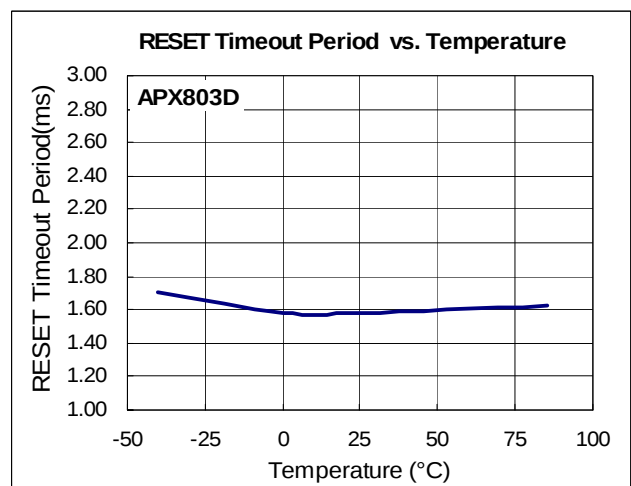


Figure 4

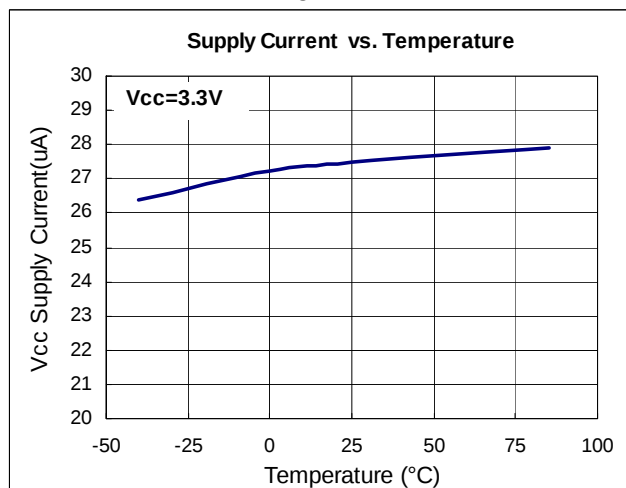


Figure 5

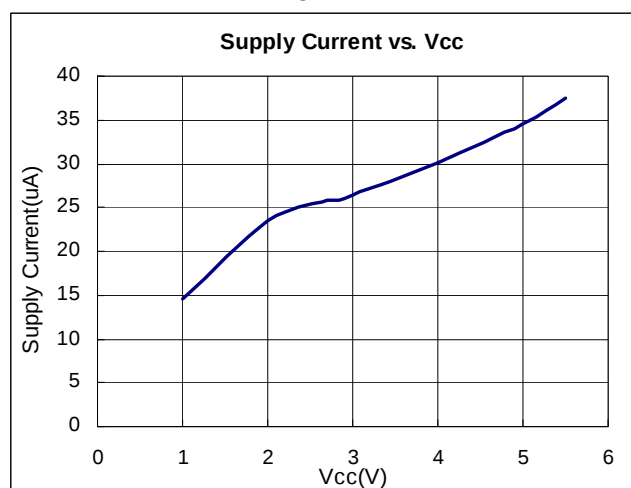


Figure 6

**Typical Performance Characteristics (Continued)**

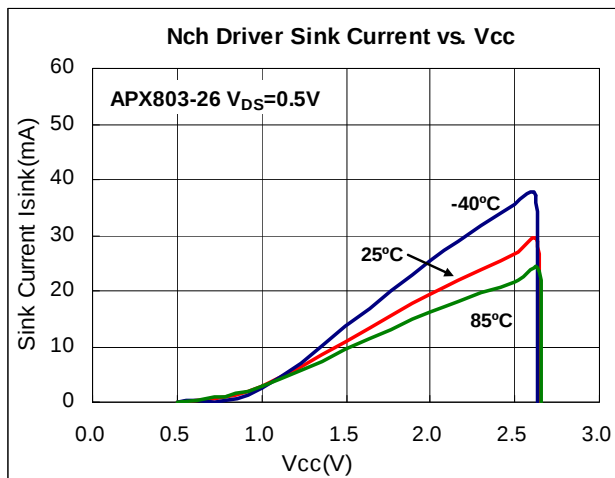


Figure 7

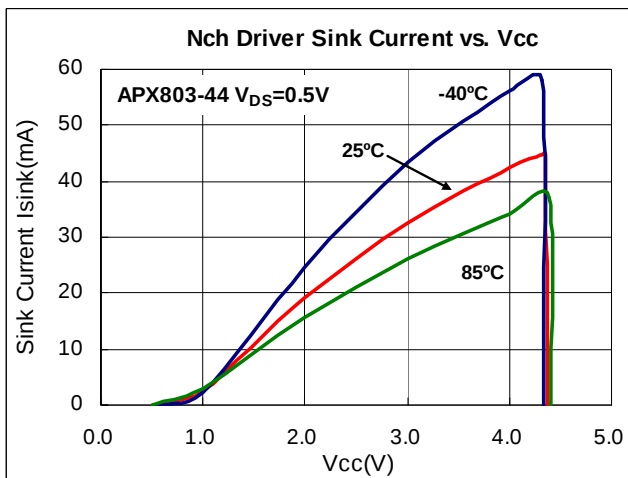


Figure 8

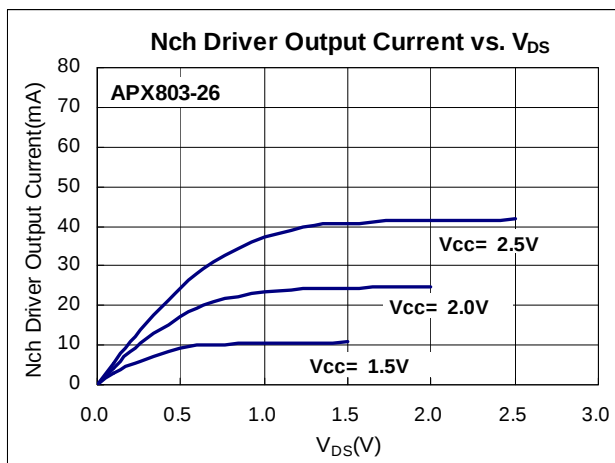


Figure 9

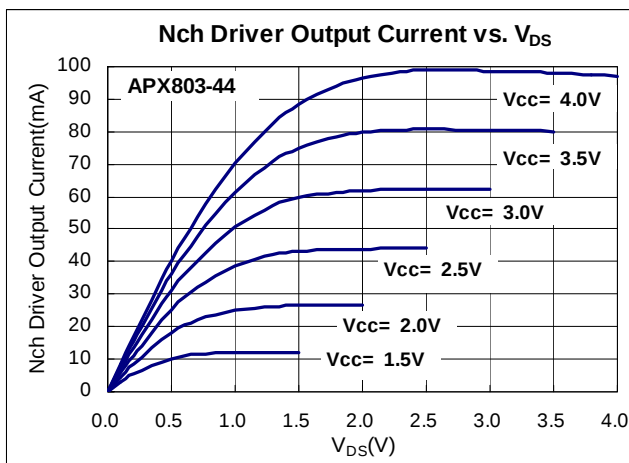
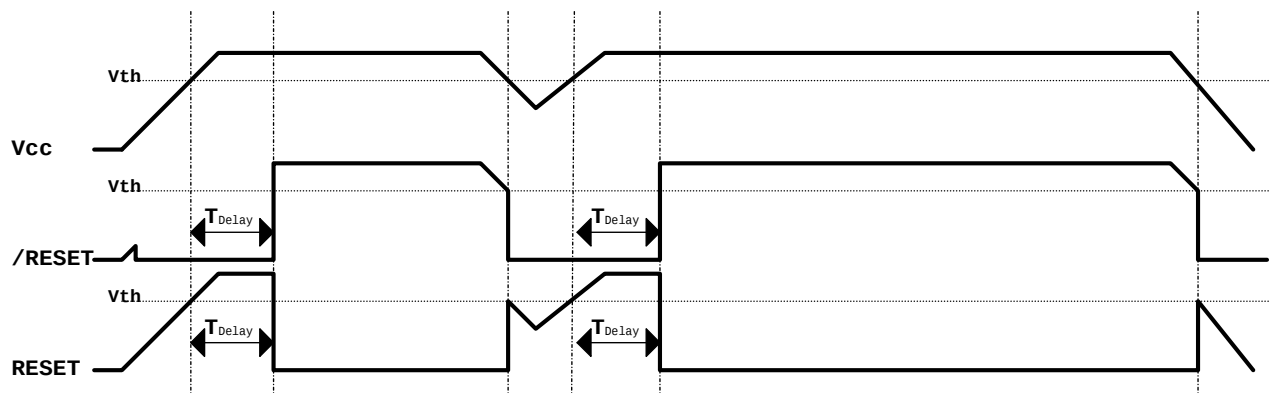


Figure 10

### Timing Diagram



### Functional Description

Microprocessors ( $\mu$ Ps) and microcontrollers ( $\mu$ C) have a reset input to ensure that it starts up in a known state. The APX803/D drive the  $\mu$ P's reset input to prevent code-execution errors during power-up, power-down, or brownout conditions. They assert a reset signal whenever the  $V_{CC}$  supply voltage declines below a preset threshold and keep it asserted for a fixed period of time after  $V_{CC}$  has risen above the reset threshold. For the APX803D this period is a minimum of 1ms while for other APX803 variants it is at least 140ms. The APX803/D have an open-drain output stage.

#### Ensuring a Valid Reset Output

##### Down to $V_{CC} = 0$

$\overline{\text{RESET}}$  is guaranteed to be a logic low for  $V_{CC} > 1V$ . Once  $V_{CC}$  exceeds the reset threshold, an internal timer keeps  $\overline{\text{RESET}}$  low for the reset timeout period; after this interval,  $\overline{\text{RESET}}$  goes high. If a brownout condition occurs ( $V_{CC}$  dips below the  $\overline{\text{RESET}}$  reset threshold),  $\overline{\text{RESET}}$  goes low. Any time  $V_{CC}$  goes below the reset threshold, the internal timer resets to zero, and  $\overline{\text{RESET}}$  goes low. The internal timer starts after  $V_{CC}$  returns above the reset threshold, and  $\overline{\text{RESET}}$  remains low for the reset timeout period.

When  $V_{CC}$  falls below 1V, the APX803/D  $\overline{\text{RESET}}$  output no longer sinks current — it becomes an open circuit. Therefore, high-impedance CMOS logic inputs connected to  $\overline{\text{RESET}}$  can drift to undetermined voltages. This presents no problem in most applications since most  $\mu$ P and other circuitry is inoperative with  $V_{CC}$  below 1V.

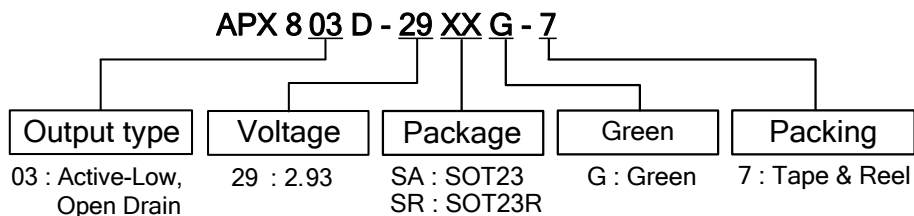
#### Interfacing to $\mu$ P with Bidirectional Reset Pins

Since the RESET output on the APX803/D is open drain, this device interfaces easily with  $\mu$ P/ $\mu$ C that have bidirectional reset pins, such as the Motorola 68HC11. Connecting the  $\mu$ P supervisor's RESET output directly to the microcontroller's ( $\mu$ C's) RESET pin with a single pull-up resistor allows either device to assert reset.

#### Supervising and monitoring Multiple Supplies

Generally, the pull-up resistor connected to the APX803/D will connect to the supply voltage that is being monitored at the IC's  $V_{CC}$  pin. However, some systems may use the APX803/D open-drain output to level-shift from the monitored supply to reset the  $\mu$ P powered by a different supply voltage or monitor multiple supplies that will be fed into 1  $\mu$ C/ $\mu$ P reset input.

### Ordering Information



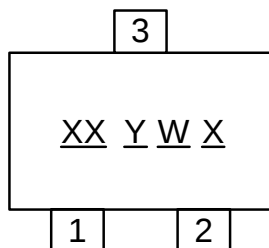
| Device          | Package Code | Packaging<br>(Note 4) | 7" Tape and Reel |                    |
|-----------------|--------------|-----------------------|------------------|--------------------|
|                 |              |                       | Quantity         | Part Number Suffix |
| APX803-XXSAG-7  | SA           | SOT23                 | 3000/Tape & Reel | -7                 |
| APX803-XXSRG-7  | SR           | SOT23R                | 3000/Tape & Reel | -7                 |
| APX803D-29SAG-7 | SA           | SOT23                 | 3000/Tape & Reel | -7                 |
| APX803D-29SRG-7 | SR           | SOT23R                | 3000/Tape & Reel | -7                 |

Notes: 4. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.

## Marking Information

### (1) SOT23 and SOT23R

( Top View )



XX : Identification code

Y : Year 0~9

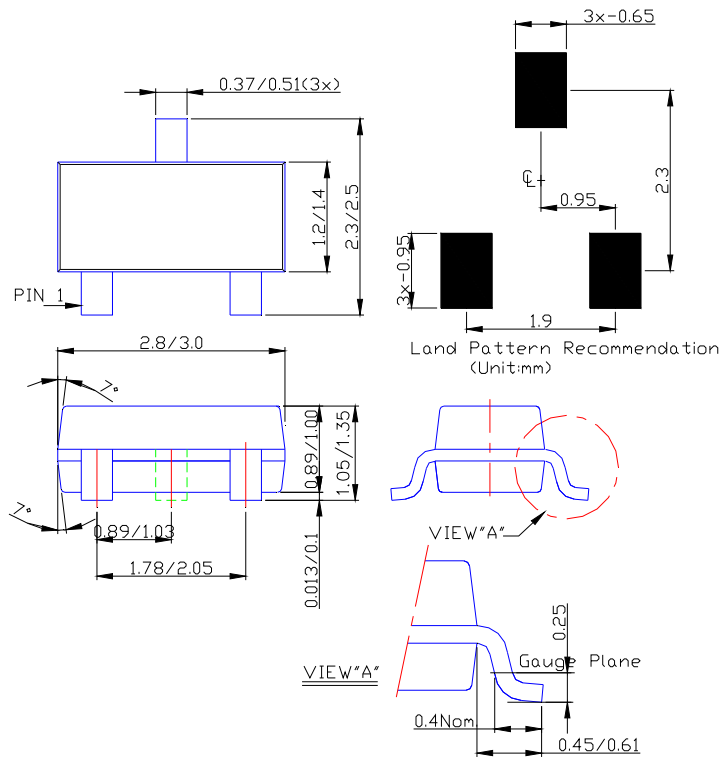
W : Week : A~Z : 1~26 week;  
a~z : 27~52 week; z represents  
52 and 53 week

X : A~Z : Green

| Device       | Package | Identification Code |
|--------------|---------|---------------------|
| APX803-46SA  | SOT23   | V3                  |
| APX803-44SA  | SOT23   | V4                  |
| APX803-40SA  | SOT23   | V5                  |
| APX803-31SA  | SOT23   | V6                  |
| APX803-29SA  | SOT23   | V7                  |
| APX803-26SA  | SOT23   | V8                  |
| APX803-23SA  | SOT23   | V9                  |
| APX803-46SR  | SOT23R  | S3                  |
| APX803-44SR  | SOT23R  | S4                  |
| APX803-40SR  | SOT23R  | S5                  |
| APX803-31SR  | SOT23R  | S6                  |
| APX803-29SR  | SOT23R  | S7                  |
| APX803-26SR  | SOT23R  | S8                  |
| APX803-23SR  | SOT23R  | S9                  |
| APX803D-29SA | SOT23   | VN                  |
| APX803D-29SR | SOT23R  | SN                  |

**Package Outline Dimensions (All Dimensions in mm)**

**(1) Package Type: SOT23 and SOT23R**



Notes: 5. Package outline dimensions as shown on Diodes Inc. package outline dimensions document AP02002, which can be found on our website at <http://www.diodes.com/datasheets/ap02002.pdf>

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