

## Microprocessor Reset IC

### Features

- Precision Monitoring of +3V, +3.3V, and +5V Power-Supply Voltages
- Fully Specified Over Temperature
- Available in Three Output Configurations
  - Push-Pull  $\overline{\text{RESET}}$  Output (G690L)
  - Push-Pull RESET Output (G690H)
  - Open-Drain  $\overline{\text{RESET}}$  Output (G691L)
- 140ms min Power-On Reset Pulse Width
- 10 $\mu$ A Supply Current
- Guaranteed Reset Valid to  $V_{CC} = +1V$
- Power Supply Transient Immunity
- No External Components
- 3-Pin SOT89, SOT23 and SC70 Packages

### Applications

- Computers
- Controllers
- Intelligent Instruments
- Critical  $\mu$ P and  $\mu$ C Power Monitoring
- Portable / Battery-Powered Equipment
- Automotive

### General Description

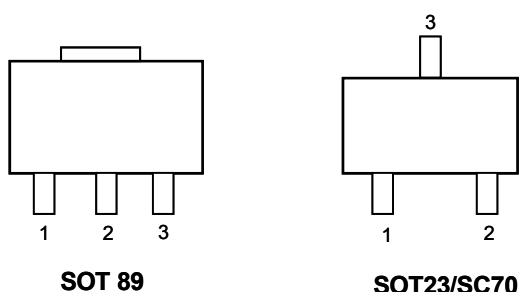
The G690/G691 are microprocessor ( $\mu$ P) supervisory circuits used to monitor the power supplies in  $\mu$ P and digital systems. They provide excellent circuit reliability and low cost by eliminating external components and adjustments when used with +5V, +3.3V, +3.0V- powered circuits.

These circuits perform a single function: they assert a reset signal whenever the  $V_{CC}$  supply voltage declines below a preset threshold, keeping it asserted for at least 140ms after  $V_{CC}$  has risen above the reset threshold. Reset thresholds suitable for operation with a variety of supply voltages are available.

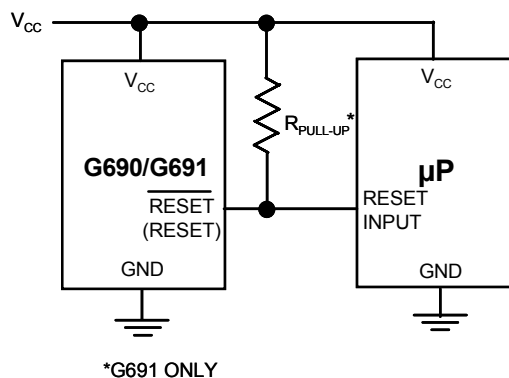
The G691L has an open-drain output stage, while the G690 have push-pull outputs. The G691L's open-drain  $\overline{\text{RESET}}$  output requires a pull-up resistor that can be connected to a voltage higher than  $V_{CC}$ . The G690L have an active-low  $\overline{\text{RESET}}$  output, while the G690H has an active-high RESET output. The reset comparator is designed to ignore fast transients on  $V_{CC}$ , and the outputs are guaranteed to be in the correct logic state for  $V_{CC}$  down to 1V.

Low supply current makes the G690/G691 ideal for use in portable equipment. The G690/G691 are available in 3-pin SOT89 or SOT23 or SC70 packages.

### Pin Configuration

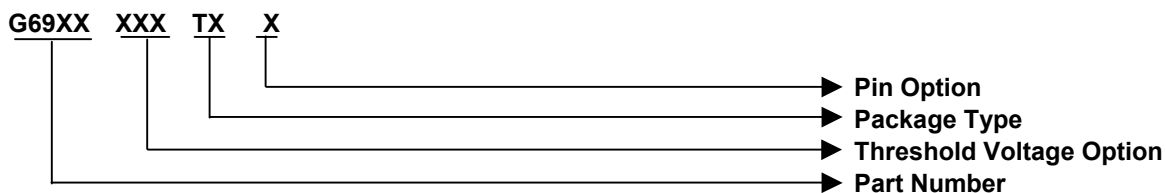


### Typical Application



**Ordering Information**

| PART        | TEMP. RANGE    | OUTPUT TYPE           |
|-------------|----------------|-----------------------|
| G690LxxxTxx | -40°C ~ +105°C | Push-Pull Active Low  |
| G690HxxxTxx | -40°C ~ +105°C | Push-Pull Active High |
| G691LxxxTxx | -40°C ~ +105°C | Open-Drain            |

**Order Number Identification****PART NUMBER**

G690L : Push-Pull Active Low Output  
 G690H : Push-Pull Active High Output  
 G691L : Open-Drain Output

**THRESHOLD VOLTAGE OPTION**

\* xxx specifies the threshold voltage.  
 e.g. 263 denotes the 2.63V threshold voltage.

**PACKAGE TYPE**

T2 : SOT 89  
 T7 : SOT 23  
 T9 : SC 70

**PIN OPTION**

| 1                             | 2                         | 3                         |
|-------------------------------|---------------------------|---------------------------|
| 1 : $\overline{\text{RESET}}$ | GND                       | $V_{CC}$                  |
| 2 : $\overline{\text{RESET}}$ | $V_{CC}$                  | GND                       |
| 3 : GND                       | $\overline{\text{RESET}}$ | $V_{CC}$                  |
| 4 : GND                       | $V_{CC}$                  | $\overline{\text{RESET}}$ |
| 5 : $V_{CC}$                  | GND                       | $\overline{\text{RESET}}$ |
| 6 : $V_{CC}$                  | $\overline{\text{RESET}}$ | GND                       |

\*RESET for G690H

**Absolute Maximum Ratings**

Terminal Voltage (with respect to GND)

 $V_{CC}$ .....-0.3V to +6.0VRESET, RESET (push-pull).....-0.3V to ( $V_{CC} + 0.3V$ )

RESET (open drain).....-0.3V to +6.0V

Input Current,  $V_{CC}$  .....20mA

Output Current, RESET, RESET .....20mA

Continuous Power Dissipation ( $T_A = +70^{\circ}\text{C}$ )

3-Pin SOT89.....500mW

3-Pin SOT23 (derate 4mW/ $^{\circ}\text{C}$  above  $+70^{\circ}\text{C}$ )....320mW3-Pin SC70 (derate 2.17mW/ $^{\circ}\text{C}$  above  $+70^{\circ}\text{C}$ )..174mWOperating Temperature Range .....-40 $^{\circ}\text{C}$  to +105 $^{\circ}\text{C}$ Storage Temperature Range.....-65 $^{\circ}\text{C}$  to +150 $^{\circ}\text{C}$ Lead Temperature (soldering, 10s) .....+300 $^{\circ}\text{C}$ 

Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**Electrical Characteristics**

( $V_{CC}$  = full range,  $T_A = -40^{\circ}\text{C}$  to  $+105^{\circ}\text{C}$ , unless otherwise noted. Typical values are at  $T_A = +25^{\circ}\text{C}$ ,  $V_{CC} = 5V$  for 463/438/400 versions,  $V_{CC} = 3.3V$  for 308/293 versions, and  $V_{CC} = 3V$  for 263 version.) (Note 1)

| PARAMETER              | SYMBOL   | CONDITION                                         | MIN                                                   | TYP  | MAX  | UNITS         |
|------------------------|----------|---------------------------------------------------|-------------------------------------------------------|------|------|---------------|
| $V_{CC}$ Range         |          | $T_A = 0^{\circ}\text{C} + 70^{\circ}\text{C}$    | 1.0                                                   |      | 5.5  | V             |
|                        |          | $T_A = -40^{\circ}\text{C} + 105^{\circ}\text{C}$ | 1.2                                                   |      | 5.5  |               |
| Supply Current (SOT23) | $I_{CC}$ | $T_A = -40^{\circ}\text{C} + 105^{\circ}\text{C}$ | $V_{CC} < 5.5V$ , G69__463/438/400__                  | 22   | 30   | $\mu\text{A}$ |
|                        |          |                                                   | $V_{CC} < 3.6V$ , G69__308/293/263__                  | 10   | 23   |               |
| Reset Threshold        | $V_{TH}$ | G69__463__                                        | $T_A = +25^{\circ}\text{C}$                           | 4.56 | 4.63 | V             |
|                        |          |                                                   | $T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$  | 4.50 |      |               |
|                        |          |                                                   | $T_A = +85^{\circ}\text{C}$ to $+105^{\circ}\text{C}$ | 4.40 |      |               |
|                        |          | G69__438__                                        | $T_A = +25^{\circ}\text{C}$                           | 4.31 | 4.38 |               |
|                        |          |                                                   | $T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$  | 4.25 |      |               |
|                        |          |                                                   | $T_A = +85^{\circ}\text{C}$ to $+105^{\circ}\text{C}$ | 4.16 |      |               |
|                        |          | G69__400__                                        | $T_A = +25^{\circ}\text{C}$                           | 3.93 | 4.00 |               |
|                        |          |                                                   | $T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$  | 3.89 |      |               |
|                        |          |                                                   | $T_A = +85^{\circ}\text{C}$ to $+105^{\circ}\text{C}$ | 3.80 |      |               |
|                        |          | G69__308__                                        | $T_A = +25^{\circ}\text{C}$                           | 3.04 | 3.08 |               |
|                        |          |                                                   | $T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$  | 3.00 |      |               |
|                        |          |                                                   | $T_A = +85^{\circ}\text{C}$ to $+105^{\circ}\text{C}$ | 2.92 |      |               |
|                        |          | G69__293__                                        | $T_A = +25^{\circ}\text{C}$                           | 2.89 | 2.93 |               |
|                        |          |                                                   | $T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$  | 2.85 |      |               |
|                        |          |                                                   | $T_A = +85^{\circ}\text{C}$ to $+105^{\circ}\text{C}$ | 2.78 |      |               |
|                        |          | G69__263__                                        | $T_A = +25^{\circ}\text{C}$                           | 2.59 | 2.63 |               |
|                        |          |                                                   | $T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$  | 2.55 |      |               |
|                        |          |                                                   | $T_A = +85^{\circ}\text{C}$ to $+105^{\circ}\text{C}$ | 2.50 |      |               |

**Electrical Characteristics (Continued)**

( $V_{CC}$  = full range,  $T_A$  = -40°C to +105°C, unless otherwise noted. Typical values are at  $T_A$  = +25°C,  $V_{CC}$  = 5V for 463/438/400 versions,  $V_{CC}$  = 3.3V for 308/293 versions, and  $V_{CC}$  = 3V for 263 version.) (Note 1)

| PARAMETER                                                                                   | SYMBOL   | CONDITION                                                                                | MIN | TYP | MAX | UNITS  |
|---------------------------------------------------------------------------------------------|----------|------------------------------------------------------------------------------------------|-----|-----|-----|--------|
| Reset Threshold Tempco                                                                      |          |                                                                                          |     | 40  |     | ppm/°C |
| $V_{CC}$ to Reset Delay (Note 2)                                                            |          | $V_{CC} = V_{TH}$ to ( $V_{TH} - 100\text{mV}$ )                                         |     | 7   |     | μs     |
| Reset Active Timeout Period                                                                 |          | $V_{CC} = V_{TH}$ max,<br>G69__ 463/438/400                                              | 280 |     | 640 | ms     |
|                                                                                             |          | $V_{CC} = V_{TH}$ max,<br>G69__ 308/293/263                                              | 140 |     | 550 |        |
| RESET Output Current Low (push-pull active low, and open-drain active-low, G690L and G691L) | $I_{OL}$ | $V_{CC} = 2.5\text{V}$ , $V_{\overline{\text{RESET}}} = 0.5\text{V}$                     | 8   |     |     | mA     |
| RESET Output Current High (push-pull active low, G690L)                                     | $I_{OH}$ | $V_{CC} = 5\text{V}$ , $V_{\overline{\text{RESET}}} = 4.5\text{V}$ ,<br>G690L463/438/400 | 4.5 |     |     | mA     |
|                                                                                             |          | $V_{CC} = 3.3\text{V}$ , $V_{\overline{\text{RESET}}} = 2.8\text{V}$ ,<br>G690L308/293   | 3   |     |     |        |
|                                                                                             |          | $V_{CC} = 3\text{V}$ , $V_{\overline{\text{RESET}}} = 2.5\text{V}$ ,<br>G690L263         | 2   |     |     |        |
| RESET Output Current Low (push-pull active high, G690H)                                     | $I_{OL}$ | $V_{CC} = 5\text{V}$ , $V_{\text{RESET}} = 0.5\text{V}$ ,<br>G690H463/438/400            | 16  |     |     | mA     |
|                                                                                             |          | $V_{CC} = 3.3\text{V}$ , $V_{\text{RESET}} = 0.5\text{V}$ ,<br>G690H308/293              | 12  |     |     |        |
|                                                                                             |          | $V_{CC} = 3\text{V}$ , $V_{\text{RESET}} = 0.5\text{V}$ ,<br>G690H263                    | 10  |     |     |        |
| RESET Output Current High (push-pull active high, G690H)                                    | $I_{OH}$ | $V_{CC} = 2.5\text{V}$ , $V_{\text{RESET}} = 2\text{V}$                                  | 2   |     |     | mA     |
| RESET Open-Drain Output Leakage Current (G691L)                                             |          | $V_{CC} > V_{TH}$ , $\overline{\text{RESET}}$ deasserted                                 |     |     | 1   | μA     |

Note 1: Production testing done at  $T_A$  = +25°C; limits over temperature guaranteed by design.

Note 2: RESET output is for G690L/G691L; While RESET output is for G690H.

**Selector Guide**

| PART/SUFFIX | RESET THRESHOLD (V) | OUTPUT TYPE     | TOP MARK |        |       |
|-------------|---------------------|-----------------|----------|--------|-------|
|             |                     |                 | SOT 89   | SOT 23 | SC70  |
| G691L463Tx1 | 4.63                | Open-Drain      | 689Fx    | 689Fx  | 689Fx |
| G691L438Tx1 | 4.38                | Open-Drain      | 689Ex    | 689Ex  | 689Ex |
| G691L400Tx1 | 4.00                | Open-Drain      | 689Dx    | 689Dx  | 689Dx |
| G691L308Tx1 | 3.08                | Open-Drain      | 689Cx    | 689Cx  | 689Cx |
| G691L293Tx1 | 2.93                | Open-Drain      | 689Bx    | 689Bx  | 689Bx |
| G691L263Tx1 | 2.63                | Open-Drain      | 689Ax    | 689Ax  | 689Ax |
| G690H463Tx1 | 4.63                | Push-Pull RESET | 688Lx    | 688Lx  | 688Lx |
| G690H438Tx1 | 4.38                | Push-Pull RESET | 688Kx    | 688Kx  | 688Kx |
| G690H400Tx1 | 4.00                | Push-Pull RESET | 688Jx    | 688Jx  | 688Jx |
| G690H308Tx1 | 3.08                | Push-Pull RESET | 688Ix    | 688Ix  | 688Ix |
| G690H293Tx1 | 2.93                | Push-Pull RESET | 688Hx    | 688Hx  | 688Hx |
| G690H263Tx1 | 2.63                | Push-Pull RESET | 688Gx    | 688Gx  | 688Gx |
| G690L463Tx1 | 4.63                | Push-Pull       | 688Fx    | 688Fx  | 688Fx |
| G690L438Tx1 | 4.38                | Push-Pull       | 688Ex    | 688Ex  | 688Ex |
| G690L400Tx1 | 4.00                | Push-Pull       | 688Dx    | 688Dx  | 688Dx |
| G690L308Tx1 | 3.08                | Push-Pull       | 688Cx    | 688Cx  | 688Cx |
| G690L293Tx1 | 2.93                | Push-Pull       | 688Bx    | 688Bx  | 688Bx |
| G690L263Tx1 | 2.63                | Push-Pull       | 688Ax    | 688Ax  | 688Ax |

Note: T2: SOT89; T7: SOT23; T9: SC70

**Selector Guide**

| PART/SUFFIX | RESET THRESHOLD (V) | OUTPUT TYPE     | TOP MARK |        |       |
|-------------|---------------------|-----------------|----------|--------|-------|
|             |                     |                 | SOT 89   | SOT 23 | SC70  |
| G691L463Tx2 | 4.63                | Open-Drain      | 687Fx    | 687Fx  | 687Fx |
| G691L438Tx2 | 4.38                | Open-Drain      | 687Ex    | 687Ex  | 687Ex |
| G691L400Tx2 | 4.00                | Open-Drain      | 687Dx    | 687Dx  | 687Dx |
| G691L308Tx2 | 3.08                | Open-Drain      | 687Cx    | 687Cx  | 687Cx |
| G691L293Tx2 | 2.93                | Open-Drain      | 687Bx    | 687Bx  | 687Bx |
| G691L263Tx2 | 2.63                | Open-Drain      | 687Ax    | 687Ax  | 687Ax |
| G690H463Tx2 | 4.63                | Push-Pull RESET | 686Lx    | 686Lx  | 686Lx |
| G690H438Tx2 | 4.38                | Push-Pull RESET | 686Kx    | 686Kx  | 686Kx |
| G690H400Tx2 | 4.00                | Push-Pull RESET | 686Jx    | 686Jx  | 686Jx |
| G690H308Tx2 | 3.08                | Push-Pull RESET | 686Ix    | 686Ix  | 686Ix |
| G690H293Tx2 | 2.93                | Push-Pull RESET | 686Hx    | 686Hx  | 686Hx |
| G690H263Tx2 | 2.63                | Push-Pull RESET | 686Gx    | 686Gx  | 686Gx |
| G690L463Tx2 | 4.63                | Push-Pull       | 686Fx    | 686Fx  | 686Fx |
| G690L438Tx2 | 4.38                | Push-Pull       | 686Ex    | 686Ex  | 686Ex |
| G690L400Tx2 | 4.00                | Push-Pull       | 686Dx    | 686Dx  | 686Dx |
| G690L308Tx2 | 3.08                | Push-Pull       | 686Cx    | 686Cx  | 686Cx |
| G690L293Tx2 | 2.93                | Push-Pull       | 686Bx    | 686Bx  | 686Bx |
| G690L263Tx2 | 2.63                | Push-Pull       | 686Ax    | 686Ax  | 686Ax |

**Note:** T2: SOT89; T7: SOT23; T9: SC70**Selector Guide**

| PART/SUFFIX | RESET THRESHOLD (V) | OUTPUT TYPE     | TOP MARK |        |       |
|-------------|---------------------|-----------------|----------|--------|-------|
|             |                     |                 | SOT 89   | SOT 23 | SC70  |
| G691L463Tx3 | 4.63                | Open-Drain      | 691Fx    | 691Fx  | 691Fx |
| G691L438Tx3 | 4.38                | Open-Drain      | 691Ex    | 691Ex  | 691Ex |
| G691L400Tx3 | 4.00                | Open-Drain      | 691Dx    | 691Dx  | 691Dx |
| G691L308Tx3 | 3.08                | Open-Drain      | 691Cx    | 691Cx  | 691Cx |
| G691L293Tx3 | 2.93                | Open-Drain      | 691Bx    | 691Bx  | 691Bx |
| G691L263Tx3 | 2.63                | Open-Drain      | 691Ax    | 691Ax  | 691Ax |
| G690H463Tx3 | 4.63                | Push-Pull RESET | 690Lx    | 690Lx  | 690Lx |
| G690H438Tx3 | 4.38                | Push-Pull RESET | 690Kx    | 690Kx  | 690Kx |
| G690H400Tx3 | 4.00                | Push-Pull RESET | 690Jx    | 690Jx  | 690Jx |
| G690H308Tx3 | 3.08                | Push-Pull RESET | 690Ix    | 690Ix  | 690Ix |
| G690H293Tx3 | 2.93                | Push-Pull RESET | 690Hx    | 690Hx  | 690Hx |
| G690H263Tx3 | 2.63                | Push-Pull RESET | 690Gx    | 690Gx  | 690Gx |
| G690L463Tx3 | 4.63                | Push-Pull       | 690Fx    | 690Fx  | 690Fx |
| G690L438Tx3 | 4.38                | Push-Pull       | 690Ex    | 690Ex  | 690Ex |
| G690L400Tx3 | 4.00                | Push-Pull       | 690Dx    | 690Dx  | 690Dx |
| G690L308Tx3 | 3.08                | Push-Pull       | 690Cx    | 690Cx  | 690Cx |
| G690L293Tx3 | 2.93                | Push-Pull       | 690Bx    | 690Bx  | 690Bx |
| G690L263Tx3 | 2.63                | Push-Pull       | 690Ax    | 690Ax  | 690Ax |

**Note:** T2: SOT89; T7: SOT23; T9: SC70

**Selector Guide**

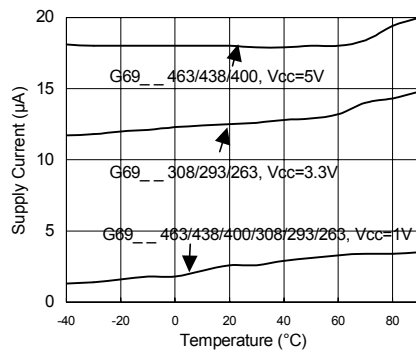
| PART/SUFFIX | RESET THRESHOLD (V) | OUTPUT TYPE     | TOP MARK |        |       |
|-------------|---------------------|-----------------|----------|--------|-------|
|             |                     |                 | SOT 89   | SOT 23 | SC70  |
| G691L463Tx6 | 4.63                | Open-Drain      | 685Fx    | 685Fx  | 685Fx |
| G691L438Tx6 | 4.38                | Open-Drain      | 685Ex    | 685Ex  | 685Ex |
| G691L400Tx6 | 4.00                | Open-Drain      | 685Dx    | 685Dx  | 685Dx |
| G691L308Tx6 | 3.08                | Open-Drain      | 685Cx    | 685Cx  | 685Cx |
| G691L293Tx6 | 2.93                | Open-Drain      | 685Bx    | 685Bx  | 685Bx |
| G691L263Tx6 | 2.63                | Open-Drain      | 685Ax    | 685Ax  | 685Ax |
| G690H463Tx6 | 4.63                | Push-Pull RESET | 684Lx    | 684Lx  | 684Lx |
| G690H438Tx6 | 4.38                | Push-Pull RESET | 684Kx    | 684Kx  | 684Kx |
| G690H400Tx6 | 4.00                | Push-Pull RESET | 684Jx    | 684Jx  | 684Jx |
| G690H308Tx6 | 3.08                | Push-Pull RESET | 684Ix    | 684Ix  | 684Ix |
| G690H293Tx6 | 2.93                | Push-Pull RESET | 684Hx    | 684Hx  | 684Hx |
| G690H263Tx6 | 2.63                | Push-Pull RESET | 684Gx    | 684Gx  | 684Gx |
| G690L463Tx6 | 4.63                | Push-Pull       | 684Fx    | 684Fx  | 684Fx |
| G690L438Tx6 | 4.38                | Push-Pull       | 684Ex    | 684Ex  | 684Ex |
| G690L400Tx6 | 4.00                | Push-Pull       | 684Dx    | 684Dx  | 684Dx |
| G690L308Tx6 | 3.08                | Push-Pull       | 684Cx    | 684Cx  | 684Cx |
| G690L293Tx6 | 2.93                | Push-Pull       | 684Bx    | 684Bx  | 684Bx |
| G690L263Tx6 | 2.63                | Push-Pull       | 684Ax    | 684Ax  | 684Ax |

**Note: T2: SOT89; T7: SOT23; T9: SC70**

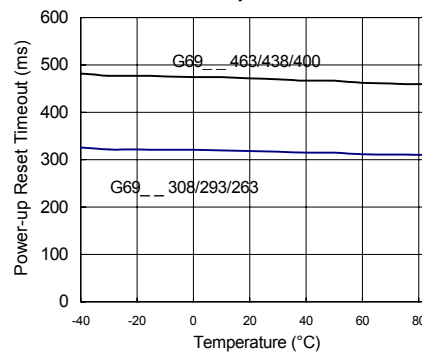
**Typical Operating Characteristics**

( $V_{CC}$  = full range,  $T_A$  =  $-40^{\circ}\text{C}$  to  $+105^{\circ}\text{C}$ , unless otherwise noted. Typical values are at  $T_A = +25^{\circ}\text{C}$ ,  $V_{CC} = 5\text{V}$  for 463/438/400 versions,  $V_{CC} = 3.3\text{V}$  for 308/293 versions, and  $V_{CC} = 3\text{V}$  for 263 version.)

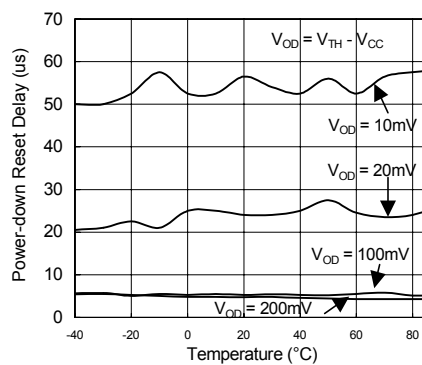
**Supply Current vs. Temperature  
(No Load)**



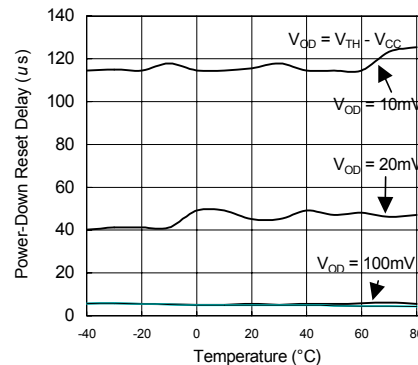
**Power-up Reset Timeout  
vs. Temperature**



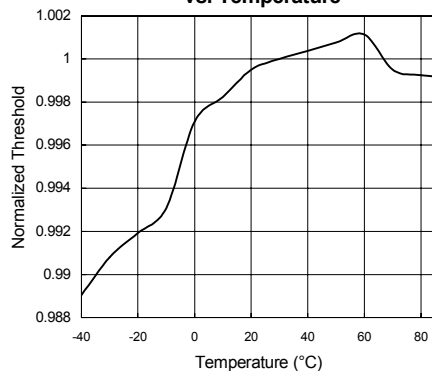
**Power-down Reset Delay vs.  
Temperature (G69\_\_308/293/263)**



**Power-down Reset Delay vs.  
Temperature (G69\_\_463/438/400)**



**Normalized Reset Threshold  
vs. Temperature**

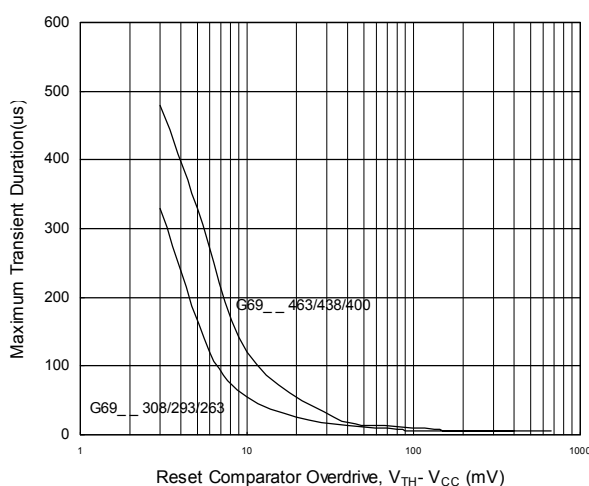


## Pin Description

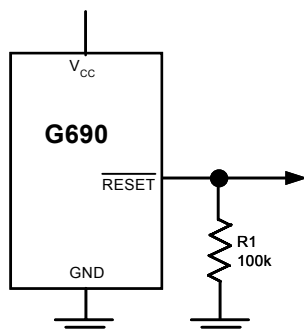
| PIN | NAME          | FUNCTION                                                                                                                                      |
|-----|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | GND           | Ground                                                                                                                                        |
| 2   | (G691L/G690L) | RESET Output remains low while $V_{CC}$ is below the reset threshold, and for at least 140ms after $V_{CC}$ rises above the reset threshold.  |
|     | RESET (G690H) | RESET Output remains high while $V_{CC}$ is below the reset threshold, and for at least 140ms after $V_{CC}$ rises above the reset threshold. |
| 3   | $V_{CC}$      | Supply Voltage (+5V, +3.3V, +3.0V)                                                                                                            |

## Detailed Description

A microprocessor's ( $\mu P$ 's) reset input starts the  $\mu P$  in a known state. The G691L/G690L/G690H assert reset 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, keeping it asserted for at least 140ms after  $V_{CC}$  has risen above the reset threshold. The G691L uses an open-drain output, and the G690L/G690H have a push-pull output stage. Connect a pull-up resistor on the G691L's RESET output to any supply between 0 and 5.5V.



**Figure 1. Maximum Transient Duration Without Causing a Reset Pulse vs. Reset Comparator Overdrive**



**Figure2. RESET Valid to  $V_{CC}$  = Ground Circuit**

## Applications Information

### Negative-Going $V_{CC}$ Transients

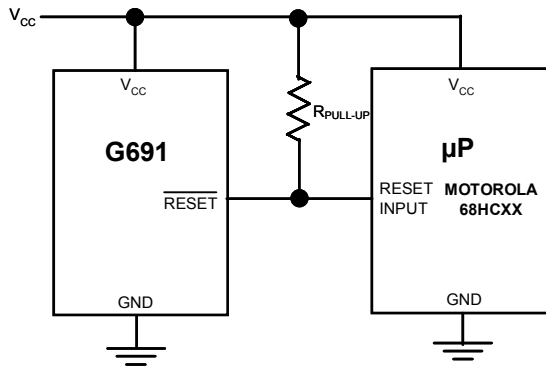
In addition to issuing a reset to the  $\mu P$  during power-up, power-down, and brownout conditions, the G691L/G690H/G690L are relatively immune to short-duration negative-going  $V_{CC}$  transients (glitches).

Figure 1 shows typical transient duration vs. reset comparator overdrive, for which the G691L/G690H/G690L do not generate a reset pulse. The graph was generated using a negative-going pulse applied to  $V_{CC}$ , starting 0.5V above the actual reset threshold and ending below it by the magnitude indicated (reset comparator overdrive). The graph indicates the maximum pulse width a negative-going  $V_{CC}$  transient can have without causing a reset pulse. As the magnitude of the transient increases (goes farther below the reset threshold), the maximum allowable pulse width decreases. Typically, for the G69\_463 and G69\_438, a  $V_{CC}$  transient that goes 100mV below the reset threshold and lasts 7 $\mu s$  or less will not cause a reset pulse. A 0.1 $\mu F$  bypass capacitor mounted as close as possible to the  $V_{CC}$  pin provides additional transient immunity.

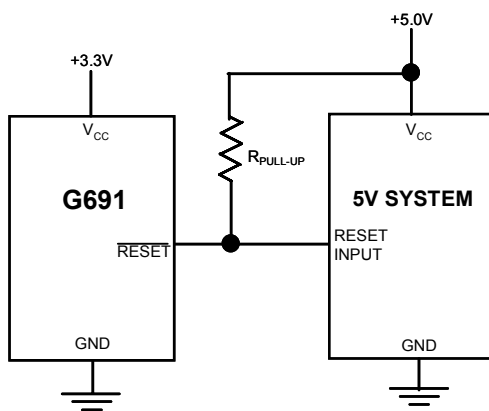
### Ensuring a Valid Reset Output Down to $V_{CC} = 0$

When  $V_{CC}$  falls below 1V, the G690 RESET output no longer sinks current—it becomes an open circuit. Therefore, high-impedance CMOS logic inputs connected to 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. However, in applications where RESET must be valid down to 0V, adding a pull-down resistor to RESET causes any stray leakage currents to flow to ground, holding RESET low (Figure 2). R1's value is not critical; 100k $\Omega$  is large enough not to load RESET and small enough to pull RESET to ground.

A 100k $\Omega$  pull-up resistor to  $V_{CC}$  is also recommended for the G691L if RESET is required to remain valid for  $V_{CC} < 1V$ .



**Figure 3. Interfacing to  $\mu$ Ps with Bidirectional Reset I/O**



**Figure 4. G691L Open-Drain  $\overline{\text{RESET}}$  Output Allows Use with Multiple Supplies**

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

Since the  $\overline{\text{RESET}}$  output on the G691L is open drain, this device interfaces easily with  $\mu$ Ps that have bidirectional reset pins, such as the Motorola 68HC11. Connecting the  $\mu$ P supervisor's  $\overline{\text{RESET}}$  output directly to the microcontroller's ( $\mu$ C's)  $\overline{\text{RESET}}$  pin with a single pull-up resistor allows either device to assert reset (Figure 3).

#### G691L Open-Drain $\overline{\text{RESET}}$ Output Allows Use with Multiple Supplies

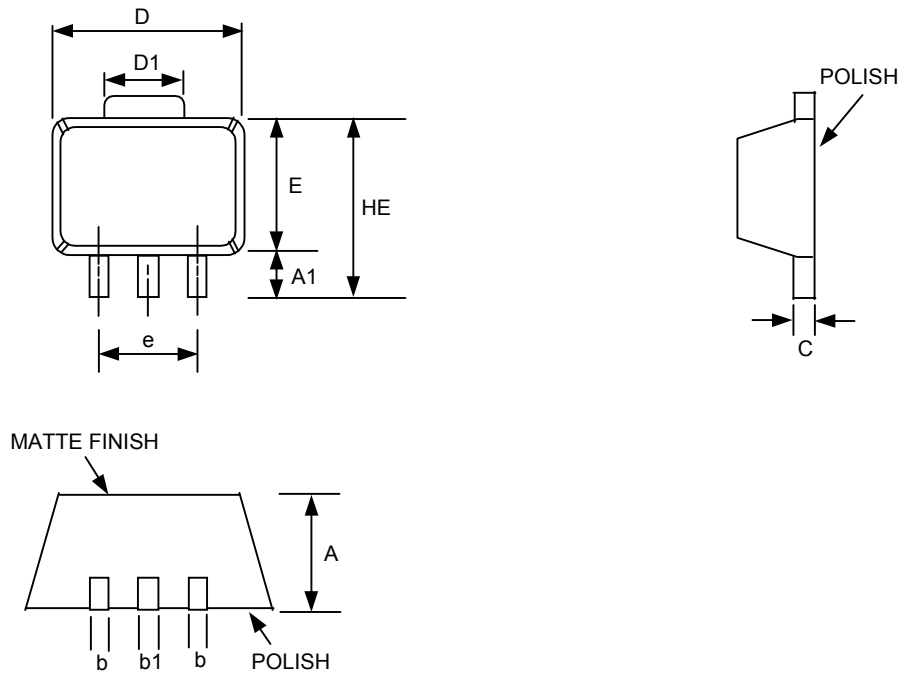
Generally, the pull-up connected to the G691L will connect to the supply voltage that is being monitored at the IC's  $V_{CC}$  pin. However, some systems may use the open-drain output to level-shift from the monitored supply to reset circuitry powered by some other supply (Figure 4). Note that as the G691L's  $V_{CC}$  decreases below 1V, so does the IC's ability to sink current at  $\overline{\text{RESET}}$ . Also, with any pull-up,  $\overline{\text{RESET}}$  will be pulled high as  $V_{CC}$  decays toward 0. The voltage where this occurs depends on the pull-up resistor value and the voltage to which it is connected.

#### Benefits of Highly Accurate Reset Threshold

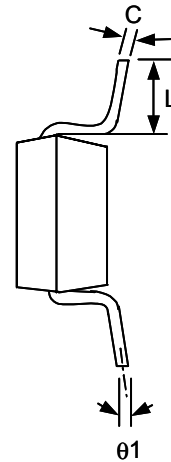
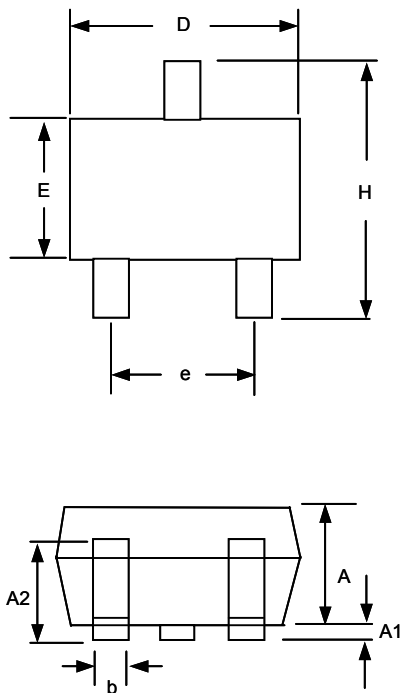
Most  $\mu$ P supervisor ICs have reset threshold voltages between 5% and 10% below the value of nominal supply voltages. This ensures a reset will not occur within 5% of the nominal supply, but will occur when the supply is 10% below nominal.

When using ICs rated at only the nominal supply  $\pm 5\%$ , this leaves a zone of uncertainty where the supply is between 5% and 10% low, and where the reset may or may not be asserted.

The G69\_\_463/G69\_\_308 use highly accurate circuitry to ensure that reset is asserted close to the 5% limit, and long before the supply has declined to 10% below nominal.

**Package Information****SOT- 89 (T2) Package**

| SYMBOLS | DIMENSIONS IN MILLIMETERS |       |       | DIMENSIONS IN INCHES |       |       |
|---------|---------------------------|-------|-------|----------------------|-------|-------|
|         | MIN                       | NOM   | MAX   | MIN                  | NOM   | MAX   |
| A       | 1.40                      | 1.50  | 1.60  | 0.055                | 0.059 | 0.063 |
| A1      | 0.80                      | 1.04  | ----- | 0.031                | 0.041 | ----- |
| b       | 0.36                      | 0.42  | 0.48  | 0.014                | 0.016 | 0.048 |
| b1      | 0.41                      | 0.47  | 0.53  | 0.016                | 0.018 | 0.020 |
| C       | 0.38                      | 0.40  | 0.43  | 0.014                | 0.015 | 0.017 |
| D       | 4.40                      | 4.50  | 4.60  | 0.173                | 0.177 | 0.181 |
| D1      | 1.40                      | 1.60  | 1.75  | 0.055                | 0.062 | 0.069 |
| HE      | -----                     | ----- | 4.25  | -----                | ----- | 0.167 |
| E       | 2.40                      | 2.50  | 2.60  | 0.094                | 0.098 | 0.102 |
| e       | 2.90                      | 3.00  | 3.10  | 0.114                | 0.118 | 0.122 |

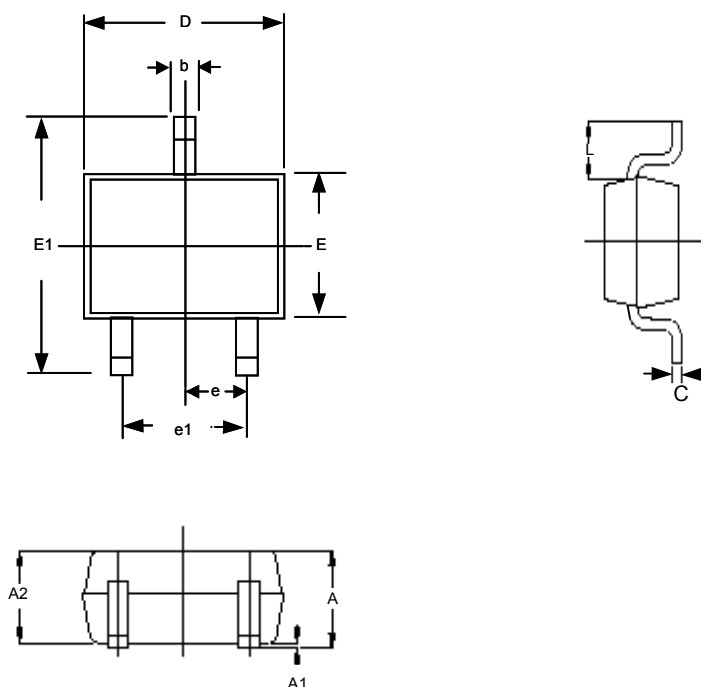


## SOT 23 (T7) Package

### Note:

- 1.Package body sizes exclude mold flash protrusions or gate burrs
- 2.Tolerance  $\pm 0.1000$  mm (4mil) unless otherwise specified
- 3.Coplanarity: 0.1000mm
- 4.Dimension L is measured in gage plane

| SYMBOLS    | DIMENSIONS IN MILLIMETERS |           |      |
|------------|---------------------------|-----------|------|
|            | MIN                       | NOM       | MAX  |
| A          | 1.00                      | 1.10      | 1.30 |
| A1         | 0.00                      | ----      | 0.10 |
| A2         | 0.70                      | 0.80      | 0.90 |
| b          | 0.35                      | 0.40      | 0.50 |
| C          | 0.10                      | 0.15      | 0.25 |
| D          | 2.70                      | 2.90      | 3.10 |
| E          | 1.40                      | 1.60      | 1.80 |
| e          | ----                      | 1.90(TYP) | ---- |
| H          | 2.60                      | 2.80      | 3.00 |
| L          | 0.37                      | ----      | ---- |
| $\theta 1$ | 1°                        | 5°        | 9°   |



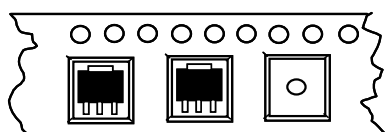
**SC70 (T9) Package**

**Note:**

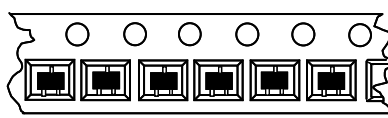
1. All dimensions are in millimeters
2. Dimensions are inclusive of plating of plating
3. Dimensions are exclusive of mold flash & metal burr
4. All specifications comply to EIAJ SC70
5. Coplanarity 4 Mils. Max.

| SYMBOL | DIMENSION IN MILLIMETERS |      | DIMENSION IN INCHS |        |
|--------|--------------------------|------|--------------------|--------|
|        | MIN.                     | MAX. | MIN.               | MAX.   |
| A      | 0.90                     | 1.20 | 0.035              | 0.047  |
| A1     | 0.05                     | 0.15 | 0.002              | 0.006  |
| A2     | 0.85                     | 1.05 | 0.033              | 0.041  |
| b      | 0.20                     | 0.40 | 0.008              | 0.016  |
| C      | 0.10                     | 0.15 | 0.004              | 0.006  |
| D      | 1.90                     | 2.10 | 0.075              | 0.083  |
| E      | 1.15                     | 1.35 | 0.045              | 0.053  |
| E1     | 2.00                     | 2.20 | 0.0787             | 0.0866 |
| e      | 0.65 BSC.                |      | 0.0256 BSC.        |        |
| e1     | 1.30 BSC.                |      | 0.0512 BSC.        |        |
| L      | 0.425 REF.               |      | 0.0167 REF.        |        |

**Package Orientation**



**SOT 89 Package Orientation**



**SOT23, SC70 Package Orientation**



**Стандарт  
Электрон  
Связь**

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