

## CMOS VOLTAGE DETECTOR

### ■ DESCRIPTION

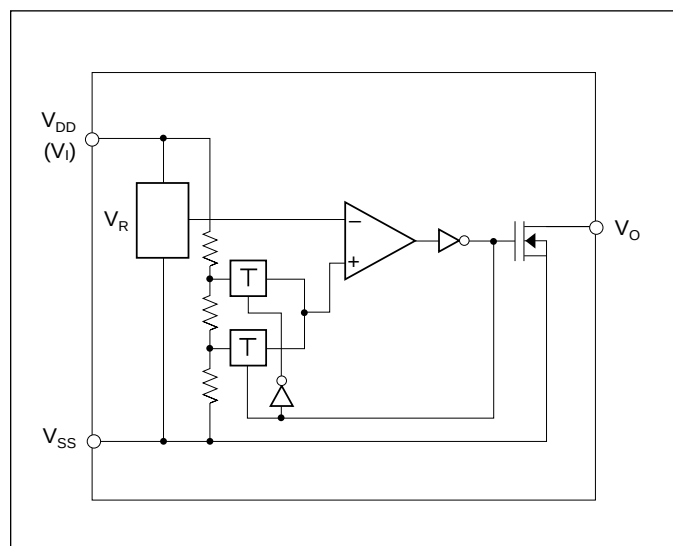
The SCI7700Y Series/SCI7701Y Series are a series of low-power precision voltage detectors, which do not require external adjustments. The SCI7700Y Series/SCI7701Y Series have such applications as battery-life detection, power supply fault monitoring, over/under-voltage protection and battery back-up switching. The SCI7700Y Series is an open-drain Nch output type and the SCI7701Y Series is a CMOS output type. Both are available in SOT 89-3pin (plastic) packages.

### ■ FEATURES

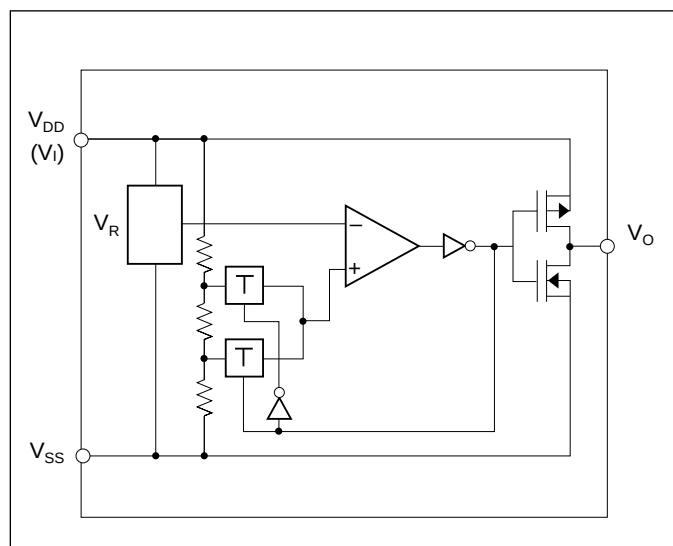
- Many types ..... see the next page
- Low operating supply current ..... Typ 1.8 $\mu$ A (SCI7700YNA, V<sub>DD</sub>=3.0V)
- Low range of operating voltage ..... Typ 1.2V (SCI7700YNA)
- Temperature coefficient of detection voltage ..... Typ (detection voltage/reference voltage) x 0.1 (mV/°C)
- Hysteresis difference ..... Typ detection voltage x 0.05V
- Package ..... SOT 89-3pin (plastic)

### ■ BLOCK DIAGRAM

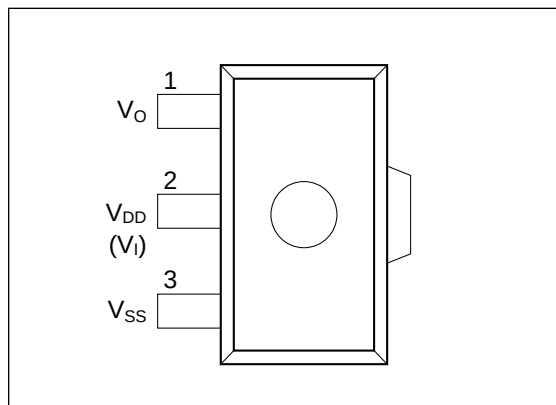
#### ● SCI7700Y Series



#### ● SCI7701Y Series



## PIN CONFIGURATION



(Ta = 25°C)

| Type No.    | Output Mode    | Detection Voltage (V) |      |      | Operating Voltage (V) | Operating Supply Current (μA) |
|-------------|----------------|-----------------------|------|------|-----------------------|-------------------------------|
|             |                | Min                   | Typ  | Max  |                       |                               |
| SCI7700YVA  | Open drain Nch | 0.90                  | 0.95 | 1.00 | 0.8 to 5.0            | Typ 1.4 (VDD=1.5V)            |
| SCI7700YAA  | Open drain Nch | 1.00                  | 1.05 | 1.10 | 0.9 to 5.0            | Typ 1.4 (VDD=1.5V)            |
| SCI7700YAS  | Open drain Nch | 1.05                  | 1.10 | 1.15 | 0.8 to 10.0           | Typ 1.4 (VDD=1.5V)            |
| SCI7700YBA  | Open drain Nch | 1.10                  | 1.15 | 1.20 | 0.9 to 5.0            | Typ 1.4 (VDD=1.5V)            |
| SCI7700YNA  | Open drain Nch | 1.85                  | 1.90 | 1.95 | 1.2 to 10.0           | Typ 1.8 (VDD=3.0)             |
| SCI7700YCA  | Open drain Nch | 2.10                  | 2.15 | 2.20 | 0.9 to 5.0            | Typ 1.8 (VDD=3.0V)            |
| SCI7700YFA  | Open drain Nch | 2.60                  | 2.70 | 2.80 | 1.5 to 10.0           | Typ 1.8 (VDD=3.0V)            |
| SCI7700YTA  | Open drain Nch | 3.80                  | 4.00 | 4.20 | 1.5 to 10.0           | Typ 2.6 (VDD=6.0V)            |
| SCI7701YCA  | CMOS           | 2.10                  | 2.15 | 2.20 | 1.5 to 10.0           | Typ 1.8 (VDD=3.0V)            |
| SCI7701YCB* |                |                       |      |      |                       |                               |
| SCI7701YPA  | CMOS           | 2.20                  | 2.25 | 2.30 | 1.5 to 10.0           | Typ 1.8 (VDD=3.0V)            |
| SCI7701YSA  | CMOS           | 2.30                  | 2.35 | 2.40 | 1.5 to 10.0           | Typ 1.8 (VDD=3.0V)            |
| SCI7701YEA  | CMOS           | 2.50                  | 2.55 | 2.60 | 1.5 to 10.0           | Typ 1.8 (VDD=3.0V)            |
| SCI7701YFA  | CMOS           | 2.60                  | 2.70 | 2.80 | 1.5 to 10.0           | Typ 1.8 (VDD=3.0V)            |
| SCI7701YFB* |                |                       |      |      |                       |                               |
| SCI7701YRA  | CMOS           | 2.70                  | 2.80 | 2.90 | 1.5 to 10.0           | Typ 1.8 (VDD=3.0V)            |
| SCI7701YGA  | CMOS           | 2.90                  | 3.00 | 3.10 | 1.5 to 10.0           | Typ 2.2 (VDD=4.5V)            |
| SCI7701YHA  | CMOS           | 3.10                  | 3.20 | 3.30 | 1.5 to 10.0           | Typ 2.2 (VDD=4.5V)            |
| SCI7701YTA  | CMOS           | 3.80                  | 4.00 | 4.20 | 1.5 to 10.0           | Typ 2.6 (VDD=6.0V)            |
| SCI7701YMA  | CMOS           | 4.00                  | 4.15 | 4.30 | 1.5 to 10.0           | Typ 2.6 (VDD=6.0V)            |
| SCI7701YJA  | CMOS           | 4.30                  | 4.45 | 4.60 | 1.5 to 10.0           | Typ 2.6 (VDD=6.0V)            |
| SCI7701YKA  | CMOS           | 4.60                  | 4.75 | 4.90 | 1.5 to 10.0           | Typ 2.6 (VDD=6.0V)            |
| SCI7701YLA  | CMOS           | 4.90                  | 5.10 | 5.30 | 1.5 to 10.0           | Typ 2.6 (VDD=6.0V)            |

\* Reverse output polarity

■ **ABSOLUTE MAXIMUM RATINGS**

| Parameter                      | Symbol         | Ratings                | Unit |
|--------------------------------|----------------|------------------------|------|
| Input voltage (supply voltage) | VDD (VI) – VSS | 12                     | V    |
| Output voltage                 | VO             | VDD + 0.3 to VSS – 0.3 | V    |
| Output current                 | IO             | 50                     | mA   |
| Power dissipation (TA ≤ 25°C)  | PD             | 400                    | mW   |
| Operating temperature          | Topr           | –30 to 85              | °C   |
| Storage temperature            | Tstg           | –65 to 150             | °C   |
| Soldering temperature and time | Tsol           | 260°C, 10s (at lead)   | —    |

Note: Although this IC has electrostatic protection circuit, damage may still occur if very high electrostatic potentials are applied.

Note: When this IC is soldered in the solder-reflow process, be sure to maintain the reflow furnace at the curve shown in “Fig. 3–5 Reflow Furnace Temperature Curve” of DATA BOOK. This IC cannot be exposed to the high temperature of the the solder dipping.

## ■ ELECTRICAL CHARACTERISTICS

### ● SCI7700YSeries/SCI7701YSeries

| Parameter                                   | Symbol                                                 | Conditions                     | Min                                        | Typ                     | Max | Unit  |
|---------------------------------------------|--------------------------------------------------------|--------------------------------|--------------------------------------------|-------------------------|-----|-------|
| Detection voltage                           | V <sub>DET</sub>                                       | Ta=25°C                        | See page 2                                 |                         |     | V     |
| Operating supply current                    | I <sub>DDO</sub>                                       | V <sub>DD</sub> =1.5V, Ta=25°C | —                                          | 1.4                     | 3.0 | μA    |
|                                             |                                                        | V <sub>DD</sub> =3.0V, Ta=25°C | —                                          | 1.8                     | 4.0 |       |
|                                             |                                                        | V <sub>DD</sub> =4.5V, Ta=25°C | —                                          | 2.2                     | 5.0 |       |
|                                             |                                                        | V <sub>DD</sub> =6.0V, Ta=25°C | —                                          | 2.6                     | 6.0 |       |
| Supply (Operating) voltage                  | V <sub>DD</sub> (V <sub>I</sub> )                      | Ta=−30 to 85°C                 | See page 2                                 |                         |     | V     |
| Hysteresis difference                       | ΔV <sub>DET</sub>                                      | Ta=−30 to 85°C                 | —                                          | V <sub>DET</sub> x0.05* | —   | V     |
| Temperature coefficient of V <sub>DET</sub> | V <sub>DET</sub> (Ta=70°C)-V <sub>DET</sub> (Ta=−20°C) | Ta=−30 to 85°C                 | Typ(V <sub>DET</sub> /V <sub>R</sub> )x0.1 |                         |     | mV/°C |
|                                             | 90                                                     |                                |                                            |                         |     |       |

\* V<sub>DET</sub> x 0.04 (Typ) about SCI7700Y<sub>TA</sub>/SCI7701Y<sub>TA</sub>/SCI7701Y<sub>MA</sub>/SCI7701Y<sub>JA</sub>/SCI7701Y<sub>KA</sub>/SCI7701Y<sub>LA</sub>

### ● SCI7700Y<sub>VA</sub>/SCI7700Y<sub>AA</sub>/SCI7700Y<sub>BA</sub>

| Parameter                | Symbol               | Conditions                                                 | Min  | Typ  | Max  | Unit |
|--------------------------|----------------------|------------------------------------------------------------|------|------|------|------|
| Output current           |                      | V <sub>DD</sub> = 0.85V, V <sub>DS</sub> = 0.5V, Ta = 25°C | 0.05 | 0.40 | 1.00 | mA   |
|                          | I <sub>O</sub> (Nch) | V <sub>DD</sub> = 0.95V, V <sub>DS</sub> = 0.5V, Ta = 25°C | 0.15 | 0.70 | 1.50 |      |
|                          |                      | V <sub>DD</sub> = 1.05V, V <sub>DS</sub> = 0.5V, Ta = 25°C | 0.30 | 1.00 | 2.00 |      |
| Reference voltage supply | V <sub>R</sub>       | Ta = 25°C                                                  | 0.70 | 0.80 | 0.90 | V    |

V<sub>DS</sub>: Voltage between drain and source

■ **ELECTRICAL CHARACTERISTICS (Cont.)**

- **SCI7700YNA/SCI7700YTA/SCI7701YCA/SCI7701YPA/SCI7701YSA/SCI7701YEA/SCI7701YFA/  
SCI7701YRA/SCI7701YGA/SCI7701YHA/SCI7701YTA/SCI7701YMA/SCI7701YJA/SCI7701YKA/  
SCI7701YLA**

| Parameter                | Symbol   | Conditions                   | Min  | Typ  | Max    | Unit |
|--------------------------|----------|------------------------------|------|------|--------|------|
| Output current           | Io (Nch) | VDD=0.95V, VDS=0.5V, Ta=25°C | 0.03 | 0.15 | 0.50   | mA   |
|                          |          | VDD=1.00V, VDS=0.5V, Ta=25°C | 0.05 | 0.22 | 0.60   |      |
|                          |          | VDD=1.20V, VDS=0.5V, Ta=25°C | 0.30 | 0.70 | 1.50   |      |
|                          |          | VDD=2.40V, VDS=0.5V, Ta=25°C | 1.40 | 2.00 | 2.30*1 |      |
|                          |          | VDD=3.60V, VDS=0.5V, Ta=25°C | 1.50 | 2.30 | 2.60*2 |      |
|                          | Io (Pch) | VDD=4.50V, VDS=2.1V, Ta=25°C | 1.7  | 2.0  | 2.3    |      |
|                          |          | VDD=8.00V, VDS=2.1V, Ta=25°C | 2.8  | 3.1  | 3.8    |      |
| Reference voltage supply | VR       | Ta=25°C                      | 0.90 | 1.00 | 1.10   | V    |

\* 1: 3.30 mA about SCI7700YTA, \* 2: 4.00 mA about SCI7700TA VDS: Voltage between drain and source

\* Please inquire IC sales department about SCI7700YCA.

- **SCI7700YAS/SCI7700YFA/SCI7701YCB/SCI7700YFB**

| Parameter                | Symbol   | Conditions                     | Min  | Typ | Max | Unit |
|--------------------------|----------|--------------------------------|------|-----|-----|------|
| Output current           | Io (Nch) | VDD=0.8V, VOUT=0.1V, Ta=25°C*1 | 0.01 | —   | —   | mA   |
|                          |          | VDD=2.4V, VOUT=0.5V, Ta=25°C*2 | 1.7  | 2.5 | 3.3 |      |
|                          |          | VDD=2.4V, VOUT=0.5V, Ta=25°C*3 | 1.4  | 1.8 | 2.3 |      |
|                          |          | VDD=3.0V, VOUT=0.5V, Ta=25°C*4 | 1.5  | 2.0 | 2.5 |      |
|                          | Io (Pch) | VDD=2.0V, VOUT=1.5V, Ta=25°C*3 | 0.1  | 0.3 | 0.9 |      |
|                          |          | VDD=2.0V, VOUT=1.5V, Ta=25°C*4 | 0.1  | 2.0 | 2.5 |      |
| Reference voltage supply | VR       | Ta=25°C*1                      | 0.7  | 0.8 | 0.9 | V    |
|                          |          | Ta=25°C*2,*3,*4                | 0.9  | 1.0 | 1.1 |      |

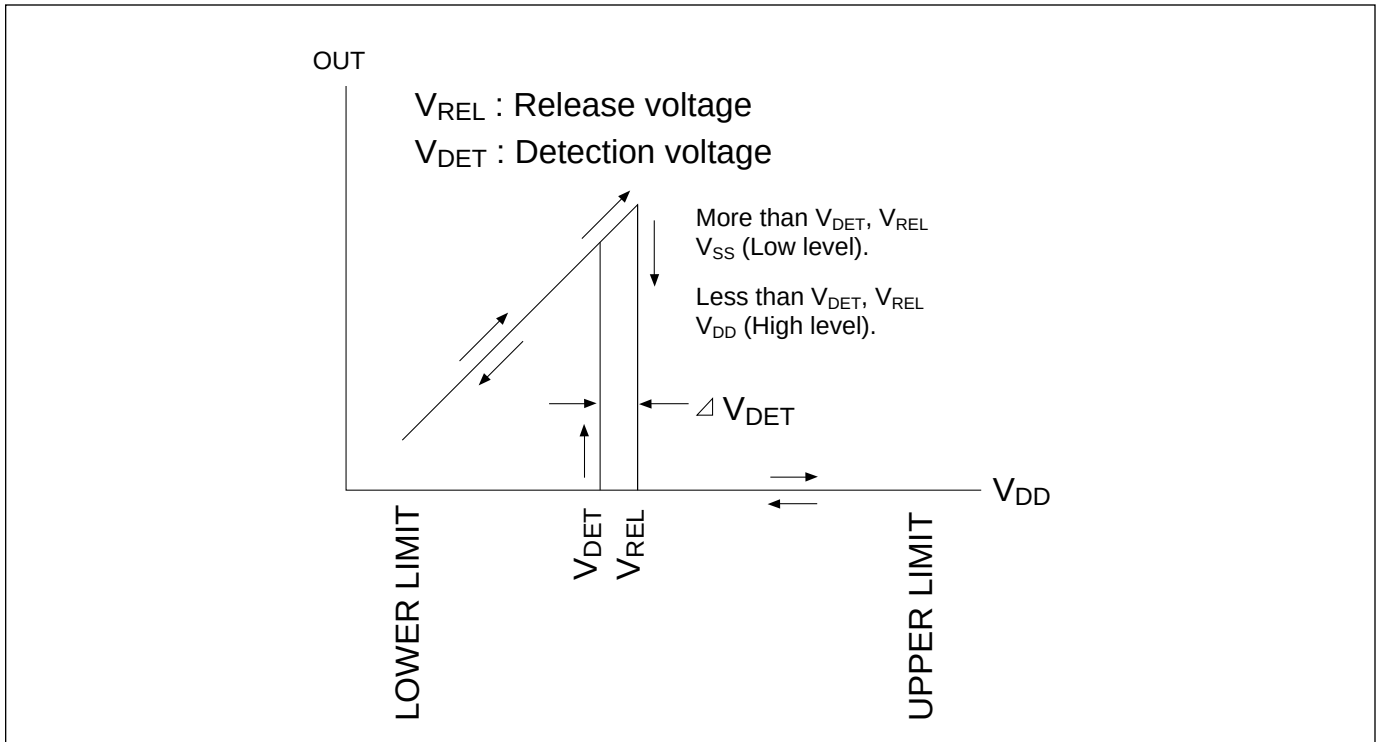
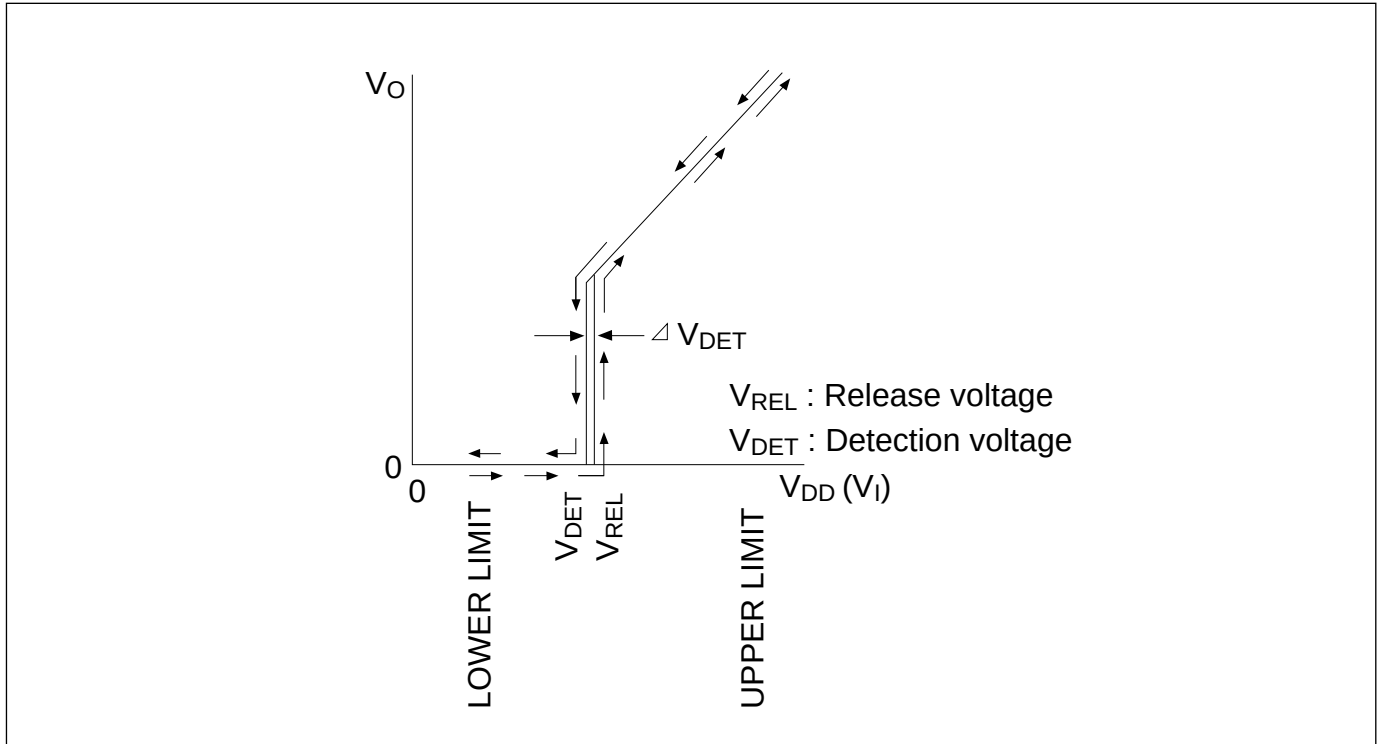
\* 1: Applicable to SCI7700YAS

\* 2: Applicable to SCI7700YFA

\* 3: Applicable to SCI7701YCB

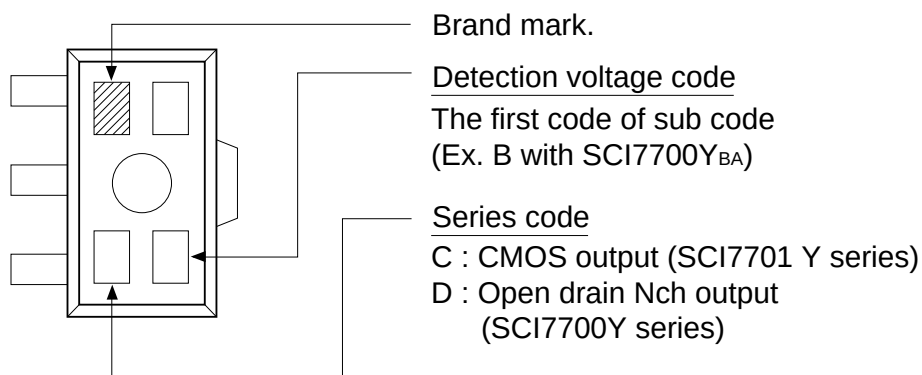
\* 4: Applicable to SCI7701YFB

■ PERFORMANCE CURVES



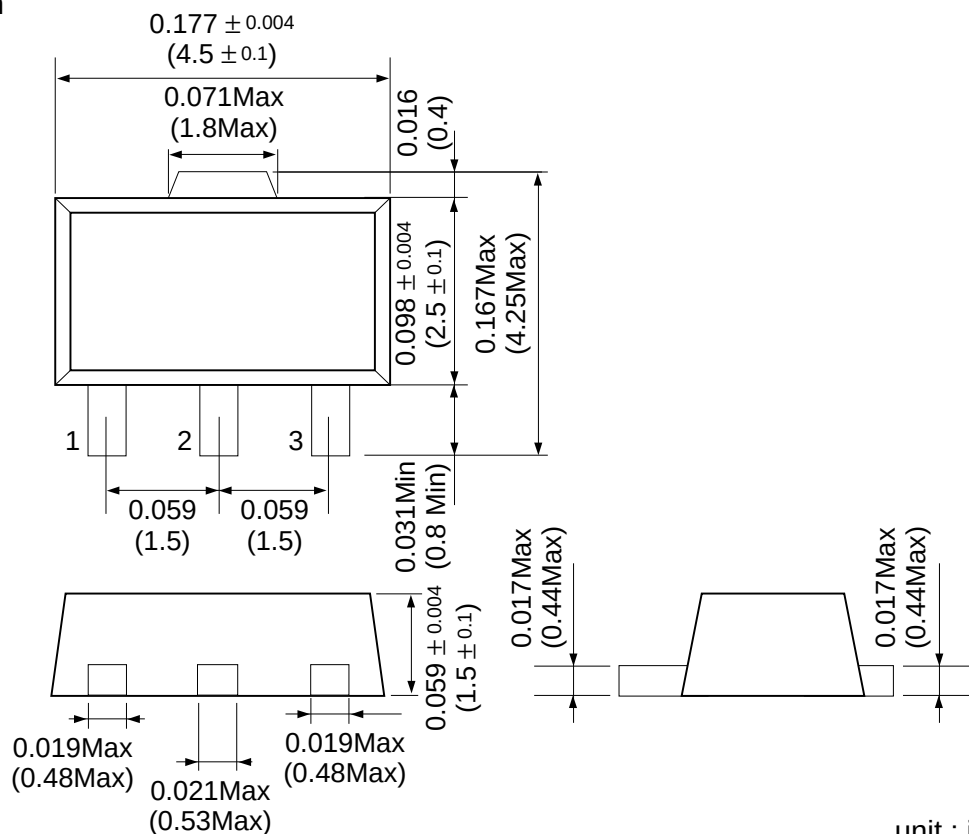
## ■ MARKING

An abbreviation is printed on SCI7700Yseries/SCI7701Yseries below, because its package size is very small.



## ■ PACKAGE DIMENSIONS

SOT 89-3 pin



unit : inch (mm)

|                                                                                                                                       |                                                                                                                                                                  |                                                                                                                                                                |                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>West Coast</b><br>S-MOS Systems, Inc.<br>150 River Oaks Parkway<br>San Jose, CA 95134<br>Tel. (408) 922-0200<br>Fax (408) 922-0238 | <b>North East and North Central</b><br>S-MOS Systems, Inc.<br>301 Edgewater Place, Suite 120<br>Wakefield, MA 01880<br>Tel. (617) 246-3600<br>Fax (617) 246-5443 | <b>South East and South Central</b><br>S-MOS Systems, Inc.<br>4300 Six Forks Road, Suite 430<br>Raleigh, NC 27609<br>Tel. (919) 781-7667<br>Fax (919) 781-6778 | <b>More info...</b><br>World Wide Web:<br><a href="http://www.smos.com">http://www.smos.com</a> |
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