November 1996

CMOS VOLTAGE DETECTOR

■ DESCRIPTION

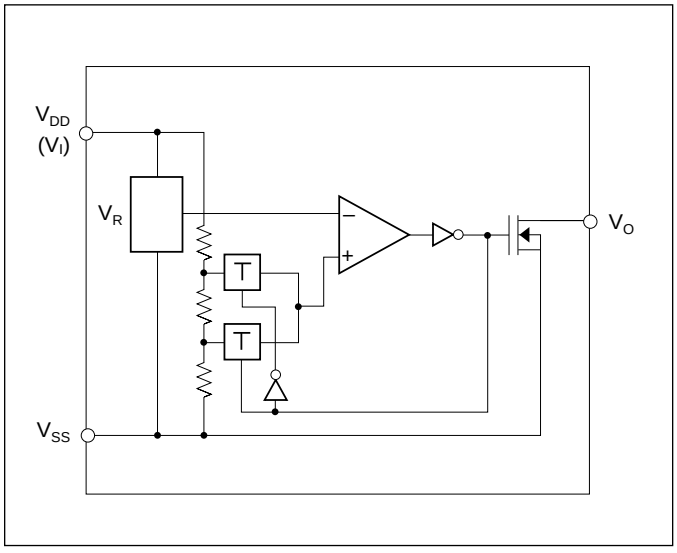
The SCI7700YSeries/SCI7701YSeries are a series of low-power precision voltage detectors, which do not require external adjustments. The SCI7700YSeries/SCI7701YSeries have such applications as battery-life detection, power supply fault monitoring, over/under-voltage protection and battery back-up switching. The SCI7700YSeries is an open-drain Nch output type and the SCI7701YSeries is a CMOS output type. Both are available in SOT 89-3pin (plastic) packages.

■ FEATURES

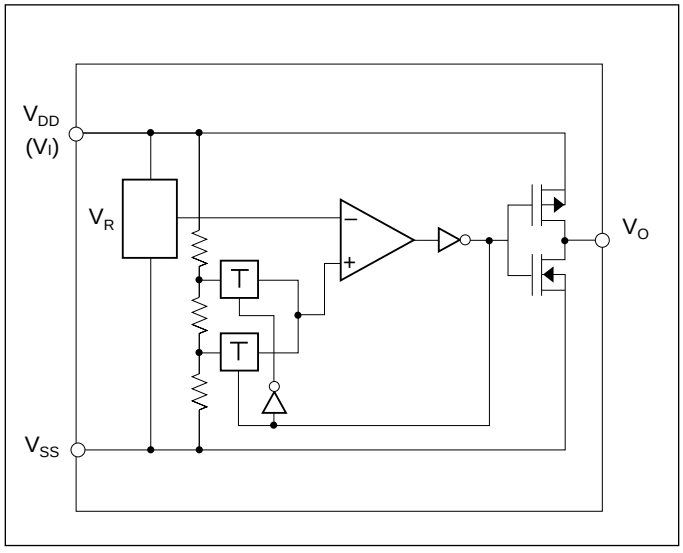
- Many types ..... see the next page
- Low operating supply current ..... Typ 1.8µA (SCI7700YNA, V_{DD}=3.0V)
- Low range of operating voltage ..... Typ 1.2V (SCI7700YNA)
- Temperature coefficient of detection voltage ..... Typ (detection voltage/reference voltage) x 0.1 (mV/°C)
- Hysteresis difference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

■ BLOCK DIAGRAM

- **SCI7700YSeries**



- **SCI7701YSeries**



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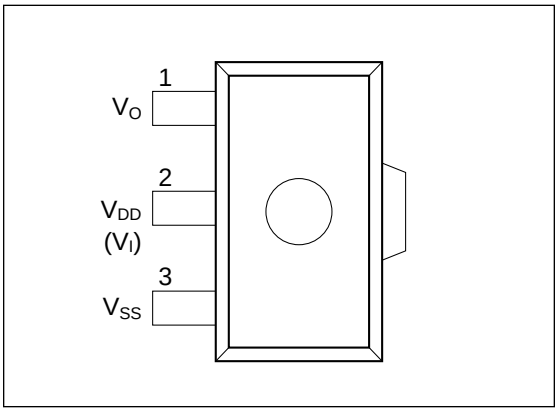
■ PIN CONFIGURATION



(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)	V_{DD} (V_I) – V_{SS}	12	V
Output voltage	V_O	VDD + 0.3 to VSS – 0.3	V
Output current	I_O	50	mA
Power dissipation (TA ≤ 25°C)	P_D	400	mW
Operating temperature	T_{opr}	–30 to 85	°C
Storage temperature	T_{stg}	–65 to 150	°C
Soldering temperature and time	T_{sol}	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_{DET}	Ta=25°C	See page 2			V
Operating supply current	I_{DDO}	V_{DD}=1.5V, Ta=25°C	—	1.4	3.0	µA
		V_{DD}=3.0V, Ta=25°C	—	1.8	4.0	
		V_{DD}=4.5V, Ta=25°C	—	2.2	5.0	
		V_{DD}=6.0V, Ta=25°C	—	2.6	6.0	
Supply (Operating) voltage	V_{DD} (V_I)	Ta=–30 to 85°C	See page 2			V
Hysteresis difference	ΔV_{DET}	Ta=–30 to 85°C	—	V_{DET}x0.05*	—	V
Temperature coefficient of V_{DET}	$\frac{V_{DET}(Ta=70°C)-V_{DET}(Ta=-20°C)}{90}$	Ta=–30 to 85°C	Typ(V_{DET}/V_R)x0.1			mV/°C

* V_{DET} x 0.04 (Typ) about SCI7700Y$_{TA}$/SCI7701Y$_{TA}$/SCI7701Y$_{MA}$/SCI7701Y$_{JA}$/SCI7701Y$_{KA}$/SCI7701Y$_{LA}$

● SCI7700Y$_{VA}$/SCI7700Y$_{AA}$/SCI7700Y$_{BA}$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output current		V_{DD} = 0.85V, V_{DS} = 0.5V, Ta = 25°C	0.05	0.40	1.00	mA
	I_O (Nch)	V_{DD} = 0.95V, V_{DS} = 0.5V, Ta = 25°C	0.15	0.70	1.50	
		V_{DD} = 1.05V, V_{DS} = 0.5V, Ta = 25°C	0.30	1.00	2.00	
Reference voltage supply	V_R	Ta = 25°C	0.70	0.80	0.90	V

V_{DS}: 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	

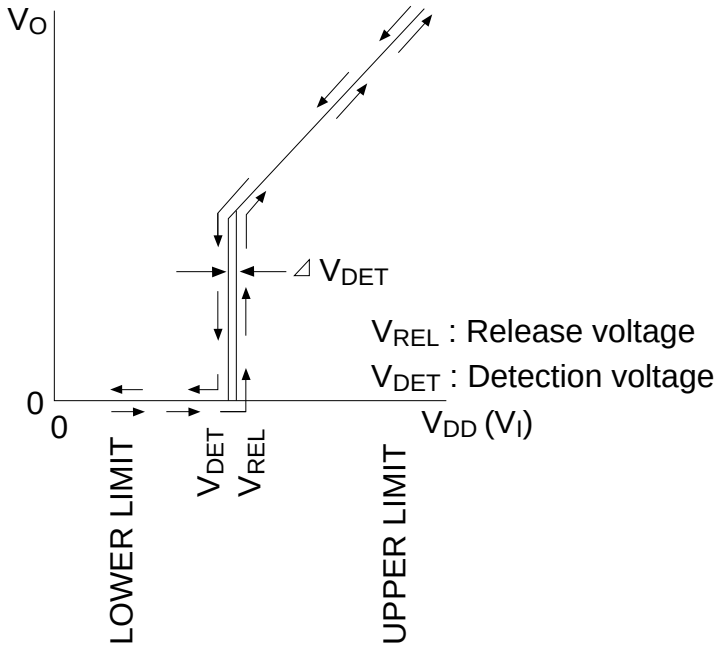
* 1: Applicable to SCI7700YAS

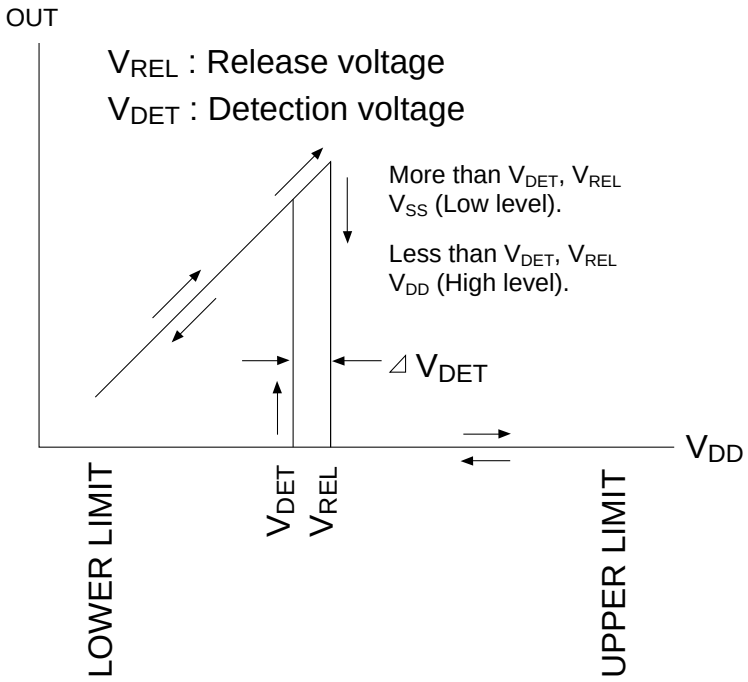
* 2: Applicable to SCI7700YFA

* 3: Applicable to SCI7701YCB

* 4: Applicable to SCI7701YFB

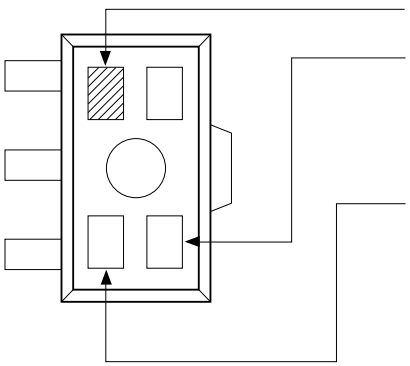
■ PERFORMANCE CURVES





■ MARKING

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



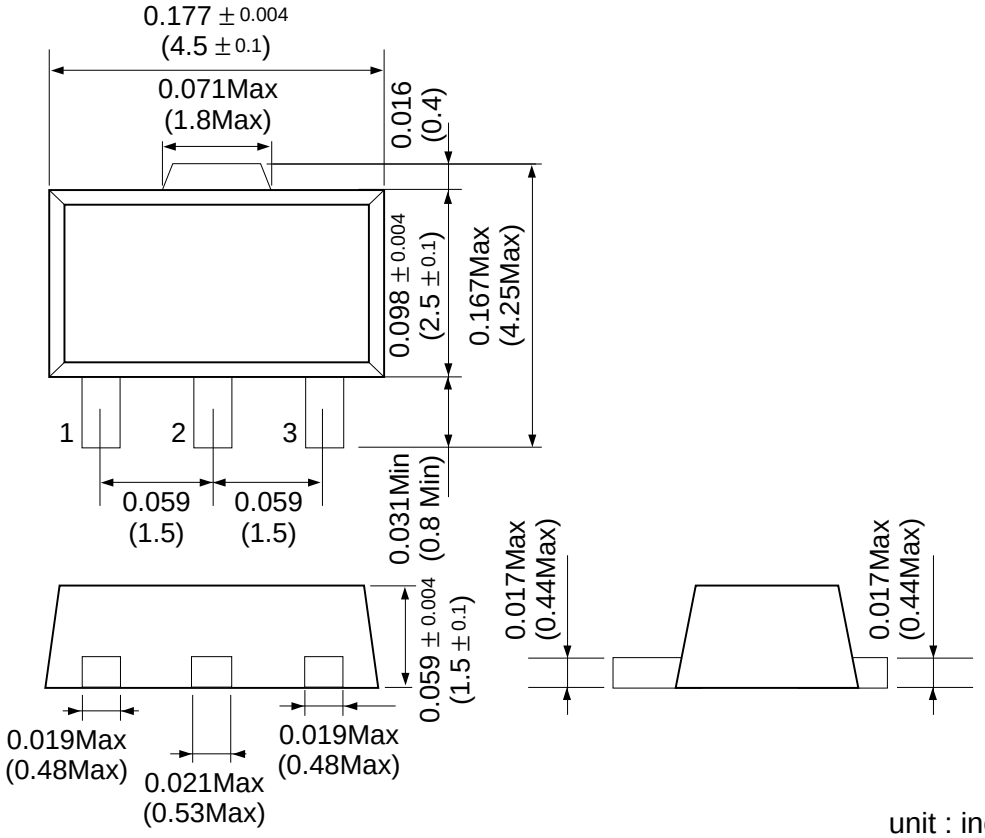
Brand mark.

Detection voltage code
The first code of sub code
(Ex. B with SCI7700Y$_{BA}$)

Series code
C : CMOS output (SCI7701 Y series)
D : Open drain Nch output
(SCI7700Y series)

■ PACKAGE DIMENSIONS

SOT 89-3 pin



unit : inch (mm)

November 1996

S-MOS SYSTEMS
A Seiko Epson Affiliate

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