

***SCI7720Y** Series
Voltage Detectors
Technical Manual***

***S-MOS Systems, Inc.
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1.0 OVERVIEW

1.1 SUMMARY

The SCI7720Y series is a set of fixed-level voltage detectors developed using a CMOS silicon gate process. They are comprised of low consumption-current standard voltage circuits, such as voltage comparators, hysteresis circuits, and output circuits. The SCI7720Y series chips have internally-set detection voltages, with a lineup of various types of standard products. The chips in the series are categorized as shown below based on the output characteristics of the voltage detector output terminals: The SCI7720Y series provides N-channel open-drain outputs, the SCI7721Y series provides CMOS outputs, and the SCI7722Y series provides P-channel, open-drain outputs.

The packages for this series are SOT89-3 pin packages. Refer to the package description.

Application notes are provided on uses in detecting battery life and monitoring the power supply voltages to microprocessors or other types of LSI systems.

2.0 FEATURES

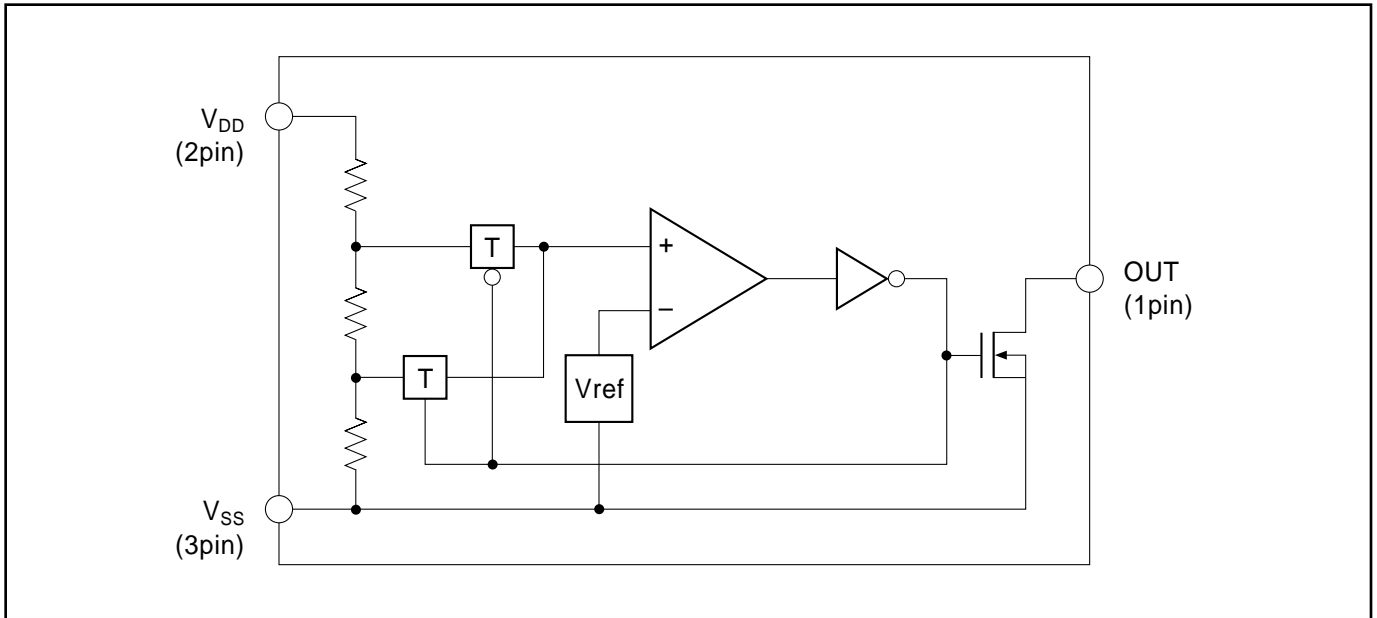
2.1 FEATURES

- An abundant product lineup 20 products are available with detection voltage levels ranging between 2V and 5V.
- Low current consumption Typ. 2.0 μ A ($V_{DD} = 5.0V$)
- Low voltage operation supported Min. 1.5V
- Absolute maximum rated voltage Max. 18V
- Highly-stable standard internal voltage source Typ. 1.0V
- Excellent detection voltage thermal dependence Typ. -100 ppm/ $^{\circ}$ C

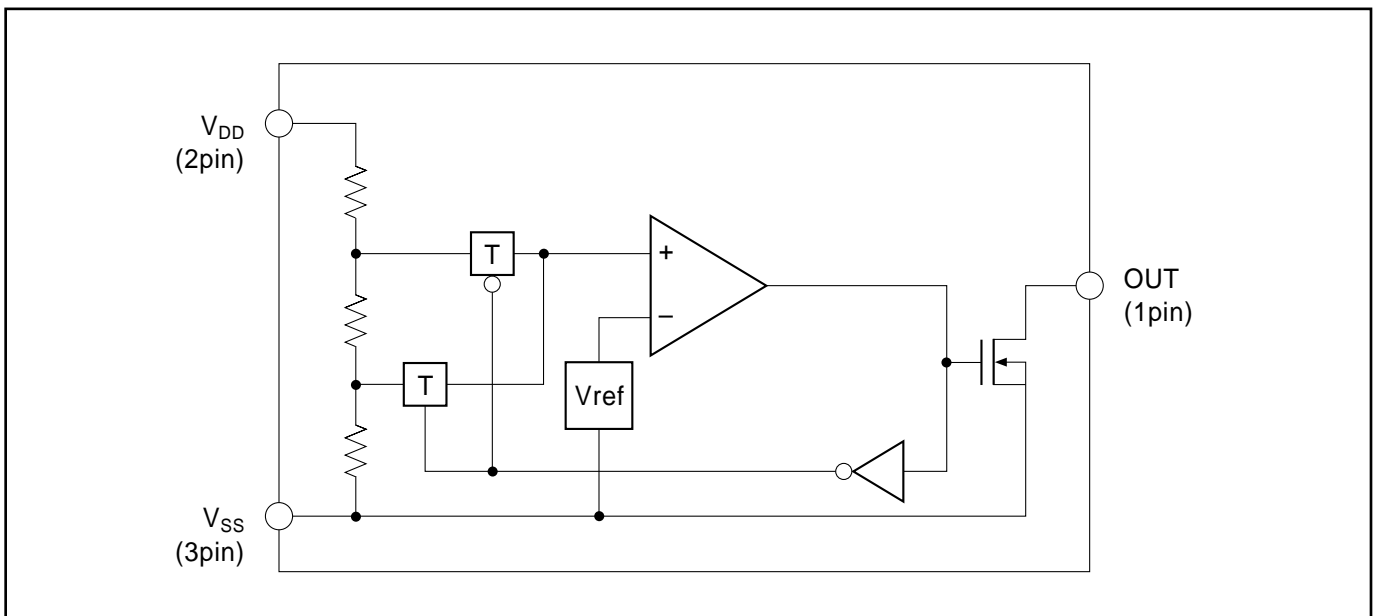
3.0 BLOCK DIAGRAMS

3.1 BLOCK DIAGRAMS

3.1.1 SCI7720Y * A type

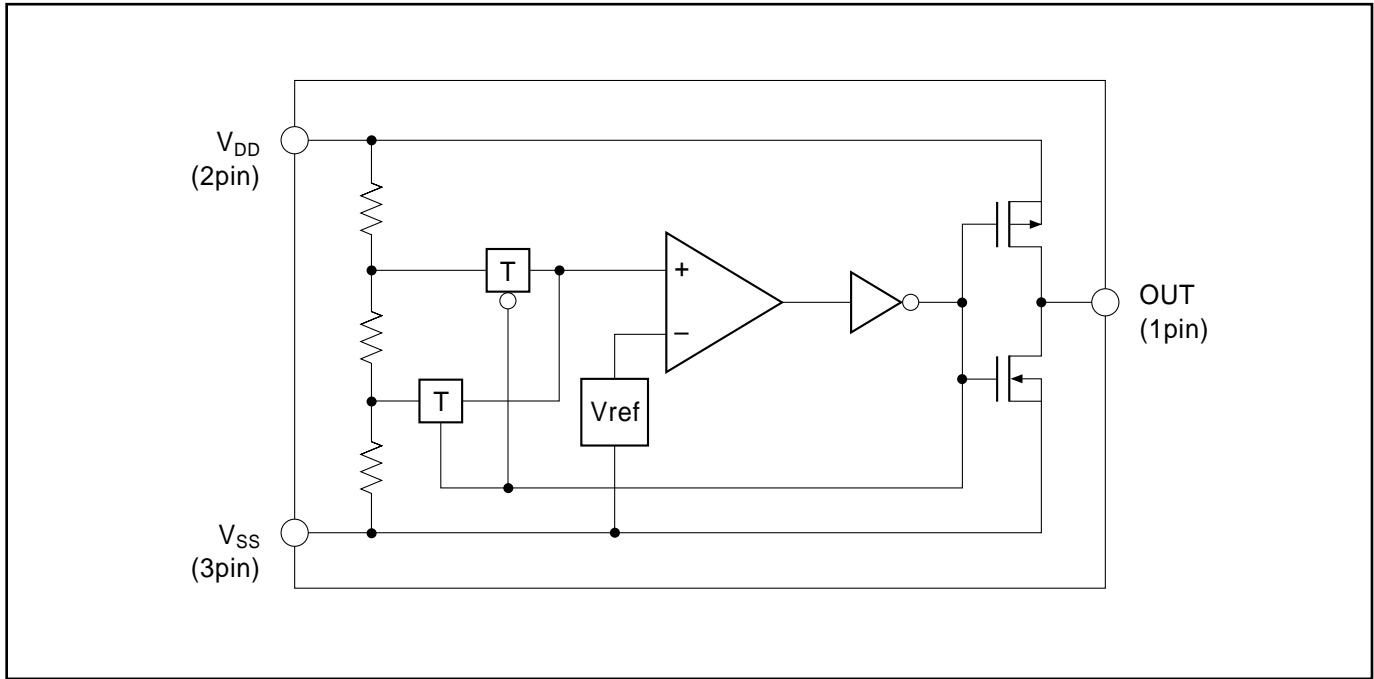


3.1.2 SCI7720Y * B type

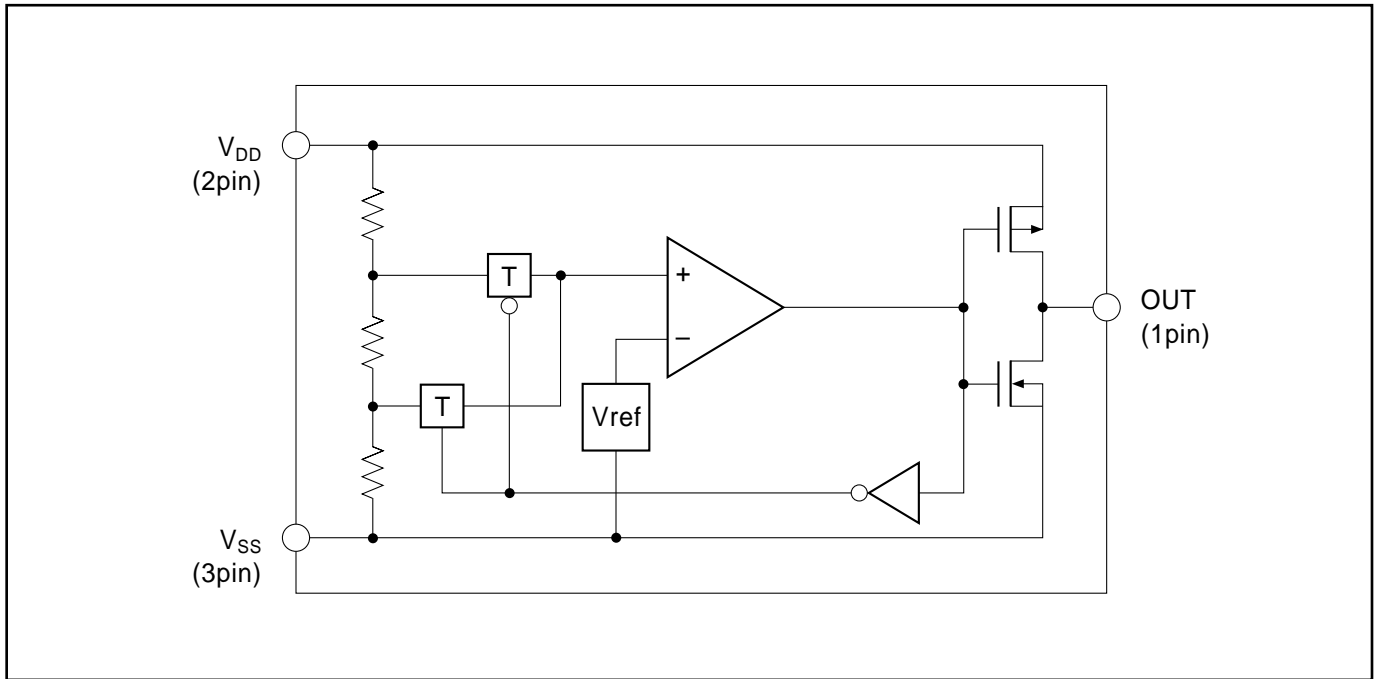


Note: The asterisks in each of these types represents a code which changes depending upon the output detection voltage level specification.

3.1.3 SCI7721Y * A type

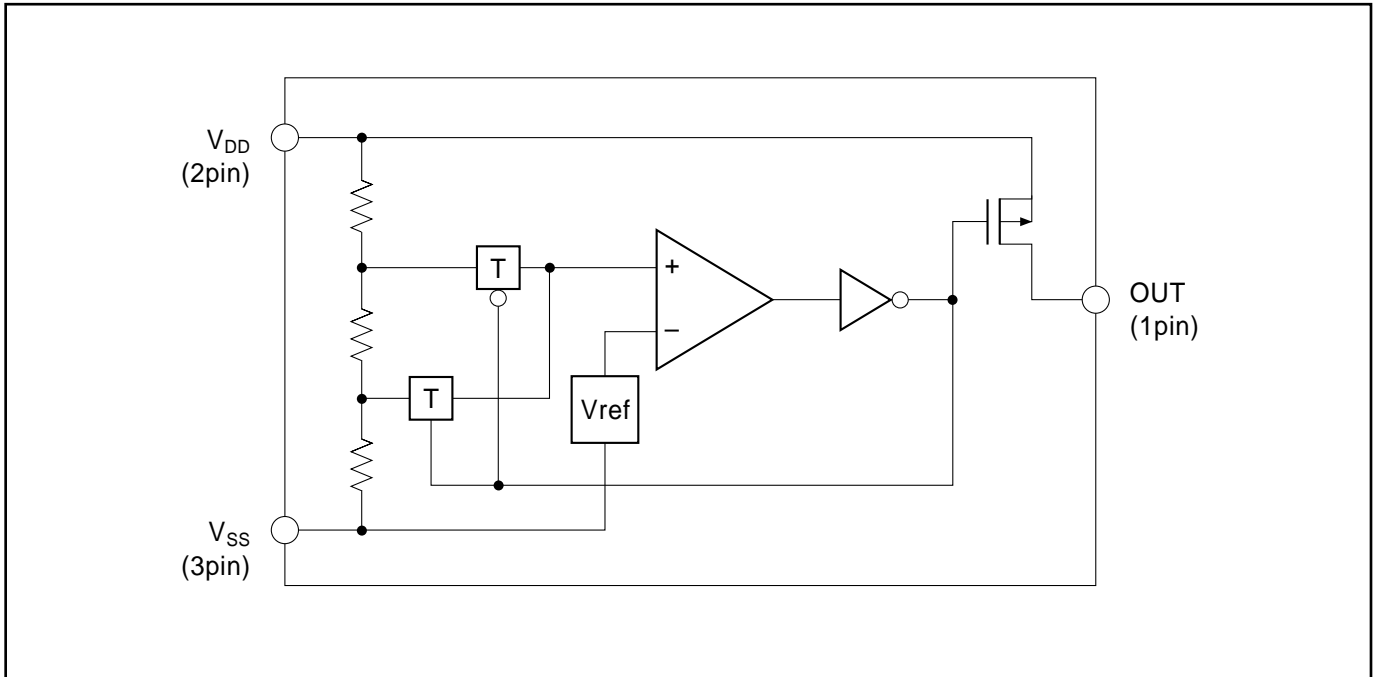


3.1.4 SCI7721Y * B type

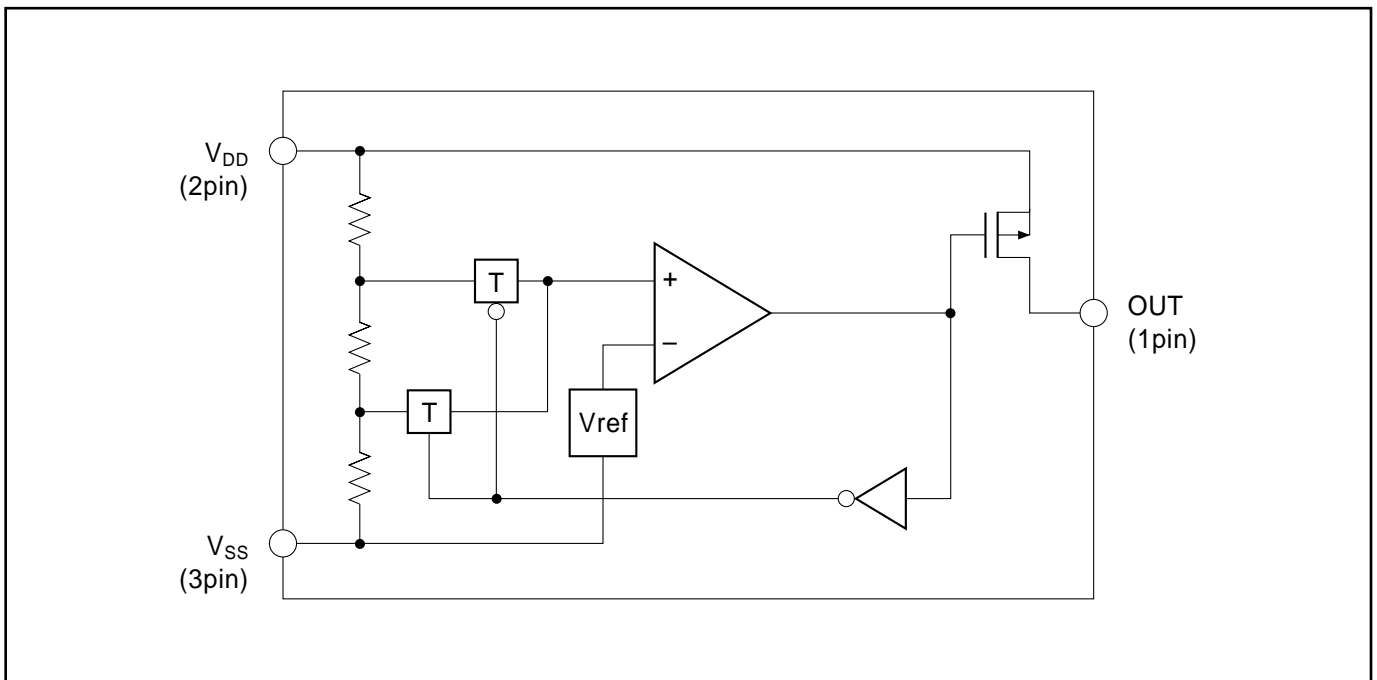


Note: The asterisks in each of these types represents a code which changes depending upon the output detection voltage level specification.

3.1.5 SCI7722Y * A type



3.1.6 SCI7722Y * B type

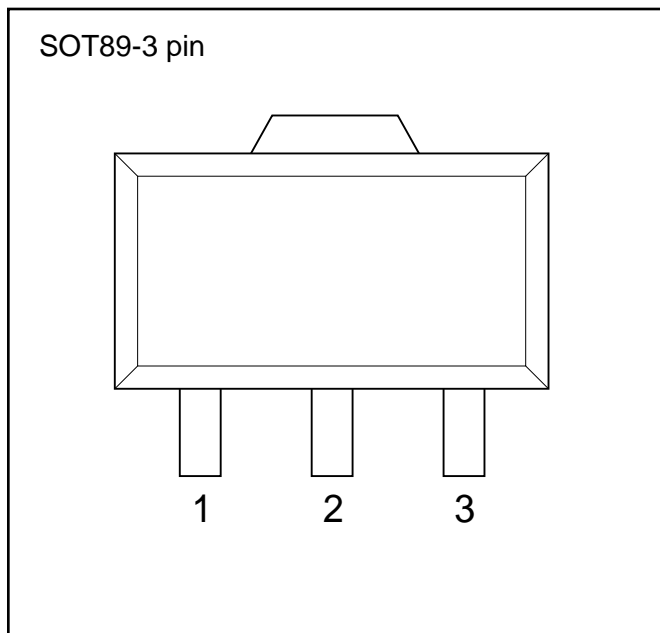


Note: The asterisks in each of these types represents a code which changes depending upon the output detection voltage level specification.

4.0 EXPLANATION OF TERMINALS

4.1 EXPLANATION OF TERMINALS

Pin No.	Pin Name	Pin Function
1	OUT	Voltage detection output pin
2	V _{DD}	Input voltage pin (positive side)
3	V _{SS}	Input voltage pin (negative side)



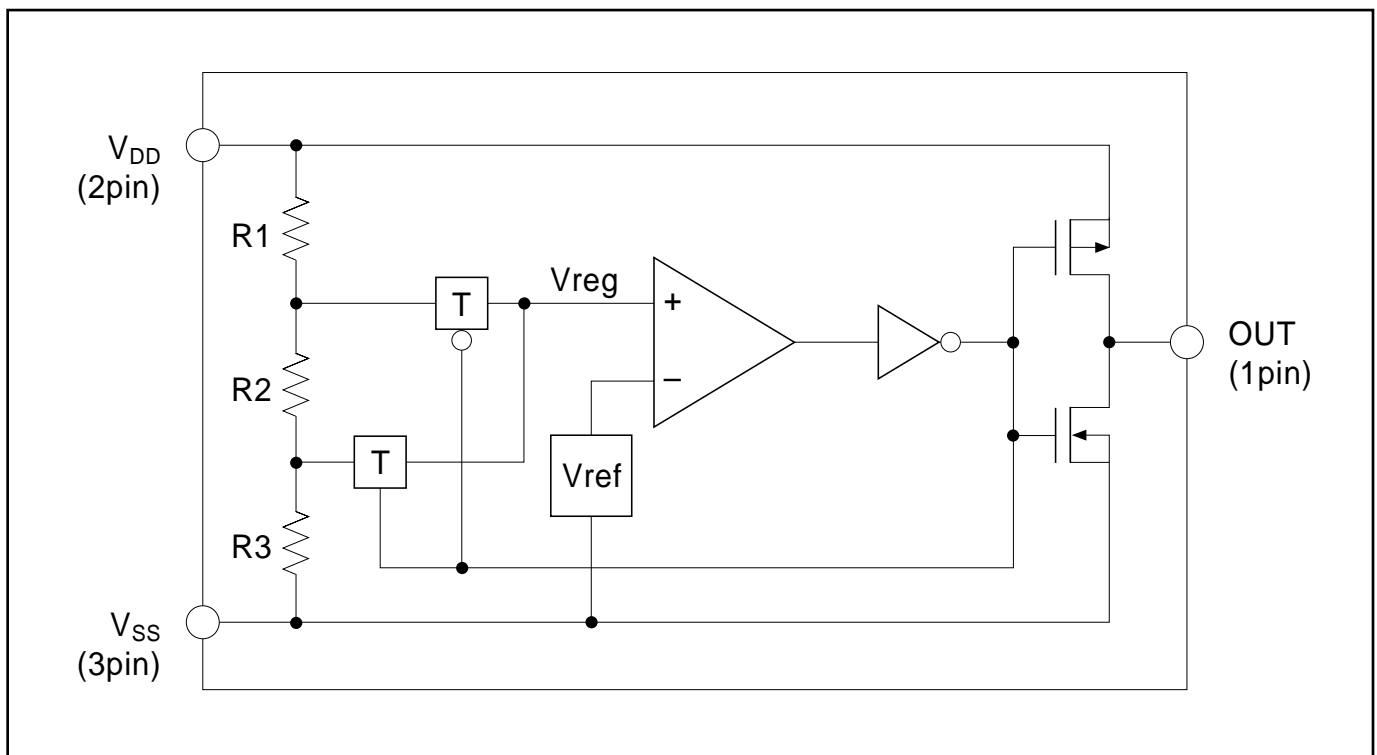
5.0 EXPLANATION OF FUNCTIONS

5.1 EXPLANATION OF FUNCTIONS

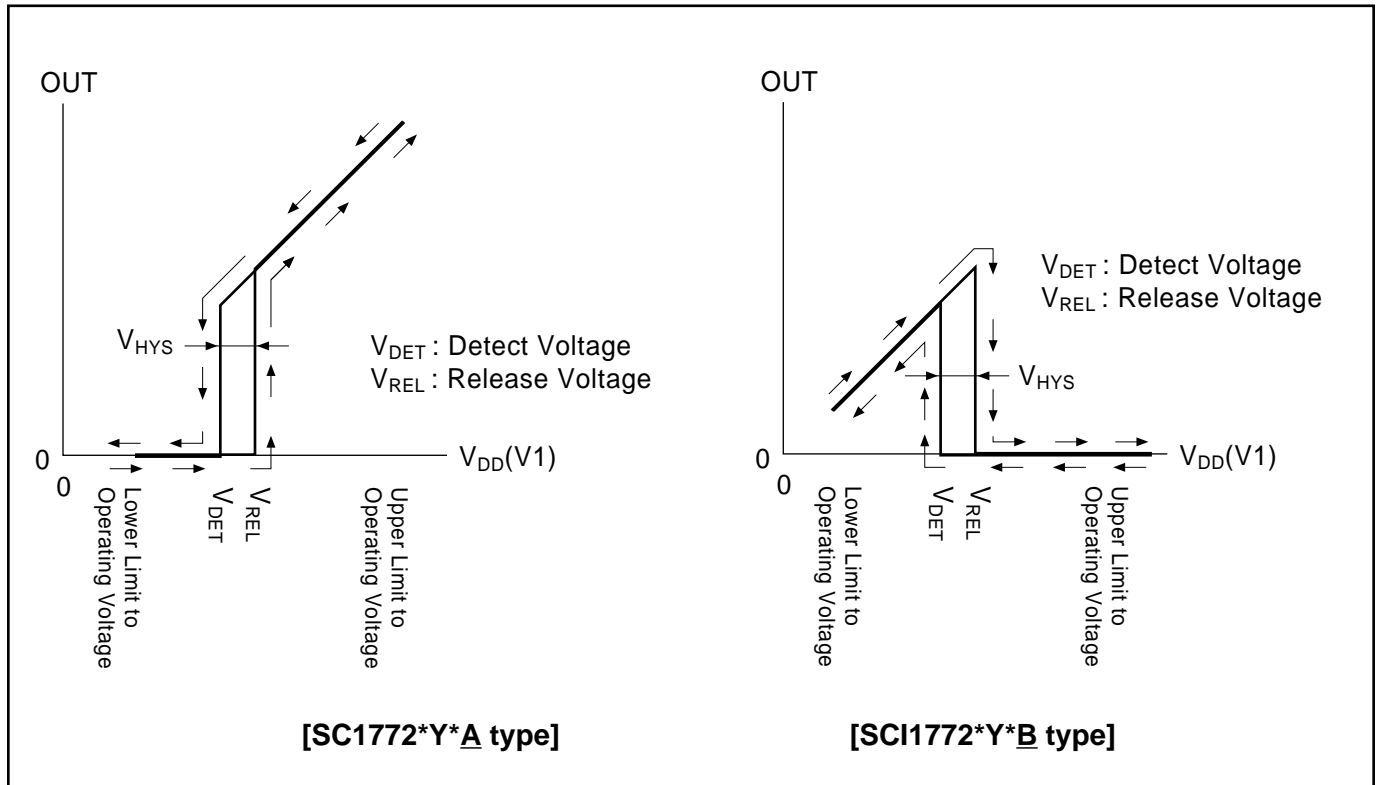
The SCI7720Y series chips are equipped internally with the circuit structures shown below. A reference voltage (V_{ref}) formed within the IC and a voltage divider voltage level (V_{reg}) from resistors connected between the power supplies are input into a voltage comparator that performs the detection operation. Also, hysteresis has been taken into consideration so that there will be no problems stemming from situations such as power supply noise when the voltage comparator detects extremely small voltage level differences between V_{reg} and V_{ref} . The output voltage (V_{DET}) when the input voltage is lower than the voltage level, and the release voltage (V_{REL}) when the input voltage is higher than the voltage level, are set according to the formulas below (given the example circuit below).

Output voltage: $V_{DET} = (R1 + R2 + R3) / (R2 + R3) * V_{ref}$

Release voltage: $V_{REL} = (R1 + R2 + R3) / R3 * V_{ref}$



The SCI7720Y Series I/O characteristics are as shown below.



Note: The input/output characteristics in the figures above are examples where a pull-up resistor is connected to the output pin between the OUT pin and the V_{DD} pin in the case of the SCI7720Y series and a pull-down resistor is connected to the output pin between the OUT pin and the V_{DD} pin in the case of the SCI7722Y series.

6.0 TABLE OF SERIES PRODUCTS

6.1 TABLE OF SERIES PRODUCTS

Product Name	Output Voltage			Output Type	Output Level	
	Min.	Typ.	Max		Less than VDET	Greater than VDET
SCI7720YCA	2.10	2.15	2.20	N-channel open drain	Low-level	Hi – Z
SCI7720YFA	2.60	2.65	2.70	N-channel open drain	Low-level	Hi – Z
SCI7720YTA	3.90	4.00	4.10	N-channel open drain	Low-level	Hi – Z
SCI7721YCA	2.10	2.15	2.20	CMOS	Low-level	High-level
SCI7721YPA	2.20	2.25	2.30	CMOS	Low-level	High-level
SCI7721YSA	2.30	2.35	2.40	CMOS	Low-level	High-level
SCI7721YEA	2.50	2.55	2.60	CMOS	Low-level	High-level
SCI7721YFA	2.60	2.65	2.70	CMOS	Low-level	High-level
SCI7721YRA	2.73	2.80	2.87	CMOS	Low-level	High-level
SCI7721YGA	2.93	3.00	3.07	CMOS	Low-level	High-level
SCI7721YHA	3.13	3.20	3.27	CMOS	Low-level	High-level
SCI7721Y1A	3.43	3.50	3.57	CMOS	Low-level	High-level
SCI7721YTA	3.90	4.00	4.10	CMOS	Low-level	High-level
SCI7721YMA	4.10	4.20	4.30	CMOS	Low-level	High-level
SCI7721YJA	4.30	4.40	4.50	CMOS	Low-level	High-level
SCI7721YOA	4.50	4.60	4.70	CMOS	Low-level	High-level
SCI7721YKA	4.70	4.80	4.90	CMOS	Low-level	High-level
SCI7721YLA	4.90	5.00	5.10	CMOS	Low-level	High-level
SCI7721YCB	2.10	2.15	2.20	CMOS	Low-level	High-level
SCI7721YFB	2.60	2.65	2.70	CMOS	Low-level	High-level

7.0 ABSOLUTE MAXIMUM RATINGS**7.1 ABSOLUTE MAXIMUM RATINGS**

Parameter	Symbol	Rating	Units
Power supply voltage range	$V_{DD} - V_{SS}$	18	V
Output voltage	V_O	$V_{DD} + 0.3 \sim V_{SS} - 0.3$	
Output current	I_O	50	mA
Allowable loss	P_D	200	mW
Operating temperature	T_{OPR}	-30 ~ +85	°C
Range of storage temperatures	T_{STG}	-65 ~ +150	
Soldering time Soldering temperature	T_{SOL}	260°C 10 seconds (lead)	—

8.0 ELECTRICAL CHARACTERISTICS

8.1 SCI7720YCA

Unless otherwise specified, Ta = -30°C to +85°C

Parameter	Symbol	Conditions (V _{SS} = 0.0V)	Min	Typ	Max	Units
Operating voltage	V _{DD}	—	1.50	—	15.0	V
Detection voltage	V _{DET}	Ta = 25°C	2.10	2.15	2.20	V
Hysteresis width	V _{HYS}	V _{HYS} = V _{REL} - V _{DET}	0.05	0.10	0.15	V
Consumption current	I _{DD}	V _{DD} = 3.0V	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/°C
Low level output current	I _{OL}	V _{DD} = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	T _{PHL}	V _{DD} = 3V → 2V Ta = 25°C	—	8	40	μS
		V _{DD} = 3V → 2V Ta = -30°C ~ 85°C	—	—	200	μS

8.2 SCI7720YFA

Unless otherwise specified, $T_a = -30^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

Parameter	Symbol	Conditions ($V_{SS} = 0.0V$)	Min	Typ	Max	Units
Operating voltage	V_{DD}	—	1.50	—	15.0	V
Detection voltage	V_{DET}	$T_a = 25^{\circ}\text{C}$	2.60	2.65	2.70	V
Hysteresis width	V_{HYS}	$V_{HYS} = V_{REL} - V_{DET}$	0.05	0.10	0.15	V
Consumption current	I_{DD}	$V_{DD} = 3.0V$	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/ $^{\circ}\text{C}$
Low level output current	I_{OL}	$V_{DD} = 2.0V$ $OUT = 0.2V$	0.20	1.00	—	mA
Detection voltage response time	T_{PHL}	$V_{DD} = 3V \rightarrow 2V$ $T_a = 25^{\circ}\text{C}$	—	8	40	μS
		$V_{DD} = 3V \rightarrow 2V$ $T_a = -30^{\circ}\text{C} \sim 85^{\circ}\text{C}$	—	—	200	μS

8.3 SCI7720YTA

Unless otherwise specified, $T_a = -30^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

Parameter	Symbol	Conditions ($V_{SS} = 0.0\text{V}$)	Min	Typ	Max	Units
Operating voltage	V_{DD}	—	1.50	—	15.0	V
Detection voltage	V_{DET}	$T_a = 25^{\circ}\text{C}$	3.90	4.00	4.10	V
Hysteresis width	V_{HYS}	$V_{HYS} = V_{REL} - V_{DET}$	0.13	0.20	0.27	V
Consumption current	I_{DD}	$V_{DD} = 5.0\text{V}$	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/ $^{\circ}\text{C}$
Low level output current	I_{OL}	$V_{DD} = 2.0\text{V}$ $\text{OUT} = 0.2\text{V}$	0.20	1.00	—	mA
Detection voltage response time	T_{PHL}	$V_{DD} = 5\text{V} \rightarrow 4\text{V}$ $T_a = 25^{\circ}\text{C}$	—	8	40	μS
		$V_{DD} = 5\text{V} \rightarrow 4\text{V}$ $T_a = -30^{\circ}\text{C} \sim 85^{\circ}\text{C}$	—	—	200	μS

8.4 SCI7721YCA

Unless otherwise specified, $T_a = -30^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

Parameter	Symbol	Conditions ($V_{SS} = 0.0\text{V}$)	Min	Typ	Max	Units
Operating voltage	V_{DD}	—	1.50	—	15.0	V
Detection voltage	V_{DET}	$T_a = 25^{\circ}\text{C}$	2.10	2.15	2.20	V
Hysteresis width	V_{HYS}	$V_{HYS} = V_{REL} - V_{DET}$	0.05	0.10	0.15	V
Consumption current	I_{DD}	$V_{DD} = 3.0\text{V}$	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/ $^{\circ}\text{C}$
High level output current	I_{OH}	$V_{DD} = 3.0\text{V}$ $\text{OUT} = 2.7\text{V}$	—	-1.00	-0.25	mA
Low level output current	I_{OL}	$V_{DD} = 2.0\text{V}$ $\text{OUT} = 0.2\text{V}$	0.20	1.00	—	mA
Detection voltage response time	T_{PHL}	$V_{DD} = 3\text{V} \rightarrow 2\text{V}$ $T_a = 25^{\circ}\text{C}$	—	8	40	μS
		$V_{DD} = 3\text{V} \rightarrow 2\text{V}$ $T_a = -30^{\circ}\text{C} \sim 85^{\circ}\text{C}$	—	—	200	μS

8.5 SCI7721YPA

Unless otherwise specified, Ta = -30°C to +85°C

Parameter	Symbol	Conditions (V _{SS} = 0.0V)	Min	Typ	Max	Units
Operating voltage	V _{DD}	—	1.50	—	15.0	V
Detection voltage	V _{DET}	Ta = 25°C	2.20	2.25	2.30	V
Hysteresis width	V _{HYS}	V _{HYS} = V _{REL} - V _{DET}	0.05	0.10	0.15	V
Consumption current	I _{DD}	V _{DD} = 3.0V	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/°C
High level output current	I _{OH}	V _{DD} = 3.0V OUT = 2.7V	—	-1.00	-0.25	mA
Low level output current	I _{OL}	V _{DD} = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	T _{PHL}	V _{DD} = 3V → 2V Ta = 25°C	—	8	40	μS
		V _{DD} = 3V → 2V Ta = -30°C ~ 85°C	—	—	200	μS

8.6 SCI7721YSA

Unless otherwise specified, $T_a = -30^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

Parameter	Symbol	Conditions ($V_{SS} = 0.0\text{V}$)	Min	Typ	Max	Units
Operating voltage	V_{DD}	—	1.50	—	15.0	V
Detection voltage	V_{DET}	$T_a = 25^{\circ}\text{C}$	2.30	2.35	2.40	V
Hysteresis width	V_{HYS}	$V_{HYS} = V_{REL} - V_{DET}$	0.05	0.10	0.15	V
Consumption current	I_{DD}	$V_{DD} = 3.0\text{V}$	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/ $^{\circ}\text{C}$
High level output current	I_{OH}	$V_{DD} = 3.0\text{V}$ $\text{OUT} = 2.7\text{V}$	—	-1.00	-0.25	mA
Low level output current	I_{OL}	$V_{DD} = 2.0\text{V}$ $\text{OUT} = 0.2\text{V}$	0.20	1.00	—	mA
Detection voltage response time	T_{PHL}	$V_{DD} = 3\text{V} \rightarrow 2\text{V}$ $T_a = 25^{\circ}\text{C}$	—	8	40	μS
		$V_{DD} = 3\text{V} \rightarrow 2\text{V}$ $T_a = -30^{\circ}\text{C} \sim 85^{\circ}\text{C}$	—	—	200	μS

8.7 SCI7721YEA

Unless otherwise specified, $T_a = -30^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

Parameter	Symbol	Conditions ($V_{SS} = 0.0\text{V}$)	Min	Typ	Max	Units
Operating voltage	V_{DD}	—	1.50	—	15.0	V
Detection voltage	V_{DET}	$T_a = 25^{\circ}\text{C}$	2.50	2.55	2.60	V
Hysteresis width	V_{HYS}	$V_{HYS} = V_{REL} - V_{DET}$	0.05	0.10	0.15	V
Consumption current	I_{DD}	$V_{DD} = 3.0\text{V}$	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/ $^{\circ}\text{C}$
High level output current	I_{OH}	$V_{DD} = 3.0\text{V}$ $\text{OUT} = 2.7\text{V}$	—	-1.00	-0.25	mA
Low level output current	I_{OL}	$V_{DD} = 2.0\text{V}$ $\text{OUT} = 0.2\text{V}$	0.20	1.00	—	mA
Detection voltage response time	T_{PHL}	$V_{DD} = 3\text{V} \rightarrow 2\text{V}$ $T_a = 25^{\circ}\text{C}$	—	8	40	μS
		$V_{DD} = 3\text{V} \rightarrow 2\text{V}$ $T_a = -30^{\circ}\text{C} \sim 85^{\circ}\text{C}$	—	—	200	μS

8.8 SCI7721YFA

Unless otherwise specified, $T_a = -30^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

Parameter	Symbol	Conditions ($V_{SS} = 0.0\text{V}$)	Min	Typ	Max	Units
Operating voltage	V_{DD}	—	1.50	—	15.0	V
Detection voltage	V_{DET}	$T_a = 25^{\circ}\text{C}$	2.60	2.65	2.70	V
Hysteresis width	V_{HYS}	$V_{HYS} = V_{REL} - V_{DET}$	0.05	0.10	0.15	V
Consumption current	I_{DD}	$V_{DD} = 3.0\text{V}$	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/ $^{\circ}\text{C}$
High level output current	I_{OH}	$V_{DD} = 3.0\text{V}$ $\text{OUT} = 2.7\text{V}$	—	-1.00	-0.25	mA
Low level output current	I_{OL}	$V_{DD} = 2.0\text{V}$ $\text{OUT} = 0.2\text{V}$	0.20	1.00	—	mA
Detection voltage response time	T_{PHL}	$V_{DD} = 3\text{V} \rightarrow 2\text{V}$ $T_a = 25^{\circ}\text{C}$	—	8	40	μS
		$V_{DD} = 3\text{V} \rightarrow 2\text{V}$ $T_a = -30^{\circ}\text{C} \sim 85^{\circ}\text{C}$	—	—	200	μS

8.9 SCI7721YRA

Unless otherwise specified, $T_a = -30^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

Parameter	Symbol	Conditions ($V_{SS} = 0.0\text{V}$)	Min	Typ	Max	Units
Operating voltage	V_{DD}	—	1.50	—	15.0	V
Detection voltage	V_{DET}	$T_a = 25^{\circ}\text{C}$	2.73	2.80	2.87	V
Hysteresis width	V_{HYS}	$V_{HYS} = V_{REL} - V_{DET}$	0.05	0.10	0.15	V
Consumption current	I_{DD}	$V_{DD} = 3.0\text{V}$	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/ $^{\circ}\text{C}$
High level output current	I_{OH}	$V_{DD} = 3.0\text{V}$ $\text{OUT} = 2.7\text{V}$	—	-1.00	-0.25	mA
Low level output current	I_{OL}	$V_{DD} = 2.0\text{V}$ $\text{OUT} = 0.2\text{V}$	0.20	1.00	—	mA
Detection voltage response time	T_{PHL}	$V_{DD} = 3\text{V} \rightarrow 2\text{V}$ $T_a = 25^{\circ}\text{C}$	—	8	40	μS
		$V_{DD} = 3\text{V} \rightarrow 2\text{V}$ $T_a = -30^{\circ}\text{C} \sim 85^{\circ}\text{C}$	—	—	200	μS

8.10 SCI7721YGA

Unless otherwise specified, $T_a = -30^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

Parameter	Symbol	Conditions ($V_{SS} = 0.0\text{V}$)	Min	Typ	Max	Units
Operating voltage	V_{DD}	—	1.50	—	15.0	V
Detection voltage	V_{DET}	$T_a = 25^{\circ}\text{C}$	2.93	3.00	3.07	V
Hysteresis width	V_{HYS}	$V_{HYS} = V_{REL} - V_{DET}$	0.09	0.15	0.21	V
Consumption current	I_{DD}	$V_{DD} = 4.0\text{V}$	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/ $^{\circ}\text{C}$
High level output current	I_{OH}	$V_{DD} = 4.0\text{V}$ $\text{OUT} = 3.6\text{V}$	—	-1.60	-0.40	mA
Low level output current	I_{OL}	$V_{DD} = 2.0\text{V}$ $\text{OUT} = 0.2\text{V}$	0.20	1.00	—	mA
Detection voltage response time	T_{PHL}	$V_{DD} = 4\text{V} \rightarrow 3\text{V}$ $T_a = 25^{\circ}\text{C}$	—	8	40	μS
		$V_{DD} = 4\text{V} \rightarrow 3\text{V}$ $T_a = -30^{\circ}\text{C} \sim 85^{\circ}\text{C}$	—	—	200	μS

8.11 SCI7721YHA

Unless otherwise specified, Ta = -30°C to +85°C

Parameter	Symbol	Conditions (V _{SS} = 0.0V)	Min	Typ	Max	Units
Operating voltage	V _{DD}	—	1.50	—	15.0	V
Detection voltage	V _{DET}	Ta = 25°C	3.13	3.20	3.27	V
Hysteresis width	V _{HYS}	V _{HYS} = V _{REL} - V _{DET}	0.09	0.15	0.21	V
Consumption current	I _{DD}	V _{DD} = 4.0V	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/°C
High level output current	I _{OH}	V _{DD} = 4.0V OUT = 3.6V	—	-1.60	-0.40	mA
Low level output current	I _{OL}	V _{DD} = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	T _{PHL}	V _{DD} = 4V → 3V Ta = 25°C	—	8	40	μS
		V _{DD} = 4V → 3V Ta = -30°C ~ 85°C	—	—	200	μS

8.12 SCI7721YIA

Unless otherwise specified, $T_a = -30^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

Parameter	Symbol	Conditions ($V_{SS} = 0.0\text{V}$)	Min	Typ	Max	Units
Operating voltage	V_{DD}	—	1.50	—	15.0	V
Detection voltage	V_{DET}	$T_a = 25^{\circ}\text{C}$	3.43	3.50	3.57	V
Hysteresis width	V_{HYS}	$V_{HYS} = V_{REL} - V_{DET}$	0.09	0.15	0.21	V
Consumption current	I_{DD}	$V_{DD} = 4.0\text{V}$	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/ $^{\circ}\text{C}$
High level output current	I_{OH}	$V_{DD} = 4.0\text{V}$ $\text{OUT} = 3.6\text{V}$	—	-1.60	-0.40	mA
Low level output current	I_{OL}	$V_{DD} = 2.0\text{V}$ $\text{OUT} = 0.2\text{V}$	0.20	1.00	—	mA
Detection voltage response time	T_{PHL}	$V_{DD} = 4\text{V} \rightarrow 3\text{V}$ $T_a = 25^{\circ}\text{C}$	—	8	40	μS
		$V_{DD} = 4\text{V} \rightarrow 3\text{V}$ $T_a = -30^{\circ}\text{C} \sim 85^{\circ}\text{C}$	—	—	200	μS

8.13 SCI7721YTA

Unless otherwise specified, $T_a = -30^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

Parameter	Symbol	Conditions ($V_{SS} = 0.0\text{V}$)	Min	Typ	Max	Units
Operating voltage	V_{DD}	—	1.50	—	15.0	V
Detection voltage	V_{DET}	$T_a = 25^{\circ}\text{C}$	3.90	4.00	4.10	V
Hysteresis width	V_{HYS}	$V_{HYS} = V_{REL} - V_{DET}$	0.13	0.20	0.27	V
Consumption current	I_{DD}	$V_{DD} = 5.0\text{V}$	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/ $^{\circ}\text{C}$
High level output current	I_{OH}	$V_{DD} = 5.0\text{V}$ $\text{OUT} = 4.5\text{V}$	—	-2.00	-0.50	mA
Low level output current	I_{OL}	$V_{DD} = 2.0\text{V}$ $\text{OUT} = 0.2\text{V}$	0.20	1.00	—	mA
Detection voltage response time	T_{PHL}	$V_{DD} = 5\text{V} \rightarrow 4\text{V}$ $T_a = 25^{\circ}\text{C}$	—	8	40	μS
		$V_{DD} = 5\text{V} \rightarrow 4\text{V}$ $T_a = -30^{\circ}\text{C} \sim 85^{\circ}\text{C}$	—	—	200	μS

8.14 SCI7721YMA

Unless otherwise specified, $T_a = -30^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

Parameter	Symbol	Conditions ($V_{SS} = 0.0\text{V}$)	Min	Typ	Max	Units
Operating voltage	V_{DD}	—	1.50	—	15.0	V
Detection voltage	V_{DET}	$T_a = 25^{\circ}\text{C}$	4.10	4.20	4.30	V
Hysteresis width	V_{HYS}	$V_{HYS} = V_{REL} - V_{DET}$	0.13	0.20	0.27	V
Consumption current	I_{DD}	$V_{DD} = 5.0\text{V}$	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/ $^{\circ}\text{C}$
High level output current	I_{OH}	$V_{DD} = 5.0\text{V}$ $\text{OUT} = 4.5\text{V}$	—	-2.00	-0.50	mA
Low level output current	I_{OL}	$V_{DD} = 2.0\text{V}$ $\text{OUT} = 0.2\text{V}$	0.20	1.00	—	mA
Detection voltage response time	T_{PHL}	$V_{DD} = 5\text{V} \rightarrow 4\text{V}$ $T_a = 25^{\circ}\text{C}$	—	8	40	μS
		$V_{DD} = 5\text{V} \rightarrow 4\text{V}$ $T_a = -30^{\circ}\text{C} \sim 85^{\circ}\text{C}$	—	—	200	μS

8.15 SCI7721YJA

Unless otherwise specified, Ta = -30°C to +85°C

Parameter	Symbol	Conditions (V _{SS} = 0.0V)	Min	Typ	Max	Units
Operating voltage	V _{DD}	—	1.50	—	15.0	V
Detection voltage	V _{DET}	Ta = 25°C	4.30	4.40	4.50	V
Hysteresis width	V _{HYS}	V _{HYS} = V _{REL} - V _{DET}	0.13	0.20	0.27	V
Consumption current	I _{DD}	V _{DD} = 5.0V	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/°C
High level output current	I _{OH}	V _{DD} = 5.0V OUT = 4.5V	—	-2.00	-0.50	mA
Low level output current	I _{OL}	V _{DD} = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	T _{PHL}	V _{DD} = 5V → 4V Ta = 25°C	—	8	40	μS
		V _{DD} = 5V → 4V Ta = -30°C ~ 85°C	—	—	200	μS

8.16 SCI7721YOA

Unless otherwise specified, $T_a = -30^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

Parameter	Symbol	Conditions ($V_{SS} = 0.0\text{V}$)	Min	Typ	Max	Units
Operating voltage	V_{DD}	—	1.50	—	15.0	V
Detection voltage	V_{DET}	$T_a = 25^{\circ}\text{C}$	4.50	4.60	4.70	V
Hysteresis width	V_{HYS}	$V_{HYS} = V_{REL} - V_{DET}$	0.08	0.15	0.22	V
Consumption current	I_{DD}	$V_{DD} = 5.0\text{V}$	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/ $^{\circ}\text{C}$
High level output current	I_{OH}	$V_{DD} = 5.0\text{V}$ $\text{OUT} = 4.5\text{V}$	—	-2.00	-0.50	mA
Low level output current	I_{OL}	$V_{DD} = 2.0\text{V}$ $\text{OUT} = 0.2\text{V}$	0.20	1.00	—	mA
Detection voltage response time	T_{PHL}	$V_{DD} = 5\text{V} \rightarrow 4\text{V}$ $T_a = 25^{\circ}\text{C}$	—	8	40	μS
		$V_{DD} = 5\text{V} \rightarrow 4\text{V}$ $T_a = -30^{\circ}\text{C} \sim 85^{\circ}\text{C}$	—	—	200	μS

8.17 SCI7721YKA

Unless otherwise specified, $T_a = -30^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

Parameter	Symbol	Conditions ($V_{SS} = 0.0\text{V}$)	Min	Typ	Max	Units
Operating voltage	V_{DD}	—	1.50	—	15.0	V
Detection voltage	V_{DET}	$T_a = 25^{\circ}\text{C}$	4.70	4.80	4.90	V
Hysteresis width	V_{HYS}	$V_{HYS} = V_{REL} - V_{DET}$	0.13	0.20	0.27	V
Consumption current	I_{DD}	$V_{DD} = 5.0\text{V}$	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/ $^{\circ}\text{C}$
High level output current	I_{OH}	$V_{DD} = 5.0\text{V}$ $\text{OUT} = 4.5\text{V}$	—	-2.00	-0.50	mA
Low level output current	I_{OL}	$V_{DD} = 2.0\text{V}$ $\text{OUT} = 0.2\text{V}$	0.20	1.00	—	mA
Detection voltage response time	T_{PHL}	$V_{DD} = 5\text{V} \rightarrow 4\text{V}$ $T_a = 25^{\circ}\text{C}$	—	8	40	μS
		$V_{DD} = 5\text{V} \rightarrow 4\text{V}$ $T_a = -30^{\circ}\text{C} \sim 85^{\circ}\text{C}$	—	—	200	μS

8.18 SCI7721YLA

Unless otherwise specified, $T_a = -30^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

Parameter	Symbol	Conditions ($V_{SS} = 0.0\text{V}$)	Min	Typ	Max	Units
Operating voltage	V_{DD}	—	1.50	—	15.0	V
Detection voltage	V_{DET}	$T_a = 25^{\circ}\text{C}$	4.90	5.00	5.10	V
Hysteresis width	V_{HYS}	$V_{HYS} = V_{REL} - V_{DET}$	0.13	0.20	0.27	V
Consumption current	I_{DD}	$V_{DD} = 6.0\text{V}$	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/ $^{\circ}\text{C}$
High level output current	I_{OH}	$V_{DD} = 6.0\text{V}$ $\text{OUT} = 5.4\text{V}$	—	-2.40	-0.60	mA
Low level output current	I_{OL}	$V_{DD} = 2.0\text{V}$ $\text{OUT} = 0.2\text{V}$	0.20	1.00	—	mA
Detection voltage response time	T_{PHL}	$V_{DD} = 6\text{V} \rightarrow 4\text{V}$ $T_a = 25^{\circ}\text{C}$	—	8	40	μS
		$V_{DD} = 6\text{V} \rightarrow 4\text{V}$ $T_a = -30^{\circ}\text{C} \sim 85^{\circ}\text{C}$	—	—	200	μS

8.19 SCI7721YCB

Unless otherwise specified, Ta = -30°C to +85°C

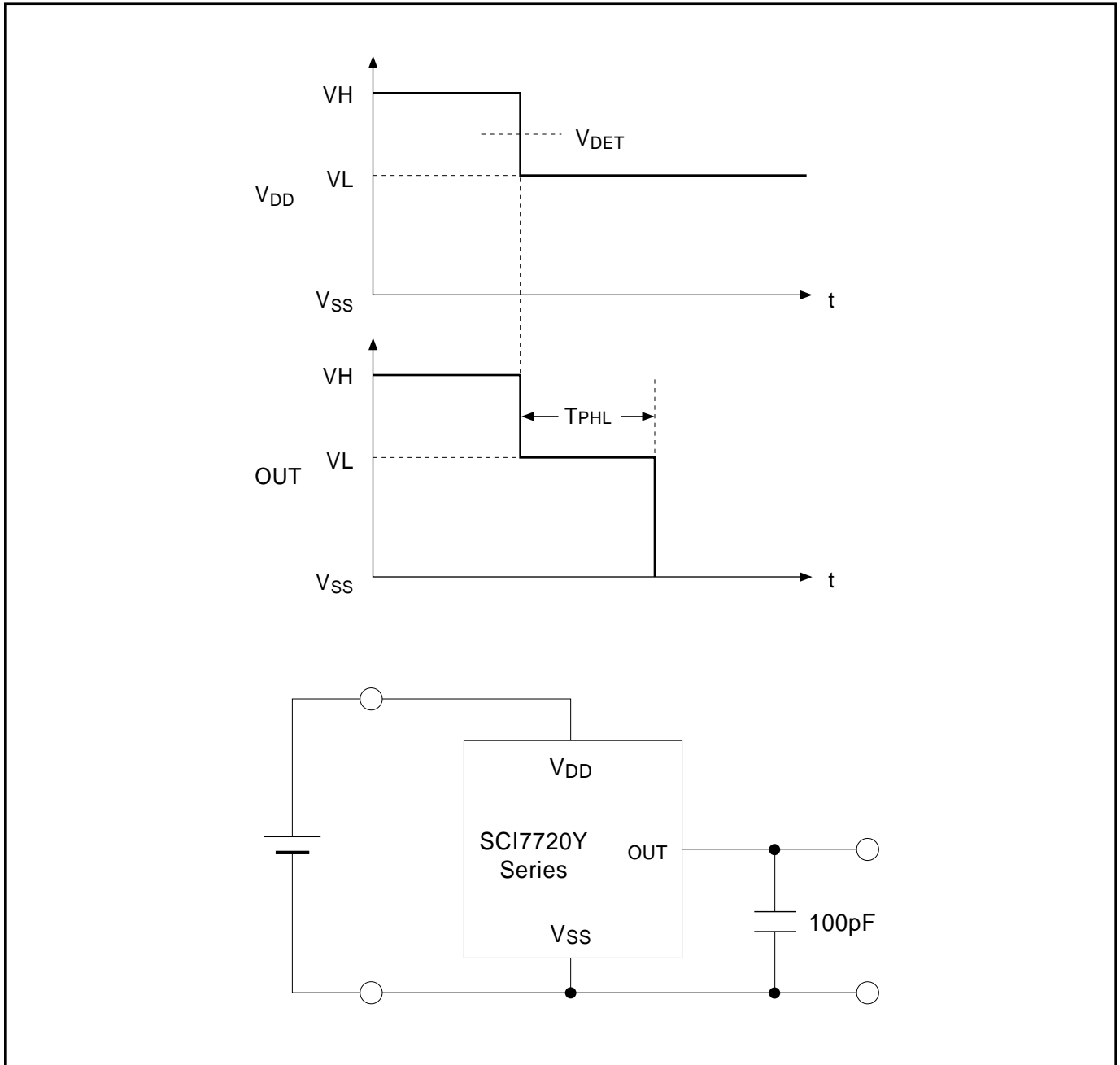
Parameter	Symbol	Conditions (V _{SS} = 0.0V)	Min	Typ	Max	Units
Operating voltage	V _{DD}	—	1.50	—	15.0	V
Detection voltage	V _{DET}	Ta = 25°C	2.10	2.15	2.20	V
Hysteresis width	V _{HYS}	V _{HYS} = V _{REL} - V _{DET}	0.05	0.10	0.15	V
Consumption current	I _{DD}	V _{DD} = 3.0V	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/°C
High level output current	I _{OH}	V _{DD} = 2.0V OUT = 1.8V	—	-0.40	-0.10	mA
Low level output current	I _{OL}	V _{DD} = 3.0V OUT = 0.3V	0.50	2.00	—	mA
Detection voltage response time	T _{PHL}	V _{DD} = 3V → 2V Ta = 25°C	—	8	40	μS
		V _{DD} = 3V → 2V Ta = -30°C ~ 85°C	—	—	200	μS

8.20 SCI7721YFB

Unless otherwise specified, $T_a = -30^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

Parameter	Symbol	Conditions ($V_{SS} = 0.0\text{V}$)	Min	Typ	Max	Units
Operating voltage	V_{DD}	—	1.50	—	15.0	V
Detection voltage	V_{DET}	$T_a = 25^{\circ}\text{C}$	2.60	2.65	2.70	V
Hysteresis width	V_{HYS}	$V_{HYS} = V_{REL} - V_{DET}$	0.05	0.10	0.15	V
Consumption current	I_{DD}	$V_{DD} = 3.0\text{V}$	—	2.00	5.00	μA
Detection voltage temperature dependency	$\frac{\Delta V_{DET}}{V_{DET}}$	—	-300	-100	+100	ppm/ $^{\circ}\text{C}$
High level output current	I_{OH}	$V_{DD} = 2.0\text{V}$ $\text{OUT} = 1.8\text{V}$	—	-0.40	-0.10	mA
Low level output current	I_{OL}	$V_{DD} = 3.0\text{V}$ $\text{OUT} = 0.3\text{V}$	0.50	2.00	—	mA
Detection voltage response time	T_{PHL}	$V_{DD} = 3\text{V} \rightarrow 2\text{V}$ $T_a = 25^{\circ}\text{C}$	—	8	40	μS
		$V_{DD} = 3\text{V} \rightarrow 2\text{V}$ $T_a = -30^{\circ}\text{C} \sim 85^{\circ}\text{C}$	—	—	200	μS

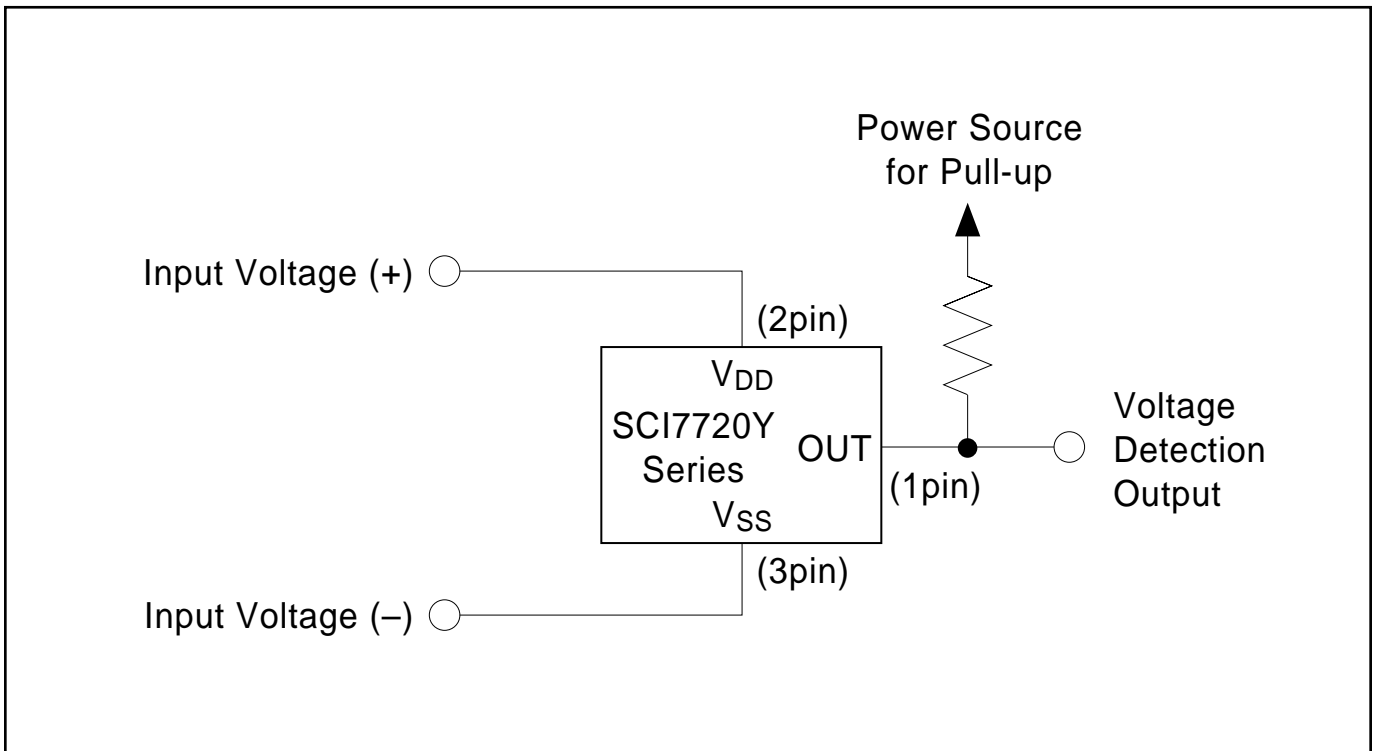
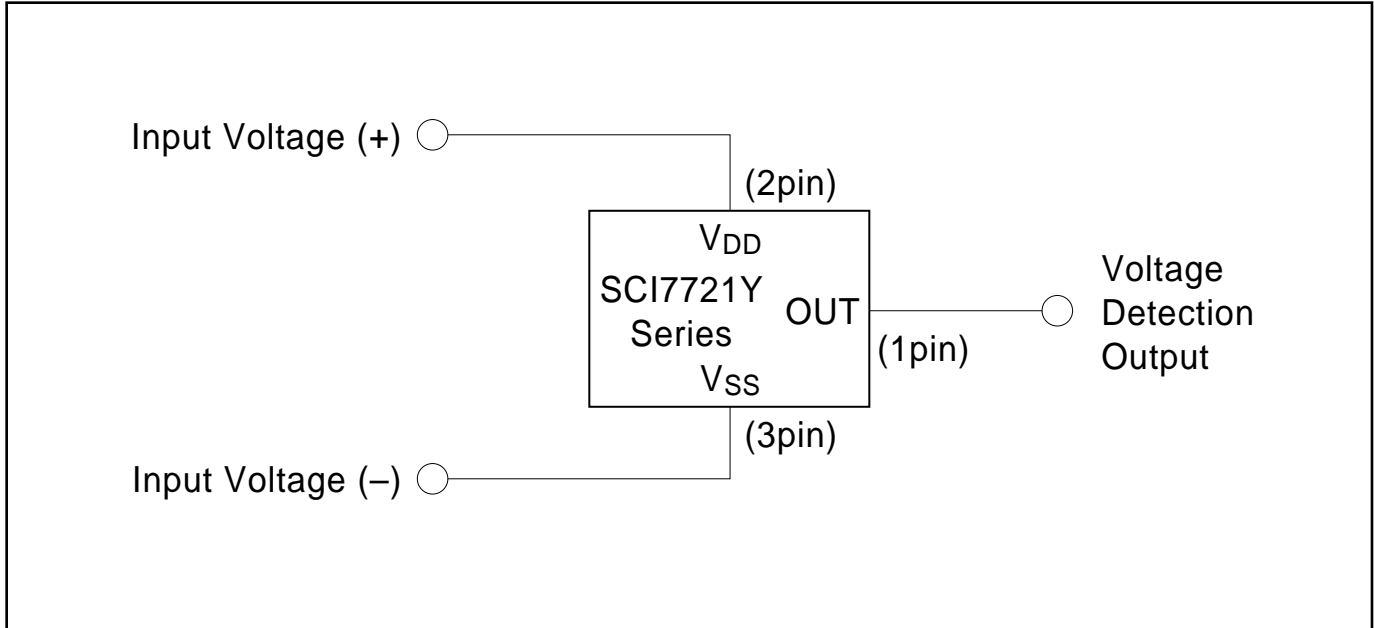
8.21 MEASUREMENT OF OUTPUT VOLTAGE RESPONSE TIME



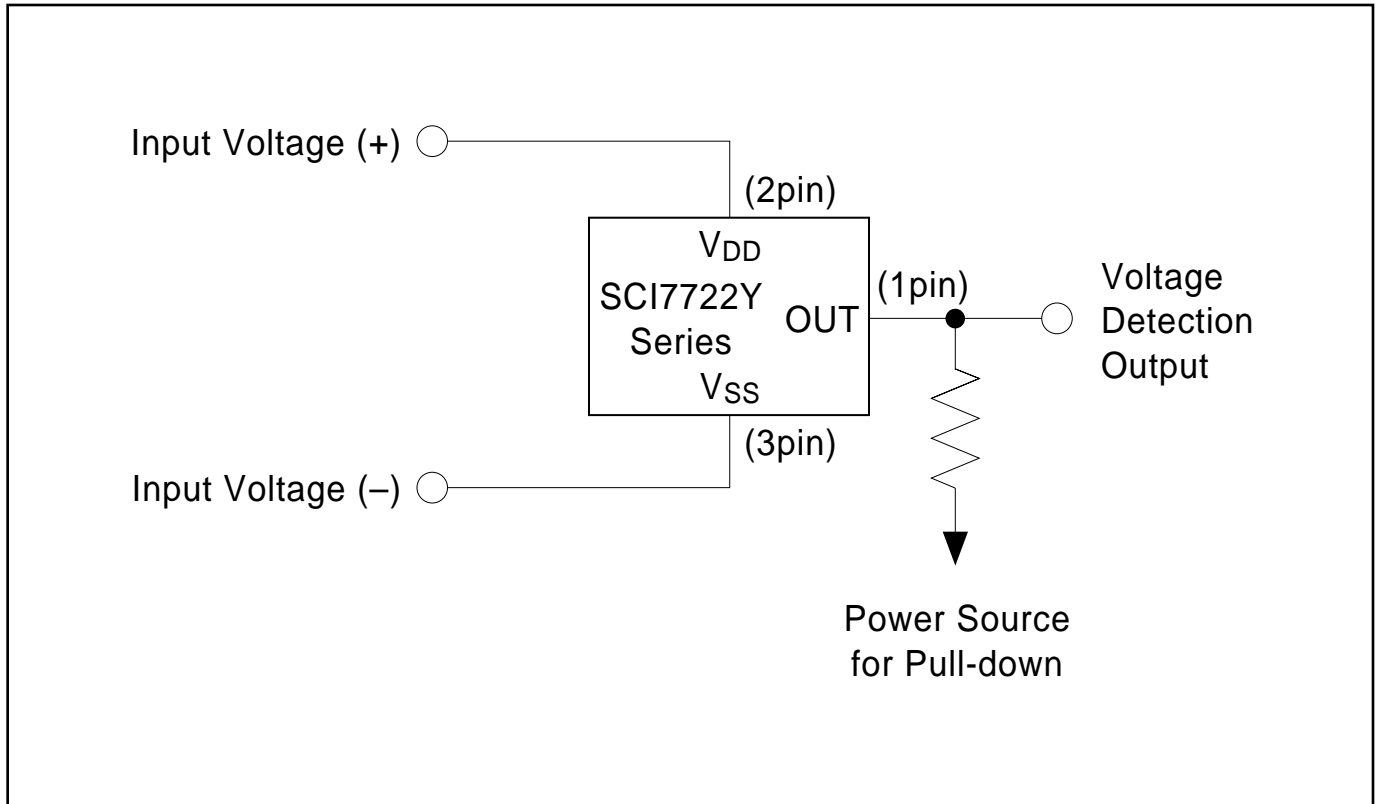
Note: These explanatory diagrams are for the case of CMOS output products, where there is a high-level output greater than V_{DET} , and a low-level output less than V_{DET} .

9.0 EXAMPLE OF EXTERNAL CONNECTIONS

9.1 EXAMPLE OF EXTERNAL CONNECTIONS

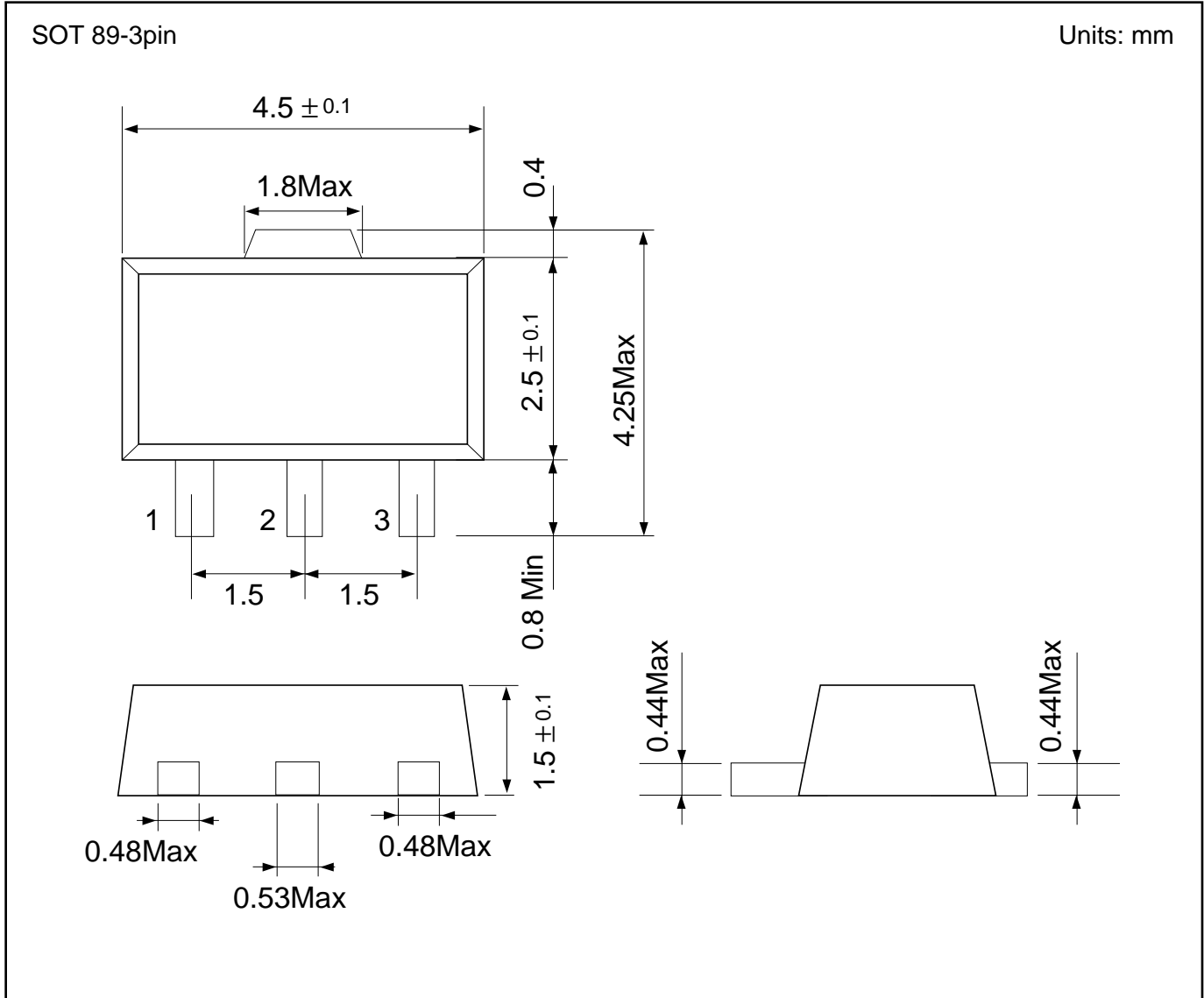


9.1 EXAMPLE OF EXTERNAL CONNECTIONS (cont.)



10.0 EXTERNAL DIMENSION DIAGRAM

10.1 EXTERNAL DIMENSION DIAGRAM



Note: This data is subject to change without notice for the purpose of improvements.

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