

SCI7720Y series POWER SUPPLY IC

5.

Voltage Detector

DESCRIPTION

The SCI7720Y series products are non-adjusting voltage detectors being developed utilizing the base of the CMOS silicon gate process.

This voltage detector consists of the reference voltage circuit, voltage comparator, hysteresis circuit and output circuit, all operating on smaller current.

A voltage range to be detected is internally set on respective detectors. A wide variety of our standard products are grouped as shown below according to the output format employed for the voltage detector output pin. The SCI7720Y series employs N-channel open drain output approach. And the SCI7721Y series and SCI7722Y series employ the CMOS output and P-channel output, respectively.

The package used is the SOT89-3 pin plastic package. Our voltage detectors are used for determining battery life, and also for monitoring supply voltage fed to microcomputers and LSI systems.

FEATURES

- Full lineups: 19 types are prepared for the detection range between 2.0V to 5.0V.
For the detection range from 0.8V to 2.5V, 7 types are available (products designed for lower voltage detection).
- Low operating current: Typ. 2.0 μ A ($V_{DD} = 5.0V$).
- Low operating voltage: 0.8V at minimum (designed for lower voltage operation).
- Absolute maximum rated voltage: 15V maximum.
- Highly stable built-in reference voltage source: Typ. 1.0V/0.8V (designed for lower voltage operation).
- Better temperature characteristics of output voltage: Typ. -100ppm/ $^{\circ}$ C.

MODEL GROUPS

Table 5-1

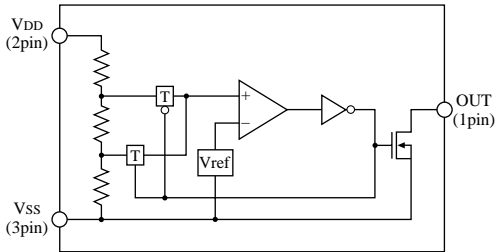
Product name	Voltage detectable			Output format	Output phase	
	Min.	Typ.	Max.		Less than VDET	VDET or above
SCI7721YCA	2.10	2.15	2.20	CMOS	Low level	High level
SCI7721YPA	2.20	2.25	2.30	CMOS	Low level	High level
SCI7721YSA	2.30	2.35	2.40	CMOS	Low level	High level
SCI7721YEA	2.50	2.55	2.60	CMOS	Low level	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
SCI7721Y3A	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
SCI7721Y2A	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	High level	Low level
SCI7721YFB	2.60	2.65	2.70	CMOS	High level	Low level

Table 5-2

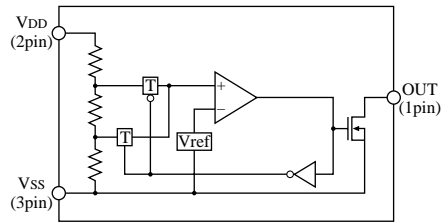
Product name	Voltage detectable			Output format	Output phase	
	Min.	Typ.	Max.		Less than VDET	VDET or above
SCI7720YTA	3.90	4.00	4.10	N ch Open Drain	Low level	Hi-Z
SCI7720YFA	2.60	2.65	2.70	N ch Open Drain	Low level	Hi-Z
SCI7720YCA	2.10	2.15	2.20	N ch Open Drain	Low level	Hi-Z
SCI7720YNA	1.85	1.90	1.95	N ch Open Drain	Low level	Hi-Z
SCI7720YBA	1.10	1.15	1.20	N ch Open Drain	Low level	Hi-Z
SCI7720YYA	1.05	1.10	1.15	N ch Open Drain	Low level	Hi-Z
SCI7720YAA	1.00	1.05	1.10	N ch Open Drain	Low level	Hi-Z
SCI7720YVA	0.90	0.95	1.00	N ch Open Drain	Low level	Hi-Z
SCI7722YDB	1.20	1.25	1.30	P ch Open Drain	High level	Hi-Z

BLOCK DIAGRAM

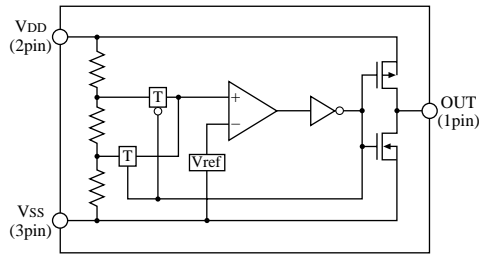
SCI7720Y* A Type



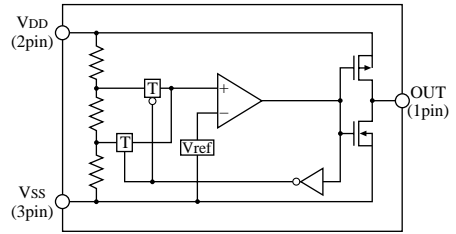
SCI7720Y* B Type



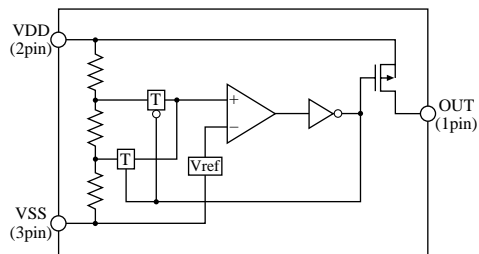
SCI7721Y* A Type



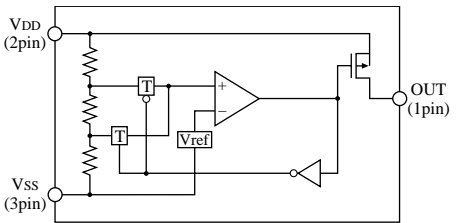
SCI7721Y* B Type



SCI7722Y* A Type



SCI7722Y* B Type



Note: A different code can be employed for the ones preceded by * marking depending on their detecting voltage specification.

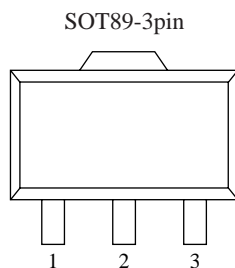
Voltage Detector

PIN DESCRIPTION

Pin function

Pin No.	Pin name	Pin function
1	OUT	Voltage detection output pin
2	VDD	Input voltage pin (positive side)
3	VSS	Input voltage pin (negative side)

Pin assignment



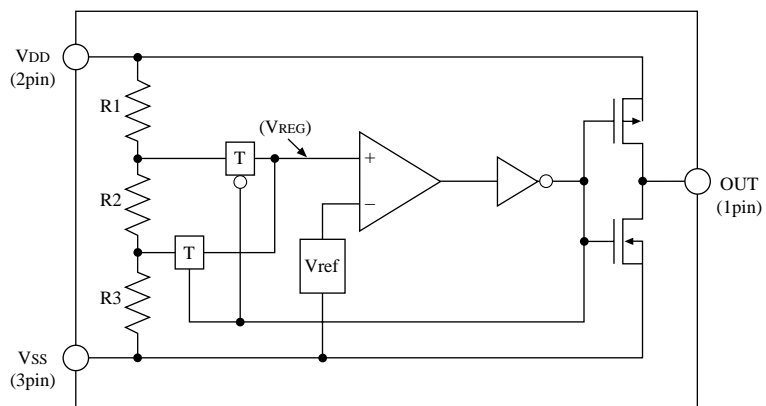
DESCRIPTION OF FUNCTION

The SCI7720Y series has the circuit configuration as shown in the figure below. For the detection, divided potential (V_{REG}) across the resistors inserted across the power supply and the reference voltage (V_{ref}) generated on the IC are entered to the voltage comparator. Since the voltage comparator is designed to detect a target voltage even when potential difference between V_{REG} and V_{ref} minute, hysteresis is added so that the comparator may not fail due to noise on the power supply and such. In the example shown in the figure below,

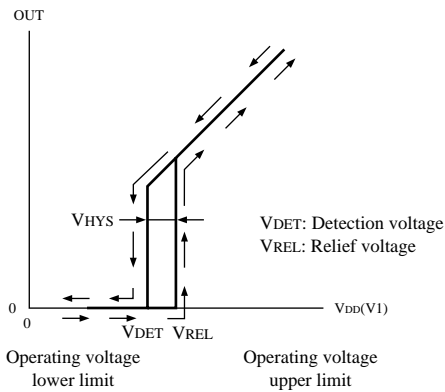
detection voltage (V_{DET}) for the input voltage drop and relief voltage (V_{REL}) for the increased input voltage are set based the following formula.

$$\text{Detection voltage: } V_{DET} = \frac{R1+R2+R3}{R2+R3} \cdot V_{ref}$$

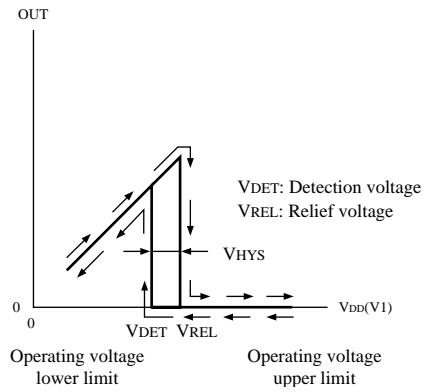
$$\text{Relief voltage: } V_{REL} = \frac{R1+R2+R3}{R3} \cdot V_{ref}$$



The following figures show the input and output characteristics of the SCI7720Y series.



[SCI772*Y*A Type]



SCI772*Y*B Type

Note: The above input/output characteristics assumes that the pull up resistor is connected to the output pin for the SCI7720Y series. For the SCI7722Y series, it assumes that the pull down resistor is connected between the OUT and VDD pins.

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Rating	Unit
Supply voltage range	$V_{DD} - V_{SS}$	15	V
Output voltage	V_o	$V_{DD} + 0.3$ to $V_{SS} - 0.3$ (SCI7721)	V
		15 to $V_{SS} - 0.3$ (SCI7720)	
		$V_{DD} + 0.3$ to $V_{DD} - 15$ (SCI7722)	
Output current	I_o	50	mA
Allowable dissipation	P_D	200	mW
Operating temperature	T_{opr}	-30 to +85	°C
Storage temperature	T_{stg}	-65 to +150	
Soldering time Soldering temperature	T_{sol}	260°C 10 seconds (at lead)	—

Voltage Detector

ELECTRIC CHARACTERISTICS

SCI7721YCA

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	1.50	—	12.0	V
Detection voltage	VDET	Ta = 25°C	2.10	2.15	2.20	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.05	0.10	0.15	V
Operating current	IDD	VDD = 3.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
High level output current	IOH	VDD = 3.0V OUT = 2.7V	—	-1.00	-0.25	mA
Low level output current	IOL	VDD = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	T _{PHL}	VDD = 3V→2V Ta = 25°C	—	8	40	μS
		VDD = 3V→2V Ta = -30°C to 85°C	—	—	200	μS

SCI7721YPA

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	1.50	—	12.0	V
Detection voltage	VDET	Ta = 25°C	2.20	2.25	2.30	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.05	0.10	0.15	V
Operating current	IDD	VDD = 3.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
High level output current	IOH	VDD = 3.0V OUT = 2.7V	—	-1.00	-0.25	mA
Low level output current	IOL	VDD = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	T _{PHL}	VDD = 3V→2V Ta = 25°C	—	8	40	μS
		VDD = 3V→2V Ta = -30°C to 85°C	—	—	200	μS

SCI7721Ysa

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	1.50	—	12.0	V
Detection voltage	VDET	Ta = 25°C	2.30	2.35	2.40	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.05	0.10	0.15	V
Operating current	IDD	VDD = 3.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
High level output current	IOH	VDD = 3.0V OUT = 2.7V	—	-1.00	-0.25	mA
Low level output current	IOL	VDD = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	TPHL	VDD = 3V→2V Ta = 25°C	—	8	40	μS
		VDD = 3V→2V Ta = -30°C to 85°C	—	—	200	μS

SCI7721Yea

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	1.50	—	12.0	V
Detection voltage	VDET	Ta = 25°C	2.50	2.55	2.60	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.05	0.10	0.15	V
Operating current	IDD	VDD = 3.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
High level output current	IOH	VDD = 3.0V OUT = 2.7V	—	-1.00	-0.25	mA
Low level output current	IOL	VDD = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	TPHL	VDD = 3V→2V Ta = 25°C	—	8	40	μS
		VDD = 3V→2V Ta = -30°C to 85°C	—	—	200	μS

SCI7720Y Series

SCI7721YFA

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	1.50	—	12.0	V
Detection voltage	VDET	Ta = 25°C	2.60	2.65	2.70	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.05	0.10	0.15	V
Operating current	IDD	VDD = 3.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
High level output current	IOH	VDD = 3.0V OUT = 2.7V	—	-1.00	-0.25	mA
Low level output current	IOL	VDD = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	T _{PHL}	VDD = 3V→2V Ta = 25°C	—	8	40	μS
		VDD = 3V→2V Ta = -30°C to 85°C	—	—	200	μS

SCI7721YRA

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	1.50	—	12.0	V
Detection voltage	VDET	Ta = 25°C	2.73	2.80	2.87	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.05	0.10	0.15	V
Operating current	IDD	VDD = 3.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
High level output current	IOH	VDD = 3.0V OUT = 2.7V	—	-1.00	-0.25	mA
Low level output current	IOL	VDD = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	T _{PHL}	VDD = 3V→2V Ta = 25°C	—	8	40	μS
		VDD = 3V→2V Ta = -30°C to 85°C	—	—	200	μS

SCI7721YGA

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (VSS = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	1.50	—	12.0	V
Detection voltage	VDET	Ta = 25°C	2.93	3.00	3.07	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.09	0.15	0.21	V
Operating current	IDD	VDD = 4.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
High level output current	IOH	VDD = 4.0V OUT = 3.6V	—	-1.60	-0.40	mA
Low level output current	IOL	VDD = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	T _{PHL}	VDD = 4V→3V Ta = 25°C	—	8	40	μS
		VDD = 4V→3V Ta = -30°C to 85°C	—	—	200	μS

SCI7721YHA

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (VSS = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	1.50	—	12.0	V
Detection voltage	VDET	Ta = 25°C	3.13	3.20	3.27	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.09	0.15	0.21	V
Operating current	IDD	VDD = 4.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
High level output current	IOH	VDD = 4.0V OUT = 3.6V	—	-1.60	-0.40	mA
Low level output current	IOL	VDD = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	T _{PHL}	VDD = 4V→3V Ta = 25°C	—	8	40	μS
		VDD = 4V→3V Ta = -30°C to 85°C	—	—	200	μS

SCI7720Y Series

SCI7721Y3A

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	1.50	—	12.0	V
Detection voltage	VDET	Ta = 25°C	3.43	3.50	3.57	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.09	0.15	0.21	V
Operating current	IDD	VDD = 4.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
High level output current	IOH	VDD = 4.0V OUT = 3.6V	—	-1.60	-0.40	mA
Low level output current	IOL	VDD = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	T _{PHL}	VDD = 4V→3V Ta = 25°C	—	8	40	μS
		VDD = 4V→3V Ta = -30°C to 85°C	—	—	200	μS

SCI7721YTA

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	1.50	—	12.0	V
Detection voltage	VDET	Ta = 25°C	3.90	4.00	4.10	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.13	0.20	0.27	V
Operating current	IDD	VDD = 5.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
High level output current	IOH	VDD = 5.0V OUT = 4.5V	—	-2.00	-0.50	mA
Low level output current	IOL	VDD = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	T _{PHL}	VDD = 5V→4V Ta = 25°C	—	8	40	μS
		VDD = 5V→4V Ta = -30°C to 85°C	—	—	200	μS

SCI7721YMA

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	1.50	—	12.0	V
Detection voltage	VDET	Ta = 25°C	4.10	4.20	4.30	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.13	0.20	0.27	V
Operating current	IDD	VDD = 5.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
High level output current	IOH	VDD = 5.0V OUT = 4.5V	—	-2.00	-0.50	mA
Low level output current	IOL	VDD = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	T _{PHL}	VDD = 5V→4V Ta = 25°C	—	8	40	μS
		VDD = 5V→4V Ta = -30°C to 85°C	—	—	200	μS

SCI7721YJA

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	1.50	—	12.0	V
Detection voltage	VDET	Ta = 25°C	4.30	4.40	4.50	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.13	0.20	0.27	V
Operating current	IDD	VDD = 5.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
High level output current	IOH	VDD = 5.0V OUT = 4.5V	—	-2.00	-0.50	mA
Low level output current	IOL	VDD = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	T _{PHL}	VDD = 5V→4V Ta = 25°C	—	8	40	μS
		VDD = 5V→4V Ta = -30°C to 85°C	—	—	200	μS

SCI7720Y Series

SCI7721Y2A

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	1.50	—	12.0	V
Detection voltage	VDET	Ta = 25°C	4.50	4.60	4.70	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.08	0.15	0.22	V
Operating current	IDD	VDD = 5.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
High level output current	IOH	VDD = 5.0V OUT = 4.5V	—	-2.00	-0.50	mA
Low level output current	IOL	VDD = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	T _{PHL}	VDD = 5V→4V Ta = 25°C	—	8	40	μS
		VDD = 5V→4V Ta = -30°C to 85°C	—	—	200	μS

SCI7721YKA

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	1.50	—	12.0	V
Detection voltage	VDET	Ta = 25°C	4.70	4.80	4.90	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.13	0.20	0.27	V
Operating current	IDD	VDD = 5.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
High level output current	IOH	VDD = 5.0V OUT = 4.5V	—	-2.00	-0.50	mA
Low level output current	IOL	VDD = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	T _{PHL}	VDD = 5V→4V Ta = 25°C	—	8	40	μS
		VDD = 5V→4V Ta = -30°C to 85°C	—	—	200	μS

SCI7721YLA

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	1.50	—	12.0	V
Detection voltage	VDET	Ta = 25°C	4.90	5.00	5.10	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.13	0.20	0.27	V
Operating current	IDD	VDD = 6.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
High level output current	IOH	VDD = 6.0V OUT = 5.4V	—	-2.40	-0.60	mA
Low level output current	IOL	VDD = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	TPHL	VDD = 6V→4V Ta = 25°C	—	8	40	μS
		VDD = 6V→4V Ta = -30°C to 85°C	—	—	200	μS

SCI7721YCB

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	1.50	—	12.0	V
Detection voltage	VDET	Ta = 25°C	2.10	2.15	2.20	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.05	0.10	0.15	V
Operating current	IDD	VDD = 3.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
High level output current	IOH	VDD = 2.0V OUT = 1.8V	—	-0.40	-0.10	mA
Low level output current	IOL	VDD = 3.0V OUT = 0.3V	0.50	2.00	—	mA
Detection voltage response time	TPHL	VDD = 3V→2V Ta = 25°C	—	8	40	μS
		VDD = 3V→2V Ta = -30°C to 85°C	—	—	200	μS

Voltage
Detector

SCI7720Y Series

SCI7721YFB

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (V _{SS} = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	V _{DD}	—————	1.50	—	12.0	V
Detection voltage	V _{DET}	Ta = 25°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
Operating current	I _{DD}	V _{DD} = 3.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-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 to 85°C	—	—	200	μS

SCI7720YTA

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (V _{SS} = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	V _{DD}	—————	1.50	—	12.0	V
Detection voltage	V _{DET}	Ta = 25°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
Operating current	I _{DD}	V _{DD} = 5.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-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} = 5V→4V Ta = 25°C	—	8	40	μS
		V _{DD} = 5V→4V Ta = -30°C to 85°C	—	—	200	μS

SCI7720YFA

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	1.50	—	12.0	V
Detection voltage	VDET	Ta = 25°C	2.60	2.65	2.70	V
Hysteresis width	VHYS	VHYS = VREL – VDET	0.05	0.10	0.15	V
Operating current	IDD	VDD = 3.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
Low level output current	IOL	VDD = 2.0V OUT = 0.2V	0.20	1.00	—	mA
Detection voltage response time	T _{PHL}	VDD = 3V→2V Ta = 25°C	—	8	40	μS
		VDD = 3V→2V Ta = -30°C to 85°C	—	—	200	μS

SCI7720YCA

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	0.80	—	10.0	V
Detection voltage	VDET	Ta = 25°C	2.10	2.15	2.20	V
Hysteresis width	VHYS	VHYS = VREL – VDET	0.05	0.10	0.15	V
Operating current	IDD	VDD = 3.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
Low level output current	IOL	VDD = 1.5V OUT = 0.15V	0.15	0.75	—	mA
Detection voltage response time	T _{PHL}	VDD = 3V→2V Ta = 25°C	—	8	40	μS
		VDD = 3V→2V Ta = -30°C to 85°C	—	—	200	μS

SCI7720Y Series

SCI7720YNA

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	0.80	—	10.0	V
Detection voltage	VDET	Ta = 25°C	1.85	1.90	1.95	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.03	0.05	0.08	V
Operating current	IDD	VDD = 3.0V	—	2.00	5.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
Low level output current	IO _L	VDD = 1.5V OUT = 0.15V	0.15	0.75	—	mA
Detection voltage response time	T _{PHL}	VDD = 2V→1V Ta = 25°C	—	8	40	μS
		VDD = 2V→1V Ta = -30°C to 85°C	—	—	200	μS

SCI7720YBA

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	0.80	—	10.0	V
Detection voltage	VDET	Ta = 25°C	1.10	1.15	1.20	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.03	0.05	0.08	V
Operating current	IDD	VDD = 1.5V	—	1.50	4.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
Low level output current	IO _L	VDD = 0.8V OUT = 0.16V	0.05	0.40	—	mA
Detection voltage response time	T _{PHL}	VDD = 1.5V→0.8V Ta = 25°C	—	8	40	μS
		VDD = 1.5V→0.8V Ta = -30°C to 85°C	—	—	200	μS

SCI7720Y_{YA}

(T_a = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (V _{SS} = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	V _{DD}	—————	0.80	—	10.0	V
Detection voltage	V _{DET}	T _a = 25°C	1.05	1.10	1.15	V
Hysteresis width	V _{HYS}	V _{HYS} = V _{REL} - V _{DET}	0.03	0.05	0.08	V
Operating current	I _{DD}	V _{DD} = 1.5V	—	1.50	4.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
Low level output current	I _{OL}	V _{DD} = 0.8V OUT = 0.16V	0.05	0.40	—	mA
Detection voltage response time	T _{PHL}	V _{DD} = 1.5V → 0.8V T _a = 25°C	—	8	40	μS
		V _{DD} = 1.5V → 0.8V T _a = -30°C to 85°C	—	—	200	μS

SCI7720Y_{AA}

(T_a = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (V _{SS} = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	V _{DD}	—————	0.80	—	10.0	V
Detection voltage	V _{DET}	T _a = 25°C	1.00	1.05	1.10	V
Hysteresis width	V _{HYS}	V _{HYS} = V _{REL} - V _{DET}	0.03	0.05	0.08	V
Operating current	I _{DD}	V _{DD} = 1.5V	—	1.50	4.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
Low level output current	I _{OL}	V _{DD} = 0.8V OUT = 0.16V	0.05	0.40	—	mA
Detection voltage response time	T _{PHL}	V _{DD} = 1.5V → 0.8V T _a = 25°C	—	8	40	μS
		V _{DD} = 1.5V → 0.8V T _a = -30°C to 85°C	—	—	200	μS

SCI7720Y Series

SCI7720Yva

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

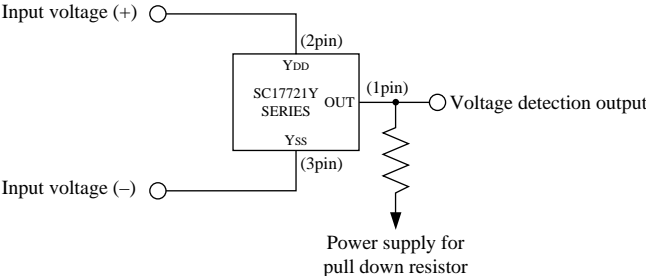
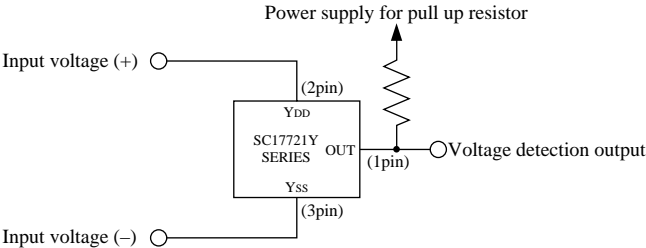
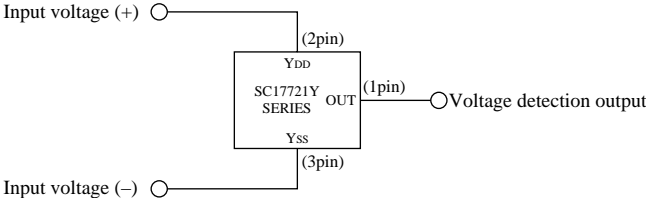
Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	0.80	—	10.0	V
Detection voltage	VDET	Ta = 25°C	0.90	0.95	1.00	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.03	0.05	0.08	V
Operating current	IDD	VDD = 1.5V	—	1.50	4.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
Low level output current	IOL	VDD = 0.8V OUT = 0.16V	0.05	0.40	—	mA
Detection voltage response time	T _{PHL}	VDD = 1.5V→0.8V Ta = 25°C	—	8	40	μS
		VDD = 1.5V→0.8V Ta = -30°C to 85°C	—	—	200	μS

SCI7722YdB

(Ta = -30°C to +85°C is assumed except where otherwise specified.)

Parameter	Symbol	Condition (Vss = 0.0V)	Min.	Typ.	Max.	Unit
Operating voltage	VDD	—————	0.80	—	10.0	V
Detection voltage	VDET	Ta = 25°C	1.20	1.25	1.30	V
Hysteresis width	VHYS	VHYS = VREL - VDET	0.03	0.05	0.08	V
Operating current	IDD	VDD = 1.5V	—	1.50	4.00	μA
Detection voltage temperature characteristics	$\frac{\Delta V_{DET}}{V_{DET}}$	—————	-300	-100	+100	ppm/°C
Low level output current	IOL	VDD = 0.8V OUT = 0.64V	—	-0.08	-0.01	mA
Detection voltage response time	T _{PHL}	VDD = 1.5V→0.8V Ta = 25°C	—	8	40	μS
		VDD = 1.5V→0.8V Ta = -30°C to 85°C	—	—	200	μS

EXAMPLES OF EXTERNAL CONNECTION



Voltage Detector

SAMPLE CIRCUITS (SCI7721Y SERIES)

CR timer circuit

When the SCI7721Y circuit configured as shown in Figure 5-14, it can be used as a CR timer circuit.

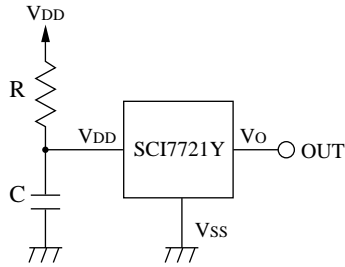


Figure 5-14 CR timer circuit

Battery backup circuit

The following is an example of the supply voltage switching circuit for the battery backup supply configured featuring the SCI7721Y series.

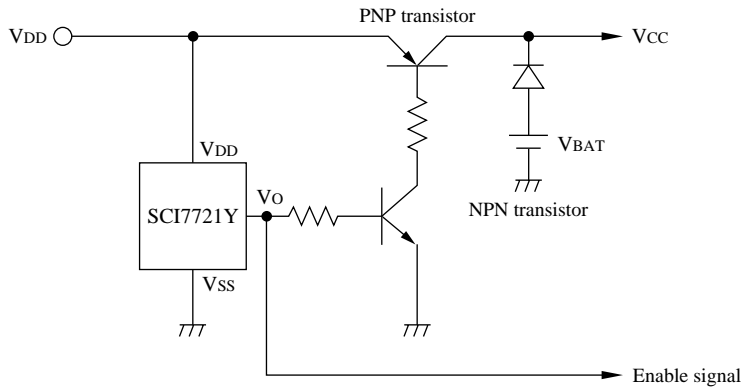


Figure 5-15 Battery backup circuit

SAMPLE CIRCUITS (SCI7720Y SERIES)
CR timer circuit

When the SCI77210 circuit is configured as shown in Figure 5-16, it can be used as a CR timer circuit.

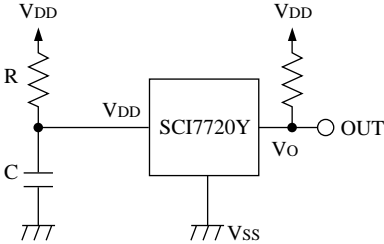


Figure 5-16 CR timer circuit

Battery backup circuit

The following is an example of the supply voltage switching circuit for the battery backup configured featuring the SCI7720Y series.

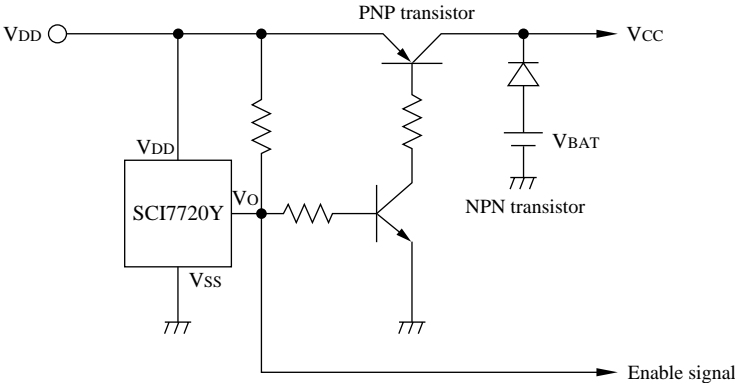


Figure 5-17 Battery backup circuit

Voltage
Detector

PRECAUTIONS

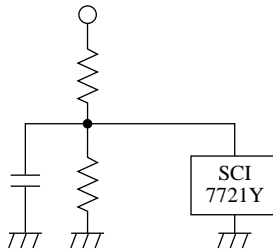
Short cut current on the SCI 7721 (CMOS output voltage detector)

Since the SCI772Y series employs CMOS output, as an input voltage nears the detection voltage range, short cut current is flown between VDD and VSS. The short cut current is voltage sensitive, and approximately 2 mA flows at 5V level or so (our products are not check for short cut current after volume production has been started).

Although duration of the short cut current depends on operating conditions (such as type the circuit used and supply impedance), normally it is assumed to continue several usec to several dozens of usec.

If a load with high impedance is inserted across the power supply, oscillation can be introduced by the short cut current. In order to reject this trouble, the following measures should be considered:

- (1) Reduce the resistance value.
- (2) Insert a capacitor.
- (3) Replace with the SCI7720Y series (it employs N-channel open drain approach).



SCI7000 series POWER SUPPLY IC

6.

Appendix