SYCS202-3

High Bandwidth, High Accuracy Galvanically Isolated Hall Current Sensor IC

General Description

The SYCS202-3 is a family of high accuracy galvanically isolated Hall-effect current sensor ICs which bandwidth up to 1MHz. It adopts non-contact differential Hall array internally for bidirectional or unidirectional currents sensing from 20A to 75A, and outputs the analog voltage proportional to the DC or AC current. Current is sensed differentially in order to reject external common-mode fields.

A precise, proportional output voltage is provided by the high accuracy, good linearity, low temperature drift Hall IC, which is programmed for accuracy at the factory. It also provides user-configurable and reliable overcurrent fault detection.

The SYCS202-3 is available in a compact SOIC16 package with low primary conductor resistance for power loss, which allows for easy implementation.

The SYCS202-3 is suitable for high frequency, insulation, small size with low heat generation applications, including automotive, industrial, and communications systems.

Features

- 3.3V Single Supply
- Wide Current Sensing Range:
  - Bidirectional: ±20 ~ ±75A
  - Unidirectional: 20 ~ 75A
- 1MHz Maximum Bandwidth, Response Time 0.7µs
- UL62368-1 Ed3 certified
  - Dielectric Strength Test Voltage = 3600V_{RMS}
  - Working Voltage for Basic Isolation = 616V_{RMS}
- Fast and Externally Configurable Overcurrent Fault Detection
- Low Primary Conductor Resistance for Power Loss
- Factory-trimmed for High Accuracy
- Compact SOIC16 Package

Applications

- EV/HEV Charger and DC-DC Power Supply
- Photovoltaic Inverter Power Supply and UPS
- Motor Control and Frequency Converter
- Communication and Server Power Supply

Typical Application

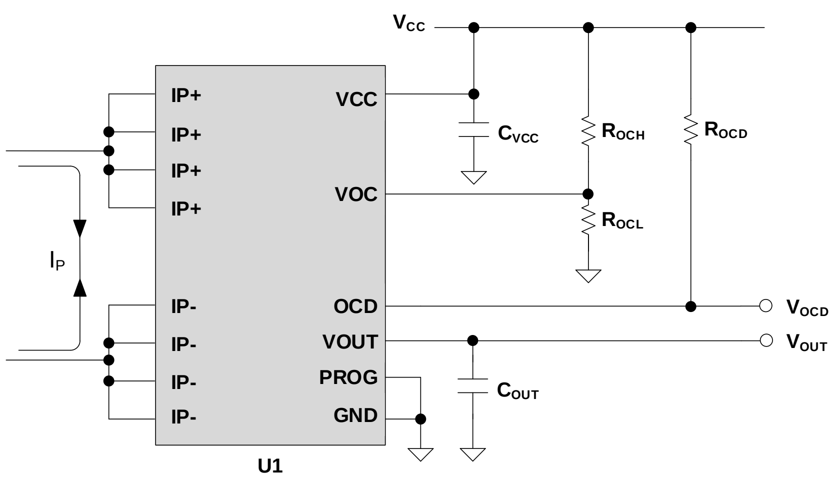

Figure 1. Typical Application Circuit

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Ordering Information

Part Number	Architecture	I_P(A)	Sensitivity(mV/A)	V_{QVO}(V)	T_A(°C)	MPQ(pcs)
SYCS202K-020BR-3	Bidirectional	±20	66	$V_{CC}/2$	-40~125	440
SYCS202K-040BR-3	Bidirectional	±40	33	$V_{CC}/2$	-40~125	440
SYCS202K-065BR-3	Bidirectional	±65	20.3	$V_{CC}/2$	-40~125	440
SYCS202K-075BR-3	Bidirectional	±75	17.6	$V_{CC}/2$	-40~125	440
SYCS202K-020UR-3	Unidirectional	20	132	$V_{CC}/10$	-40~125	440
SYCS202K-040UR-3	Unidirectional	40	66	$V_{CC}/10$	-40~125	440
SYCS202K-065UR-3	Unidirectional	65	40.6	$V_{CC}/10$	-40~125	440
SYCS202K-075UR-3	Unidirectional	75	35.2	$V_{CC}/10$	-40~125	440

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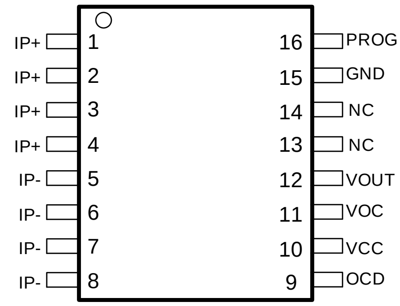
Pinout (Top View)



(SOIC 16)

Pin Number	Pin Name	Pin Description
1,2,3,4	IP+	Positive terminals for sensing current.
5,6,7,8	IP-	Negative terminals for sensing current.
9	OCD	Overcurrent detection pin, open drain; active low.
10	VCC	Power supply pin.
11	VOC	Overcurrent fault threshold set pin.
12	VOUT	Analog output pin.
13,14	NC	No connection.
15	GND	Ground pin.
16	PROG	Factory-trimmed pin. Connect this pin to GND.

Block Diagram

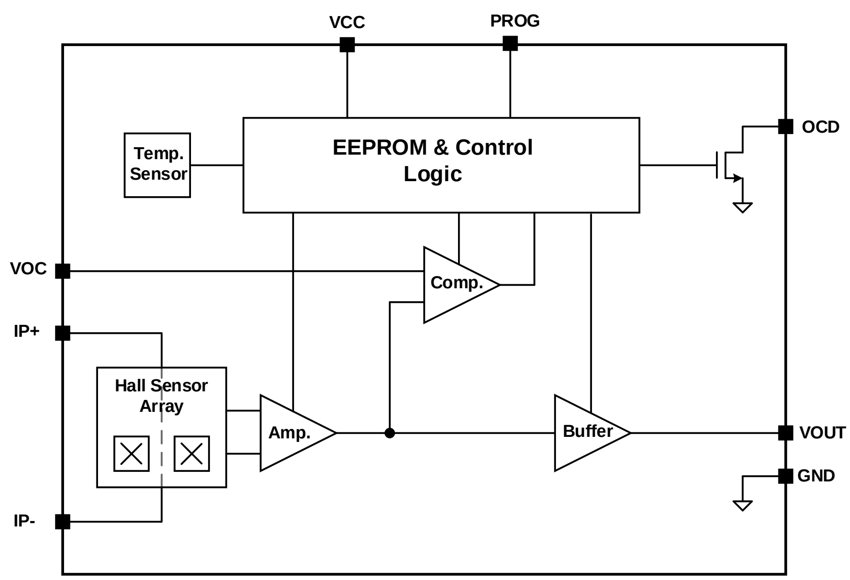


Figure 2. Block Diagram

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Absolute Maximum Ratings (Note 1)

Supply Input Voltage -- -0.3 to 4.6V

VOC, OCD, PROG, VOUT -- 0.15 to V_{CC}-0.15V

Output Current (Note 2) -- ±40 mA

Junction Temperature Range -- -40 to 165°C

Lead Temperature Range (Soldering, 10 sec.) -- 260°C

Storage Temperature Range -- -55 to 150°C

Recommended Operating Conditions (Note 3)

Supply Input Voltage -- 3.0 to 3.6V

Ambient Temperature Range -- -40 to 125°C

Isolation Characteristics

Characteristic	Symbol	Notes	Rating	Unit
Dielectric Strength Test Voltage (Note 4)	V_{ISO}	Agency type-tested for 60 seconds per UL standard 62368-1 Ed3	3600	V_{RMS}
Working Voltage for Basic Isolation	V_{WVBI}	For basic (single) isolation per UL standard 62368-1 Ed3	870	V_{PK}
			616	V_{RMS}
Clearance Distance	D_{CL}	Min distance from IP pin to signal pin(air)	7.5	mm
Creepage Distance	D_{CR}	Min distance from IP pin to signal pin (molded body)	7.5	mm

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Electrical Characteristics

(V_{CC} = 3.3V, C_{VCC} = 0.1µF, T_A = -40 to 125°C, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ.	Max	Unit
Supply Voltage	V_{CC}		3.14	3.3	3.46	V
Supply Current	I_{CC}	R_L ≥ 10kΩ		16		mA
Power on Delay Time	T_{POD}	T_A=25°C			1000	µs
Zero Current Output Voltage	V_{QVO}	SYCS-xxxBR-3, T_A = 25°C		V_{CC}/2		V
		SYCS-xxxUR-3, T_A = 25°C		V_{CC}/10		V
Output Voltage Range @I_P	V_{OUT}-V_{QVO}	SYCS-xxxBR-3, T_A = 25°C		±1.32		V
		SYCS-xxxUR-3, T_A = 25°C		2.64		V
Zero Current Output Ratiometry Error	E_{RAT}		-0.3		0.3	%
Output Load Resistance	R_L	V_{OUT} to V_{CC} or GND	5			kΩ
Output Load Capacitance	C_L	V_{OUT} to GND			10	nF
Response Time	t_{RES}	T_A=25°C, C_L=1nF		0.7		µs
Bandwidth	BW	Small signal –3dB, C_L=1nF, T_A=25°C		0.7	1	MHz
DC Output Impedance	R_{OUT}	T_A = 25°C			20	kΩ
Moisture Sensitivity Level	MSL			3		

Overcurrent Fault Characteristics

(V_{CC} = 3.3V, C_{VCC} = 0.1µF, T_A = -40 to 125°C, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Overcurrent Detection Response Time	$t_{OCD, RES}$	Time from I_P>I_{OCD} to V_{OCD}<$V_{OCD, FAU}$; I_P stepped from 0 to 1.2×I_{OCD}		1	1.5	µs
Overcurrent Detection Range	I_{OCD}	Relative to I_P; program via VOC pin	0.5×I_P		2×I_P	A
Overcurrent Detection Output Low Voltage	$V_{OCD, FAU}$	In fault condition; R_{OCD} = 5kΩ		0.07	0.4	V
Overcurrent Detection Pull-Up Resistance	R_{OCD}		1		200	kΩ
Overcurrent Detection Leakage Current	$I_{OCD, LKG}$			±5		µA
Overcurrent Detection Hysteresis	$I_{OCD, HYS}$			9		%FS
Overcurrent Detection Error	E_{OCD}	V_{VOC}=0.2×V_{CC}, I_{OCD} = 100% × I_{PR}		±5		%
VOC Input Range	V_{VOC}		0.1×V_{CC}		0.4×V_{CC}	V
VOC Input Current	I_{VOC}			10	100	nA

Note 1: Stresses beyond the "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Note 2: Maximum survivable sink or source current on the VOUT pin.

Note 3: The device is not guaranteed to function outside its operating conditions.

Note 4: 60-second test is only for UL test; Tested in production against UL62368-1 Ed3.

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SYCS202K-020BR-3 Performance Characteristics

(V_{CC} = 3.3V, C_{VCC} = 0.1µF, T_A = -40 to 125°C, unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal Performance						
Current Sensing Range	I_P		-20		20	A
Sensitivity	Sens			66		mV/A
Zero Current Output Voltage	V_{QVO}	I_P=0A		V_{CC}/2		V
Accuracy Performance						
Sensitivity Error	E_{SENS}	T_A=25°C;	-1		1	%
Voltage Offset Error	V_{OE}	I_P=0A,T_A = 25°C	-10	±5	10	mV
		I_P=0A,T_A = -40 to 125°C	-30	±15	30	mV
Linearity Error	E_{LIN}	Full scale of I_P	-1	0.5	1	%
Total Output Error	$E_{TOT, H}$	Full scale of I_P, T_A = 25 to 125°C	-2		2	%
	$E_{TOT, H2}$	Full scale of I_P, T_A = 25 to 85°C	-1.5		1.5	%
	$E_{TOT, L}$	Full scale of I_P, T_A = –40 to 25°C		±3		%

SYCS202K-020UR-3 Performance Characteristics

(V_{CC} = 3.3V, C_{VCC} = 0.1µF, T_A = -40 to 125°C, unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal Performance						
Current Sensing Range	I_P		0		20	A
Sensitivity	Sens			132		mV/A
Zero Current Output Voltage	V_{QVO}	I_P=0A		V_{CC}/10		V
Accuracy Performance						
Sensitivity Error	E_{SENS}	T_A=25°C;	-1		1	%
Voltage Offset Error	V_{OE}	I_P=0A,T_A = 25°C	-10	±5	10	mV
		I_P=0A,T_A = -40 to 125°C	-30	±15	30	mV
Linearity Error	E_{LIN}	Full scale of I_P	-1	0.5	1	%
Total Output Error	$E_{TOT, H}$	Full scale of I_P, T_A = 25 to 125°C	-2		2	%
	$E_{TOT, H2}$	Full scale of I_P, T_A = 25 to 85°C	-1.5		1.5	%
	$E_{TOT, L}$	Full scale of I_P, T_A = –40 to 25°C		±3		%

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SYCS202K-040BR-3 Performance Characteristics

(V_{CC} = 3.3V, C_{VCC} = 0.1µF, T_A = -40 to 125°C, unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal Performance						
Current Sensing Range	I_P		-40		40	A
Sensitivity	Sens			33		mV/A
Zero Current Output Voltage	V_{QVO}	I_P=0A		V_{CC}/2		V
Accuracy Performance						
Sensitivity Error	E_{SENS}	T_A=25°C;	-1		1	%
Voltage Offset Error	V_{OE}	I_P=0A,T_A = 25°C	-10	±5	10	mV
		I_P=0A,T_A = -40 to 125°C	-30	±15	30	mV
Linearity Error	E_{LIN}	Full scale of I_P	-1	0.5	1	%
Total Output Error	$E_{TOT, H}$	Full scale of I_P, T_A = 25 to 125°C	-2		2	%
	$E_{TOT, H2}$	Full scale of I_P, T_A = 25 to 85°C	-1.5		1.5	%
	$E_{TOT, L}$	Full scale of I_P, T_A = –40 to 25°C		±3		%

SYCS202K-040UR-3 Performance Characteristics

(V_{CC} = 3.3V, C_{VCC} = 0.1µF, T_A = -40 to 125°C, unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal Performance						
Current Sensing Range	I_P		0		40	A
Sensitivity	Sens			66		mV/A
Zero Current Output Voltage	V_{QVO}	I_P=0A		V_{CC}/10		V
Accuracy Performance						
Sensitivity Error	E_{SENS}	T_A=25°C;	-1		1	%
Voltage Offset Error	V_{OE}	I_P=0A,T_A = 25°C	-10	±5	10	mV
		I_P=0A,T_A = -40 to 125°C	-30	±15	30	mV
Linearity Error	E_{LIN}	Full scale of I_P	-1	0.5	1	%
Total Output Error	$E_{TOT, H}$	Full scale of I_P, T_A = 25 to 125°C	-2		2	%
	$E_{TOT, H2}$	Full scale of I_P, T_A = 25 to 85°C	-1.5		1.5	%
	$E_{TOT, L}$	Full scale of I_P, T_A = –40 to 25°C		±3		%

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SYCS202K-065BR-3 Performance Characteristics

(V_{CC} = 3.3V, C_{VCC} = 0.1µF, T_A = -40 to 125°C, unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal Performance						
Current Sensing Range	I_P		-65		65	A
Sensitivity	Sens			20.3		mV/A
Zero Current Output Voltage	V_{QVO}	I_P=0A		V_{CC}/2		V
Accuracy Performance						
Sensitivity Error	E_{SENS}	T_A=25°C;	-1		1	%
Voltage Offset Error	V_{OE}	I_P=0A,T_A = 25°C	-10	±5	10	mV
		I_P=0A,T_A = -40 to 125°C	-30	±15	30	mV
Linearity Error	E_{LIN}	Full scale of I_P	-1	0.5	1	%
Total Output Error	$E_{TOT, H}$	Full scale of I_P, T_A = 25 to 125°C	-2		2	%
	$E_{TOT, H2}$	Full scale of I_P, T_A = 25 to 85°C	-1.5		1.5	%
	$E_{TOT, L}$	Full scale of I_P, T_A = –40 to 25°C		±3		%

SYCS202K-065UR-3 Performance Characteristics

(V_{CC} = 3.3V, C_{VCC} = 0.1µF, T_A = -40 to 125°C, unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal Performance						
Current Sensing Range	I_P		0		65	A
Sensitivity	Sens			40.6		mV/A
Zero Current Output Voltage	V_{QVO}	I_P=0A		V_{CC}/10		V
Accuracy Performance						
Sensitivity Error	E_{SENS}	T_A=25°C;	-1		1	%
Voltage Offset Error	V_{OE}	I_P=0A,T_A = 25°C	-10	±5	10	mV
		I_P=0A,T_A = -40 to 125°C	-30	±15	30	mV
Linearity Error	E_{LIN}	Full scale of I_P	-1	0.5	1	%
Total Output Error	$E_{TOT, H}$	Full scale of I_P, T_A = 25 to 125°C	-2		2	%
	$E_{TOT, H2}$	Full scale of I_P, T_A = 25 to 85°C	-1.5		1.5	%
	$E_{TOT, L}$	Full scale of I_P, T_A = –40 to 25°C		±3		%

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SYCS202K-075BR-3 Performance Characteristics

(V_{CC} = 3.3V, C_{VCC} = 0.1µF, T_A = -40 to 125°C, unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal Performance						
Current Sensing Range	I_P		-75		75	A
Sensitivity	Sens			17.6		mV/A
Zero Current Output Voltage	V_{QVO}	I_P=0A		V_{CC}/2		V
Accuracy Performance						
Sensitivity Error	E_{SENS}	T_A=25°C;	-2		2	%
Voltage Offset Error	V_{OE}	I_P=0A,T_A = 25°C	-10	±5	10	mV
		I_P=0A,T_A = -40 to 125°C	-30	±15	30	mV
Linearity Error	E_{LIN}	Full scale of I_P	-1.5	0.5	1.5	%
Total Output Error	$E_{TOT, H}$	Full scale of I_P, T_A = 25 to 125°C	-3		3	%
	$E_{TOT, H2}$	Full scale of I_P, T_A = 25 to 85°C	-2		2	%
	$E_{TOT, L}$	Full scale of I_P, T_A = –40 to 25°C		±3		%

SYCS202K-075UR-3 Performance Characteristics

(V_{CC} = 3.3V, C_{VCC} = 0.1µF, T_A = -40 to 125°C, unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal Performance						
Current Sensing Range	I_P		0		75	A
Sensitivity	Sens			35.2		mV/A
Zero Current Output Voltage	V_{QVO}	I_P=0A		V_{CC}/10		V
Accuracy Performance						
Sensitivity Error	E_{SENS}	T_A=25°C;	-2		2	%
Voltage Offset Error	V_{OE}	I_P=0A,T_A = 25°C	-10	±5	10	mV
		I_P=0A,T_A = -40 to 125°C	-30	±15	30	mV
Linearity Error	E_{LIN}	Full scale of I_P	-1.5	0.5	1.5	%
Total Output Error	$E_{TOT, H}$	Full scale of I_P, T_A = 25 to 125°C	-3		3	%
	$E_{TOT, H2}$	Full scale of I_P, T_A = 25 to 85°C	-2		2	%
	$E_{TOT, L}$	Full scale of I_P, T_A = –40 to 25°C		±3		%

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Operation

The SYCS202-3 is a family of high accuracy galvanically isolated current sensor ICs. It offers high isolation, high bandwidth Hall-effect-based current sensing with user-configurable overcurrent fault detection.

There are various output modes for measuring bidirectional or unidirectional current from 20A to 75A, which output the analog voltage proportional to the AC or DC current. The bandwidth is up to 1MHz.

The SYCS202-3 is available in a compact SOIC16 package.

Application Information

Power Supply Capacitor (C_{VCC})

To minimize the potential noise problem, place a typical X5R or better grade ceramic capacitor really close to the IN and GND pins. In this case, a 0.1μF or larger low ESR ceramic capacitor is recommended.

Output Capacitor (C_{OUT})

The output capacitor is selected to handle the output noise requirements. An X5R or better grade ceramic capacitor close to the VOUT and GND pins can work well. To achieve better filtering results, a resistor (R_{OUT}) can be added. The values of C_{OUT} and R_{OUT} are depended on the application. For most applications, a 10nF ceramic capacitor can operate well.

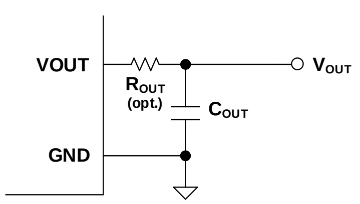

Figure 3. Output Capacitor

Sensitivity (Sens)

Sensitivity is the slope of the approximate straight line between the output voltage (V_{OUT}) and the input primary current (I_P) within the sensing range. V_{QVO} is the quiescent voltage output.

$$V_{OUT} = V_{QVO} + Sens \times I_P$$

Response Time (t_{RES})

Response time (t_{RES}) is defined as the time delay from the 90% of input primary current (I_P) to the 90% of the output voltage (V_{OUT}).

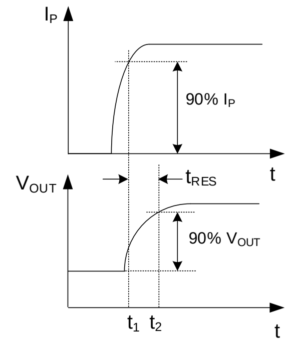

Figure 4. Response Time

Quiescent Voltage Output (V_{QVO})

The V_{QVO} is defined as the output voltage (V_{OUT}) when the primary current (I_P) is zero, which is related to the V_{CC}.

For the bidirectional current sensor IC,

$$V_{QVO} = \frac{1}{2} \times V_{CC}$$

For the unidirectional current sensor IC,

$$V_{QVO} = \frac{1}{10} \times V_{CC}$$

Voltage Offset Error (V_{OE})

The voltage offset error (V_{OE}) is defined as the deviation of the zero current output voltage from its ideal quiescent value (V_{QVO}), due to nonmagnetic causes.

Zero Current Output Ratiometric Error (E_{RAT})

When the supply voltage V_{CC} changes from the typical value ($V_{CC,\ TYP}$) to $V_{CC,\ MIN} < V_{CC,\ M} < V_{CC,\ MAX}$ there will be a certain deviation between the measured zero current output ($V_{QVO,\ M}$) and its ideal value ($V_{QVO,\ TYP}$), which is defined as follows:

$$E_{RAT} = 1 - \frac{V_{QVO,M}}{V_{CC,M}} \times \frac{V_{CC,TYP}}{V_{QVO,TYP}}$$

Linearity Error (E_{LIN})

The linearity error (E_{LIN}) is the maximum positive or negative error between the measured output voltage and the ideal value within the sensing range.

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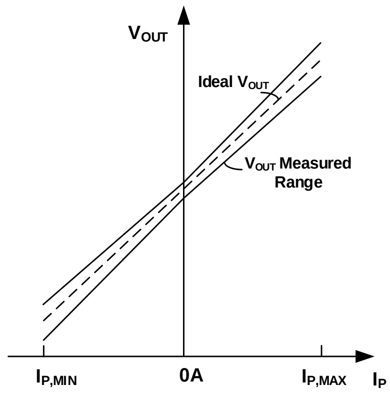

Figure 5. Linearity Error

Total Output Error (E_{TOT})

Total output error (E_{TOT}) is defined as the difference between the ideal output voltage (V_{OUT}) and the actual output voltage ($V_{OUT,\ IP}$), divided by the ideal sensitivity (Sens), relative to the primary current (I_P) flowing through the primary conduction path:

$$E_{TOT} = \frac{V_{OUT,IP} - V_{OUT}}{Sens \times I_P}$$

At relatively high current, E_{TOT} will be mostly due to sensitivity errors; but at relatively low current, E_{TOT} will be mostly due to the voltage offset error (V_{OE}). As the primary current (I_P) approaches zero, the E_{TOT} approaches infinity due to the voltage offset error (V_{OE}).

Overcurrent Detection (OCD)

The overcurrent detection is user-configurable from 50% to 200% of the full-scale primary input current which is shown below.

For example, if V_{VOC}=0.4×V_{CC}, the overcurrent threshold(I_{OCD}) is double of maximum primary current range($I_{P,MAX}$). And for bidirectional current application, the fault will trip for both positive and negative current.

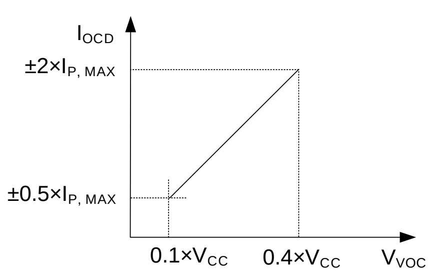

Figure 6. Overcurrent Detection Threshold

VOC Resistor Dividers R_{OCH} and R_{OCL}

Choose R_{OCH} and R_{OCL} to program the proper overcurrent detection threshold. As shown below, V_1 is an external power source, which is recommended to connect it to the V_{CC} to remain constant even as the V_{CC} varies. It is recommended to use resistor values <10kΩ for setting V_{VOC} and 5kΩ for pulling up V_{OCD} when V_1=V_2=V_{CC}. With larger resistor values, the leakage current may result in errors in the trip point. The R_{OCH} and R_{OCL} can be calculated to be:

$$\frac{R_{OCL}}{R_{OCH} + R_{OCL}} = \frac{1}{5} \times \frac{V_{CC}}{V_1} \times \frac{I_{OCD}}{I_{PR,MAX}}$$

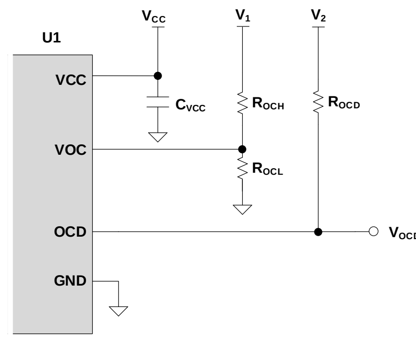

Figure 7. Overcurrent Detection Circuit

The OCD pin is open drain that the default value is high-Z. It drops down when the absolute value of primary current (|I_P|) exceeds the user-set overcurrent threshold (I_{OCD}), and rise up when the I_P smaller than the user-set I_{OCD} minus overcurrent detection hysteresis ($I_{OCD,\ HYS}$). The high and low voltage of VOC pin are related to the pull-up voltage (V_2).

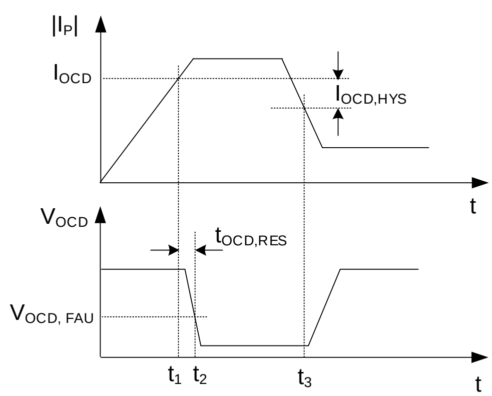

Figure 8. Overcurrent Detection Response

Layout Design

The layout design of the SYCS202-3 is relatively simple. For the best performance, the attention should be paid to heat dissipation and traces.

1. It is best practice for the current to approach the IC parallel to the current-carrying pins, and for the current-carrying trace to not creep towards the center of the

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package.

2. It is best to place C_{VCC} and C_L close to the IC to achieve better filtering performance.

3. If in some application scenarios, the Vcc pin has an instantaneous pulse peak of more than 6.5V, it is recommended to install a TVS (Transient Voltage Suppressor) diode between Vcc pin and GND pin to absorb the spike energy.

4. It is important to implement proper current path planning, as this constitutes a critical measure for effective magnetic interference suppression. The recommended PCB layout is as follows. In terms of details, for better performance, it is recommended to use PCB with minimum 2-ounce copper foil, at least 4-layer board, and place thermal vias near primary current pins.

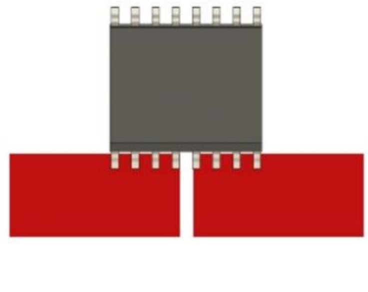

Figure 9. Recommended PCB Layout

Bad PCB layout will degrade isolation performance. The following design is NOT recommended.

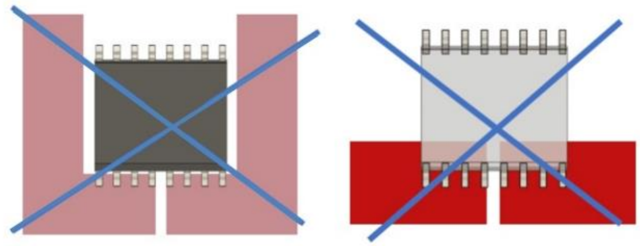

Figure 10. Not Recommended PCB Layout

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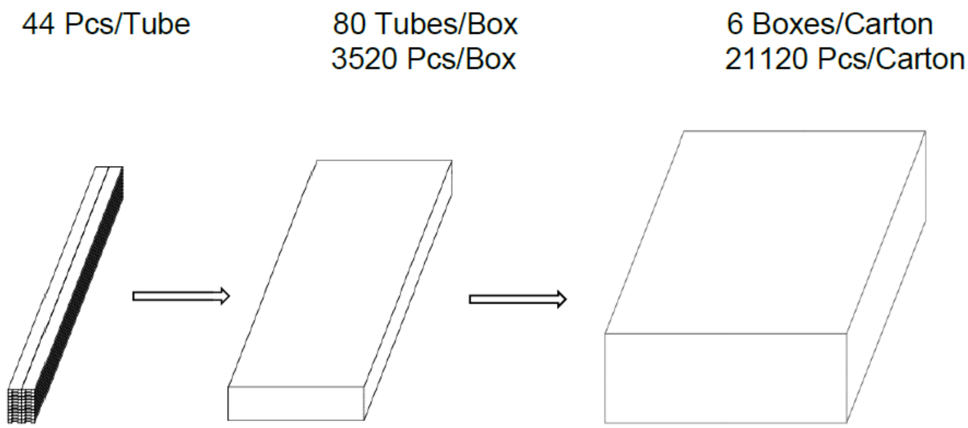
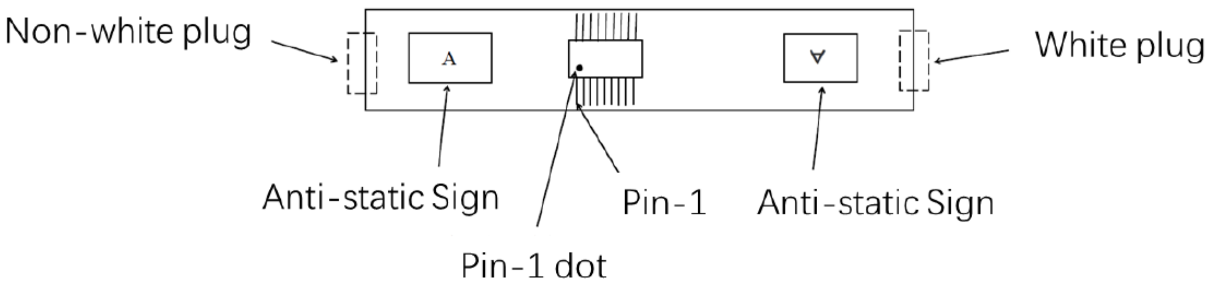
Packaging Quantity Specifications





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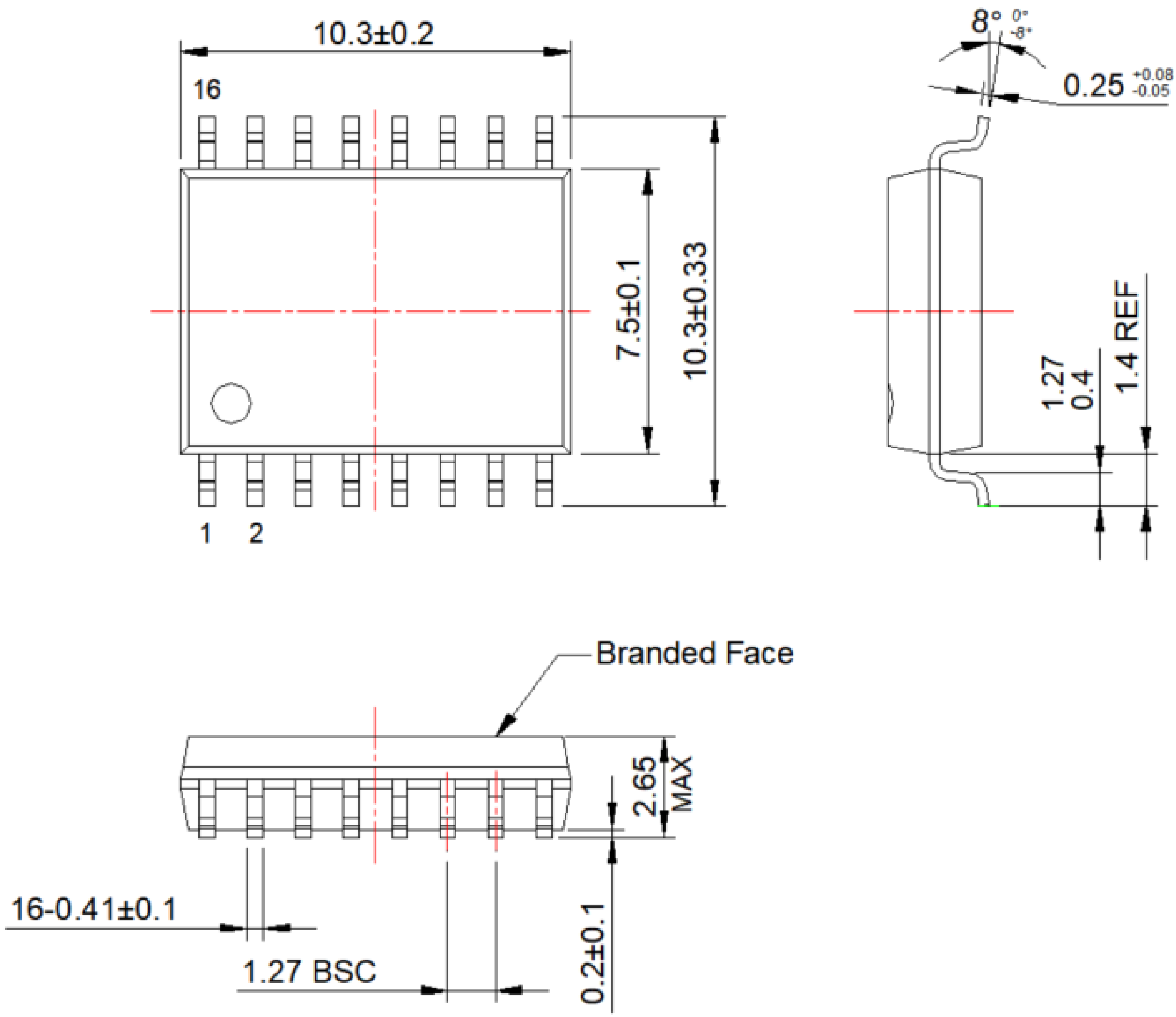
Package Outline & PCB Layout Design



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Storage Conditions

1. We suggest that the element must be stored at an appropriate temperature 5 ~ 40°C and Relative humidity 40 ~ 60%RH.

2. Please keep the element away from the following circumstance: (Because store the products under the following circumstance, will cause appearance damage, characteristic defectiveness and inferior assembly etc)

1) Under high temperature, high humidity circumstance for long time
2) With corrosive gas, oxidation gas, acidity / alkalinity circumstance.
3) dusty circumstance

3. Long-term storage may result in poor lead solderability and degraded electrical performance.

4. After unpacking, it should be stored in a dry environment with a relative humidity of less than 60% and a temperature controlled between 5°C and 30°C. It is recommended to complete welding within 168 hours after unpacking. If it exceeds 168 hours, it is recommended to re bake before use or repackage.

Soldering Conditions

Suggestion conditions for soldering to PCB:

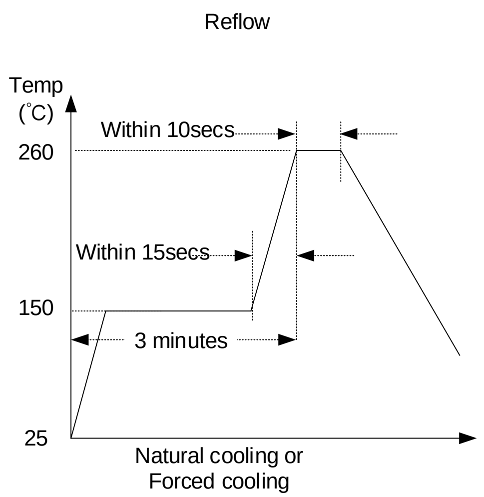
1) Avoid rapid heating, rapid cooling.
2) Preheat at temperature 130~150°C for 2~3 minutes.
3) Best condition of soldering (For example reflow): at 230~250°C for 3~5 secs.

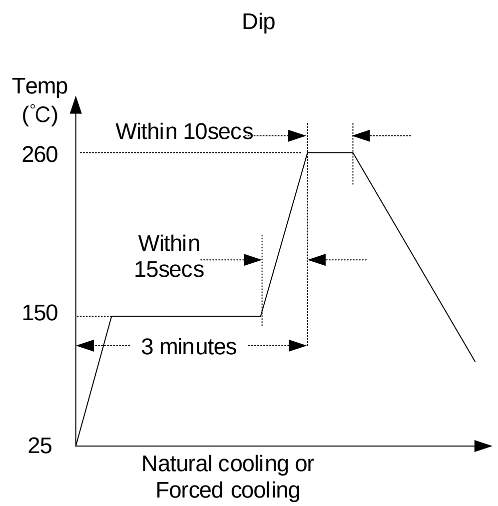
Soldering Method and Guarantee Temperature

1) Soldering Method

Method	Method Description	Temperature
Reflow soldering	Soldering at high temperature environment	MAX260°C within 10secs
Dip soldering	Soldering at dipping solder sink	MAX260°C within 10secs
Hand soldering	Soldering lead of element by searing-iron	MAX350°C within 3secs

2) Guarantee Temperature Range





Guarantee Value (at Max. temperature)

Method	Reflow	Dip
Temperature	260°C	260°C
Time	10 seconds	10 seconds

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Revision History

The revision history provided is for informational purposes only and is believed to be accurate; however, not warrantied. Please make sure that you have the latest revision.

Revision Number	Revision Date	Description	Pages changed
1.0	Aug. 14, 2025	Initial Release	

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