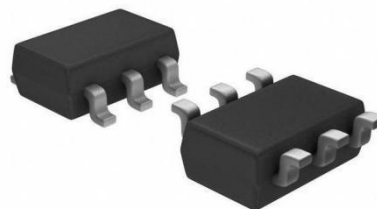


## SCM2306A Full bridge synchronous rectification controller

### Features

- Built-in power MOSFET
- Full bridge synchronous rectification
- High precision and fast voltage detection
- Positive temperature detection threshold

### Package



Product package: SOT-23-6

Please see "Ordering Information" for details

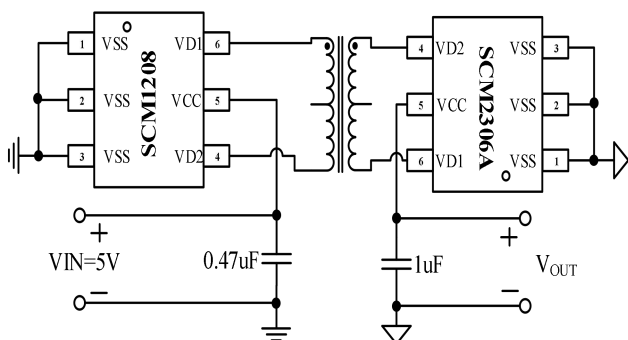
### Application

- DC-DC isolation converters

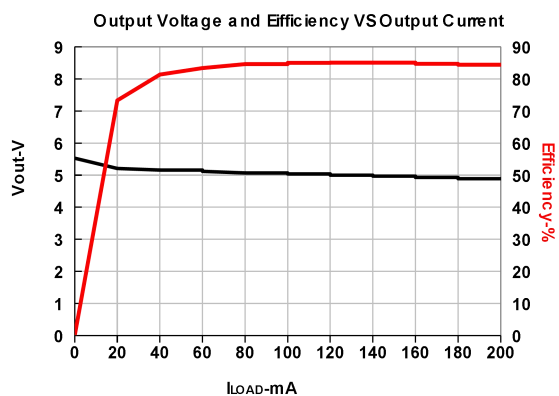
### Function Description

The SCM2306A is a synchronous rectification controller IC for power supplies in full bridge topology, the controller IC even integrates two pairs of power MOSFET's. The full bridge mode is adopted to realize the single winding on the secondary side of the transformer. For synchronous rectifier control. Turn on the rectifier when the drain port voltage of power NMOS is detected to be less than the set negative voltage, when the drain port voltage of power NMOS is detected to be greater than the set negative voltage again, the rectifier will be closed. The voltage comparator in the control IC adopts the threshold self-generating fast comparator of proprietary technology, and the threshold value is positive temperature coefficient, to a great extent, the positive temperature coefficient of power MOSFET on internal resistance is eliminated.

### Typical Application Circuit



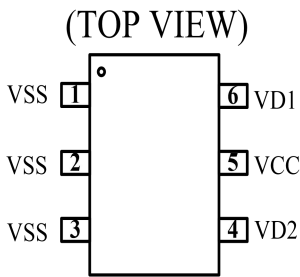
### Function Curve



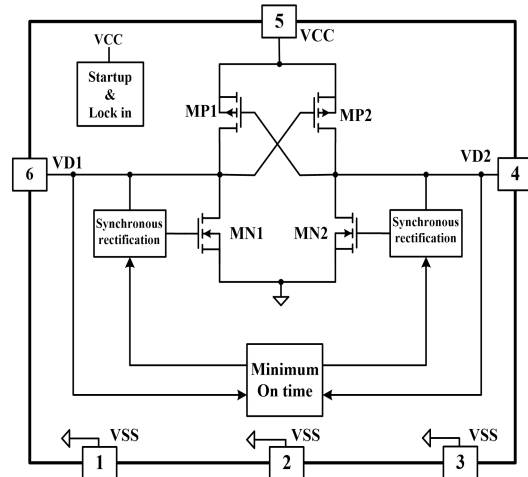
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## Pin Configuration



## Internal Block Diagram



## Pin Description

Pin No.	Name	I/O	Function
1	VSS	P	Pin 1, 2 and 3 are the ground connection of the chip. Pin 2 is the IC's substrate ground potential which is pasted directly through the bottom of the package metal frame to the chip's substrate, therefore ideal for heat dissipation. Pin number 1 and 3 are connected to the built-in power MOSFET's source. For optimized application it is recommended to connect pin 2 and pin 3 to a solid, large heat dissipating ground plane on the mother board for best cooling performance of the device.
2	VSS		
3	VSS		
4	VD2	I/O	the built-in power MOSFET's drain, connected to other port of the transformer.
5	VCC	P	Chip power supply port.
6	VD1	I/O	the built-in power MOSFET's drain, connected to a port of the transformer.

## Absolute Maximum Ratings

Test conditions: Free-air, normal operating temperature range unless otherwise specified, voltage reference is ground.

Parameters		Min	Max	Unit
Continuous input voltage	$V_{VCC}$	-0.4	7	V
Continuous power MOSFET drain voltage	$V_{VD1}/V_{VD2}$	-0.7	14.5	V
Junction temperature range	$T_J$	-40	150	°C
Storage temperature range	$T_{STG}$	-55	150	
Soldering Temperature (Allowable reflow soldering temperature of chip within 10 seconds)			260	
Moisture Sensitivity Level	MSL		MSL3	
Electrostatic Discharge (ESD)	Human Body Model (HBM)		8000	V
	Charged Device Model (CDM)		1000	

Note: Stress levels exceeding the "Absolute Maximum Ratings" are not recommended, they may severely affect the device reliability and/or result in permanent damage.

## Recommended Operating Conditions

Parameter		Min	Max	Unit
Continuous input voltage	$V_{VCC}$	4	7	V
Continuous power MOSFET drain voltage	$V_{VD1}/V_{VD2}$	-0.7	14.5	V
Junction temperature range	$T_J$	-40	150	°C

## Thermal Resistance

Heating current, Heating time 300s, test current 10mA, test time 300s. the reference standard is JESD51-1.

Parameter		numerical value	Unit
Junction to air thermal resistance	$\theta_{JA}$	196	°C/W

## Electrical Characteristic

General test conditions and  $V_{VIN}=5V, T=25^{\circ}C$  (unless otherwise specified).

Symbol	Parameter	Test conditions	Min	Typ	Max	Unit
<b>Supply Section (VCC Pin )</b>						
VCC	Operating voltage range		4.5	5	6	V
$I_{RUN}$	Operating supply current		400	550	670	$\mu A$
$I_{START}$	Start-up current	$V_{VIN}=2V$	30	45	60	$\mu A$
$V_{VIN(on)}$	Start-up voltage	$V_{VIN}$ voltage increasing	2.1	2.3	2.5	V
<b>Drain port of MOSFET (VD1/VD2 pin)</b>						
$BV_{DSS}$	Breakdown voltage	$T_J=25^{\circ}C, I_{DS}=100\mu A$		14.5		V
$R_{NDS(ON)}$	RON ( $V_{VCC}=5V$ )	$T_J=25^{\circ}C, I_{DS}=0.5A$		0.13		$\Omega$
		$T_J=100^{\circ}C, I_{DS}=0.5A$		0.16		
$R_{PDS(ON)}$	RON ( $V_{VCC}=5V$ )	$T_J=25^{\circ}C, I_{DS}=0.5A$	0.24	0.27	0.30	$\Omega$
		$T_J=100^{\circ}C, I_{DS}=0.5A$	0.27	0.30	0.33	

## Typical Curve

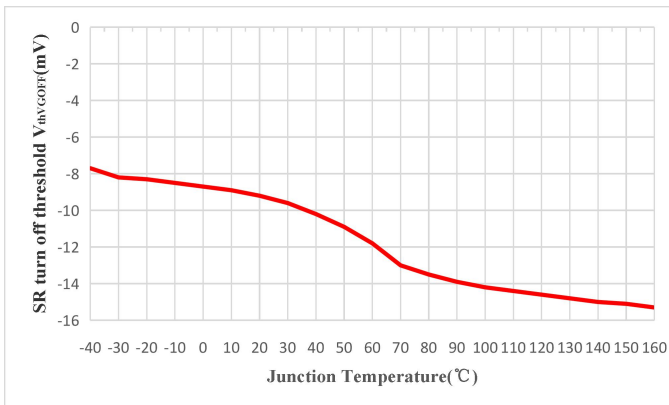


Figure 1 SR Turn Off Threshold Voltage vs .Temperature

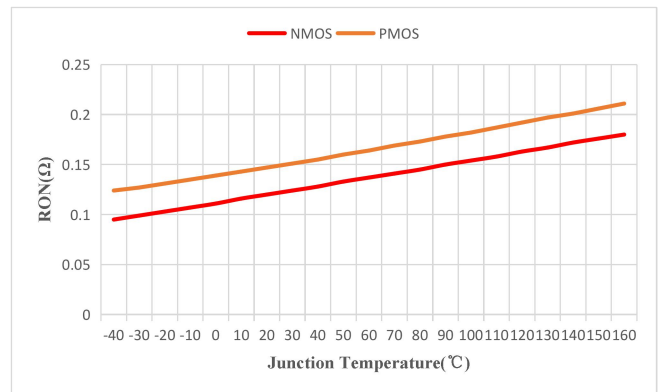


Figure 2 NMOS & PMOS RON vs .Temperature

## Parameter Measurement Information

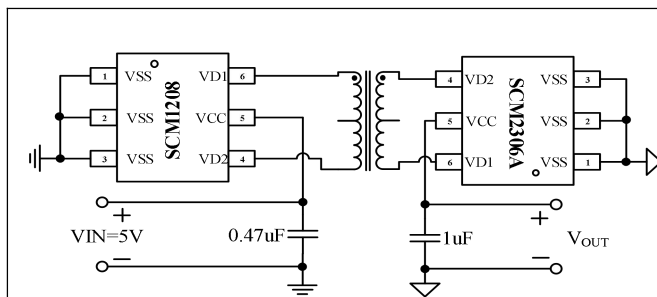


Figure 3 Schematic diagram of function curve test circuit

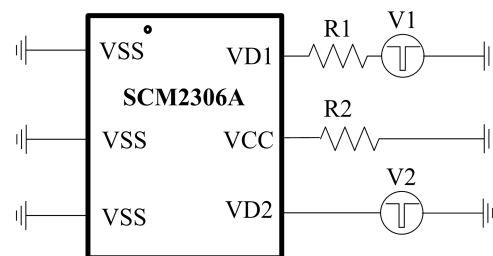


Figure 4 Schematic diagram of turn off threshold of synchronous rectifier internal resistance test circuit

## Application Circuit

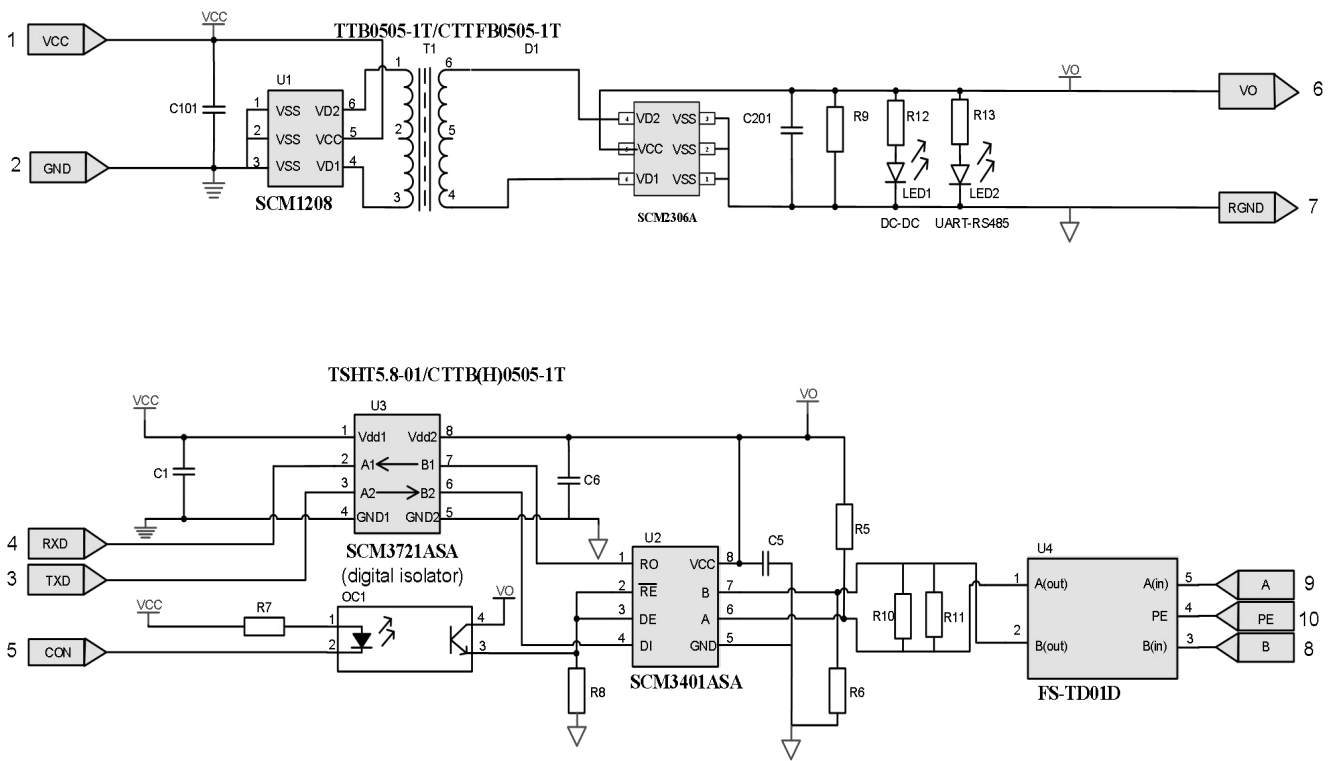


Figure 5 One of application circuits

### ( 1 ) TTB05xx-1T Transformer introduction

The isolation voltage of primary and secondary sides of TTB05xx-1T is 1650VDC, allowable operating temperature is  $-40^{\circ}\text{C}\sim+125^{\circ}\text{C}$ . Package size is 6.50 x 8.80 x 3.60mm, design with our company' IC SCM1201ATA, for 5VDC input, electrical isolation scenario with output demand power no more than 1W, for example: pure digital circuit, analog acquisition circuit, data exchange circuit.

### ( 2 ) TSHT5.8-01 Transformer introduction

TSHT5.8-01 is specially designed for use with IC SCM1201ATA, Package size is 12.50 x 8.70 x 5.90mm, for 5VDC input, electrical isolation scenario with output demand power no more than 1W, for example: pure digital circuit, analog acquisition circuit, data exchange circuit.

## Product Working Mode

The SCM2306A is a synchronous rectification controller IC for power supplies in full bridge topology. The controller IC even integrates two pairs of power MOSFET's. The full bridge mode is adopted to realize the single winding on the secondary side of the transformer. For synchronous rectifier control, turn on the rectifier when the drain port voltage of power NMOS is detected to be less than the set negative voltage, when the drain port voltage of power NMOS is detected to be greater than the set negative voltage again, the rectifier will be closed, in a period of time after the power NMOS is turned off by mistake due to the oscillation of drain voltage, SCM2306A set minimum on time called  $t_{min}$ , shield the signal of turning off the power NMOS, reliable conduction of built-in power NMOS transistor. The built-in power PMOS supplies power to the output capacitance and load while the chip completes synchronous rectification. The voltage comparator in the control IC adopts the threshold self generating fast comparator of proprietary technology, and the threshold value is positive temperature coefficient, to a great extent, the positive temperature coefficient of power MOSFET on internal resistance is eliminated.

## Ordering Information

Part Number	Package type	Number of Pins	Marking Code	Reel information
SCM2306ATA	SOT-23-6	6	2306YM	3K/REEL

### Product marking

SCM2306xyz:

(1) SCM2306 = Product designation.

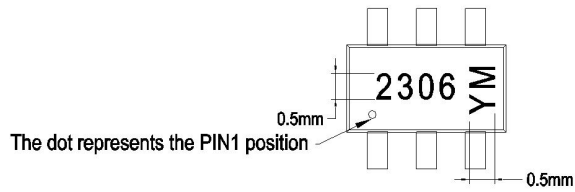
(2) x = Version information (Letter from A-Z).

(3) y = Package definition, (T = SOT package).

(4) z = Operating temperature range (C =  $0^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ , I =  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ , A =  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ , M =  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ ).

(5) YM: product traceability code; Y production year code, M product production month code.

## Silk Screen Information

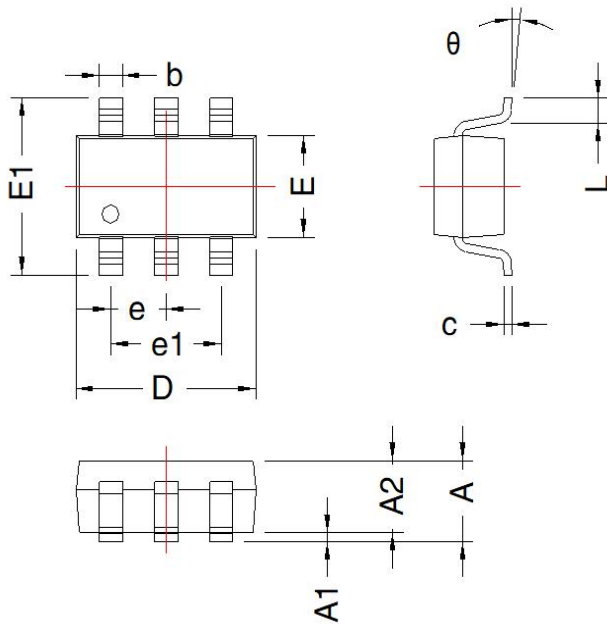


**Note:**

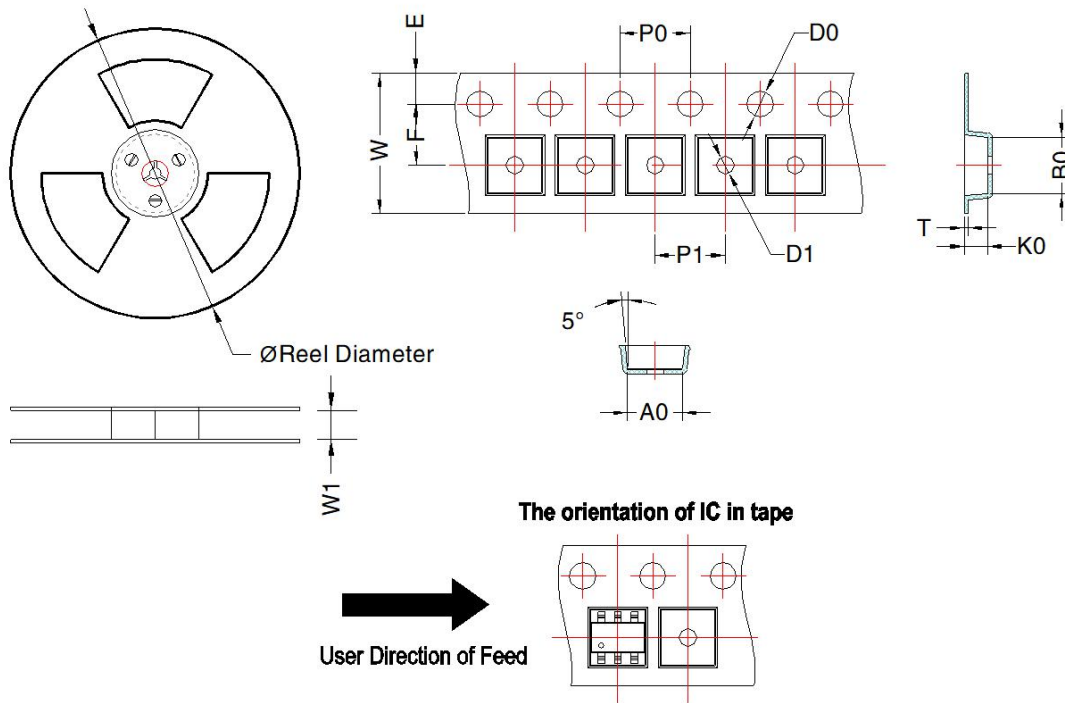
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- 2、Character size:  
Height: 0.5mm, Spacing: 0.1mm

**Mechanical Package Information**

THIRD ANGLE PROJECTION



SOT-23-6				
Mark	Dimension(mm)		Dimension(inch)	
	Min	Max	Min	Max
A	1.05	1.25	0.041	0.049
A1	0	0.1	0	0.004
A2	1.05	1.15	0.041	0.045
D	2.82	3.02	0.111	0.119
E	2.65	2.95	0.104	0.116
E1	1.5	1.7	0.059	0.067
L	0.3	0.6	0.012	0.024
b	0.3	0.5	0.012	0.02
e	0.95 TYP		0.037 TYP	
e1	1.8	2	0.071	0.079
c	0.3	0.6	0.012	0.024
θ	0°	8°	0°	8°



Device	Package Type	MPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	T (mm)	W (mm)	E (mm)	F (mm)	P1 (mm)	P0 (mm)	D0 (mm)	D1 (mm)
SCM2306ATA	SOT-23-6	3000	180.0	8.5	3.17	3.23	1.37	0.25	8.0	1.75	3.5	4	4	1.5	1.0

Note: The minimum order quantity is the minimum package quantity, and the order quantity should be an integer multiple of MPQ.

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