General Description

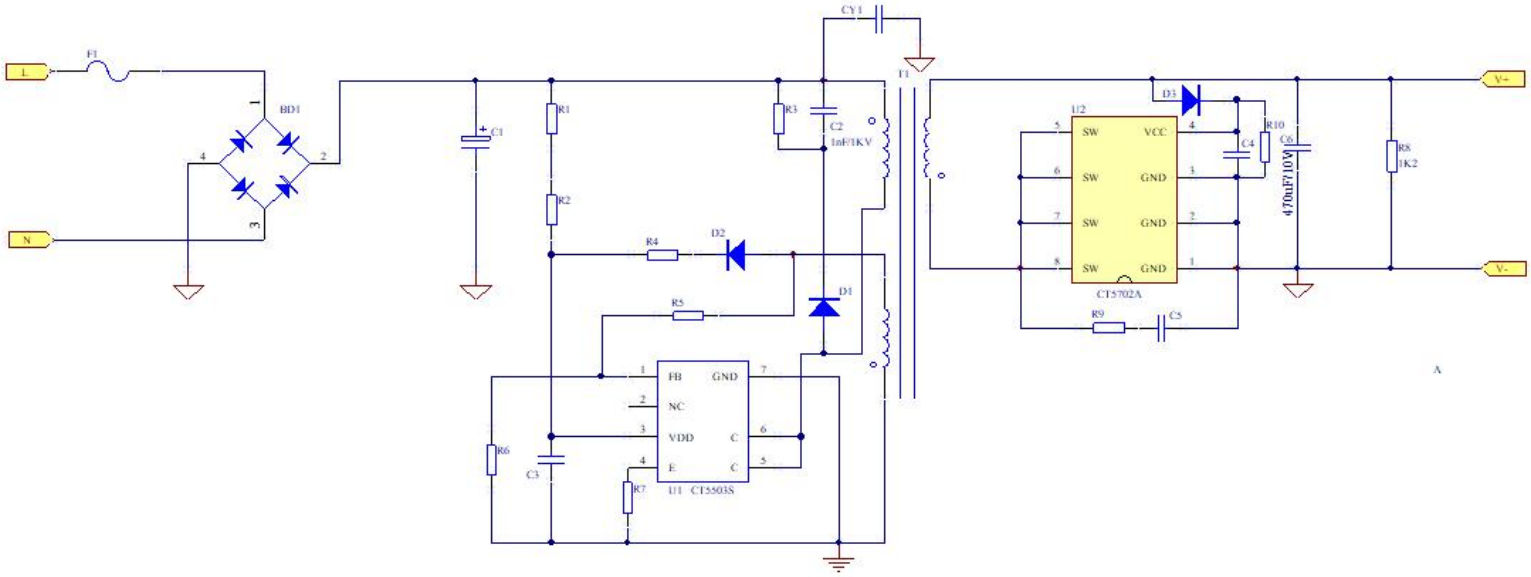
The CT5702A is a synchronous rectifier for Flyback converters. It integrates a 40V power MOSFET, that can replace Schottky diode for high efficiency.
The CT5702A have multi-protection functions which largely enhance the safety and reliability of the system.
The CT5702A is available in SOP-8 package.

Features

- Integrated 13mΩ 40V Trench MOSFET
- Supports DCM and Quasi-Resonant Flyback
- Precise Synchronous Rectifier VDS detection
- MOSFET Fast Shutdown Ability within 20nS
- Supports Low-side Rectification
- VDD UVLO Protection

Typical Application

- AC/DC 5V Adapters
- Chargers for Cell
- Low-voltage and High-current Rectifying Circuit

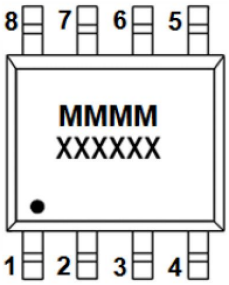


- D3/ R10 optional.

Ordering Information

Part Number	Package	Package Method	Marking
CT5702A(SOP-8）	SOP-8	Tape 4,000pcs/Roll	CT5702A XXXXXX

Pin Assignment & Description



Pin	Pin Name	Description
1/2/3	GND	Ground
4	VCC	IC Supply Voltage
5/6/7/8	SW	Internal Power MOSFET Drain

Absolute Maximum Ratings

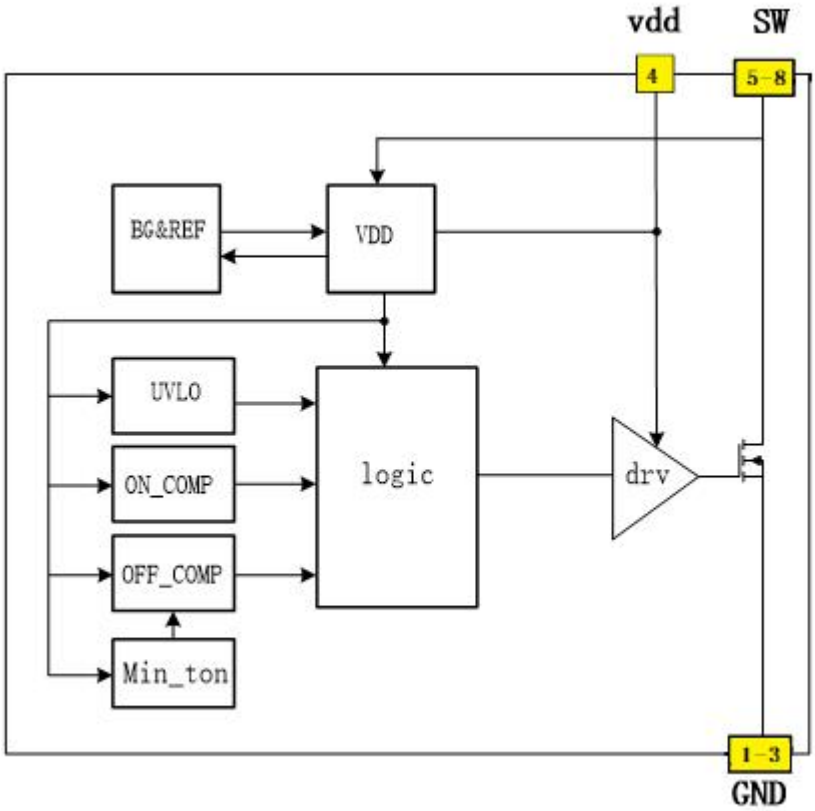
Parameter	Parameter Range	Unit
Vvcc	-0.3~7.5	V
Vsw	-1~45	V
Junction Temperature Range	-40~150	℃
Lead Temperature（10s）	260	℃
Storage Temperature Range	-65~150	℃

Note: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Exposure to Absolute Maximum Rating conditions for extended periods may affect device reliability。

Electronic Characteristics

T_C=25°C,V_{CC} = 5V,unless otherwise specified						
Parameter	**Symbol**	**Test Conditions**	**Min**	**Typ**	**Max**	**Unit**
Power Section						
Quiescent Current	Iq	VCC=5V		130	190	uA
VCC startup voltage	VCC_ON			4		V
VCC UVLO	VCC_UVLO		2.8	3	3.1	V
VCC Voltage	VCC		4.55	5.4	6.3	V
Synchronous Detection Section						
Synchronous RectifierTurn-on Voltage	VON_SR			-0.5		V
Synchronous Rectifier Turn-off Voltage	VOFF_SR			-3		mV
Synchronous Rectifier Turn-on Delay	Tdon			100		nS
Synchronous Rectifier Turn-off Delay	Tdoff			6		nS
Synchronous Rectifier Minimum Turn-on Time	Ton_min			1.5		uS
Synchronous Rectifier Minimum Turn-off Time	Toff_min			1.6		uS
Power MOSFET						
Driver Max. Source current	Isource			0.6		A
Driver Max. Sink current	Isink			1.5		A
MOSFET Turn-on Rising Time	Trise			50		nS
MOSFET Turn-off Falling Time	Tfall			20		nS
MOSFET Section						
Static Drain-source On-resistance	R_{DS_ON}	V_{GS}=10V/I_{DS}=9A		13	15	mΩ
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V/I_D=250uA	40			V

Functional Block Diagram



Applications Information

Functional Description

The CT5702A is a synchronous rectifier; it can replace the Schottky to improve the efficiency in Flyback converters. It supports operation in DCM and Quasi-Resonant Flyback converters .It can power itself through the internal LDO, a capacitor is needed between VDD and GND.

VDD Under-Voltage Lockout (UVLO)

The CT5702A has the function of UVLO. When the voltage of the VDD pin exceeds the startup voltage, it recovers from latch model and works normally, and the MOSFET can be started up. When the VDD voltage is below UVLO threshold, the internal MOSFET is turned off.

Minimum ON Time

The CT5702A can control synchronous rectifiers with minimum conduction function. When the MOSFET is turned on, secondary parasitic elements will produce high-frequency noise which can make the MOSFET turned off improperly. But the minimum ON time can effectively block false turned-off signals and ensure that the MOSFET can be turned on as long as 1.5uS.

Minimum ON Time

At the end of demagnetization,SR MOSFET will be turned off.In addition,the resonance oscillation between the magnetization inductance and pararistic capacitance after demagnetization may cause negative drain voltage.These may turn on SR MOSFET by mistake.To avoid above mis-turn-on of SR MOSFET,proprietary minimum off time control is implemented in CT5702A,Which can guarantee reliable synchronous recification operation in DCM,QR.

Synchronous Rectifier (SR) Turn On

The CT5702A controls the opening through detecting the VDS voltage of the MOSFET. When the primary side of the flyback converter is turned off and the secondary starts to degauss, the secondary current produces Vbe voltage drop through the diode. The drain voltage of the MOSFET will drop to -0.7V. As shown in Figure 1, if the CT5702A first sense that the drain voltage is higher than 0.7V and then it drops to -0.7V, it turns on the internal MOSFET after 100ns delay.

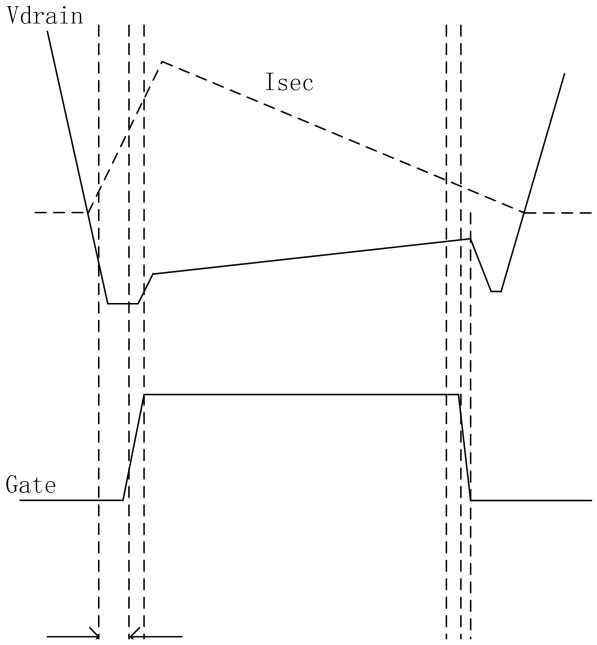


Figure 1 SR MOSFET Turn-on and Turn-off

Synchronous Rectifier (SR) Turn Off

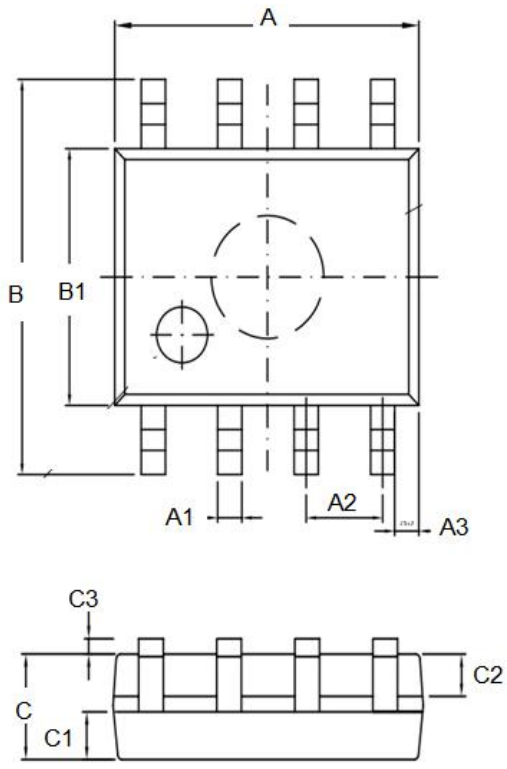
When the synchronous rectifier is turned on, the drain voltage will gradually rise with the deceasing secondary current. As shown in Figure 1, when the secondary current is lower than the Internal MOSFET turn off threshold, the MOSFET will be turned off soon after 10ns delay.

SOP-8 封装机械尺寸

SOP-8 MECHANICAL DATA

单位:毫米/UNIT：mm

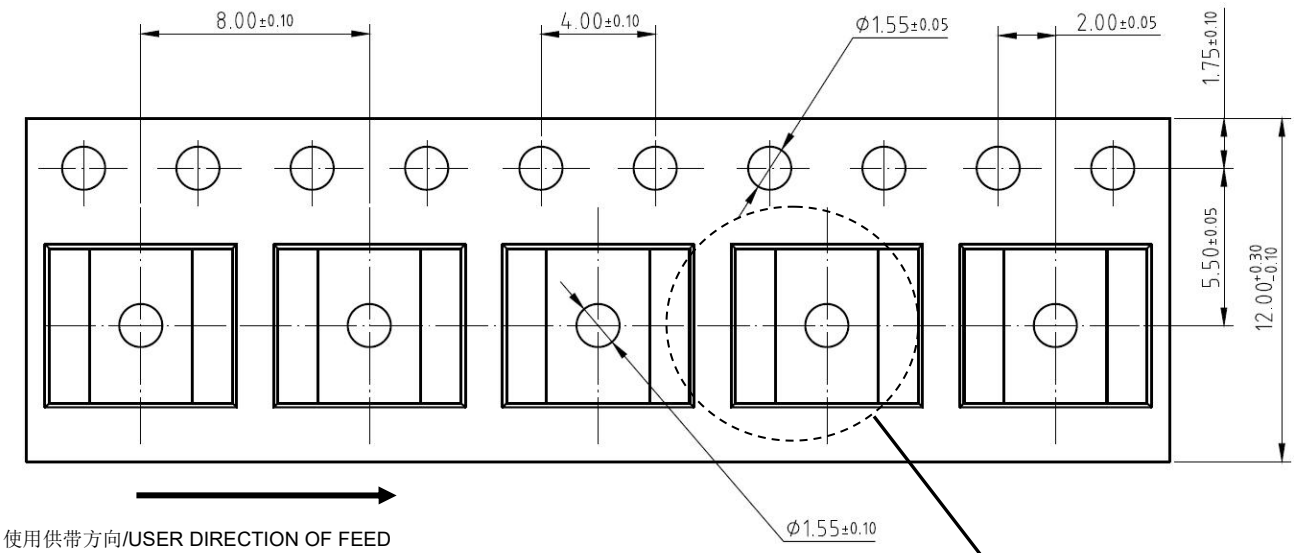
符号 SYMBOL	最小值 Min.	典型值 Typ.	最大值 Max.	符号 SYMBOL	最小值 Min.	典型值 Typ.	最大值 Max.
A	4.80		5.00	C	1.30		1.50
A1	0.37		0.47	C1	0.55		0.75
A2		1.27 TYP		C2	0.55		0.65
A3		0.41 TYP		C3	0.05		0.20
B	5.80		6.20	C4	0.19	0.20TYP	0.23
B1	3.80		4.00	D		1.05TYP	
B2		5.0TYP		D1	0.40		0.62



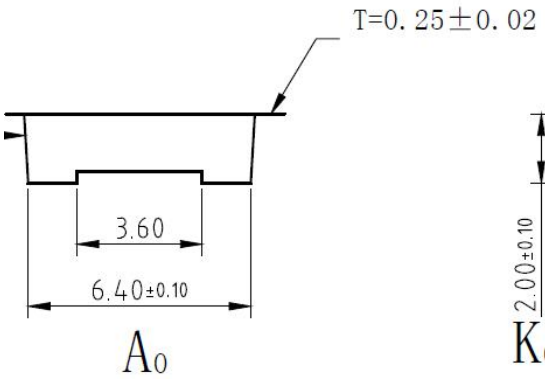
SOP-8 (13")编带规格

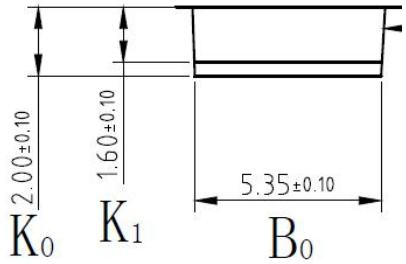
SOP-8 (13")TAPE AND REEL DATA

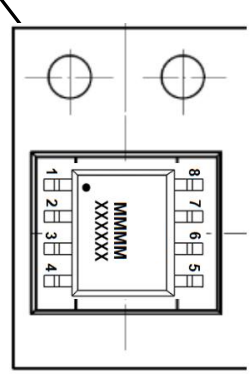
单位:毫米/UNIT：mm



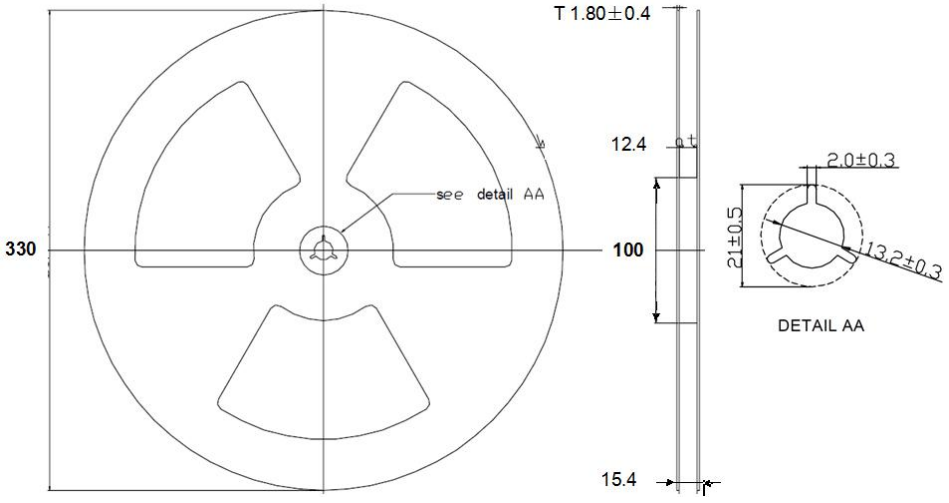
使用供带方向/USER DIRECTION OF FEED







器件定位示意图/UNIT ORIENTATION



13"卷盘/REEL

Revision history

Revision	Release data	Description
1.0	2016-12-1	Initial Version