SP6033

High Performance Synchronous Rectifying Converter

DESCRIPTION

SP6033 is a high performance and tightly integrated secondary side synchronous rectifying converter for switching mode power supply system. It combines a low Rdson N-channel MOSFET to emulate the traditional diode rectifier at the secondary side of Flyback converter, The fundamental of SP6033 synchronous rectifying (SR) converter is based on our U.S. patented methods that utilize the principle of "prediction" logic circuit. The IC deliberates previous cycle timing to control the SR in present cycle by "predictive" algorithm that makes adjustments to the turn-off time, in order to achieve maximum efficiency and avoid cross-conduction at the same time. The SP6033 is capable to adapt in almost all existing Resonance converters with no adjustment required.

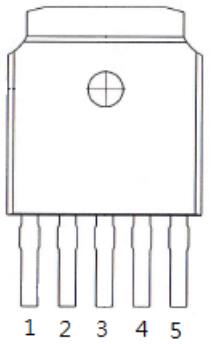
APPLICATIONS

- Switching Mode Power Supply (CCM&DCM&QR)
- Storage area network power supplies
- Telecommunication converters
- Embedded systems
- Industrial & commercial systems using high current processors
- Power converters to meet Lot 6 requirement

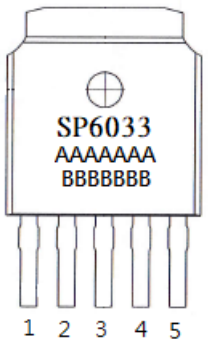
FEATURES

- Offers efficiency improvement over Schottky Diode.
- Low Standby Power to meet DOE Lot 6 requirement.
- Secondary-side synchronous rectifier optimized for switching power system.
- Build-in 100V SR MOSFET with low Rdson
- Operating frequency up to 300 KHz.
- Synchronize to transformer primary voltage waveform.
- Internal over voltage protection

PIN CONFIGURATION (TO-252-5L)

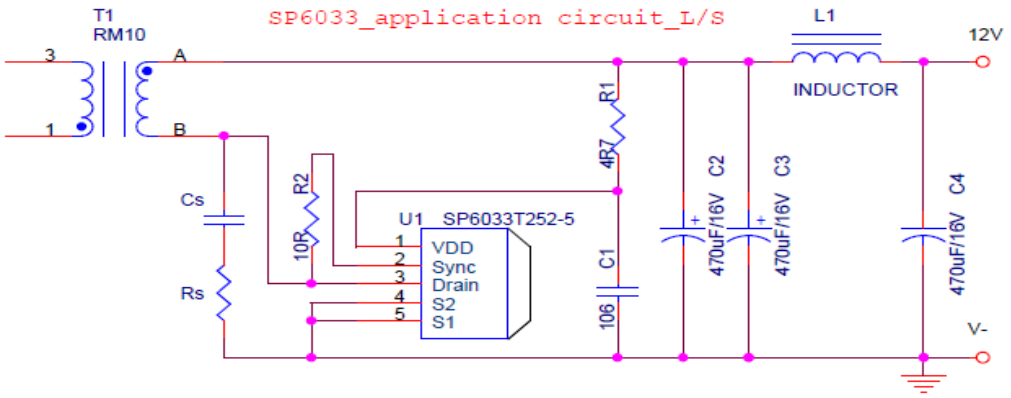


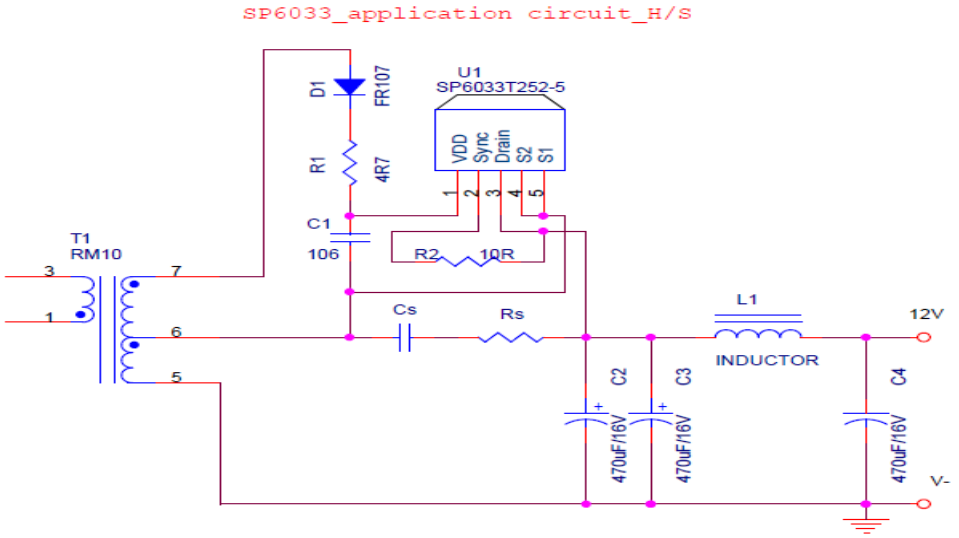
PART MARKING



A : Lot Code
B : Date Code

TYPICAL APPLCATION CIRCUIT





PIN DESCRIPTION

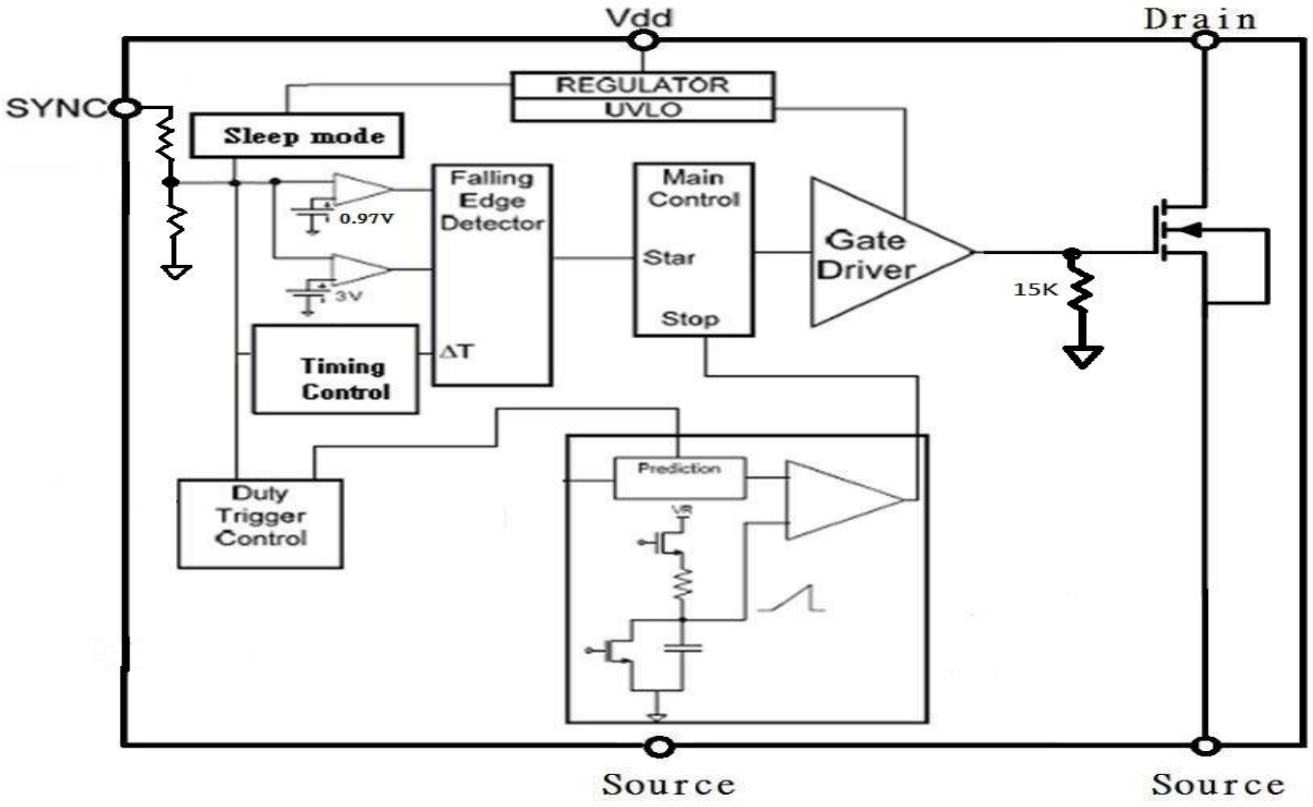
Pin	Symbol	Description
1	Vdd	DC supply voltage.
2	SYNC	Synchronized signal from Vds of SR MOSFET
3	Drain	Internal MOSFET drain
4	Source	Internal MOSFET Source
5	Source	Internal MOSFET Source

ORDERING INFORMATION

Part Number	Package	Part Marking
SP6033T255RGB	TO-252-5L	SP6033

※ SP6033T255RGB : Tape Reel ; Pb – Free ; Halogen - Free

BLOCK DIAGRAM



ABSOULTE MAXIMUM RATINGS (TA=25℃, unless otherwise specified.)

The following ratings designate persistent limits beyond which damage to the device may occur.

Symbol	Parameter	Value	Unit
V_{dd}	DC Supply Voltage	16	V
Vd to Vs	Drain to Source	100	V
P_D	Power Dissipation @ T_C=25℃ (*)	1.33	W
T_J	Operating Junction Temperature Range	-40 to125	℃
T_{STG}	Storage Temperature Range	-40 to 150	℃
T_{LEAD}	Lead Soldering Temperature for 5 sec.	260	℃

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient (*)	75	℃/W

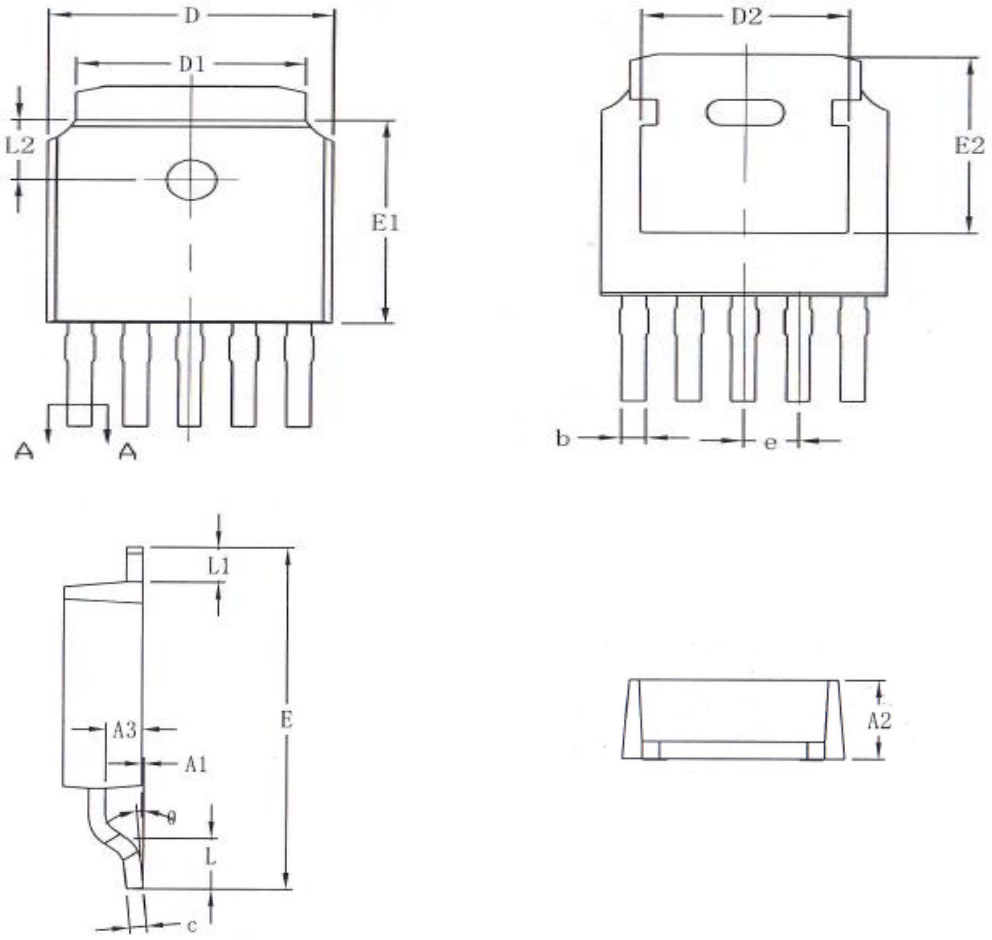
(*) The power dissipation and thermal resistance are evaluated under copper board mounted with free air conditions.

ELECTRICAL CHARACTERISTICS

(T_A=25℃, V_{dd}=5V, Freq. =50 KHz, Duty Cycle=50%, unless otherwise specified.)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
SUPPLY INPUT						
Idd	Supply current	No load & Sleep mode	0.05	0.11	0.2	mA
		V_{SYNC}=DC 12V	2.3	2.65	3.0	mA
Vdd	Supply voltage	Idd peak < 1A	4.3		16	V
Vdd on	Enable voltage		3.3	3.5	4.3	V
Vdd hysteresis	Enable voltage			0.2		V
Vovp	Over voltage protection		17	17.5	18.5	V
Vovp hysteresis				0.67		V
SYNC REFERENCE (SYNC)						
Vshth	SYNC high threshold			3.0		V
Vslth	SYNC low threshold			0.97		V
Vsync WK	SYNC wake-up voltage		12			V
Isync	SYNC input current				3	mA
PREDICTION SECTION						
Td	Propagation delay			150		nS
Tpred	Dead time			1		uS
SR MOSFET SECTION						
BVdss	MOSFET Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=250uA	100			V
Rds(on)	On Resistance	V_{GS}=10V,I_D=20A		9.5	12	mΩ
Ciss	Input Capacitance	V_{DS}=50V,V_{GS}=0V f=1MHz		2275		
Coss	Output Capacitance			162		
Crss	Reverse Transfer Capacitance			7.9		
Td(on)	Turn On Time	V_{DD}=50V, I_D=14A V_{GEN}=10V, R_G=10Ω		8		
Td(off)	Turn Off Time			26		
Tf	Fall time			4		nS

TO-252-5L PACKAGE OUTLINE



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A1	0.00	——	0.10
A2	2.20	2.30	2.40
A3	1.02	1.07	1.12
b	0.54	——	0.62
b1	0.53	0.56	0.59
c	0.51	——	0.55
c1	0.50	0.51	0.52
D	6.50	6.60	6.70
D1	5.33 REF.		
D2	4.83 REF.		
E	9.90	10.10	10.30
E1	6.00	6.10	6.20
E2	5.30REF		
e	1.27BSC		
L	1.40	1.50	1.60
L1	1.02REF.		
L2	1.70	1. 80	1.90
θ	0	——	8°

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