



SP6036

High Performance Synchronous Rectifying Converter

DESCRIPTION

SP6036 is a high performance and tightly integrated secondary side synchronous rectifier for switching mode power supply system. It combines a much lower voltage drop N-channel MOSFET to emulate the traditional diode rectifier at the secondary side of Flyback converter. The fundamental of SP6036 synchronous rectifier (SR) driver IC 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 SP6036 is capable to adapt in almost all existing Resonance converters with few adjustments considered necessary.

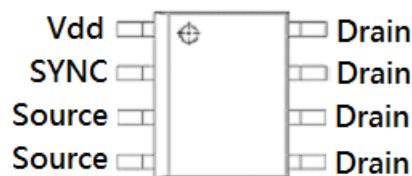
APPLICATIONS

- 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

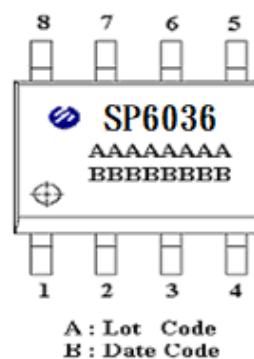
FEATURES

- Offers efficiency improvement over Schottky Diode (depends on drive configuration of the SR).
- Low Standby Power to meet DOE Lot 6 requirement.
- Secondary-side synchronous rectifier optimized for output system.
- Build-in 100V SR MOSFET with low $R_{ds(on)}$
- Operating frequency up to 300 KHz.
- Synchronize to transformer secondary voltage waveform.
- Internal over voltage protection

PIN CONFIGURATION (SOP-8)



PART MARKING



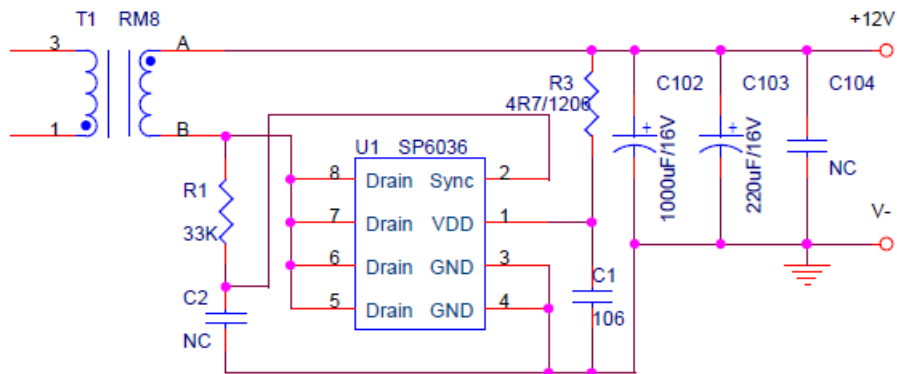


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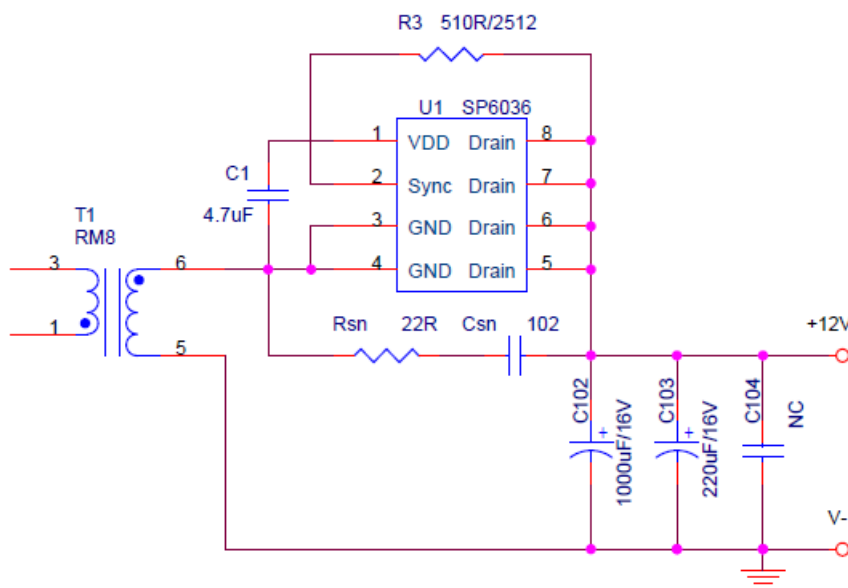
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TYPICAL APPLICATION CIRCUIT

SP6036_application circuit_L/S



SP6036_Demo board_H/S without aux winding





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PIN DESCRIPTION

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

ORDERING INFORMATION

Part Number	Package	Part Marking
SP6036S8RGB	SOP-8	SP6036

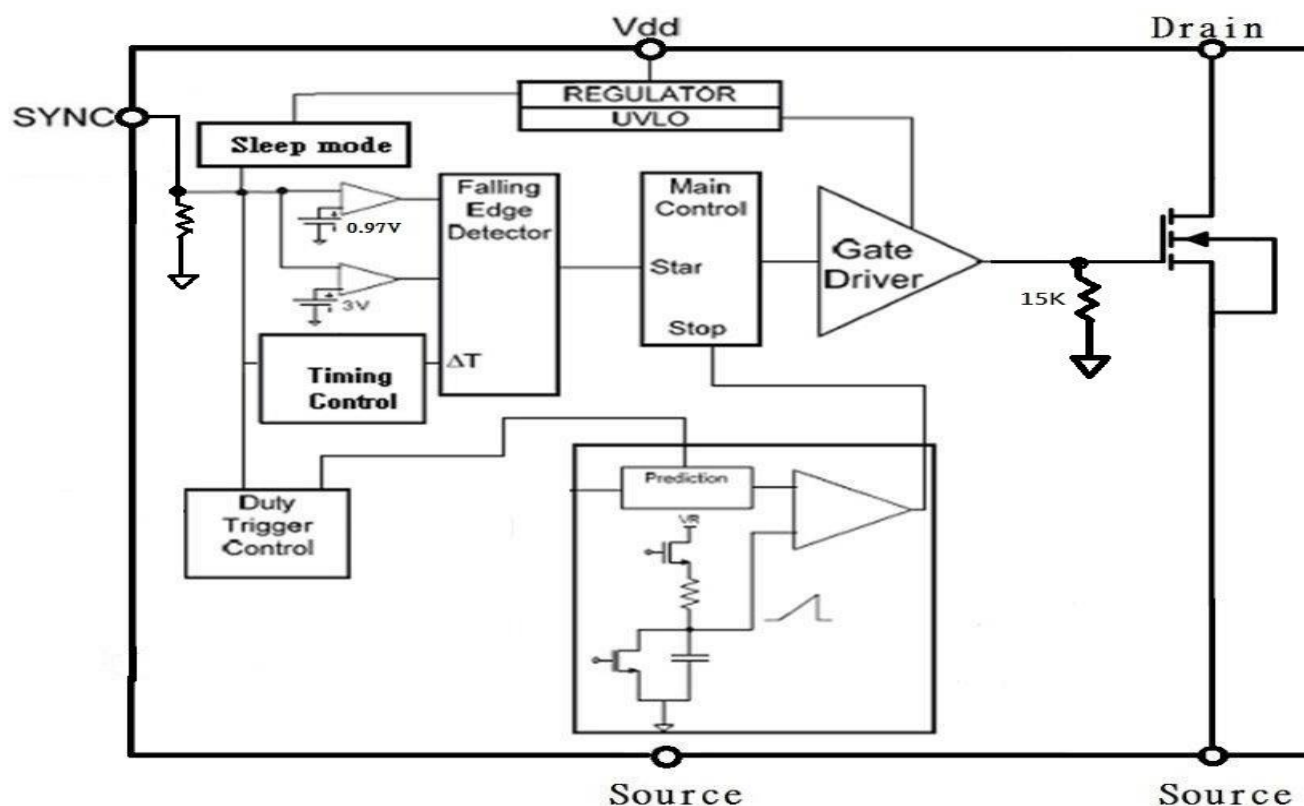
※ SP6036S8RGB : Tape Reel ; Pb – Free ; Halogen - Free



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BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS (TA=25°C, 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
V _d to V _s	Drain to Source	100	V
P _D	Power Dissipation @ T _A =85°C (*)	0.3	W
T _J	Operating Junction Temperature Range	-40 to 125	°C
T _{STG}	Storage Temperature Range	-40 to 150	°C
T _{LEAD}	Lead Soldering Temperature for 5 sec.	260	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
R _{ΘJA}	Thermal Resistance-Junction to Ambient (*)	110	°C/W

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



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ELECTRICAL CHARACTERISTICS

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

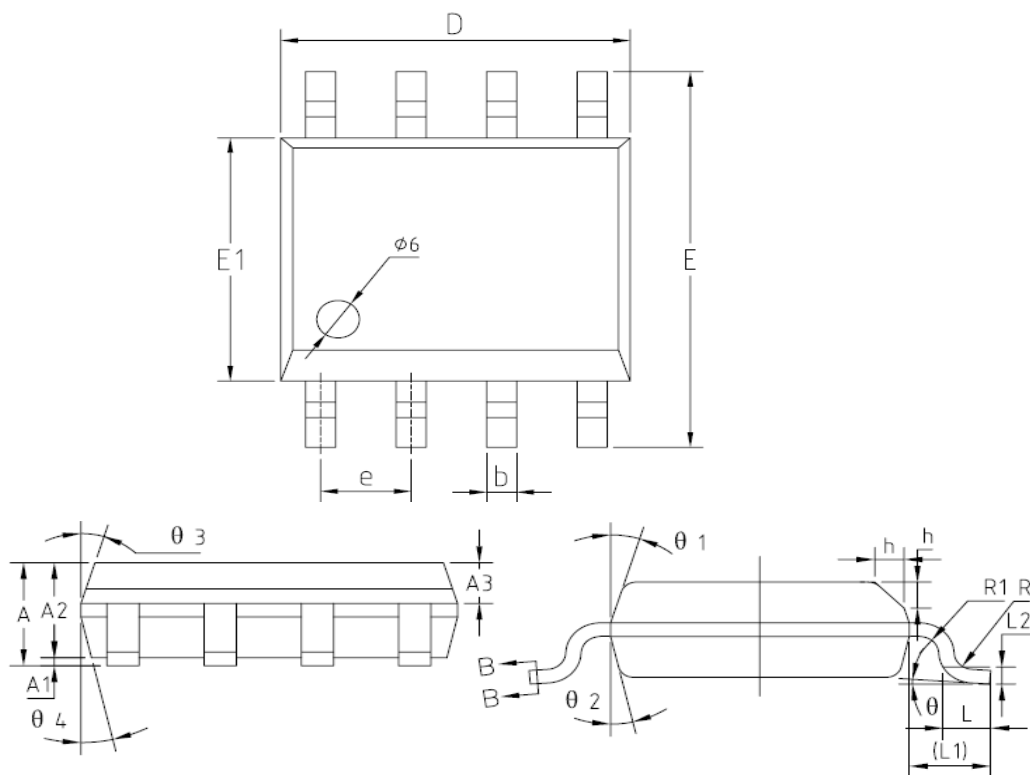
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
SUPPLY INPUT						
I _{dd}	Supply current	No load & Sleep mode V _{SYNC} =V _{dd} , No load		0.2	0.35	mA
V _{dd}	Supply voltage	I _{dd peak} < 1A	2.0	3.0	4.0	mA
V _{dd on}	Enable voltage		4.3		16	V
V _{dd hysteresis}	Enable voltage		3.35	3.7	4.1	V
V _{ovp}	Over voltage protection			0.2		V
V _{ovp hysteresis}	Enable voltage		17	17.5	18.5	V
SYNC REFERENCE (SYNC)						
V _{shth}	SYNC high threshold			3.0		V
V _{slth}	SYNC low threshold			0.9		V
V _{sync}	SYNC clamp voltage	I _{sync} =3mA	V _{dd} +1.5			V
V _{sync WK}	SYNC wake-up voltage	Pulse width >1uS for V _{dd} =5V	6			V
I _{sync}	SYNC input current				3	mA
Dynamic Protect						
D _t	Dynamic variable			5.1		uS
T _{on-min}	MOSG-C on time	PWM adjusts time > D _t	0.4		0.7	uS
SR MOSFET SECTION						
B _{Vdss}	MOSFET Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	100			V
R _{ds(on)}	Drain-Source On-Resistance	V _{GS} =10V, I _D =15A		7.6	9.2	mΩ
C _{iss}	Input Capacitance	V _{ds} =25V, V _{gs} =0V, f=1MHz		2550	5100	pF
C _{oss}	Output Capacitance			685	1370	
C _{rss}	Reverse Transfer Capacitance			42	84	
T _{d(on)}	Turn On Time	V _{DD} =50V,		14.6	30	nS
T _{d(off)}	Turn Off Time	I _D =1A, V _{GS} =10V R _G =6Ω		54	108	



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SOP-8 PACKAGE OUTLINE



SYMBOL	MIN	NOM	MAX
A	1.35	--	1.75
A1	0.10	--	0.25
A2	1.25	1.40	1.65
A3	0.50	0.60	0.70
b	0.33	-	0.51
c	0.17	--	0.25
D	4.80	4.93	5.05
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.17	1.27	1.37
L	0.45	0.60	0.80
L1	1.04 REF		
L2	0.25BSC		
R	0.07	--	--
R1	0.07	--	0.20
h	0.25	--	0.50
θ	0°	--	8°
θ 1	15°	17°	19°
θ 2	11°	13°	15°
θ 3	15°	17°	19°
θ 4	11°	13°	15°



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