



SP6033G

High Performance Synchronous Rectifying Converter

DESCRIPTION

SP6033G is a high performance and tightly integrated secondary side synchronous rectifying converter for switching mode power supply system. It combines a low R_{dson} N-channel MOSFET to emulate the traditional diode rectifier at the secondary side of Flyback converter, The fundamental of SP6033G 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 SP6033G is capable to adapt in almost all existing Resonance converters with no adjustment required.

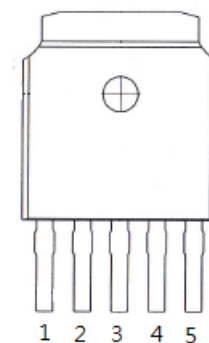
FEATURES

- 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 R_{dson}
- Operating frequency up to 300 KHz.
- Synchronize to transformer primary voltage waveform.
- Internal over voltage protection

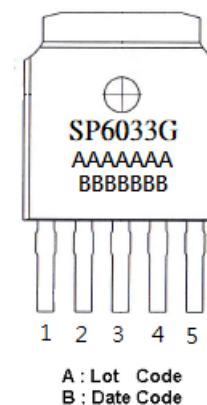
APPLICATIONS

- 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

PIN CONFIGURATION (TO-252-5L)



PART MARKING

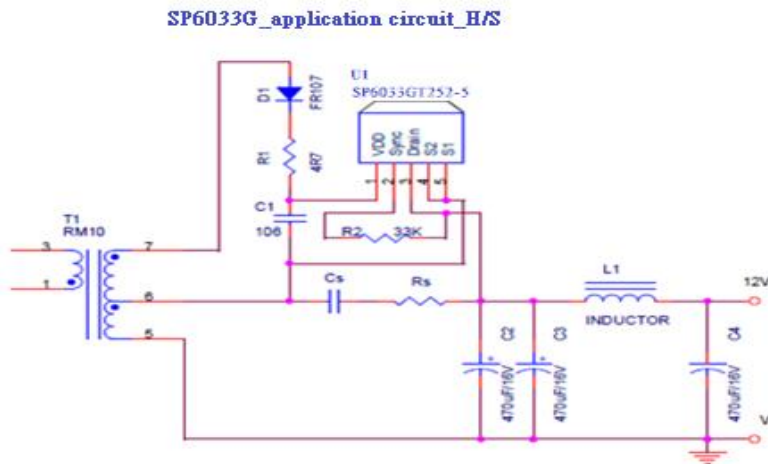
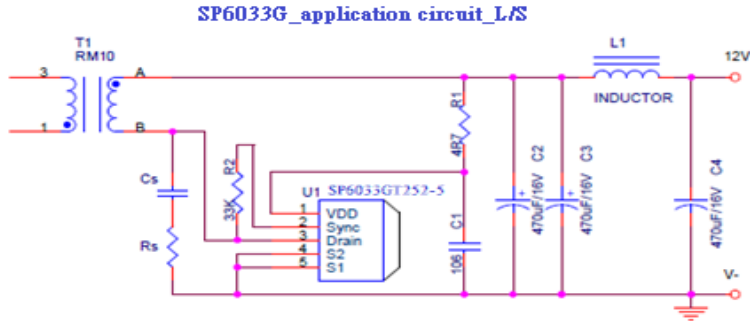




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TYPICAL APPLICATION CIRCUIT



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
SP6033GT255RGB	TO-252-5L	SP6033G

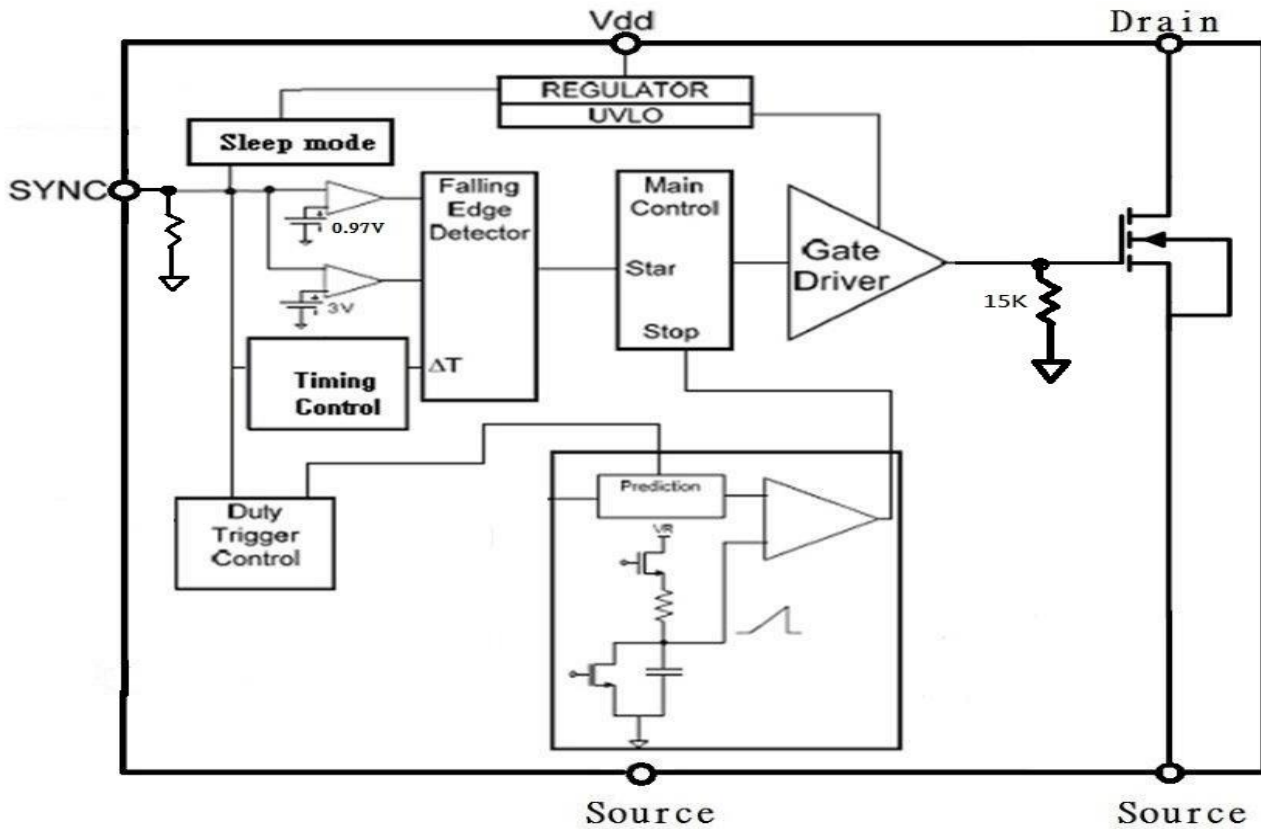
※ SP6033GT255RGB : Tape Reel ; Pb – Free ; Halogen - Free



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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 _C =25°C (*)	1.33	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 (*)	75	°C/W

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



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ELECTRICAL CHARACTERISTICS

($T_A=25^{\circ}\text{C}$, $V_{dd}=5\text{V}$, Freq. =50 KHz, Duty Cycle=50%, unless otherwise specified.)

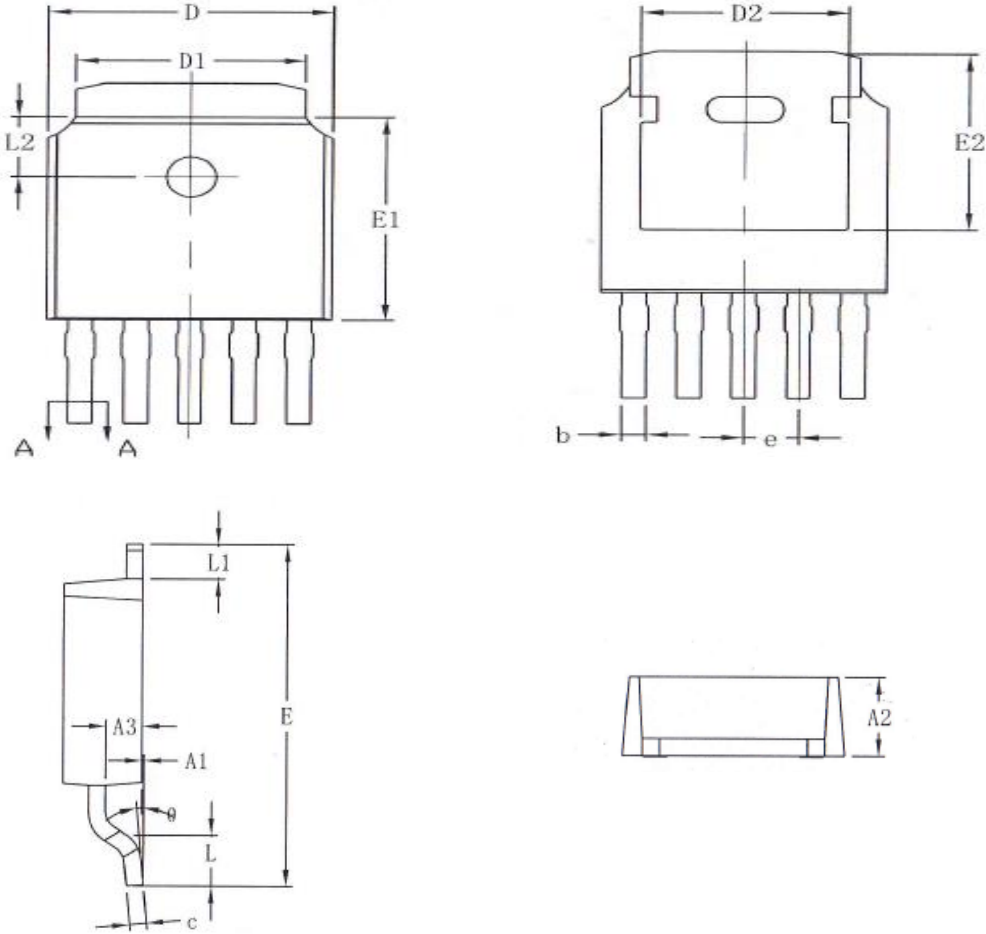
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
SUPPLY INPUT						
I _{dd}	Supply current	No load & Sleep mode	0.05		0.3	mA
		V _{SYNC} =DC 12V		2.65		mA
V _{dd}	Supply voltage	I _{dd peak} < 1A	4.3		16	V
V _{dd on}	Enable voltage		3.4		4.1	V
V _{dd hysteresis}	Enable voltage			0.2		V
V _{ovp}	Over voltage protection		17	17.5	18.5	V
V _{ovp hysteresis}				0.67		V
SYNC REFERENCE (SYNC)						
V _{shth}	SYNC high threshold			3.0		V
V _{slth}	SYNC low threshold			0.97		V
V _{sync WK}	SYNC wake-up voltage		6.5			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	0.45		0.75	uS
PREDICTION SECTION						
T _d	Propagation delay			150		nS
T _{pred}	Dead time			1		uS
SR MOSFET SECTION						
B _{Vdss}	MOSFET Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	100			V
R _{ds(on)}	On Resistance	V _{GS} =10V, I _D =20A		9.5	12	mΩ
C _{iss}	Input Capacitance	V _{DS} =50V, V _{GS} =0V f=1MHz		2275		pF
C _{oss}	Output Capacitance			162		
C _{rss}	Reverse Transfer Capacitance			7.9		
T _{d(on)}	Turn On Time	V _{DD} =50V, I _D =14A		8		nS
T _{d(off)}	Turn Off Time	V _{GS} =10V, R _G =10Ω		26		



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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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