SP6879
Multi Mode PWM Controller

DESCRIPTION
The SP6879 is a low cost, multi mode PWM controller intended for flyback topologies. The internal valley detector ensures the converter operates at quasi-resonant operation at high line voltage. IC operates in fixed frequency mode when the line voltage is low. Under certain conditions, SP6879 can be operated in PFM or burst mode. The build-in advanced energy saving function would provide the users a superior AC/DC power application of higher efficiency, and lower standby power.

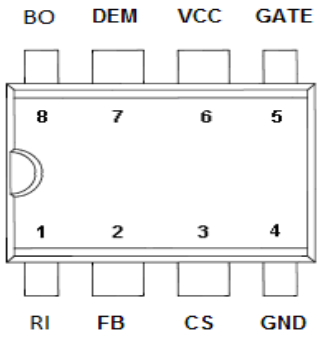
The rich set of protection features such as VCC Under Voltage Lockout (UVLO), VCC Over Voltage Protection (VCC OVP) and clamp, load Over Voltage Protection (OVP), Over Load Protection (OLP), on-chip Over Temperature Protection (OTP), line OVP and programmable Brownout Protection, to realize low component counts and high performance power supply.

SP6879 is available in SOP-8 packages.

APPLICATIONS
- AC/DC Switching Power Adaptor
- Set-top Box Power Supply
- Open-Frame Switching Power Supply

FEATURES
- High-Voltage BCD Process
- Under Voltage Lockout (UVLO)
- Quasi-Resonant Control
- Internal 4ms Soft Start
- Brownout Protection
- Line OVP protection
- OLP (Over Load Protection)
- OVP (Over Voltage Protection) on Vcc Pin
- 100KHz Maximum Frequency
- 800mA Driving Capability
- Low standby power <100mW solution with HV start-up IC SP689A

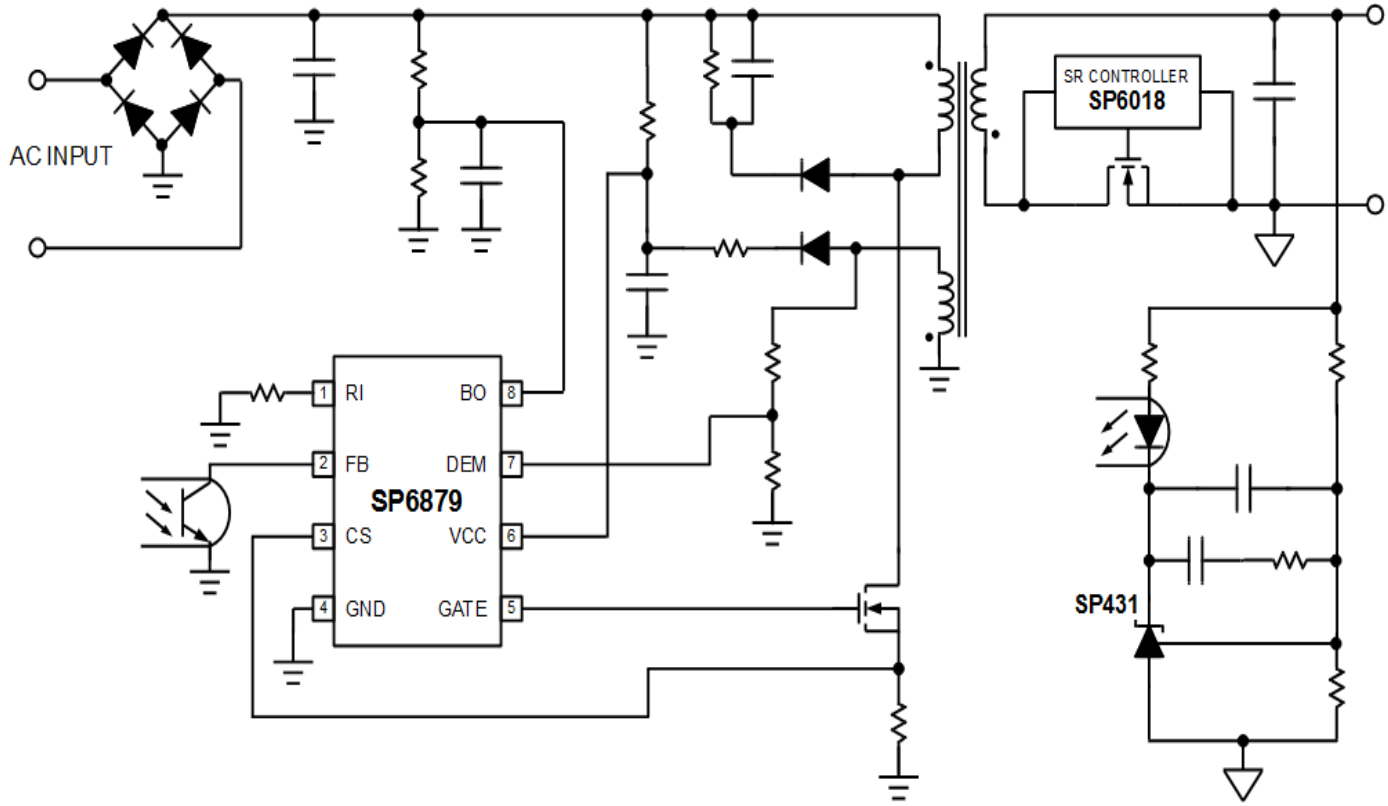
PIN CONFIGURATION
SOP-8



PART MARKING
SOP-8

A : Lot Code
B : Date Code

TYPICAL APPLCATION CIRCUIT FOR HIGH EFFICIENCY SMPS



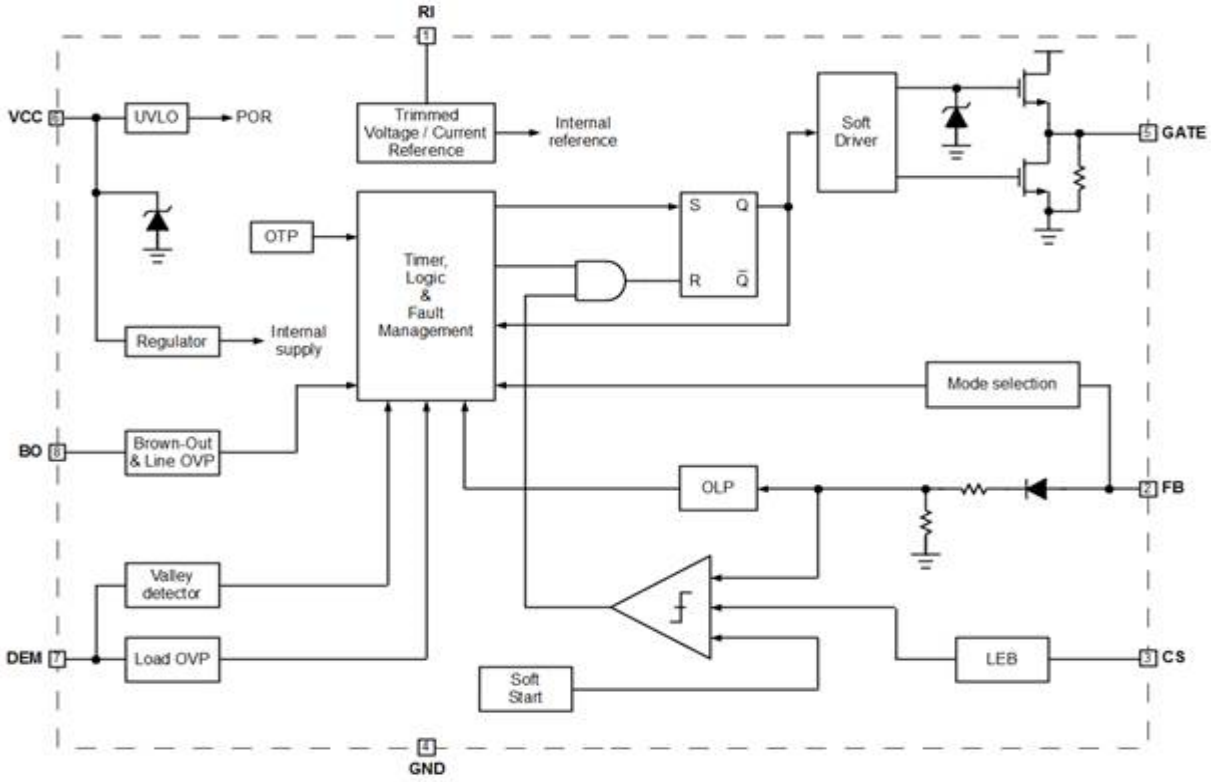
PIN DESCRIPTION

Pin	Symbol	Description
1	RI	Set the internal frequency and timer.
2	FB	Voltage feedback. It provides feedback to the internal PWM comparator to control the duty cycle.
3	CS	Current sense.
4	GND	Ground
5	GATE	Gate driver output to drive the external MOSFET.
6	Vcc	Supply voltage for the IC
7	DEM	Core reset detection and OVP.
8	BO	Brown Out and Line OVP .

PROTECTION MODE

Part number	VCC_OVP	OSCP	DEM_OVP	OLP	OTP
SP6879	Latch off	Auto-Restart	Latch off	Auto-Restart	Auto-Restart

BLOCK DIAGRAM



ORDERING INFORMATION

Part Number	Package	Part Marking
SP6879S8RGB	SOP-8	SP6879

※ SP6879S8RGB : Tape Reel ; Pb – Free ; Halogen-Free

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

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

Symbol	Parameter		Value	Unit
V_{CC}	DC Supply Voltage		26	V
$V_{RI/FB/CS\ /\ DEM\ /BO}$	RI /FB /CS/DEM/BO Voltage		-0.3 ~ 7.0	V
ESD	Human Body Model		3	KV
	Machine Model		200	V
T_{ope}	Operating Ambient Temperature		-40 ~ 85	℃
T_J	Operating Junction Temperature Range		-40 ~ 150	℃
T_{STG}	Storage Temperature Range		-40 ~ 150	℃
T_{LEAD}	Pb-Free Lead Soldering Temperature for 5 sec.		260	℃
$R_{\Theta JC}$	Thermal Resistance Junction – Case (*)	SOP-8	150	℃/W

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

ELECTRICAL CHARACTERISTICS

(T_A=25℃, V_{CC}=16V, RRI = 20K Ohm unless otherwise specified.)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage (Vcc Pin)						
Istup	Startup Current	Vcc=UVLO-1.5V		2	15	uA
Icc(op)	Operating Current	VFB=3V		2.0	4.0	mA
		VFB=3V, CL=1nf		3.0	5.0	mA
UVLO (off)	Min. Operating Voltage			7.5		V
UVLO (on)	Start Threshold Voltage			13.5		V
OVP Level	Over Voltage Protection			24		V
Vcc Clamp	Clamping Voltage	IVCC=10mA		26		V
Voltage Feedback (FB Pin)						
Isc	Short Circuit Current			0.3		mA
Vop	Open Loop Voltage			5.3		V
VTH_BM_on	Burst Mode on threshold			0.8		V
VTH_BM_off	Burst Mode off threshold			0.7		V
ZFB	Input Impedance			17		KΩ
VTLOLP	OLP Trip Level			4.4		V
TDOLP	OLP Delay Time (note)			80		mS
Demagnetization (DEM Pin)						
VTH(DEM)	Demagnetization Threshold Voltage			75		mV
VDEM(H)	Input Clamp Voltage High			6		V
VDEM(L)	Input Clamp Voltage Low			-0.7		V
Tsupp	Suppression of the transformer ringing at start of secondary stoke			2.5		uS
TDEM	Demagnetization Propagation Delay			250		nS
VDEM(OVP)	Load OVP trigger point		3.4	3.75	4.1	V
TDEL	Number of Cycles to trigger OVP			4		Cycle
Current Sensing (CS Pin)						
VCS(L)	CS threshold at Zero Duty Cycle	Zero duty cycle, VFB=3V	0.415	0.45	0.485	V
VCS(H)	CS threshold at max Duty Cycle	Max duty cycle, VFB=3V		0.8		V
VCS(BM)	Burst mode CS threshold	Zero Output, VFB=1V		0.3		V
TLEB	Leading Edge Blanking Time			100		nS
Gate Driver Output (GATE Pin)						
VOL	Output Low Level	VCC=15V, Io=100mA			1	V
VOH	Output High Level	VCC=15V, Io=100mA	7.5			V
VOC	Output Clamp Voltage Level	Vcc=18V		16.5		V
Tr	Rising Time	CL=1nf		80		nS
Tf	Falling Time	CL=1nf		30		nS
Frequency Setup (RI Pin)						
RI	Resistor Range			20		KΩ
VRI_open	RI open voltage			2.0		V
Fburst	Burst mode switching frequency			22		KHz
FQR(L)	Frequency low clamp in QR mode		47	52	57	KHz
FQR(H)	Frequency high clamp in QR mode		82	90	98	KHz
G_PFM	PFM mode frequency modulation slope			90		KHz/V
△F(shuffle) /F	Frequency Shuffling Range		-4		+4	%
TON	Maximum ON Time	RRI=20KΩ	10	13	15	uS
TOFF	Maximum OFF Time	RRI=20KΩ	40	55	75	uS

ELECTRICAL CHARACTERISTICS

(TA=25℃, VCC=16V, RRI = 20K Ohm unless otherwise specified.) (continued)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Brown Out and Line OVP Section (BO Pin)						
$V_{BO(ovp)}$	Line OVP Threshold Voltage			2		V
$V_{BO(TH)}$	Brown Out Threshold Voltage			0.5		V
$T_{DEL(BO)}$	Brown Out Debounce Time			50		mS
$I_{BD(HYS)}$	Output current for hysteresis setup			2		uA
Soft Start						
T_soft	Internal Soft Startup Time			4		mS
Thermal Protection						
T_{SD}	Thermal shutdown			150		℃
T_{HYS}	Thermal shutdown hysteresis			50		℃

Note: The OLP delay time is proportional to the period of switching cycle. So that, the lower RI resistor value will set the higher switching frequency and the shorter OLP delay time.

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