SP6075
Fast Turn-off Intelligent Rectifier

DESCRIPTION

The SP6075 is a low-drop diode emulator controller IC which when combined with an external MOS FET replaces Schottky diodes in high-efficiency flyback converters. The chip regulates the forward drop of an external MOS FET to about 40mV and switches it off as soon as the voltage becomes negative.
SP6075 It combines a low Rdson N-channel MOSFET to emulate the traditional diode rectifier at the secondary side of Flyback converter, is available in space saving SOP-8 package.

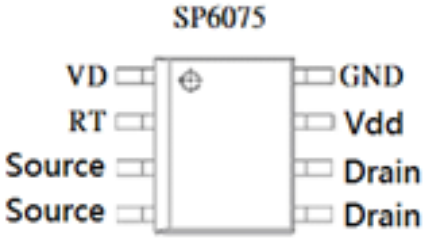
APPLICATIONS

- Industrial Power Systems
- Distributed Power Systems
- Battery Powered Systems
- Flyback Converters

FEATURES

- Works with 5V Logic Level FETS
  Less Than 100mW Standby Power
- Fast Turn-off Delay of 25ns
- 3.6V~5.5V VDD operating range
- Build-in 40V SR MOSFET with low Rdson
- Supports DCM and Quasi-Resonant Operation
- Supports High-side and Low-side Rectification
- Available in space saving SOP-8 Package

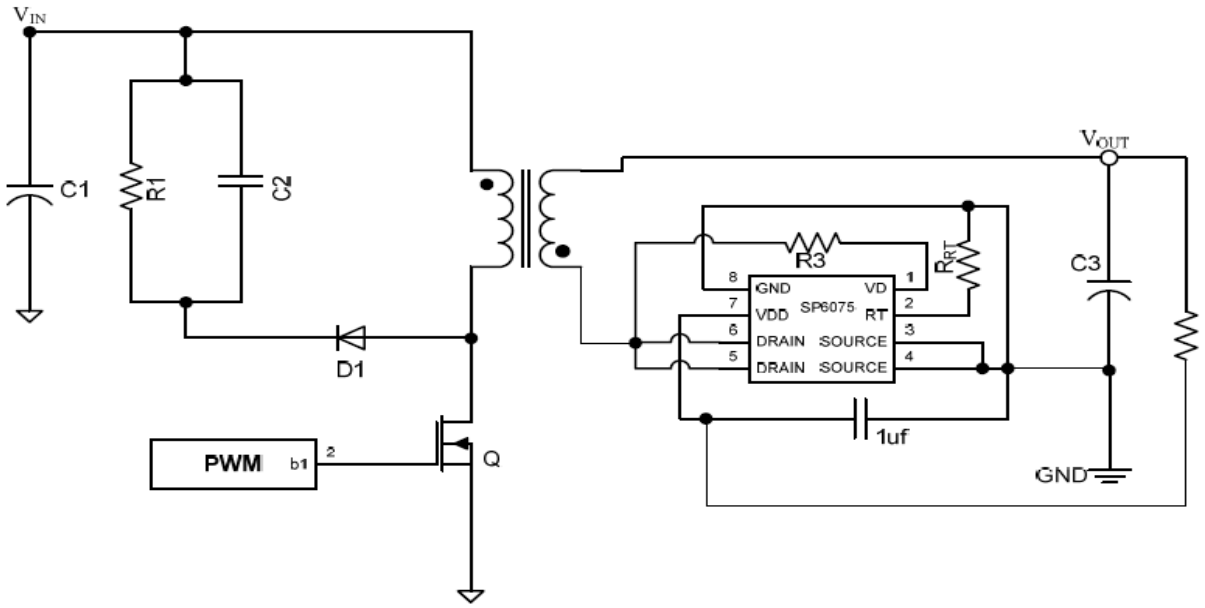
PIN CONFIGURATION (SOP-8)



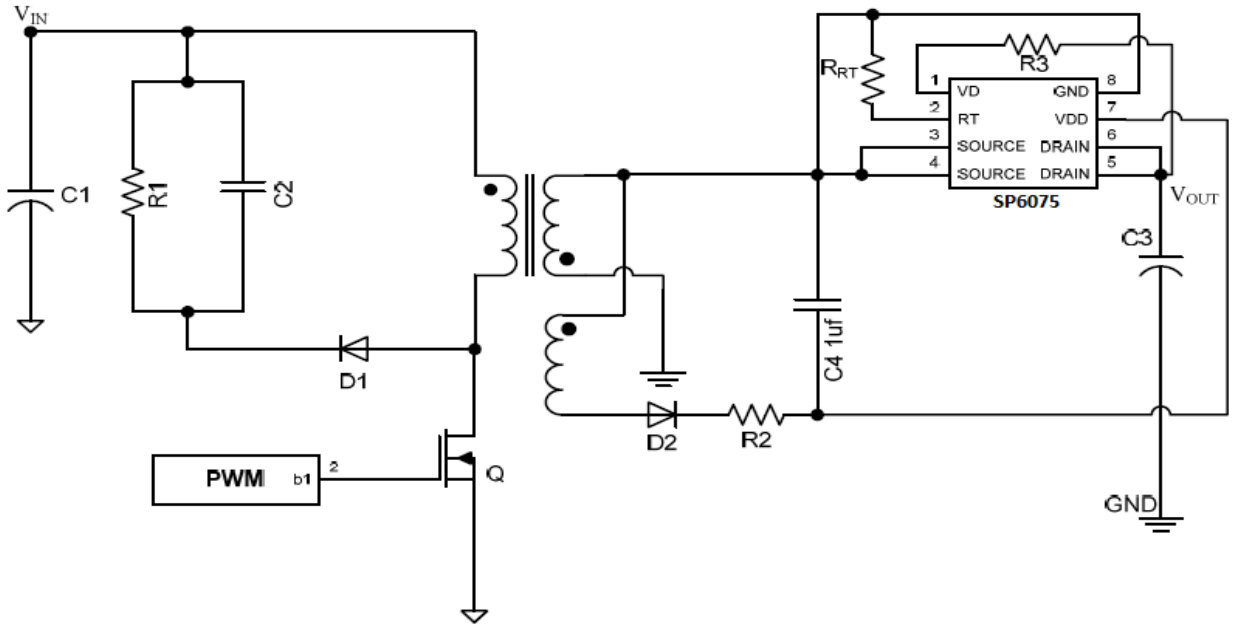
PART MARKING

A : Lot Code
B : Date Code

TYPICAL APPLICATION CIRCUIT



IC Supply Derived Directly from Output Voltage



IC Supply Derived from Auxiliary Winding in High-Side Rectification

PIN DESCRIPTION

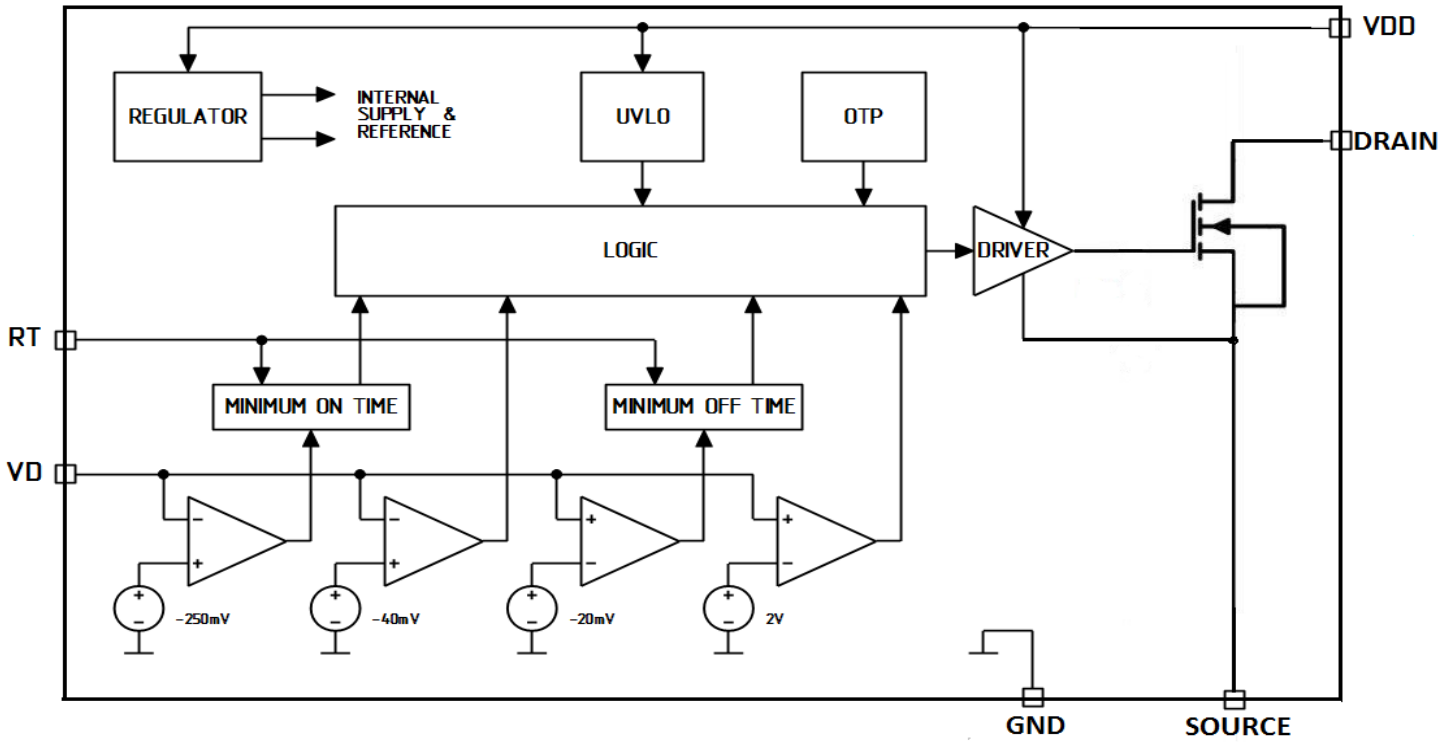
Pin	Symbol	Description
1	VD	External FET drain voltage sensing
2	RT	Minimum On-time setting pin. A resistor connected between this pin and VSS defines minimum On-time
3	Source	Internal MOSFET Source
4	Source	Internal MOSFET Source
5	Drain	Internal MOSFET drain
6	Drain	Internal MOSFET drain
7	Vdd	DC supply voltage.
8	GND	Ground connection.

ORDERING INFORMATION

Part Number	Package	Part Marking
SP6075S8RGB	SOP-8	SP6075

※ SP6075S8RGB : Tape Reel ; Pb – Free ; Halogen – Free

BLOCK DIAGRAM



ABSOLUTE 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
Vdd	DC Supply Voltage	-0.3 ~ 7.0	V
PGND	Power Ground, return for gate driver	-0.3 ~ 0.3	V
Vd to Vs	Drain to Source	40	V
V_D	External FET drain voltage sensing	-1.0 ~ 60	V
P_D	Power Dissipation @ T_A=85℃ (*)	0.3	W
T_J	Junction temperature	-40 ~ 150	℃
T_{STG}	Storage temperature	-40 ~ 150	℃
T_{LEAD}	Lead soldering temperature for 5 sec	260	℃

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{\Theta JA}$	Thermal Resistance Junction –to Ambient (*)	110	℃/W

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

ELECTRICAL CHARACTERISTICS, (T_A=25°C, V_{DD}=5V, R_{RT} = 100kΩ, unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Supply SECTION						
Vdd	Supply voltage		3.6		5.5	V
Vdd on	Vdd UVLO rising				3.6	V
Vdd hysteresis	Vdd UVLO hysteresis		0.2			V
I_{CC}	Operating current	C_{LOAD}=5nF, F_{SW}=100kHz			10	mA
Iq	Quiescent current	V_{SS}-V_D=0.5V			3	mA
	Shutdown current	V_{DD}=3V			100	uA
	Thermal shutdown			150		℃
	Thermal shutdown hysteresis			30		℃
Control Circuitry SECTION						
V_{fwd}	V_{SS}-V_D forward voltage			40		mV
	V_{SS}-V_D turn-off threshold			20		mV
T_{Don}	Turn-on delay	C_{LOAD}=5nF		100		nS
		C_{LOAD}=10nF		150		nS
	Input bias current on V_D pin	V_D=60V			1	uA
T_{MIN}	Minimum on-time	C_{LOAD}=5nF		1.6		uS
V_{Boff}	Turn-off blanking V_{DS}			2		V
V_{ON-DS}	Turn-on V_{DS} threshold			-250		mV
Gate Driver SECTION						
V_{G-L}	Gate output low voltage	I_{LOAD}=1mA			0.1	V
V_{G-H}	Gate output high voltage	V_{DD}=5V	4.5			V
	Turn-off propagation delay	V_D=V_{SS}		25		nS
T_{Doff}	Turn-off total delay	V_D=V_{SS}, C_{LOAD}=5nF, R_{GATE}=0Ω, V_{GS}=2V		35		nS
		V_{SS}, C_{LOAD}=10nF, R_{GATE}=0Ω, V_{GS}=2V		45		nS
	Maximum source current (*)			0.5		A
	Maximum sink current (*)		2			A
	Pull down impedance			1		Ω
SR MOSFET SECTION						
BVdss	MOSFET Drain-Source	V_{GS}=0V,I_D=250uA	40			V
Rds(on)	Drain-Source On-Resistance	V_{GS}=10V,I_D=7A		13	17	mΩ
		V_{GS}=4.5V,I_D=6A		18	22	
Ciss	Input Capacitance	Vds=15V,Vgs=0V, f=1MHz		1013		pF
Coss	Output Capacitance			107		
Crss	Reverse Transfer Capacitance			76		
Td(on)	Turn On Time	Vds=20V, Id=10A, Vgs=10V, Rg=10Ω		2.8		nS
Td(off)	Turn Off Time			22.8		

Notes: (*) Guaranteed by design and characterization

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