

GENERAL DESCRIPTION

The N3861P is the low cost integrated PWM primary switcher, it combines a current mode PWM controller with a high voltage power MOSFET, specifically designed for use in the low power output, any universal and single input AC / DC converters, DC / DC converters, battery chargers, AC adapters or stand-by switching power supplies.

The N3861P features a burst mode function at light load condition, when output power works at light load and the duty of gate driver is under 900nS, the N3861P will enter the burst mode condition to reduce operating frequency and switching loss, this special function helps decrease power consumption to be Green Mode Requirement.

The N3861P features a protective circuitry which in presence of an over load condition or an over voltage condition, the device controls a delayed time to disable the output pulses and pull down the VCC voltage to 4V, then trying to restart, once the default has gone, the power device auto-recovers.

The N3861P is capable of powers to 10W maximum for a universal line input.

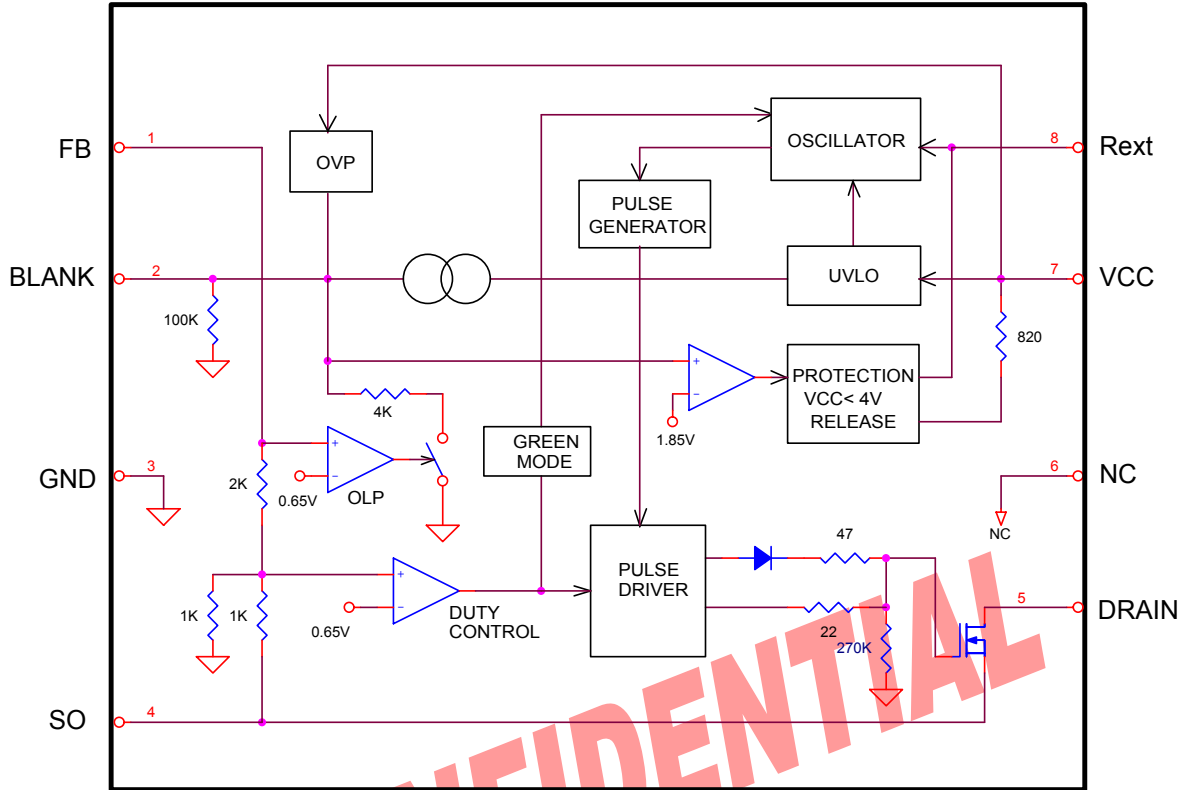
FEATURES

- Low Start-up Current (typ.=10uA)
- Low Operating Supply Current
- Current Mode Control
- 10V~26V Range For VCC Voltage
- Adjustable Operating Frequency
- Over Load Protection
- Over Voltage Protection
- Pulse Output For Driving MOSFET
- Green Mode Requirement
- Burst Mode at Light Load Condition
- Built-in High Voltage Power MOSFET
- Very Low Cost Solution
- DIP-8 package

DEVICE SELECTION GUIDE

SnPb	Pb Free
N3861P	N3861PG

BLOCK DIAGRAM



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ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMITS	UNITS
Power supply voltage	Vcc	30	V
Switching Drain-Source Voltage	VDS	-0.3 to 650	V
Continuous Drain Current	ID	1	A
Source to GND Voltage	Vsource	-0.3 to 5	V
Power Dissipation at Ta =50	PTOT	1200	mW
Junction Temperature	Tj	- 25 ~ 150	
Storage Temperature	TSTG	- 55 ~ 150	
Lead Temperature (Soldering) 10S	TLEAD	300	

THERMAL DATA

PARAMETER	SYMBOL	SOP- 8	DIP-8	UNIT
Thermal Resistance Junction to Ambient	θ_{ja}	53	45	/W
Thermal Resistance Junction to Case	θ_{jc}	23	15	/W

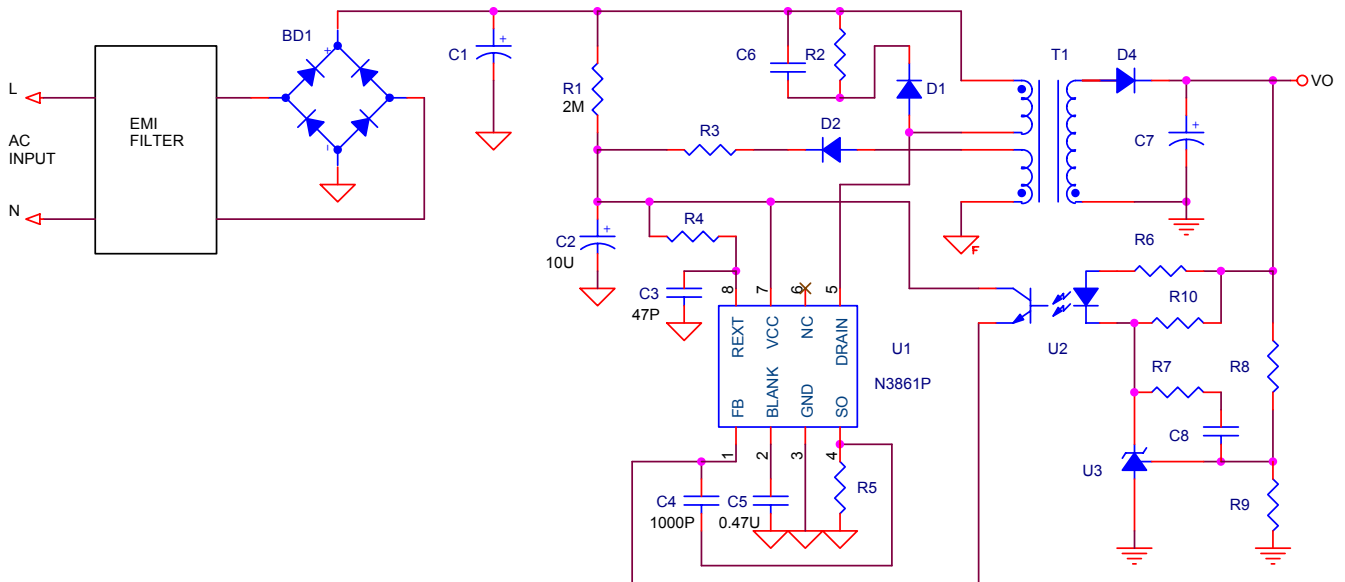
ELECTRICAL SPECIFICATIONS

(Vcc =15V ,Ta = - 25 to 125 ,unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
SUPPLY VOLTAGE SECTION						
Turn-on Threshold	Vcc(on)		16	17	18	V
Turn-off Threshold	Vcc(off)		9.5	10	10.5	V
Operating Voltage Range	Vcc		10.5	15	26	V
Operating Supply Current	Icc			1.0		mA
OSCILLATOR SECTION						
Frequency Range	fs	Rext =100K	47	52	57	KHz
POWER SECTION						
Drain-Source Voltage	BVDSS	ID =1mA	650			V
Off State Drain Current	IDSS	VDS=650V, Tj=25 VDS=650V, Tj=125			0.1 0.3	mA
Drain-Source On State Resistance	RDS(ON)	Tj=25 ,ID=1A, N3861P	-	9.5	11.5	Ω
Drain Capacitance		VDS=25V		20		pF
Rise Time	tr			250		nS
Fall Time	tf			120		nS
Max.Current Sense Voltage	Vcs(max)	Tj = 25	1.2	1.3	1.4	V
		Tj = 100	1.1	1.2	1..3	V
Over Voltage Protection	VOVP	Vcc= VOVP	26	28	30	V

TYPICAL APPLICATION

N3861P---- OUTPUT<10W



The maximum peak switch current is :

$$I_{PK} = 1.1 / R5 \quad (\text{at } T_c=100 \text{ })$$

The frequency set by R4

$$f_s = 5.4E9 / R4$$

OPERATION DESCRIPTION

Under Voltage Lockout (UVLO)

The turn-on/turn-off threshold are fixed at 17V/10V, The hold-up capacitor must be charged to 17V through the start-up resistor, then the device starts to work, if the hold-up capacitor be discharged to 10V, the device stops to work.

The hold-up capacitor should be enough to supply VCC before energy can be delivered from the auxiliary winding of the main transformer. VCC must not drop below 10V during start-up process. The UVLO function ensures the hold-up capacitor can adequately supply VCC.

Start-Up Current

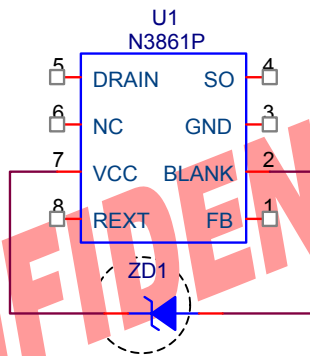
The typical start-up current is only 10uA, This allows to use a high resistance of start-up resistor for minimizing power loss, therefore, a 2 M start-up resistor and a 10uF VCC hold-up capacitor would be sufficient for the typical application.

Internal Over-Voltage Protection

The N3861 has built in a internal OVP function to prevent damage due to over-voltage of VCC, When the voltage of VCC exceeds 28V, to disable the output pulses and pull down the VCC voltage to 4V, then trying to restart, once the default has gone, the power device auto-recovers.

External Over-Voltage Protection

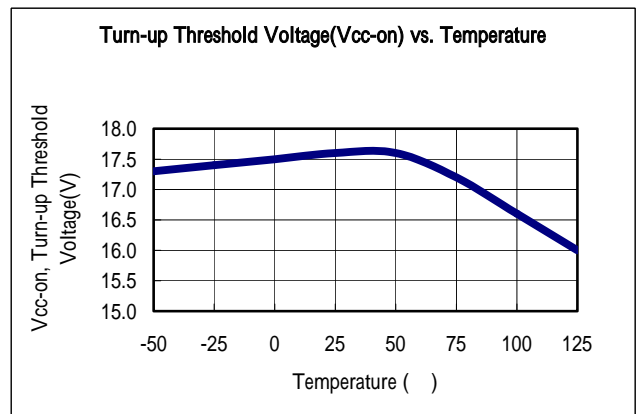
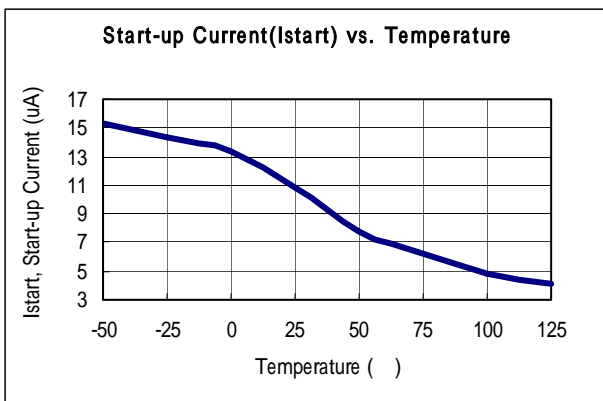
The 3861 is also provided an external OVP function to set lower over voltage threshold than internal OVP. The external over-voltage protection with an external zener diode ZD1 is showing on the bellowing application circuit.

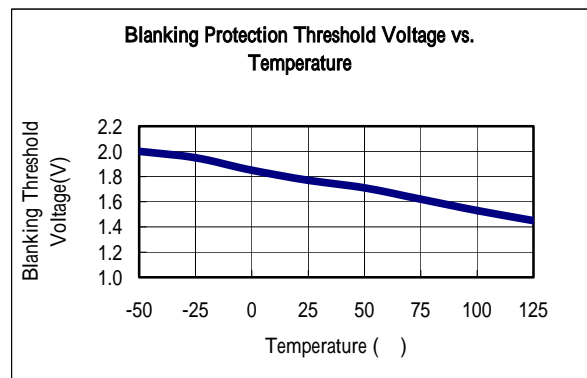
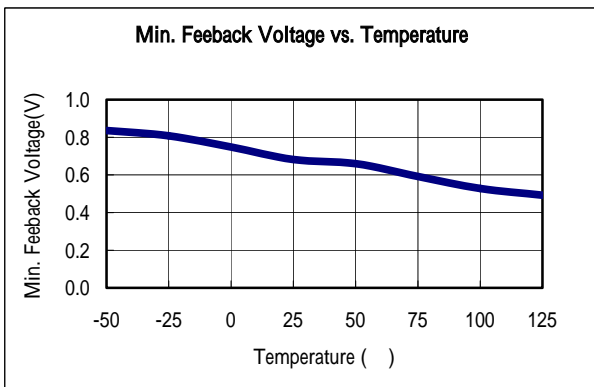
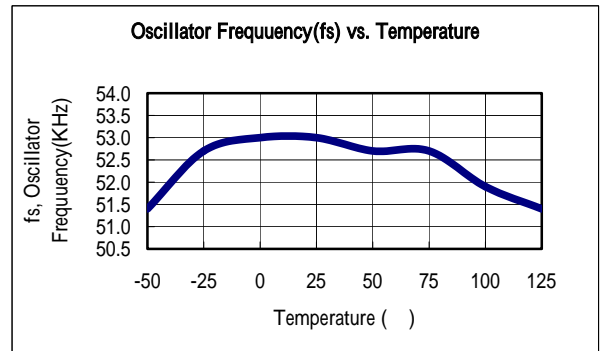
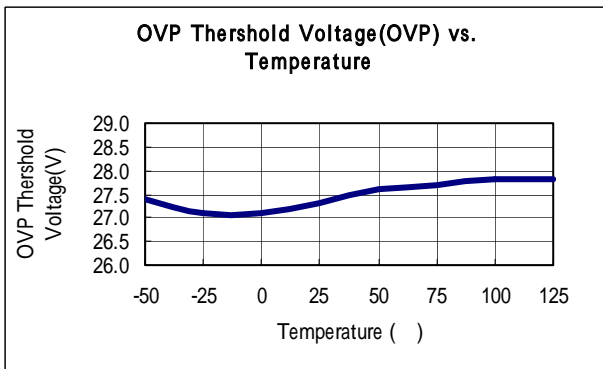
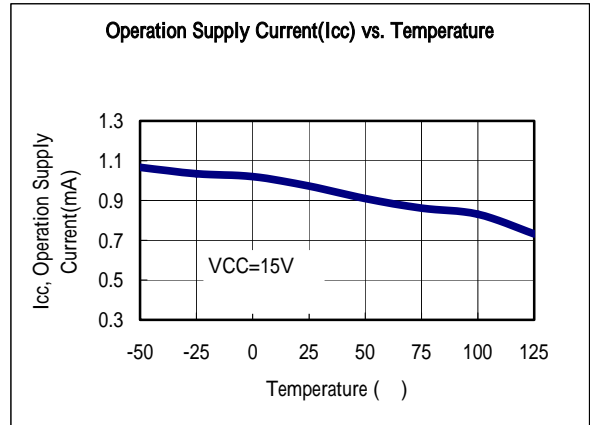
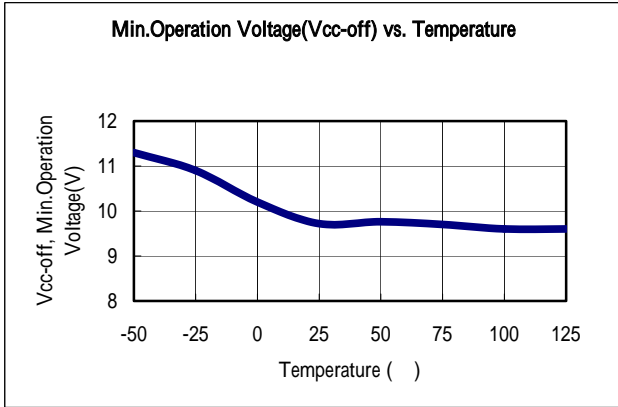


Constant Limited Power compensation

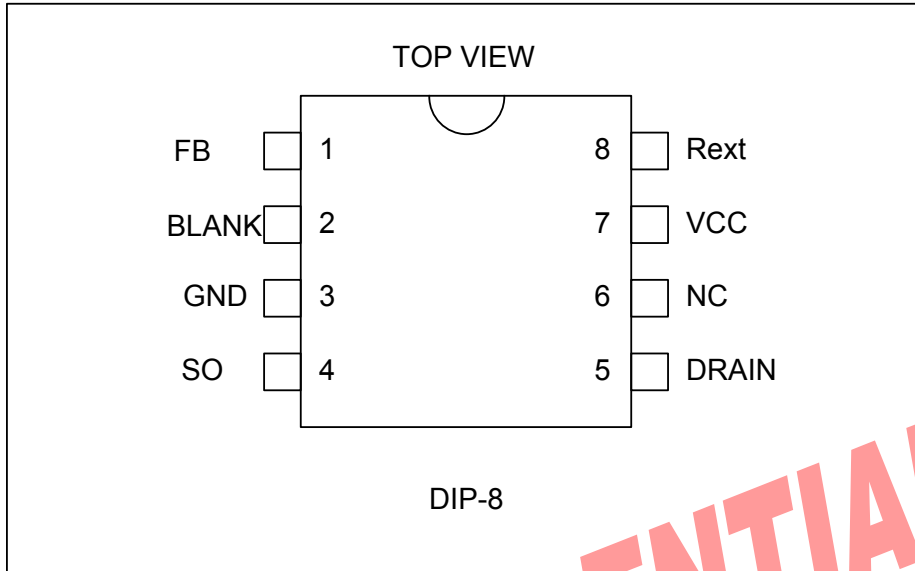
The N3861 provides a constant limited power compensation, It used a special feedback control with an external capacitor 1000pF across FB pin and SO pin to make output power equal, no mater input is low or high line condition.

TYPICAL CHARACTERISTICS





PIN CONFIGURATION



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PIN FUNCTIONS

NO	FUNCTION	DESCRIPTION
1	FB	Voltage feedback input .
2	BLANK	Set the blanking time to delay the protection operation.
3	GND	Ground, Current return for both the signal and drive circuit .
4	SO	Source of the internal power MOSFET.
5	DRAIN	Drain of the internal power MOSFET.
6	NC	Not connect.
7	VCC	Supply Voltage of this IC .
8	REXT	Frequency setting resistor, connects a resistor to VCC pin and a capacitor to GND.(The capacitor is fixed to 47pF)

DIP-8 MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	8.8		9.6	H	7.95		9.75
B	6.2		7.0	I			
C	0.35	0.45	0.55	J			
D		2.54		K			
E	0.5		0.8	L			
F	3.05	3.28	3.56	M			
G	7.48	7.62	8.13	N			

