

GENERAL DESCRIPTION

The N3856V is a low cost , high efficiency, full featured ,synchronous rectification controller that specifically designed for the synchronous rectification applications of the Flyback AC/DC PWM mode switching power supply .

The N3856V is included a totem pole output ideally suited for driving a synchronous rectification power MOSFET . 2 way of the current detect provided for wide applications by any continuous or discontinuous mode operating (patent pending).In continuous mode operating, it included a timing control to adjust maximum turn-on duty to allow the designer to determine the optimal condition for the best efficiency by the external resistor and capacitor. In discontinuous mode operating, it included a very sensitive current detector (about 20mV) to control synchronous rectification MOSFET,avoid happening a large reverse current via synchronous rectification MOSFET to damage the device.

FEATURES

- ▲ High efficiency operating.
- ▲ Adjustable Max. duty cycle designed.
- ▲ Decrease areas of heatsink or PCB.
- ▲ Solved heat dissipation .
- ▲ Sensitive current detector(about 20mV)
- ▲ Suited for continuous and discontinuous mode operation .
- ▲ Auto frequency tracking with PWM frequency.
- ▲ Suited for fixed or variable frequency
- ▲ SOP-8 package .

APPLICATION

- Flyback AC/DC power supply

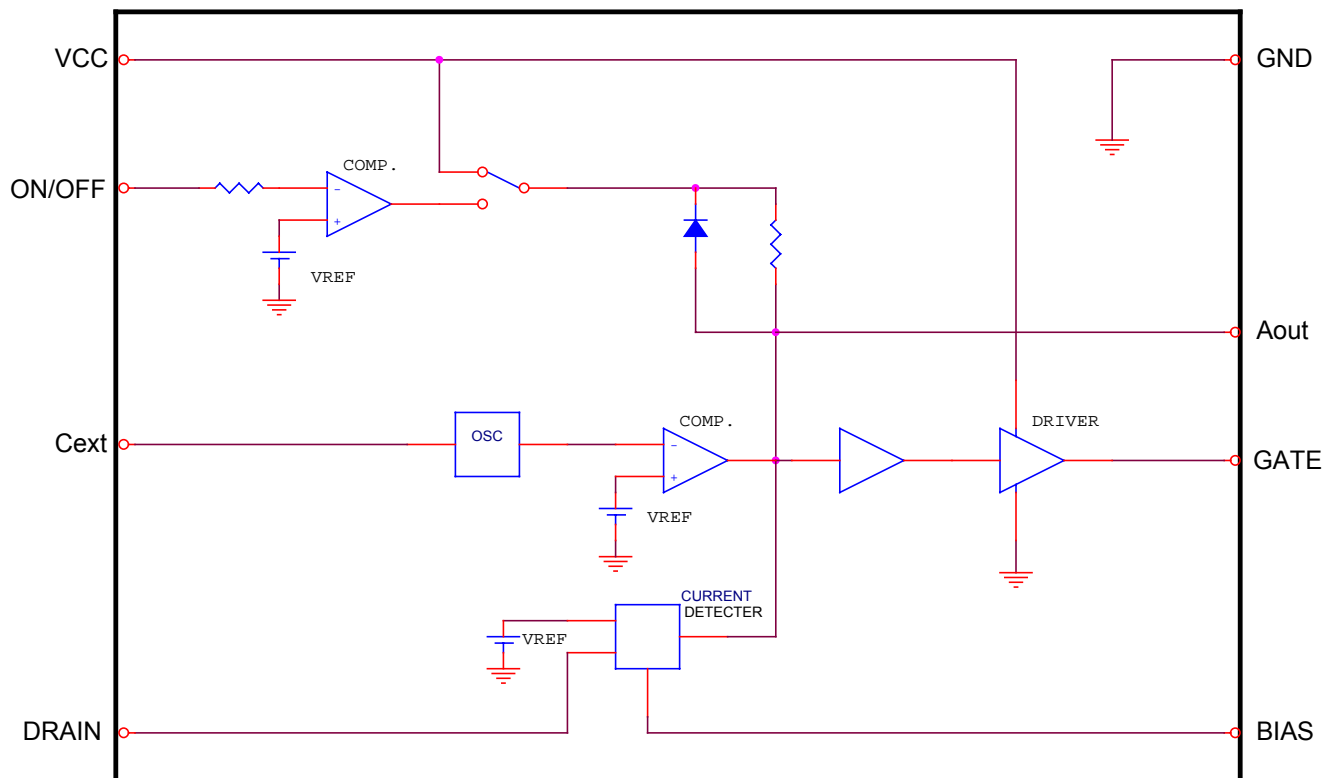
ABSOLUTE MAXIMUM RATING

PARAMETERS	SYMBOL	LIMITS	UNITS
Vcc to GND	Vcc	-0.3 to 30	V
Power Dissipation at Ta = 25 ,Derate 8mW/ for Ta 25	Pd	725	mW
Operating Ambient Temperature Range	Ta	0 to 85	
Operating Junction Temperature Range	Tj	0 to 125	
Storage Temperature Range	TSTG	-65 to +150	
Lead Temperture(Soldering) 10 sec	TLEAD	300	

ELECTRICAL CHARACTERISTICS (T_C = 25 °C)

PARAMETER	TEST CONDITIONS	LIMITS			UNIT
		MIN	TYP	MAX	
Supply Voltage	V _{cc}	7	12	30	V
Supply Current		-	4.5	-	mA
GATE Sink Current			1		A
GATE Source Current			1		A
Rise Time	C _L = 1.0nF		40		nS
Fall Time	C _L = 1.0nF		40		nS
Delay Time			300	400	nS
Max Duty Cycle		90	95		%

BLOCK DIAGRAM



TYPICAL APPLICATION CIRCUIT

a. Non-synchronous signal type

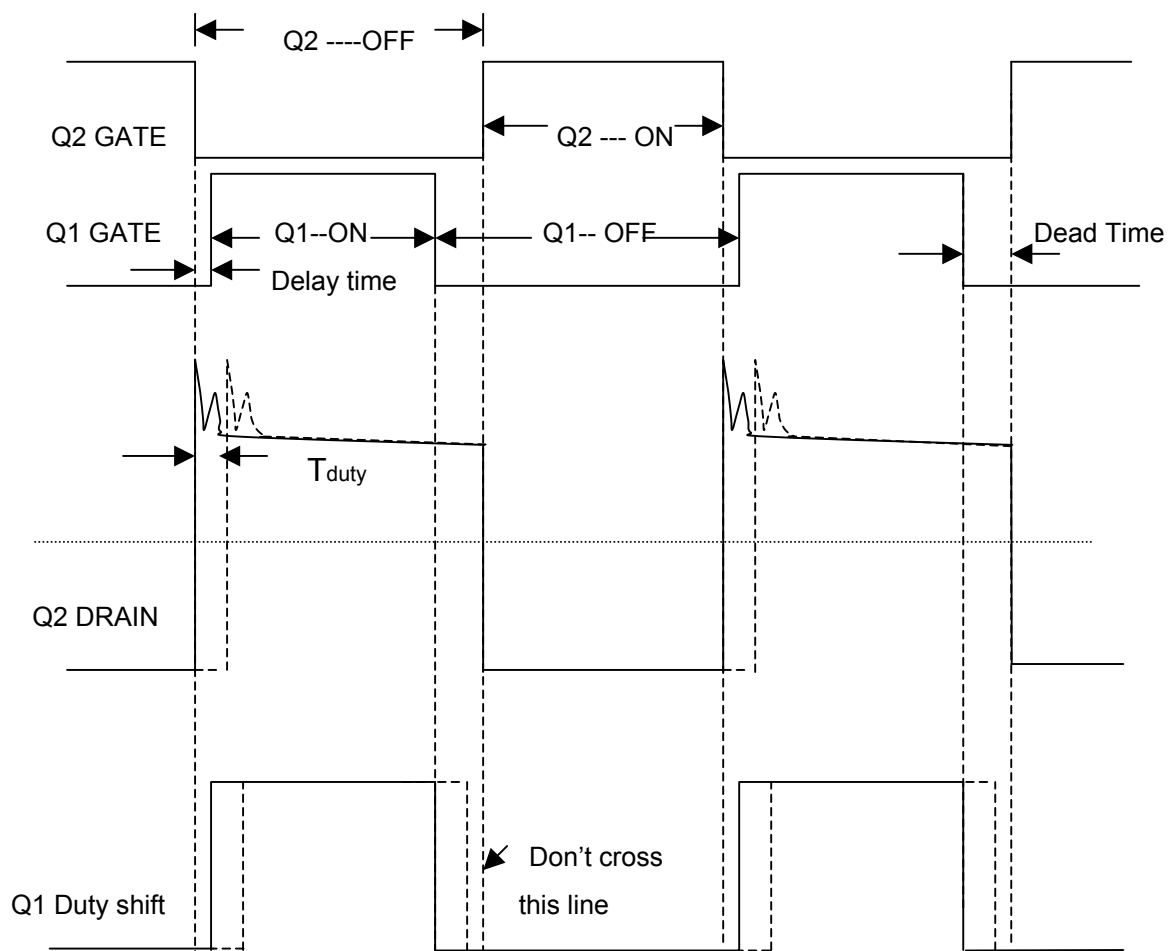
The non-synchronous signal type is designed for a low cost flyback power supply . The structure is suggested to design in discontinuous mode for high line input voltage and low line input voltage in continuous mode that can get better efficiency for full range input design .

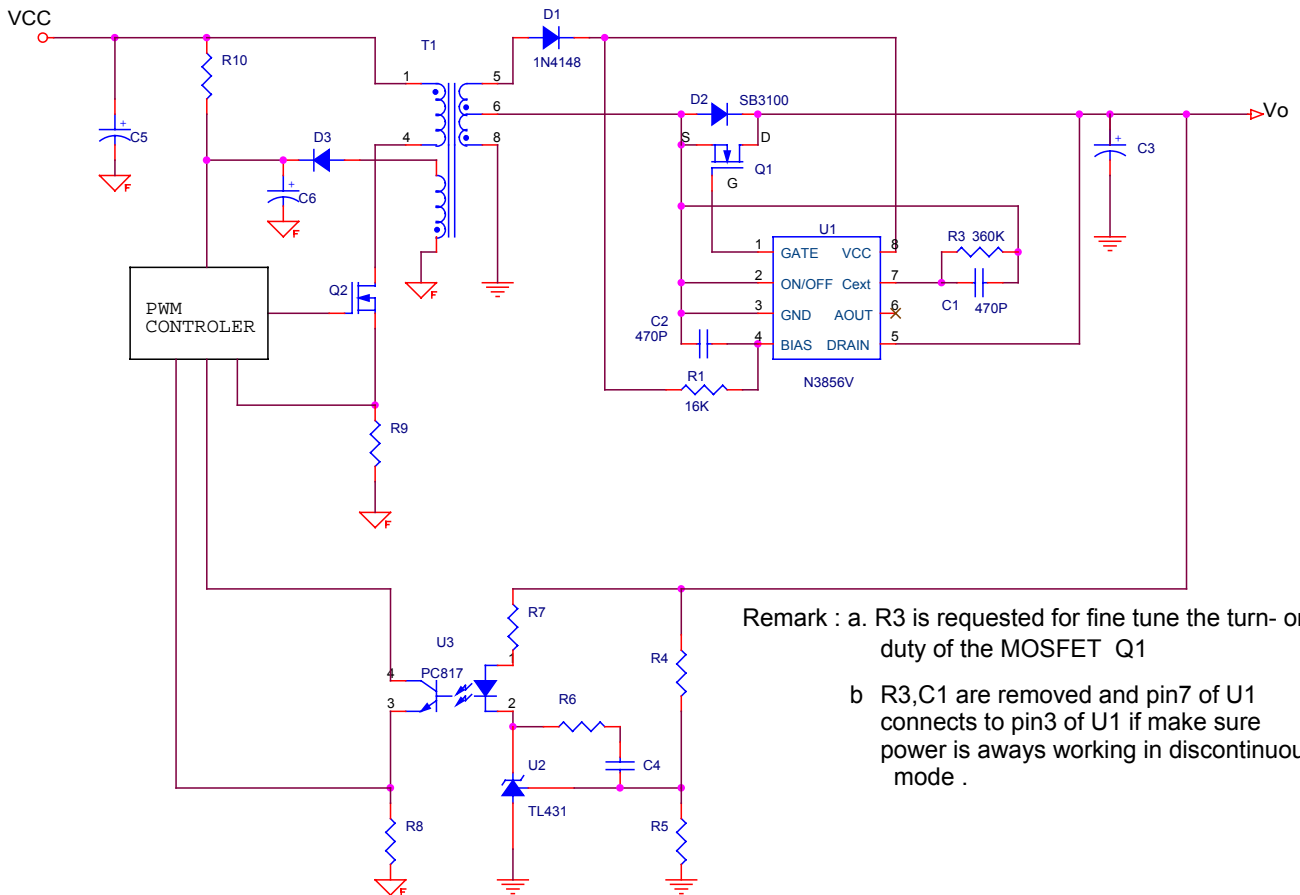
In this structure, to select small tolerance(1~2%) of some componets will be necessary, such as R3,C1 and the frequency componets Rt / Ct of the PWM controller . Otherwise , it may cause Q1and Q2 turn on at same time.

Dead time = T_{turn off time} (1-Total Tol.%) - Delay time - T_{duty}

T_{duty} : duty variation from the AC ripple volatage

Total Tol.%= (Controller +Rt +Ct +R3+C1)Tol.%





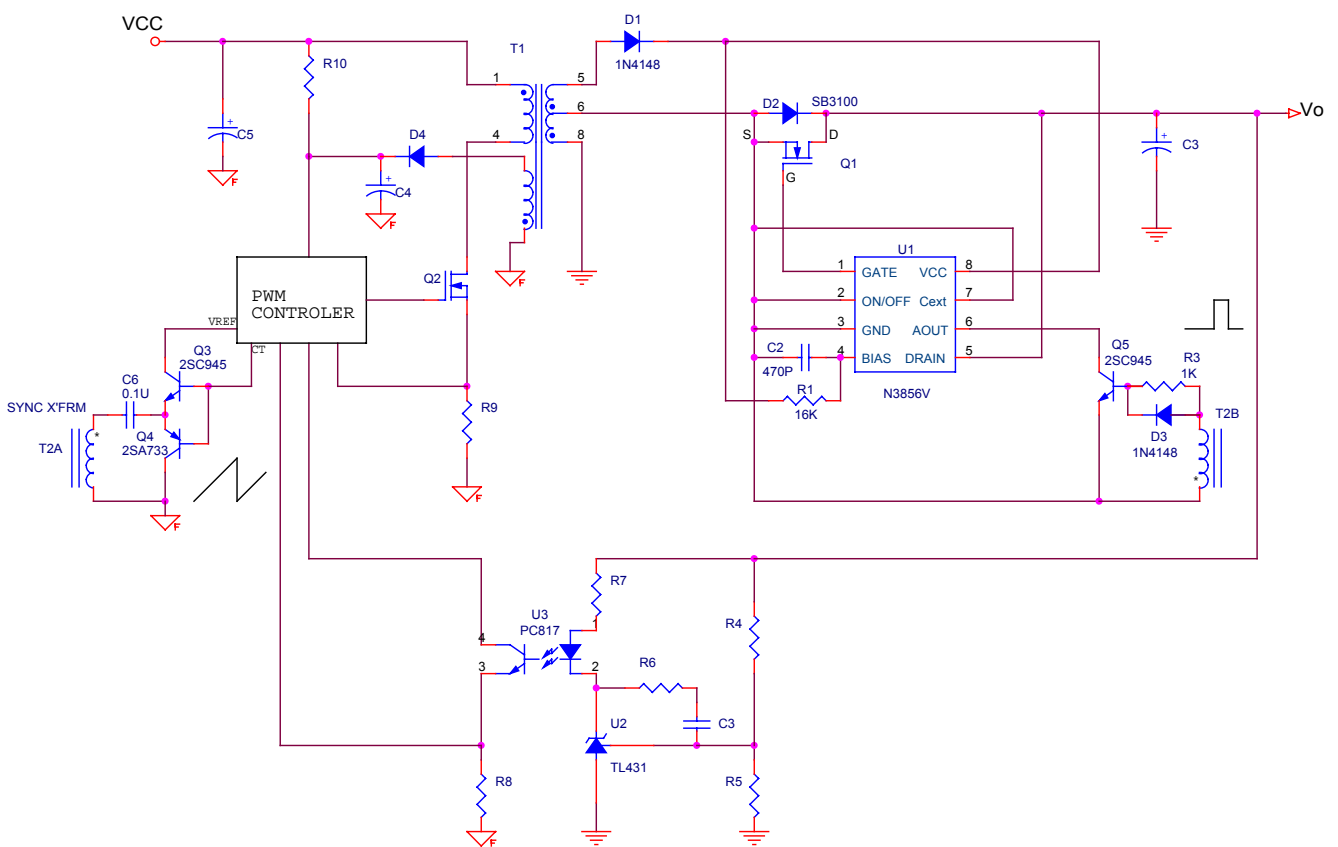
Schematic 1 Non-synchronous signal type with AUX winding application

Schematic 1 is a non-synchronous signal type with AUX winding application , the AUX winding is designed to provide the supply voltage about 10V ~15V , the supply voltage via the diode D2 to VCC of the U1 without any capacitor .

In the continous mode, to change the values of the external resistor R3 and capacitor C1 that can set the maximum turn-on duty for the synchronous rectification MOSFET. In the discontinuous mode , current detect pin5 can sense the voltage drop of the MOSFET , if it is under 20mV ,this IC will turn off the MOSFET .

b. Synchronous signal from primary side

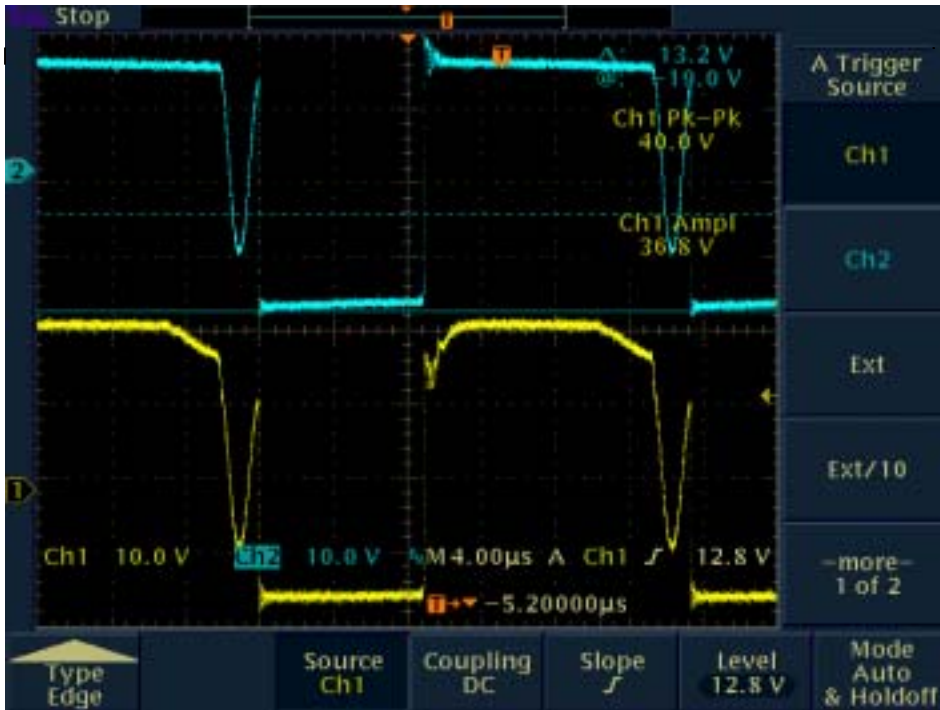
The structure is designed for a high power , high performance flyback power supply , the synchronous signal is provided before the MOSFET Q2 turn on from the triangle wave of the PWM controller , it need to use a isolation transformer between the primary and the secondary for safety request .when the circuit is designed in continuous mode , the MOSFET of the secondary side to be turned off by a synchronous signal , if works in discontinuous mode that turned off by the current detect pin5 to sense the voltage drop of the MOSFET .



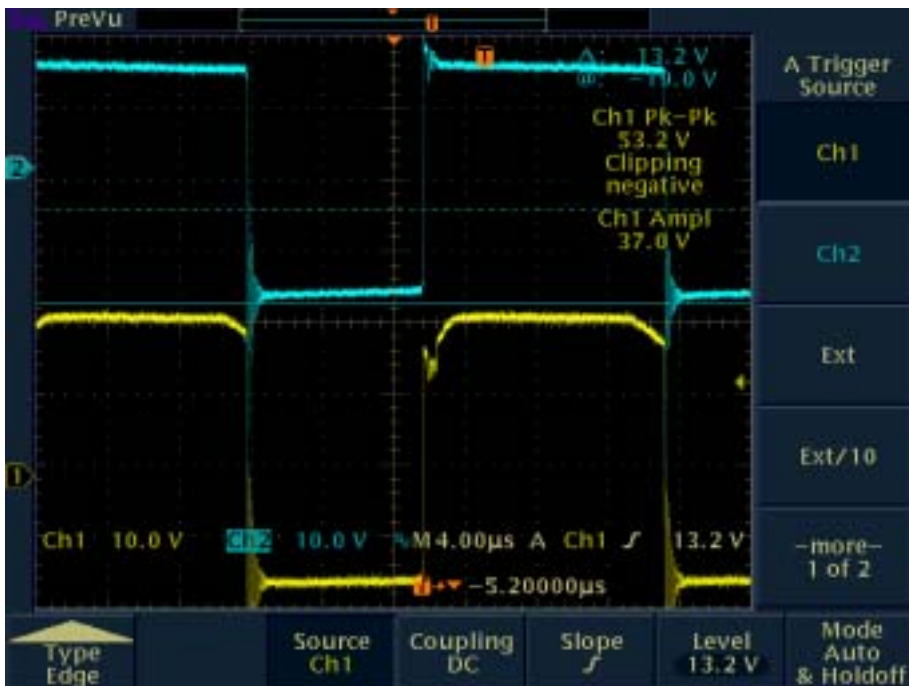
Schematic 2 synchronous signal type with AUX winding application

Schematic 2 is a synchronous signal type with AUX winding application ,in this application , the pin Cext is connected to pin3 of this IC to cancel maximum turn on duty function because the MOSFET can get best control from the synchronous signal .

TYPICAL CHARACTERISTICS



pic.1 secondary winding output and gate voltage of MOSFET waveform at discontinuous mode condition .

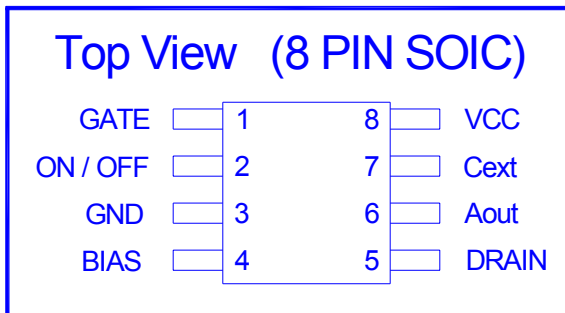


pic.2 secondary winding output and gate voltage of MOSFET waveform at continuous mode condition .



pic.3 secondary winding output and gate voltage of MOSFET waveform at no load condition .

PIN CONFIGURATIONS

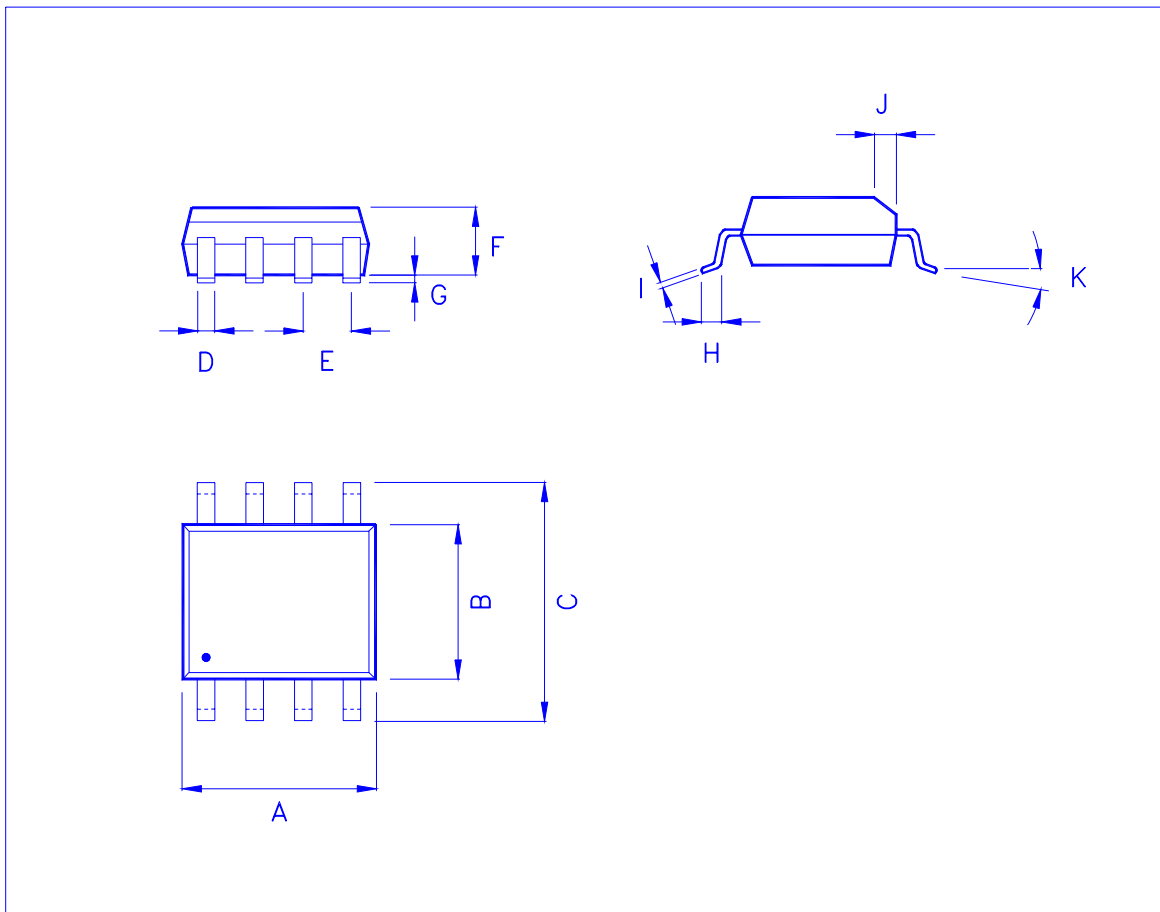


PIN FUNCTIONS

NO.	FUNCTION	DESCRIPTION
1	GATE	This pin is the output pin to drive the gate of the power MOSFET.
2	ON/OFF	This pin is to control the controller ON or OFF function.
3	GND	This is GND pin for the controller.
4	BIAS	This pin is bias voltage supply for the internal current detector .
5	DRAIN	Input pin of the internal current detector , connect to drain of MOSFET .
6	Aout	This pin is internal comparator output to control “pin1” output duty.
7	Cext	This pin is connected a external capacitor to set the turn-on duty..
8	VCC	This pin is for supply voltage .

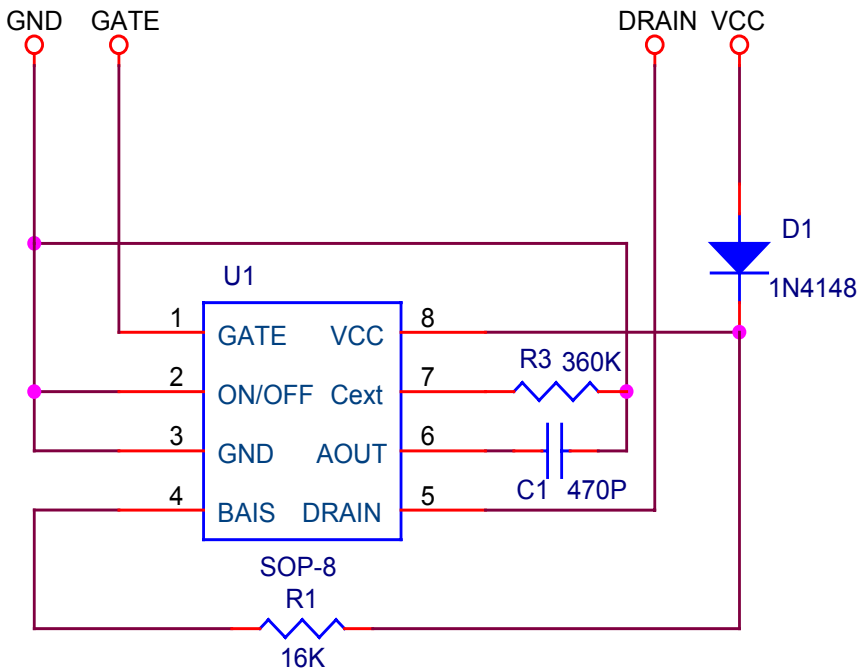
SOIC-8 (D) MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	4.8	4.9	5.0	H	0.5	0.715	0.83
B	3.8	3.9	4.0	I	0.18	0.254	0.25
C	5.8	6.0	6.2	J		0.22	
D	0.38	0.445	0.51	K	0°	4°	8°
E		1.27		L			
F	1.35	1.55	1.75	M			
G	0.1	0.175	0.25	N			

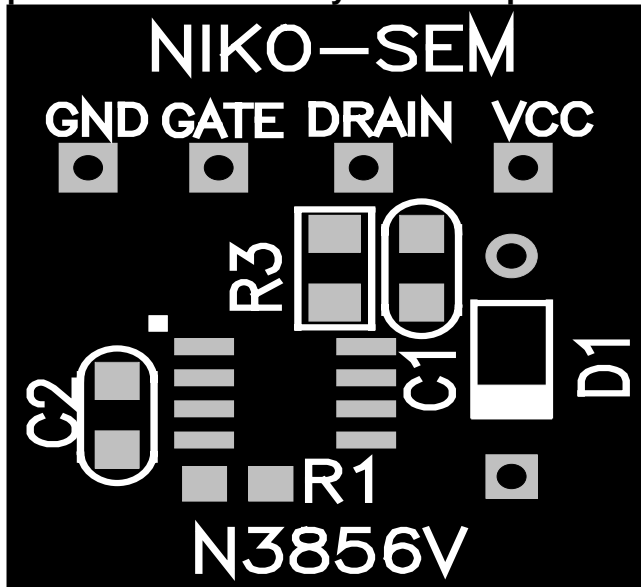


DEMO BOARD DESCRIPTION

The Schematic 3 presents a demo board for the N3856V , This board replaces the output rectifier diode with synchronous rectification MOSFET in flyback power supply and includes all the components needs by the N3856V to operate, R3 and C1 can be adjusted for different switching frequency and turn-on duty demand



pic.4 demo board layout----componects



pic.5 demo board layout----soldering side

