24WAC/DC conversion chip

Product Overview

DK125It is a secondary feedback flybackAC-DCOffline switching power supply control chip. The chip adopts highly integratedCMOSThe circuit design has protection functions such as output short circuit, secondary open circuit, over-temperature, over-voltage, etc. The chip has built-in high-voltage power tubes and self-powered circuits, with very few peripheral components and simple transformer design (the transformer for the isolated output circuit only needs two windings).

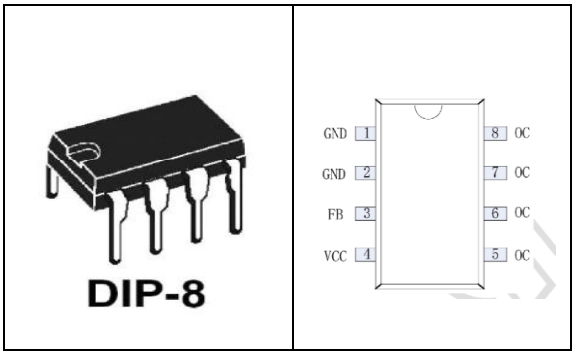
Main Features

- Full voltage input90V—265V
- built-in700VHigh voltage power tube
- The internal high-voltage constant-current startup circuit does not require external Start-up resistor
- Standby power consumption is less than0.3W
- 65KHz PWMSwitching frequency
- Patented self-powered technology, no external auxiliary winding required electricity
- Built-in frequency jitter function, automatically reducing the operating frequency when in standby mode. In meeting European green energy standards (<0.3W) ,same
- 4KVAnti-staticESDtest
- Reduces the output voltage ripple
- Built-in slope compensation circuit to ensure low voltage and high power Circuit stability at output rate
- Frequency jitter reductionEMIFiltering cost
- Over temperature, over current, over voltage and output short circuit, secondary switch Road protection

Typical Applications

- Power adapter
- ledpower supply
- induction cooker
- air conditioner,DVD, set-top boxes and other home appliances

Terminal arrangement



Typical power

Product Model	Input voltage	Closed	Open
DK125	230VAC	24W	24W
	85-265VAC	18W	24W

Remark:

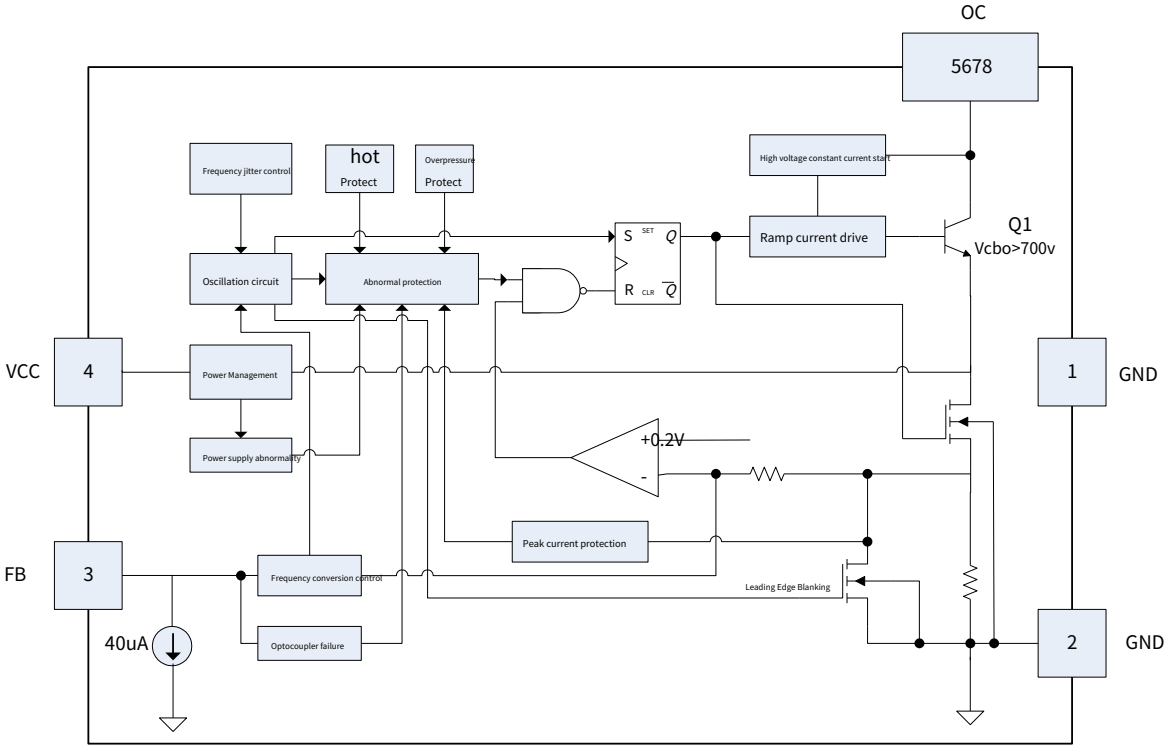
1.Typical power in a closed environment45Tested in °C environment.

2.Maximum power in open frame45Tested in °C environment

Lead-out terminal function

Pin number	Pin Name	describe
1	GND	Ground pin
2	GND	Ground pin
3	FB	Feedback control terminal pin, connected to1nF~10nF
4	VCC	Power supply pin, external ground connection10uF~47uFCapacitance
5,6,7,8	OC	Output pin, connected to the high-voltage power tube inside the chip, and connected to the switching transformer outside

Circuit structure block diagram



Limit parameters

parameter	symbol	Minimum	Typical Value	Maximum	unit
Supply voltageVCC	U_S	- 0 . 3		8	V
Supply currentVCC	I_S		100		mA
Pin voltage	U_{PV}	- 0.3		VDD+0.3	V
Power tube withstand voltage	U_{PP}	- 0.3		730	V
Peak current	I_{PEAK}			1300	mA
Total power dissipation	P_{TOT}		1000		mW
Operating temperature range	T_R	- 25		125	°C
Storage temperature range	T_{STG}	- 55		155	°C
Soldering temperature	T_W		280/5S		°C

Electrical characteristics parameters (T_A= 25°C,Special circumstances will be explained separately)

parameter	Test conditions	Minimum	Typical Value	Maximum	unit
Operating voltage					
VCCOperating voltage	ACenter85V-----265V	4.5	4.7	4.9	V
VCCStarting voltage	ACenter85V-----265V		4.9		V
VCCRestart voltage	ACenter85V-----265V	3.30	3.60	3.90	V
VCCProtection voltage	ACenter85V-----265V	6.25	6.55	6.85	V
VCCWorking current	VCC=5V,FB=1.5V			50	mA
Startup Section					
High voltage starting current	ACenter85V----265V	0.3	0.6	1.2	mA
Startup time	ACenter85V			500	ms
Power tube part					
Power tube withstand voltage	Ioc=1mA	700	700		V
Power tube protection voltage	MeasurementOCVoltage	540	600	660	V
Current limiting part					
Peak current protection	VCC=5V FB=1.5V—2.8V	1100	1200	1300	mA
Leading edge blanking time	VCC=5V FB=1.5V—2.5V		250		ns
Minimum opening time	VCC=5V FB=2.6V		500		ns
Oscillation part					
PWMOutput frequency	VCC=5V FB=1.5V—2.5V	61	65	69	KHz
			20		KHz
Modulation step frequency	VCC=5V FB=2.5V—2.8V	20	twenty two	twenty four	KHz
	VCC=5V FB=1.5V—2.5V		0.5		KHz
Duty Cycle	VCC=5V FB=1.5V—2.5V	5		70	%

parameter	Test conditions	Minimum	Typical Value	Maximum	unit
Feedback Section					
Short circuit protection threshold	MeasurementFBVoltage	1.15	1.33	1.50	V
Frequency conversion threshold voltage	MeasurementFBVoltage	2.3	2.5	2.7	V
Burst Mode Threshold	MeasurementFBVoltage	2.6	2.8	3.0	V
other					
Temperature protection	Junction temperature	120	130	140	°C
Standby power consumption	ACenter265V, no load			270	mW

Functional Description

1.Power on and start

When powered on, the chip connects internallyOCandVCCpin high voltage current source for externalVCCThe energy storage capacitor is charged. whenVCCThe voltage increases to4.7VWhen the high voltage current source is turned off, the startup process ends and the control logic starts to outputPWMpulse.

2.Soft Start

After power-on, the chip starts to outputPWMTo prevent the instantaneous output voltage from overshooting, the transformer core will saturate and the power The stress on the secondary rectifier tube is too large, and the chip is built-in16mSSoft start circuit, in16mSwill gradually increasePWMWhen the opening The peak current of the power tube is100mAIncreases linearly to the maximum peak current.

3.Feedback Control

The chip uses a cycle-by-cycle peak current limitPWMControl method, through detectionFBThe feedback voltage is used to regulate the current limit. whenPWMAfter being turned on, the chip detects the output current of the power tube and shuts down the power until the output current of the power tube reaches the current limit current. Waiting for the next onePWMOpening cycle.FBVoltage at1.5V-2.5VThe current limit will be adjusted linearly.1.5VCorresponding to the most Limit current,2.5VCorresponding to the minimum limiting current. When the load increases,FBThe voltage will gradually decrease; otherwise,FBThe voltage will gradually When the load is too heavy,FBVoltage less than1.5VWhen the load is very light, the chip will enter the short circuit or overload protection judgment.FB Voltage greater than2.5VWhenPWMThe switching frequency is determined by65KHzReduce to22KHz,And pass with the minimum opening time. When the load is lighter,FBThe voltage will continue to increase; whenFBVoltage higher than2.8VWhen the control circuit stopsPWMOutput, chip in Enter standby burst mode.

4.Standby Burst Mode

When in standby mode,FBThe voltage will increase to2.8VAbove, the chip stopsPWMOutput. When the output voltage drops slightly,FBVoltage Lower than2.8VWhen the chip will re-output somePWMpulse to maintain the set output voltage; this burst output mode can To achieve lower standby power consumption.

5.Frequency Modulation

To satisfyEMIdesign requirements, reducingEMITo reduce the design complexity and cost, a frequency modulation circuit is installed in the chip.PWM The frequency will be65KHzCentered on0.5KHzThe step frequency is16Operates on a frequency point.

6.Self-powered technology

The chip uses patented self-powered technology to controlVCCThe voltage at4.7VAbout, provide the current consumption of the chip itself, so The external transformer auxiliary winding can be omitted, simplifying the transformer design.

7.Peak current protection

Whenever the chip detects that the peak current of the internal power tube exceeds1.3AWhen the power tube is turned off immediately, the power tube and the corresponding The device is protected from damage.

8.Constant power control

In order to prevent over-power output at high voltage, the chip has built-in high and low voltage power compensation circuit to make the maximum power output at different grid voltage input The output power is basically the same.

9.Power supply abnormality

Caused by external abnormalityVCCVoltage below3.6VWhen the chip turns off the power tube and restarts. VCCVoltage higher than6.5VStart immediatelyVCCOvervoltage protection stops outputting pulses untilVCCThe overpressure condition is removed.

10.Power tube overvoltage protection

The secondary circuit is open, the input bus voltage is too high, and the transformer leakage inductance is too large, which will cause the power tube toOCHigher peak voltage; to ensure Protect the power tube from being damaged. When the circuit detects that the power tubeOCVoltage exceeds600VWhenFBVoltage, stop output PWMPulse until the power tube overvoltage condition is relieved.

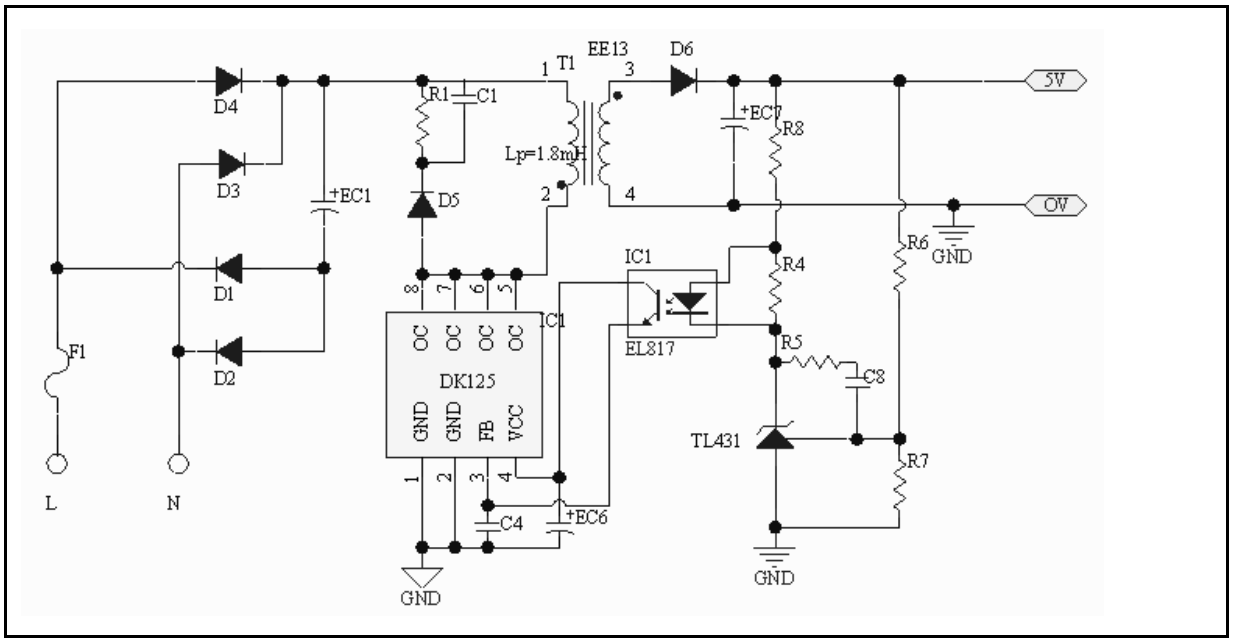
11.Short circuit and overload protection

When the secondary output is short-circuited or overloaded,FBThe voltage will be lower than1.3V;In some applications, due to the inductive loads such as motors, A higher startup current is required, which may cause the circuit to overload for a short time. Therefore, the first overload protection judgment time of the chip is512mS. ifFBVoltage at512mSThe chip will not judge as overload or short circuit.FBVoltage at512mSInternal always low At1.3V,The secondary output is judged to be short-circuited, and the short-circuit protection is immediately activated, and the short-circuit protection judgment time is shortened to32mS,Until short circuit Condition resolved.

12.Over temperature protection

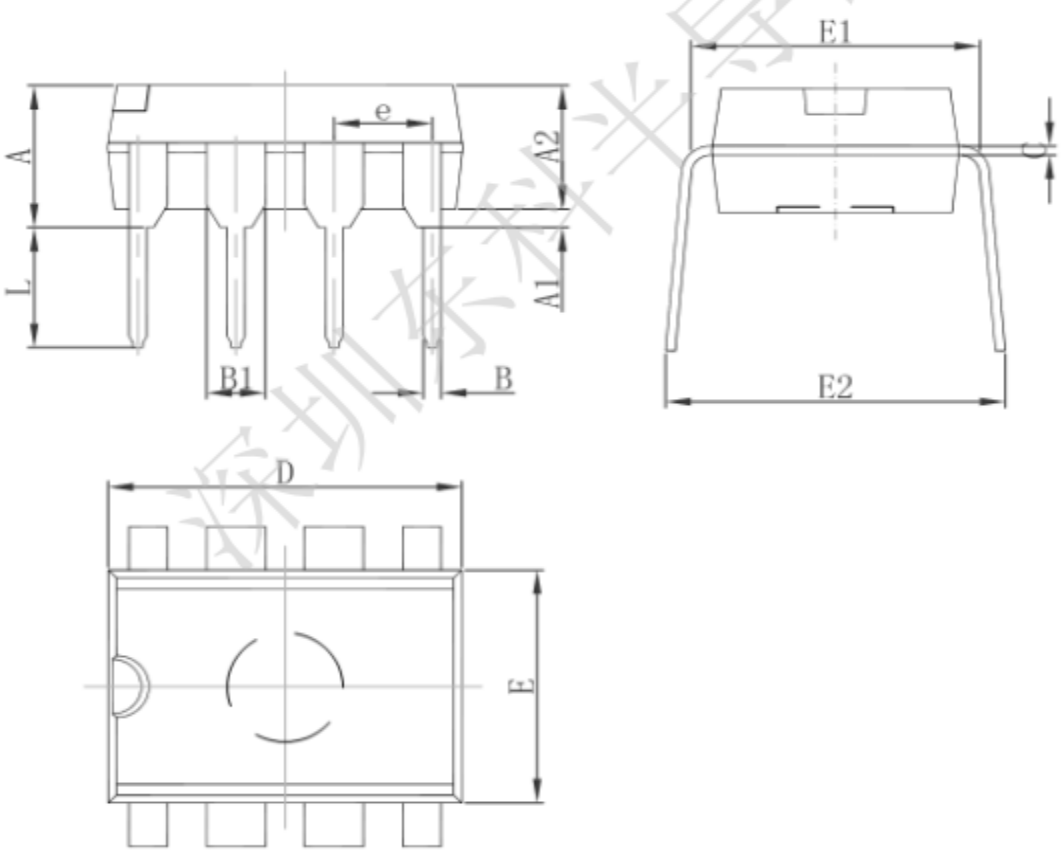
Whenever the chip temperature exceeds130℃, over-temperature protection is activated immediately and pulse output is stopped until the over-temperature condition is relieved.

Typical application circuit diagram



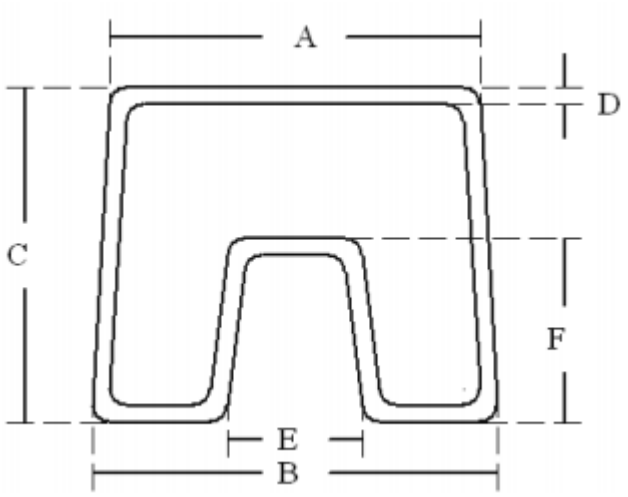
Package outline and dimensions

1.DIP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.710	4.310	0.146	0.170
A1	0.510		0.020	
A2	3.200	3.600	0.126	0.142
B	0.380	0.570	0.015	0.022
B1	1.524(BSC)		0.060(BSC)	
C	0.204	0.360	0.008	0.014
D	9.000	9.400	0.354	0.370
E	6.200	6.600	0.244	0.260
E1	7.320	7.920	0.288	0.312
e	2.540(BSC)		0.100(BSC)	
L	3.000	3.600	0.118	0.142
E2	8.400	9.200	0.331	0.354

2.Packaging specifications: Chips are packed in anti-static tubes



代号	最小值 (mm)	额定值 (mm)	最大值 (mm)
A	11	11.5	12
B	11.5	12	12.5
C	10	10.5	11
D	0.4	0.5	0.6
E	3.5	4	4.5
F	5	5.5	6

包装	数量
单管	50
单包装箱	2000
大包装箱	20000

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Notice: This product is an electrostatically sensitive component, please take precautions! ESD damage can range from slight performance degradation to device failure. Precision integrated circuits may be more susceptible to damage, which may cause component parameters to fail to meet published specifications.

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