

General Description

SDC612 is a high-performance current mode control IC designed for AC/DC convertor, which supplies about continuous 6W output power at the universal AC input range from 85V to 265V.

Features

- Built-in oscillator
- Built-in high voltage power transistor of 700V
- Cycle-by-cycle current limit
- Very low power consumption under no load
- Internal slope compensation and feedback compensation
- Over load protection
- Built-in high precise current limit with temperature compensation
- Over temperature protection
- Low startup and operating current
- VCC over-voltage clamp
- 6W output power at the universal AC input range, 8W output power at AC input 220V
- Package: DIP-8

Applications

- Offline AC/DC flyback converter
- Adaptor/Charger for cell and other portable Apparatus

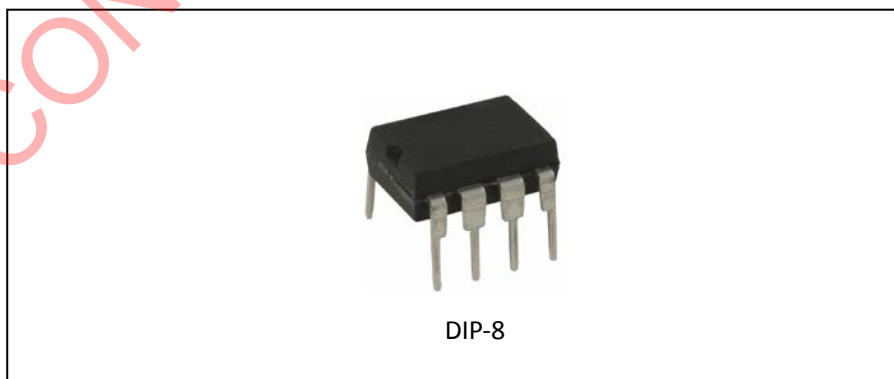


Figure 1. Package Type

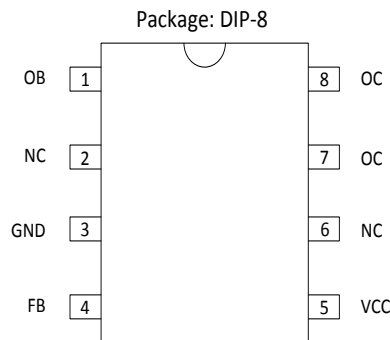
Pin Configuration


Figure 2. Pin Configuration

Pin Number	Pin Name	Function
1	OB	Startup current input, connecting to startup resistor
2	NC	No connection
3	GND	Ground
4	FB	Feedback pin
5	VCC	Supply voltage pin
6	NC	No connection
7,8	OC	Output of HV transistor, connecting to primary wind of transformer

Table 1. Pin Configuration

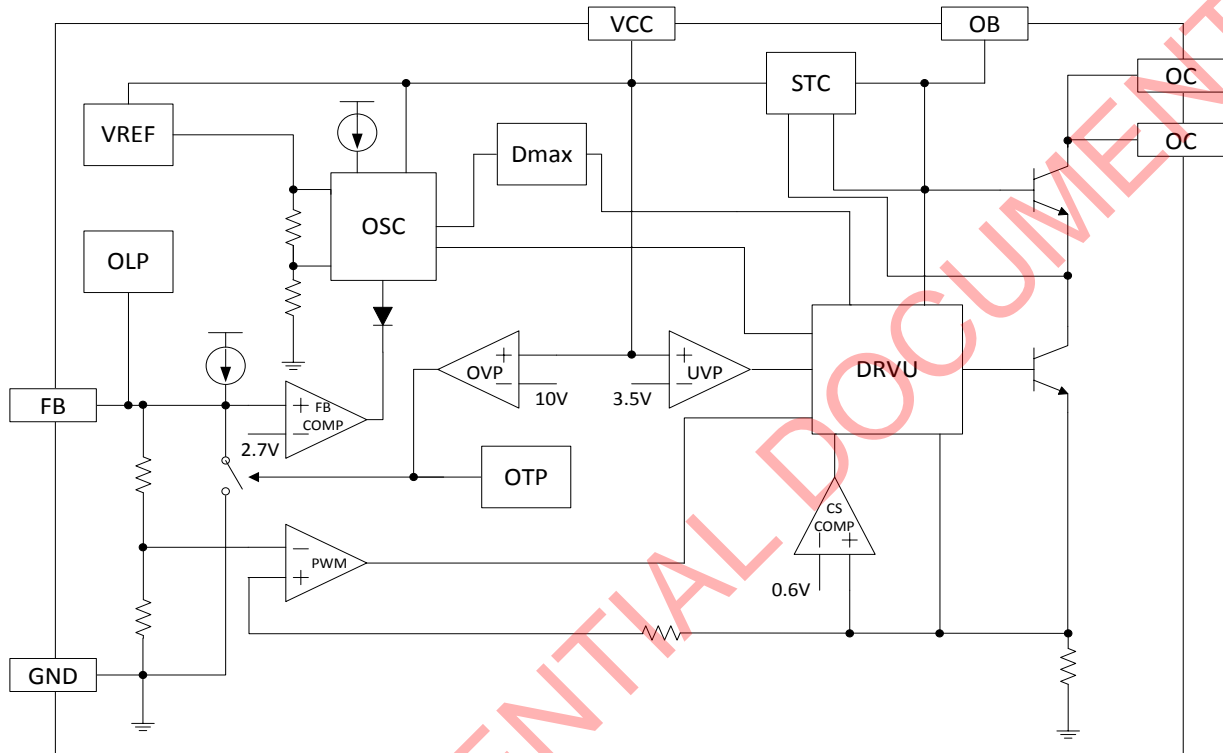
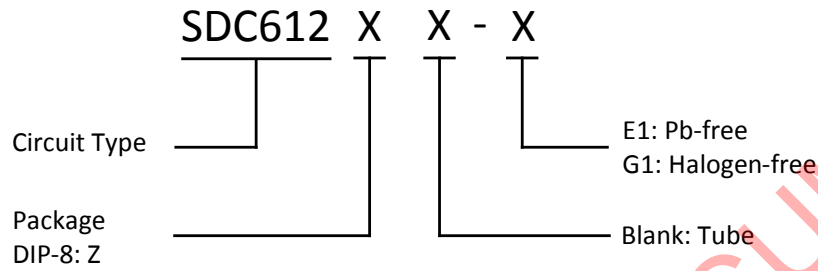
Functional Block Diagram


Figure 3. Functional Block Diagram

Ordering Information


Package	Temperature	Part Number		Marking ID		Packing Type
		Pb-free	Halogen-free	Pb-free	Halogen-free	
DIP-8	-40℃~85℃	SDC612Z-E1	SDC612Z-G1	SDC612	SDC612G	Tube

Absolute Maximum Ratings (NOTE: Stresses greater than those listed under Absolute Maximum Ratings may cause permanent damage to the device.)

Parameter	Symbol	Value	Unit
Power supply voltage VCC	V_{CC}	18	V
Collector current	I_C	1.5	A
Endurance voltage of OC collector	V_{CB}	-0.3~700	V
Peak value of switching current	I_p	330	mA
Total dissipation power	P_D	1000	mW
Operating Junction Temperature	T_J	-40~150	°C
Storage temperature range	T_{STG}	-55~150	°C
Lead temperature (soldering, 10sec)	T_{LEAD}	260	°C
Latch-up test per JEDEC 78	-	200	mA
ESD, HBM model per Mil-Std-883, Method 3015	HBM	2000	V
ESD, MM model per JEDEC EIA/JESD22-A115	MM	200	V

Table 2. Absolute Maximum Ratings

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Power supply voltage, VCC	V_{CC}	4.8	9.0	V
Operating temperature	T_a	-40	85	°C

Table 3. Recommended Operating Conditions

Electrical Characteristics (Ta=25°C, V_{CC}=7.0V, unless otherwise specified)

Parameter		Symbol	Conditions	Min	Typ	Max	Unit
Output Section							
On-state saturation voltage drop		V _{SAT}	I _{OC} =290mA	-	-	1	V
Output rise time		T _r	C _L =1nF	-	-	75	ns
Output fall time		T _f	C _L =1nF	-	-	75	ns
HV start-up current		I _{STC}	-	1	-	2.6	mA
Oscillator Section							
Oscillation frequency		f _{OSC}	-	55	61	68	kHz
Temperature Stability		ΔF _V	V _{CC} =4.8V~9V	-	-	1	%
Temperature Stability		ΔF _T	Ta=0°C~85°C	-	-	1	%
Feedback Section							
Input impedance	Pull-up current	I _{FB}	V _{FB} =2.5V	0.40	0.55	0.70	mA
	Pull-down resistance	R _{FB}	-	10	15	20	kΩ
PSRR		-	V _{CC} =4.8V~9V	-	60	70	dB
Current Sampling Section							
Over current threshold voltage		V _{TH_OC}	-	0.55	0.60	0.65	V
Current limit		I _{TH_OC}	-	0.27	0.29	0.31	A
PSRR		-	-	-	60	70	dB
Over current detection and control delay		T _D	-	-	150	250	ns
PWM Section							
Maximum duty cycle		D _{MAX}	V _{FB} =4.0V	52	57	62	%
Minimum duty cycle		D _{MIN}	-	-	1.5	-	%
Power Current Section							
Startup leakage current		I _{ST}	-	-	15	50	uA
Static operation current		I _{OP}	V _{FB} =0V, V _{CC} =8V	2.0	2.8	4.0	mA
Startup threshold voltage		V _{ST}	-	8.6	9.0	9.4	V
Minimal operating voltage		V _{UV}	-	3.2	3.5	3.8	V
Restart voltage		V _{RST}	-	1.7	2.0	2.4	V
Over voltage protection		V _{OV}	-	9.6	10	10.6	V

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
OTP Section						
Thermal shutdown temperature	T_{OTP}	-	-	150	-	°C
BJT Section						
Collector cutoff current	I_{CBO}	$V_{CB}=700V, I_E=0$	-	-	0.1	mA
Collector-emitter cutoff current	I_{CEO}	$V_{CE}=400V, I_B=0$	-	-	0.1	mA
Collector-base cutoff current	I_{EBO}	$V_{EB}=9V, I_C=0$	-	-	0.1	mA
Collector-base breakdown voltage	V_{CBO}	$I_C=0.1mA$	700	-	-	V
Collector-emitter sustain voltage	V_{CEO}	$I_C=1mA$	400	-	-	V
Collector-base sustain voltage	V_{EBO}	$I_E=0.1mA$	9	-	-	V
DC current gain	h_{FE}	$V_{CE}=5V, I_C=0.5A$	15	-	30	-
Collector-emitter saturation voltage	V_{CE_STA}	$I_C=1A, I_B=0.25A$		0.3	0.9	V
Base-emitter saturation voltage	V_{BE_STA}	$I_C=1A, I_B=0.25A$		0.9	1.2	V

Table 4. Electrical Characteristics

Function Description

Startup control

During Startup phase, reference voltage, the oscillator and all protection circuits are OFF. Startup current of SDC612 is designed to be very low so that VCC could be charged up above UVLO threshold level and device starts up quickly. A large startup resistor can therefore be used to minimize the power loss yet achieve a reliable startup in application.

PWM control

The peak current (sensed on the IS pin) is set by the voltage on FB pin. By comparing the voltage on FB pin and the IS ramp voltage, the duty-cycle of the PWM modulator is thus adjusted to provide the necessary load current at the desired output voltage. FB can be controlled by internal control circuit and external feedback circuit.

VCC over voltage protection

VCC over voltage protection circuit is integrated into IC. When VCC voltage reaches 9.8V(TYP), FB voltage is pulled down via internal control circuit, then the PWM switching is shut off. When VCC voltage goes down below 9.8V(TYP), the switching is reactivated. The VCC over voltage protection ensures IC to operate reliably.

Current limit

The output is shut off to limit the power when voltage of IS Pin exceeds Current sense threshold voltage.

Green mode control

Under no-load and light-load condition, the switching frequency internally reduces to lower the switching power loss and improve the conversion efficiency. If FB is less than 2.7V(Typ), the cycle of the oscillator will increase with it, the less FB is, the wider the cycle of the oscillator is, until the oscillation stop.

Power transistor drive

During the ON cycle, OB pin supplies base current for the power transistor, OE pulls down the emitter of the power transistor to IS, and OB is adaptive to the IS current. If the current of IS exceeds the specified current of FB, SDC612 will turn into the OFF cycle. During the OFF cycle, OB is pulled down, the power transistor will shut off.

Over temperature protection

When IC's internal temperature reaches 150°C, FB voltage will be pulled down by internal control circuit, the switching frequency decreases or shut off. This protection protects the IC from over temperature.

Typical Application

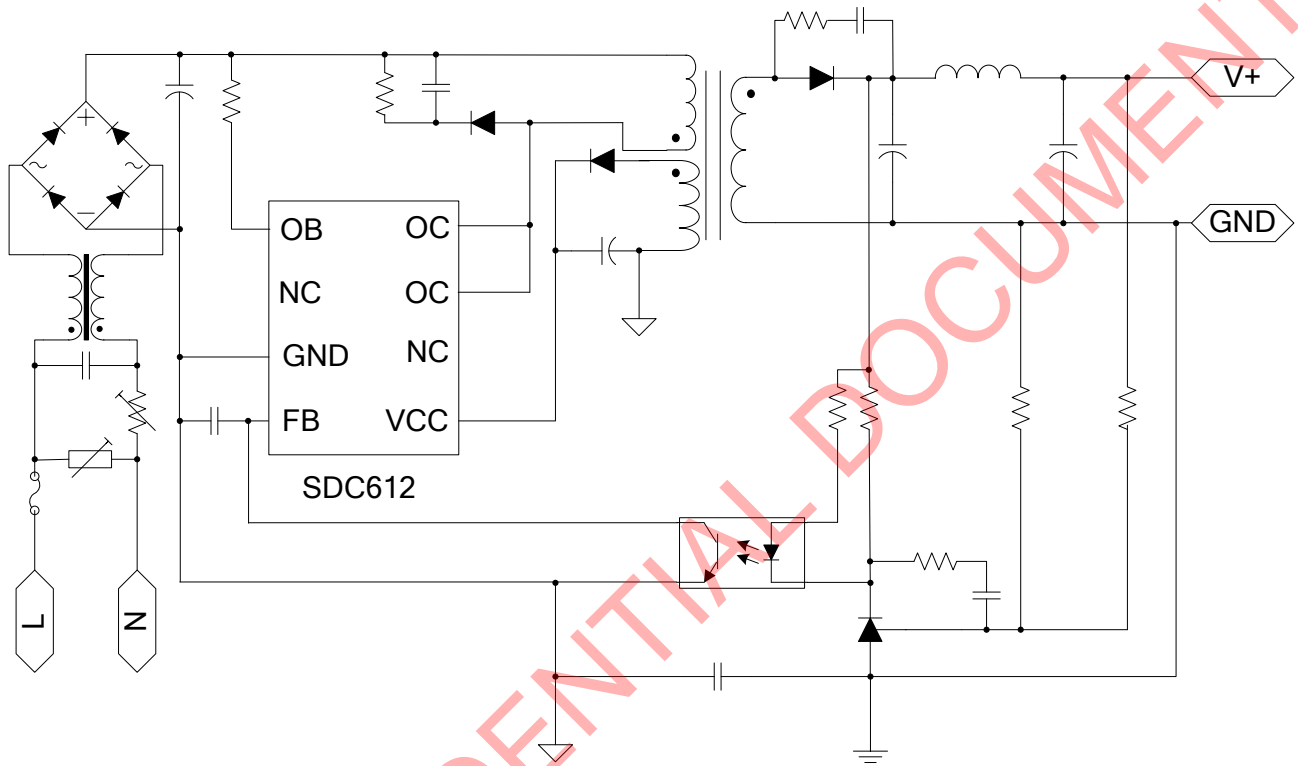
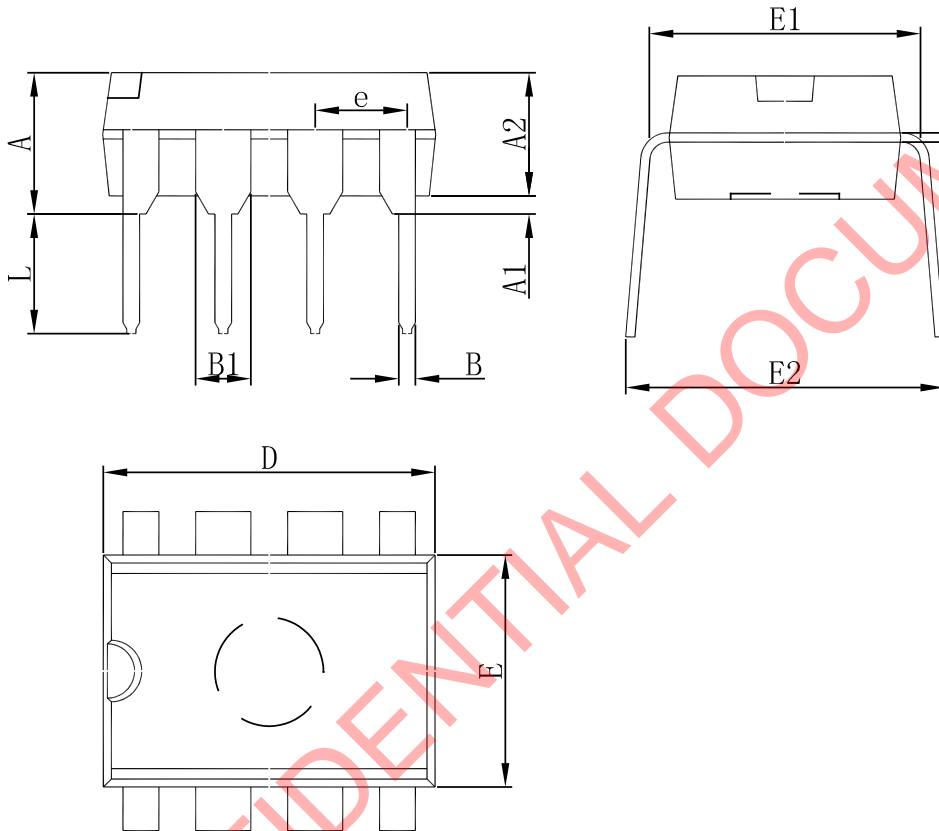


Figure 4. Typical Application

Package Dimension
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	9.000	0.331	0.354



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