

DESCRIPTION

CRE6536T is a high performance offline PSR power switch for low power AC/DC charger and adapter applications. It operates in primary-side sensing and regulation. Consequently, OPTO-coupler and TL431 could be eliminated. The product is convenient for users to design high performance AC/DC converter with fewer peripheral components and effective system cost.

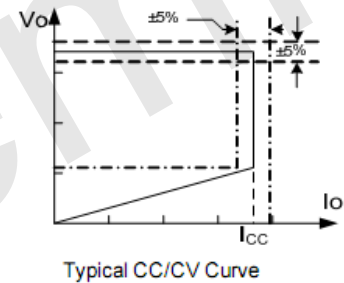
CRE6536T provides extremely comprehensive and excellent intelligent protection functions, including cycle-by-cycle overcurrent protection, soft start, over temperature protection, programmable output overvoltage protection, VDD undervoltage locking protection, VDD overvoltage locking protection

CRE6536T provides precise constant voltage, constant current (CV/CC), without optical coupler and secondary control circuit adjustment. It eliminates the need of loop compensation circuit and maintains good stability.

Standby-loss can be less than 75 mW.

CRE6536T has the function of cable voltage drop compensation. Cable loss compensation can be adjusted by adjusting FB divider resistance. In addition, the unique PWM/PFM mode of operation of the chip minimizes the audio energy, and there is no audio noise in the full load.

CRE6536T is offered in SOP7 package, which provides a good design platform for fly-back switching power supply system with ultra-low standby power consumption. It is very suitable for the application of Level 6 and Eur2.0.



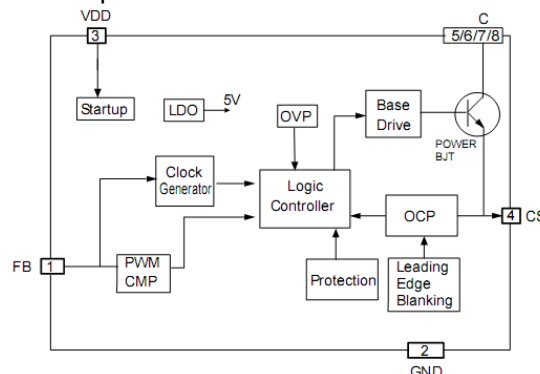
APPLICATION

- Charger
- Small Power adapter
- Auxiliary Power for PC, TV etc
- Linear Regulator/RCC Replacement

FEATURES

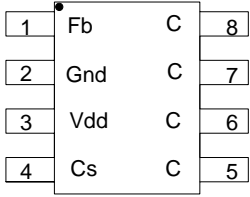
- Primary Side Regulation
- Built-in Power BJT
- Cable Loss Voltage Compensation
- Good Dynamic Response
- Ultra-low Start-up Current
- Output Over Voltage Protection Function
- Built-in Over Temperature Protection
- Noise Immunity
- Multi-mode PWM/PFM control
- Primary Winding Inductance Compensation
- High Precision Constant Voltage Output
- High Precision Constant Current Output
- VDD Overvoltage Protection
- Undervoltage Lock-in Protection (UVLO)
- No audio noise
- Built-in Leading Edge Blanking
- Quasi-resonant (QR) mode
- Input over voltage protection
- Input undervoltage protection

BLOCK DIAGRAM

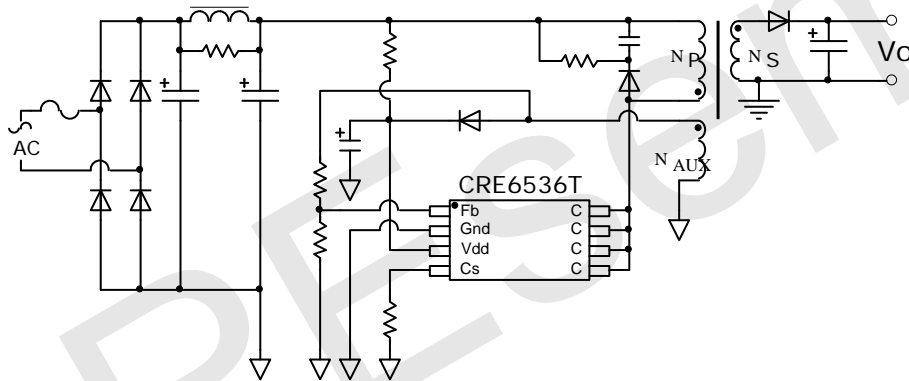


PIN DEFINITION AND DESCRIPTION

Pin#	Name	Description
1	Fb	Feedback input
2	Gnd	Ground
3	Vdd	Power supply
4	Cs	Current sense input
5	C	BJT Collector
6	C	BJT Collector
7	C	BJT Collector
8	C	BJT Collector



TYPICAL APPLICATION



ABSOLUTE MAXIMUM RATINGS

Parameter	Value	Unit
Vdd	-0.3—26	V
Fb	-0.3—6	V
Cs	-0.3—6	V
C	≤450	V
Package thermal resistance	180	°C/W
Lead Temperature (Soldering, 10secs)	260	°C
Operating Ambient Temperature	-40-150	°C
Min/Max Storage Temperature T _{stg}	-65--150	°C
Soldering Temperature	126 10s	°C

RECOMMENDED OPERATING CONDITIONS

Max Vdd Operation Voltage	25V
Junction Temperature Range T _j	-40°C—150°C
Ambient Temperature Range	-40°C—85°C

ELECTRICAL CHARACTERISTICS							
(VDD=20V, TA=25°C, unless otherwise specified)							
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit	
VDD Supply Section							
I_ST	Startup current	Vdd_ON-1V		3	20	uA	
VTH_ON	Turn on voltage	Vdd Rising	15	16	17	V	
VTH_OFF	Turn off voltage	Vdd Falling	3.8	4.2	4.6	V	
IOP1	Operation current1			800		uA	
OVP	VDD OVP voltage			26		V	
Current Sense Section							
LEB	Leading edge blanking			350		ns	
VTH_OCPmin	Threshold of OCPmin			500		mV	
VTH_OCPmax	Threshold of OCPmax			550		mV	
Feedback Input Section							
Vref_F	Feedback voltage		1.975	2.0	2.025	V	
Min_off	Minimum off time			2		us	
F_max	Maximum frequency			100		KHZ	
F_min	Minimum frequency			350		HZ	
I_cable				15		uA	
Output Over Voltage Protection							
VTH_OVP	Threshold of OVP			2.4		V	
Power BJT Section							
Vcbo	Break down voltage between collector and base	CRE6536T	G		800		V
			L		800		V
			M		800		V
			H		900		V
			I		800		V
			K		800		V
			A		800		V
			B		700/800		V
			C		700/800		V
			E		700/800		V
D		700		V			

OPERATION

Start up Control

Because the chip startup current is very small, the large value startup resistors can be used. The startup current flows through the startup resistance to charge the capacitor of the VDD. When the VDD voltage reaches the turn on voltage, the chip starts to work.

Soft Start

In the start-up stage, the maximum peak current limit of power BJT is gradually increased. Can greatly reduce device stress and prevent transformer saturation.

Peak Current Detection

When the drive is high level, the power BJT of CRE6536T turns on, and the current of the primary coil increases linearly by sampling resistance detection. When the set peak current limit is reached, the power BJT is turned off.

Constant Voltage Principle

When the power BJT is turned off and the system is demagnetized, the feedback voltage Fb is positive. Sampling is done at 2/3 of the time when the FB is positive. The voltage sampled is compared with the constant voltage threshold of 2.0V, amplified and maintained, resulting in the turn-off time of the constant voltage loop, thus realizing the output constant voltage.

Constant Current Principle

The control circuit of CRE6536T detects the time of VFb is positive, negative or attenuated oscillation, so that the maximum output current is constant. Users can adjust the maximum output current by adjusting the Cs resistance. The larger the CS resistance, the smaller

the maximum output current; the smaller the CS resistance, the larger the maximum output current. Constant voltage and constant current is integrated as shown in the figure below.

Cable Drop Compensation

In practical application design, the output voltage will have voltage drop on the cable. Under different current conditions, the voltage drop of the rectifier diode at the output end will also change, which needs to be considered comprehensively.

CRE6536T realize cable loss compensation by increasing constant voltage threshold at Fb end. The increased threshold is inversely proportional to the turn-off time of the power transistor, and the turn-off time of the power transistor is inversely proportional to the output load current, so the compensation is proportional to the output load current. In the process of load from no load to full load, the threshold voltage of Fb port increases gradually, so the output voltage is basically unchanged to achieve the purpose of constant voltage

Over Temperature Protection

When the temperature exceeds 150 C, the chip enters into the over temperature protection state.

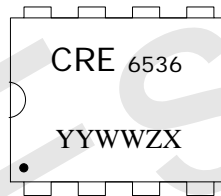
Protection Controls

CRE6536T provides many comprehensive and excellent intelligent protection functions including cycle-by-cycle over-current protection, output over-voltage protection, Chip overheating protection, etc.

OUTPUT POWER TABLE (This value is the maximum possible value)

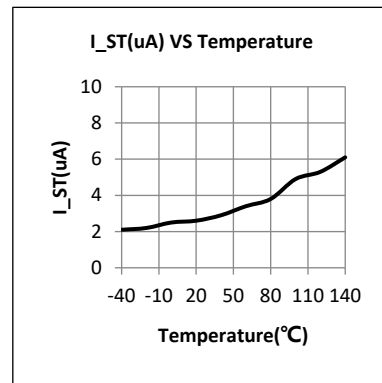
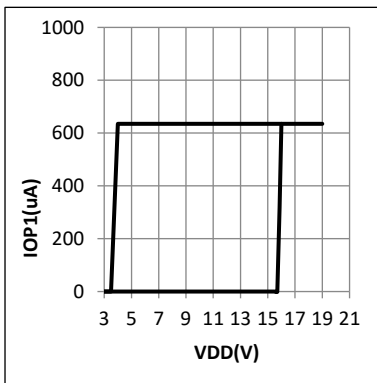
Name	Power BJT/ (Vcbo/V)	Package	Output Power/ (90-264V)
CRE6536TG	800	SOP-8	3W
CRE6536TL	800	SOP-8	5W
CRE6536TM	800	SOP-8	5W
CRE6536TH	900	SOP-8	5.5W
CRE6536TI	800	SOP-8	6W
CRE6536TK	800	SOP-8	7W
CRE6536TA	800	SOP-8	9W
CRE6536TB	700/800	SOP-8	10W
CRE6536TC	700/800	SOP-8	10.5W
CRE6536TE	700/800	SOP-8	12W
CRE6536TD	700	SOP-8	12.5W

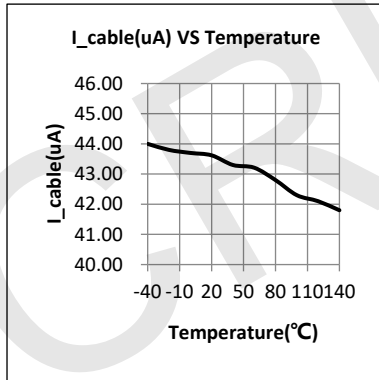
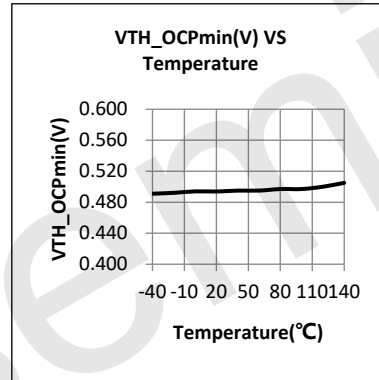
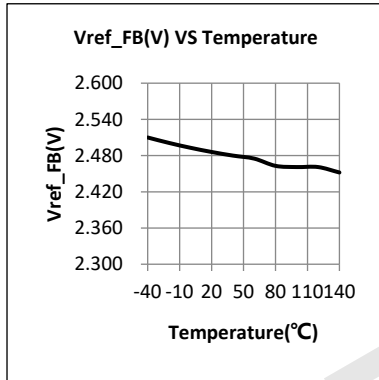
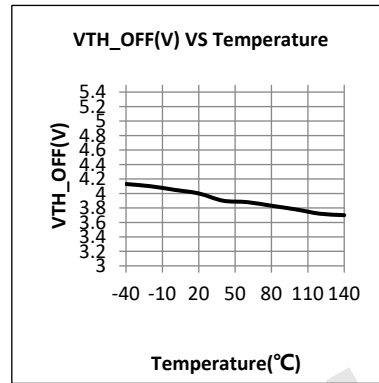
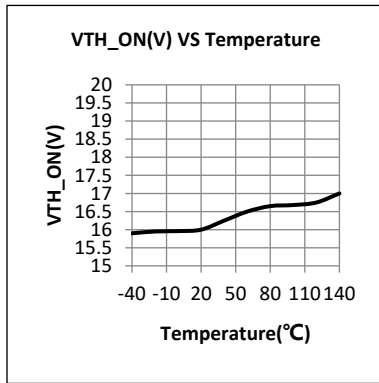
MARKING INFORMATION



- CRE: Company LOGO
- 6536: the Product Type
- YYWW: the Year and Cycle of Production
- Z: Internal traceability code (the character is alphabetical)
- X: Product Model Extension

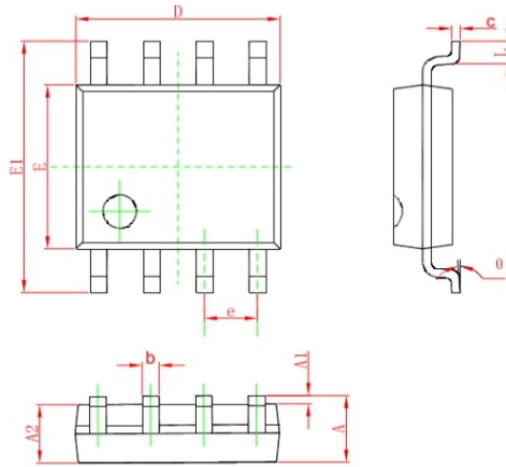
TYPICAL PERFORMANCE CHARACTERISTICS





PACKAGE DIMENSIONS

SOP-8



Package Size Table

Symbol	Metric system		British system	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A1	0.1	0.25	0.004	0.01
A2	1.35	1.55	0.053	0.061
b	0.33	0.51	0.013	0.02
c	0.17	0.25	0.006	0.01
D	4.7	5.1	0.185	0.2
E	3.8	4	0.15	0.157
E1	5.8	6.2	0.228	0.244
e	1.270(BSC)		0.050 (BSC)	
L	0.4	1.27	0.016	0.05
θ	0°	8°	0°	8°

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