

### GENERAL DESCRIPTION

The PT2204 is a primary side constant current/voltage regulator, targeted to sub 4W AC-DC power suppliers applications. It is designed for the flyback topology, and regulates output current/voltage without the secondary feedback loop. In addition to providing the tight output regulation, the excellent low power control allows the PT2204 to meet all the global energy efficiency and standby power requirements.

The PT2204 provides accurate CV/CC regulation with built in compensation circuitry. Integrated line and primary inductance compensation ensures output current free of line voltage and primary inductance variations. More over, the integrated output cord resistance compensation further enhances output voltage accuracy.

A complete set of integrated protection functions allows the PT2204 to protect against all fault conditions including output short circuit, line under-voltage, and over temperature shut down.

The PT2204 is available in a SOP8 package.

### FEATURES

- CC and CV Control Without Secondary Feed back
- Eliminates Compensation Network
- Standby power dissipation down to 30 mW
- Integrates 600V Power switch
- Compensates Line Voltage Variation
- Compensates Inductor Variation in CC mode
- Compensates Output Cable Resistance
- VCC/FB Over Voltage Protection
- Short Circuit Protection
- Line Under Voltage Protection
- Cycle by Cycle Current Limit
- Over Temperature Protection

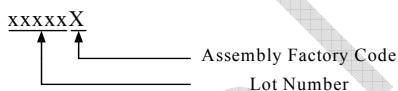
### APPLICATIONS

- AC-DC RCC chargers replacement
- Power Adapters and Battery Chargers
- Standby and Auxiliary Suppliers

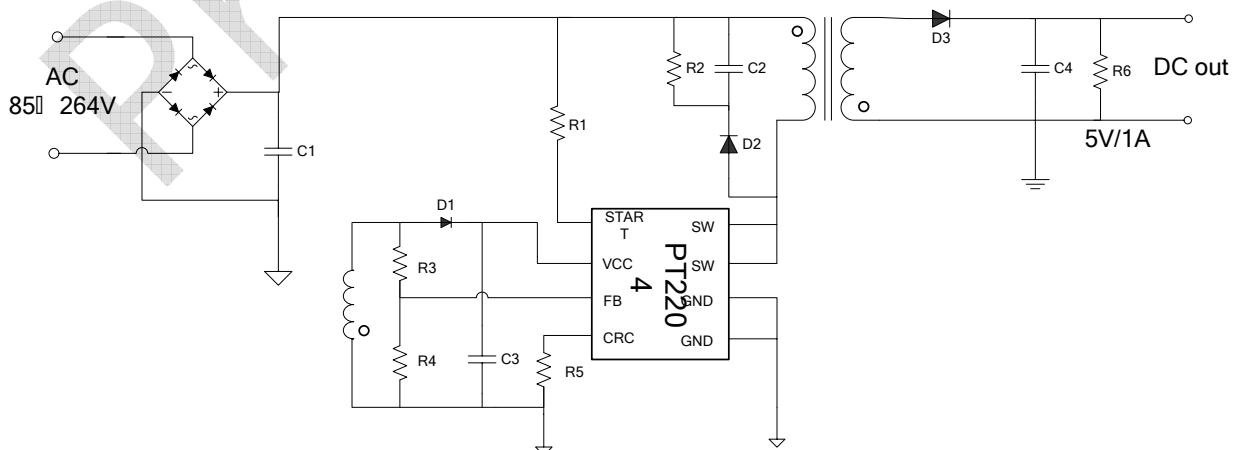
### ORDERING INFORMATION

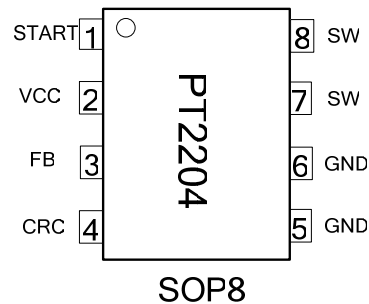
PACKAGE	TEMPERATURE RANGE	ORDERING PART NUMBER	TRANSPORT MEDIA	MARKING
SOP8	-40°C to 85°C	PT2204ESOH	Tape and Reel	PT2204 xxxxxX

Note:



### TYPICAL APPLICATION CIRCUIT



**PIN ASSIGNMENT**

**PIN DESCRIPTIONS**

PIN No.	PIN NAMES	DESCRIPTION
1	START	Start up control pin, connects to the start up resistor
2	VCC	Auxiliary winding input, PT2203 is supplied by an auxiliary winding.
3	FB	Feedback Winding Voltage Sense Input
4	CRC	Cable Resistor Compensation, connects to a Resistor
5,6	GND	Ground
7,8	SW	Power switch output, connect to the primary winding of transformer

**ABSOLUTE MAXIMUM RATINGS (note1)**

SYM	PARAMETER	VALUE	UNIT
VCC	VCC DC Supply Voltage	25	V
V <sub>START</sub>	Start Input Voltage	-0.3-25	V
V <sub>FB</sub>	Feedback Sense Input Voltage	-0.3-5	V
V <sub>CRC</sub>	Cable Resistor Compensation Current Sense Voltage	-0.3-5	V
V <sub>SW</sub>	Drive Output Voltage	-0.3-600	V
T <sub>opt</sub>	Operating Junction Temp. Range	-40 to 150	°C
T <sub>stg</sub>	Storage Temp. Range	-55 to 150	°C
HBM	ESD Capability, HBM	2000	V
R <sub>θJA</sub>	SOP8	150	°C/W

**Note 1:** Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Recommended Operating Range indicates conditions for which the device is functional, but do not guarantee specific performance limits. Electrical Characteristics state DC and AC electrical specifications under particular test conditions which guarantee specific performance limits. This assumes that the device is within the Operating Range. Specifications are not guaranteed for parameters where no limit is given, however, the typical value is a good indication of device performance.

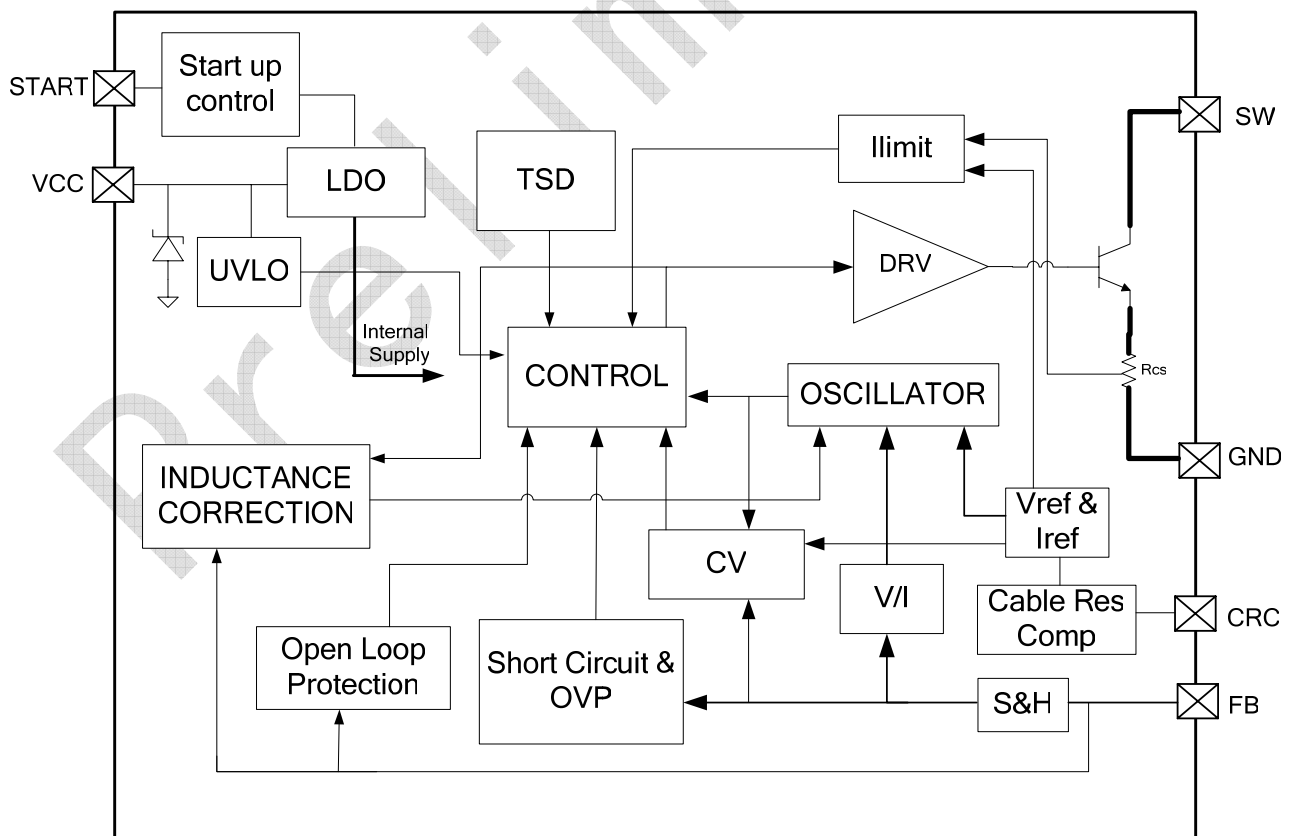
**ELECTRICAL CHARACTERISTICS**

 (T<sub>OPT</sub>=25°C, V<sub>CC</sub>=14V, unless specified otherwise)

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNIT
<b>SUPPLY VOLTAGE (V<sub>CC</sub>, V<sub>DD</sub> and V<sub>STRT</sub>)</b>						
V <sub>VCC_ON</sub>	VCC minimum voltage to turn on the chip	VCC Rising	13	15	17	V
V <sub>VCC_OFF</sub>	VCC minimum operating level	VCC Falling	6.5	7.5	8.5	V
V <sub>VCC_Clap</sub>	VCC Clamp Voltage			22		
V <sub>VCC_OVP</sub>	VCC Over Voltage Protection Threshold			18		
I <sub>VCC_OPER</sub>	VCC Supply Current (During Working)	V <sub>in</sub> =310V, F <sub>osc</sub> =45KHz, FB=V <sub>REF</sub>		2000	4000	uA
V <sub>BD</sub>	V <sub>BD</sub> Pin Zener Diode Clamp Voltage	I(V <sub>Gate</sub> )=2.5mA		25		V
<b>FEED BACK VOLTAGE SENSE PIN (FS)</b>						
V <sub>REF</sub>	FB Reference Voltage, CV mode and no cable resistor compensation		1.975	2.0	2.025	V
V <sub>FBMAX</sub>	FB Over Voltage Protection level		2.75	3	3.25	V
V <sub>FBMIN</sub>	FB Minimum Voltage		0.4	0.5	0.6	V
I <sub>FB_OPEN</sub>	FB Open Loop Current			-200		uA
T <sub>SMP_LEB</sub>	FB Sample LEB time			1.9		uS
<b>OSCILLATOR (OSC)</b>						
F <sub>osc</sub>	Oscillator Frequency	FB=V <sub>REF</sub> , I <sub>FB</sub> ×Ton=1.5mA*uS	37	40	43	kHz
Dither_osc	Dither frequency percentage	T <sub>J</sub> =25°C		± 7		%
R <sub>ATIO_CC</sub>	CC Mode Frequency Ratio	F <sub>osc</sub> At V <sub>FB</sub> =2V /F <sub>osc</sub> At V <sub>FB</sub> =1V		2		
R <sub>ATIO_IND</sub>	Inductor correction Ratio	I <sub>FB</sub> ×Ton between 1mA*uS and 2mA*uS		2		
F <sub>MIN</sub>	Minimum Operating Frequency At No Load			500		Hz
T <sub>ON_MIN</sub>	Minimum Turn On Time			500		nS

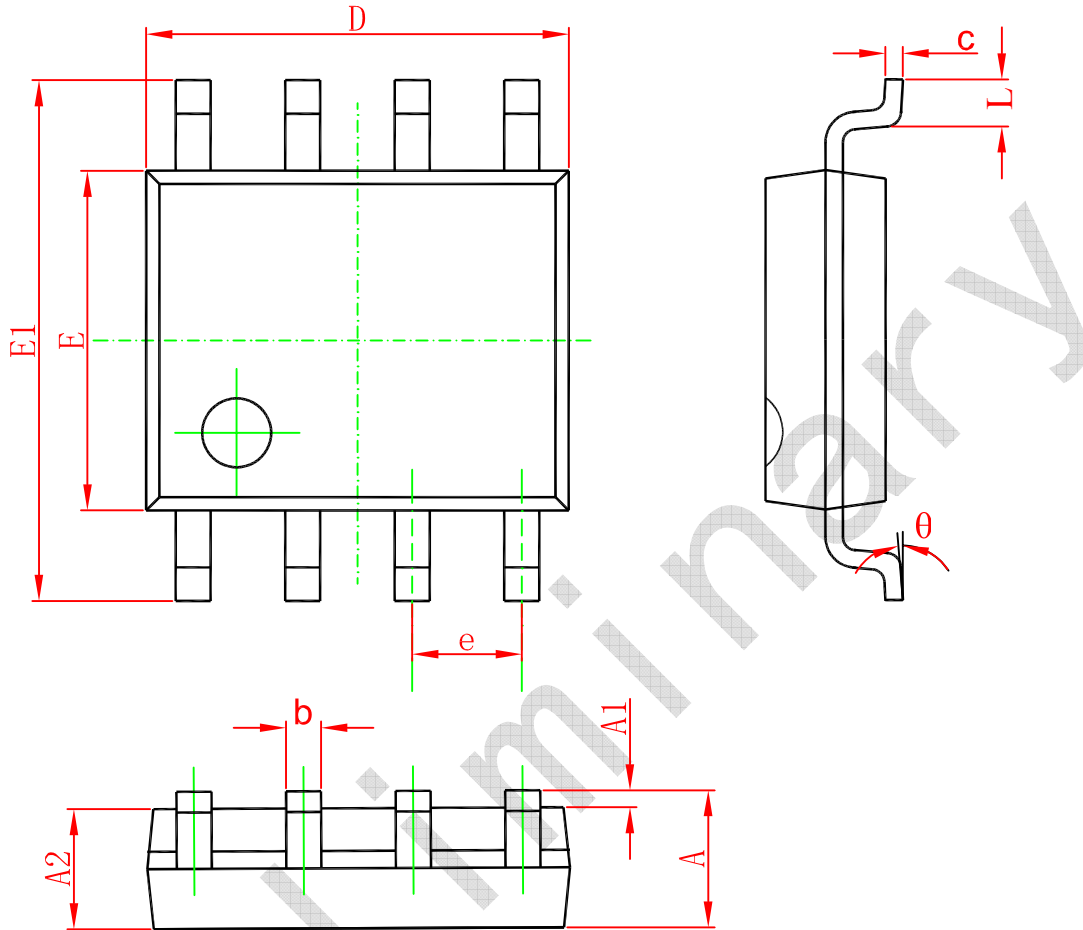
**ELECTRICAL CHARACTERISTICS (continued)**

OUTPUT							
$R_{DS(ON)}$	On-State Resistance	$T_J=25^\circ\text{C}$		2	3	$\Omega$	
PROTECTION							
$I_{LIMIT}$	Current Limit	$di/dt=70$ $T_J=25^\circ\text{C}$	mA/us,	425	450	475	mA
$T_{LIMIT\_LEB}$	Current Limit Leading Edge Blanking Time				300		ns
$T_{SD}$	Thermal Shut Down Threshold				150		$^\circ\text{C}$
$T_{SDH}$	Thermal Shut Down Hysteresis				20		

**SIMPLIFIED BLOCK DIAGRAM**


**PACKAGE INFORMATION**

SOP8



SYMBOL	DIMENSIONS IN MILLIMETERS		DIMENSIONS IN INCH	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°