



1.5A Ultra Low Dropout Voltage Regulator Fast Response, Adjustable & Fixed

FEATURES

- Low Dropout Voltage 500mV at 1.5A Full Load Current
- Adjustable Output Down to 1.2V from ATX Power Supply
- Fixed Output Voltages of 3.3V, 2.8V, 2.5V, and 1.5V
- Extremely Tight Voltage and Line Regulation
- Standard 5-Terminal Low Cost TO-220 & TO-263

APPLICATIONS

- 3.3V to 2.8V ATX Power Supplies
- 3.3V to 2.9V for Portable PENTIUM™ Processor
- 5V to 3.5V VRE Supply
- High Efficiency “Green” Computer Systems

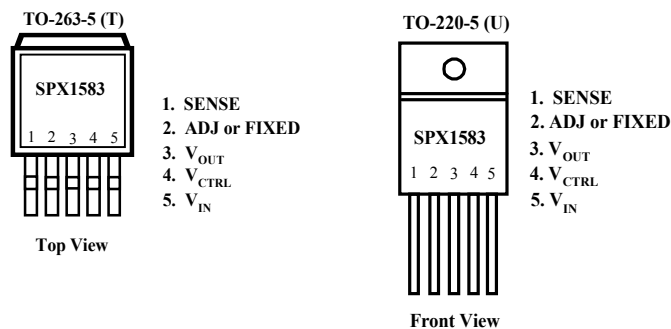
PRODUCT DESCRIPTION

The SPX1583 is a 1.5A Low Dropout Regulator with extremely low dropout voltage. The adjustable version requires only two external resistors to set the output voltage. The fixed version has a preset output of 3.3V, 2.8V or 2.5V and does not require any external resistors. The SPX1583 features a low dropout of less than 400mV(typ.) and offers fast transient response. **This device is suitable for Pentium applications requiring 2.8V or 2.5V from 3.3V ATX power supplies**, where a low current input voltage 1V greater than the output voltage is needed. With an external sense pin the load regulation is less than 1mV. This device is an excellent choice for the use in powering low voltage microprocessors that require a lower dropout, fast transient response to regulate from 3.3V and 5V supplies. The SPX1583 is also an excellent choice as a post regulator for switching supplies applications.

The SPX1583 offers full protection against over-current faults, reversed input polarity, over temperature operation and positive and negative transient voltage.

The SPX1583 is offered in a 5 pin TO-220 and TO-263 compatible with industry standard 5-terminal regulators. For 7A, 5A and 3A ultra low dropout versions refer to SPX1580, SPX1581 and SPX1582 data sheets respectively.

PIN CONNECTIONS



ABSOLUTE MAXIMUM RATINGS

Power Dissipation.....	Internally Limited	Input Supply Voltage	6V
Lead Temp (soldering, 10 seconds).....	300°C	V _{CTRL} Input Voltage	13V
Storage Temperature Range	-65°C to +150°C		
Operating Junction Temperature Range			
SPX1583 Control Section	0°C to +125°C		
SPX1583 Power Transistor	0°C to +150°C		

ELECTRICAL CHARACTERISTICS at V_S=14V, T_A=25°C, I_O=10mA, C₂=100µF, unless otherwise specified. (Note 1) (Boldface applies over full temperature range).

Parameters	Conditions	SPX1583			Units
		Min	Typ	Max	
2.5V Version					
Output Voltage	V _{CTRL} =6.0V to 12V, V _{IN} =3.0V to 5.0V, I _O =10mA I _O =10mA to 1.5A	2.450 2.400	2.500	2.550 2.600	V
2.8V Version					
Output Voltage	V _{CTRL} =6.3V to 12V, V _{IN} =3.3V to 12V, I _O =10mA I _O =10mA to 1.5A	2.744 2.688	2.800	2.856 2.912	V
3.3V Version					
Output Voltage	V _{CTRL} =6.3V to 12V, V _{IN} =3.3V to 12V, I _O =10mA I _O =10mA to 1.5A	3.234 3.168	3.300	3.366 3.432	V
All Voltage Options					
Reference Voltage	V _{CTRL} =2.75V, V _{IN} =2.00V, I _O =10mA V _{CTRL} =2.7V to 12V, V _{IN} =2.05V to 5.5V, I _O =10mA to 1.5A	1.237	1.250	1.263	V
Line Regulation	V _{CTRL} =2.5V to 12V, V _{IN} =1.75V to 5.5V, I _O =10mA V _{ADJ} =0V		1.0	3.0	mV
Load Regulation (Note1)	V _{CTRL} =2.75V, V _{IN} =2.1V, I _O =10mA to 1.5A, V _{ADJ} =0V		1.0	5.0	mV
Dropout Voltage Minimum V _{CTRL} (Note2) (V _{CTRL} - V _{OUT})	V _{ADJ} =0V V _{IN} =2.05V, I _O =1A		1.00	1.15	V
Dropout Voltage Minimum V _{IN} (Note2) (V _{IN} - V _{OUT})	V _{ADJ} =0V V _{IN} =2.75V, I _O =1.5A		0.40	0.50	V
Current Limit	V _{CTRL} =2.75V, V _{IN} =2.05V, dV _O =100mV, V _{ADJ} =0V	1.6			A
Minimum Load Current	V _{CTRL} =5V, V _{IN} =3.3V, V _{ADJ} =0V		5	10	mA
Thermal Regulation	30ms Pulse		0.002	0.02	%W
Ripple Rejection	V _{CTRL} =3.75V, V _{IN} =3.75V, I _O =2.15A, V _{ADJ} =0V T _J =25, V _{RIPPLE} =1Vpp at 120Hz	60	80		dB
Control Pin Current	V _{ADJ} =0V V _{CTRL} =2.75V, V _{IN} =2.05V, I _O =1.5A		60	120	mA
Adjustable Pin Current	V _{CTRL} =2.75V, V _{IN} =2.05V, V _{ADJ} =0V, I _O =10mA		50	90	µA
Thermal Resistance	TO-220-5	Junction to Case (θ _{JC})		3	°C/W
		Junction to Ambient (θ _{JA})		50	°C/W
	TO-263-5	Junction to Case (θ _{JC})		3	°C/W
		Junction to Ambient (θ _{JA})		60	°C/W

The **Bold** specifications applying to the over full operating temperature range.

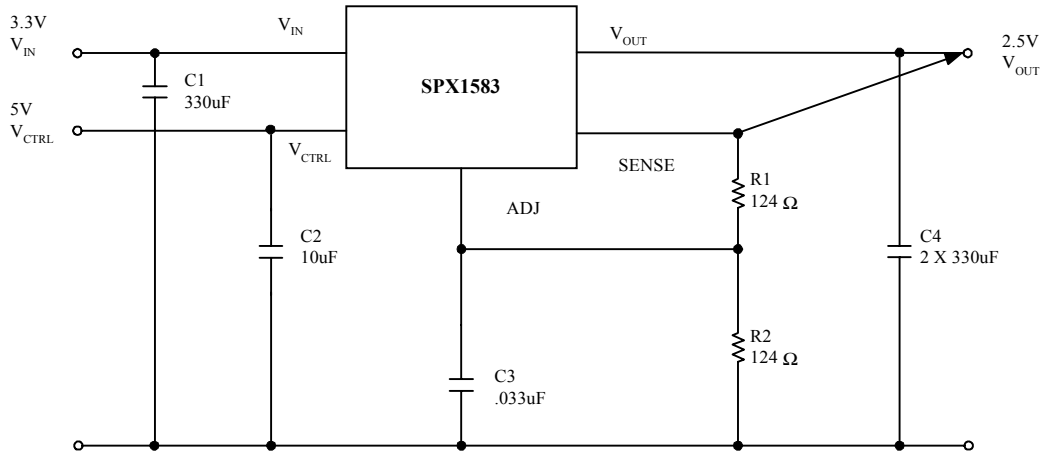
Note 1: Low duty cycle pulse testing with Kelvin connections is required to order to maintain accurate data.

Note 2: Dropout voltage is defined as the minimum differential between V_{IN} and V_{OUT} or V_{CTRL} and V_{OUT} required to maintain regulation at V_{OUT} 99% Nominal V_{OUT}.

Note 3: V_{REF} is measured across Adjust pin to Sense pin.

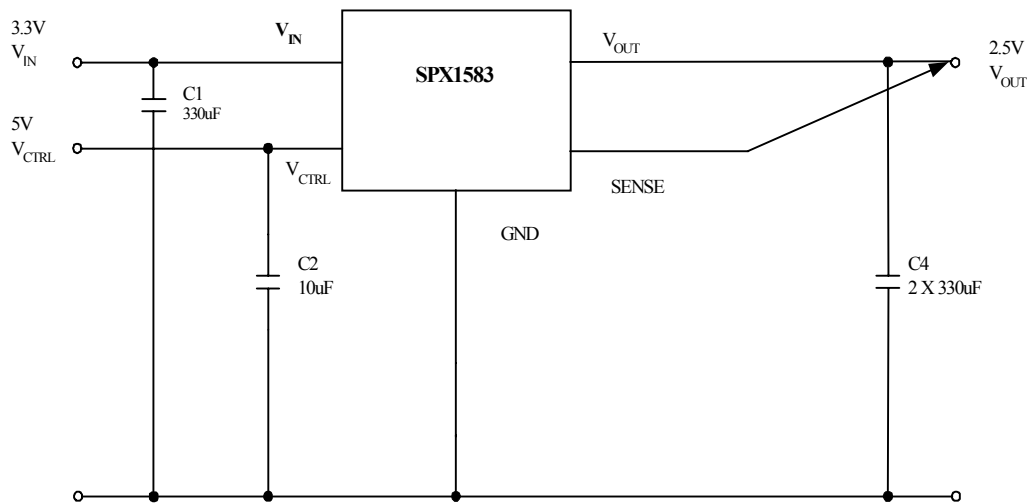
TYPICAL APPLICATION

Fig. 1 Adjustable Regulator



- (1) V_{CTRL} needed when $V_{IN} < 5V$.
- (2) $V_{OUT} = V_{REF} (1 + R2/R1) + I_{ADJ} R2$.
- (3) V_{REF} is measured across adjust to sense.

Fig.2 Typical Fixed Regulator



- (1) V_{CTRL} is needed when $V_{IN} < 5V$.

ORDERING INFORMATION

Ordering No.	Precision	Output Voltages	Packages
SPX1583U	0.6%	Adj	3 Lead TO-220
SPX1583U-1.5	0.6%	1.5V	3 Lead TO-220
SPX1583U-2.5	0.6%	2.5V	3 Lead TO-220
SPX1583U-3.0	0.6%	3.0V	3 Lead TO-220
SPX1583U-3.3	0.6%	3.3V	3 Lead TO-220
SPX1583T	0.6%	Adj	3 Lead TO-263
SPX1583T-1.5	0.6%	1.5V	3 Lead TO-263
SPX1583T-2.5	0.6%	2.5V	3 Lead TO-263
SPX1583T-3.0	0.6%	3.0V	3 Lead TO-263
SPX1583T-3.3	0.6%	3.3V	3 Lead TO-263



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