

Switch-mode Step-down Regulator



The SRD power converter is a high frequency, switch-mode, step-down regulator for applications requiring stable power. The compact and efficient design requires little heatsinking or support components. It provides the functions of bench-top power supplies in a smaller and more efficient setup.

Benefits

- Economical and easy-to-use.
- Compact and efficient.
- Reliable operation.
- Provides stable power to load.

Applications

- Bench-top power supply.
- Powering electronic products.
- Battery charging.
- Replace lost or broken power supplies.
- Marine, industrial, auto, recreational Camping, remote field-use, others.

Features

- Adjustable voltage (CV) and current (CC) limiting.
- Power protection and filtering.
- Wide input voltage range.
- Stable voltage and current limiting.
- Efficient high frequency switch-mode design.

Available Models

OT-PESRD-0V2-01: 35V input max., adjustable 6-17VDC output, 2A max. CV or CC/CV models available. Other output voltages available.

Voltage and current limiting

The benefits of providing clean, regulated power to equipment result in a more reliable and cost-effective system over the lifespan of the product. Many users do not take into account clean power until the equipment provides problems or fails. Also, many systems do not operate at optimum performance if power is inconsistent. Some electronic components such as LEDs require constant current operation. The LEDs operating voltage drastically decreases with increasing temperature and decreasing forward current. If the LEDs were operated in a fixed, constant voltage method with minimum power limiting, the operating current may increase more than 50% from cold. There is the chance of thermal runaway and the LEDs becoming damaged. A power regulator with voltage and current limiting will maintain the LEDs in an optimum power band for maximum life and performance.

Technical Specifications:

Input voltage:	9-35VDC
Output voltage:	6-17VDC, up to 30VDC
Output current:	0-3.0A
Current limit control:	0.51A-2.1A
Noise:	<100mV ripples, <150mV _{p-p} voltage spikes at full load.
Operation temperature:	-20°C to 60°C
Dimension:	2.3"x2.1"

Note: Do not use in wet or damp locations. Do not exceed the specifications of the unit. The unit should be mounted away from sunlight for easier viewing of the display.

Operation

The SRD Switching Regulator uses the LM2596T-ADJ 150kHz 3A simple switching regulator to provide the power converter functions. There is an op-amp and some passive components to provide current and voltage feedback to the switching regulator. The PCB is designed to maximize heat

dissipation and minimum noise generated with thick traces and component separation. All the power conversion components (inductors and capacitors) are on one side while the feedback control is on the opposite side of the switching regulator. The SRD has voltage and current limiting operation similar to a standard bench-top power supply. See SRD schematic and LM2596T-ADJ technical data sheet for more information.

Installation

Please read the appropriate data sheet prior to installation for best results. The installation should be made by a qualified service person and conforms to all appropriate local codes. Onstate Technologies Inc. will not be responsible for injuries or damages resulting from the improper installation or use of any products sold by Onstate or its retailers. Install the product within its specification limits.

The installation of the SRD Switching Regulator is straight-forward. Apply input DC power and adjust the output voltage and current is all is required. A digital multimeter will help in the ease of the setup. Do not use the product in high temperature or direct sunlight locations. The SRD unit get warm when operation at full power. Make sure that there is good air circulation around the product.

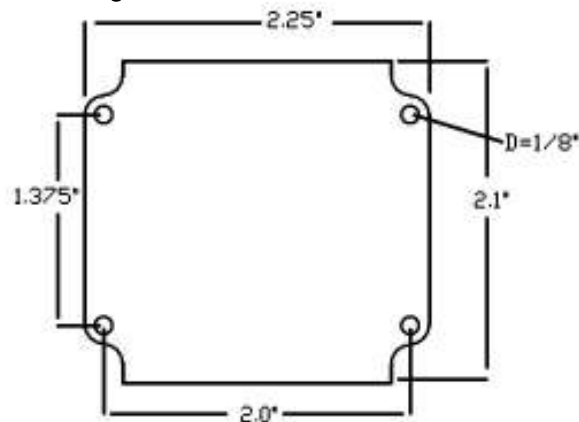
Control Adjustments

The only control adjustments are for output voltage and current limit setting.

Mounting hole dimensions

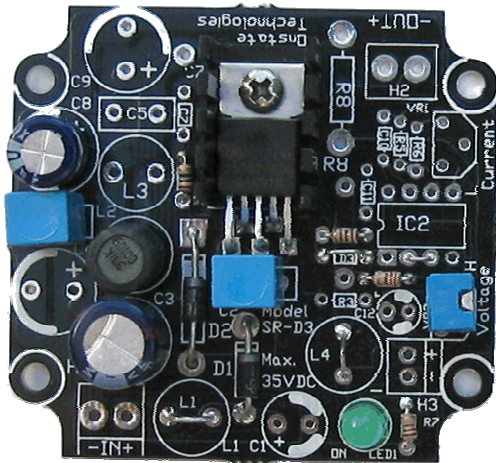
All units in inches

Mounting dimensions are 1/8" diameter for #4 or M3 bolts.

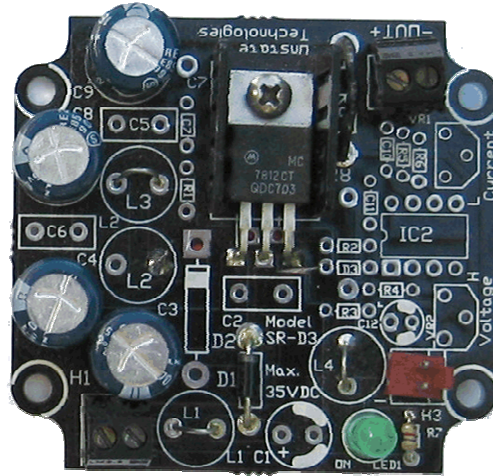


Application Example

1. Battery charging.
2. LED array power control.
3. Sensitive electronic equipment.
4. Bench-top power supply.

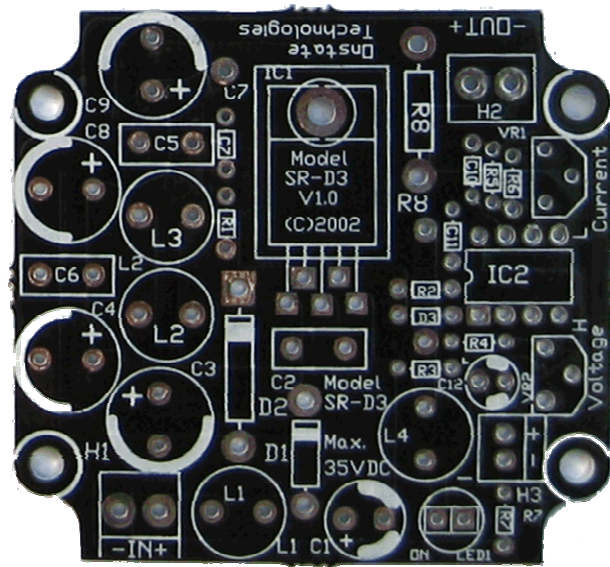
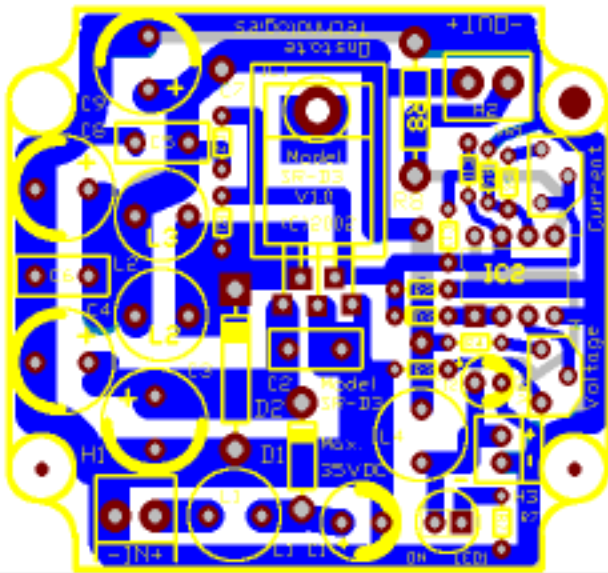


Low-cost switching regulator.

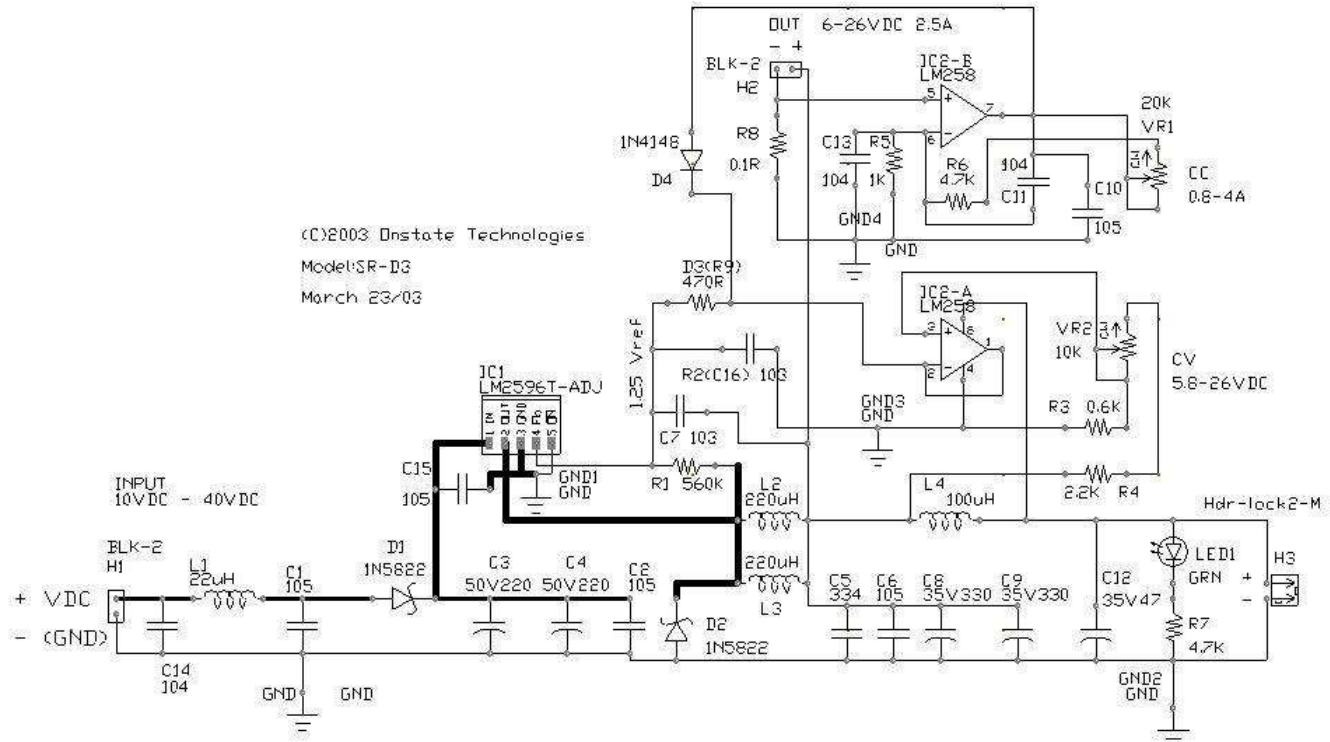


Low-cost fixed voltage linear regulator.

SRD design and assembly



Top silkscreen (legend) layer for SRD and PCB top layer.



Schematic of SRD Switching Regulator

Table 1. Bill-of-materials for SRD Switching Regulator.

Part #	Digi-Key #	Description	Designation	Qty
LM2596T-ADJ	LM2596T-ADJ -ND	150kHz, 3A simple switcher regulator, To-220	IC1	1
LM258	296-6625-5-ND	LM258 dual op-amp, 8-pin DIP	IC2	1
2-pos.		2-position terminal block, 0.15" spacing	H1, H2	2
1N5822	1N5822DICT-ND, 1N5822GICT-ND	3A Schottky diode	D1, D2	2
1N4148	1N4148DICT-ND, 1N4148MSCT-ND	low power signal diode.	D4, D5/R6	2
L1	M6011-ND	22uH inductor, JW Miller	L1	0
L2, L3	M6023-ND	220uH inductor, JW Miller	L2, L3	2
L4	TK4444-ND	47uH inductor, Toko	L4	0
35V330	P5167-ND	35V 330uF electrolytic cap, 0.2" spacing	C8, C9	1
50V220	P5183-ND	50V 220uF electrolytic cap, 0.2" spacing	C3, C4	2
35V47	P5164-ND	35V 47uF electrolytic cap, 0.1" spacing	C12	1
104	BC1127CT-ND	50V 0.1uF mono. cap, 0.2" spacing	C1, C11	2
105	3019PH-ND	63V 1uF mylar cap. 0.2" spacing	C2, C6	2
103	BC1130CT-ND	50V 0.01uF mono. ceramic cap. 0.2" spacing	C7	1
203		20k variable resistor	VR1	1

103		10k variable resistor	VR2	1
green				
LED	160-1130-ND	Green LED, T1-3/4 size	LED1	1
0.05		0.05 ohm, 1W power resistor	R8	1
1k	1.0kEBK-ND	1k 1/8W resistor	R2, D3, R5	3
4.3k	4.3kEBK-ND	4.3k 1/8W resistor, 6.2-18.5V out	R4	3
4.7k	4.7kEBK-ND	4.7k 1/8W resistor	R7	3
560k	560kEBK-ND	560k 1/8W resistor	R1	1
15k	15kEBK-ND	15k 1/8W resistor, 1-2.5A CC	R6	1
heatsink				1
Metal				
plate				1
assembly				1
hardware				1
PCB				1