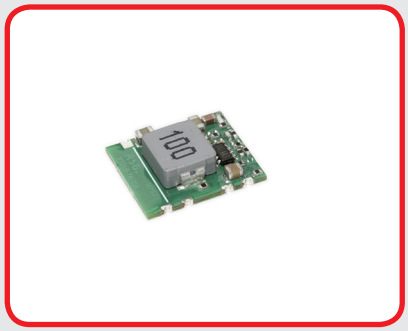
RTOVR-78F[L]

1.0A Non-Isolated, regulated DC/DC Converter



Picture similar

CE

RoHS

- 10 Pin (6) SMD Open-frame
- Wide Input Range
- Step-down switching
- Full SMD Technology
- Efficiency up to 96%
- High Operating Temperature Range -40°C ~ +105°C
- Continuous Short Circuit Protection
- Adjustable Output Voltage
- Low no Load Input Current
- Remote On/Off Control

Output Specifications	
Voltage Accuracy	±2% max.
Output Voltage Adjustability (Trim)	±10% max.
Maximum Output Current	1000mA max.
Line Regulation	±0.2% max.
Load Regulation	from 10% to 100% Load: ±0.6% max. –
Short Circuit Protection	Continuous (Automatic Recovery)
Ripple & Noise (20 MHz bandwidth)	50mV/75mV pk-pk max. (<7.5/>7.5Vout)
Temperature Coefficient	±0.02%/°C
Transient Recovery Time	250µs typ.
Transient Response Deviation	±5% max.

Input Specifications	
Voltage Range	See table
Start-up Time	5ms typ.
No-Load/Full-Load Input Current	See table
Input Filter	C/L (see filter details on following pages)
Input Reflected Ripple Current	35mA pk-pk typ.
Remote ON	2 ~ 5VDC or open circuit
Remote OFF	0 ~ 0.4VDC or short circuit pin 10 and 7/9
OFF Idle Current	0.3mA/0.8mA max. (5Vin/24Vin)
Surge Voltage (100 ms) †)	
5V Models 24V Models	6VDC max. 40VDC max.

General Specifications	
Switching Frequency	1200kHz/410KHz (5Vin/24Vin)
Humidity	95% rel H
Reliability Calculated MTBF	>35MHrs/4.7MHrs (5Vin/24Vin) (MIL-HDBK-217 f)
Safety Standard(s)	IEC/EN60950-1,62368-1 (designed to meet)

Environmental Specifications	
Operating Temperature Range	-40°C ~ +105°C (see Derating Curve)
Maximum Case Temperature	
Storage Temperature	-55°C ~ +125°C
Cooling	Natural Convection
Soldering Profile and Peak Temperature	Pb-free Reflow: 245°C, 10s, max. (IPC/JEDEC J-STD-020D.1, MSL 1)

Physical Specifications	
Case Material	– –
Pin Material	–
Potting Material	–
Weight	1.4g
Case Dimensions	0.60" x 0.47" x 0.15"

EMC Specifications	
Radiated / Conducted Emissions	EN55032 Class B see EMI Filter
ESD	IEC 61000-4-2 Perf.Criteria A
Rad. RF	IEC 61000-4-3 Perf.Criteria A
EFT	IEC 61000-4-4 Perf.Criteria A
Surge	IEC 61000-4-5 Perf.Criteria A
Cond. RF	IEC 61000-4-6 Perf.Criteria A
PFMF	IEC 61000-4-8 Perf.Criteria A

†) These are stress ratings; exposure of devices to any of these conditions may adversely affect long-term reliability.
All specifications typical at T_A = 25 °C, nominal input voltage and full load, unless otherwise specified.
The information and specification contained in this data sheet are believed to be correct at time of publication. However RSG accepts no responsibility for consequences arising from printing errors or inaccuracies. Specifications are subject to change without notice.

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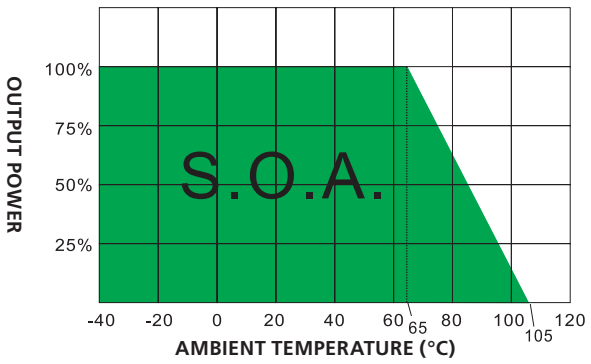
we energize electronics!

Number structure RxVR Series

RT(O)VR	–	78	F	(L)	05	A	(v3)
Name / package		**Compatibility**	**Usage / Amps**	**Input Voltage**	**Voltage out**	**Int. Code**	
RSVR = SIL3 RTVR = DIL10-SMD ..O.. = open-frame		78 = LM78xx	M = Mid-Amp (0.5 A) F = Full-Amp (1.0 A) D = Double-Amp (2.0 A) W = Wide-Input (0.5 A)	_ = standard L = Low input	00 = 1.5 V 01 = 1.8 V 02 = 2.5V … 15 = 15 V	Logistics Code	

Derating Curve



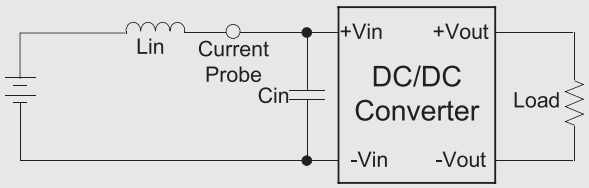
Model Selection Guide

Model Number	Input Voltage (VDC)	Input Current (mA)			Output		Efficiency (% / Typ.)	Max. Capacitive Load (µF)
	Nominal (Range)	No-Load	Full-Load V_{in} (Min)	Full-Load V_{in} (Max)	Voltage (VDC)	Max. Current (mA)	(Min. Vin) / (Max. Vin) @Full Load	
RTOVR-78FL00A	5 (3 ~ 5.5)	0.4	544	297	1.5	1000	92/92	330
RTOVR-78FL01A	5 (3 ~ 5.5)	0.4	649	354	1.8	1000	92.5/92.5	330
RTOVR-78FL02A	5 (3.8 ~ 5.5)	0.4	697	484	2.5	1000	94.5/94	330
RTOVR-78F00A	24 (4.6 ~ 36)	1.5	367	55	1.5	1000	89/76	330
RTOVR-78F01A	24 (4.6 ~ 36)	1.5	433	64	1.8	1000	90.5/79	330
RTOVR-78F02A	24 (4.6 ~ 36)	1.5	588	84	2.5	1000	92.5/83	330
RTOVR-78F03A	24 (4.75 ~ 36)	1.5	740	106	3.3	1000	94/86.5	330
RTOVR-78F05A	24 (6.5 ~ 36)	1.5	806	156	5	1000	95.5/89.5	330
RTOVR-78F06A	24 (9 ~ 36)	1.5	765	201	6.5	1000	94.5/90	330
RTOVR-78F09A	24 (12 ~ 36)	1.5	786	272	9	1000	95.5/92	330
RTOVR-78F12A	24 (15 ~ 36)	1.5	843	359	12	1000	95/93	330
RTOVR-78F15A	24 (18 ~ 36)	1.5	869	444	15	1000	96/94	330

Test Configurations

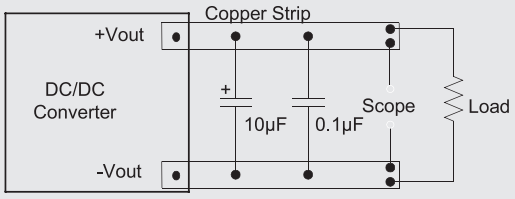
Input Reflected Ripple Current Test

Input reflected ripple current is measured with a source inductor L_{in} (12 µH) and a source capacitor C_{in} (10 µF, ESR < 1.0 Ω at 100 kHz) at nominal input and full load.



Output Ripple & Noise Measurement Test

Use a 10 µF electrolytic capacitor and a 0.1 µF ceramic capacitor. The Scope measurement bandwidth is 20 MHz.

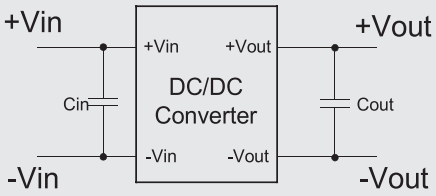


The models listed above are standard types. If you need special specifications or have questions regarding packing or need application support, please contact our specialists: sales@rsg-electronic.de or +49 69-984047-0

Design Configurations

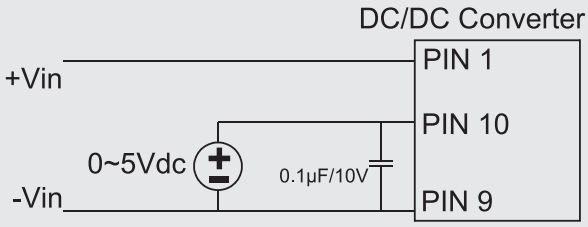
Standard Application Circuit

1. C_{in} is required and must be connected close to the pin terminal of the module. (C_{in} = 10 µF)
2. C_{out} = 47 µF (optional)



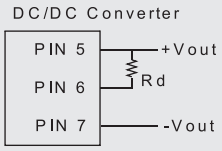
Remote ON/OFF Test Step

Input voltage (2 ~ 5 V_{DC}) connect to Pin 10 or open = converter ON.
Input voltage (0 ~ 0.4 V_{DC}) connect to Pin 10 or short-circuit = converter OFF.

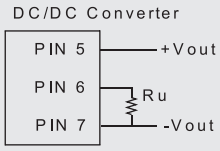


Output Voltage Adjustment

Pin 6 via a resistor to Pin 5 (+V_{out}), V_o trim down.
Pin 6 via a resistor to Pin 7 (–V_{out}), V_o trim up.



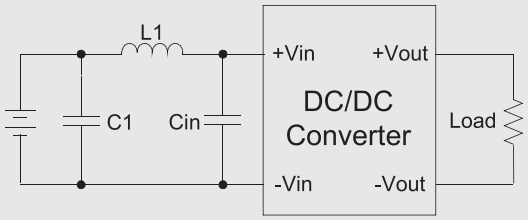
Trim down



Trim up

EMI Filter

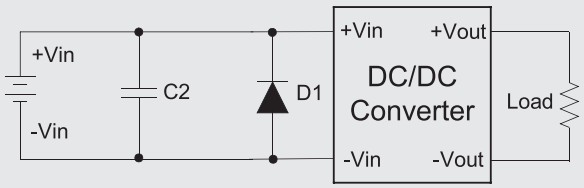
Input filter components (C_{in}, C1, L1) are used to help meet EMI requirement for the module.
These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



	C1	L1	C_{in}
5 V_{in} models	1206, 10 µF, 50 V	6.8 µH	1206, 10 µF, 50 V
24 V_{in} models	1206, 4.7 µF, 50 V	33 µH	1206, 10 µF, 50 V

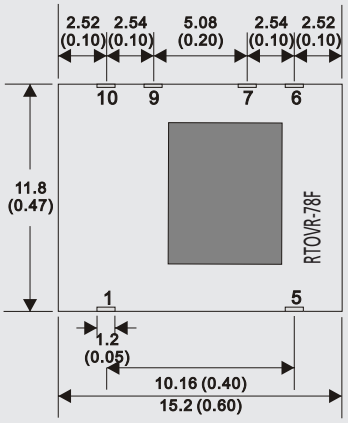
EFT & Surge Test

The suggested filters:
5 V_{in} models: Nippon - chemi - con KY series, 2200 µF/50 V
and a TVS, 3 KW, 6.0 V
24 V_{in} models: Nippon - chemi - con KY series, 330 µF/100 V
and a TVS, 3 KW, 36 V

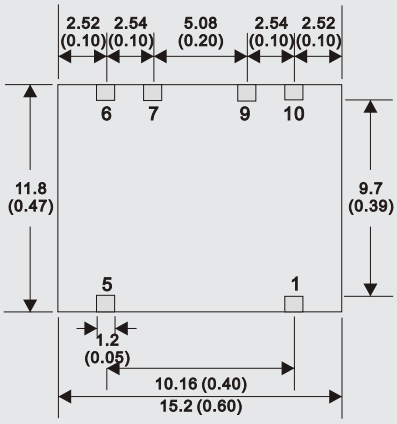


	C2	D1
5 V_{in} models	2200 µF, 50 V	SMDJ6.0A
24 V_{in} models	330 µF, 100 V	SMDJ36A

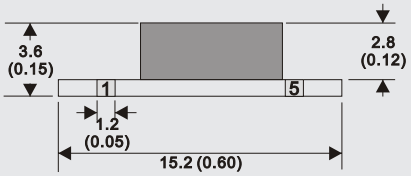
Mechanical Specifications



Top view



Bottom view



Side view

Pin Connections	
Pin Number	**Single**
1	+V Input
5	+V Output
6	Trim
7	–V Output
9	–V Input
10	Remote On/Off

SMD 10 Pin Package

Notes: All dimensions are typical in millimeters (inches).
1. Pin pitch tolerances: ±0.25 (±0.01)
2. Pin profile tolerance: ±0.1 (±0.004)
3. Other tolerances: ±0.5 (±0.02)

Notes:

1. Ripple / Noise measured with a 0.1 µF ceramic and a 10 µF electrolytic capacitor.
2. Capacitive load is tested at minimal Vin and constant resistive load.
3. Transient recovery and response are tested at normal Vin and 50 % ~ 100 % load, 50 % load step change.
4. Measured Input reflected ripple current with a simulated source inductance of 12 µH and a source capacitor 10 µF at nominal input and full load.
5. An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5.
6. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
7. "Nature Convection" is usually about 30 ~ 65 LFM but is not equal to still air (0 LFM).
8. The device can meet EN55032 Class B with an external filter in parallel to input pins.

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