RTVR-78Fv3

1.0A Non-Isolated, regulated DC/DC Converter

Picture similar

RoHS

- 10 Pin (8) SMD Package
- Wide Input Range
- Step-down switching
- Full SMD Technology
- Efficiency up to 95%
- Operating Temperature Range -40°C ~ +85°C
- Continuous Short Circuit Protection
- Adjustable Output Voltage
- Non Conductive Black Plastic Case
- Remote On/Off Control

Output Specifications	
Voltage Accuracy	±2% typ. ±4% max.
Output Voltage Adjustability (Trim)	±10% max.
Maximum Output Current	1000mA max.
Line Regulation	±0.2% typ. ±0.6% max.
Load Regulation	from 10% to 100% Load: ±0.3% typ. ±1.5% max. –
Short Circuit Protection	Continuous, self-recovery
Ripple & Noise (20 MHz bandwidth)	30mV typ., 75mV pk-pk max.
Temperature Coefficient	±0.03%/°C
Transient Recovery Time	200µs typ., 1ms max.
Transient Response Deviation	50mV typ., 150mV max.

Input Specifications	
Voltage Range	See table
Start-up Time	–
No-Load/Full-Load Input Current	See table
Input Filter	C/L (see filter details on following pages)
Input Reflected Ripple Current	–
Remote ON	3.2 ~ 5.5VDC or open circuit
Remote OFF	0 ~ 0.8VDC or short circuit pin 10 and 3/7
OFF Idle Current	0.2mA typ.
Surge Voltage (100 ms) †)	

General Specifications	
Switching Frequency	370kHz ~ 700KHz
Humidity	95% rel H
Reliability Calculated MTBF	>2.0MHrs (MIL-HDBK-217 f)
Safety Standard(s)	IEC/EN62368-1 (designed to meet)

Environmental Specifications	
Operating Temperature Range	-40°C ~ +85°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. / 217°C <60s (IPC/JEDEC J-STD-020D.1, MSL 1)

Physical Specifications	
Case Material	Black flame-retardant, heat-resistant plastic (UL94 V-O) –
Pin Material	–
Potting Material	–
Weight	1.7g typ.
Case Dimensions	0.60" x 0.45" x 0.32"

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

†) 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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Number structure RSVR/RTVR Series

RSVR	–	78	F	05	D	(v3)
Name / package		**Compatibility**	**Usage / Amps**	**Voltage out**	**Int. Code**	
RSVR = SIL3 RTVR = DIL10-SMD		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)	00 = 1.5 V 01 = 1.8 V 02 = 2.5V … 15 = 15 V	Logistics Code	

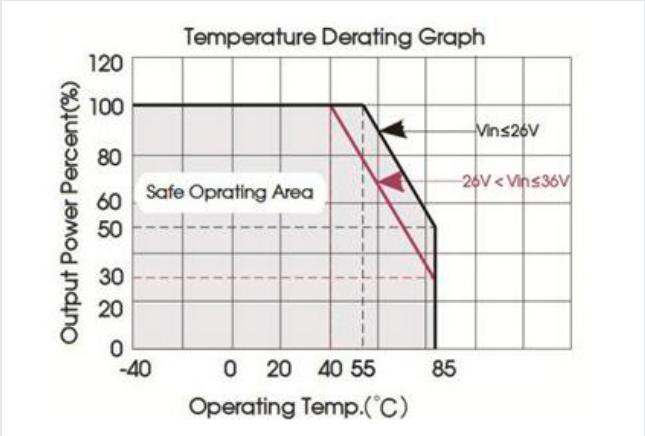
Model Selection Guide

Model Number	Input Voltage (VDC)	Output		Efficiency (%/Typ.)	Max. Capacitive Load (µF)
	Nominal (Range)	Output Voltage (VDC)	Max. Output Current (mA)	(Min. Vin)/ (Max. Vin) @Full Load	
RTVR-78F00Dv3	12 (4.75-32)	1.5	1000	76/66	680
RTVR-78F01Dv3	12 (4.75-32)	1.8	1000	79/69	680
RTVR-78F02Dv3	12 (4.75-32)	2.5	1000	86/74	680
RTVR-78F03Dv3	24 (6.5-36)	3.3	1000	90/80	680
RTVR-78F05Dv3	24 (8-36)	5	1000	93/85	680
RTVR-78F06Dv3	24 (10-36)	6.5	1000	93/86	680
RTVR-78F09Dv3	24 (13-36)	9	1000	94/89	680
RTVR-78F12Dv3	24 (16-36)	12	800	95/92	680

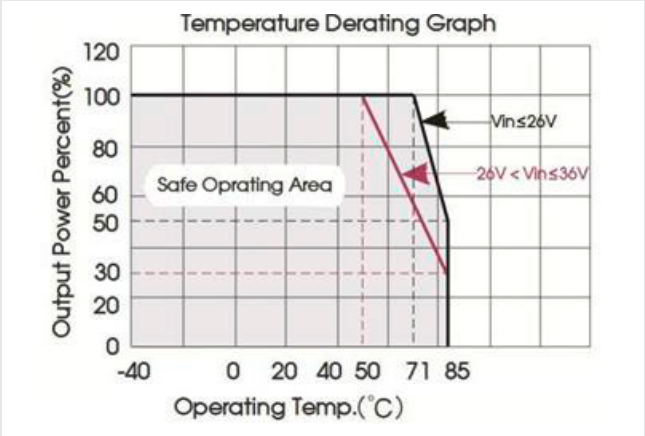
Note: For input voltage higher than 30 VDC, a 22µF/50V input capacitor is required.

Product Characteristic Curve

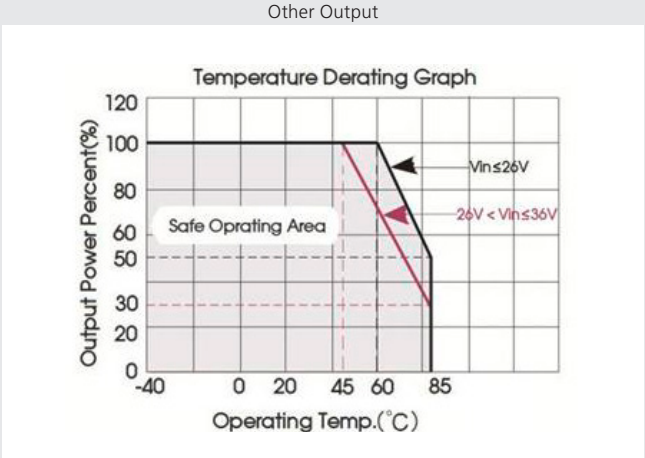
9V Output



12V Output



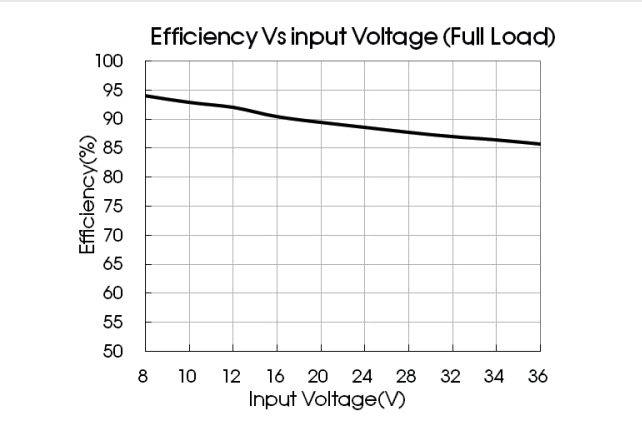
Other Output



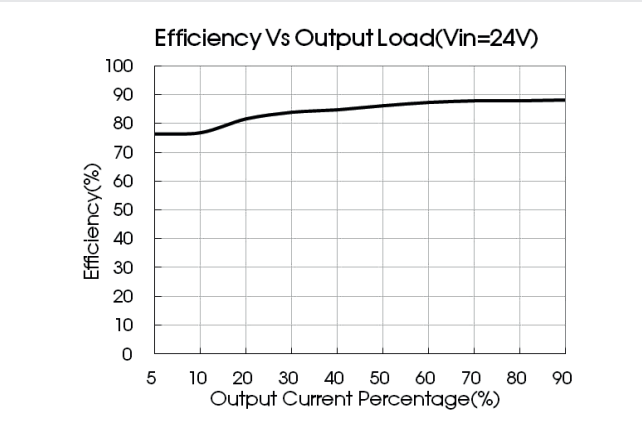
The models listed above are standard types. If you need special specifications or have questions regarding packing (Tube or Tape & Reel) or need application support, please contact our specialists: sales@rsg-electronic.de or +49 69-984047-0

Product Characteristic Curve

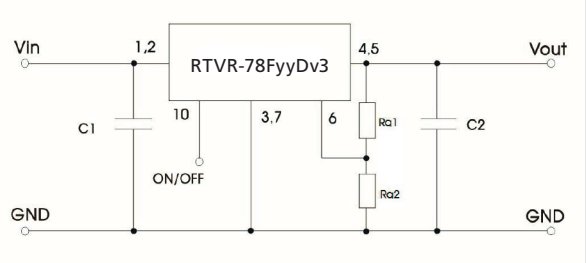
RTVR-78F05Dv3



RTVR-78F05Dv3

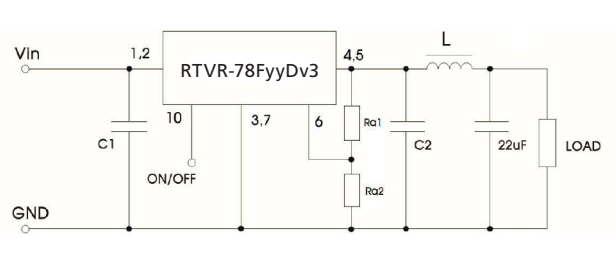


Typical Application Circuit



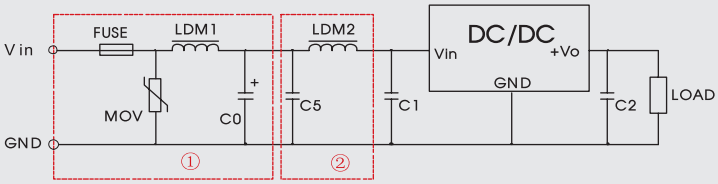
Part No.	C1 (ceramic capacitor)	C2 (ceramic capacitor)	Ra1/Ra2 (Vadj resistance)
RTVR-78F00Dv3	10μF/50V	22μF/10V	Refer to Vadj resistance calculation
RTVR-78F01Dv3		22μF/10V	
RTVR-78F02Dv3		22μF/10V	
RTVR-78F03Dv3		22μF/10V	
RTVR-78F05Dv3		22μF/16V	
RTVR-78F06Dv3		22μF/16V	
RTVR-78F09Dv3		22μF/25V	
RTVR-78F12Dv3		22μF/25V	

Note:
1. C1 and C2 are required and should be connected close to the pin terminal of the module.
2. For capacitance of C1 and C2 refer to table, it can be increased properly if required, and tantalum or low ESR electrolytic capacitors may also suffice.
3. Cannot be used in parallel for output and hot swap.



To reduce the output ripple furtherly, it is suggested to connect an "LC" filter at the output terminal, and recommended value of L is 10μH-47μH.

EMC solution-recommended circuit



Note: Part **1** in this figure is for EMS test, part **2** is for EMI filtering; parts **1** and **2** can be added based on actual requirement.

FUSE	MOV	LDM1	C0	C2	C1/C5	LDM2
Selected based on the actual input current from the customer	S20K30	82μH	680μF /50V	Refer to Sheet 1	4.7μF /50V	68μH

Application of Vadj and calculation of Vadj resistance

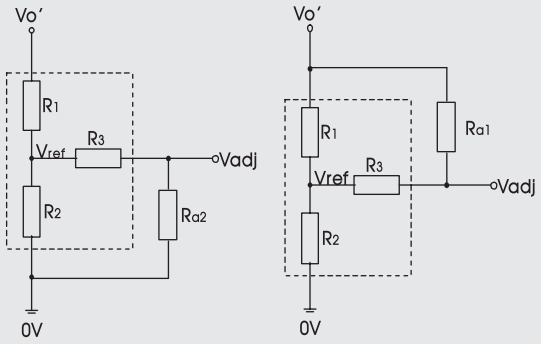


Fig.5 Applied circuits of Vadj (Part in broken line is the interior of models)

Calculation formula of Vadj resistance:

$$\text{up: } R_{a2}=\frac{aR_2}{R_2-a}-R_3 \qquad a=\frac{V_{ref}}{V_o'-V_{ref}}\cdot R_1$$

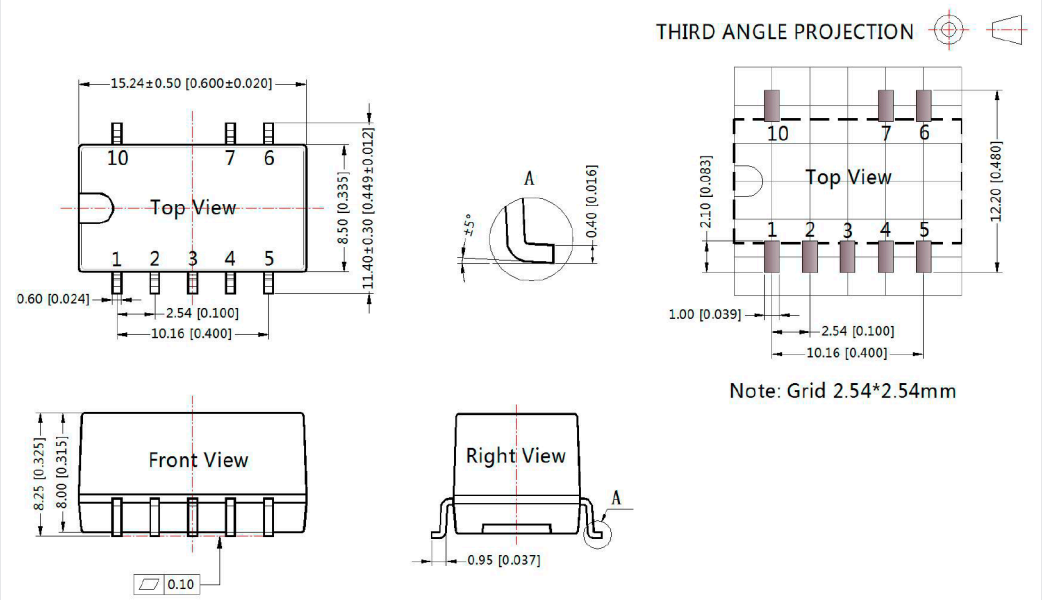
$$\text{down: } R_{a1}=\frac{aR_1}{R_1-a}-R_3 \qquad a=\frac{V_o'-V_{ref}}{V_{ref}}\cdot R_2$$

Ra1, Ra2 is Vadj resistance, a is a self-defined parameter, with no real meaning.
Vo' for the actual needs of the up or down regulated voltage

Vout(V)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
1.5	7.5	7.5	15	0.75
1.8	4.7	3.3	6.8	0.75
2.5	9.1	3.9	8.2	0.75
3.3	75	22	75	0.75
5	43	7.5	33	0.75
6.5	43	5.6	22	0.75
9	43	3.9	22	0.75
12	36	2.4	10	0.75

Note: The 1.5VDC output model only supports Vadj up, not down.

Dimensions and Recommended Layout



Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.25[±0.010]

Pin	Function
1	+Vin
2	+Vin
3	GND
4	+Vout
5	+Vout
6	V adj
7	GND
10	Remote On/Off

Notes

1. The maximum capacitive load offered were tested at input voltage range and full load;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25 , humidity<75%RH with nominal input voltage and rated output load.

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