

DR-78-1A Series

1A Output Current, Non-Isolated DC/DC converter



Features

- 3 Pin SIL
- Non isolated, No need for heatsinks
- Wide Input Range, Step-down switching dc-dc converter
- Full SMD Technology
- Continuous Short Circuit Protection
- Pin-out compatible with LM78XX three terminals positive Regulator
- Efficiency up to 94%
- -40 ~ 85°C Operation Temperature Range

The DR series is a family of cost effective 1.5~5W single output buck DC-DC converters. These converters are encapsulated in a non-conductive black plastic package 3-pin SIL case, continuous short circuit protection with automatic restart and good line / load regulation. Devices are filled up with flame retardant resin. Input voltages of 4.75~18, and 6.5~18 with output voltage of 1.5, 1.8, 2.5, 3.3, 5, Vdc. High performance features include high efficiency operation up to 94%. Standard features include an input range of 4.75~18Vdc tolerance and low output noise and ripple.

All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified

| OUTPUT SPECIFICATIONS | |
|--------------------------------------|--------------------------------|
| Voltage accuracy | ±2% |
| Line regulation | ±0.5% |
| Load regulation | (From 10% to 100% Load) ±0.6% |
| Ripple & noise (20 MHz bandwidth)(1) | 60mV pk-pk, max. |
| Short Circuit Protection | Indefinite(Automatic Recovery) |
| Temperature coefficient | ±0.02%/°C |
| Capacitor load(2) | See table |

| INPUT SPECIFICATIONS | |
|-----------------------------------|------------|
| Voltage Range | See table |
| Input Current | See table |
| No-Load Input Current | See table |
| Input Filter | Capacitors |
| Input Reflected Ripple Current(3) | 40mA pk-pk |

| GENERAL SPECIFICATIONS | |
|---|--------------|
| Efficiency | See table |
| Switching Frequency | 330kHz, typ. |
| Humidity | 95% rel H |
| Reliability Calculated MTBF(MIL-HDBK-217 F) | >4.3Mhrs |

| ENVIRONMENT SPECIFICATIONS | |
|----------------------------|---|
| Operating Temperature | -40°C~85°C(See Derating Curve) -40°C~60°C(For 100% load) |
| Maximum Case Temperature | 100°C |
| Storage Temperature | -40°C~125°C |
| Cooling | Nature Convection |

| PHYSICAL SPECIFICATIONS | |
|-------------------------|---|
| Case Material | Non-conductive Black Plastic(UL94V-0 rated) |
| Pin Material | C5191R-H Solder-coated |
| Potting Material | Epoxy (UL94V-0 rated) |
| Weight | 2.0g |
| Dimensions | 0.46"x0.29"x0.40" |

| EMC CHARACTERISTICS | | |
|------------------------|--------------|------------------|
| Radiated Emissions | EN55022 | CLASS B |
| Conducted Emissions(4) | EN55022 | CLASS B |
| ESD | IEC61000-4-2 | Perf. Criteria A |
| RS | IEC61000-4-3 | Perf. Criteria A |
| EFT(5) | IEC61000-4-4 | Perf. Criteria A |
| CS | IEC61000-4-6 | Perf. Criteria A |
| PFMF | IEC61000-4-8 | Perf. Criteria A |

| ABSOLUTE MAXIMUM RATINGS(6) | |
|--|--------------|
| These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability. | |
| Input Surge Voltage(100mS) | 20 Vdc, max. |
| Soldering Temperature (1.5mm from case 10 sec. max.) | 260°C, max. |

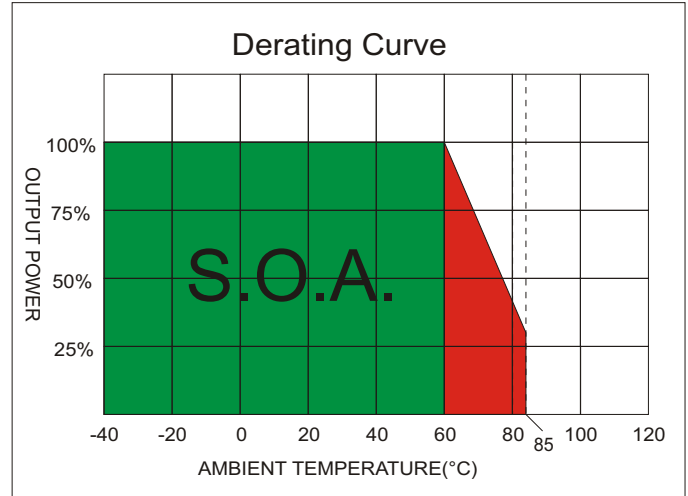
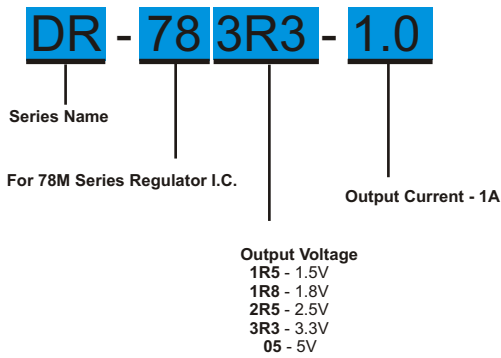
NOTE

1. Ripple/Noise measured with 20MHz bandwidth. Load condition : 10% ~ 100%, output noise arise when load is under 10%.
2. Tested by minimal Vin and constant resistive load.
3. Measured Input reflected ripple current with a simulated source inductance of 12uH.
4. Input filter components (C1, C2, L) are used to help meet conducted emissions 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.
5. An external filter capacitor is required if the module has to meet IEC61000-4-4.
The filter capacitor ZimTec Electronics suggest: Nippon chemi-con KY series, 220uF/100V.
6. Do not operate the unit(s) exceeding the absolute maximum rating, over rating causes damage to the units.
7. Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.

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PART NUMBER STRUCTURE



MODEL SELECTION GUIDE

| MODEL NUMBER | INPUT Voltage Range (Vdc) | INPUT Current (mA) No-Load (Max) | Full Load | | OUTPUT Voltage (Vdc) | OUTPUT Current (mA) | | EFFICIENCY | | Capacitor Load(μF) |
|--------------|---------------------------------|--|-----------|----------|----------------------------|---------------------|-------------------|---------------------|---------------------|-----------------------|
| | | | Vin(Min) | Vin(Max) | | Min. Load (mA) | Full Load (mA) | Vin (Min) @FL(%) | Vin (Max) @FL(%) | |
| DR-781R5-1A | 4.75-18 | 10.0 | 416.00 | 119.00 | 1.5 | 100.0 | 1000 | 78 | 72 | 220 |
| DR-781R8-1A | 4.75-18 | 10.0 | 474.00 | 135.00 | 1.8 | 100.0 | 1000 | 82 | 76 | 220 |
| DR-782R5-1A | 4.75-18 | 10.0 | 619.00 | 176.00 | 2.5 | 100.0 | 1000 | 87 | 81 | 220 |
| DR-783R3-1A | 4.75-18 | 10.0 | 790.00 | 221.00 | 3.3 | 100.0 | 1000 | 90 | 85 | 220 |
| DR-7805-1A | 6.5-18 | 10.0 | 836.00 | 319.00 | 5.0 | 100.0 | 1000 | 94 | 89 | 220 |

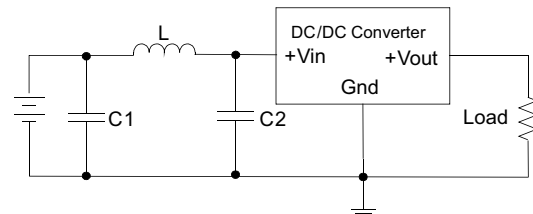
EMC COUNTERMEASURES

EMC Countermeasures

Input filter components (C1,C2,L) are used to help meet conducted emissions requirement for the module.

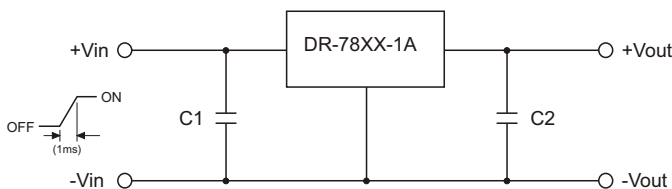
These components should be mounted as close as possible to the module and all leads should be minimized to decrease radiated noise. An external filter capacitor is required if the module has to meet IEC61000-4-4.

The filter capacitor ZimTec Electronics suggest: Nippon chemi-con KY series, 220μF/100V.



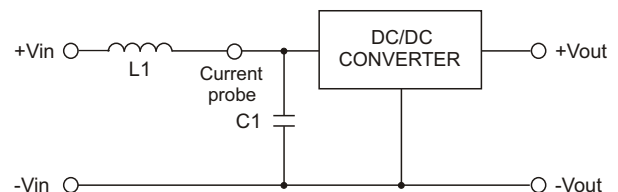
| | C1 | L | C2 |
|------------|-----------|-------|-----------|
| DR-78XX-1A | 470μF,35V | 6.4μH | 470μF,35V |

STANDARD APPLICATION CIRCUIT



1. To protect the converter during power-up, use soft start Vin and C1=47μF
2. C2=100μF(Optional)

TEST CONFIGURATIONS



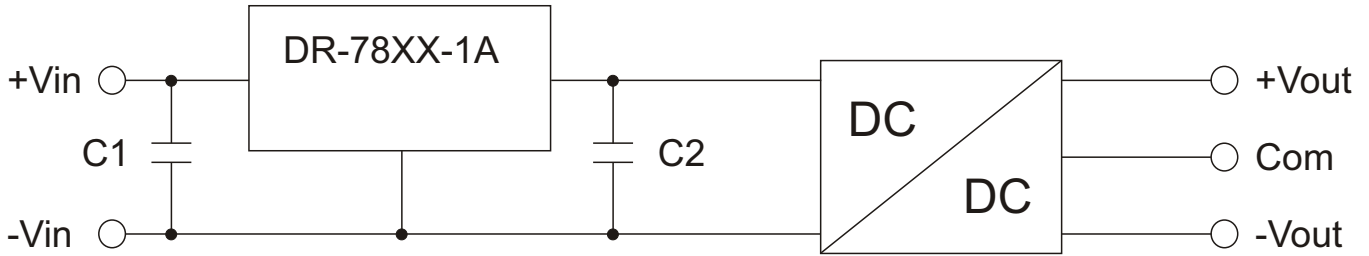
Input reflected ripple current is measured through a source inductor L1(12μH) and a source capacitor C1=47μF at nominal input and full load.

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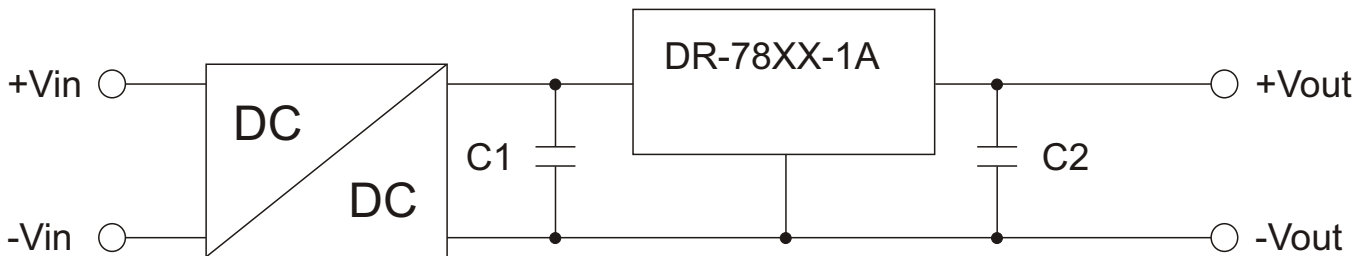
APPLICATION EXAMPLES

High efficiency, isolated, dual unregulated outputs, one economic way to build up isolated dual output



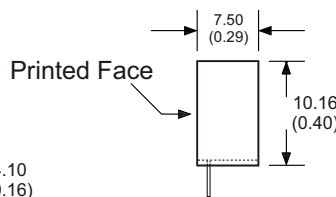
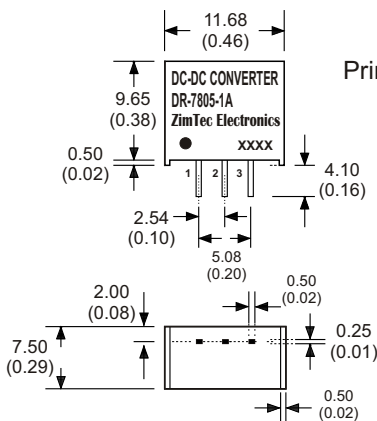
- Isolated dual outputs
- Wide input range 4.75V to 18V
- C1: Optional
- C2: Required (further decoupling filtering may be necessary between the two converters)

Isolated (up to 6KV), wide input range regulated output



- High isolation voltage
- Improved loading / line regulation
- C1: Required (further decoupling filtering may be necessary between the two converters)
- C2: Optional
- Wide input voltage range
- Point-of-load Architecture

MECHANICAL SPECIFICATIONS



Notes : All dimensions are typical in millimeters (inches).
 1. Pin diameter: 0.5±0.05 (0.02±0.002)
 2. Pin pitch and length tolerance: ±0.35 (±0.014)
 3. Pin to case tolerance: ±0.5 (±0.02)
 4. Case Tolerance: ±0.5 (±0.02)

| PIN CONNECTIONS | |
|-----------------|-----------|
| PIN NUMBER | SINGLE |
| 1 | +V Input |
| 2 | GND |
| 3 | +V Output |

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