## muRata Ps Murata Power Solutions

#### **TECHNICAL NOTES** (continued)

6. Soldering & Handling Precautions: All units are designed to be hand soldered to pc-boards using no-clean solders (+260°C, 5 seconds max.). Water-soluble solders can also be used, but the units must be washed and dried using processes appropriate to the type of solder employed. See the Mechanical Specifications section for pin 1 orientation and recommended plated-through hole dimensions.

While 78SR regulators easily withstand a 2kV ESD discharge to any terminal (using human body model), they should always be treated as ESD sensitive devices.

- 7. Horizontal-Pin Models (78XXSRH-C): 78XXSRH-C switching regulators are pin-compatible replacements for T0-220 style LM78XX linear regulators that are installed with their metal tabs lying flat on the surface of the pc-board. However, because the surface of inductor L1 on 78XXSRH-C models is electrically conductive, it must not be allowed to come in contact with any exposed pc-board traces, other than power ground (GND). While the 2-mil-thick (0.05mm) polyester label attached to L1 provides some degree of electrical insulation (only if L1 sits perfectly flat on the pc-board), it is recommended that a 0.020" (0.5mm) clearance be maintained between L1 and all exposed pc-board traces.
- 8. Dropout Voltage: 78SR series regulators described in this data sheet specify a minimum input voltage at which full-load accuracy and output regulation are guaranteed (7.5V for 7803SR-C and 7805SR-C, and 15.0V for 7812SR-C). However, these devices will stay in regulation at lower input voltages if they are operated at less than their rated loads. The following dropout-voltage data, derived from sample testing performed at an ambient temperature of +25°C with resistive loads, should be used for information purposes only. For these tests, a unit was considered to be out of regulation when its output changed by more +/-0.005Vdc from its nominal value. All voltages were measured directly at the regulator's I/O pins.

| Typical Dropout Voltage |         |          |          |           |  |
|-------------------------|---------|----------|----------|-----------|--|
|                         | 0% Load | 25% Load | 50% Load | 100% Load |  |
| 7803SR-C                | 6.0V    | 6.2V     | 6.2V     | 6.3V      |  |
| 7805SR-C                | 6.3V    | 6.2V     | 6.2V     | 6.8V      |  |
| 7812SR-C                | 12.8V   | 13.0V    | 12.8V    | 13.0V     |  |

# **78xxSR Series**

3.3V/5V/12V Outputs High-Efficiency Switching Regulators with LM78xx Pinouts

#### **Performance/Functional Specifications** Typical at T<sub>A</sub> = +25°C

| Input/Output                  |                           |                        |           |  |
|-------------------------------|---------------------------|------------------------|-----------|--|
| Models                        | 7803SR-C                  | 7805SR-C               | 7812SR-C  |  |
| Output Voltage                | +3.3Vdc                   | +5.0Vdc                | +12.0Vdc  |  |
| Rated Output Current          | 0.5A                      | 0.5A                   | 0.4A      |  |
| Output Voltage Accuracy       | ±2%                       | ±2%                    | ±2%       |  |
| Input Voltage Range ①         | +7.5-36Vdc                | +7.5-36Vdc             | +15-36Vdc |  |
| Line Regulation (100% load)   | ±0.3%                     | ±0.3%                  | ±0.3%     |  |
| Load Regulation (0-100% load) | ±0.2%                     | ±0.2%                  | ±0.2%     |  |
| Quiescent Current             | 3mA typ., 5mA max.        |                        |           |  |
| Input Current                 | See Performance Curves    |                        |           |  |
| Efficiency                    | See Performance Curves    |                        |           |  |
| Transient Response            | See Performance Curves    |                        |           |  |
| Input & Output Noise          | See P                     | See Performance Curves |           |  |
| Short Circuit Protection 2    |                           | Continuous             |           |  |
| Isolation                     | None                      |                        |           |  |
| Overvoltage Protection        | Prvoltage Protection None |                        |           |  |
| Undervoltage Protection None  |                           |                        |           |  |
| Environmental                 |                           |                        |           |  |
| Models                        | 7803SR-C                  | 7805SR-C               | 7812SR-C  |  |
| Operating Temperature         | -40 to +70°C              |                        |           |  |
| Storage Temperature           | -                         | -40 to +85°C           |           |  |
| Cooling                       | Free Air Convection       |                        |           |  |
| Humidity (Non-condensing)     | 0 to 85%                  |                        |           |  |

| Physical      |  |
|---------------|--|
| Mechanical    | See Mechanical Specifications                |
| Package       | Open-frame SIP                               |
| Pins          | 0.025" (0.64mm) square,<br>tin-plated bronze |
| Weight        | 0.08 ounces (2.2g)                           |
| Pin Soldering | +260°C for 5 seconds                         |

① See Technical Note 5.

② While these regulators can withstand a continuous short-circuit across their output terminals, they will experience a significant temperature rise. Extended short-circuit operation will adversely affect the unit's reliability.



3.3V/5V/12V Outputs High-Efficiency Switching Regulators with LM78xx Pinouts

Typical Performance Curves T<sub>A</sub> = +25°C, VIN as indicated



### 7803SR-C Vin = 12V, ILOAD = 500mA



### 7805SR-C Vin = 12V, ILOAD = 500mA



### 7812SR-C Vin = 24V, ILOAD = 400mA



## muRata Ps Murata Power Solutions

## **78xxSR Series**

### 3.3V/5V/12V Outputs High-Efficiency Switching Regulators with LM78xx Pinouts

### Transient Response - 90% Load Step







### 7803SR-C 100% to 10% Load Step

| U U U U U U U U U U U U U U U U U U U |          |
|---------------------------------------|----------|
| CH1: Vout, 50mV/div.                  | Vin = 9V |
|                                       |          |
|                                       |          |
|                                       |          |
|                                       |          |
| CH2: Load Current                     |          |
| 100%                                  | 10%      |

40µsec/div.

### 7805SR-C 100% to 10% Load Step



#### 7812SR-C 100% to 10% Load Step





3.3V/5V/12V Outputs High-Efficiency Switching Regulators with LM78xx Pinouts



30 32 34 36

INPUT VOLTAGE

**Efficience Curves** 

7803SR-C Input Current 0.25 0.20 **NPUT CURRENT (AMPS)** 00% LOAD 0.15 0.10 50% LOAD 0.05 25% LOAD 0.00 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 INPUT VOLTAGE





www.murata-ps.com/support



3.3V/5V/12V Outputs High-Efficiency Switching Regulators with LM78xx Pinouts





3.3V/5V/12V Outputs High-Efficiency Switching Regulators with LM78xx Pinouts



## low-profile package



Murata Power Solutions, Inc. 11 Cabot Boulevard, Mansfield, MA 02048-1151 U.S.A. ISO 9001 and 14001 REGISTERED





Murata Power Solutions, Inc. makes no representation that the use of its products in the circuits described herein, or the use of other technical information contained herein, will not infringe upon existing or future patent rights. The descriptions contained herein do not imply the granting of licenses to make, use, or sell equipment constructed in accordance therewith. Specifications are subject to change without notice.