

## Series AMSRL1-78JZ

Up to 12 Watt | DC-DC Switching Regulator

### FEATURES:

- Switching Regulator
- Low Quiescent Current
- Wide Input
- Non-Isolated
- Adjustable Output Voltage
- High MTBF
- SMD Package
- Efficiency Up To 95%
- Remote On/Off
- Short Circuit Protection
- Meet EN 62368 Standard
- RoHS Compliant

Picture Coming Soon

### Models Single output



| Model          | Input Voltage (V) | Output Voltage (V) | Output Current max (mA) | Efficiency Vin Max (%) | Efficiency Vin Min (%) |
|----------------|-------------------|--------------------|-------------------------|------------------------|------------------------|
| AMSRL1-781.5JZ | 4.75-32           | 1.5                | 1000                    | 66                     | 76                     |
| AMSRL1-781.8JZ | 4.75-32           | 1.8                | 1000                    | 69                     | 79                     |
| AMSRL1-782.5JZ | 4.75-32           | 2.5                | 1000                    | 74                     | 86                     |
| AMSRL1-783.3JZ | 6.5-36            | 3.3                | 1000                    | 80                     | 90                     |
| AMSRL1-7805JZ  | 8-36              | 5                  | 1000                    | 85                     | 93                     |
| AMSRL1-786.5JZ | 10-36             | 6.5                | 1000                    | 86                     | 93                     |
| AMSRL1-7809JZ  | 13-36             | 9                  | 1000                    | 90                     | 94                     |
| AMSRL1-7812JZ  | 16-36             | 12                 | 1000                    | 92                     | 95                     |

NOTE: All specifications in this datasheet are measured at an ambient temperature of 25°C, humidity<75%, nominal input voltage and at rated output load unless otherwise specified.

### Input Specifications

| Parameters        | Nominal                                                         | Typical | Maximum | Units |
|-------------------|-----------------------------------------------------------------|---------|---------|-------|
| Voltage range     | See Models table above                                          |         |         |       |
| On/Off Control    | ON –open or 3.2V < Vc < 8V ; OFF –GND or 0V < VC < 0.8V , 200uA |         |         |       |
| Quiescent Current | Vin = min to max at 0% load                                     | 0.2     | 1       | mA    |

### Output Specifications

| Parameters                      | Conditions               | Typical                    | Maximum                      | Units  |
|---------------------------------|--------------------------|----------------------------|------------------------------|--------|
| Voltage accuracy                | At 100% load             | 1.5/1.8/2.5/3.3V<br>Others | ±2<br>±2<br>±4<br>±3         | %      |
| Short Circuit protection        | Continuous, hiccup mode  |                            |                              |        |
| Short circuit restart           | Auto-Recovery            |                            |                              |        |
| Dynamic load stability          | 25% load step change     | ±25                        | ±100                         | mV     |
| Transient recovery time         | 25% load step change     | 0.2                        | 1                            | ms     |
| Line voltage regulation         | Vin=(LL-HL) at full load | 1.5/1.8/2.5V<br>Others     | ±0.3<br>±0.2<br>±0.6<br>±0.4 | %      |
| Load voltage regulation         | 10-100% load             | 1.5/1.8/2.5V<br>Others     | ±0.8<br>±0.3<br>±1.5<br>±0.6 | %      |
| Temperature coefficient         | -40°C to +85°C ambient   | ±0.03                      |                              | %/°C   |
| Ripple & Noise                  | 20MHz Bandwidth          | 30                         | 75                           | mV p-p |
| Voltage adjustment range (Vadj) |                          | ±10                        |                              | %Vout  |
| Maximum Capacitive Load         |                          |                            | 680                          | uF     |

NOTE:

\*1. Ripple and noise tested with “parallel cable” method;

\*2. With the load lower than 20%, the maximum ripple will be 150mVp-p.

### General Specifications

| Parameters            | Conditions                      | Typical                             | Maximum           | Units |
|-----------------------|---------------------------------|-------------------------------------|-------------------|-------|
| Switching frequency   | 100% load                       | 1.5/1.8/2.5V<br>3.3/5/6.5V<br>9/12V | 370<br>520<br>700 | KHz   |
| Operating temperature | With derating (see graph below) | -40 to +85                          |                   | °C    |
| Storage temperature   |                                 | -55 to +125                         |                   | °C    |

|                               |                                                          |     |     |      |
|-------------------------------|----------------------------------------------------------|-----|-----|------|
| Maximum case temperature      |                                                          |     | 100 | °C   |
| Cooling                       | Free Air Convection                                      |     |     |      |
| Humidity                      |                                                          |     | 95  | % RH |
| Case material                 | Plastic (UL94-V0)                                        |     |     |      |
| Weight                        | 1.7                                                      |     |     | g    |
| Dimensions (L x W x H)        | 0.60 x 0.45 x 0.32 Inches 15.24 x 11.40 x 8.25 mm        |     |     |      |
| MTBF                          | > 2 000 000 hrs (MIL-HDBK-217F, Ground Benign, t=+25 °C) |     |     |      |
| Maximum Soldering Temperature | 1.5mm from case for 10 sec                               |     | 245 | °C   |
| Off idle current              |                                                          | 0.2 | 1   | mA   |

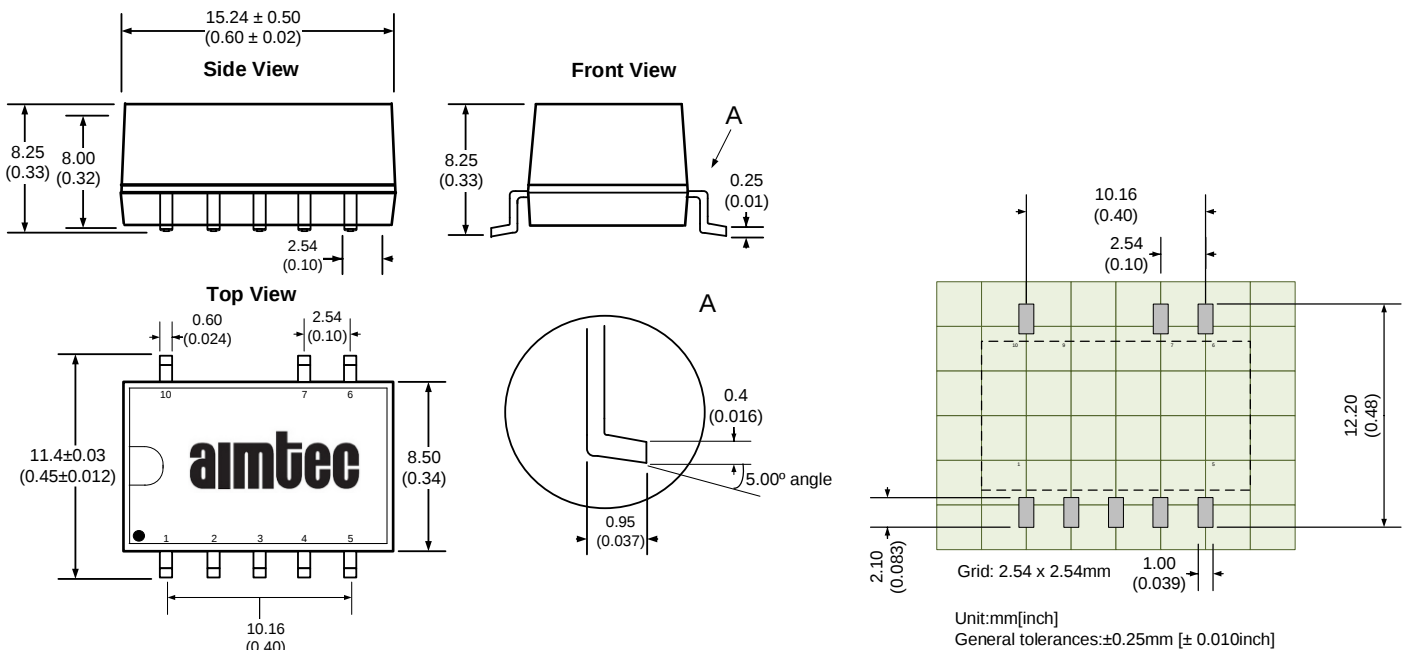
## Safety Specifications

| Parameters |                                            |                                                                       |
|------------|--------------------------------------------|-----------------------------------------------------------------------|
| Standards  | Information Technology Equipment           | Design to meet EN 62368                                               |
|            | EMI - Conducted and radiated emission      | CISPR32 / EN55032, class B (with the recommended EMI circuit)         |
|            | Electrostatic Discharge Immunity           | IEC 61000-4-2, Contact ±4KV, Criteria B                               |
|            | RF, Electromagnetic Field Immunity         | IEC 61000-4-3, 10V/m, Criteria A                                      |
|            | Electrical Fast Transient / Burst Immunity | IEC 61000-4-4, ±1KV, Criteria B, with the recommended EMS circuit     |
|            | Surge Immunity                             | IEC 61000-4-5, L-L ±1KV, Criteria B, with the recommended EMS circuit |
|            | RF, Conducted Disturbance Immunity         | IEC 61000-4-6, 3 Vrms, Criteria A                                     |

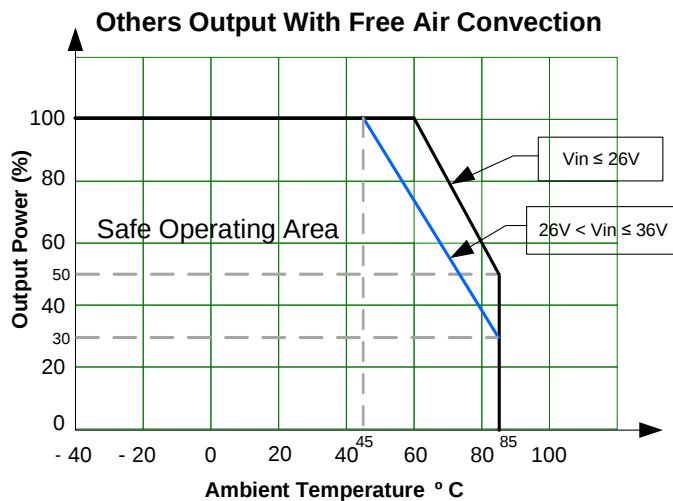
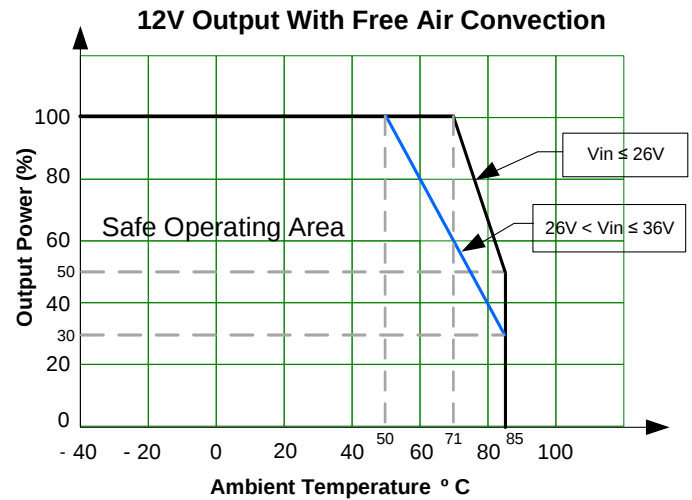
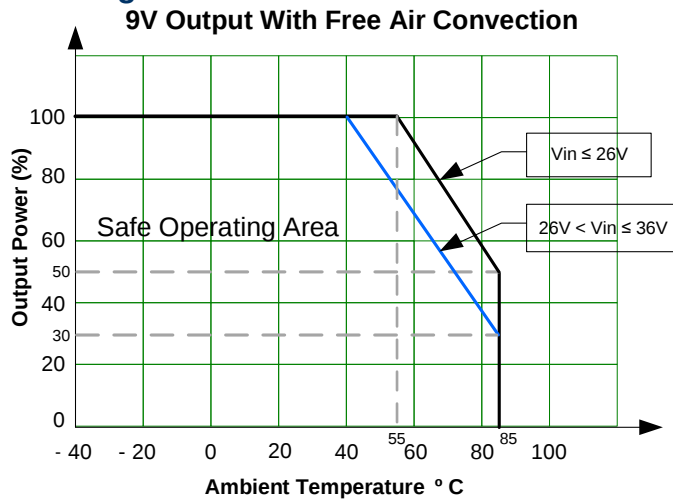
## Pin Out Specifications

| Pin | Single    |
|-----|-----------|
| 1   | +V input  |
| 2   | +V input  |
| 3   | Ground    |
| 4   | +V output |
| 5   | +V output |
| 6   | V adj     |
| 7   | Ground    |
| 10  | ON/OFF    |

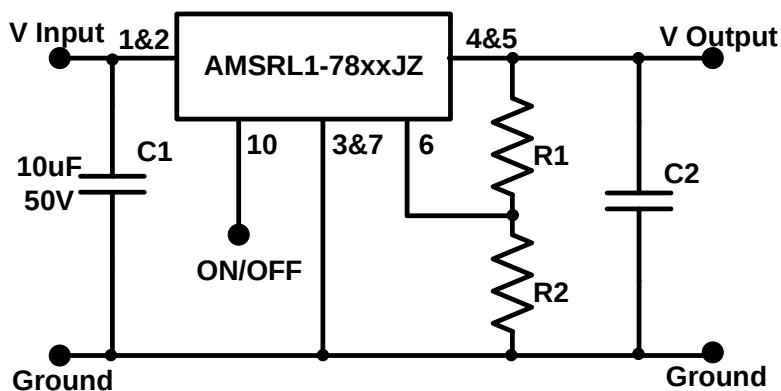
## Dimensions & PCB Foot Print



## Derating

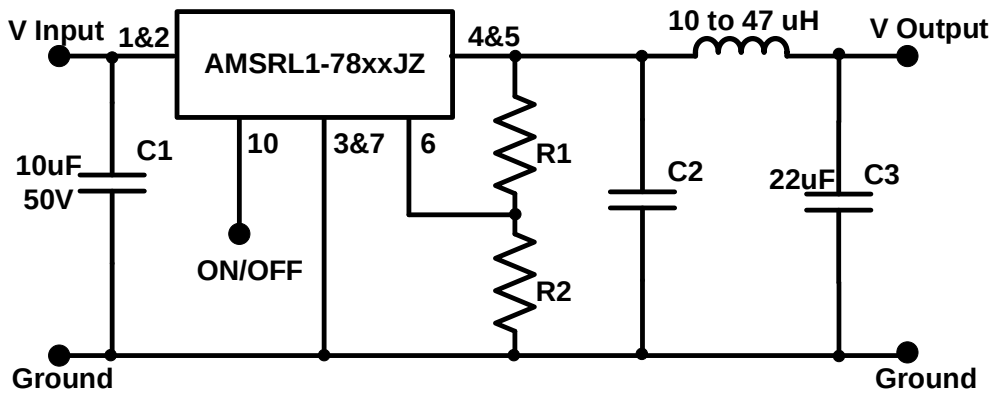


## Application Circuit

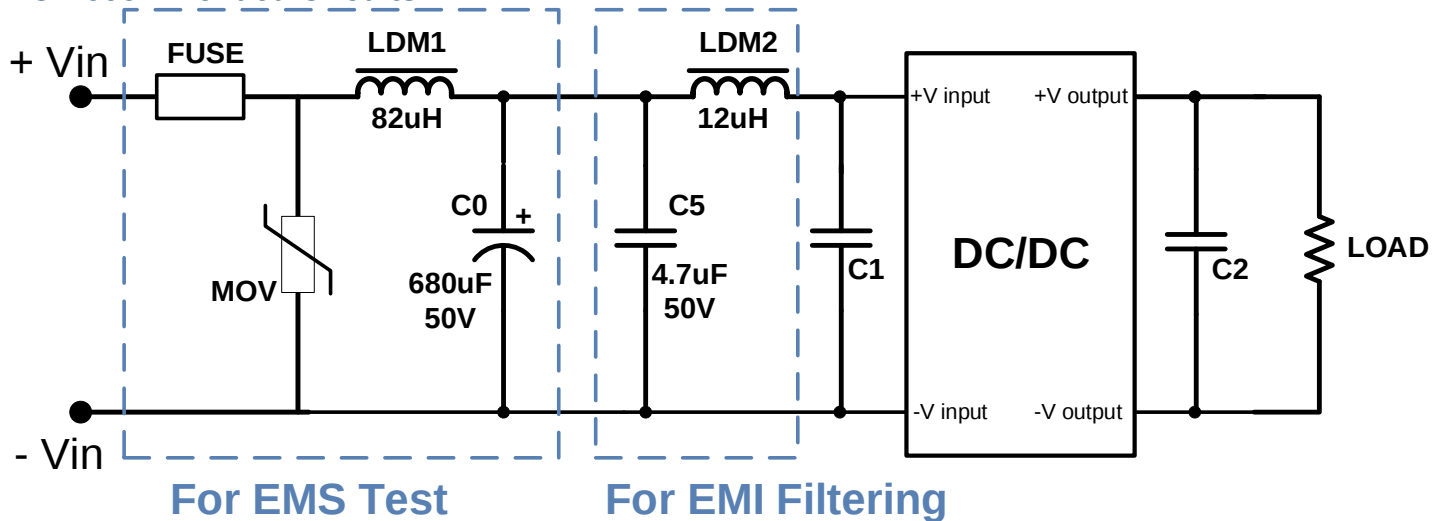


| Model                   | C2 (uF)    |
|-------------------------|------------|
| 1.5/1.8/2.5/3.3V output | 22uF / 10V |
| 5/6.5V output           | 22uF / 16V |
| 9/12/15V output         | 22uF / 25V |

## LC filter Application Circuit



## EMC Recommended Circuits



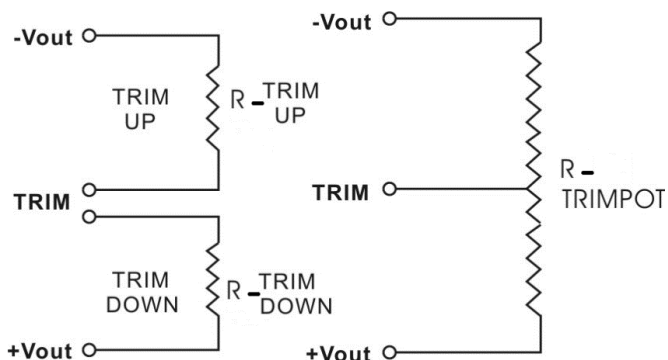
It is recommended that tantalum or low ESR electrolytic capacitors are used for C1 & C2. C1 & C2 are required and should be installed as close to the converter as possible

## Trimming

Output voltage can be externally trimmed by utilizing the methods as shown below

### Fixed Resistor

### Variable Potentiometer



Leave open if not used.

Note: For the 1.5VDC output model is only support Vadj up, the Vadj down is unsupported.

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|            |        |        |        |       |       |       |       |       |       |       |
|------------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|
| Trim up %  | 1      | 2      | 3      | 4     | 5     | 6     | 7     | 8     | 9     | 10    |
| Vout (VDC) | 1.515  | 1.53   | 1.545  | 1.56  | 1.575 | 1.59  | 1.605 | 1.62  | 1.635 | 1.65  |
| Rt up (KΩ) | 360.00 | 172.50 | 110.00 | 78.75 | 60.00 | 47.50 | 38.57 | 31.88 | 26.67 | 22.50 |

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|              |         |        |       |       |       |       |       |       |       |       |
|--------------|---------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| Trim down %  | 1       | 2      | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    |
| Vout (VDC)   | 1.782   | 1.764  | 1.746 | 1.728 | 1.71  | 1.692 | 1.674 | 1.656 | 1.638 | 1.62  |
| Rt down (KΩ) | 127.26  | 81.16  | 58.05 | 44.17 | 34.91 | 28.29 | 23.32 | 19.46 | 16.36 | 13.83 |
| Trim up %    | 1       | 2      | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    |
| Vout (VDC)   | 1.82    | 1.836  | 1.854 | 1.872 | 1.89  | 1.908 | 1.926 | 1.944 | 1.962 | 1.98  |
| Rt up (KΩ)   | 1931.95 | 191.03 | 91.61 | 58.70 | 42.28 | 32.45 | 25.89 | 21.22 | 17.71 | 14.98 |

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|              |        |        |        |        |        |       |       |       |       |       |
|--------------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|
| Trim down %  | 1      | 2      | 3      | 4      | 5      | 6     | 7     | 8     | 9     | 10    |
| Vout (VDC)   | 2.475  | 2.45   | 2.425  | 2.4    | 2.375  | 2.35  | 2.325 | 2.3   | 2.275 | 2.25  |
| Rt down (KΩ) | 619.70 | 301.20 | 195.03 | 141.95 | 110.10 | 88.87 | 73.70 | 62.33 | 53.48 | 46.40 |
| Trim up %    | 1      | 2      | 3      | 4      | 5      | 6     | 7     | 8     | 9     | 10    |
| Vout (VDC)   | 2.525  | 2.55   | 2.575  | 2.6    | 2.625  | 2.65  | 2.675 | 2.7   | 2.725 | 2.75  |
| Rt up (KΩ)   | 264.80 | 128.30 | 82.80  | 60.05  | 46.40  | 37.30 | 30.80 | 25.93 | 22.13 | 19.10 |

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|              |         |         |         |         |        |        |        |        |        |        |
|--------------|---------|---------|---------|---------|--------|--------|--------|--------|--------|--------|
| Trim down %  | 1       | 2       | 3       | 4       | 5      | 6      | 7      | 8      | 9      | 10     |
| Vout (VDC)   | 3.267   | 3.234   | 3.201   | 3.168   | 3.135  | 3.102  | 3.069  | 3.036  | 3.003  | 2.97   |
| Rt down (KΩ) | 4665.93 | 2483.43 | 1662.18 | 1231.39 | 966.07 | 786.25 | 656.34 | 558.08 | 481.17 | 419.33 |
| Trim up %    | 1       | 2       | 3       | 4       | 5      | 6      | 7      | 8      | 9      | 10     |
| Vout (VDC)   | 3.333   | 3.366   | 3.399   | 3.432   | 3.465  | 3.498  | 3.531  | 3.564  | 3.597  | 3.63   |
| Rt up (KΩ)   | 2073.44 | 875.46  | 535.21  | 374.35  | 280.60 | 219.22 | 175.91 | 143.72 | 118.84 | 99.05  |

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|              |         |         |        |        |        |        |        |        |        |        |
|--------------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|
| Trim down %  | 1       | 2       | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     |
| Vout (VDC)   | 4.95    | 4.9     | 4.85   | 4.8    | 4.75   | 4.7    | 4.65   | 4.6    | 4.55   | 4.5    |
| Rt down (KΩ) | 1773.00 | 1156.67 | 848.50 | 663.60 | 540.33 | 452.29 | 386.25 | 334.89 | 293.80 | 260.18 |
| Trim up %    | 1       | 2       | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     |
| Vout (VDC)   | 5.06    | 5.1     | 5.15   | 5.2    | 5.25   | 5.3    | 5.35   | 5.4    | 5.45   | 5.5    |
| Rt up (KΩ)   | 3192.00 | 612.00  | 289.50 | 182.00 | 128.25 | 96.00  | 74.50  | 59.14  | 47.63  | 38.67  |

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|              |         |         |         |        |        |        |        |        |        |        |
|--------------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|
| Trim down %  | 1       | 2       | 3       | 4      | 5      | 6      | 7      | 8      | 9      | 10     |
| Vout (VDC)   | 6.435   | 6.37    | 6.305   | 6.24   | 6.175  | 6.11   | 6.045  | 5.98   | 5.915  | 5.85   |
| Rt down (KΩ) | 3284.64 | 1717.46 | 1149.32 | 855.82 | 676.58 | 555.75 | 468.78 | 403.18 | 351.94 | 310.81 |
| Trim up %    | 1       | 2       | 3       | 4      | 5      | 6      | 7      | 8      | 9      | 10     |
| Vout (VDC)   | 6.565   | 6.63    | 6.695   | 6.76   | 6.825  | 6.89   | 6.955  | 7.02   | 7.085  | 7.15   |
| Rt up (KΩ)   | 553.16  | 244.37  | 151.32  | 106.45 | 80.03  | 62.63  | 50.30  | 41.10  | 33.98  | 28.31  |

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|              |         |         |         |        |        |        |        |        |        |        |
|--------------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|
| Trim down %  | 1       | 2       | 3       | 4      | 5      | 6      | 7      | 8      | 9      | 10     |
| Vout (VDC)   | 8.91    | 8.82    | 8.73    | 8.64   | 8.55   | 8.46   | 8.37   | 8.28   | 8.19   | 8.1    |
| Rt down (KΩ) | 3190.28 | 1719.75 | 1164.39 | 872.63 | 692.79 | 570.83 | 482.69 | 416.01 | 363.80 | 321.82 |
| Trim up %    | 1       | 2       | 3       | 4      | 5      | 6      | 7      | 8      | 9      | 10     |
| Vout (VDC)   | 9.09    | 9.18    | 9.27    | 9.36   | 9.45   | 9.54   | 9.63   | 9.72   | 9.81   | 9.9    |
| Rt up (KΩ)   | 433.71  | 178.60  | 106.60  | 72.64  | 52.87  | 39.93  | 30.80  | 24.02  | 18.78  | 14.62  |

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|              |         |         |         |        |        |        |        |        |        |        |
|--------------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|
| Trim down %  | 1       | 2       | 3       | 4      | 5      | 6      | 7      | 8      | 9      | 10     |
| Vout (VDC)   | 11.88   | 11.76   | 11.64   | 11.52  | 11.4   | 11.28  | 11.16  | 11.04  | 10.92  | 10.8   |
| Rt down (KΩ) | 3329.00 | 1641.50 | 1079.00 | 797.75 | 629.00 | 516.50 | 436.14 | 375.88 | 329.00 | 291.50 |
| Trim up %    | 1       | 2       | 3       | 4      | 5      | 6      | 7      | 8      | 9      | 10     |
| Vout (VDC)   | 12.12   | 12.24   | 12.36   | 12.48  | 12.6   | 12.72  | 12.84  | 12.96  | 13.08  | 13.2   |
| Rt up (KΩ)   | 215.00  | 102.50  | 65.00   | 46.25  | 35.00  | 27.50  | 22.14  | 18.13  | 15.00  | 12.50  |

If it is needed to adjust the output voltage higher or lower than the converter's nominal value use the table above to determine appropriate resistor values, insuring that the voltage is within the adjustment range for the converter used.  
If no voltage adjustment is needed connect a 470pF ceramic capacitor from pin 6 to ground.

**NOTE:** 1. Datasheets are updated as needed and as such, specifications are subject to change without notice. Once printed or downloaded, datasheets are no longer controlled by Aimtec; refer to [www.aimtec.com](http://www.aimtec.com) for the most current product specifications. 2. Product labels shown, including safety agency certifications on labels, may vary based on the date manufactured. 3. Mechanical drawings and specifications are for reference only. 4. All specifications are measured at an ambient temperature of 25°C, humidity<75%, nominal input voltage and at rated output load unless otherwise specified. 5. Aimtec may not have conducted destructive testing or chemical analysis on all internal components and chemicals at the time of publishing this document. CAS numbers and other limited information are considered proprietary and may not be available for release. 6. This product is not designed for use in critical life support systems, equipment used in hazardous environments, nuclear control systems or other such applications which necessitate specific safety and regulatory standards other the ones listed in this datasheet. 7. Warranty is in accordance with Aimtec's standard Terms of Sale available at [www.aimtec.com](http://www.aimtec.com).