



FEATURES:

- Wide 4:1 Input Voltage Range
- High efficiency up to 90%
- 1500 VDC Isolation
- Over Current Protection
- No load consumption $\leq 0.12W$
- Operating Temperature $-40^{\circ}C$ to $+85^{\circ}C$
- Output Over Voltage protection
- Continuous Short Circuit Protection
- Input Under Voltage Protection
- Remote On/Off control

Models
Single output



| Model | Input Voltage (V) | Output Voltage (V) | Output Current max (A) | Isolation (VDC) | Max Capacitive Load (μF) | Efficiency Typ. (%) |
|-----------------|-------------------|--------------------|------------------------|-----------------|---------------------------------|---------------------|
| AM20CW-2403S-NZ | 9-36 | 3.3 | 5 | 1500 | 10000 | 88 |
| AM20CW-2405S-NZ | 9-36 | 5 | 4 | 1500 | 10000 | 90 |
| AM20CW-2412S-NZ | 9-36 | 12 | 1.667 | 1500 | 1600 | 90 |
| AM20CW-2415S-NZ | 9-36 | 15 | 1.333 | 1500 | 1000 | 91 |
| AM20CW-2424S-NZ | 9-36 | 24 | 0.833 | 1500 | 500 | 91 |
| AM20CW-4803S-NZ | 18-75 | 3.3 | 5 | 1500 | 10000 | 88 |
| AM20CW-4805S-NZ | 18-75 | 5 | 4 | 1500 | 10000 | 90 |
| AM20CW-4812S-NZ | 18-75 | 12 | 1.667 | 1500 | 1600 | 91 |
| AM20CW-4815S-NZ | 18-75 | 15 | 1.333 | 1500 | 1000 | 91 |
| AM20CW-4824S-NZ | 18-75 | 24 | 0.833 | 1500 | 500 | 91 |

Models
Dual output

| Model | Input Voltage (V) | Output Voltage (V) | Output Current max (A) | Isolation (VDC) | Max Capacitive Load (μF) | Efficiency Typ. (%) |
|-----------------|-------------------|--------------------|------------------------|-----------------|---------------------------------|---------------------|
| AM20CW-2405D-NZ | 9-36 | ± 5 | ± 2 | 1500 | 2000 | 87 |
| AM20CW-2412D-NZ | 9-36 | ± 12 | ± 0.833 | 1500 | 800 | 90 |
| AM20CW-2415D-NZ | 9-36 | ± 15 | ± 0.667 | 1500 | 600 | 90 |
| AM20CW-2424D-NZ | 9-36 | ± 24 | ± 0.417 | 1500 | 300 | 89 |
| AM20CW-4805D-NZ | 18-75 | ± 5 | ± 2 | 1500 | 2000 | 86 |
| AM20CW-4812D-NZ | 18-75 | ± 12 | ± 0.833 | 1500 | 800 | 90 |
| AM20CW-4815D-NZ | 18-75 | ± 15 | ± 0.667 | 1500 | 600 | 90 |
| AM20CW-4824D-NZ | 18-75 | ± 24 | ± 0.417 | 1500 | 300 | 90 |

*Add suffix "-K" for optional heatsink(Single output models only)

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

Input Specifications

| Parameters | Nominal | Typical | Maximum | Units | |
|---------------------------------|------------------|--------------------|-------------------------|-------|----|
| Voltage range | 24 Vin 48 Vin | 9-36 18-75 | | VDC | |
| Filter | Pi network | | | | |
| Absolute Maximum Rating (100ms) | 24 Vin 48 Vin | | -0.7 - 50 -0.7 - 100 | VDC | |
| No Load Input Current | 24 Vin | 3.3V single output | 30 | 50 | mA |
| | | 5V single output | 35 | 55 | |
| | | 12V single output | 6 | 15 | |
| | | 15V single output | 6 | 15 | |
| | | 24V single output | 10 | 20 | |
| | | All dual output | 10 | 20 | |

| | | | | | |
|------------------------------|-------------------------------|--------------------|---|---------|-----|
| | 48 Vin | 3.3V single output | 15 | 30 | mA |
| | | 5V single output | 20 | 30 | |
| | | 12V single output | 3 | 15 | |
| | | 15V single output | 3 | 15 | |
| | | 24V single output | 4 | 15 | |
| | | All dual output | 5 | 11 | |
| Input reflected current | | | 30 | | mA |
| Input Under voltage turn off | 24 Vin 48 Vin | | 5.5 ~ 6.5 12 ~ 15.5 | | VDC |
| Startup voltage | 24 Vin 48 Vin | | | 9 18 | VDC |
| Startup time | Nominal input, resistive load | | 10 | | ms |
| Remote On/Off Control | On Off | | 3.5-12VDC or leave open 0-1.2VDC or connect to GND, idle current 2-7mA | | |

Isolation Specifications

| Parameters | Conditions | Typical | Maximum | Units |
|--------------------|------------------|---------|---------|-------|
| Tested I/O voltage | 60 sec, <1mA | >1500 | | VDC |
| Resistance | 500VDC | >1000 | | MOhm |
| Capacitance | I/O, 100KHz/0.1V | 2000 | | pF |

Output Specifications

| Parameters | Conditions | Typical | Maximum | Units |
|------------------------------|--|------------------------|---------|-----------|
| Voltage accuracy | Single output 0% to 100% load | ±1 | ±3 | % |
| | Dual output 5%-100% load | ±1 | ±3 | |
| Over voltage protection | | 110-160 | | % of Vout |
| Over current protection | | 150 | | % of Iout |
| Short Circuit protection | Continuous | | | |
| Short circuit restart | Auto-Recovery | | | |
| Line voltage regulation | Single output, Full load, LL to HL | ±0.2 | ±0.5 | % of Vin |
| | Dual output, Full load, LL to HL | 1 st output | ±0.2 | |
| | | 2 nd output | ±0.4 | |
| Load voltage regulation | 5% to 100% load | ±0.5 | ±1 | % |
| Cross Regulation | 50% at 1st output, 10-100% at 2nd output | | ±5 | % |
| Voltage adjustment | Single output | | ±10 | %Vout |
| Temperature coefficient | 100% load | | ±0.03 | %/°C |
| Ripple & Noise | Single output, 20MHz, 5-100% load | 50 | 100 | mV p-p |
| | Dual output, 20MHz, 5-100% load | 100 | 200 | |
| Transient recovery time | 25% load step change | 300 | 500 | µs |
| Transient recovery deviation | 3.3/5VDC single output, 25% load step change | ±5 | ±8 | % |
| | ±5VDC dual output, 25% load step change | ±3 | ±8 | |
| | Others, 25% load step change | ±3 | ±5 | |

General Specifications

| Parameters | Conditions | Typical | Maximum | Units |
|--------------------------|---|---------------------------|--------------------------|-------|
| Switching frequency | 3.3/5VDC single output, 100% load | 300 | | KHz |
| | Others, 100% load | 270 | | |
| Operating temperature | 3.3/5VDC single output with derating curve | | -40 to +95 | °C |
| | Others with derating curve | | -40 to +105 | |
| Storage temperature | | -55 to +125 | | °C |
| Maximum case temperature | | | 105 | °C |
| Cooling | Free air convection | | | |
| Humidity | | | 95 | % RH |
| Case material | Aluminum Alloy | | | |
| Weight | Pin mountable: | 15 | | g |
| | With optional -K Pin mountable: | 20 | | |
| Dimensions (L x W x H) | Pin mountable: | 1.00 x 1.00 x 0.46 inches | 25.40 x 25.40 x 11.70 mm | |
| | With optional -K Pin mountable: | 1.00 x 1.00 x 0.64 inches | 25.40 x 25.40 x 16.20 mm | |
| MTBF | >1,000,000 hours (MIL-HDBK -217F, Ground Benign, t=+25°C) | | | |

| | | | |
|-------------------------------|----------------------------|-----|----|
| Maximum soldering temperature | 1.5mm from case for 10 sec | 300 | °C |
|-------------------------------|----------------------------|-----|----|

Environmental Specifications

| Parameters | | |
|------------|--------------|-----------------------|
| Vibration | Test mode | 10-150Hz |
| | Acceleration | 5G, every axis tested |

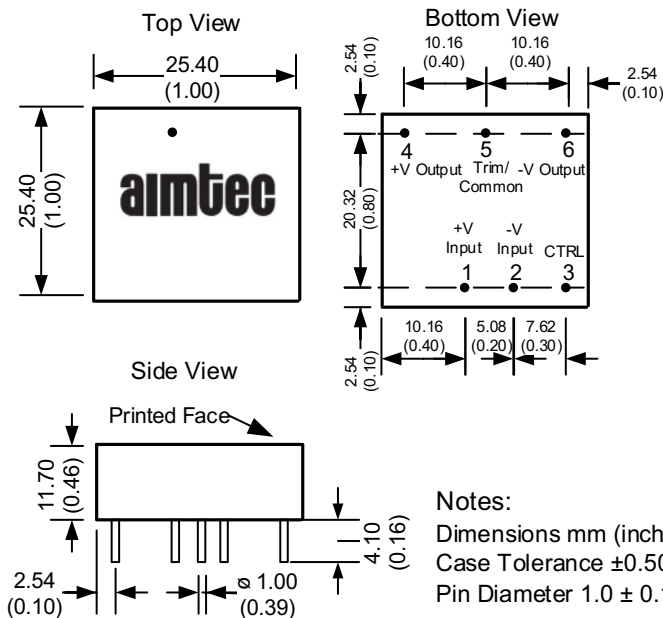
Safety Specifications

| Parameters | | |
|------------|---|--|
| Approval | cULus(with exception of the dual output models), CE | |
| Standards | Information technology Equipment | IEC/EN/UL 62368-1 |
| | EMI - Conducted and radiated emission | EN 55032, class B (with the recommended EMC 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, ±2KV, Criteria B (with the recommended EMC circuit) |
| | Surge Immunity | IEC 61000-4-5, ±2KV, Criteria B (with the recommended EMC circuit) |
| | RF, Conducted Disturbance Immunity | IEC 61000-4-6, 3 Vrms, Criteria A |

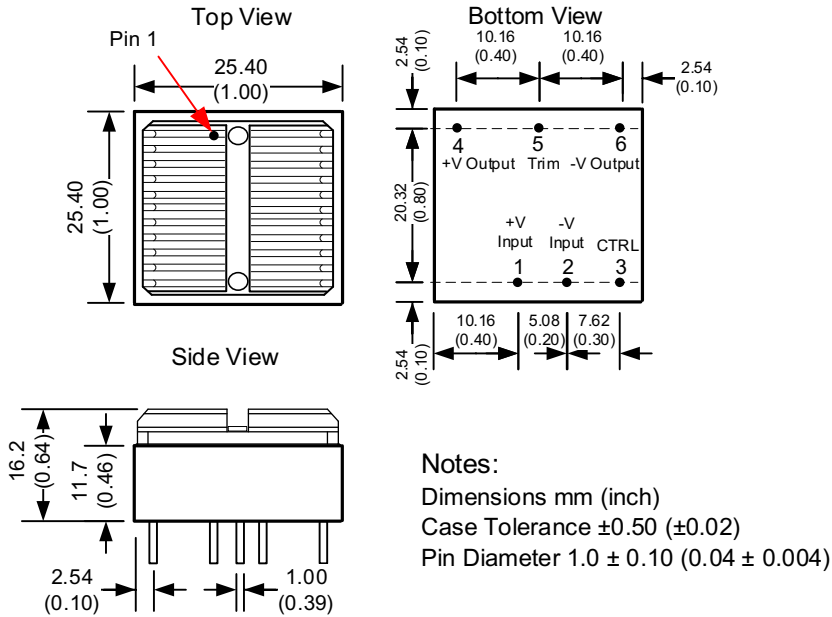
Pin Out Specifications

| Pin | Single | Pin | Dual |
|-----|----------------|-----|----------------|
| 1 | +V Input | 1 | +V Input |
| 2 | -V Input | 2 | -V Input |
| 3 | On/Off Control | 3 | On/Off Control |
| 4 | +V Output | 4 | +V Output |
| 5 | Trim | 5 | Common |
| 6 | -V Output | 6 | -V Output |

Dimensions

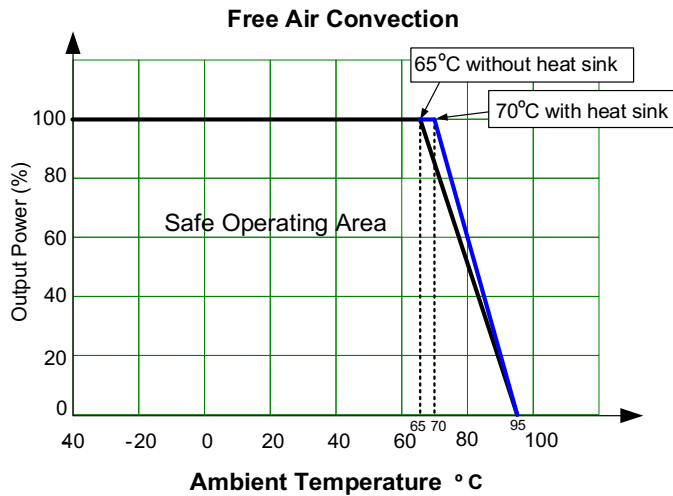


Heatsink Option: AM20CW-NZ-K

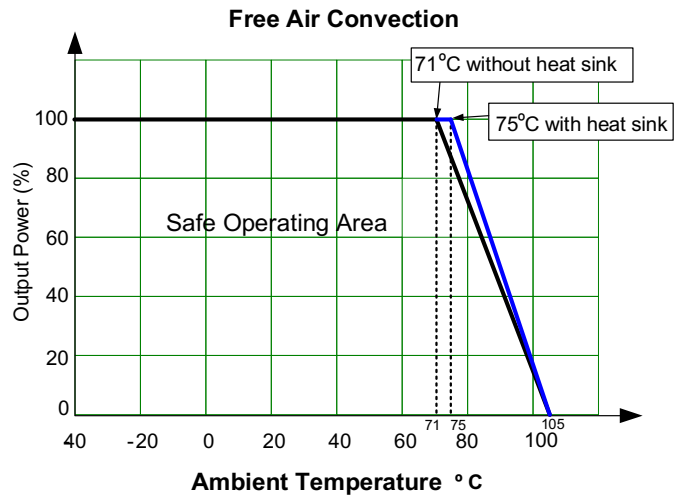


Derating

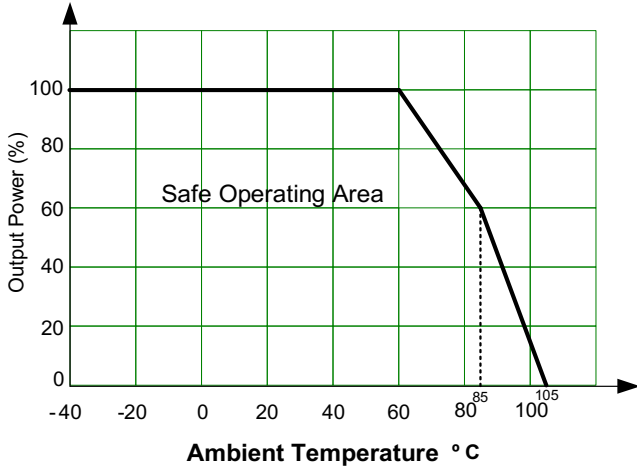
3.3V & 5V single output models



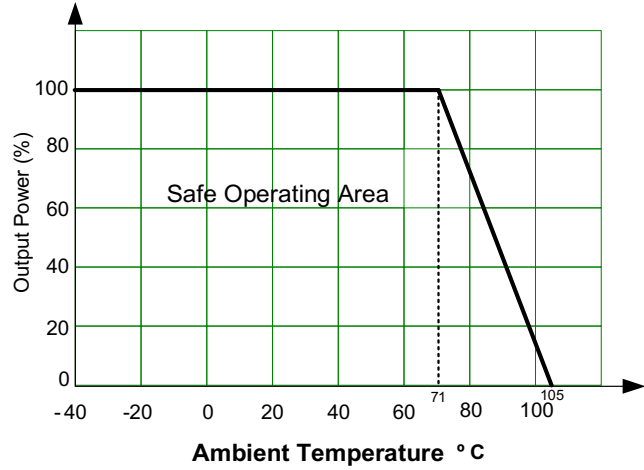
Other single output models



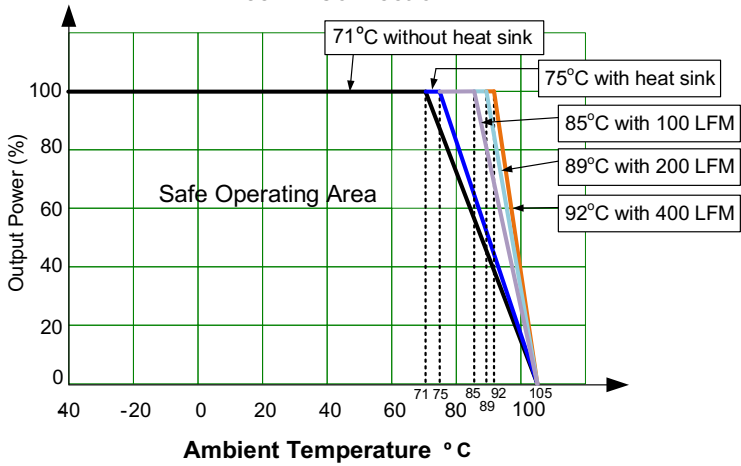
±5V dual output model
Free Air Convection



Other Dual output models
Free Air Convection

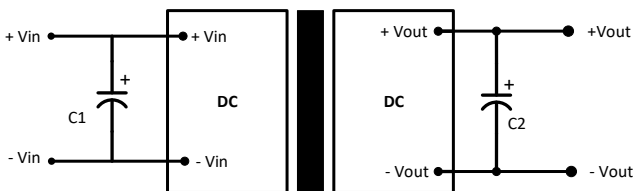


24V output model
Free Air Convection



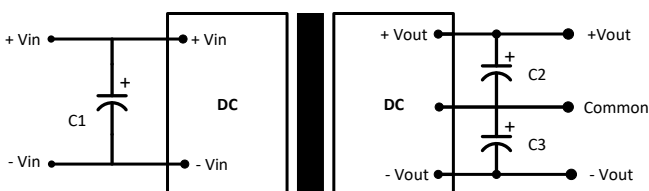
Typical Application Circuit

Single



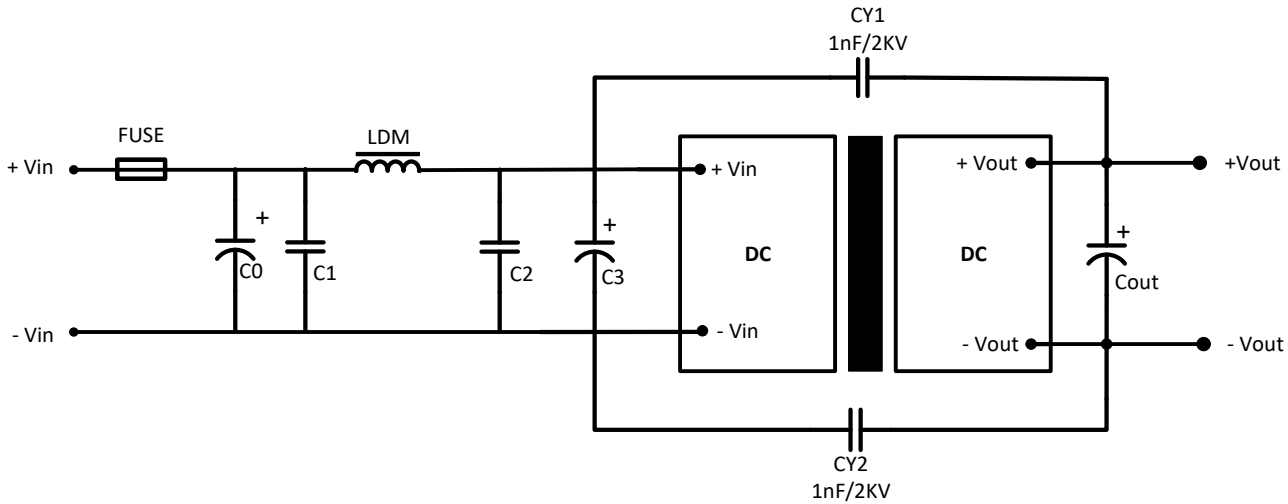
| Model | Single 3.3/5/12/15V output | Single 24V output |
|-------|----------------------------|-------------------|
| C1 | 100µF | |
| C2 | 100µF | 47µF |

Dual



| Model | 24V input dual output | 48V input dual output |
|-------|-----------------------|-----------------------|
| C1 | 100µF | 10 - 47µF |
| C2 | 10µF | |
| C3 | 10µF | |

Recommended EMC Circuit



| Model | 24V input single output | 48V input single output |
|--------|-----------------------------|-------------------------|
| C0, C3 | 330 μ F/50V | 330 μ F/100V |
| C1, C2 | 4.7 μ F/50V | 4.7 μ F/100V |
| LDM | 2.2 μ H/4A | 2.2 μ H/2A |
| Cout | Refer to typical circuit C2 | |

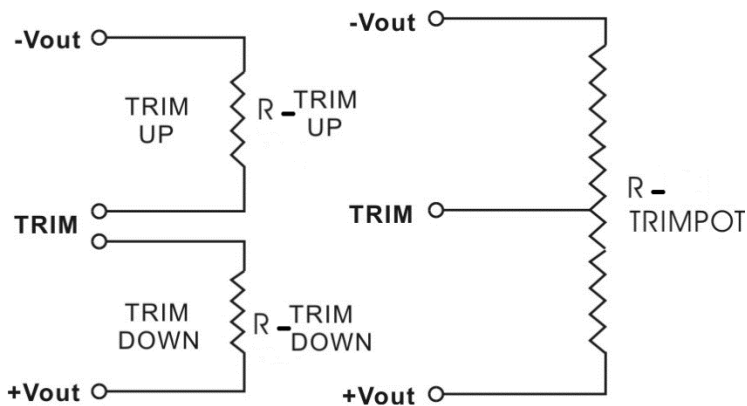
| Model | 24V input dual output | 48V input dual output |
|--------|-----------------------------|-----------------------|
| C0, C3 | 330 μ F/50V | 330 μ F/100V |
| C1, C2 | 4.7 μ F/50V | 4.7 μ F/100V |
| LDM | 4.7 μ H | |
| Cout | Refer to typical circuit C2 | |

Trimming

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

Fixed Resistor

Variable Potentiometer



Leave open if not used.

3.3V Output

| | | | | | | | | | | |
|--------------|----------|---------|--------|--------|--------|--------|--------|--------|--------|-------|
| 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) | 138.598 | 83.989 | 57.383 | 41.637 | 31.229 | 23.837 | 18.316 | 14.037 | 10.621 | 7.833 |
| 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) | 1795.815 | 149.446 | 71.134 | 43.348 | 29.116 | 20.466 | 14.652 | 10.475 | 7.330 | 4.876 |

5V Output

| | | | | | | | | | | |
|--------------|---------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
| 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) | 89.996 | 47.446 | 29.793 | 20.131 | 14.036 | 9.840 | 6.775 | 4.439 | 2.598 | 1.111 |
| Trim up % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Vout (VDC) | 5.05 | 5.1 | 5.15 | 5.2 | 5.25 | 5.3 | 5.35 | 5.4 | 5.45 | 5.5 |
| Rt up (KΩ) | 238.676 | 81.473 | 46.044 | 30.398 | 21.581 | 15.923 | 11.985 | 9.085 | 6.861 | 5.101 |

12V Output

| | | | | | | | | | | |
|--------------|---------|---------|---------|---------|---------|---------|--------|--------|--------|--------|
| 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) | 493.692 | 299.052 | 210.127 | 159.185 | 126.173 | 103.042 | 85.932 | 72.764 | 62.316 | 53.823 |
| 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) | 704.035 | 156.520 | 81.479 | 51.675 | 35.677 | 25.695 | 18.874 | 13.917 | 10.152 | 7.195 |

15V Output

| | | | | | | | | | | |
|--------------|----------|---------|---------|---------|---------|---------|---------|---------|--------|--------|
| Trim down % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Vout (VDC) | 14.85 | 14.7 | 14.55 | 14.4 | 14.25 | 14.1 | 13.95 | 13.8 | 13.65 | 13.5 |
| Rt down (KΩ) | 632.483 | 398.237 | 286.114 | 220.359 | 177.137 | 146.560 | 123.787 | 106.169 | 92.132 | 80.687 |
| Trim up % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Vout (VDC) | 15.15 | 15.3 | 15.45 | 15.6 | 15.75 | 15.9 | 16.05 | 16.2 | 16.35 | 16.5 |
| Rt up (KΩ) | 1457.699 | 190.174 | 94.242 | 58.954 | 40.616 | 29.381 | 21.791 | 16.321 | 12.190 | 8.961 |

24V Output

| | | | | | | | | | | |
|--------------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Trim down % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Vout (VDC) | 23.76 | 23.52 | 23.28 | 23.04 | 22.8 | 22.56 | 22.32 | 22.08 | 21.84 | 21.6 |
| Rt down (KΩ) | 1284.000 | 789.923 | 563.667 | 433.904 | 349.754 | 290.763 | 247.115 | 213.514 | 186.847 | 165.170 |
| Trim up % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Vout (VDC) | 24.24 | 24.48 | 24.72 | 24.96 | 25.2 | 25.44 | 25.68 | 25.92 | 26.16 | 26.4 |
| Rt up (KΩ) | 814.689 | 177.714 | 92.138 | 58.264 | 40.107 | 28.788 | 21.057 | 15.440 | 11.176 | 7.827 |

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