## MAC20 SERIES
### SINGLE, DUAL & TRIPLE OUTPUTS

The MAC20 series of DC-DC converters have been designed as a surface-mount & thru-hole solution for a wide range of applications where a wide dc input range, light weight and ease of assembly are needed. Utilizing the latest thermal transfer techniques the MAC20 series packs up to 20 watts of power in 1.75” x 2.0” x .500” open frame construction, with input ranges of 9-36Vdc and 18-75Vdc and operating temperatures of -40°C to +105°C. All models are designed to meet UL1950, CSA 950 and EN 60950.

### FEATURES:
- Wide Input Range 4:1
- Pick & Place Packaging
- High Efficiency to 86%
- External Trim
- -40C To +105C Operation
- Overvoltage & Short Circuit Protection
- Surface Mount & Thru-Hole Types
- 1500Vdc Isolation
- Integral Metal Substrate
- Under-Voltage Lockout
- Floating or Common Auxiliaries
- Remote On/Off
- Open Frame Construction

### MODEL SELECTION GUIDE:

<table>
<thead>
<tr>
<th>INPUT VOLTAGE RANGE</th>
<th>INPUT @ VIN NOM. FL</th>
<th>OUTPUT V1 &amp; V2/V3</th>
<th>OUTPUT CURRENT (MAX)</th>
<th>PO (W)</th>
<th>OUTPUT OVP</th>
<th>TYPICAL EFFICIENCY</th>
<th>NOTE (**)</th>
<th>MODEL NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>12Vdc 9-36Vdc</td>
<td>0.947</td>
<td>7mA</td>
<td>2.5</td>
<td>3.5</td>
<td>8.75</td>
<td>3.9V</td>
<td>77%</td>
<td>MAC20-12S2V5(**)</td>
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<td>7mA</td>
<td>3.30</td>
<td>3.5A</td>
<td>11.5</td>
<td>3.9V</td>
<td>79%</td>
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<td>7mA</td>
<td>5.00</td>
<td>3.2A</td>
<td>16</td>
<td>6.8V</td>
<td>82%</td>
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<td>7mA</td>
<td>12.00</td>
<td>1.33A</td>
<td>16</td>
<td>15V</td>
<td>84%</td>
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<td>15.00</td>
<td>1.06A</td>
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<td>18V</td>
<td>85%</td>
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<td>2.9 &amp; +/-26A</td>
<td>16</td>
<td>3.9 (V1)</td>
<td>81%</td>
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<tr>
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<td>2.9 &amp; +/-22A</td>
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<td>82%</td>
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<td>2.9 &amp; +/-14A</td>
<td>16</td>
<td>3.9 (V1)</td>
<td>83%</td>
<td>MAC20-12T3D24</td>
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<tr>
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<td>5.0 &amp; +/-12.00</td>
<td>2.6 &amp; +/-26A</td>
<td>16</td>
<td>6.8 (V1)</td>
<td>83%</td>
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<td>12Vdc 9-36Vdc</td>
<td>1.587</td>
<td>7mA</td>
<td>5.0 &amp; +/-15.00</td>
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<td>84%</td>
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<td>1.569</td>
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<td>16</td>
<td>6.8 (V1)</td>
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<td>2.50</td>
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<td>80%</td>
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<td>1.33A</td>
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<td>18V</td>
<td>86%</td>
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<tr>
<td>48Vdc 18-75Vdc</td>
<td>0.508</td>
<td>7mA</td>
<td>3.3 &amp; +/-12.00</td>
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<td>20</td>
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<td>3.9 (V1)</td>
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<td>3.3 &amp; +/-24.00</td>
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<td>20</td>
<td>3.9 (V1)</td>
<td>84%</td>
<td>MAC20-48T3D24</td>
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<td>48Vdc 18-75Vdc</td>
<td>0.496</td>
<td>7mA</td>
<td>5.0 &amp; +/-12.00</td>
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</tr>
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Note (***) Insert suffix; SM for Surface-mount type or TH for Thru-hole Type mounting

**MODIFICATIONS AND CUSTOMS AVAILABLE**

International Coil, Inc., 15 Jonathan Drive, Unit 1 Brockton, MA, 02301 Tel(508) 580-8515, Fax 508-580-8511, w w w. a c u t e p o w e r. c o m
SPECIFICATIONS: All Specifications Are Typical @Nominal Input, Full Load & 25°C Unless Otherwise Stated and are Subject to Change without Notice

INPUT

Input Voltage Range 4:1
- Note (3) 9-36Vdc (12V Models)
18-75Vdc (48V Models)
Input Filter P Type
Under Voltage Lockout 8.5V (12V Models)
16.5V (48V Models)
Remote ON: +5V or open, Ref. (-) Vin
OFF: +0.7V, Ref. (-) Vin
Conducted Noise EN55022, Level A (Note 5)

OUTPUT

Output Power 20 W Continuous (Max)
Output Voltage/Current See Model Table
Output Setting Accuracy Singles +/- 1% typ., +/- 1.5% max.
Aux +/- 3%
Load Variation Singles (FL-10%L) +/- 0.5% Note (4), (6)
Aux (FL-20%L) +/- 3%, Balanced: V1 (10%L-F1)
Line Regulation +/- 0.5%(Vo1), +/- 2% Aux
Total Error Band Singles +/- 3%, Line/Load & Temp.
Auxiliary Outputs +/- 10%(0.1, 2.63 @ 20% FL)
Ripple & Noise (20MHz BW) 100mV (Vo1), 1% (Aux)
Transient Response (FL-1/2L) 2% Dev., 200μs
Temperature Coefficient +/- 0.01%/c
Short circuit Protection Indefinite, Modulated, Automatic Recovery

GENERAL

Efficiency See Model Table
Isolation Voltage 1500Vdc (1 Min)
Isolation Resistance 100M
Switching Frequency 400KHz
MTBF 1.0M hrs. MIL-HDBK-217F Ground Benign @ 25°C

ENVIRONMENTAL

Operating Temperature Range 40°C to +105°C (See Derating Curve)
Storage Temperature Range 40°C to +60°C @ FL
Maximum Case Temperature 110°C
Humidity 5% to 95% RH, Non-condensing
Cooling Natural Convection
Processing (Note 2) (230°C peak, 20 Sec.), water washable

MECHANICAL

Size 1.75" X 2.00" X 0.500"
Weight 24.0G
Mounting SMD & Through Hole Types
Case Material Open-Frame, 94V-0 FR-4 P.C.B., with Bonded Aluminum Substrate

NOTES:

1) O.V.P. protection is across Vo1.
2) Consult factory for recommended reflow profile.
3) Typical start-up for 12V in models is 9V. Maximum startup is 9.5V, with full operation down to 9.0V.
4) Operation is allowed to No-Load on single outputs, however operation below 10% load may cause ripple & noise to exceed spec.
5) External Capacitor required.
6) Auxiliary output regulation rely’s on cross coupling of output channels. A 10% minimum load is required on Vo1 for regulation.
7) Max output power not to exceed 20 watts total.