



APPLICATIONS

Wireless Network
Telecom/Datacom
Industry Control System
Measurement Equipment
Semiconductor Equipment

FEATURES

- 3 WATTS REGULATED OUTPUT POWER
- OUTPUT CURRENT UP TO 0.5A
- STANDARD 1.25 X 0.80 X 0.40 INCH
- HIGH EFFICIENCY UP TO 80%
- 2:1 WIDE INPUT VOLTAGE RANGE
- FIVE-SIDED SHIELD
- FIXED SWITCHING FREQUENCY (300KHz)
- STANDARD 24 PIN DIP PACKAGE & SMD TYPE PACKAGE
- OVER CURRENT PROTECTION
- OUTPUT 1 / OUTPUT 2 ISOLATION (DS TYPE)
- CE MARK MEETS 2006/95/EC, 93/68/EEC AND 2004/108/EC
- UL60950-1, EN60950-1 AND IEC60950-1 LICENSED
- ISO9001 CERTIFIED MANUFACTURING FACILITIES
- COMPLIANT TO RoHS EU DIRECTIVE 2002/95/EC

OPTIONS

SMD TYPE, M1 TYPE

DESCRIPTION

The MKC03 series offer 3 watts of output power from a package in an IC compatible 24pin DIP configuration without derating to 82°C ambient temperature. MKC03 series have 2:1 wide input voltage of 9-18, 18-36 and 36-75VDC.

TECHNICAL SPECIFICATION All specifications are typical at nominal input, full load and 25°C otherwise noted

| OUTPUT SPECIFICATIONS | | | |
|----------------------------------|---------------------------------|----------------------------------|--|
| Output power | | | 3 Watts, max. |
| Voltage accuracy | Full load and nominal Vin | | ± 1% |
| Minimum load | | | 0% |
| Line regulation | LL to HL at Full Load | | ± 0.2% |
| Load regulation | No Load to Full Load | Single | ± 0.2% |
| | | Dual | ± 1% |
| | | DS | ± 1% |
| Cross regulation (Dual) | Asymmetrical load 25% / 100% FL | | ± 5% |
| Ripple and noise | 20MHz bandwidth | | See table |
| Temperature coefficient | | | ±0.02% / °C, max. |
| Transient response recovery time | 25% load step change | | 200µS |
| Over load protection | % of FL at nominal input | | 180%, typ. |
| Short circuit protection | | Continuous, automatic recovery | |
| GENERAL INPUT SPECIFICATIONS | | | |
| Efficiency | | | See table |
| Isolation voltage | Input to Output to Case | | 500VDC, min. |
| | DS type, Output to Output | | 500VDC, min. |
| Isolation resistance | | | 10 ⁹ ohms, min. |
| Isolation capacitance | | | 300pF, max. |
| Switching frequency | | | 300KHz, typ. |
| Approvals and standard | | IEC60950-1, UL60950-1, EN60950-1 | |
| Case material | | | Nickel-coated copper |
| Base material | | | Non-conductive black plastic |
| Potting material | | | Epoxy (UL94-V0) |
| Dimensions | | | 1.25 X 0.80 X 0.40 Inch (31.8 X 20.3 X 10.2 mm) |
| Weight | DIP | | 16g (0.55oz) |
| | SMD | | 18g (0.62oz) |
| MTBF (Note 1) | BELLCORE TR-NWT-000332 | | 3.069 x 10 ⁶ hrs |
| | MIL-HDBK-217F | | 2.003 x 10 ⁶ hrs |

| INPUT SPECIFICATIONS | | | |
|----------------------------------|---|----------|-------------------------------|
| Input voltage range | 12V nominal input | | 9 – 18VDC |
| | 24V nominal input | | 18 – 36VDC |
| | 48V nominal input | | 36 – 75VDC |
| Input filter | | | Pi type |
| Input surge voltage 100mS max | 12V input | | 36VDC |
| | 24V input | | 50VDC |
| | 48V input | | 100VDC |
| Input reflected ripple current | Nominal Vin and full load | | 20mA _{p-p} |
| Start up time | Nominal Vin and constant resistive load | Power up | 350mS,max. |
| | | | |
| ENVIRONMENTAL SPECIFICATIONS | | | |
| Operating ambient temperature | Standard | | -25°C ~ +85°C (with derating) |
| | M1 (Note 6) | | -40°C ~ +85°C (non-derating) |
| Maximum case temperature | | | 100°C |
| Storage temperature range | | | -55°C ~ +105°C |
| Thermal impedance | Nature convection | | 20°C/Watt |
| Thermal shock | | | MIL-STD-810F |
| Vibration | | | MIL-STD-810F |
| Relative humidity | | | 5% to 95% RH |
| EMC CHARACTERISTICS | | | |
| EMI | EN55022 | | Class A |
| ESD | EN61000-4-2 | Air | ± 8KV |
| | | Contact | ± 6KV |
| Radiated immunity | EN61000-4-3 | | 10 V/m Perf. Criteria A |
| Fast transient (Note 7) | EN61000-4-4 | | ± 2KV Perf. Criteria B |
| Surge (Note 7) | EN61000-4-5 | | ± 1KV Perf. Criteria B |
| Conducted immunity | EN61000-4-6 | | 10 Vr.m.s Perf. Criteria A |

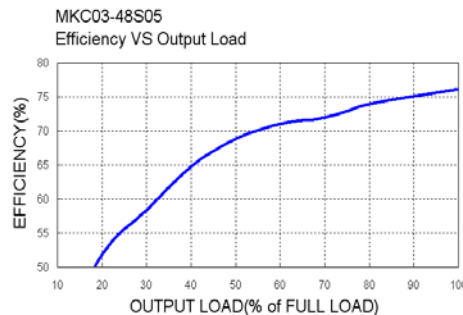
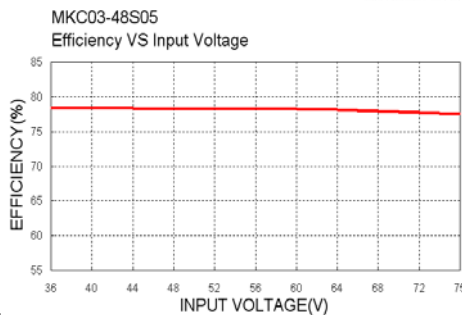
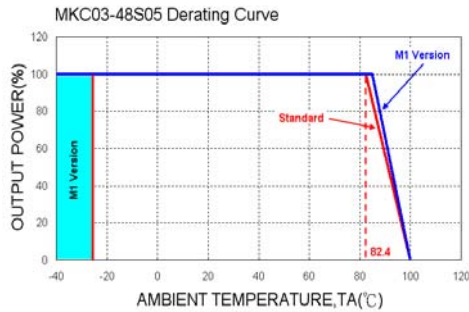




| Model Number | Input Range | Output Voltage | Output Current | | Output (4) Ripple & Noise | Input Current | | Eff (4) (%) | Capacitor(5) Load max |
|--------------|-------------|---------------------|----------------|-------------------|------------------------------|---------------|--------------|----------------|--------------------------|
| | | | Min. load | Full load | | No load(3) | Full load(2) | | |
| MKC03-12S33 | 9 – 18 VDC | 3.3 VDC | 0mA | 500mA | 50mVp-p | 8mA | 196mA | 74 | 2200μF |
| MKC03-12S05 | 9 – 18 VDC | 5 VDC | 0mA | 500mA | 50mVp-p | 10mA | 286mA | 77 | 1000μF |
| MKC03-12S12 | 9 – 18 VDC | 12 VDC | 0mA | 250mA | 50mVp-p | 13mA | 333mA | 79 | 220μF |
| MKC03-12S15 | 9 – 18 VDC | 15 VDC | 0mA | 200mA | 50mVp-p | 13mA | 329mA | 80 | 150μF |
| MKC03-12D05 | 9 – 18 VDC | ± 5 VDC | 0mA | ± 250mA | 50mVp-p | 13mA | 293mA | 75 | ± 470μF |
| MKC03-12D12 | 9 – 18 VDC | ± 12 VDC | 0mA | ± 125mA | 50mVp-p | 16mA | 329mA | 80 | ± 100μF |
| MKC03-12D15 | 9 – 18 VDC | ± 15 VDC | 0mA | ± 100mA | 50mVp-p | 16mA | 329mA | 80 | ± 68μF |
| MKC03-12DS05 | 9 – 18 VDC | V1:5 VDC;V2:5 VDC | 0mA | V1:250mA;V2:250mA | 50mVp-p | 18mA | 293mA | 75 | V1:470μF;V2:470μF |
| MKC03-12DS12 | 9 – 18 VDC | V1:12 VDC;V2:12 VDC | 0mA | V1:125mA;V2:125mA | 50mVp-p | 18mA | 329mA | 80 | V1:100μF;V2:100μF |
| MKC03-12DS15 | 9 – 18 VDC | V1:15 VDC;V2:15 VDC | 0mA | V1:100mA;V2:100mA | 50mVp-p | 18mA | 329mA | 80 | V1:68μF;V2:68μF |
| MKC03-24S33 | 18 – 36 VDC | 3.3 VDC | 0mA | 500mA | 50mVp-p | 12mA | 101mA | 72 | 2200μF |
| MKC03-24S05 | 18 – 36 VDC | 5 VDC | 0mA | 500mA | 50mVp-p | 12mA | 149mA | 74 | 1000μF |
| MKC03-24S12 | 18 – 36 VDC | 12 VDC | 0mA | 250mA | 50mVp-p | 16mA | 169mA | 78 | 220μF |
| MKC03-24S15 | 18 – 36 VDC | 15 VDC | 0mA | 200mA | 50mVp-p | 16mA | 169mA | 78 | 150μF |
| MKC03-24D05 | 18 – 36 VDC | ± 5 VDC | 0mA | ± 250mA | 50mVp-p | 18mA | 147mA | 75 | ± 470μF |
| MKC03-24D12 | 18 – 36 VDC | ± 12 VDC | 0mA | ± 125mA | 50mVp-p | 18mA | 169mA | 78 | ± 100μF |
| MKC03-24D15 | 18 – 36 VDC | ± 15 VDC | 0mA | ± 100mA | 50mVp-p | 18mA | 169mA | 78 | ± 68μF |
| MKC03-24DS05 | 18 – 36 VDC | V1:5 VDC;V2:5 VDC | 0mA | V1:250mA;V2:250mA | 50mVp-p | 16mA | 147mA | 75 | V1:470μF;V2:470μF |
| MKC03-24DS12 | 18 – 36 VDC | V1:12 VDC;V2:12 VDC | 0mA | V1:125mA;V2:125mA | 50mVp-p | 20mA | 169mA | 78 | V1:100μF;V2:100μF |
| MKC03-24DS15 | 18 – 36 VDC | V1:15 VDC;V2:15 VDC | 0mA | V1:100mA;V2:100mA | 50mVp-p | 20mA | 169mA | 78 | V1:68μF;V2:68μF |
| MKC03-48S33 | 36 – 75 VDC | 3.3 VDC | 0mA | 500mA | 50mVp-p | 8mA | 48mA | 76 | 2200μF |
| MKC03-48S05 | 36 – 75 VDC | 5 VDC | 0mA | 500mA | 50mVp-p | 10mA | 75mA | 74 | 1000μF |
| MKC03-48S12 | 36 – 75 VDC | 12 VDC | 0mA | 250mA | 50mVp-p | 10mA | 84mA | 79 | 220μF |
| MKC03-48S15 | 36 – 75 VDC | 15 VDC | 0mA | 200mA | 50mVp-p | 10mA | 84mA | 79 | 150μF |
| MKC03-48D05 | 36 – 75 VDC | ± 5 VDC | 0mA | ± 250mA | 50mVp-p | 10mA | 75mA | 74 | ± 470μF |
| MKC03-48D12 | 36 – 75 VDC | ± 12 VDC | 0mA | ± 125mA | 50mVp-p | 12mA | 86mA | 77 | ± 100μF |
| MKC03-48D15 | 36 – 75 VDC | ± 15 VDC | 0mA | ± 100mA | 50mVp-p | 12mA | 86mA | 77 | ± 68μF |
| MKC03-48DS05 | 36 – 75 VDC | V1:5 VDC;V2:5 VDC | 0mA | V1:250mA;V2:250mA | 50mVp-p | 18mA | 75mA | 74 | V1:470μF;V2:470μF |
| MKC03-48DS12 | 36 – 75 VDC | V1:12 VDC;V2:12 VDC | 0mA | V1:125mA;V2:125mA | 50mVp-p | 18mA | 86mA | 77 | V1:100μF;V2:100μF |
| MKC03-48DS15 | 36 – 75 VDC | V1:15 VDC;V2:15 VDC | 0mA | V1:100mA;V2:100mA | 50mVp-p | 18mA | 86mA | 77 | V1:68μF;V2:68μF |

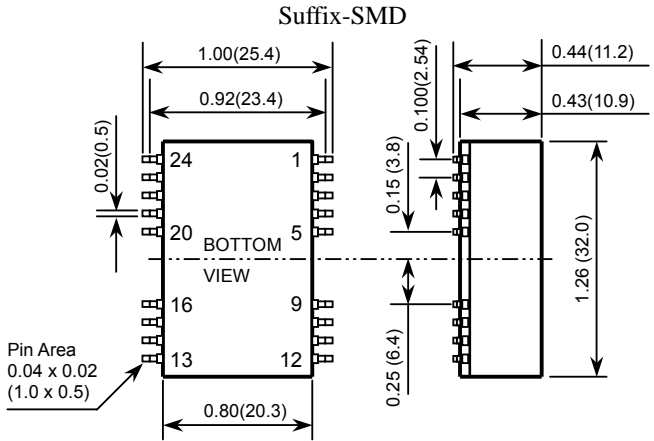
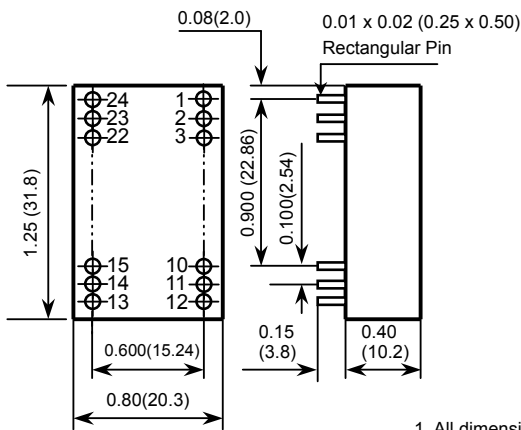
Note

1. BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40°C.
MIL-HDBK-217F Notice2 @Ta=25 °C, Full load(Ground, Benign, controlled environment).
2. Maximum value at nominal input voltage and full load of standard type.
3. Typical value at nominal input voltage and no load.
4. Typical value at nominal input voltage and full load.
5. Test by minimum Vin and constant resistive load.
6. M1 version is more efficient, therefore, it can be operated in a more extensive temperature range than standard.
7. An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5.
The filter capacitor Power Mate suggest: Nippon chemi-con KY series, 220μF/100V, ESR 48mΩ.





**3 WATTS
DC-DC CONVERTER**



1. All dimensions in Inches (mm)
Tolerance: X.XX±0.02 (X.X±0.5)
X.XXX±0.01 (X.XX±0.25)
2. Pin pitch tolerance ±0.01(0.25)
3. Pin dimension tolerance ±0.004 (0.1)

| DIP PIN CONNECTION | | | | | | | |
|--------------------|---------|----------|----------|-----|----------|----------|----------|
| PIN | SINGLE | DUAL | DS | PIN | SINGLE | DUAL | DS |
| 1 | + INPUT | + INPUT | + INPUT | 24 | + INPUT | + INPUT | + INPUT |
| 2 | NC | - OUTPUT | - V1 out | 23 | NC | - OUTPUT | - V1 out |
| 3 | NC | COMMON | + V1 out | 22 | NC | COMMON | + V1 out |
| 10 | -OUTPUT | COMMON | - V2 out | 15 | - OUTPUT | COMMON | - V2 out |
| 11 | +OUTPUT | +OUTPUT | + V2 out | 14 | +OUTPUT | +OUTPUT | + V2 out |
| 12 | - INPUT | - INPUT | - INPUT | 13 | - INPUT | - INPUT | - INPUT |

| SMD PIN CONNECTION | | | | | | | |
|--------------------|---------|----------|----------|--------|---------|----------|----------|
| PIN | SINGLE | DUAL | DS | PIN | SINGLE | DUAL | DS |
| 1 | + INPUT | + INPUT | + INPUT | 24 | + INPUT | + INPUT | + INPUT |
| 2 | NC | - OUTPUT | - V1 out | 23 | NC | - OUTPUT | - V1 out |
| 3 | NC | COMMON | + V1 out | 22 | NC | COMMON | + V1 out |
| 10 | -OUTPUT | COMMON | - V2 out | 15 | -OUTPUT | COMMON | - V2 out |
| 11 | +OUTPUT | +OUTPUT | + V2 out | 14 | +OUTPUT | +OUTPUT | + V2 out |
| 12 | - INPUT | - INPUT | - INPUT | 13 | - INPUT | - INPUT | - INPUT |
| Others | NC | NC | NC | Others | NC | NC | NC |

