



FEATURES

- Efficiency up to 84%
- MTBF > 1M Hours
- Reinforced Insulation rated for 300VAC Working Voltage
- UL/EN60601-1&EN60950-1 Safety Approval
- Operating Temperature Range -40°C to +85 °C
- High Isolation Voltage 4000VACrms
- Wide 2:1 Input Range
- Complies with EN5022 Class A
- Overload Protection
- Low Leakage Current
- 3 Years Product Warranty



The DM03S/D series are miniature, DIP Package, isolated 3W DC/DC converters with 4,000VACrms isolation. It offers short circuit protection and allows a wide operating temperature range of -40°C to +85°C. These isolated DC/DC converters are the latest offering from a world leader in power systems technology and manufacturing — Delta Electronics, Inc. With creative design technology and optimization of component placement, these converters possess outstanding electrical and thermal performance, as well as extremely high reliability under highly stressful operating conditions..

Model List

| Model Number | Input Voltage (Range) VDC | Output Voltage VDC | Output Current | | Input Current | | Reflected Ripple Current mA (typ.) | Max. capacitive Load uF | Efficiency (typ.) @Max. Load % |
|--------------|------------------------------|-----------------------|----------------|------------|------------------------|----------------------|---------------------------------------|----------------------------|--------------------------------------|
| | | | Max. mA | Min. mA | @Max. Load mA(typ.) | @No Load mA(typ.) | | | |
| DM03S0505A | 5 (4.5 ~ 9) | 5 | 600 | 90 | 857 | 40 | 60 | 1000 | 70 |
| DM03S0512A | | 12 | 250 | 37.5 | 800 | | | 470 | 75 |
| DM03S0524A | | 24 | 125 | 18.8 | 800 | | | 470 | 76 |
| DM03D0512A | | ±12 | ±125 | ±18.8 | 800 | | | 220* | 75 |
| DM03D0515A | | ±15 | ±100 | ±15 | 800 | | | 220* | 75 |
| DM03S1205A | 12 (9 ~ 18) | 5 | 600 | 90 | 338 | 30 | 30 | 1000 | 74 |
| DM03S1212A | | 12 | 250 | 37.5 | 313 | | | 470 | 80 |
| DM03S1224A | | 24 | 125 | 18.8 | 313 | | | 470 | 81 |
| DM03D1212A | | ±12 | ±125 | ±18.8 | 313 | | | 220* | 80 |
| DM03D1215A | | ±15 | ±100 | ±15 | 313 | | | 220* | 80 |
| DM03S2405A | 24 (18 ~ 36) | 5 | 600 | 90 | 160 | 20 | 15 | 1000 | 78 |
| DM03S2412A | | 12 | 250 | 37.5 | 151 | | | 470 | 83 |
| DM03S2424A | | 24 | 125 | 18.8 | 151 | | | 470 | 84 |
| DM03D2412A | | ±12 | ±125 | ±18.8 | 151 | | | 220* | 83 |
| DM03D2415A | | ±15 | ±100 | ±15 | 151 | | | 220* | 83 |
| DM03S4805A | 48 (36 ~ 75) | 5 | 600 | 90 | 80 | 10 | 10 | 1000 | 78 |
| DM03S4812A | | 12 | 250 | 37.5 | 75 | | | 470 | 83 |
| DM03S4824A | | 24 | 125 | 18.8 | 75 | | | 470 | 84 |
| DM03D4812A | | ±12 | ±125 | ±18.8 | 75 | | | 220* | 83 |
| DM03D4815A | | ±15 | ±100 | ±15 | 75 | | | 2208 | 83 |

* For each output



Input Characteristics

| Parameter | Model | Min. | Typ. | Max. | Unit |
|-----------------------------------|------------------|--|------|------|------|
| Input Surge Voltage (1 sec. max.) | 5V Input Models | -0.7 | --- | 11 | VDC |
| | 12V Input Models | -0.7 | --- | 25 | |
| | 24V Input Models | -0.7 | --- | 50 | |
| | 48V Input Models | -0.7 | --- | 100 | |
| Start-Up Voltage | 5V Input Models | 3.7 | 4 | 4.5 | |
| | 12V Input Models | 8 | 8.5 | 9 | |
| | 24V Input Models | 15 | 17 | 18 | |
| | 48V Input Models | 30 | 33 | 36 | |
| Under Voltage Shutdown | 5V Input Models | --- | --- | 4 | |
| | 12V Input Models | --- | --- | 8.5 | |
| | 24V Input Models | --- | --- | 17 | |
| | 48V Input Models | --- | --- | 34 | |
| Reverse Polarity Input Current | All Models | --- | --- | 0.3 | A |
| Short Circuit Input Power | | --- | --- | 2000 | mW |
| Internal Power Dissipation | | --- | --- | 2500 | mW |
| Conducted EMI | | Compliance to EN 55022, class A and FCC part 15, class A | | | |

Output Characteristics

| Parameter | Conditions | Min. | Typ. | Max. | Unit |
|------------------------------|-------------------------------|------|-------|-------|-------------------|
| Output Voltage Accuracy | | --- | ±0.5 | ±1.0 | % |
| Output Voltage Balance | Dual Output, Balanced Loads | --- | ±0.5 | ±2.0 | % |
| Line Regulation | V _{in} =Min. to Max. | --- | ±0.3 | ±0.5 | % |
| Load Regulation | I _o =25% to 100% | --- | ±0.5 | ±1.0 | % |
| Ripple & Noise (20MHz) | 5V Output Models | --- | 75 | 100 | mV _{P-P} |
| | Other Output Models | --- | 100 | 150 | mV _{P-P} |
| Ripple & Noise (20MHz) | Over Line, Load & Temp. | --- | --- | 180 | mV _{P-P} |
| Ripple & Noise (20MHz) | | --- | --- | 15 | mV rms |
| Transient Recovery Time | 25% Load Step Change | --- | 150 | 500 | μS |
| Transient Response Deviation | | --- | ±3 | ±6 | % |
| Temperature Coefficient | | --- | ±0.02 | ±0.05 | %/°C |
| Over Load Protection | Foldback | 120 | 150 | --- | % |
| Short Circuit Protection | Continuous | | | | |

Isolation, Safety Approvals

| Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------|--|------|------|------|-----------------|
| I/O Isolation Voltage (rated) | 60 Seconds | 4000 | --- | --- | VACrms |
| I/O Isolation Test Voltage | Flash tested for 1 Second | 6000 | --- | --- | V _{PK} |
| Leakage Current | 240VAC, 60Hz | --- | --- | 2 | μA |
| I/O Isolation Resistance | 500 VDC | 10 | --- | --- | GΩ |
| I/O Isolation Capacitance | 100KHz, 1V | --- | 7 | 13 | pF |
| Safety Standards | cUL/UL60950-1, CSA C22.2 No. 60950-1-03 | | | | |
| | UL60601-1, CSA C22.2 No.601-1 | | | | |
| | IEC/EN 60950-1, IEC/EN 60601-1 | | | | |
| Safety Approvals | IEC60950-1 CB report, cUL/UL 60950-1 certificate | | | | |
| | UL60601-1 UL certificate | | | | |

General Characteristics

| Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---------------------|-----------------------------------|-----------|------|------|-------|
| Switching Frequency | | --- | 150 | --- | KHz |
| MTBF(calculated) | MIL-HDBK-217F@25°C, Ground Benign | 1,000,000 | --- | --- | Hours |

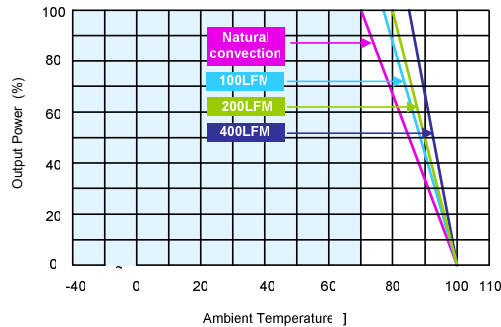
Recommended Input Fuse

| 5V Input Models | 12V Input Models | 24V Input Models | 48V Input Models |
|-----------------------|-----------------------|----------------------|----------------------|
| 2000mA Slow-Blow Type | 1000mA Slow-Blow Type | 500mA Slow-Blow Type | 250mA Slow-Blow Type |

Environmental Specifications

| Parameter | Conditions | Min. | Max. | Unit |
|---|---------------------|------|------|----------|
| Operating Temperature Range (with Derating) | Ambient | -40 | +85 | °C |
| Case Temperature | | --- | +95 | °C |
| Storage Temperature Range | | -50 | +125 | °C |
| Humidity (non condensing) | | --- | 95 | % rel. H |
| Cooling | Free-Air convection | | | |
| Lead Temperature (1.5mm from case for 10Sec.) | | --- | 260 | °C |

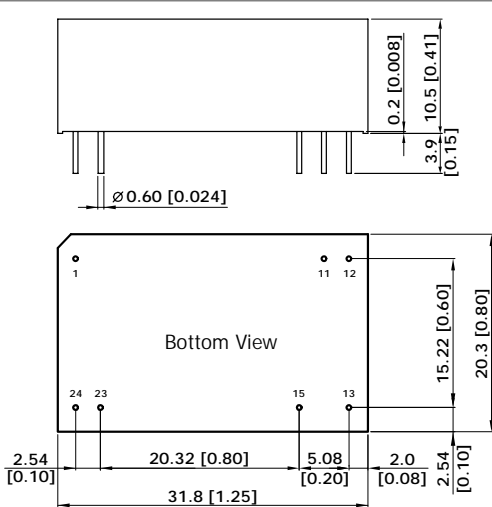
Power Derating Curve



Notes

- 1 Specifications typical at $T_a=+25^{\circ}\text{C}$, resistive load, nominal input voltage and rated output current unless otherwise noted.
- 2 Transient recovery time is measured to within 1% error band for a step change in output load of 75% to 100%.
- 3 Ripple & Noise measurement bandwidth is 0-20 MHz.
- 4 These power converters require a minimum output loading to maintain specified regulation, operation under no-load conditions will not damage these modules; however, they may not meet all specifications listed.
- 5 All DC/DC converters should be externally fused at the front end for protection.
- 6 Specifications subject to change without notice.

Mechanical Drawing

| Mechanical Dimensions | Pin Connections | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---------------|---------------|-------------|---|------|------|----|--------|--------|----|-------|--------|----|-------|-------|----|--------|-------|----|------|------|----|------|------|
|  <p>Top View Dimensions: Pin diameter: $\varnothing 0.60$ [0.024] Pin height: 0.2 [0.008] Pin spacing: 10.5 [0.41] Pin offset: 3.9 [0.15]</p> <p>Bottom View Dimensions: Total width: 31.8 [1.25] Pin 1 offset: 2.54 [0.10] Pin 11 offset: 20.32 [0.80] Pin 12 offset: 5.08 [0.20] Pin 15 offset: 2.0 [0.08] Pin 23 offset: 2.54 [0.10] Pin 24 offset: 15.22 [0.60] Total height: 20.3 [0.80]</p> | <table border="1"> <thead> <tr> <th>Pin</th> <th>Single Output</th> <th>Dual Output</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>+Vin</td> <td>+Vin</td> </tr> <tr> <td>11</td> <td>No Pin</td> <td>Common</td> </tr> <tr> <td>12</td> <td>-Vout</td> <td>No Pin</td> </tr> <tr> <td>13</td> <td>+Vout</td> <td>-Vout</td> </tr> <tr> <td>15</td> <td>No Pin</td> <td>+Vout</td> </tr> <tr> <td>23</td> <td>-Vin</td> <td>-Vin</td> </tr> <tr> <td>24</td> <td>-Vin</td> <td>-Vin</td> </tr> </tbody> </table> | Pin | Single Output | Dual Output | 1 | +Vin | +Vin | 11 | No Pin | Common | 12 | -Vout | No Pin | 13 | +Vout | -Vout | 15 | No Pin | +Vout | 23 | -Vin | -Vin | 24 | -Vin | -Vin |
| | Pin | Single Output | Dual Output | | | | | | | | | | | | | | | | | | | | | | |
| 1 | +Vin | +Vin | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | No Pin | Common | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | -Vout | No Pin | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | +Vout | -Vout | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | No Pin | +Vout | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | -Vin | -Vin | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | -Vin | -Vin | | | | | | | | | | | | | | | | | | | | | | | |
| <p>► All dimensions in mm (inches)</p> <p>► Tolerance: X.X±0.25 (X.XX±0.01) X.XX±0.13 (X.XXX±0.005)</p> <p>► Pin diameter $\varnothing 0.6 \pm 0.05$ (0.024±0.002)</p> | | | | | | | | | | | | | | | | | | | | | | | | | |

Physical Outline

| | |
|---------------|---|
| Case Size | : 31.8x20.3x10.5mm (1.25x0.8x0.41 Inches) |
| Case Material | : Non-Conductive Black Plastic (flammability to UL 94V-0 rated) |
| Weight | : 16.2g |



| Part Numbering System | | | | | | |
|-----------------------|---------------|-------|-------------------|---------------|----------------|--------------------|
| D | M | 03 | S | 05 | 05 | A |
| Form factor | Family series | Watt | Number of Outputs | Input Voltage | Output Voltage | Option Code |
| D-DIP | A~Z | 01:1W | S - Single | 03:3.3V | 03:3.3V | A - Std. Functions |
| P-SIP | | 02:2W | D- Dual | 05: 5V | 05: 5V | |
| S-SMD | | 03:3W | | 12:12V | 12:12V | |
| | | 04:4W | | 24: 24V | 15: 15V | |
| | | 06:6W | | 48:48V | 24: 24V | |

WARRANTY

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