



FEATURES

- Efficiency up to 64%
- Regulated Outputs
- Short Circuit Protection
- High Isolation Voltage 6000VDC
- Low Leakage Current
- Low Isolation Capacitance
- Low Ripple & Noise
- Complies with EN55022 Class A
- Lead free, RoHs Compliant
- 3 Years Product Warranty

The DC02S/D series are miniature, DIP Package, isolated 2W DC/DC converters with ultra- high 6,000VDC isolation . It offers short circuit protection and allows a wide operating temperature range of -25°C to $+75^{\circ}\text{C}$. 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) | Output Voltage | Output Current | | Input Current | | Reflected Ripple Current | Max. capacitive Load | Efficiency (typ.) |
|--------------|-----------------------|----------------|----------------|------|---------------|----------|--------------------------|----------------------|-------------------|
| | | | Max. | Min. | @Max. Load | @No Load | | | @Max. Load |
| | | VDC | mA | mA | mA(typ.) | mA(typ.) | | uF | % |
| DC02S0505A | 5 (4.5 ~ 5.5) | 5 | 400 | 0 | 645 | 100 | 15 | 680 | 62 |
| DC02S0512A | | 12 | 165 | | 629 | | | | 63 |
| DC02S0515A | | 15 | 133 | | 623 | | | | 64 |
| DC02D0505A | | ± 5 | ± 100 | | 476 | | | 270* | 42 |
| DC02D0512A | | ± 12 | ± 83 | | 699 | | | | 57 |
| DC02D0515A | | ± 15 | ± 66 | | 695 | | | | 57 |
| DC02S1205A | 12 (10.8 ~ 13.2) | 5 | 400 | 0 | 269 | 50 | 8 | 680 | 62 |
| DC02S1212A | | 12 | 165 | | 262 | | | | 63 |
| DC02S1215A | | 15 | 133 | | 260 | | | | 64 |
| DC02D1205A | | ± 5 | ± 100 | | 185 | | | 270* | 45 |
| DC02D1212A | | ± 12 | ± 83 | | 281 | | | | 59 |
| DC02D1215A | | ± 15 | ± 66 | | 280 | | | | 59 |
| DC02S2405A | 24 (21.6 ~ 26.4) | 5 | 400 | 0 | 134 | 30 | 3 | 680 | 62 |
| DC02S2412A | | 12 | 165 | | 131 | | | | 63 |
| DC02S2415A | | 15 | 133 | | 130 | | | | 64 |
| DC02D2405A | | ± 5 | ± 100 | | 93 | | | 270* | 45 |
| DC02D2412A | | ± 12 | ± 83 | | 143 | | | | 58 |
| DC02D2415A | | ± 15 | ± 66 | | 142 | | | | 58 |

* For each output

Input Characteristics

| Parameter | Model | Min. | Typ. | Max. | Unit |
|-----------------------------------|------------------|----------------------------------------------------------|------|------|------|
| Input Voltage Range | 5V Input Models | 4.5 | 5 | 5.5 | VDC |
| | 12V Input Models | 10.8 | 12 | 13.2 | |
| | 24V Input Models | 21.6 | 24 | 26.4 | |
| Input Surge Voltage (1 sec. max.) | 5V Input Models | -0.7 | --- | 7.5 | |
| | 12V Input Models | -0.7 | --- | 15 | |
| | 24V Input Models | -0.7 | --- | 30 | |
| Reverse Polarity Input Current | All Models | --- | --- | 0.5 | A |
| Short Circuit Input Power | | --- | --- | 2000 | mW |
| Internal Power Dissipation | | --- | --- | 2000 | 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 | | --- | ±2.0 | ±4.0 | % |
| Output Voltage Balance | Dual Output, Balanced Loads | --- | ±2.0 | ±4.0 | % |
| Line Regulation | Vin=Min. to Max. | --- | ±0.3 | ±0.5 | % |
| Load Regulation | Io=10% to 100% | --- | ±0.5 | ±1.0 | % |
| Ripple & Noise (20MHz) | | --- | 30 | 50 | mV _{P-P} |
| Ripple & Noise (20MHz) | Over Line, Load & Temp. | --- | --- | 100 | mV _{P-P} |
| Ripple & Noise (20MHz) | | --- | --- | 15 | mV rms |
| Temperature Coefficient | | --- | ±0.01 | ±0.02 | %/°C |
| Short Circuit Protection | Continuous | | | | |

General Characteristics

| Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------|-----------------------------------|---------|------|------|-----------------|
| I/O Isolation Voltage (rated) | 60 Seconds | 6000 | --- | --- | VDC |
| I/O Isolation Test Voltage | Flash tested for 1 Second | 8000 | --- | --- | V _{PK} |
| Leakage Current | 240VAC, 60Hz | --- | --- | 2 | uA |
| I/O Isolation Resistance | 500 VDC | 10 | --- | --- | GΩ |
| I/O Isolation Capacitance | 100KHz, 1V | --- | 20 | 30 | pF |
| Switching Frequency | | 25 | --- | 80 | KHz |
| MTBF(calculated) | MIL-HDBK-217F@25°C, Ground Benign | 600,000 | --- | --- | Hours |

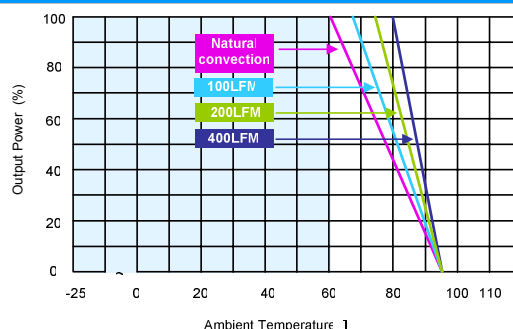
Recommended Input Fuse

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

Environmental Characteristics

| Parameter | Conditions | Min. | Max. | Unit |
|-----------------------------------------------|---------------------|------|------|----------|
| Operating Temperature Range (with Derating) | Ambient | -25 | +75 | °C |
| Case Temperature | | --- | +90 | °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 |

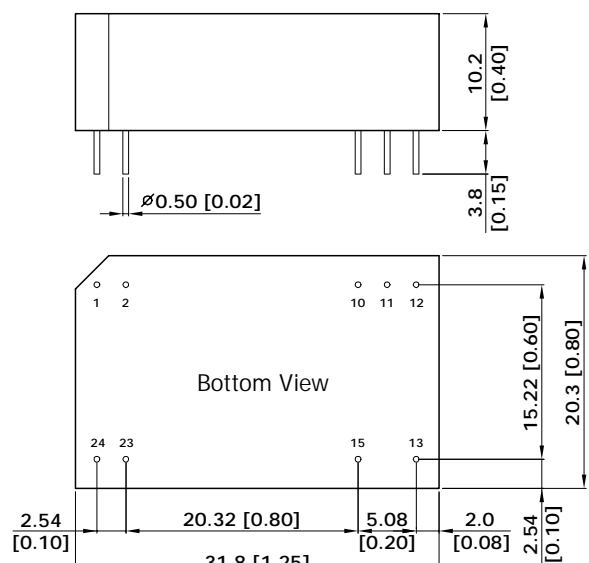
Power Derating Curve



Notes

- 1 Specifications typical at $T_a = +25^{\circ}\text{C}$, resistive load, nominal input voltage and rated output current unless otherwise noted.
- 2 Ripple & Noise measurement bandwidth is 0-20 MHz.
- 3 All DC/DC converters should be externally fused at the front end for protection.
- 4 Specifications subject to change without notice.

Mechanical Drawing

| Mechanical Dimensions | Pin Connections | | |
|------------------------------------------------------------------------------------|-----------------|---------------|-------------|
|  | Pin | Single Output | Dual Output |
| | 1 | +Vin | +Vin |
| | 2 | +Vin | +Vin |
| | 10 | No Pin | Common |
| | 11 | No Pin | Common |
| | 12 | -Vout | No Pin |
| | 13 | +Vout | -Vout |
| | 15 | No Pin | +Vout |
| | 23 | -Vin | -Vin |
| | 24 | -Vin | -Vin |

► All dimensions in mm (inches)

► Tolerance: X.X±0.25 (X.XX±0.01)
X.XX±0.13 (X.XXX±0.005)

► Pin pitch tolerance: ±0.25 (0.01)

Physical Outline

| | |
|---------------|-----------------------------------------------------------------|
| Case Size | : 31.8x20.3x10.2mm (1.25x0.8x0.40 Inches) |
| Case Material | : Non-Conductive Black Plastic (flammability to UL 94V-0 rated) |
| Weight | : 12.4g |



| Part Numbering System | | | | | | |
|-----------------------|---------------|-------|-------------------|---------------|----------------|--------------------|
| D | C | 02 | 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

Delta offers a three(3) years limited warranty. Complete warranty information is listed on our web site or is available upon request from Delta.

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