# FDD12 SERIES




DC - DC CONVERTER

10 ~ 12W SINGLE & DUAL OUTPUT

## FEATURES

- LOW COST
- 4:1 WIDE INPUT RANGE
- I/O ISOLATION
- INPUT Pi FILTER
- SHORT CIRCUIT PROTECTION
- HIGH PERFORMANCE
- 2 YEARS WARRANTY

## MODEL LIST

| MODEL NO. | INPUT VOLTAGE | INPUT CURRENT (typ.) | OUTPUT WATTAGE | OUTPUT VOLTAGE | OUTPUT CURRENT | EFF. (min.) | EFF. (typ.) | CAPACITOR LOAD (max.) |
|---|---|---|---|---|---|---|---|---|
| **Single Output Models** | | | | | | | | |
| FDD12 - 03S4 | 10~36 VDC | 0.54 A | 10 WATTS | +3.3 VDC | 3000 mA | 75% | 78% | 4700 μF |
| FDD12 - 05S4 | 10~36 VDC | 0.64 A | 12 WATTS | + 5 VDC | 2400 mA | 77% | 80% | 4700 μF |
| FDD12 - 12S4 | 10~36 VDC | 0.63 A | 12 WATTS | + 12 VDC | 1000 mA | 77% | 80% | 1000 μF |
| FDD12 - 15S4 | 10~36 VDC | 0.63 A | 12 WATTS | + 15 VDC | 800 mA | 77% | 80% | 470 μF |
| FDD12 - 03S5 | 18~72 VDC | 0.26 A | 10 WATTS | +3.3 VDC | 3000 mA | 77% | 80% | 4700 μF |
| FDD12 - 05S5 | 18~72 VDC | 0.32 A | 12 WATTS | + 5 VDC | 2400 mA | 77% | 80% | 4700 μF |
| FDD12 - 12S5 | 18~72 VDC | 0.32 A | 12 WATTS | + 12 VDC | 1000 mA | 77% | 80% | 1000 μF |
| FDD12 - 15S5 | 18~72 VDC | 0.32 A | 12 WATTS | + 15 VDC | 800 mA | 77% | 80% | 470 μF |
| **Dual Output Models** | | | | | | | | |
| FDD12 - 05D4 | 10~36 VDC | 0.64 A | 12 WATTS | ± 5 VDC | ± 1200 mA | 77% | 80% | ± 2200 μF |
| FDD12 - 12D4 | 10~36 VDC | 0.64 A | 12 WATTS | ± 12 VDC | ± 500 mA | 77% | 80% | ± 470 μF |
| FDD12 - 15D4 | 10~36 VDC | 0.64 A | 12 WATTS | ± 15 VDC | ± 400 mA | 77% | 80% | ± 470 μF |
| FDD12 - 05D5 | 18~72 VDC | 0.32 A | 12 WATTS | ± 5 VDC | ± 1200 mA | 77% | 80% | ± 2200 μF |
| FDD12 - 12D5 | 18~72 VDC | 0.32 A | 12 WATTS | ± 12 VDC | ± 500 mA | 77% | 80% | ± 470 μF |
| FDD12 - 15D5 | 18~72 VDC | 0.32 A | 12 WATTS | ± 15 VDC | ± 400 mA | 77% | 80% | ± 470 μF |

# SPECIFICATION

All Specifications Typical At Nominal Line, Full Load, 25°C Unless Otherwise Noticed

## GENERAL

| Characteristics | Conditions | min. | typ. | max. | unit |
|---|---|---|---|---|---|
| Switching frequency | Vi nom, Io nom | | 200 | | KHz |
| Isolation voltage | Input - Output | 1500 | | | VDC |
| Isolation resistance | Input - Output, @ 500VDC | 100 | | | MΩ |
| Isolation capacitance | 100KHz / 1V | | | 1000 | PF |
| Ambient temperature | Operating at Vi nom, Io nom | -25 | | +71 | °C |
| Case temperature | Operating at Vi nom, Io nom | | | +100 | °C |
| Derating | Vi nom | See derating curve | | | |
| Storage temperature | Non operational | -40 | | +100 | °C |
| Relative humidity | Vi nom, Io nom | 20 | | 95 | % RH |
| Temperature coefficient | Vi nom, Io min | | | ± 0.02 | % / °C |
| Dimension | | L50.8 x W50.8 x H12.0 | | | mm |
| MTBF | Bellcore issue 6@40°C, GB | | 1040000 | | Hours |
| Cooling | Free air convection | | | | |

## INPUT SPECIFICATIONS

| Characteristics | Conditions | | min. | typ. | max. | unit |
|---|---|---|---|---|---|---|
| Input voltage range | Ta min ...Ta max, Io nom | | 10 | 24 | 36 | VDC |
| | | | 18 | 48 | 72 | VDC |
| No load input current | Vi nom, Io=0 | 24V models | | | 20 | mA |
| | | 48V models | | | 15 | mA |
| Input voltage w/o damage | Io nom | 24V models | | | 40 | VDC |
| | | 48V models | | | 75 | VDC |
| Startup voltage | Io nom | 24V models | | 9 | | VDC |
| | | 48V models | | 15 | | VDC |
| Input filter | Pi type | | | | | |

## OUTPUT SPECIFICATIONS

| Characteristics | Conditions | | min. | typ. | max. | unit |
|---|---|---|---|---|---|---|
| Output voltage accuracy | Vi nom, Io nom | | | | ± 2 | % |
| Minimum load | Vi nom | single output models | 0 | | | % |
| | | dual output models (each output) | 20 | | | % |
| Line regulation | Io nom, Vi min ...Vi max | | | | ± 1 | % |
| Load regulation | Vi nom, Io 0 ...Io nom, single output models | | | | ± 2 | % |
| | Vi nom, Io min ...Io nom, dual output models | | | | ± 5 | % |
| Cross regulation (Dual model) | Aymmetrical load 20% - 100% FL | | | | ± 5 | % |
| Startup time | Vi nom, Io nom | | | | 30 | ms |
| Transient recovery time | Vi nom, 1 ~ 0.5 Io nom | | | | 500 | μs |
| Ripple & noise | Vi nom, Io nom, BW = 20MHz | 3.3V model | | | 100 | mV |
| | | 5V, 12V, 15V & dual | | | Vout x ±1% | mV |
| Efficiency | Vi nom, Io nom, Po / Pi | | Up to 80%, See model list and efficiency curve | | | |

## CONTROL AND PROTECTION

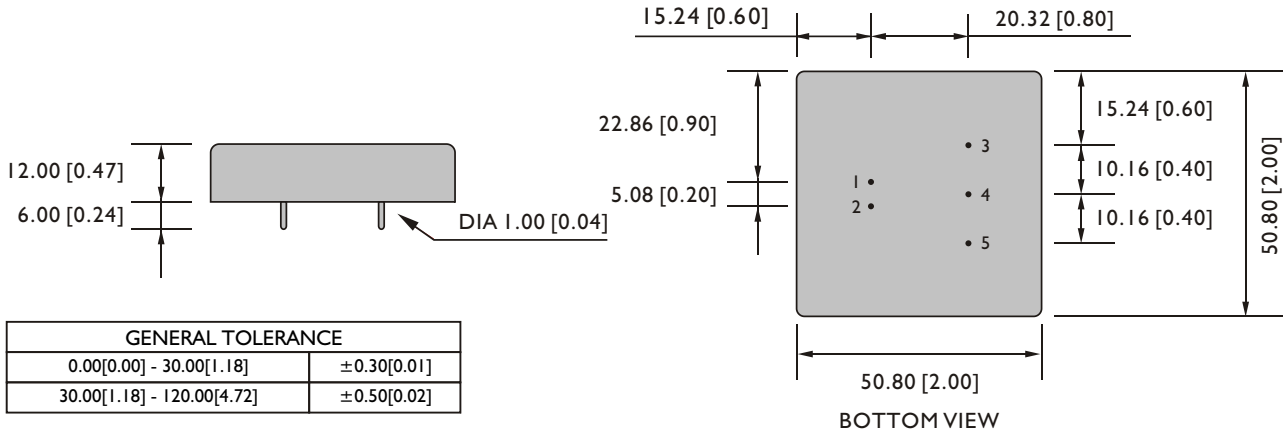
| | |
|---|---|
| Input reversed | Shunt diode built in, external fuse recommended ( 24Vin : 1.5A, 48Vin : 1A) |
| Output short circuit | Current limited (Auto-recovery) |
| Rated over load protection | 110%min....140%max |

## PHYSICAL CHARACTERISTICS

| | |
|---|---|
| Case size | 50.8 x 50.8 x 12.0 mm (2 x 2 x 0.47 inches) |
| Case material | Plastic base / Metal case |
| Weight | 70 g |
| Patting material | Epoxy |

## MECHANISM & PIN CONFIGURATION

mm [inch]



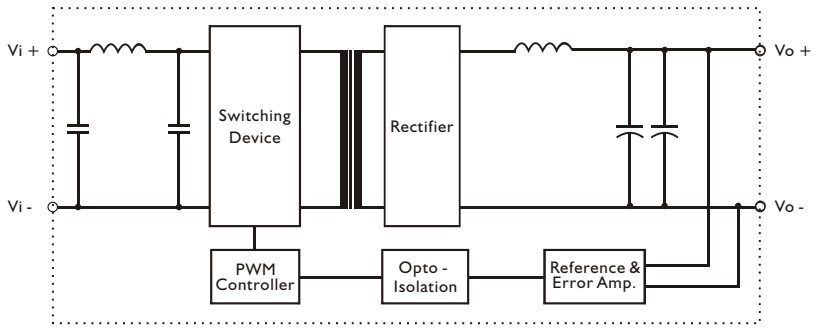

| GENERAL TOLERANCE | |
|---|---|
| 0.00[0.00] - 30.00[1.18] | ±0.30[0.01] |
| 30.00[1.18] - 120.00[4.72] | ±0.50[0.02] |

## PIN ASSIGNMENT

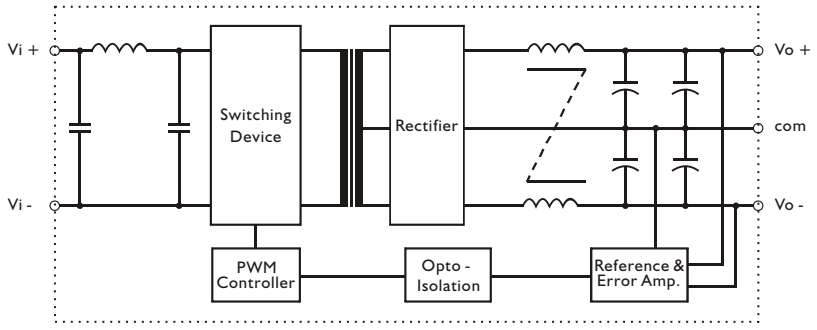
| GENERAL | | | | | |
|---|---|---|---|---|---|
| PIN NO. | 1 | 2 | 3 | 4 | 5 |
| SINGLE | Vi+ | Vi - | Vo+ | NO PIN | Vo - |
| DUAL | Vi+ | Vi - | Vo+ | com | Vo - |

## CIRCUIT SCHEMATIC

• Block diagram for FDD12 series with single output

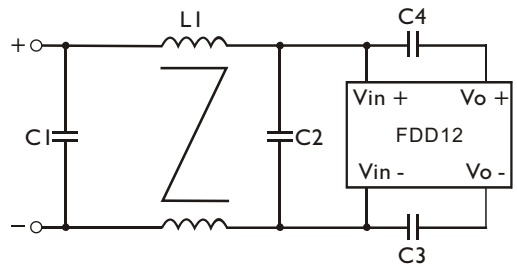



• Block diagram for FDD12 series with dual output



## RECOMMENDED CIRCUIT

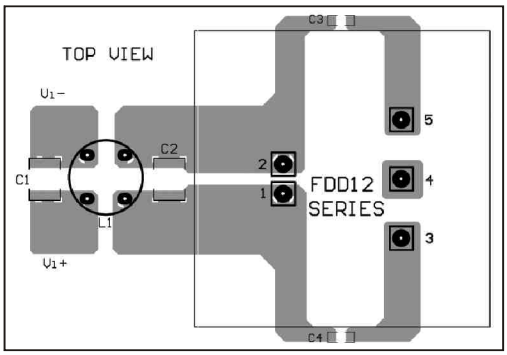
• Recommended filter for EN55022 Class B compliance



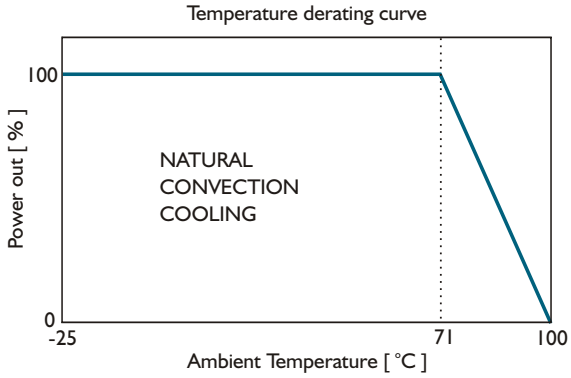

• The commponents used in the above figure, together with the manufacturer part numbers for these components, are as follows.

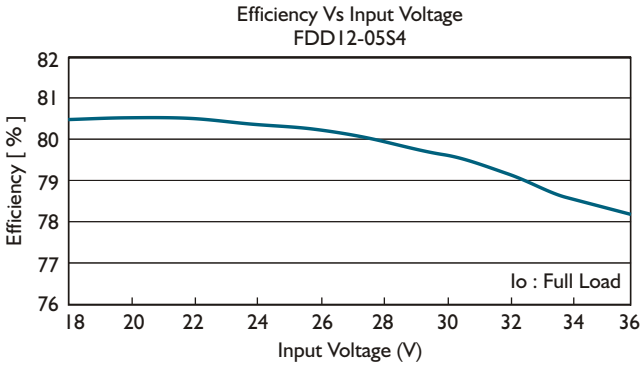
| | C1 | C2 | C3 | C4 | L1 |
|---|---|---|---|---|---|
| FDD12-XXX4 | 4.7μF / 50V MLCC | 4.7μF / 50V MLCC | InF / 2KV MLCC | InF / 2KV MLCC | 0.5mH Common Choke |
| FDD12-XXX5 | 6.8μF / 100V MLCC | 6.8μF / 100V MLCC | InF / 2KV MLCC | InF / 2KV MLCC | 0.5mH Common Choke |

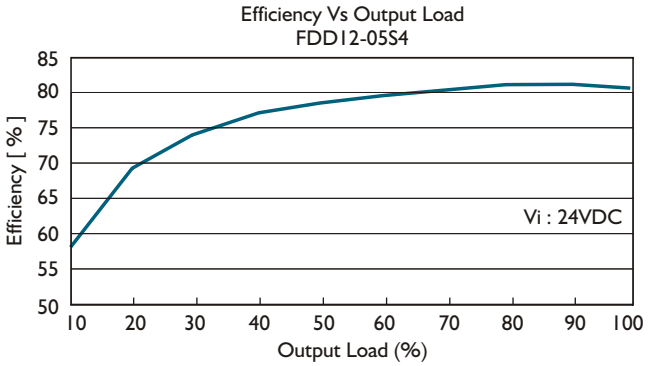
• Recommended EN 55022 Class B filter circuit layout.




## DERATING AND EFFICIENCY CURVE



# FDD12 SERIES




DC - DC CONVERTER
12W TRIPLE OUTPUT

## FEATURES

- LOW COST
- 4:1 WIDE INPUT RANGE
- I/O ISOLATION
- LC INPUT FILTER
- SHORT CIRCUIT PROTECTION
- HIGH PERFORMANCE
- 2 YEARS WARRANTY

## MODEL LIST

| MODEL NO. | INPUT VOLTAGE | INPUT CURRENT (typ.) | OUTPUT WATTAGE | OUTPUT VOLTAGE | OUTPUT CURRENT | EFF. (min.) | EFF. (typ.) | CAPACITOR LOAD (max.) |
|---|---|---|---|---|---|---|---|---|
| **Triple Output Models** | | | | | | | | |
| FDD12 - 0512T4 | 10~36 VDC | 0.62 A | 12 WATTS | +5 / ±12 VDC | 1.5A / ± 0.2 A | 80% | 82% | 3500 μF / ±1000 μF |
| FDD12 - 0515T4 | 10~36 VDC | 0.64 A | 12 WATTS | +5 / ±15 VDC | 1.5A / ± 0.16A | 80% | 82% | 3500 μF / ±1000 μF |
| FDD12 - 0512T5 | 18~72 VDC | 0.31 A | 12 WATTS | +5 / ±12 VDC | 1.5A / ± 0.2 A | 80% | 82% | 3500 μF / ±1000 μF |
| FDD12 - 0515T5 | 18~72 VDC | 0.31 A | 12 WATTS | +5 / ±15 VDC | 1.5A / ± 0.16A | 80% | 82% | 3500 μF / ±1000 μF |

# SPECIFICATION

All Specifications Typical At Nominal Line, Full Load, 25°C Unless Otherwise Noticed

## GENERAL

| Characteristics | Conditions | min. | typ. | max. | unit |
|---|---|---|---|---|---|
| Switching frequency | Vi nom, Io nom | | 200 | | KHz |
| Isolation voltage | Input - Output | 1500 | | | VDC |
| Isolation resistance | Input - Output, @ 500VDC | 100 | | | MΩ |
| Isolation capacitance | 100KHz / 1V | | | 1000 | PF |
| Ambient temperature | Operating at Vi nom, Io nom | -25 | | +71 | °C |
| Case temperature | Operating at Vi nom, Io nom | | | +100 | °C |
| Derating | Vi nom | See derating curve | | | |
| Storage temperature | Non operational | -40 | | +100 | °C |
| Relative humidity | Vi nom, Io nom | 20 | | 95 | % RH |
| Temperature coefficient | Vi nom, Io min | | | ± 0.02 | % / °C |
| Dimension | | L50.8 x W50.8 x H12.0 | | | mm |
| MTBF | Bellcore issue 6@40°C, GB | | 960000 | | Hours |
| Cooling | Free air convection | | | | |

## INPUT SPECIFICATIONS

| Characteristics | Conditions | | min. | typ. | max. | unit |
|---|---|---|---|---|---|---|
| Input voltage range | Ta min ...Ta max, Io nom | | 10 | 24 | 36 | VDC |
| | | | 18 | 48 | 72 | VDC |
| No load input current | Vi nom, Io=0 | 24V models | | | 25 | mA |
| | | 48V models | | | 15 | mA |
| Input voltage w/o damage | Io nom | 24V models | | | 40 | VDC |
| | | 48V models | | | 75 | VDC |
| Startup voltage | Io nom | 24V models | | 9.4 | | VDC |
| | | 48V models | | 15 | | VDC |
| Input filter | Pi type | | | | | |

## OUTPUT SPECIFICATIONS

| Characteristics | Conditions | | min. | typ. | max. | unit |
|---|---|---|---|---|---|---|
| Output voltage accuracy | Vi nom, Io nom | + 5V | | | ± 2 | % |
| | | ± 12V or ± 15V | | | ± 6 | % |
| Minimum load | Vi nom | + 5V | 10 | | | % |
| | | ± 12V or ± 15V | 20 | | | % |
| Line regulation | Io nom, Vi min ...Vi max | | | | ± 2 | % |
| Load regulation | Vi nom, Io min...Io nom | + 5V | | | ± 2 | % |
| | | ± 12V or ± 15V | | | ± 6 | % |
| Cross regulation | Aymmetrical load 20% - 100% FL | | | | ± 6 | % |
| Startup time | Vi nom, Io nom | | | | 30 | ms |
| Transient recovery time | Vi nom, 1 ~ 0.5 Io nom | | | | 500 | μs |
| Ripple & noise | Vi nom, Io nom, BW = 20MHz | | | | Vout x ±1% | mV |
| Efficiency | Vi nom, Io nom, Po / Pi | | Up to 82%, See model list and efficiency curve | | | |

## CONTROL AND PROTECTION

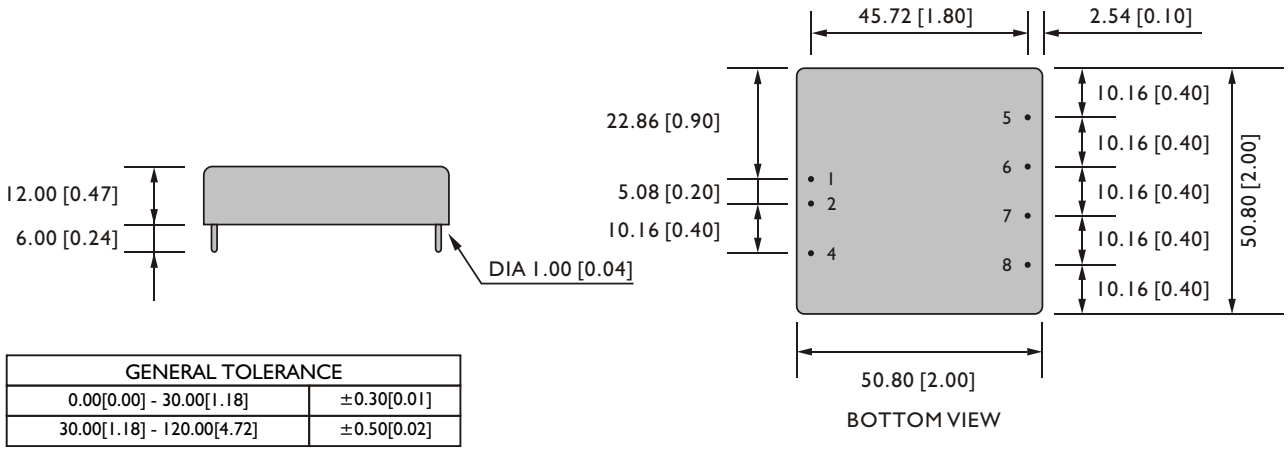
| | |
|---|---|
| Remote ON / OFF | ON : opened or 8 ~ 10VDC applied, reference to input GND<br>OFF : -0.3 ~ 2VDC applied, reference to input GND |
| Input reversed | Shunt diode built in, external fuse recommended (24Vin : 1.5A, 48Vin : 1A) |
| Output short circuit | Current limited (Auto-recovery) |
| Rated over load protection | 110%min....140%max |

## PHYSICAL CHARACTERISTICS

| | |
|---|---|
| Case size | 50.8 x 50.8 x 12.0 mm (2 x 2 x 0.47 inches) |
| Case material | Plastic base / Metal case |
| Weight | 70 g |
| Patting material | Epoxy |

## MECHANISM & PIN CONFIGURATION

mm [inch]




| GENERAL TOLERANCE | |
|---|---|
| 0.00[0.00] - 30.00[1.18] | ±0.30[0.01] |
| 30.00[1.18] - 120.00[4.72] | ±0.50[0.02] |

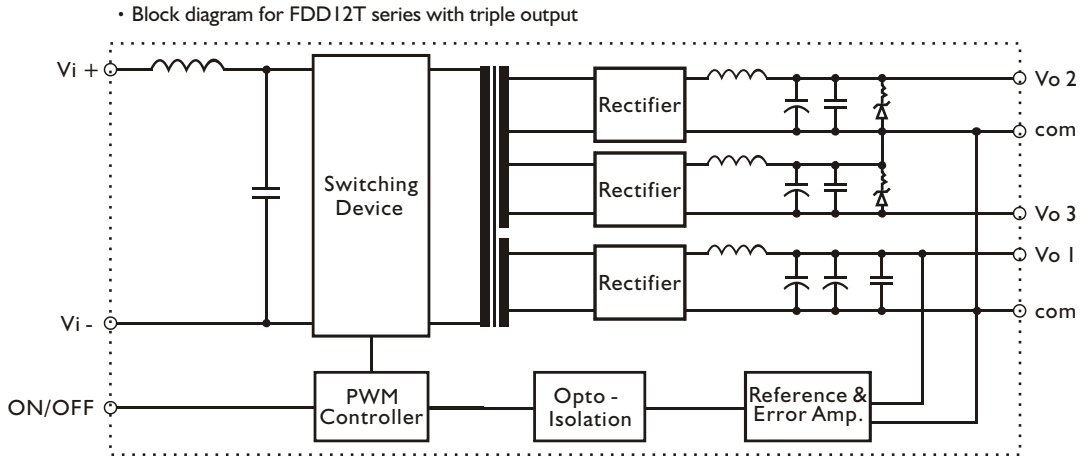
## PIN ASSIGNMENT

**GENERAL**

| PIN NO. | 1 | 2 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| TRIPLE | Vi+ | Vi - | ON / OFF | Vo2 (+ OUT) | Vo1 (+ 5V) | com | Vo3 (- OUT) |

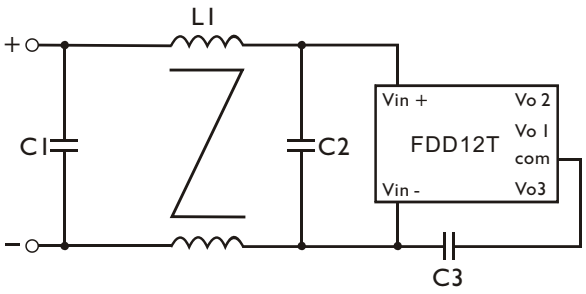
## CIRCUIT SCHEMATIC

• Block diagram for FDD12T series with triple output



## RECOMMENDED CIRCUIT

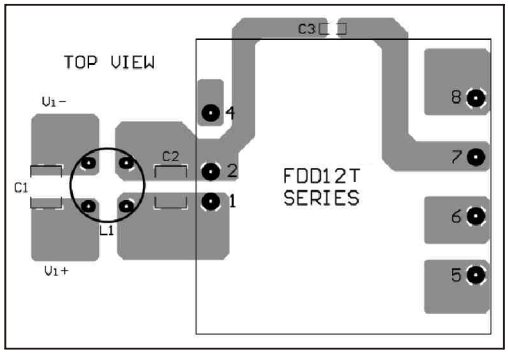
• Recommended filter for EN55022 Class B compliance



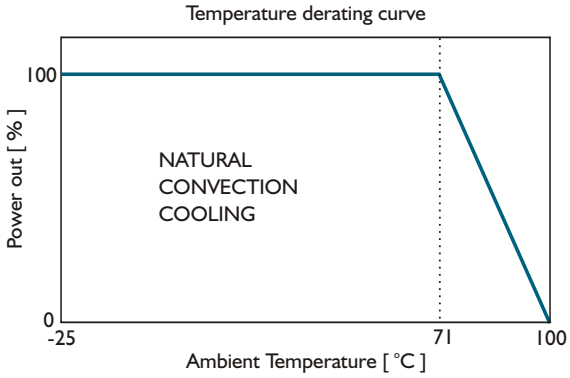

• The commponents used in the above figure, together with the manufacturer part numbers for these components, are as follows.

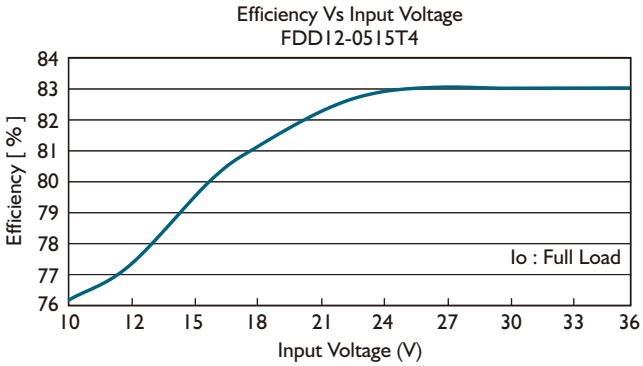
| | C1 | C2 | C3 | L1 |
|---|---|---|---|---|
| FDD12-XXXXT4 | 3.3μF / 50V MLCC | 3.3μF / 50V MLCC | InF / 2KV MLCC | 0.5mH Common Choke |
| FDD12-XXXXT5 | 3.3μF / 100V MLCC | 3.3μF / 100V MLCC | InF / 2KV MLCC | 0.5mH Common Choke |

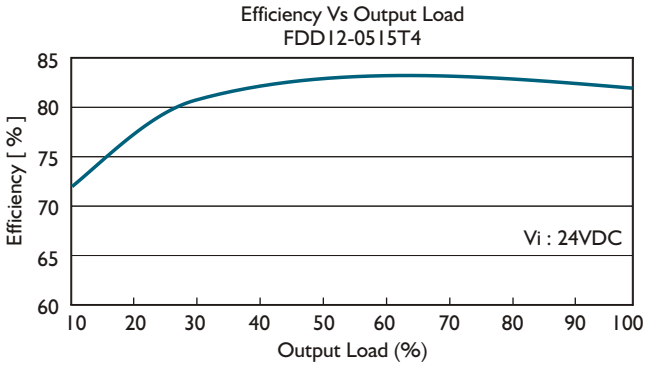
• Recommended EN 55022 Class B filter circuit layout.




## DERATING AND EFFICIENCY CURVE



Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

**Данный компонент на территории Российской Федерации**

**Вы можете приобрести в компании MosChip.**

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

**Офис по работе с юридическими лицами:**

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