

### FEATURES

- Efficiency up to 97%, Non-isolated
- SIP Package 11.5x7.5x10.2 mm
- Excellent Line/Loads Regulation
- Short Circuit Protection, Thermal Shutdown
- Low Ripple and Noise
- Operating Temperature range -40°C to +80°C
- Low Stand-by Current
- Wideinputrange (4.75V~32V)
- 3 Years Product Warranty



The PM05S series provides high efficiency switching regulators. The high efficiency of these step-down converters allow an operating temperature up to 80°C at full-load without heatsink. The regulators come in a package which fits in the standard TO-220 footprint of linear regulators.

The high efficiency of up to 97% and low stand-by power consumption of these switching regulators offer a cost-efficient solution for different applications.

These high efficiency DC/DC converters are the latest offering from a world leader in power systems technology and manufacturing — Delta Electronics, Inc..

### Model List

| Model Number | Input Voltage (Range) | Output Voltage | Output Current | Max. capacitive Load | Efficiency (typ.) | Efficiency (typ.) |
|--------------|-----------------------|----------------|----------------|----------------------|-------------------|-------------------|
|              |                       |                | Max.           |                      | @Min. Vin         | @Max. Vin         |
|              | VDC                   | VDC            | mA             | μF                   | %                 | %                 |
| PM05S015A    | 4.75 ~ 32             | 1.5            | 500            | 220                  | 73                | 63                |
| PM05S018A    |                       | 1.8            | 500            | 220                  | 82                | 71                |
| PM05S025A    |                       | 2.5            | 500            | 220                  | 87                | 77                |
| PM05S033A    |                       | 3.3            | 500            | 220                  | 91                | 81                |
| PM05S050A    | 6.5 ~ 32              | 5              | 500            | 220                  | 94                | 86                |
| PM05S065A    | 8 ~ 32                | 6.5            | 500            | 220                  | 95                | 88                |
| PM05S090A    | 11 ~ 32               | 9              | 500            | 220                  | 96                | 92                |
| PM05S120A    | 15 ~ 32               | 12             | 500            | 220                  | 97                | 94                |
| PM05S150A    | 18 ~ 32               | 15             | 500            | 220                  | 97                | 95                |

### Input Characteristics

| Parameter                         | Conditions | Min.      | Typ. | Max. | Unit |
|-----------------------------------|------------|-----------|------|------|------|
| Input Surge Voltage (1 sec. max.) |            | -0.3      | ---  | 34   | VDC  |
| Internal Filter Type              |            | Capacitor |      |      |      |
| Internal Power Dissipation        |            | ---       | ---  | 0.4  | W    |
| Short Circuit Input Power         |            | ---       | ---  | 1.5  | W    |
| Input Current                     | @No Load   | ---       | 5    | 7    | mA   |

## Output Characteristics

| Parameter                       | Conditions                  |              | Min. | Typ.  | Max.   | Unit              |
|---------------------------------|-----------------------------|--------------|------|-------|--------|-------------------|
| Output Voltage Setting Accuracy |                             |              | ---  | ±2.0  | ±3.0   | %Vnom.            |
| Line Regulation                 | Vin=Min. to Max.            | 1.5V to 6.5V | ---  | ±0.2  | ±0.4   | %                 |
|                                 |                             | 9V to 15V    | ---  | ±0.1  | ±0.2   | %                 |
| Load Regulation                 | Io=10% to 100%              | 1.5V to 6.5V | ---  | ±0.4  | ±0.6   | %                 |
|                                 |                             | 9V to 15V    | ---  | ±0.25 | ±0.4   | %                 |
| Min.Load                        | No minimum Load Requirement |              |      |       |        |                   |
| Ripple & Noise (20MHz)          | 1.5V to 6.5V                |              | ---  | 20    | 30     | mV <sub>P-P</sub> |
|                                 | 9V to 15V                   |              | ---  | 30    | 40     | mV <sub>P-P</sub> |
| Transient Recovery Time         | 50% Load Step Change        |              | ---  | 100   | ---    | μsec              |
| Transient Response Deviation    |                             |              | ---  | ±2    | ---    | %                 |
| Temperature Coefficient         |                             |              | ---  | ---   | ±0.015 | %/°C              |
| Output Current Limit            |                             |              | ---  | ---   | 1      | A                 |
| Short Circuit Protection        | Continuous                  |              |      |       |        |                   |

## General Characteristics

| Parameter             | Conditions                        | Min.      | Typ. | Max. | Unit  |
|-----------------------|-----------------------------------|-----------|------|------|-------|
| I/O Isolation Voltage | none                              |           |      |      |       |
| Switching Frequency   |                                   | 280       | 330  | 380  | KHz   |
| MTBF(calculated)      | MIL-HDBK-217F@25°C, Ground Benign | 2,000,000 | ---  | ---  | Hours |

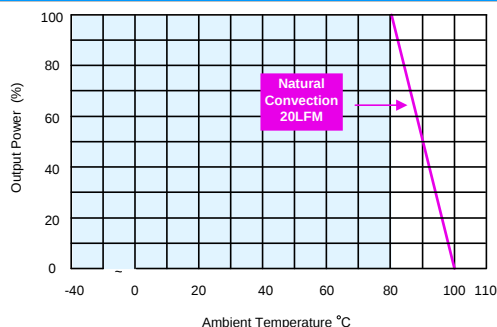
## Environmental Characteristics

| Parameter                                                      | Conditions           | Min. | Typ. | Max. | Unit     |
|----------------------------------------------------------------|----------------------|------|------|------|----------|
| Operating Ambient Temperature Range (See Power Derating Curve) | Natural Convection   | -40  | ---  | +90  | °C       |
| Case Temperature                                               |                      | ---  | ---  | +100 | °C       |
| Storage Temperature                                            |                      | -55  | ---  | +125 | °C       |
| Thermal Shutdown                                               | Internal IC junction | ---  | 160  | ---  | °C       |
| Humidity (non condensing)                                      |                      | ---  | ---  | 95   | % rel. H |
| Lead Temperature (1.5mm from case for 10Sec.)                  |                      | ---  | ---  | 260  | °C       |

## EMC Characteristics

| Parameter                   | Standards & Level                     | Performance          |
|-----------------------------|---------------------------------------|----------------------|
| Conducted EMI               | Compliance to EN55022 and FCC part 15 | Class B (See Page 3) |
| Radiated Emissions          | EN55022                               | Class B              |
| ESD                         | EN61000-4-2                           | Class A              |
| Radiated immunity           | EN61000-4-3                           | Class A              |
| Fast transient (See Note 5) | EN61000-4-4                           | Class A              |
| Conducted immunity          | EN61000-4-6                           | Class A              |
| Magnetic Field Immunity     | EN61000-4-8                           | Class A              |

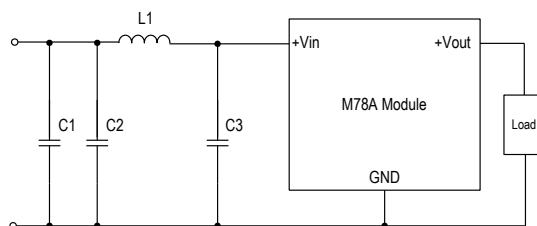
## Power Derating Curve



## Notes

- 1 Specifications typical at  $T_a = +25^\circ\text{C}$ , resistive load, nominal input voltage, 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 Other input and output voltage may be available, please contact factory.
- 5 The PM05S series can meet EN61000-4-4 by adding a capacitor across the input pins. Suggested capacitor CHEMI-CON KY 330 $\mu\text{F}/100\text{V}$ .
- 6 That "natural convection" is about 20LFM but is not equal to still air (0 LFM).
- 7 It needs to increase 1V for  $V_{in}(\text{min})$  under high and low temperature.
- 8 Specifications are subject to change without notice.

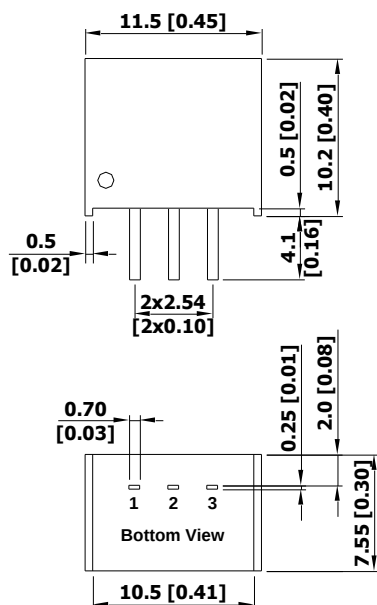
## EMI-Filter to meet EN 55022, class A, class B; FCC part 15 ,level A



| Class   | Model        | C1                                     | C2                                     | C3                                     | L1                             |
|---------|--------------|----------------------------------------|----------------------------------------|----------------------------------------|--------------------------------|
| Class A | PM05S series | ---                                    | 4.7 $\mu\text{F}/50\text{V}$ 1206 MLCC | 4.7 $\mu\text{F}/50\text{V}$ 1206 MLCC | Würth Elektronik NO. 744774033 |
| Class B | PM05S series | 4.7 $\mu\text{F}/50\text{V}$ 1206 MLCC | 4.7 $\mu\text{F}/50\text{V}$ 1206 MLCC | 4.7 $\mu\text{F}/50\text{V}$ 1206 MLCC | Würth Elektronik NO. 74477410  |

## Mechanical Drawing

### Mechanical Dimensions



### Pin Connections

| Pin | Function |
|-----|----------|
| 1   | +Vin     |
| 2   | GND      |
| 3   | +Vout    |

- ▶ All dimensions in mm (inches)
- ▶ Tolerance: X.X±0.5 (X.XX±0.02)  
X.XX±0.25 (X.XXX±0.01)
- ▶ Pins ±0.05(±0.002)

## Physical Characteristics

Case Size : 11.5x7.55x10.2mm (0.45x0.30x0.40 inches)

Case Material : Non-Conductive Black Plastic (flammability to UL 94V-0 rated)

Pin Material : Alloy 42

Weight : 1.95g

## Part Numbering System

| P           | M             | 05        | S                 | 033            | A                  |
|-------------|---------------|-----------|-------------------|----------------|--------------------|
| Form factor | Family series | Watt      | Number of Outputs | Output Voltage | Option Code        |
| P-SIP       | M-Regulator   | 05:0.5AMP | S - Single        | 033:3.3VDC     | A - Std. Functions |

## 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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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.

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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

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