

**PART NUMBER:** VAT0.25-SMT Series

**DESCRIPTION:** dc-dc converter

**description**

Designed to convert fixed voltages into isolated voltages, the VAT0.25-SMT series is well suited for providing board-mount local supplies in a wide range of applications, including mixed analog/digital circuits, test & measurement equip., process/machine controls, data-com/telecom fields, etc...

**features**

- SMT package
- internal SMD construction
- I/O isolation: 1000 V dc
- no heatsink required
- no external component required
- industry standard pinout
- temperature range: -40°C~+85°C


**MODEL**

| MODEL               | input voltage     |                  | output voltage<br>(V dc) | output current |              | efficiency<br>typ.<br>(%) |
|---------------------|-------------------|------------------|--------------------------|----------------|--------------|---------------------------|
|                     | nominal<br>(V dc) | range.<br>(V dc) |                          | max.<br>(mA)   | min.<br>(mA) |                           |
| VAT0.25-S5-D3.3-SMT | 5                 | 4.5~5.5          | ±3.3                     | ±38            | ±4           | 62                        |
| VAT0.25-S5-D5-SMT   | 5                 | 4.5~5.5          | ±5                       | ±25            | ±3           | 64                        |
| VAT0.25-S5-D9-SMT   | 5                 | 4.5~5.5          | ±9                       | ±14            | ±2           | 65                        |
| VAT0.25-S5-D12-SMT  | 5                 | 4.5~5.5          | ±12                      | ±11            | ±2           | 67                        |
| VAT0.25-S5-D15-SMT  | 5                 | 4.5~5.5          | ±15                      | ±9             | ±1           | 66                        |
| VAT0.25-S12-D5-SMT  | 12                | 10.8~13.2        | ±5                       | ±25            | ±3           | 65                        |
| VAT0.25-S12-D9-SMT  | 12                | 10.8~13.2        | ±9                       | ±14            | ±2           | 64                        |
| VAT0.25-S12-D12-SMT | 12                | 10.8~13.2        | ±12                      | ±11            | ±2           | 63                        |
| VAT0.25-S12-D15-SMT | 12                | 10.8~13.2        | ±15                      | ±9             | ±1           | 64                        |
| VAT0.25-S24-D5-SMT  | 24                | 21.6~26.4        | ±5                       | ±25            | ±3           | 61                        |
| VAT0.25-S24-D9-SMT  | 24                | 21.6~26.4        | ±9                       | ±14            | ±2           | 62                        |
| VAT0.25-S24-D12-SMT | 24                | 21.6~26.4        | ±12                      | ±11            | ±2           | 63                        |
| VAT0.25-S24-D15-SMT | 24                | 21.6~26.4        | ±15                      | ±9             | ±1           | 65                        |

notes: 1. All specifications measured at TA=25°C, humidity <75%, nominal input voltage and rated output load unless otherwise specified.  
 2. Unbalanced load: ±5%

**OUTPUT**

| parameter               | conditions/description              | min | nom | max  | units |
|-------------------------|-------------------------------------|-----|-----|------|-------|
| output power            |                                     |     |     | 0.25 | W     |
| voltage accuracy        | see tolerance envelope graph        |     |     |      |       |
| output ripple           | @ 20MHz Bandwidth                   |     | 50  | 75   | mVpp  |
| output noise            | @ 20MHz Bandwidth                   |     | 75  | 150  | mVpp  |
| line regulation         | for Vin change of 1%(3.3V output)   |     |     | ±1.5 | %     |
|                         | for Vin change of 1%                |     |     | ±1.2 | %     |
| load regulation         | 10% to 100% full load               |     |     |      |       |
|                         | 3.3V output                         |     | 15  | 20   | %     |
|                         | 5V output                           |     | 10  | 15   | %     |
|                         | 9V output                           |     | 6.5 | 15   | %     |
|                         | 12V output                          |     | 6.0 | 15   | %     |
|                         | 15V output                          |     | 6.0 | 15   | %     |
| temperature coefficient | 100% full load                      |     |     | 0.03 | %/°C  |
| switching frequency     | 100% load, nominal input(24V input) |     | 700 |      | KHz   |
|                         | 100% load, nominal input(5V, 12V)   |     | 150 |      | KHz   |

notes: 1. Test ripple and noise by "parallel cable" method.

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**DESCRIPTION:** dc-dc converter

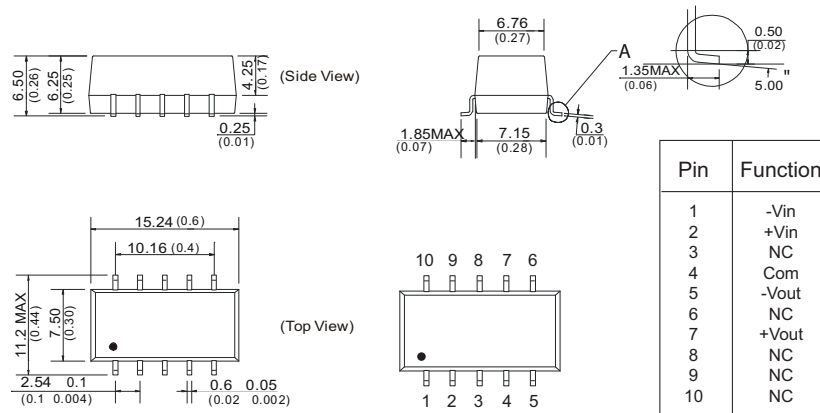
## GENERAL SPECIFICATIONS

| parameter                       | conditions/description                 |
|---------------------------------|----------------------------------------|
| output short circuit protection | 1 second max.                          |
| temperature rise at full load   | 15°C typ., 25°C max.                   |
| cooling                         | free air convection                    |
| operating temp. range           | -40°C ~ +85°C                          |
| storage temp. range             | -55°C ~ +125°C                         |
| reflow soldering temp.          | 260°C (1.5mm from case for 10 seconds) |
| storage humidity range          | ≤95%                                   |
| case material                   | plastic (UL94-V0)                      |
| MTBF                            | >3,500,000 hours                       |

## ISOLATION SPECIFICATIONS

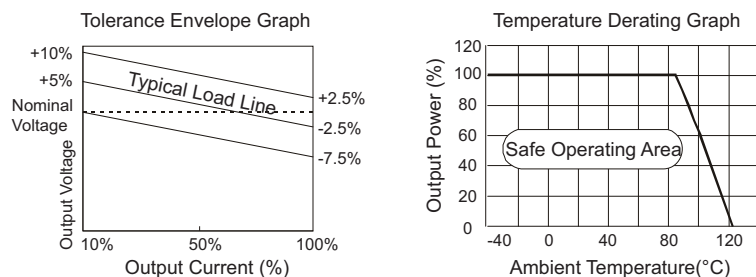
| parameter            | conditions/description    | min  | nom | max | units |
|----------------------|---------------------------|------|-----|-----|-------|
| isolation voltage    | flash tested for 1 minute | 1000 |     |     | V dc  |
| isolation resistance | test at 500 V dc          | 1000 |     |     | MΩ    |

## OUTLINE DIMENSIONS & RECOMMENDED LAYOUT PATTERN



Note: All Pins on a 2.54mm(0.1) pitch; All Pin Widths are 0.60 mm(0.02);  
Tolerances:±0.15mm(0.006); Unit: mm(inch)

## TYPICAL CHARACTERISTICS



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**Application Notes:**

- To ensure this module can operate efficiently and reliably during operation, the minimum output load should not be less than 10% of the full load. This product should never be operated under no load conditions. If the actual output power is very low you should increase the load by connecting a resistor with the proper resistance at the output end in parallel.

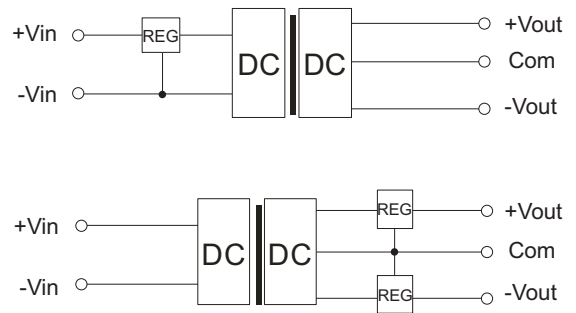
- Overload Protection  
Under normal operating conditions, the output circuit of these products has no protection against overload. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.

- Recommended Circuit  
If you want to further decrease the input/output ripple, an "LC" filtering network may be connected to the input and output ends of the dc-dc converter, see (Figure 1).

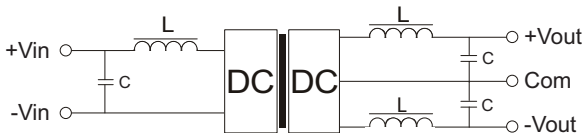
- Output Voltage Regulation and Over-voltage Protection Circuit  
The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (Figure 2).

No parallel connection or plug and play.

**Figure 2**



**Figure 1**



It should also be noted that the inductance and the frequency of the "LC" filtering network should be staggered with the dc-dc frequency to avoid mutual interference. However, the capacitance of the output filter capacitor must be proper. If the capacitance is too large, a startup problem might arise. It is not recommended to connect any external capacitor in the application field .

**Reflow Profile**

