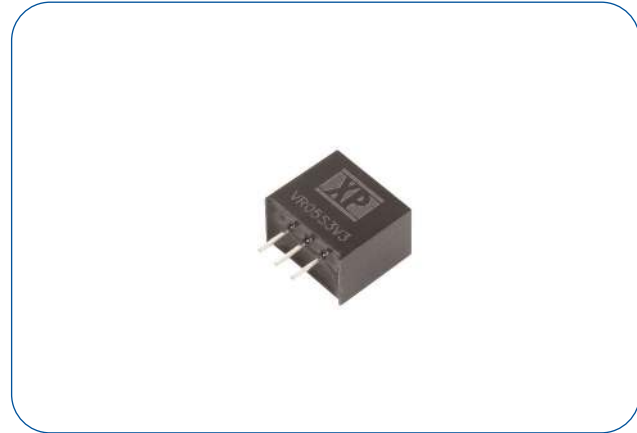


0.5 Amp

- Non Isolated 0.5A Switching Regulator
- Regulated Single Outputs from 3.3 to 15VDC
- Wide Input Range to 36V
- SIP3 Package
- High Efficiency to 95%
- Class B Conducted & Radiated Emissions
- Short Circuit Protection
- Low 0.1mA Standby Input Current
- -40°C to +85°C Operation
- MTBF >2Mhrs
- 3 Year Warranty



Dimensions:

VR05:
0.457 x 0.401 x 0.297" (11.6 x 10.16 x 7.55mm)

The VR05 provides a cost effective compact efficient switching regulator solution operating from a wide range DC input. Output voltages start from 3.3V and the VR05 consumes as little as 0.2mA when idle.

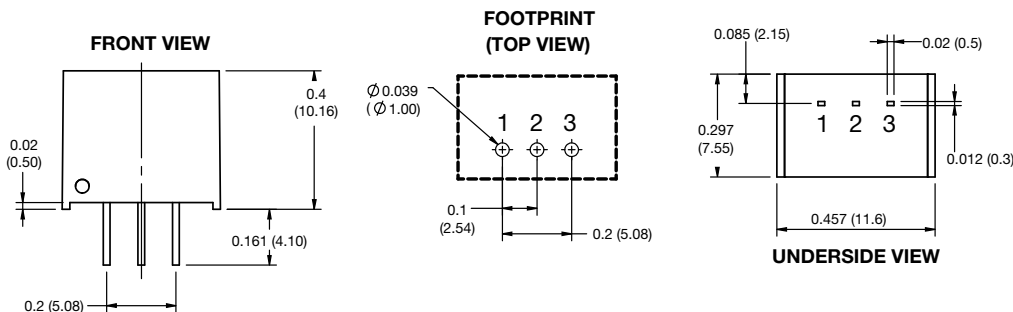
Models & Ratings

| Input Voltage | Output Voltage | Output Current | Input Current ⁽¹⁾ | | Max. Capacitive Load | Efficiency ⁽²⁾ | | Model Number |
|---------------|----------------|----------------|------------------------------|-----------|----------------------|---------------------------|-----------|--------------|
| | | | No Load | Full Load | | Vin, Min. | Vin, Max. | |
| 4.75-36V | 3.3V | 500mA | 1.5mA | 416mA | 680µF | 89% | 80% | VR05S3V3 |
| 6.5-36V | 5.0V | 500mA | 0.2mA | 446mA | 680µF | 90% | 84% | VR05S05 |
| 12-36V | 9.0V | 500mA | 0.2mA | 412mA | 680µF | 93% | 90% | VR05S09 |
| 15-36V | 12V | 500mA | 0.2mA | 436mA | 680µF | 94% | 91% | VR05S12 |
| 19-36V | 15V | 500mA | 0.2mA | 422mA | 680µF | 95% | 93% | VR05S15 |

Notes

1. Full load input current measured at minimum input voltage.
2. Efficiency measured at full load.
3. Standard tube quantity 43 pcs.

Mechanical Details



| Pin Connections | | |
|-----------------|----------|----------|
| Pin | Positive | Negative |
| 1 | Vin | Vin |
| 2 | Ground | -Vout |
| 3 | +Vout | Ground |

Notes

1. All dimensions are in inches (mm)
2. Weight: 0.0039lbs (1.8g) approx.
3. Pin diameter: 0.02±0.004 (0.7±0.1)
4. Case & pin tolerance: ±0.02 (±0.5)

Input

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|------------------------|--------------------|---------|---------|----------|-------------------------------|
| Input Voltage Range | 4.75 | | 36 | VDC | See Models and Ratings table. |
| Input Filter | Internal capacitor | | | | |
| Input Reflected Ripple | | | 20 | mA pk-pk | |
| Input Surge | | | 45 | VDC | For max. 100ms. |

Output

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|--------------------------|---------------------------------|---------|-----------|----------|--|
| Output Voltage | 3.3 | | 15 | VDC | See Models and Ratings table. |
| Initial Set Accuracy | | ±2.0 | ±4.0/±3.0 | % | 3.3V/others (At full load) |
| Minimum Load | 0 | | | mA | No minimum load required. |
| Line Regulation | | ±0.2 | ±0.4 | % | Full load over input voltage range. |
| Load Regulation | | ±0.3 | ±0.6 | % | Maximum variation applies to 3.3V output models. |
| Transient Response | | | ±2 | % | For 50% load change. Recovery in 100µs. |
| Ripple & Noise | | | 75 | mV pk-pk | 20 MHz bandwidth. |
| Short Circuit Protection | Continuous, with auto recovery. | | | | |
| Maximum Capacitive Load | See Models and Ratings table. | | | | |
| Temperature Coefficient | | | 0.03 | %/°C | |
| Overload Protection | | 1.0 | | A | |
| Start-up Time | | 20 | | ms | |

General

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|----------------------------|--|--------------|---------|--------|---|
| Efficiency | | 92 | | % | See models and ratings table. |
| Isolation: Input to Output | 0 | | | VDC | Non isolated. |
| Switching Frequency | 550 | | 850 | kHz | At full load, nominal input. |
| Mean Time Between Failure | 2 | | | MHrs | MIL-HDBK-217F. |
| Weight | | 0.0039 (1.8) | | lb (g) | |
| Case Material | Non-conductive black plastic UL94V-0. | | | | |
| Pin Material | Solder coated phosphor bronze C5191R-1/2H. | | | | |
| Potting Material | Polyurethane type L780 UL94V-0 rated. | | | | |
| Water Wash | Use de-ionised water only, dry thoroughly. | | | | |
| Soldering Temperature | | | 260 | °C | Wave solder peak, 1.5mm from case 10s max. Not suitable for vapour phase soldering. For further details contact XP Power applications team. |

Environmental

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|-----------------------|---------------------|---------|---------|-------|----------------------|
| Operating Temperature | -40 | | +85 | °C | See derating curves. |
| Storage Temperature | -55 | | +125 | °C | |
| Case Temperature | | | +120 | °C | |
| Humidity | | | 95 | %RH | Non-condensing. |
| Cooling | Natural convection. | | | | |

EMC: Emissions

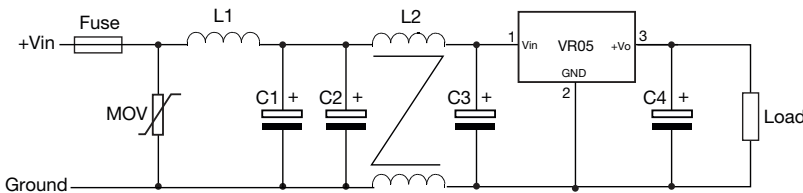
| Phenomenon | Standard | Test Level | Notes & Conditions |
|------------|----------|------------|-----------------------|
| Conducted | EN55032 | Class B | See Application Notes |
| Radiated | EN55032 | Class B | |

EMC: Immunity

| Phenomenon | Standard | Test Level | Criteria | Notes & Conditions |
|--------------------|-------------|------------|----------|-----------------------|
| ESD Immunity | EN61000-4-2 | ±6kV | B | Contact discharge. |
| Radiated Immunity | EN61000-4-3 | 10V/m | A | |
| EFT/Burst | EN61000-4-4 | ±1.0kV | B | See Application Notes |
| Surges | EN61000-4-5 | ±1.0kV | B | |
| Conducted Immunity | EN61000-4-6 | 3Vrms | A | |

Application Notes

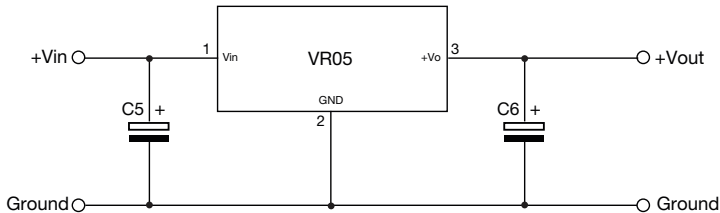
Input Filter to meet Class B Conducted Emissions



| MOV | L1 | L2 | C1 | C2 | C3 | C4 |
|--------|------|------|-----------|-----------|--------|--------|
| S20K30 | 82µH | 12µH | 680µF/50V | 4.7µF/50V | See C5 | See C6 |

Select fuse rating based on application input current.

Typical Application



| Part Number | C5 | C6 |
|-------------|----------|----------|
| VR05S3V3 | 10µF/50V | 22µF/10V |
| VR05S05 | | 22µF/10V |
| VR05S09 | | 22µF/16V |
| VR05S12 | | 22µF/25V |
| VR05S15 | | 22µF/25V |
| | | |

Derating Curve

