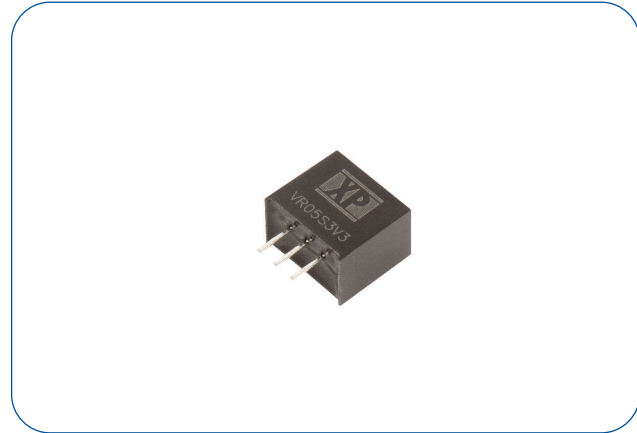


0.5 Amp

- 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.

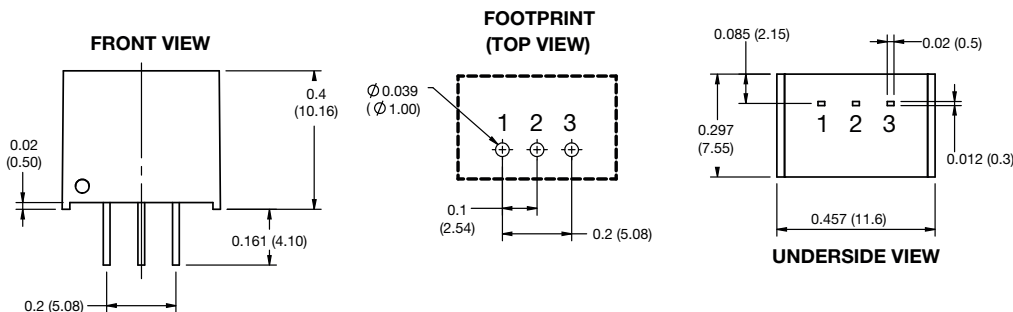
Models & Ratings

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

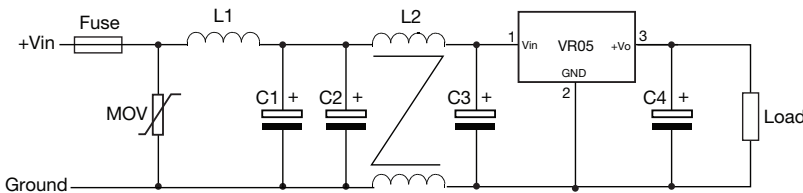
Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN55032	Class B	See Application Notes
Radiated	EN55032	Class B	

EMC: Immunity

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

Application Notes

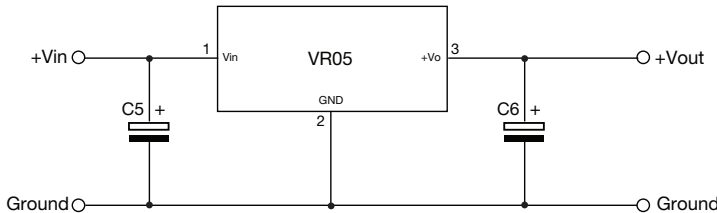
Input Filter to meet Class B Conducted Emissions



MOV	L1	L2	C1	C2	C3	C4
S20K30	82 μH	12 μH	680 $\mu\text{F}/50\text{V}$	4.7 $\mu\text{F}/50\text{V}$	See C5	See C6

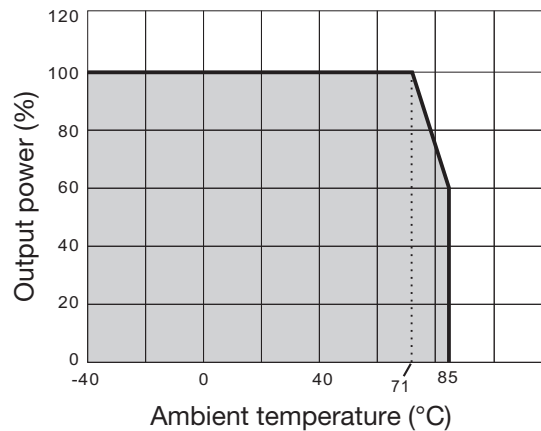
Select fuse rating based on application input current.

Typical Application



Part Number	C5	C6
VR05S3V3	10 $\mu\text{F}/50\text{V}$	22 $\mu\text{F}/10\text{V}$
VR05S05		22 $\mu\text{F}/10\text{V}$
VR05S09		22 $\mu\text{F}/16\text{V}$
VR05S12		22 $\mu\text{F}/25\text{V}$
VR05S15		22 $\mu\text{F}/25\text{V}$

Derating Curve



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[VR05S05](#) [VR05S12](#) [VR05S3V3](#) [VR05S15](#) [VR05S09](#)