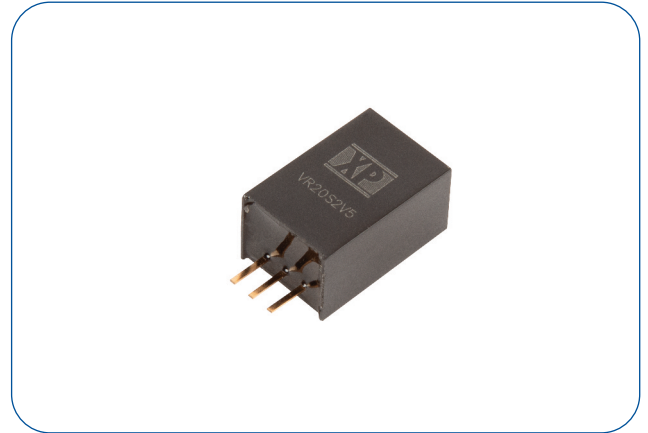


### 2 Amp

- Non Isolated 2A Switching Regulator
- Regulated Single Outputs from 2.5 to 15VDC
- Wide Input Range to 36V
- SIP3 Package
- High Efficiency to 96%
- 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:

**VR20:**  
0.453 x 0.689 x 0.354" (11.5 x 17.5 x 9.0mm)

The VR20 provides a cost effective compact efficient switching regulator solution operating from a wide range DC input. Output voltages start from 2.5V and the VR20 consumes as little as 0.1mA when idle.

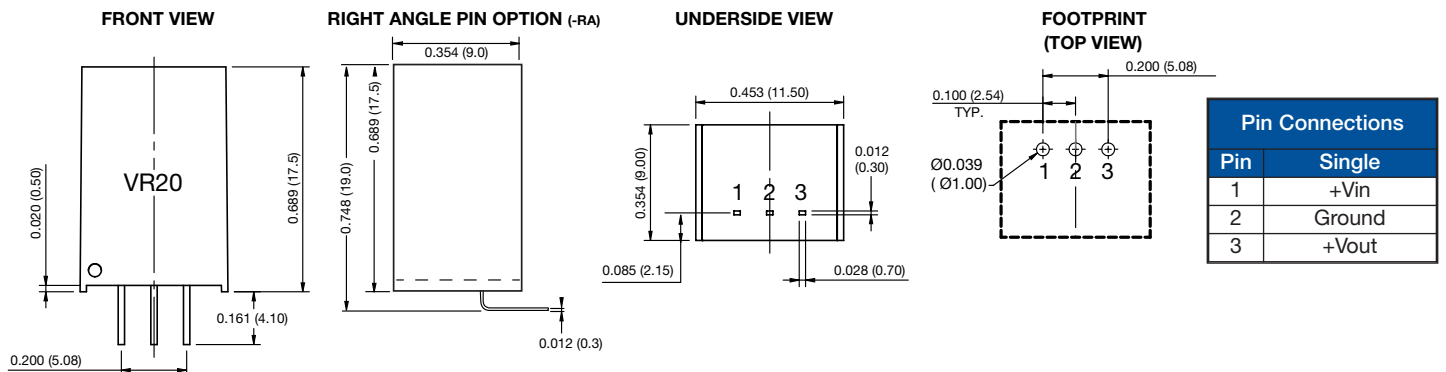
### Models & Ratings

Input Voltage	Output Voltage	Output Current	Input Current <sup>(1)</sup>		Max. Capacitive Load	Efficiency <sup>(2)</sup>		Model Number
			No Load	Full Load		Vin, Min.	Vin, Max.	
4.5-36V	2.5V	2.0A	0.2mA	1300mA	2000µF	89%	83%	VR20S2V5
6.0-36V	3.3V	2.0A	0.1mA	1260mA	1800µF	89%	85%	VR20S3V3
8.0-36V	5.0V	2.0A	0.1mA	1380mA	1000µF	92%	89%	VR20S05
13-36V	9.0V	2.0A	0.1mA	1490mA	680µF	95%	92%	VR20S09
16-36V	12V	2.0A	0.1mA	1590mA	470µF	96%	94%	VR20S12
18-36V	15V	2.0A	0.1mA	1760mA	470µF	96%	94%	VR20S15

### Notes

1. Full load input current measured at minimum input voltage.
2. Efficiency measured at full load.
3. Standard tube quantity 44 pcs.
4. Right angle pin option, add suffix -RA.

### Mechanical Details



### Notes

1. All dimensions are in inches (mm)
2. Weight: 0.0083lbs (3.8g) 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	4.5		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	2.5		15	VDC	See Models and Ratings table.
Initial Set Accuracy		±2.0	±4.0/±3.0	%	2.5V and 3.3V/others (At full load)
Minimum Load	0			mA	No minimum load required.
Line Regulation		±0.4	±0.8	%	Full load over input voltage range.
Load Regulation		±0.5	±1.5	%	Maximum variation applies to 2.5V output models.
Transient Response			±5	%	For 50% load change. Recovery in 200µs.
Ripple & Noise			75	mV pk-pk	20 MHz bandwidth.
Short Circuit Protection	Continuous, with auto recovery. Hiccup mode.				
Maximum Capacitive Load	See Models and Ratings table.				
Temperature Coefficient			0.03	%/°C	
Overload Protection		3.5		A	
Start-up Time		20		ms	

### General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency			96	%	See models and ratings table.
Isolation: Input to Output	0			VDC	Non isolated.
Switching Frequency		400		kHz	At full load.
Mean Time Between Failure	2			MHrs	MIL-HDBK-217F.
Weight		0.0083 (3.8)		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

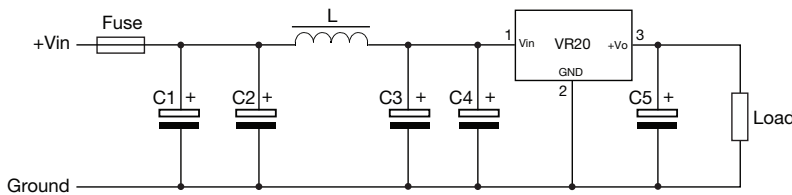
Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN55032	Class B	See Application Notes
Radiated	EN55032	Class B	

### 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	See Application Notes
EFT/Burst	EN61000-4-4	±1.0kV	B	
Surges	EN61000-4-5	±1.0kV	B	
Conducted Immunity	EN61000-4-6	3Vrms	A	

### Application Notes

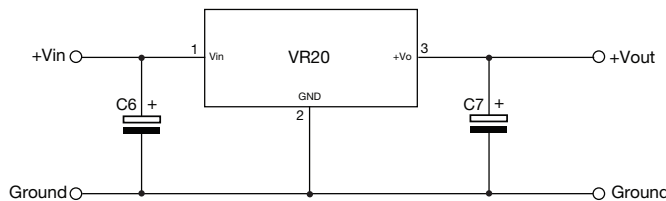
#### Input Filter to meet Class B Conducted Emissions



L	C1	C2/C3	C4	C5
22µH	100µF/100V	10µF/50V	680µF/50V	22µF/25V

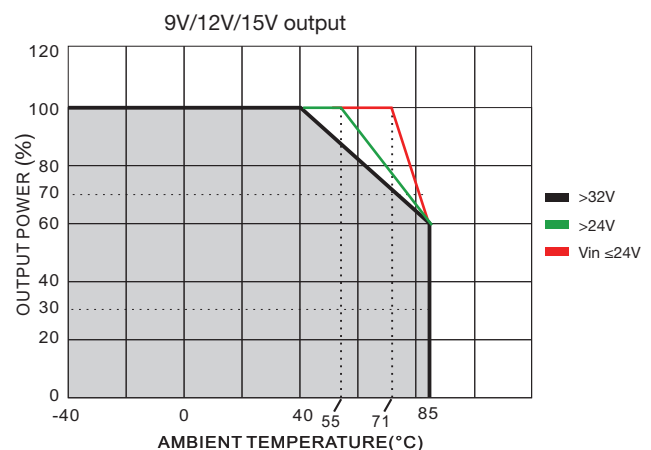
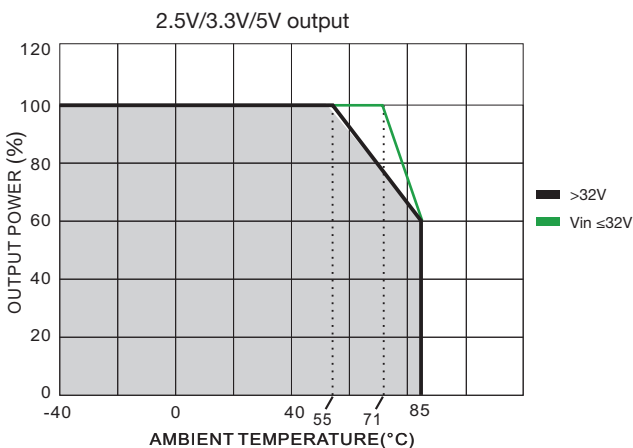
Select fuse rating based on application input current.

#### Typical Application



Part Number	C6	C7
VR20S2V5	22µF/50V	22µF/10V
VR20S3V3		22µF/10V
VR20S05		22µF/10V
VR20S09		22µF/16V
VR20S12		22µF/25V
VR20S15		22µF/25V

#### Derating Curves



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