

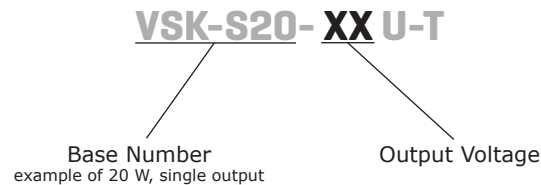
SERIES: VSK-S20-T | **DESCRIPTION:** AC-DC POWER SUPPLY

FEATURES

- up to 20 W continuous output
- encapsulated compact case
- output short circuit protection
- over current protection
- thermal protection
- CE, UL safety approval
- regulated output
- universal input (85~264 Vac)
- efficiency up to 85%



| MODEL | output voltage | output current | output power | ripple and noise | efficiency |
|----------------|----------------|----------------|--------------|------------------|------------|
| | (Vdc) | max (A) | max (W) | max (mVp-p) | max (%) |
| VSK-S20-3R3U-T | 3.3 | 4.1 | 14 | 100 | 73 |
| VSK-S20-5U-T | 5 | 3.5 | 18 | 100 | 75 |
| VSK-S20-9U-T | 9 | 2.1 | 19 | 100 | 77 |
| VSK-S20-12U-T | 12 | 1.6 | 19 | 100 | 81 |
| VSK-S20-15U-T | 15 | 1.3 | 20 | 100 | 83 |
| VSK-S20-24U-T | 24 | 0.85 | 20 | 100 | 85 |

PART NUMBER KEY


INPUT

| parameter | conditions/description | min | typ | max | units |
|---------------------------------|--------------------------------|-----------|------------|------------|------------|
| voltage | | 85 120 | | 264 370 | Vac Vdc |
| frequency | | 47 | | 63 | Hz |
| input current | at 110 Vac at 230 Vac | | 330 180 | | mA mA |
| inrush current | at 110 Vac at 230 Vac | | 16 30 | | A A |
| recommended external input fuse | 3.15 A / 250 V, slow-blow type | | | | |

OUTPUT

| parameter | conditions/description | min | typ | max | units |
|-------------------------|------------------------|-----|------|-----|-------|
| voltage set accuracy | | | ±2 | | % |
| line regulation | | | ±0.5 | | % |
| load regulation | at 10~100% load | | ±1 | | % |
| minimum load | | 0 | | | % |
| hold-up time | at 230 Vac | | 80 | | ms |
| temperature coefficient | | | 0.02 | | %/°C |
| switching frequency | | | 65 | | kHz |

PROTECTIONS

| parameter | conditions/description | min | typ | max | units |
|--------------------------|---|-----|-----|-----------------------|--------------------------|
| over voltage protection | 3.3 and 5 V models 9 V model 12 and 15 V models 24 V model | | | 7.5 12 20 30 | Vdc Vdc Vdc Vdc |
| overload protection | | 110 | | | % |
| short circuit protection | shutdown and auto restart | | | | |

SAFETY & COMPLIANCE

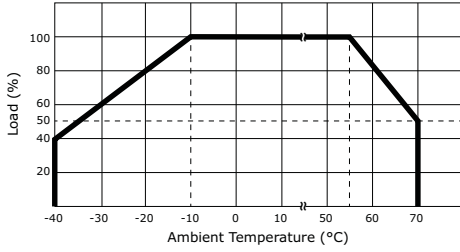
| parameter | conditions/description | min | typ | max | units |
|-------------------|---|---------|-----|-------|-------|
| isolation voltage | for 1 minute | | | 3,000 | Vac |
| safety approvals | EN 60950-1, IEC 60950-1, UL 60950-1 | | | | |
| safety class | Class I | | | | |
| EMI/EMC | CISPR22/EN 55022 class B, IEC/EN 61000-4-(2, 3, 4, 5) | | | | |
| leakage current | at 230 Vac, 50 Hz | | | 0.3 | mA |
| MTBF | at 25°C, max. load | 300,000 | | | hours |
| RoHS compliant | yes | | | | |

ENVIRONMENTAL

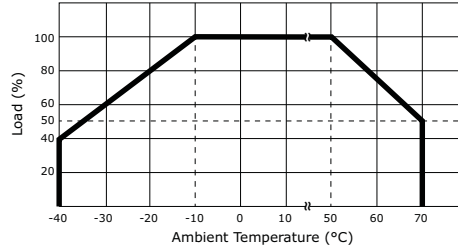
| parameter | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|-----|-------|
| operating temperature | | -40 | | 70 | °C |
| storage temperature | | -40 | | 105 | °C |
| case temperature | | | | 90 | °C |
| humidity | non-condensing | | | 85 | % |

DERATING CURVES

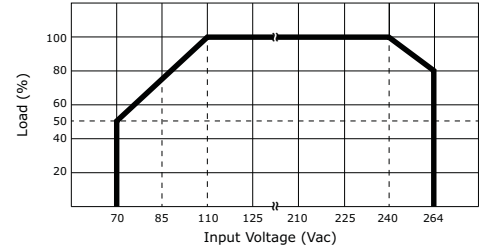
1. output power vs. ambient temperature
5 V model



all other models



2. output power vs. input voltage

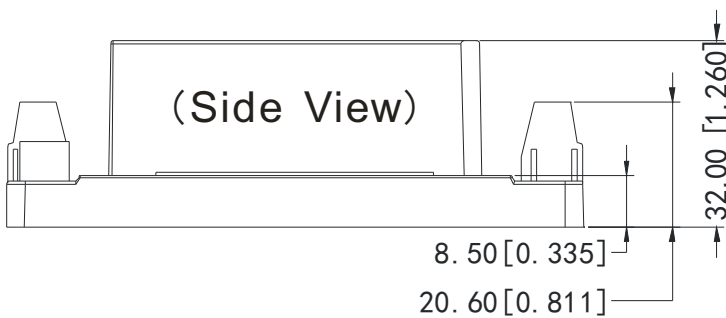
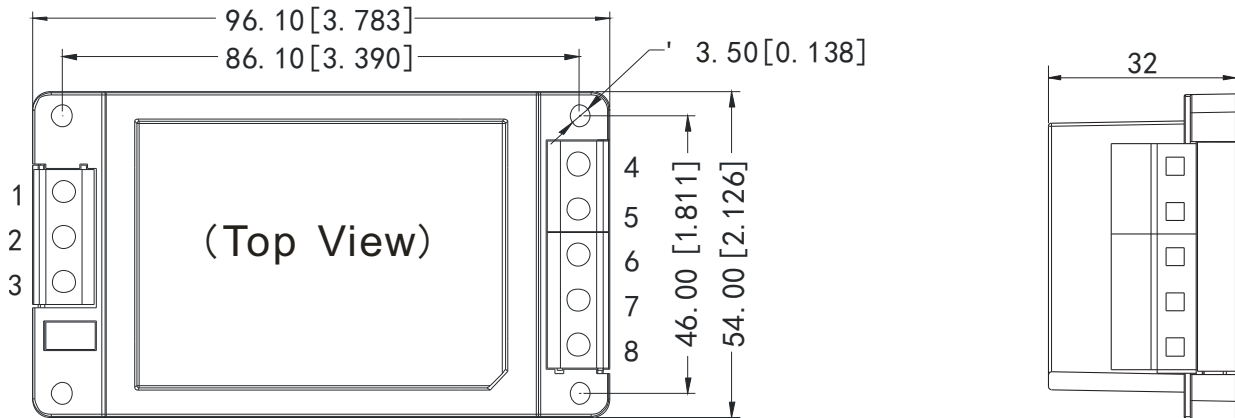


MECHANICAL

| parameter | conditions/description | min | typ | max | units |
|------------|--|-----|-----|-----|-------|
| dimensions | 3.783 x 2.126 x 1.26 (96.1 x 54 x 32 mm) | | | | inch |
| weight | | | 170 | | g |

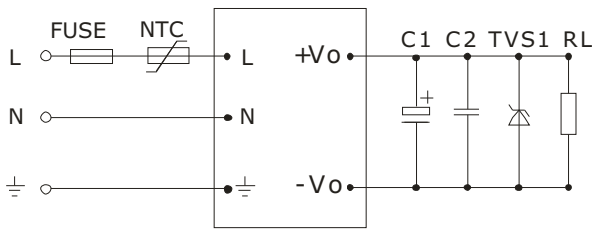
MECHANICAL DRAWING

units: mm [inches]
tolerance: ±0.50 [±0.020]

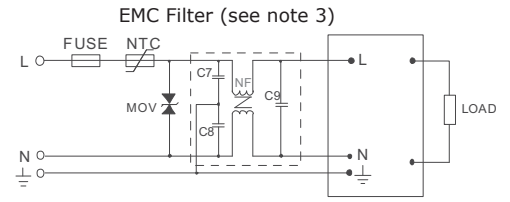


| PIN CONNECTIONS | |
|-----------------|----------|
| PIN | FUNCTION |
| 1 | GND |
| 2 | AC[N] |
| 3 | AC[L] |
| 4 | -Vo |
| 5 | NC |
| 6 | TRIM |
| 7 | NC |
| 8 | +Vo |

TYPICAL APPLICATION CIRCUIT

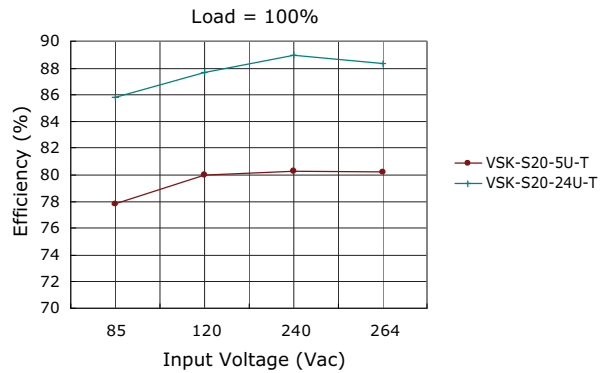
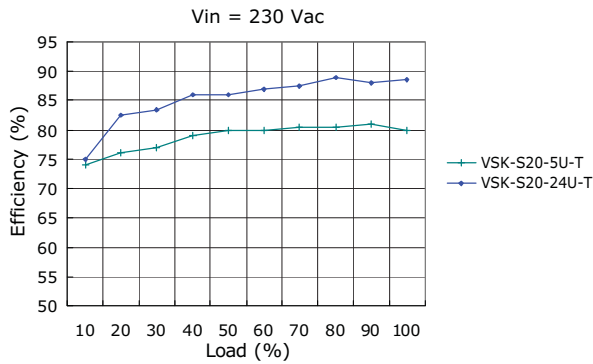


| EXTERNAL CAPACITORS TYPICAL VALUE (Unit: μF) | |
|---|-----|
| MODEL | C1 |
| VSK-S20-3R3U-T | 330 |
| VSK-S20-5U-T | 330 |
| VSK-S20-9U-T | 220 |
| VSK-S20-12U-T | 220 |
| VSK-S20-15U-T | 220 |
| VSK-S20-24U-T | 220 |

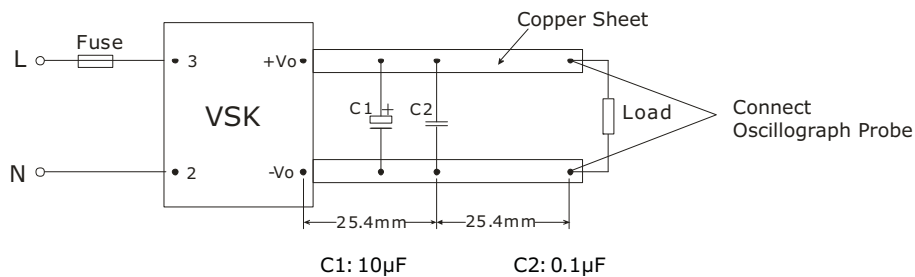


- Notes:
- Output filtering capacitors C1, C2 and C3 are electrolytic capacitors, It is recommended to use high frequency and low impedance electrolytic capacitors. For capacitance and current of capacitor please refer to manufacture's datasheet. Voltage derating of capacitor should be 80% or above. TVS is recommended component to protect post-circuits (if converter fails).
 - 0.1 μF is recommended for C1.
 - If a higher requirement to EMC performance is required it is recommended to add an "EMC filter" at the input end, recommended parameter are as follows:
 MOV: Varistor is used to protect the device under surge.
 C7,C8:Y capacitor, recommended parameter 2200pF/400V;
 C9:X capacitor, recommended parameter 0.1 μF /275V;
 NF: common model choke, recommended inductance is about 10mH-30mH.

TYPICAL EFFICIENCY CURVES

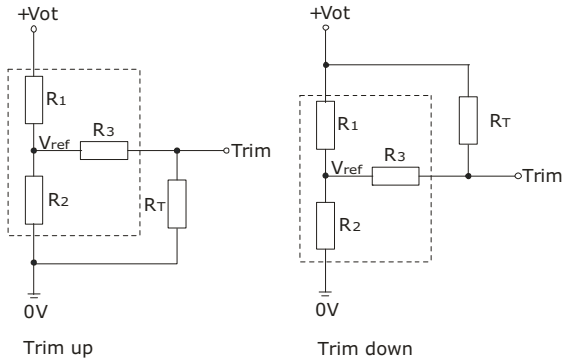


PARALLEL LINES



TRIM APPLICATION AND CALCULATION

Application circuit for TRIM
(Part in broken line is the interior of the models)



Formula for resistance of Trim

$$\text{up: } R_T = \frac{aR_2}{R_2 - a} - R_3 \quad a = \frac{V_{ref}}{V_{ot} - V_{ref}} \cdot R_1$$

$$\text{down: } R_T = \frac{aR_1}{R_1 - a} - R_3 \quad a = \frac{V_{ot} - V_{ref}}{V_{ref}} \cdot R_2$$

Note: Value for R1, R2, R3 and Vref refer to the following table.
RT: Resistance of Trim
a: User-defined parameter, no actual meanings.

| Vo(V) | 3.3 | 5 | 12 | 15 | 24 |
|------------|--|-----|-----|-----|-----|
| Resistance | | | | | |
| R1(KΩ) | 2 | 3.3 | 3.8 | 7.5 | 8.6 |
| R2(KΩ) | 1.2 | 3.3 | 1 | 1.5 | 1 |
| R3(KΩ) | 1 | 1 | 1 | 1 | 1 |
| Vref(V) | 1.24 | 2.5 | 2.5 | 2.5 | 2.5 |
| Vot(V) | Output voltage of Trim, variation ≤ ±10% | | | | |

REVISION HISTORY

| rev. | description | date |
|------|-----------------|------------|
| 1.0 | initial release | 09/06/2012 |

The revision history provided is for informational purposes only and is believed to be accurate.



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