

ADD-A-PAK Generation VII Power Modules Standard Diodes, 100 A



ADD-A-PAK

PRODUCT SUMMARY

| | |
|-------------|-------|
| $I_{F(AV)}$ | 100 A |
|-------------|-------|

MECHANICAL DESCRIPTION

The ADD-A-PAK generation VII, new generation of ADD-A-PAK module, combines the excellent thermal performances obtained by the usage of exposed direct bonded copper substrate, with advanced compact simple package solution and simplified internal structure with minimized number of interfaces.

FEATURES

- High voltage
- Industrial standard package
- UL pending
- Low thermal resistance
- Compliant to RoHS directive 2002/95/EC
- Designed and qualified for industrial level


**RoHS
COMPLIANT**

BENEFITS

- Excellent thermal performances obtained by the usage of exposed direct bonded copper substrate
- Up to 1600 V
- High surge capability
- Easy mounting on heatsink

ELECTRICAL DESCRIPTION

These modules are intended for general purpose high voltage applications such as high voltage regulated power supplies, lighting circuits, temperature and motor speed control circuits, UPS and battery charger.

MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
|---------------|-----------------|-------------|--------------------|
| $I_{F(AV)}$ | 112 °C | 100 | A |
| $I_{F(RMS)}$ | | 157 | |
| I_{FSM} | 50 Hz | 2020 | |
| | 60 Hz | 2115 | |
| I^2t | 50 Hz | 20.41 | kA ² s |
| | 60 Hz | 18.63 | |
| $I^2\sqrt{t}$ | | 204.1 | kA ² √s |
| V_{RRM} | Range | 400 to 1600 | V |
| T_J | | - 40 to 150 | °C |
| T_{Stg} | | | |



ELECTRICAL SPECIFICATIONS

| VOLTAGE RATINGS | | | | |
|-----------------|--------------|---|---|---|
| TYPE NUMBER | VOLTAGE CODE | V _{RRM} , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V | V _{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V | I _{RRM} MAXIMUM AT T _J = 150 °C mA |
| VSK.91 | 04 | 400 | 500 | 10 |
| | 06 | 600 | 700 | |
| | 08 | 800 | 900 | |
| | 10 | 1000 | 1100 | |
| | 12 | 1200 | 1300 | |
| | 14 | 1400 | 1500 | |
| | 16 | 1600 | 1700 | |

| FORWARD CONDUCTION | | | | | |
|---|---------------------|--|---|-----------------------------------|--------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum average forward current at case temperature | I _{F(AV)} | 180° conduction, half sine wave | | 100 | A |
| | | | | 112 | °C |
| Maximum RMS forward current | I _{F(RMS)} | DC at 90 °C case temperature | | 157 | |
| Maximum peak, one-cycle forward, non-repetitive surge current | I _{FSM} | t = 10 ms | No voltage reappplied | 2000 | A |
| | | t = 8.3 ms | | 100 % V _{RRM} reappplied | |
| | | t = 10 ms | Sinusoidal half wave, initial T _J = T _J maximum | | |
| | | t = 8.3 ms | | 1780 | |
| Maximum I ² t for fusing | I ² t | t = 10 ms | No voltage reappplied | 20.41 | kA ² s |
| | | t = 8.3 ms | | 100 % V _{RRM} reappplied | |
| | | t = 10 ms | 14.44 | | |
| | | t = 8.3 ms | 13.18 | | |
| Maximum I ² √t for fusing | I ² √t | t = 0.1 ms to 10 ms, no voltage reappplied | | 204.1 | kA ² √s |
| Low level value of threshold voltage | V _{F(TO)1} | (16.7 % × π × I _{F(AV)} < I < π × I _{F(AV)}), T _J = T _J maximum | | 0.76 | V |
| High level value of threshold voltage | V _{F(TO)2} | (I > π × I _{F(AV)}), T _J = T _J maximum | | 0.89 | |
| Low level value of forward slope resistance | r _{f1} | (16.7 % × π × I _{F(AV)} < I < π × I _{F(AV)}), T _J = T _J maximum | | 2.4 | mΩ |
| High level value of forward slope resistance | r _{f2} | (I > π × I _{F(AV)}), T _J = T _J maximum | | 2.05 | |
| Maximum forward voltage drop | V _{FM} | I _{FM} = π × I _{F(AV)} , T _J = 25 °C, t _p = 400 μs square wave | | 1.55 | V |

| BLOCKING | | | | | |
|--------------------------------------|------------------|-------------------------|--|--------------|-------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum peak reverse leakage current | I _{RRM} | T _J = 150 °C | | 10 | mA |
| Maximum RMS insulation voltage | V _{INS} | 50 Hz | | 3000 (1 min) | V |
| | | | | 3600 (1 s) | |



| THERMAL AND MECHANICAL SPECIFICATIONS | | | | |
|---|----------------|--|---------------------|-------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Junction and storage temperature range | T_J, T_{Stg} | | - 40 to 150 | °C |
| Maximum internal thermal resistance, junction to case per leg | R_{thJC} | DC operation | 0.22 | °C/W |
| Typical thermal resistance, case to heatsink per module | R_{thCS} | Mounting surface flat, smooth and greased | 0.1 | |
| Mounting torque $\pm 10\%$ to heatsink busbar | | A mounting compound is recommended and the torque should be rechecked after a period of 3 h to allow for the spread of the compound. | 4 | Nm |
| | | | 3 | |
| Approximate weight | | | 75 | g |
| | | | 2.7 | oz. |
| Case style | | JEDEC | TO-240AA compatible | |

| ΔR CONDUCTION PER JUNCTION | | | | | | | | | | | |
|----------------------------|---------------------------|-------|-------|------|-------|-----------------------------|-------|-------|-------|-------|-------|
| DEVICES | SINE HALF WAVE CONDUCTION | | | | | RECTANGULAR WAVE CONDUCTION | | | | | UNITS |
| | 180° | 120° | 90° | 60° | 30° | 180° | 120° | 90° | 60° | 30° | |
| VSK.91 | 0.057 | 0.068 | 0.087 | 0.12 | 0.177 | 0.045 | 0.073 | 0.093 | 0.123 | 0.178 | °C/W |

Note

- Table shows the increment of thermal resistance R_{thJC} when devices operate at different conduction angles than DC

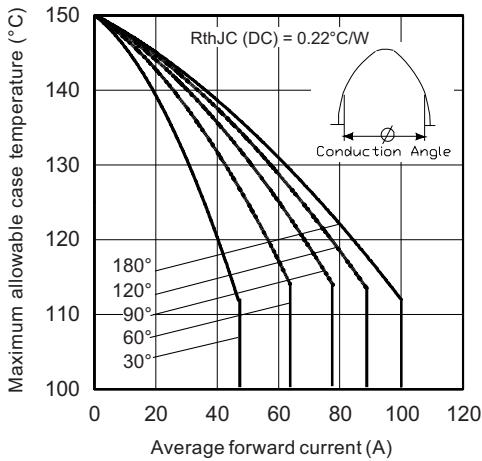


Fig. 1 - Current Ratings Characteristics

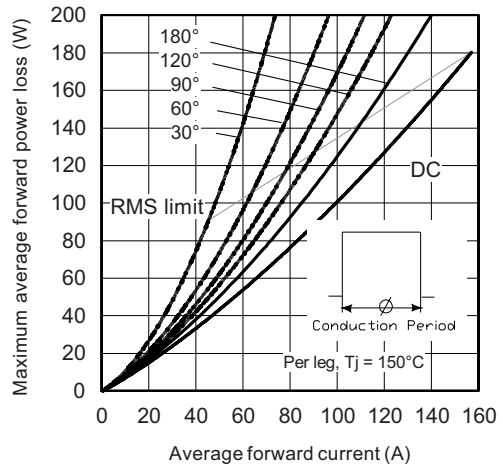


Fig. 4 - On-State Power Loss Characteristics

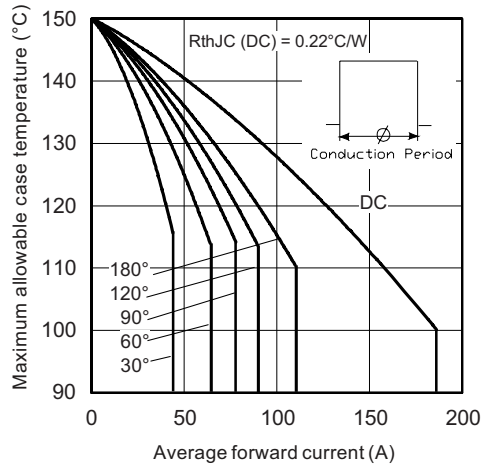


Fig. 2 - Current Ratings Characteristics

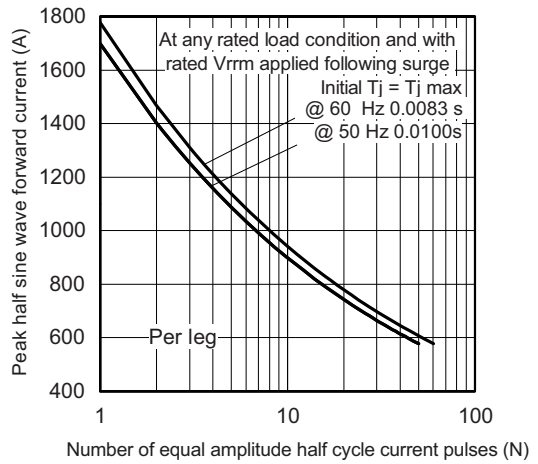


Fig. 5 - Maximum Non-Repetitive Surge Current

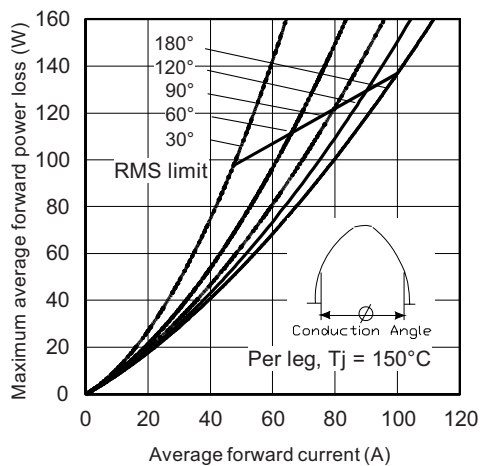


Fig. 3 - Forward Power Loss Characteristics

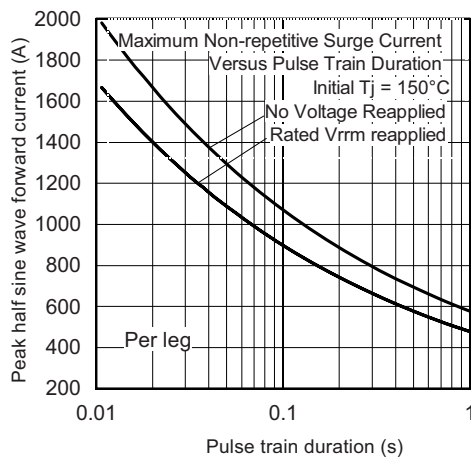


Fig. 6 - Maximum Non-Repetitive Surge Current

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Vishay High Power Products

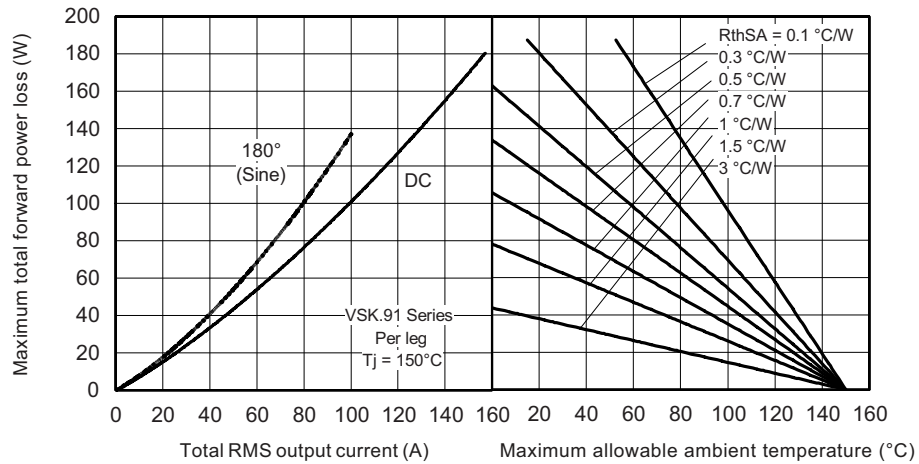


Fig. 7 - Forward Power Loss Characteristics

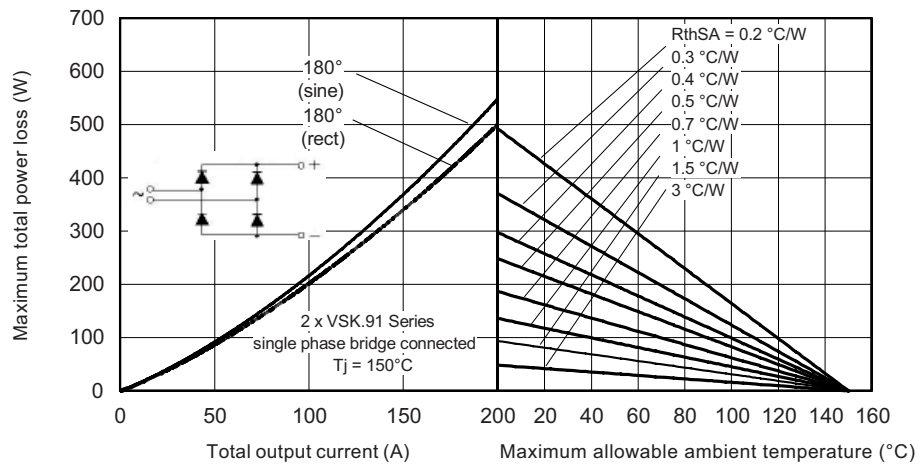


Fig. 8 - Forward Power Loss Characteristics

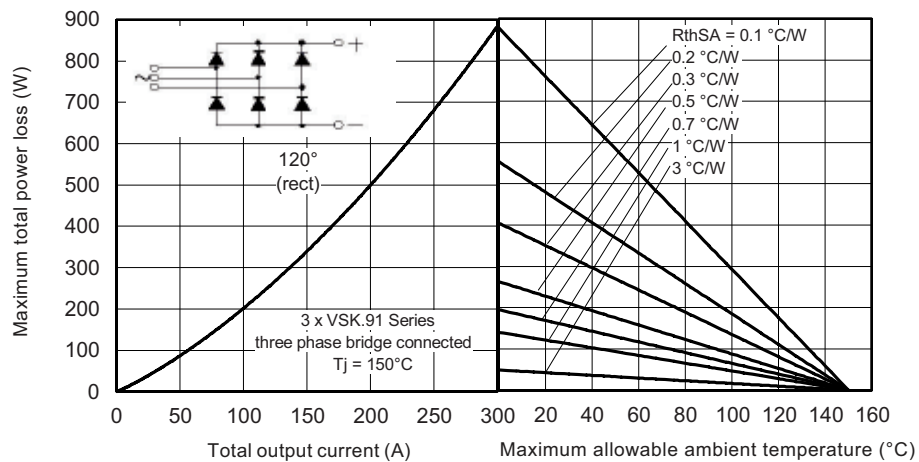


Fig. 9 - Forward Power Loss Characteristics

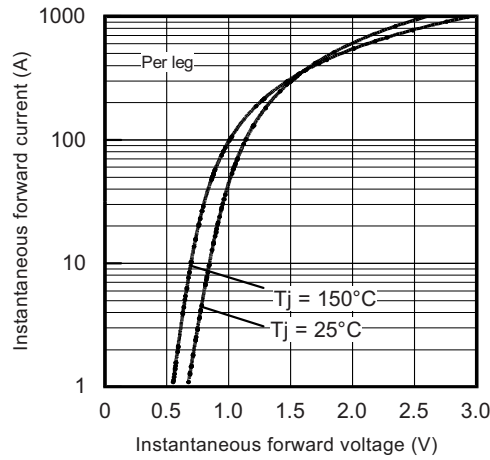


Fig. 10 - Forward Voltage Characteristics

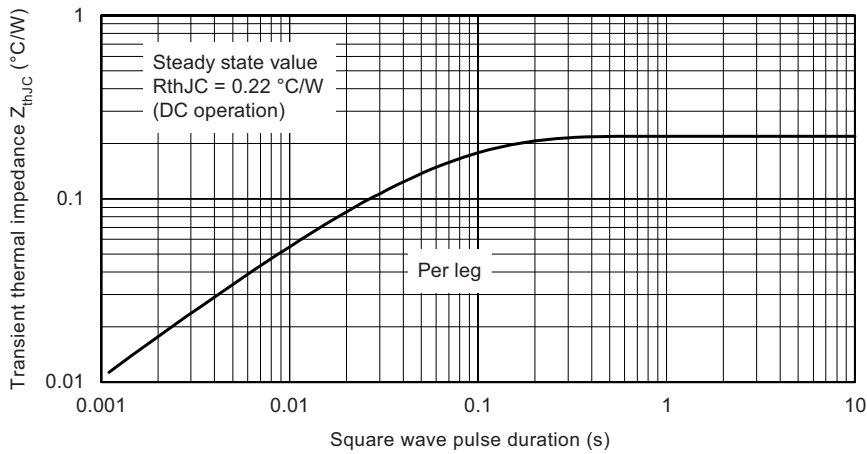


Fig. 11 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

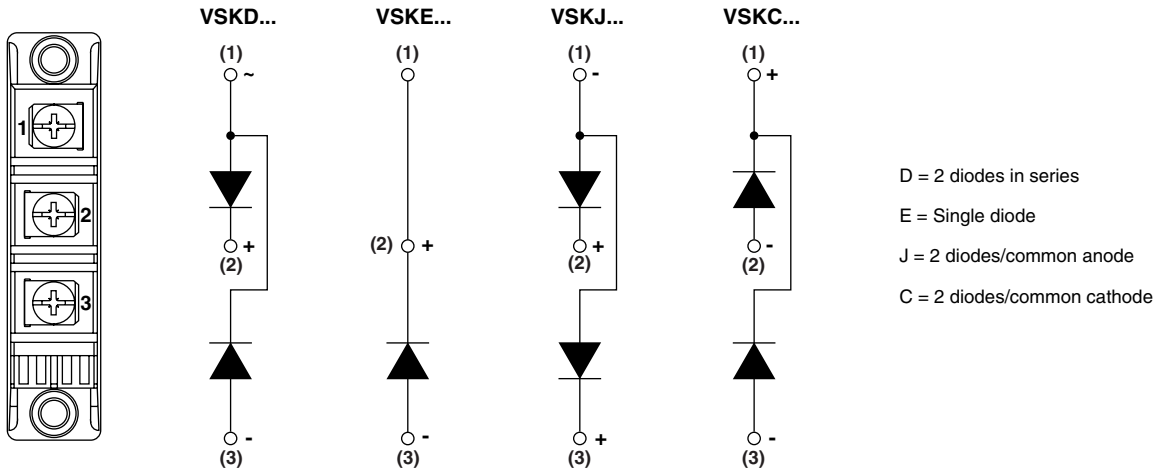
| | | | | | |
|-------------|------------|----------|--|----------|-----------|
| Device code | VSK | D | 91 | / | 16 |
| | ① | ② | ③ | | ④ |
| | 1 | - | Module type | | |
| | 2 | - | Circuit configuration (see end of datasheet) | | |
| | 3 | - | Current code (100 A) | | |
| | 4 | - | Voltage code (see Voltage Ratings table) | | |

Note

- To order the optional hardware go to www.vishay.com/doc?95172



CIRCUIT CONFIGURATION



LINKS TO RELATED DOCUMENTS

Dimensions

www.vishay.com/doc?95369



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