

Standard Diodes, 60 A/80 A (ADD-A-PAK Generation 5 Power Modules)



ADD-A-PAK

| PRODUCT SUMMARY | |
|-----------------|-------------------------------|
| $I_{F(AV)}$ | 60 A/80 A |
| Type | Modules - Diode, High Voltage |


MECHANICAL DESCRIPTION

The Generation 5 of ADD-A-PAK module combine the excellent thermal performance obtained by the usage of direct bonded copper substrate with superior mechanical ruggedness, thanks to the insertion of a solid copper baseplate at the bottom side of the device. The Cu baseplate allow an easier mounting on the majority of heatsink with increased tolerance of surface roughness and improve thermal spread.

The Generation 5 of AAP module is manufactured without hard mold, eliminating any possible direct stress on the leads.

The electrical terminals are secured against axial pull-out: they are fixed to the module housing via a click-stop feature already tested and proved as reliable on other Vishay HPP modules.

FEATURES

- High voltage
- Industrial standard package
- Thick copper baseplate
- UL E78996 approved 
- 3500 V_{RMS} isolating voltage
- Compliant to RoHS directive 2002/95/EC
- Designed and qualified for industrial level



RoHS
COMPLIANT

BENEFITS

- Up to 1600 V
- Full compatible TO-240AA
- High surge capability
- Easy mounting on heatsink
- Al_2O_3 DBC insulator
- Heatsink grounded

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 | VSK.56 | VSK.71 | UNITS |
| $I_{F(AV)}$ | 100 °C | 60 | 80 | A |
| $I_{F(RMS)}$ | | 94 | 126 | |
| I_{FSM} | 50 Hz | 1600 | 1790 | |
| | 60 Hz | 1680 | 1870 | |
| I^2t | 50 Hz | 12.89 | 15.90 | kA ² s |
| | 60 Hz | 11.76 | 14.53 | |
| $I^2\sqrt{t}$ | | 128.9 | 159 | kA ² √s |
| V_{RRM} | Range | 400 to 1600 | | V |
| T_J | | - 40 to 150 | | °C |
| T_{Stg} | | | | |

VSK.56..PbF, VSK.71..PbF Series



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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 150 °C mA |
| VSK.56 VSK.71 | 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 | | VSK.56 | VSK.71 | UNITS |
| Maximum average forward current at case temperature | I _{F(AV)} | 180° conduction, half sine wave | | 60 | 80 | A |
| | | | | 100 | 100 | °C |
| Maximum RMS forward current | I _{F(RMS)} | DC at 92 °C case temperature | | 94 | 126 | A |
| Maximum peak, one-cycle forward, non-repetitive surge current | I _{FSM} | t = 10 ms | No voltage reappplied | 1600 | 1790 | |
| | | t = 8.3 ms | | 1680 | 1870 | |
| | | t = 10 ms | 100 % V _{RRM} reappplied | 1350 | 1500 | |
| | | t = 8.3 ms | | 1420 | 1570 | |
| Maximum I ² t for fusing | I ² t | t = 10 ms | No voltage reappplied | 12.89 | 15.90 | kA ² s |
| | | t = 8.3 ms | | 11.76 | 14.53 | |
| | | t = 10 ms | 100 % V _{RRM} reappplied | 9.12 | 11.25 | |
| | | t = 8.3 ms | | 8.32 | 10.23 | |
| Maximum I ² √t for fusing | I ² √t | t = 0.1 ms to 10 ms, no voltage reappplied | | 128.9 | 159.0 | 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 | | 0.96 | 0.83 | V |
| High level value of threshold voltage | V _{F(TO)2} | (I > π × I _{F(AV)}), T _J = T _J maximum | | 1.03 | 0.92 | |
| 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 | | 2.81 | 2.68 | mΩ |
| High level value of forward slope resistance | r _{f2} | (I > π × I _{F(AV)}), T _J = T _J maximum | | 2.48 | 2.40 | |
| Maximum forward voltage drop | V _{FM} | I _{FM} = π × I _{F(AV)} , T _J = 25 °C, t _p = 400 μs square wave | | 1.51 | 1.50 | V |

| BLOCKING | | | | | | |
|--------------------------------------|------------------|---|--|------------|--------|-------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VSK.56 | VSK.71 | UNITS |
| Maximum peak reverse leakage current | I _{RRM} | T _J = 150 °C | | 10 | | mA |
| RMS insulation voltage | V _{INS} | 50 Hz, circuit to base, all terminals shorted | | 3500 (1 s) | | V |



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| THERMAL AND MECHANICAL SPECIFICATIONS | | | | | |
|---|----------------|--|----------------------|--------|----------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | | UNITS |
| | | | VSK.56 | VSK.71 | |
| Junction and storage temperature range | T_J, T_{Stg} | | - 40 to 150 | | °C |
| Maximum thermal resistance, junction to case per junction | R_{thJC} | DC operation | 0.5 | 0.4 | K/W |
| Typical thermal resistance, case to heatsink | 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 hours to allow for the spread of the compound. | 5 | 4 | Nm |
| Approximate weight | | | 110 | 4 | |
| Case style | | JEDEC | ADD-A-PAK (TO-240AA) | | g oz. |

| ΔR CONDUCTION PER JUNCTION | | | | | | | | | | | |
|------------------------------------|---------------------------|------|------|------|------|-----------------------------|------|------|------|------|-------|
| DEVICES | SINE HALF WAVE CONDUCTION | | | | | RECTANGULAR WAVE CONDUCTION | | | | | UNITS |
| | 180° | 120° | 90° | 60° | 30° | 180° | 120° | 90° | 60° | 30° | |
| VSK.56 | 0.11 | 0.13 | 0.16 | 0.22 | 0.32 | 0.09 | 0.14 | 0.17 | 0.23 | 0.32 | °C/W |
| VSK.71 | 0.06 | 0.08 | 0.11 | 0.14 | 0.21 | 0.06 | 0.09 | 0.11 | 0.15 | 0.21 | |

Note

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

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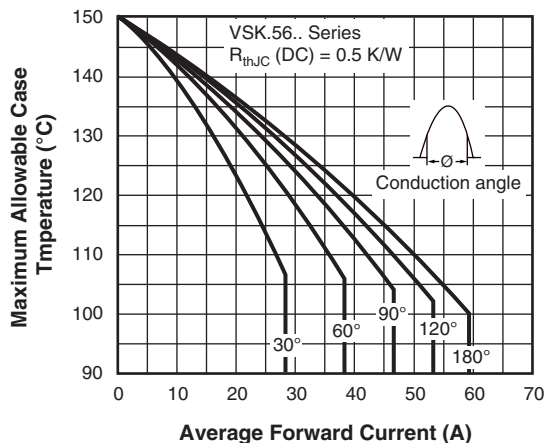


Fig. 1 - Current Ratings Characteristics

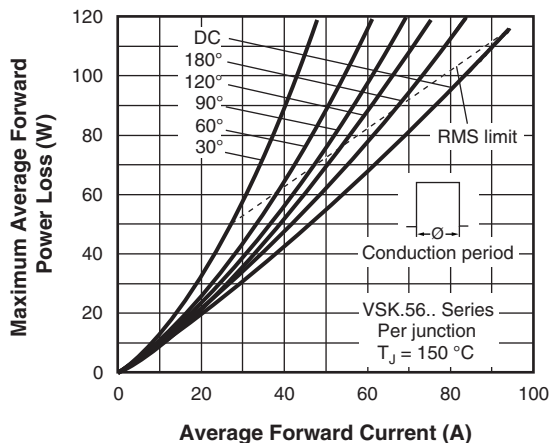


Fig. 4 - Forward Power Loss Characteristics

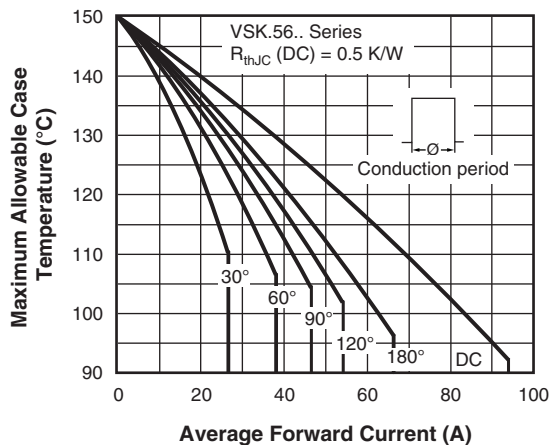


Fig. 2 - Current Ratings Characteristics

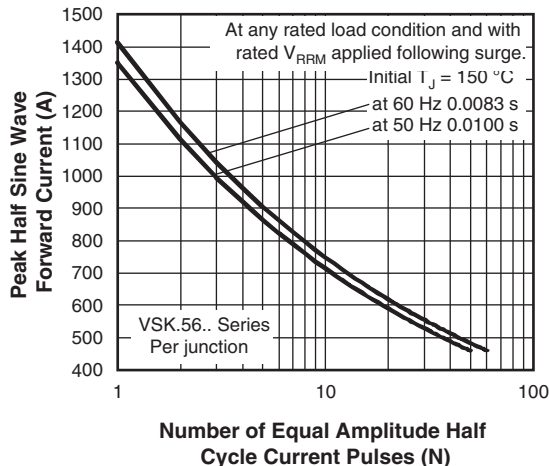


Fig. 5 - Maximum Non-Repetitive Surge Current

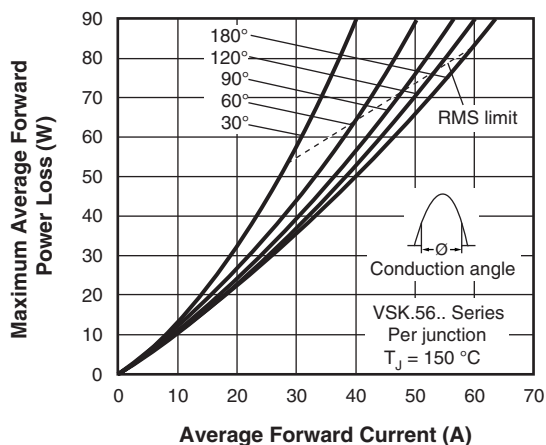


Fig. 3 - Forward Power Loss Characteristics

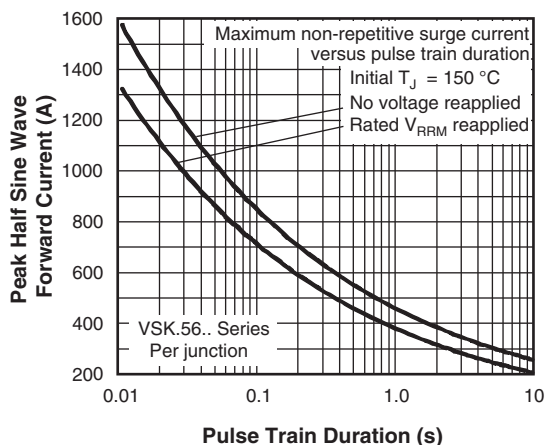


Fig. 6 - Maximum Non-Repetitive Surge Current



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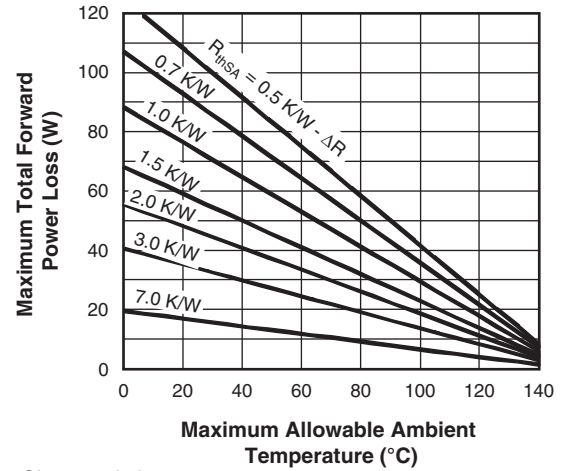
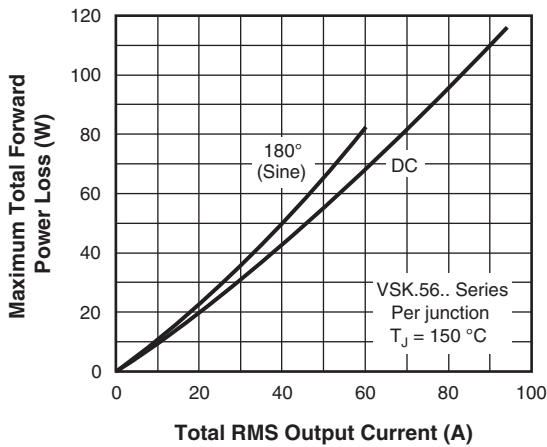


Fig. 7 - Forward Power Loss Characteristics

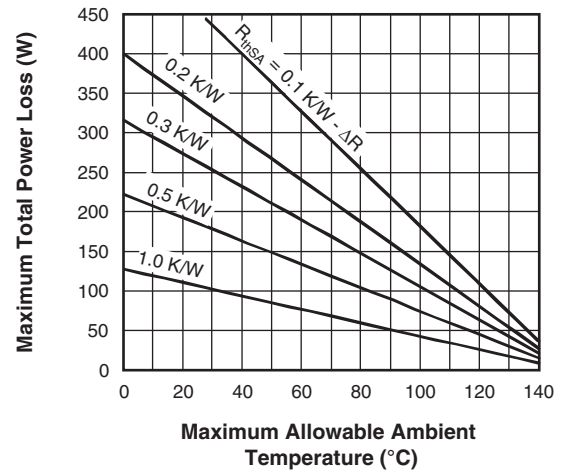
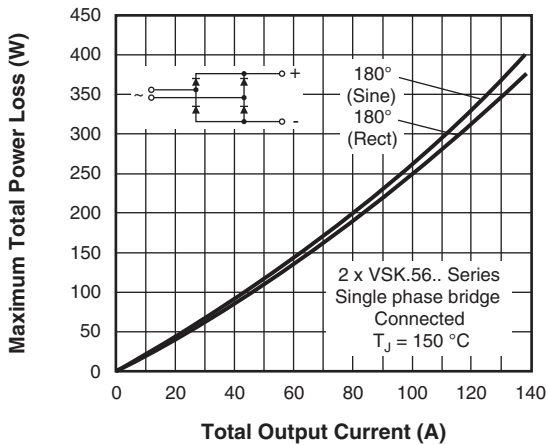


Fig. 8 - Forward Power Loss Characteristics

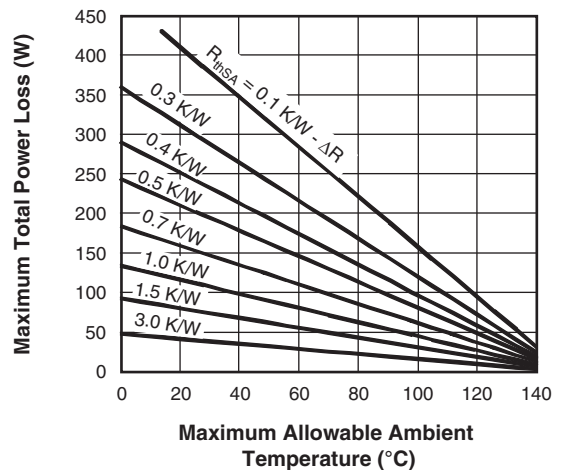
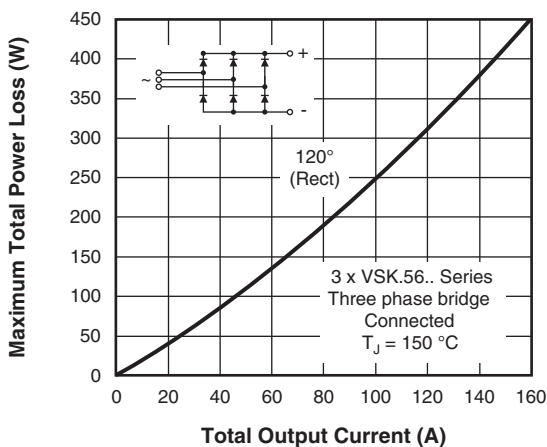


Fig. 9 - Forward Power Loss Characteristics

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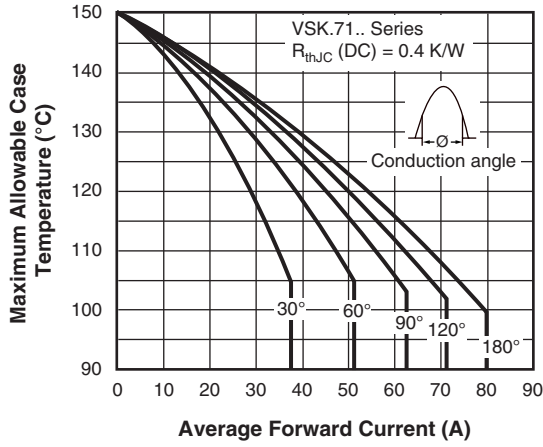


Fig. 10 - Current Ratings Characteristics

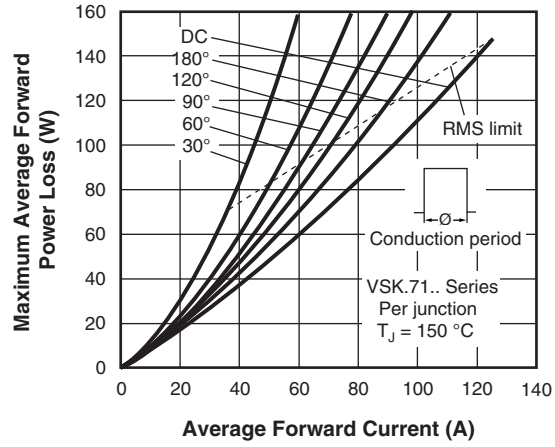


Fig. 13 - Forward Power Loss Characteristics

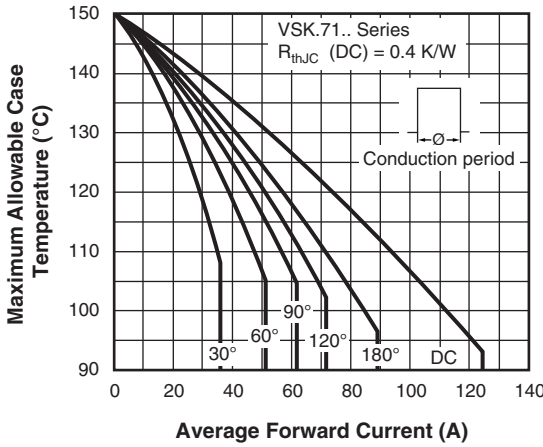


Fig. 11 - Current Ratings Characteristics

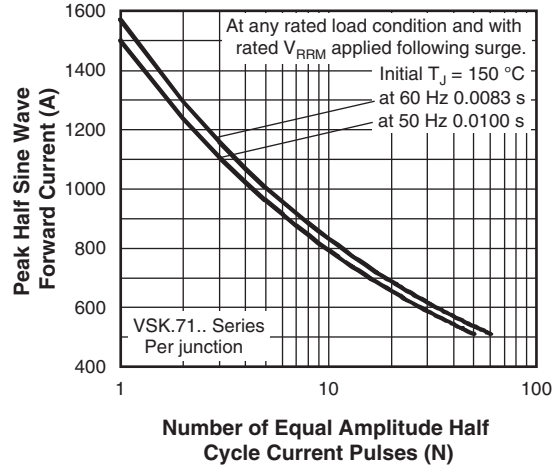


Fig. 14 - Maximum Non-Repetitive Surge Current

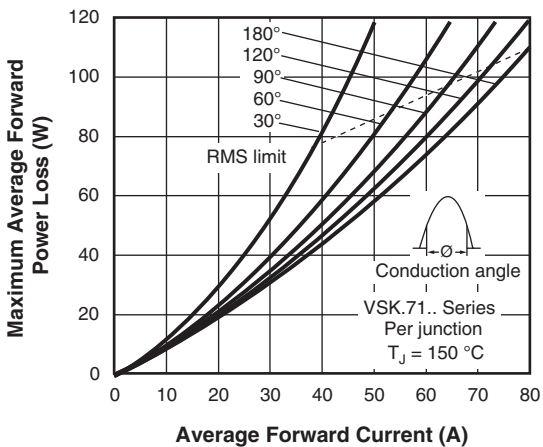


Fig. 12 - Forward Power Loss Characteristics

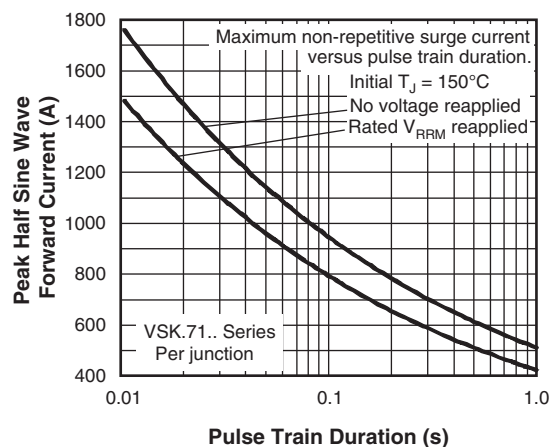


Fig. 15 - Maximum Non-Repetitive Surge Current



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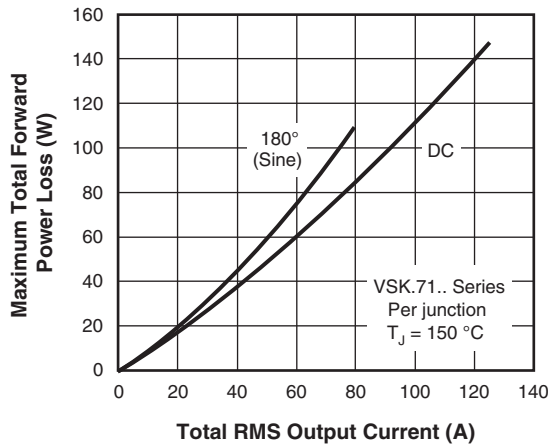


Fig. 16 - Forward Power Loss Characteristics

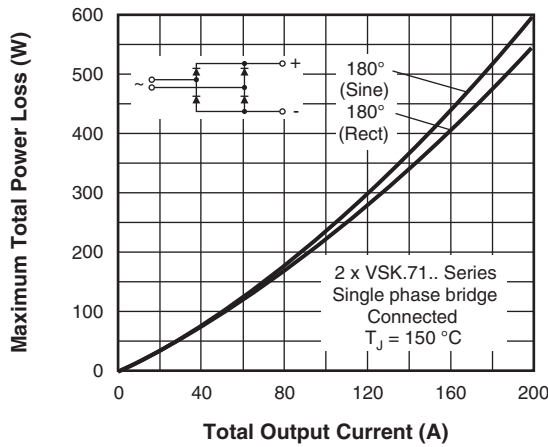
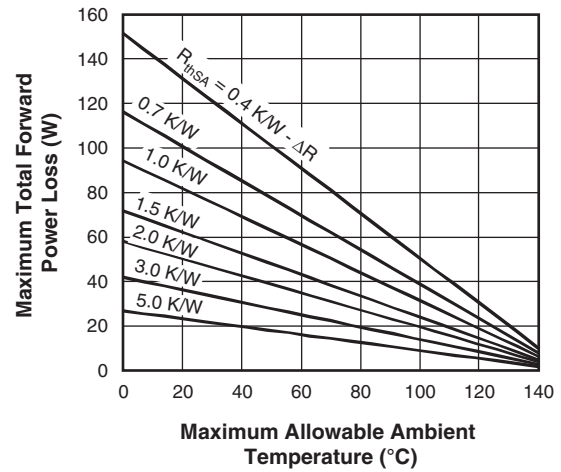


Fig. 17 - Forward Power Loss Characteristics

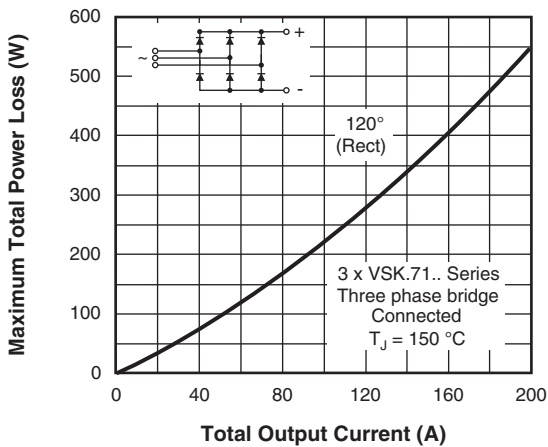
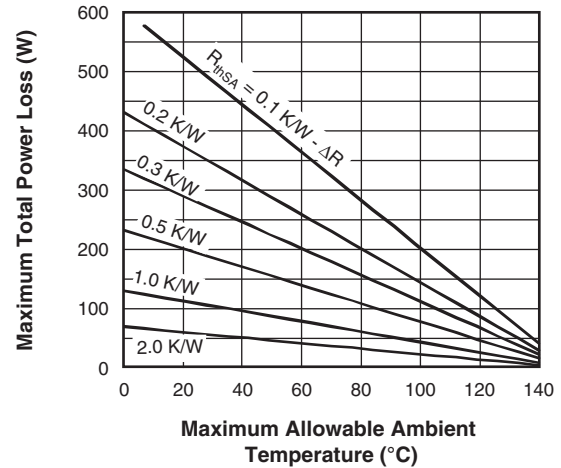
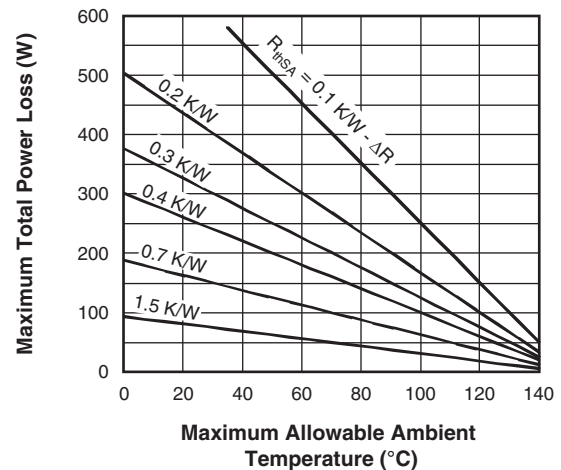


Fig. 18 - Forward Power Loss Characteristics



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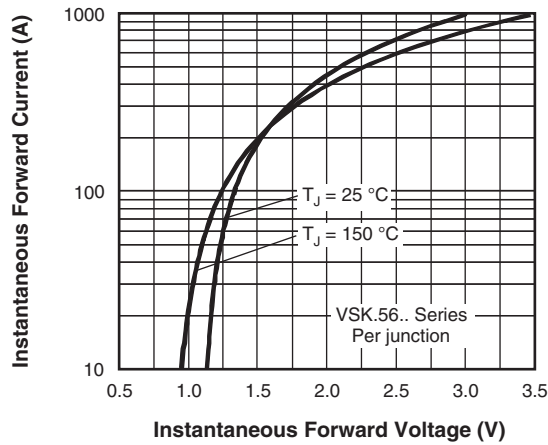


Fig. 19 - Forward Voltage Drop Characteristics

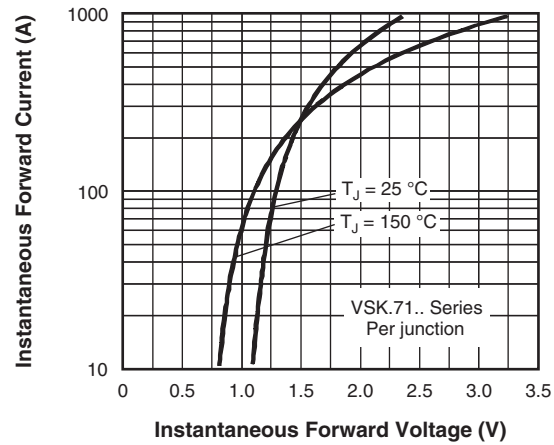


Fig. 20 - Forward Voltage Drop Characteristics

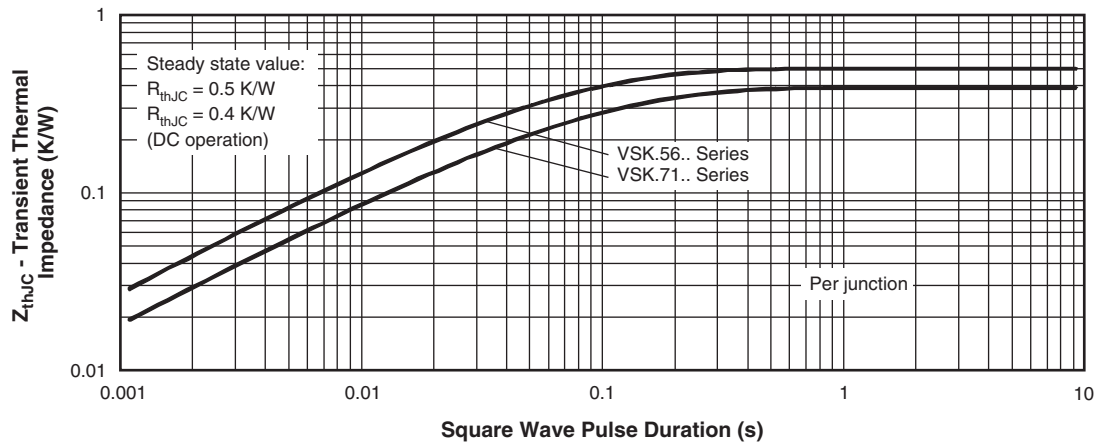


Fig. 21 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

| | | | | | | |
|-------------|-----|---|----|---|----|---|
| Device code | VSK | D | 71 | / | 16 | P |
| | ① | ② | ③ | | ④ | ⑤ |

- ① - Module type
- ② - Circuit configuration (see Circuit Configuration table)
- ③ - Current code
- ④ - Voltage code (see Voltage Ratings table)
- ⑤ - P = Lead (Pb)-free

Note

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



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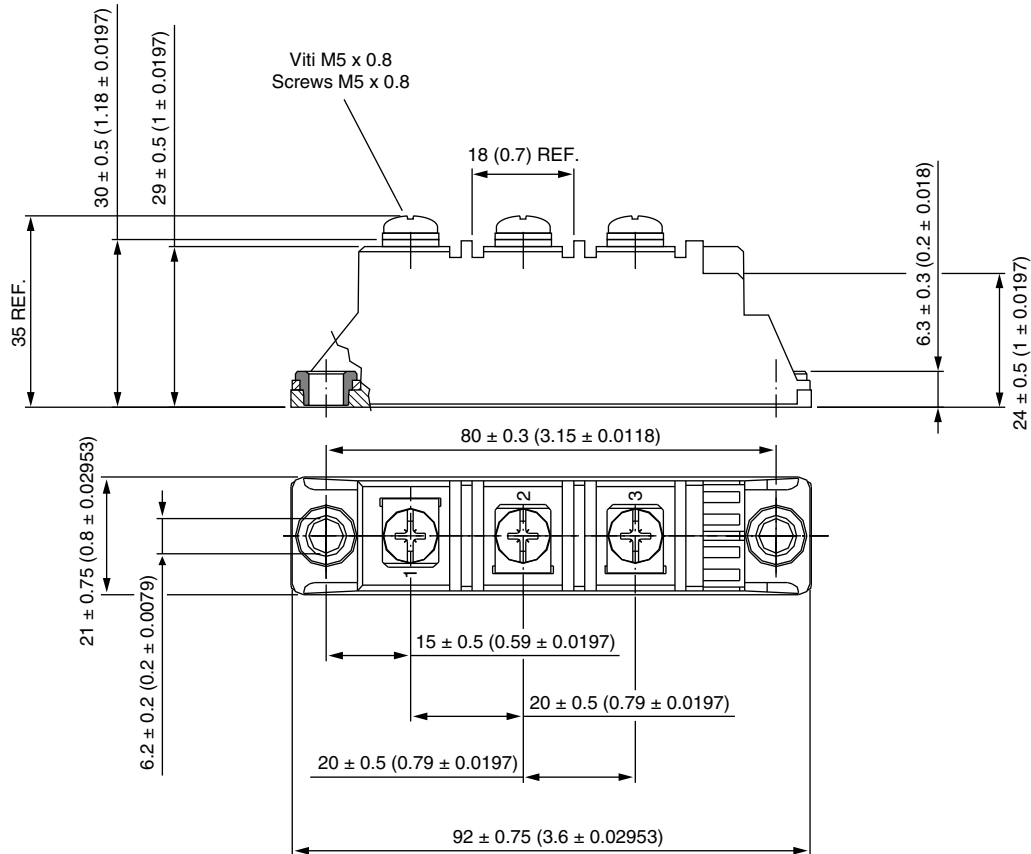
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| CIRCUIT CONFIGURATION | | |
|----------------------------|----------------------------|-----------------------|
| CIRCUIT DESCRIPTION | CIRCUIT CONFIGURATION CODE | CIRCUIT DRAWING |
| Two diodes doubler circuit | D | <p>VSKD...</p> |
| Two diodes common cathodes | C | <p>VSKC...</p> |
| Two diodes common anodes | J | <p>VSKJ...</p> |
| Single diode | E | <p>VSKE...</p> |

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|--|
| Dimensions | www.vishay.com/doc?95015 |

ADD-A-PAK Diode

DIMENSIONS in millimeters (inches)





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