# Schottky Rectifier, 300 A

ADD-A-PAK

## FEATURES

- 175 °C $T_J$ operation
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- UL pending
- Totally lead (Pb)-free, RoHS compliant
- Designed and qualified for industrial level

Pb-free
RoHS COMPLIANT

| PRODUCT SUMMARY | |
|---|---|
| $I_{F(AV)}$ | 300 A |

## 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 improved thermal spread.
The Generation 5 of ADD-A-PAK module is manufactured without hard mold, eliminating in this way 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.

## DESCRIPTION

The VSKCS303 .. Schottky rectifier common cathode has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature.
Typical applications are in high current switching power supplies, plating power supplies, UPS systems, converters, freewheeling diodes, welding, and reverse battery protection.

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|---|---|---|---|
| SYMBOL | CHARACTERISTICS V | ALUES | UNITS |
| $I_{F(AV)}$ | Rectangular waveform | 300 | A |
| $V_{RRM}$ | | 100 | V |
| $I_{FSM}$ | $t_p$ = 5 µs sine | 22 000 | A |
| $V_F$ | 150 Apk, $T_J$ = 125 °C | 1.0 | V |
| $T_J$ | Range | - 55 to 175 | °C |

| VOLTAGE RATINGS | | | |
|---|---|---|---|
| PARAMETER SY | MBOL | VSKCS303/100P | UNITS |
| Maximum DC reverse voltage | $V_R$ | 100 | V |
| Maximum working peak reverse voltage | $V_{RWM}$ | | |

## ABSOLUTE MAXIMUM RATINGS

| PARAMETER SYMBO | | L | TEST CONDITIONS | | VALUES | UNITS |
|---|---|---|---|---|---|---|
| Maximum average forward current | per module | $I_{F(AV)}$ | 50 % duty cycle at $T_C$ = 96 °C, rectangular waveform | | 300 | A |
| | per leg | | | | 150 | |
| Maximum peak one cycle non-repetitive surge current | | $I_{FSM}$ | 5 µs sine or 3 µs rect. pulse | Following any rated load condition and with rated $V_{RRM}$ applied | 22 000 | |
| | | | 10 ms sine or 6 ms rect. pulse | | 2500 | |
| Non-repetitive avalanche energy | | $E_{AS}$ | $T_J$ = 25 °C, $I_{AS}$ = 5.5 Amps, L = 1 mH | | 15 | mJ |
| Repetitive avalanche current | | $I_{AR}$ | Current decaying linearly to zero in 1 µs<br>Frequency limited by $T_J$ maximum $V_A$ = 1.5 x $V_R$ typical | | 1A | |

## ELECTRICAL SPECIFICATIONS

| PARAMETER SYMBOL | | TEST CONDITIONS | | VALUES | UNITS |
|---|---|---|---|---|---|
| Maximum forward voltage drop | $V_{FM}$ (1) | 150 A | $T_J$ = 25 °C | 0.95 | V |
| | | 300 A | | 1.28 | |
| | | 150 A | $T_J$ = 125 °C | 1.0 | |
| | | 300 A | | 1.06 | |
| Maximum reverse leakage current | $I_{RM}$ (1) | $T_J$ = 25 °C | $V_R$ = Rated $V_R$ | 4.5 | mA |
| | | $T_J$ = 125 °C | | 60 | |
| Maximum junction capacitance | $C_T$ | $V_R$ = 5 $V_{DC}$ (test signal range 100 kHz to 1 MHz) 25 °C | | 4150 | pF |
| Typical series inductance | $L_S$ | From top of terminal hole to mounting plane | | 7.0 | nH |
| Maximum voltage rate of change | dV/dt | Rated $V_R$ | | 10 000 | V/µs |
| RMS insulation voltage | $V_{INS}$ | 50 Hz, circuit to base, all terminals shorted (1 s) | | 3500 | V |

**Note**

(1) Pulse width < 500 µs

## THERMAL - MECHANICAL SPECIFICATIONS

| PARAMETER SYMBOL | | | TEST CONDITIONS | VALUES | UNITS |
|---|---|---|---|---|---|
| Maximum junction and storage temperature range | | $T_J$, $T_{Stg}$ | | - 55 to 175 | °C |
| Maximum thermal resistance, junction to case per leg | | $R_{thJC}$ D | C operation | 0.45 | °C/W |
| Maximum thermal resistance, case to heatsink | | $R_{thCS}$ | Mounting surface, smooth and greased | 0.1 | |
| Approximate weight | | | | 110 | g |
| | | | | 4o | z. |
| Mounting torque ± 10 % | to heatsink | | | 5 | Nm |
| | busbar | | | 4 | |
| Case style | | | JEDEC | TO-240AA | |

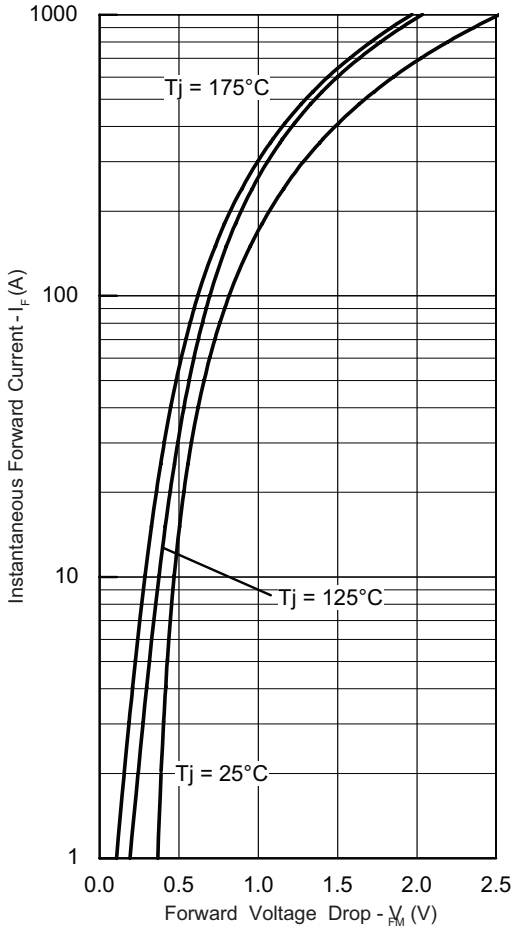



Fig. 1 - Maximum Forward Voltage Drop Characteristics

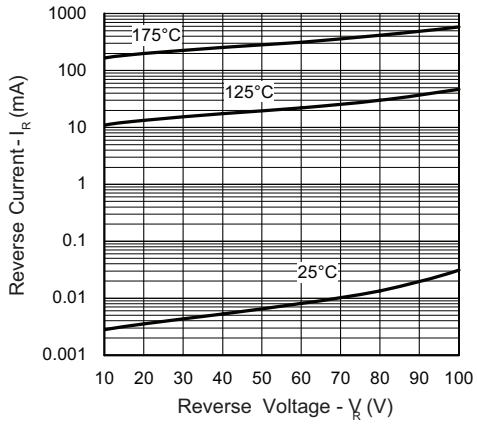



Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

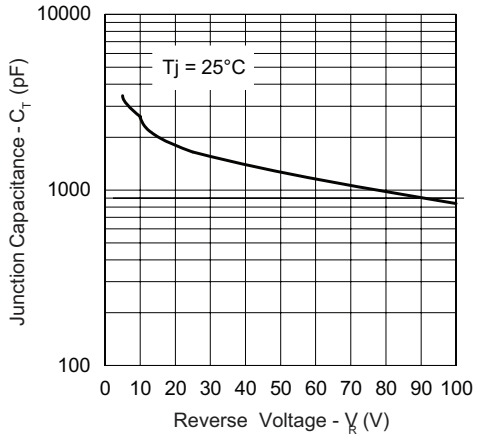



Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

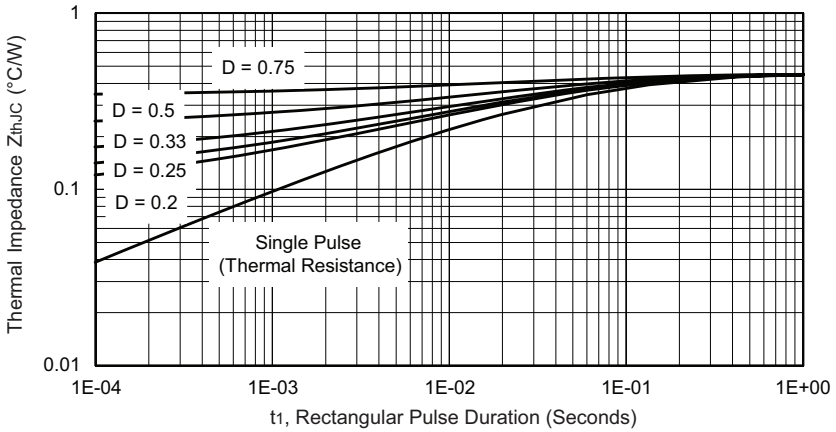



Fig. 4 - Maximum Thermal Impedance $Z_{thJC}$ Characteristics

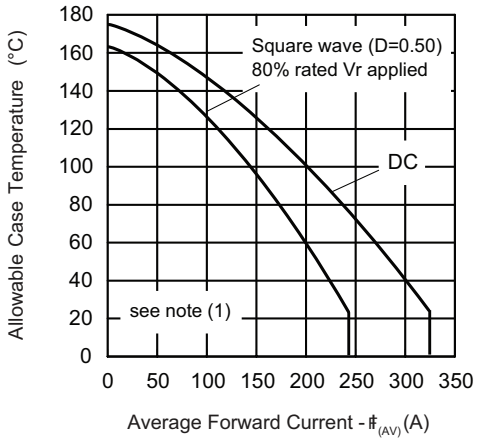



Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

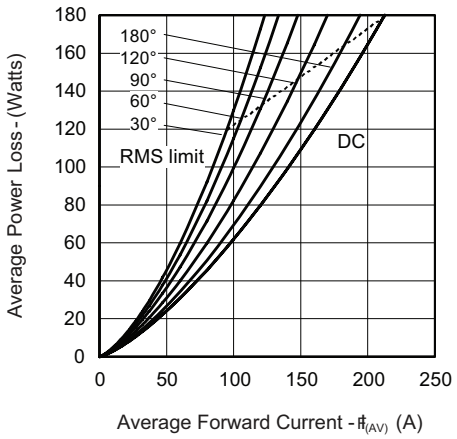



Fig. 6 - Forward Power Loss Characteristics

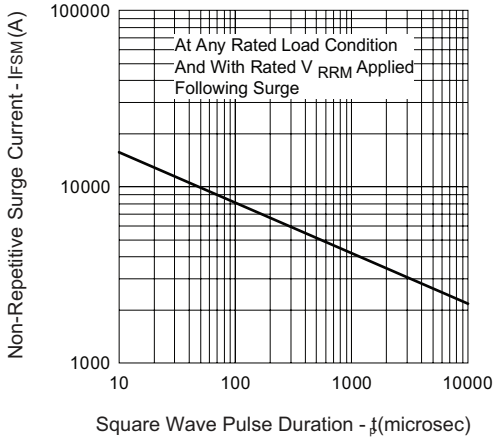



Fig. 7 - Maximum Non-Repetitive Surge Current

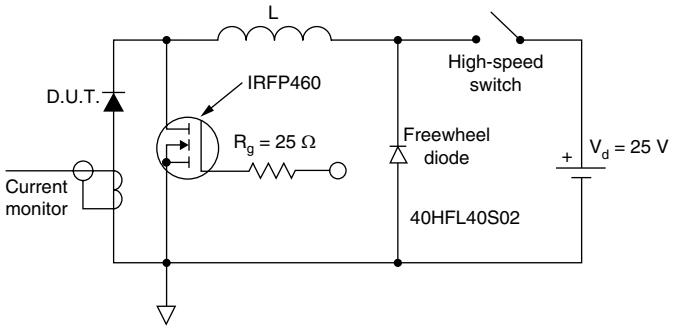



Fig. 8 - Unclamped Inductive Test Circuit

**Note**

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at ($I_{F(AV)}$/D) (see fig. 6);
$Pd_{REV}$ = Inverse power loss = $V_{R1} \times I_R$ (1 - D); $I_R$ at $V_{R1}$ = 80 % rated $V_R$

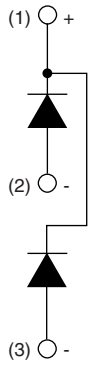
## ORDERING INFORMATION TABLE

**Device code**

| VS | KC | S | 30 | 3 | / | 100 | P |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | | 6 | 7 |

- 1 - Vishay HPP
- 2 - Circuit configuration:
  KC = ADD-A-PAK - 2 diodes/common cathode
- 3 - S = Schottky diode
- 4 - Average rating (x 10)
- 5 - Product silicon identification
- 6 - Voltage rating (100 = 100 V)
- 7 - Lead (Pb)-free

## CIRCUIT CONFIGURATION




| LINKS TO RELATED DOCUMENTS | |
|---|---|
| Dimensions | http://www.vishay.com/doc?95174 |

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