

ADD-A-PAK Generation VII Power Modules Thyristor/Diode and Thyristor/Thyristor, 95 A



ADD-A-PAK

FEATURES

- High voltage
- Industrial standard package
- UL pending
- 3500 V_{RMS} isolating voltage
- Low thermal resistance
- Totally lead (Pb)-free
- Designed and qualified for industrial level



RoHS
COMPLIANT

PRODUCT SUMMARY

| | |
|----------------------------|------|
| $I_{T(AV)}$ or $I_{F(AV)}$ | 95 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.

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

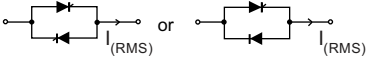
These modules are intended for general purpose high voltage applications such as high voltage regulated power supplies, lighting circuits, temperature and motor speed control circuits, UPS and battery charger.

MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
|----------------------------|-----------------|-------------|--------------------|
| $I_{T(AV)}$ or $I_{F(AV)}$ | 85 °C | 95 | A |
| $I_{O(RMS)}$ | As AC switch | 210 | |
| I_{TSM} , I_{FSM} | 50 Hz | 2000 | |
| | 60 Hz | 2094 | |
| I^2t | 50 Hz | 20 | kA ² s |
| | 60 Hz | 18.26 | |
| $I^2\sqrt{t}$ | | 200 | kA ² √s |
| V_{RRM} | Range | 400 to 1600 | V |
| T_{Stg} | | - 40 to 125 | °C |
| T_J | | | |

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 | V _{DRM} , MAXIMUM REPETITIVE PEAK OFF-STATE VOLTAGE, GATE OPEN CIRCUIT V | I _{RRM} , I _{DRM} AT 125 °C mA |
| VSK.91 | 04 | 400 | 500 | 400 | 15 |
| | 06 | 600 | 700 | 600 | |
| | 08 | 800 | 900 | 800 | |
| | 10 | 1000 | 1100 | 1000 | |
| | 12 | 1200 | 1300 | 1200 | |
| | 14 | 1400 | 1500 | 1400 | |
| | 16 | 1600 | 1700 | 1600 | |

| ON-STATE CONDUCTION | | | | | | |
|--|--|--|---|---|--------------------|------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS | |
| Maximum average on-state current (thyristors) | I _{T(AV)} | 180° conduction, half sine wave, T _C = 85 °C | | 95 | A | |
| Maximum average forward current (diodes) | I _{F(AV)} | | | | | |
| Maximum continuous RMS on-state current, as AC switch | I _{O(RMS)} |  | | 210 | | |
| Maximum peak, one-cycle non-repetitive on-state or forward current | I _{TSM} or I _{FSM} | t = 10 ms | No voltage reapplied | Sinusoidal half wave, initial T _J = T _J maximum | | 2000 |
| | | t = 8.3 ms | | | | 2094 |
| | | t = 10 ms | 100 % V _{RRM} reapplied | | | 1682 |
| | | t = 8.3 ms | | | 1760 | |
| Maximum I ² t for fusing | I ² t | t = 10 ms | No voltage reapplied | Initial T _J = T _J maximum | 20 | |
| | | t = 8.3 ms | | | 18.26 | |
| | | t = 10 ms | 100 % V _{RRM} reapplied | | 14.14 | |
| | | t = 8.3 ms | | | 12.91 | |
| Maximum I ² √t for fusing | I ² √t (1) | t = 0.1 ms to 10 ms, no voltage reapplied T _J = T _J maximum | | 200 | kA ² √s | |
| Maximum value or threshold voltage | V _{T(TO)} (2) | Low level (3) | T _J = T _J maximum | 0.97 | V | |
| | | High level (4) | | 1.1 | | |
| Maximum value of on-state slope resistance | r _t (2) | Low level (3) | T _J = T _J maximum | 2.76 | mΩ | |
| | | High level (4) | | 2.38 | | |
| Maximum peak on-state or forward voltage | V _{TM} | I _{TM} = π × I _{T(AV)} | T _J = 25 °C | 1.73 | V | |
| | V _{FM} | I _{FM} = π × I _{F(AV)} | | | | |
| Maximum non-repetitive rate of rise of turned on current | di/dt | T _J = 25 °C, from 0.67 V _{DRM} , I _{TM} = π × I _{T(AV)} , I _g = 500 mA, t _r < 0.5 μs, t _p > 6 μs | | 150 | A/μs | |
| Maximum holding current | I _H | T _J = 25 °C, anode supply = 6 V, resistive load, gate open circuit | | 250 | mA | |
| Maximum latching current | I _L | T _J = 25 °C, anode supply = 6 V, resistive load | | 400 | | |

Notes

- (1) I²t for time t_x = I²√t × √t_x
- (2) Average power = V_{T(TO)} × I_{T(AV)} + r_t × (I_{T(RMS)})²
- (3) 16.7 % × π × I_{AV} < I < π × I_{AV}
- (4) I > π × I_{AV}



| TRIGGERING | | | | | |
|--|-------------|---|-----------------------------------|--------|-------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum peak gate power | P_{GM} | | | 12 | W |
| Maximum average gate power | $P_{G(AV)}$ | | | 3.0 | |
| Maximum peak gate current | I_{GM} | | | 3.0 | A |
| Maximum peak negative gate voltage | $-V_{GM}$ | | | 10 | V |
| Maximum gate voltage required to trigger | V_{GT} | $T_J = -40\text{ }^\circ\text{C}$ | Anode supply = 6 V resistive load | 4.0 | |
| | | $T_J = 25\text{ }^\circ\text{C}$ | | 2.5 | |
| | | $T_J = 125\text{ }^\circ\text{C}$ | | 1.7 | |
| Maximum gate current required to trigger | I_{GT} | $T_J = -40\text{ }^\circ\text{C}$ | Anode supply = 6 V resistive load | 270 | mA |
| | | $T_J = 25\text{ }^\circ\text{C}$ | | 150 | |
| | | $T_J = 125\text{ }^\circ\text{C}$ | | 80 | |
| Maximum gate voltage that will not trigger | V_{GD} | $T_J = 125\text{ }^\circ\text{C}$, rated V_{DRM} applied | | 0.25 | V |
| Maximum gate current that will not trigger | I_{GD} | $T_J = 125\text{ }^\circ\text{C}$, rated V_{DRM} applied | | 6 | mA |

| BLOCKING | | | | | |
|---|--------------------------|--|--|--------|------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum peak reverse and off-state leakage current at V_{RRM} , V_{DRM} | I_{RRM} , I_{DRM} | $T_J = 125\text{ }^\circ\text{C}$, gate open circuit | | 15 | mA |
| RMS insulation voltage | V_{INS} | 50 Hz, 1 s | | 3500 | V |
| Maximum critical rate of rise of off-state voltage | dV/dt | $T_J = 125\text{ }^\circ\text{C}$, linear to $0.67 V_{DRM}$ | | 1000 | V/ μ s |

| THERMAL AND MECHANICAL SPECIFICATIONS | | | | | |
|---|-------------------|--|-------|---------------------|--------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Junction operating and storage temperature range | T_J , T_{Stg} | | | - 40 to 125 | $^\circ\text{C}$ |
| Maximum internal thermal resistance, junction to case per leg | R_{thJC} | DC operation | | 0.22 | $^\circ\text{C/W}$ |
| Typical thermal resistance, case to heatsink per module | R_{thCS} | Mounting surface flat, smooth and greased | | 0.1 | |
| Mounting torque $\pm 10\%$ | to heatsink | 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. | | 4 | Nm |
| | busbar | | | 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.. | 0.04 | 0.048 | 0.063 | 0.085 | 0.125 | 0.033 | 0.052 | 0.067 | 0.088 | 0.127 | $^\circ\text{C/W}$ |

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 - On-State Power Loss Characteristics



Fig. 6 - Maximum Non-Repetitive Surge Current

ADD-A-PAK Generation VII Power Modules Vishay High Power Products Thyristor/Diode and Thyristor/Thyristor, 95 A



Fig. 7 - On-State Power Loss Characteristics



Fig. 8 - On-State Power Loss Characteristics



Fig. 9 - On-State Power Loss Characteristics



Fig. 10 - On-State Voltage Drop Characteristics



Fig. 11 - Thermal Impedance Z_{thJC} Characteristics



Fig. 12 - Gate Characteristics



ORDERING INFORMATION TABLE



- 1** - Module type
- 2** - Circuit configuration (see end of datasheet)
- 3** - Current code (95 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 | http://www.vishay.com/doc?95368 |



Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)
Email: org@lifeelectronics.ru