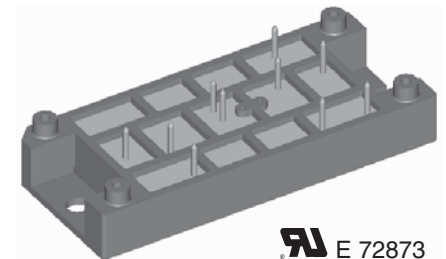
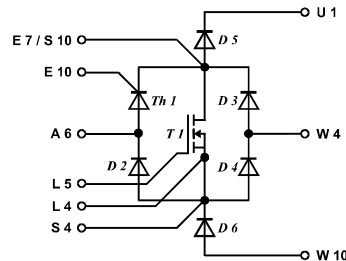


Rectifier Module for Three Phase Power Factor Correction

$V_{DSS} = 500\text{ V}$
 $I_{D25} = 130\text{ A}$
 $R_{DS(on)} = 36\text{ m}\Omega$

Preliminary data

| V_{RRM} (FAST Diode) V | $V_{RRM, DRM}$ (Diode, Thyr.) V | V_{DSS} (MOSFET) V | Type |
|--------------------------------|---------------------------------------|----------------------------|------------|
| 600 | 500 | 500 | VUM 85-05A |



| Symbol | Conditions | Maximum Ratings | |
|--|---|-----------------|--------------------|
| MOSFET T 1 | | | |
| V_{DSS} | $T_{VJ} = 25^{\circ}\text{C}$ to 150°C | 500 | V |
| V_{DGR} | $T_{VJ} = 25^{\circ}\text{C}$ to 150°C ; $R_G = 1\text{ M}\Omega$ | 500 | V |
| V_{GSM} | Transient | ± 30 | V |
| V_{GS} | Continuous | ± 20 | V |
| I_D | $T_C = 100^{\circ}\text{C}$, $T_{VJ} = 125^{\circ}\text{C}$ | 60 | A |
| I_{D25} | $T_C = 25^{\circ}\text{C}$, $T_{VJ} = 150^{\circ}\text{C}$ | 130 | A |
| I_{DM} | $T_C = 25^{\circ}\text{C}$, $T_{VJ} = 150^{\circ}\text{C}$ | 520 | A |
| E_{AR} | $T_C = 25^{\circ}\text{C}$ | 60 | mJ |
| P_{tot} | $T_C = 25^{\circ}\text{C}$ | 1380 | W |
| Single Phase Bridge Th1, D2, D3, D4 | | | |
| V_{RRM}, V_{DRM} | | 500 | V |
| I_{DAV} | $T_{VJ} = 150^{\circ}\text{C}$, $T_C = 100^{\circ}\text{C}$ | 47 | A |
| I_{FSM}, I_{TSM} | $T_{VJ} = 45^{\circ}\text{C}$, $t = 10\text{ ms}$ (50 Hz) | 320 | A |
| | $t = 8.3\text{ ms}$ (60 Hz) | 340 | A |
| | $T_{VJ} = 150^{\circ}\text{C}$, $t = 10\text{ ms}$ (50 Hz) | 280 | A |
| | $t = 8.3\text{ ms}$ (60 Hz) | 300 | A |
| P_{tot} | $T_C = 25^{\circ}\text{C}$; per diode | 90 | W |
| Fast Diodes D5, D6 | | | |
| V_{RRM} | | 600 | V |
| I_{FAV} | $T_{VJ} = 150^{\circ}\text{C}$, $T_C = 100^{\circ}\text{C}$, rectangular $\delta = 0.5$ | 31 | A |
| I_{FSM} | $T_{VJ} = 45^{\circ}\text{C}$, $t = 10\text{ ms}$ (50 Hz) | 250 | A |
| P_{tot} | $T_C = 25^{\circ}\text{C}$ | 95 | W |
| Module | | | |
| T_{VJ} | | -40...+150 | $^{\circ}\text{C}$ |
| T_{JM} | | 150 | $^{\circ}\text{C}$ |
| T_{stg} | | -40...+125 | $^{\circ}\text{C}$ |
| V_{ISOL} | $I_{ISOL} \leq 1\text{ mA}$ | 50/60 Hz | 3600 V~ |
| M_d | Mounting torque (M5) | 2-2.5/18-22 | Nm/lb.in. |
| Weight | | 80 | g |

Features

- Package with DCB ceramic base plate
- Soldering connections for PCB mounting
- Isolation voltage 3600 V~
- Low $R_{DS(on)}$ HDMOS™ process
- Low package inductance for high speed switching
- Ultrafast diodes
- Kelvin source for easy drive
- UL recognized

Applications

- Three phase PFC by Kolar circuit
- Three phase input rectifier with power factor correction consisting of three modules VUM 85-05
- For power supplies, UPS, SMPS, drives, welding etc.

Advantages

- Reduced harmonic content of input currents corresponding to standards
- Rectifier generates maximum DC power with a given AC fuse
- Wide input voltage range
- No external isolation
- Easy to mount with two screws
- Suitable for wave soldering
- High temperature and power cycling capability

| Symbol | Conditions | Characteristic Values ($T_{VJ} = 25^{\circ}\text{C}$, unless otherwise specified) | | |
|--|--|--|--------------------------|------------------------|
| | | min. | typ. | max. |
| MOSFET T 1 | | | | |
| $V_{GS(th)}$ | $V_{DS} = \pm 20\text{ V}$, $I_D = 30\text{ mA}$ | 2 | 3 | 4 V |
| I_{GSS} | $V_{GS} = \pm 20\text{ V}$, $V_{DS} = 0\text{ V}$ | | | $\pm 1.5\ \mu\text{A}$ |
| I_{DSS} | $V_{DS} = V_{DSS}$, $V_{GS} = 0\text{ V}$ $V_{DS} = 0,8 \cdot V_{DSS}$, $V_{GS} = 0\text{ V}$, $T_{VJ} = 125^{\circ}\text{C}$ | | 0.5 | 1.4 mA |
| | | | 1 | 7 mA |
| $R_{DS(on)}$ | $I_D = \frac{1}{2} I_{D25}$, $V_{GS} = 10\text{ V}$, pulse test $t \leq 300\ \mu\text{s}$, $d \leq 2\%$ | | | 36 m Ω |
| g_{fs} | $V_{DS} = 10\text{ V}$, $I_D = \frac{1}{2} I_{D25}$, $t = < 300\ \mu\text{s}$ | 75 | 145 | S |
| $t_{d(on)}$ | $V_{DS} = \frac{1}{2} V_{DSS}$, $I_D = \frac{1}{2} I_{D25}$, $V_{GS} = 15\text{ V}$ $R_G = 1\ \Omega$, $L = 100\ \mu\text{H}$, $T_{VJ} = 125^{\circ}\text{C}$ | | 16 | 25 ns |
| t_r | | | 33 | 45 ns |
| $t_{d(off)}$ | | | 65 | 80 ns |
| t_f | | | 30 | 40 ns |
| C_{iss} | $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$, $V_{GS} = 0\text{ V}$ | | 30 | nF |
| C_{oss} | | | 3 | nF |
| C_{rss} | | | 1 | nF |
| Q_g | $V_{DS} = \frac{1}{2} V_{DSS}$, $I_D = \frac{1}{2} I_{D25}$, $V_{GS} = 15\text{ V}$ | | 945 | 1120 nC |
| Q_{gs} | | | 195 | 280 nC |
| Q_g | | | 435 | 595 nC |
| R_{thJC} | | | 0.05 | 0.09 K/W |
| R_{thCH} | | | | K/W |
| Single Phase Bridge Th1, D2, D3, D4 | | | | |
| V_F, V_T | $I_F, I_T = 45\text{ A}$, $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$ | | | 1.50 V 1.55 V |
| I_{RRM}, I_{DRM} | $V_D, V_R = V_{DRM}, V_{RRM}$, $T_{VJ} = 25^{\circ}\text{C}$ $V_D, V_R = 0,8 \cdot V_{DRM}, V_{RRM}$, $T_{VJ} = 125^{\circ}\text{C}$ | | 0.5 | 1.4 mA |
| | | | 1 | 7 mA |
| V_{T0} | For power-loss calculations only | | | 0.85 V |
| r_T | $T_{VJ} = 150^{\circ}\text{C}$ | | | 14 m Ω |
| V_{GT} | $V_D = 6\text{ V}$ | | | 1.5 V |
| I_{GT} | | | | 100 mA |
| V_{GD} | $V_D = \frac{2}{3} V_{DRM}$, $T_{VJ} = 150^{\circ}\text{C}$ | | | 0.2 V |
| I_{GD} | | | | 5 mA |
| V_{RGM} | | | | 10 V |
| I_H | $V_D = 6\text{ V}$, $R_{GK} = \infty$ | | | 200 mA |
| I_L | $I_G = 0.45\text{ A}$, $di_G/dt = 0.45\text{ A}/\mu\text{s}$, $t_p = 10\ \mu\text{s}$ | | | 450 mA |
| $(di/dt)_{cr}$ | $I_G = 0.45\text{ A}$, $di_G/dt = 0.45\text{ A}/\mu\text{s}$, $t_p = 200\ \mu\text{s}$, $f = 50\text{ Hz}$ $V_D = \frac{2}{3} V_{DRM}$, $T_{VJ} = 150^{\circ}\text{C}$, $I_T = 45\text{ A}$, repetitive | | | 150 A/ μs |
| | $I_G = 0.45\text{ A}$, $di_G/dt = 0.45\text{ A}/\mu\text{s}$, $t_p = 200\ \mu\text{s}$, $f = 50\text{ Hz}$ $V_D = \frac{2}{3} V_{DRM}$, $T_{VJ} = 150^{\circ}\text{C}$, $I_T = I_{DAV}$, non-repetitive | | | 500 A/ μs |
| t_{gd} | $I_G = 0.45\text{ A}$, $di_G/dt = 0.45\text{ A}/\mu\text{s}$, $V_D = \frac{1}{2} V_{DRM}$ | | | 2 μs |
| t_q | $I_T = 20\text{ A}$, $di/dt = -10\text{ A}/\mu\text{s}$, $V_R = 100\text{ V}$, $V_D = \frac{2}{3} V_{DRM}$ $t_p = 200\ \mu\text{s}$, $dv/dt = 15\text{ V}/\mu\text{s}$, $T_{VJ} = 150^{\circ}\text{C}$ | 150 | | μs |
| P_{GM} | $I_T = I_{d(AV)}$, $T_{VJ} = 150^{\circ}\text{C}$ | | $t_p = 30\ \mu\text{s}$ | 10 W |
| | | | $t_p = 300\ \mu\text{s}$ | 5 W |
| P_{GAVM} | | | | 0,5 W |
| R_{thJC} | DC per diode / thyristor | | | 1.3 K/W |
| R_{thCH} | DC per diode / thyristor | 0.4 | | K/W |

| Symbol | Conditions | Characteristic Values | | |
|-----------------------------|--|--|------|------------------|
| | | (T _{VJ} = 25°C, unless otherwise specified) | | |
| | | min. | typ. | max. |
| Fast Diodes D 5, D 6 | | | | |
| V _F | I _F = 30 A; T _{VJ} = 25°C T _{VJ} = 125°C | | | 2.70 V 1.85 V |
| I _R | V _R = 600 V, T _{VJ} = 25°C T _{VJ} = 125°C | | | 0.5 mA 1 mA |
| V _{T0} | For power-loss calculations only | | | 1.23 V |
| r _T | T _{VJ} = 150°C | | | 9.8 mΩ |
| I _{RM} | I _F = 50 A; di/dt = 100 A/μs V _R = 100 V, T _{VJ} = 100°C | | 3 | 3.5 A |
| t _{rr} | I _F = 1 A, V _R = 30 V, di/dt = 200 A/μs | | 25 | 30 ns |
| R _{thJC} | DC per diode | | | 1.3 K/W |
| R _{thCH} | DC per diode | | 0.4 | K/W |

Dimensions in mm (1 mm = 0.0394")

