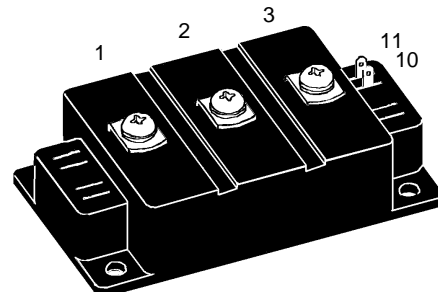
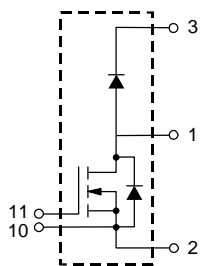


Dual Power HiPerFET™ Module with Schottky Diode

N-Channel Enhancement Mode

VMD 600-007S

$V_{DSS} = 70 \text{ V}$
 $I_{D25} = 620 \text{ A}$
 $R_{DS(on) \text{ typ.}} = 1.6 \text{ m}\Omega$



| Symbol | Conditions | Maximum Ratings | |
|------------|--|----------------------------------|------------------------|
| V_{DSS} | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$ | 70 | V |
| V_{DGR} | $T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GS} = 10 \text{ k}\Omega$ | 70 | V |
| V_{GS} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ ① | 620 | A |
| I_{D80} | $T_C = 80^\circ\text{C}$ ① | 460 | A |
| I_{DM} | $T_C = 25^\circ\text{C}; t_p = 10 \mu\text{s}$ ① | 2480 | A |
| P_D | $T_C = 25^\circ\text{C}$ | 1350 | W |
| T_J | | -40 ... +150 | $^\circ\text{C}$ |
| T_{JM} | | 150 | $^\circ\text{C}$ |
| T_{stg} | | -40 ... +125 | $^\circ\text{C}$ |
| V_{ISOL} | 50/60 Hz $t = 1 \text{ min}$ $I_{ISOL} \leq 1 \text{ mA}$ $t = 1 \text{ s}$ | 3000 3600 | V~ |
| M_d | Mounting torque (M6) Terminal connection torque (M5) | 2.25-2.75/20-25 2.5-3.7/22-33 | Nm/lb.in. Nm/lb.in. |
| Weight | typical including screws | 250 | g |

| Symbol | Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|------|----------------------|
| | | min. | typ. | max. |
| V_{DSS} | $V_{GS} = 0 \text{ V}, I_D = 10 \text{ mA}$ | 70 | | V |
| $V_{GS(th)}$ | $I_D = 30 \text{ mA}$ | 2 | | 4 V |
| I_{GSS} | $V_{GS} = \pm 20 \text{ V DC}, V_{DS} = 0$ | | | $\pm 500 \text{ nA}$ |
| I_{DSS} | $V_{DS} = 0.8 \cdot V_{DSS}$ $V_{GS} = 0 \text{ V}$ | | | 1 mA 4 mA |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}, I_D = 0.5 \cdot I_{D25}$ Pulse test, $t \leq 300 \mu\text{s}$, duty cycle $d \leq 2 \%$ | | 1.6 | 2.1 m Ω |

① Additional current limitation by external leads

Features

- International standard package
- Direct Copper Bonded Al_2O_3 ceramic base plate
- Low $R_{DS(on)}$ HDMOS™ process
- Low package inductance for high speed switching
- Kelvin Source contact for easy drive

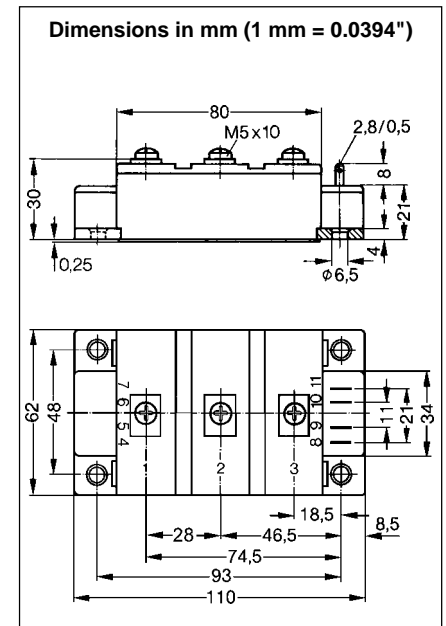
Applications

- Motor speed control for electric vehicles
- DC servo and robot drives
- Switched-mode and resonant-mode power supplies
- DC choppers

Advantages

- Easy to mount
- Space and weight savings
- High power density
- Low losses

| Symbol | Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|--|---|------|----------|
| | | min. | typ. | max. |
| g_{fs} | $V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$ pulsed | | 300 | S |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 35 | nF |
| C_{oss} | | | 15 | nF |
| C_{rss} | | | 10 | nF |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 1\ \Omega$ | | 150 | ns |
| t_r | | | 300 | ns |
| $t_{d(off)}$ | | | 500 | ns |
| t_f | | | 200 | ns |
| Q_g | $V_{GS} = 10\text{ V}, V_{DS} = 35\text{ V}, I_D = 300\text{ A}$ | | 1900 | nC |
| Q_{gs} | | | 240 | nC |
| Q_{gd} | | | 950 | nC |
| R_{thJC} | with heat transfer paste | | | 0.09 K/W |
| R_{thJS} | | | 0.13 | K/W |



| Source-Drain Diode | | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------------|---|---|------|--------|
| Symbol | Conditions | min. | typ. | max. |
| I_S | $V_{GS} = 0\text{ V}, T_C = 25^\circ\text{C}, T_J = T_{JM}$ ② | | | 620 A |
| I_{SM} | ② | | | 2480 A |
| V_{SD} | $I_F = 600\text{ A}, V_{GS} = 0\text{ V},$ Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$ | | 1.2 | 1.4 V |
| t_{rr} | $I_F = 600\text{ A}, -di/dt = 700\text{ A}/\mu\text{s}, V_{DS} = 25\text{ V}$ | | 300 | ns |

| Free-Wheeling Diode | | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|---------------------|---|---|------|---------------|
| Symbol | Conditions | min. | typ. | max. |
| I_{F25} | $V_{GS} = 0\text{ V}, T_C = 25^\circ\text{C}, T_J = T_{JM}$ ② | | | 650 A |
| I_{F80} | ② | | | 500 A |
| V_F | $I_F = 300\text{ A}, V_{GS} = 0\text{ V},$ Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$ | | | 0.9 V |
| I_R | $V_R = 0.8 \cdot V_{DSS}, T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ | | | 3 mA 60 mA |
| R_{thJC} | with heat transfer paste | | | 0.19 K/W |
| R_{thJS} | | | 0.28 | K/W |

② Additional current limitation by external leads