

## Excellent Integrated System Limited

Stocking Distributor

Click to view price, real time Inventory, Delivery & Lifecycle Information:

[IXYS Corporation](#)

[VMO1600-02P](#)

For any questions, you can email us directly:

[sales@integrated-circuit.com](mailto:sales@integrated-circuit.com)

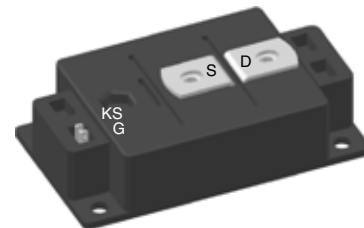
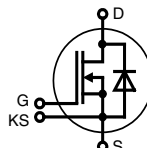


**VMO 1600-02P**

## PolarHT™ Module

N-Channel Enhancement Mode

$$\begin{aligned} V_{DSS} &= 200 \text{ V} \\ I_{D80} &= 1600 \text{ A} \\ R_{DS(on)} &= 1.7 \text{ m}\Omega \text{ max.} \end{aligned}$$



| MOSFET                                                       |                                                                                                                                                  |                       |              |            |                                      |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------|------------|--------------------------------------|
| Symbol                                                       | Conditions                                                                                                                                       | Maximum Ratings       |              |            |                                      |
| $V_{DSS}$                                                    | $T_{VJ} = 25^{\circ}\text{C}$ to $150^{\circ}\text{C}$                                                                                           | 200                   |              |            | V                                    |
| $V_{GS}$                                                     |                                                                                                                                                  | $\pm 20$              |              |            | V                                    |
| $I_{D25}$                                                    | $T_C = 25^{\circ}\text{C}$                                                                                                                       | 1900                  |              |            | A                                    |
| $I_{D80}$                                                    | $T_C = 80^{\circ}\text{C}$                                                                                                                       | 1600                  |              |            | A                                    |
| $I_{F25}$                                                    | $T_C = 25^{\circ}\text{C}$ (diode)                                                                                                               | 1900                  |              |            | A                                    |
| $I_{F80}$                                                    | $T_C = 80^{\circ}\text{C}$ (diode)                                                                                                               | 1600                  |              |            | A                                    |
| Symbol                                                       | Conditions                                                                                                                                       | Characteristic Values |              |            |                                      |
| $(T_{VJ} = 25^{\circ}\text{C}$ , unless otherwise specified) |                                                                                                                                                  |                       |              |            |                                      |
|                                                              |                                                                                                                                                  | min.                  | typ.         | max.       |                                      |
| $R_{DSon}$                                                   | $V_{GS} = 10\text{ V}$ ; $I_D = 1600\text{ A}$ ; $T_{VJ} = 25^{\circ}\text{C}$<br>$T_{VJ} = 125^{\circ}\text{C}$                                 |                       | 1.58<br>3.25 | 1.7<br>3.6 | $\text{m}\Omega$<br>$\text{m}\Omega$ |
| $V_{GS(th)}$                                                 | $V_{DS} = 20\text{ V}$ ; $I_D = 5\text{ mA}$                                                                                                     | 2.5                   |              | 5          | V                                    |
| $I_{DSS}$                                                    | $V_{DS} = V_{DSS}$ ; $V_{GS} = 0\text{ V}$ ; $T_{VJ} = 25^{\circ}\text{C}$<br>$T_{VJ} = 125^{\circ}\text{C}$                                     |                       |              | 0.5<br>5.0 | mA<br>mA                             |
| $I_{GSS}$                                                    | $V_{GS} = \pm 20\text{ V}$ ; $V_{DS} = 0\text{ V}$                                                                                               |                       |              | 2          | $\mu\text{A}$                        |
| $Q_g$                                                        | $V_{GS} = 10\text{ V}$ ; $V_{DS} = 0.5 \cdot V_{DSS}$ ; $I_D = I_{D80}$                                                                          |                       | 2900         |            | nC                                   |
| $Q_{gs}$                                                     |                                                                                                                                                  |                       | 600          |            | nC                                   |
| $Q_{gd}$                                                     |                                                                                                                                                  |                       | 1600         |            | nC                                   |
| $t_{d(on)}$                                                  | inductive load<br>$V_{GS} = 10\text{ V}$ ; $V_{DS} = 100\text{ V}$<br>$I_D = 1600\text{ A}$ ; $R_G = 1.8\ \Omega$ $T_{VJ} = 25^{\circ}\text{C}$  |                       | 320          |            | ns                                   |
| $t_r$                                                        |                                                                                                                                                  |                       | 1220         |            | ns                                   |
| $t_{d(off)}$                                                 |                                                                                                                                                  |                       | 620          |            | ns                                   |
| $t_f$                                                        |                                                                                                                                                  |                       | 700          |            | ns                                   |
| $E_{on}$                                                     |                                                                                                                                                  |                       | 24           |            | mJ                                   |
| $E_{off}$                                                    |                                                                                                                                                  |                       | 152          |            | mJ                                   |
| $E_{rec}$                                                    |                                                                                                                                                  |                       | 3.7          |            | mJ                                   |
| $t_{d(on)}$                                                  | inductive load<br>$V_{GS} = 10\text{ V}$ ; $V_{DS} = 100\text{ V}$<br>$I_D = 1600\text{ A}$ ; $R_G = 1.8\ \Omega$ $T_{VJ} = 125^{\circ}\text{C}$ |                       | 340          |            | ns                                   |
| $t_r$                                                        |                                                                                                                                                  |                       | 1220         |            | ns                                   |
| $t_{d(off)}$                                                 |                                                                                                                                                  |                       | 740          |            | ns                                   |
| $t_f$                                                        |                                                                                                                                                  |                       | 580          |            | ns                                   |
| $E_{on}$                                                     |                                                                                                                                                  |                       | 28           |            | mJ                                   |
| $E_{off}$                                                    |                                                                                                                                                  |                       | 147          |            | mJ                                   |
| $E_{rec}$                                                    |                                                                                                                                                  |                       | 4.9          |            | mJ                                   |
| $R_{thJC}$                                                   |                                                                                                                                                  |                       |              | 0.03       | K/W                                  |
| $R_{thJH}$                                                   | with heat transfer paste                                                                                                                         |                       | 0.037        | 0.056      | K/W                                  |

### Features

- PolarHT™ technology
  - low  $R_{DS(on)}$
  - dv/dt ruggedness
  - fast intrinsic reverse diode
- Package
  - low inductive current path
  - screw connection to high current main terminals
  - use of non interchangeable connectors for auxiliary terminals possible
  - Kelvin source terminals for easy drive
  - isolated ceramic base plate

### Applications

- converters with high power density for
  - main & aux. AC drives of electric vehicles
  - DC drives
  - power supplies



**VMO 1600-02P**

**Source Drain Diode**

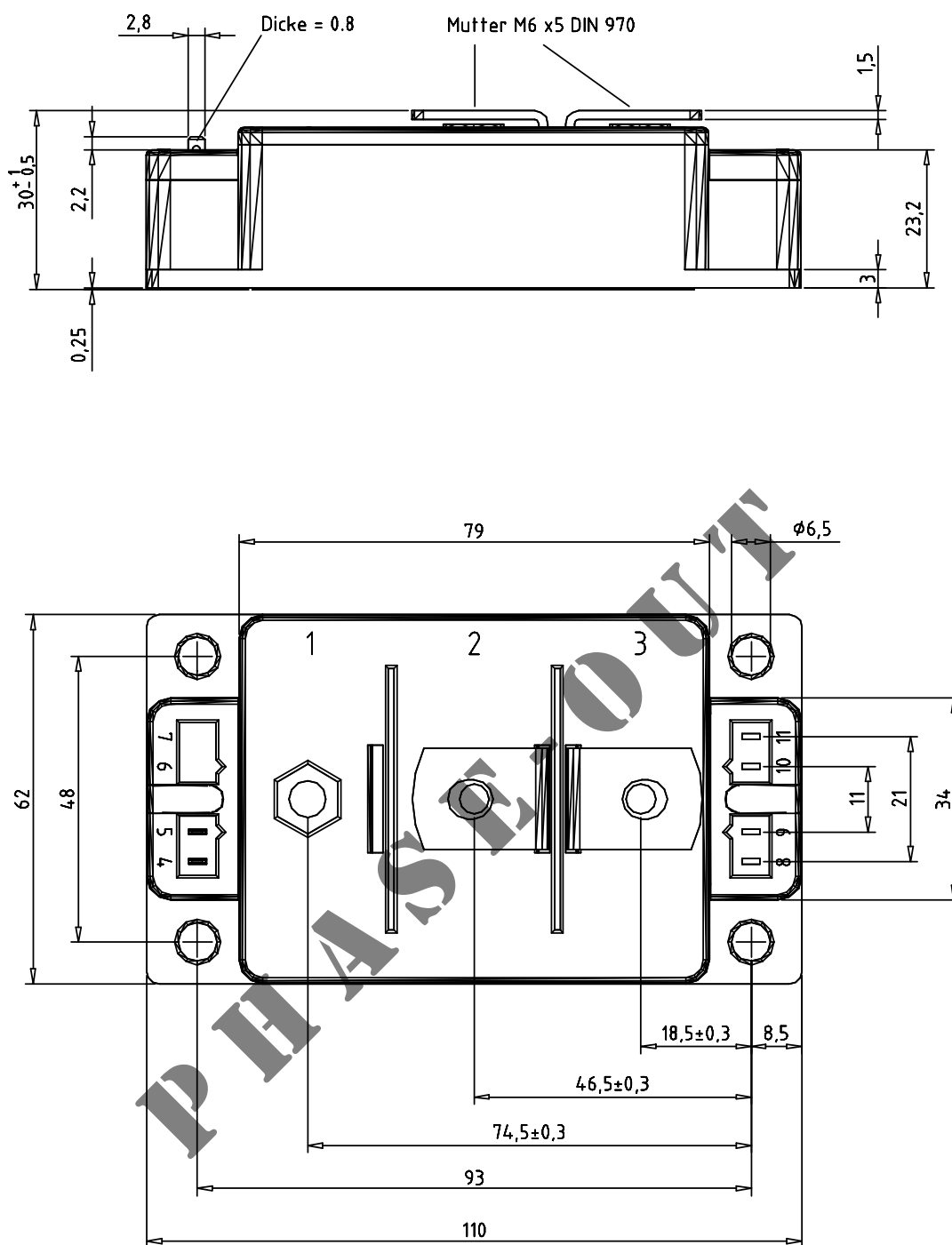
| Symbol                           | Conditions                                                                                                               | Characteristic Values |                  |      |                          |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------|------|--------------------------|
|                                  |                                                                                                                          | min.                  | typ.             | max. |                          |
| $V_{SD}$                         | $I_F = 1600 \text{ A}; V_{GS} = 0 \text{ V};$<br>$T_{VJ} = 25^\circ\text{C}$<br>$T_{VJ} = 125^\circ\text{C}$             |                       | 1.17<br>1.13     |      | V<br>V                   |
| $t_{rr}$<br>$Q_{rr}$<br>$I_{RM}$ | $V_{DS} = 100 \text{ V}; I_F = 1600 \text{ A}$<br>$dV_F/dt = 1300 \text{ A}/\mu\text{s}$<br>$T_{VJ} = 25^\circ\text{C}$  |                       | 340<br>40<br>210 |      | ns<br>$\mu\text{C}$<br>A |
| $t_{rr}$<br>$Q_{rr}$<br>$I_{RM}$ | $V_{DS} = 100 \text{ V}; I_F = 1600 \text{ A}$<br>$dV_F/dt = 1300 \text{ A}/\mu\text{s}$<br>$T_{VJ} = 125^\circ\text{C}$ |                       | 380<br>56<br>250 |      | ns<br>$\mu\text{C}$<br>A |

**Module**

| Symbol     | Conditions                                              | Maximum Ratings          |                  |
|------------|---------------------------------------------------------|--------------------------|------------------|
| $T_{VJ}$   |                                                         | -40...+150               | $^\circ\text{C}$ |
| $T_{stg}$  |                                                         | -40...+125               | $^\circ\text{C}$ |
| $V_{ISOL}$ | $I_{ISOL} \leq 1 \text{ mA}; 50/60 \text{ Hz}$          | 3600                     | V~               |
| $M_d$      | mounting torque (M6)<br>terminal connection torque (M6) | 2.25 - 2.75<br>4.5 - 5.5 | Nm<br>Nm         |

| Symbol | Conditions | Characteristic Values |      |      |
|--------|------------|-----------------------|------|------|
|        |            | min.                  | typ. | max. |
| Weight |            |                       | 250  | g    |

| Ordering | Part Name    | Marking on Product | Delivering Mode | Base Qty | Code Key |
|----------|--------------|--------------------|-----------------|----------|----------|
| Standard | VMO 1600-02P | VMO 1600-02P       | Box             | 2        | 504288   |



**Optional accessories for modules**

**Dimensions in mm (1 mm = 0.0394")**

keyed twin plugs  
(UL758, style 1385, CSA class 5851,  
guide 460-1-1)

- Type ZY180L with wire length 350 mm  
for pins 4 (Gate, yellow wire)  
and 5 (Kelvin Source, red wire)

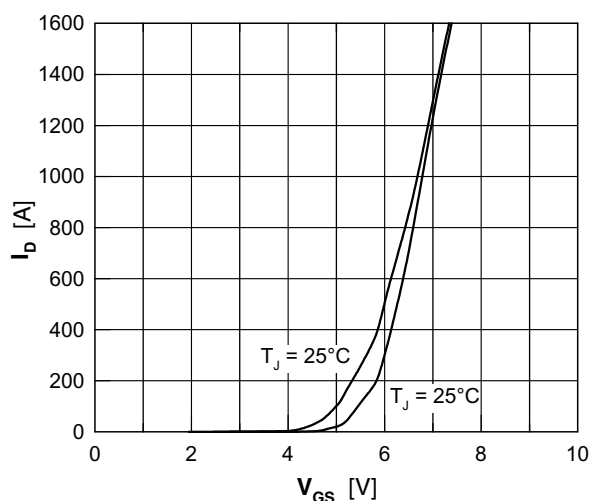


Fig. 1 Typical transfer characteristic

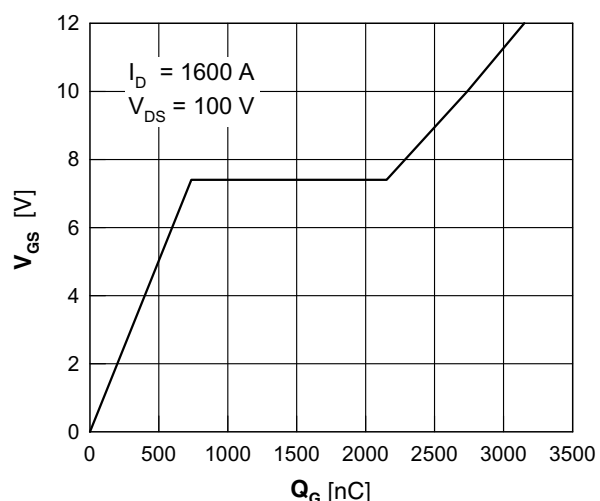


Fig. 2 Typical gate charge characteristic

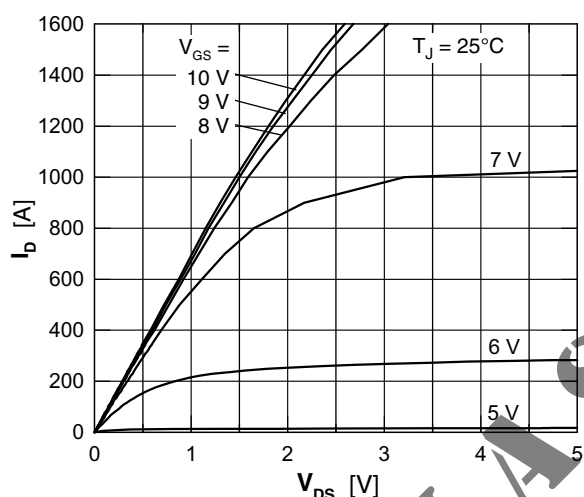


Fig. 3 Typical output characteristic

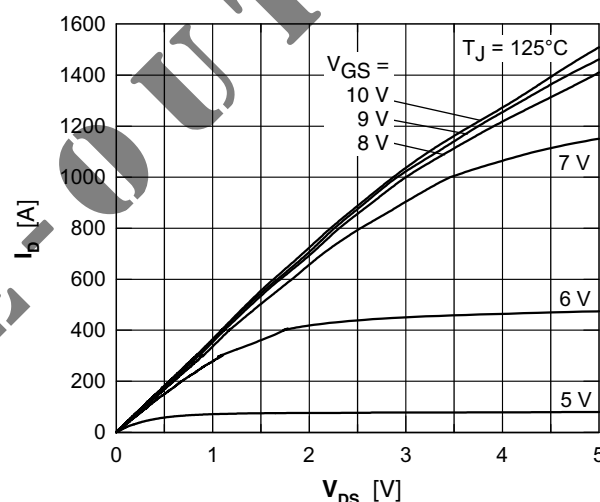


Fig. 4 Typical output characteristic

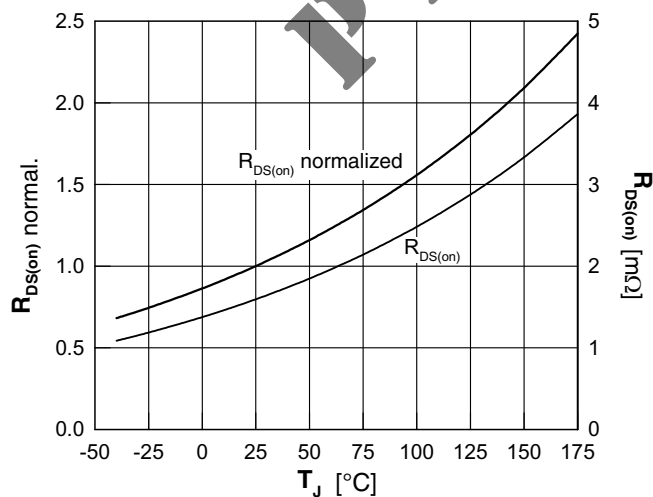


Fig. 5 Typ. drain source on-state resistance  $R_{DS(on)}$  versus junction temperature  $T_J$

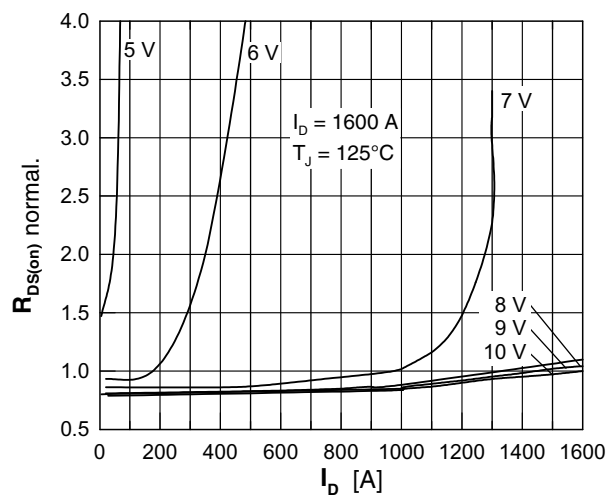


Fig. 6 Typ. drain source on-state resistance  $R_{DS(on)}$  versus  $I_D$

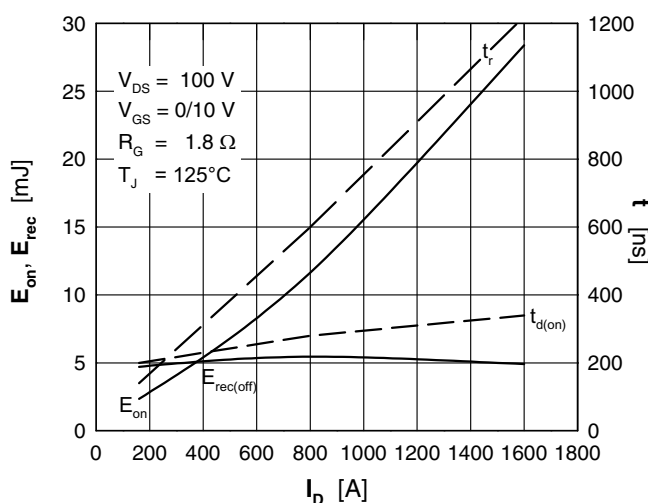


Fig. 7 Typ. turn-on energy & switching times vs. drain source current, inductive switching

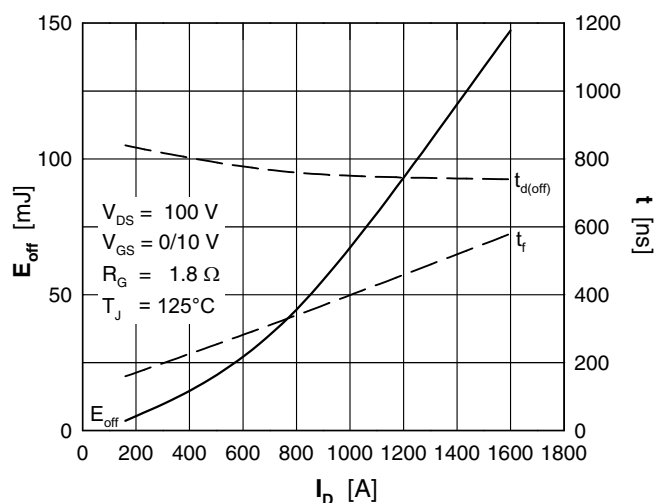


Fig. 8 Typ. turn-off energy & switching times vs. drain source current, inductive switching

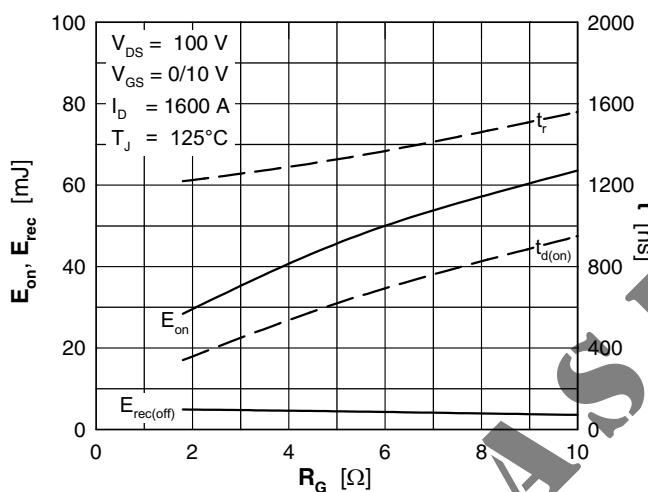


Fig. 9 Typ. turn-on energy & switching times vs. gate resistor, inductive switching

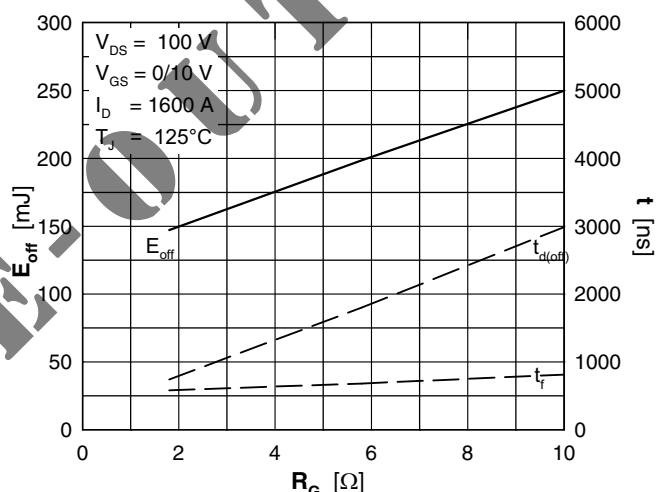


Fig. 10 Typ. turn-off energy & switching times vs. gate resistor, inductive switching

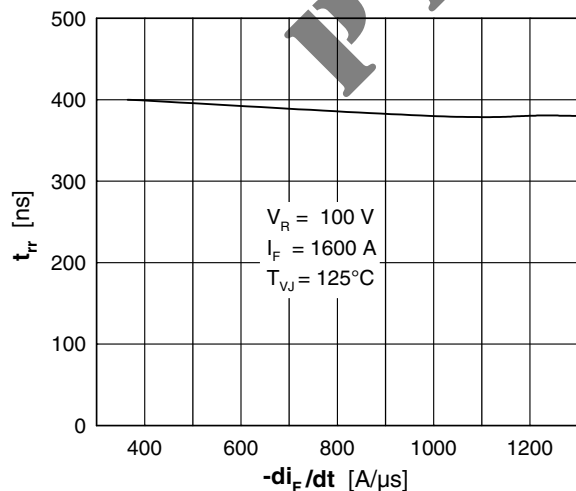


Fig. 11 Typ. reverse recovery time  $t_{rr}$  of the body diode versus  $di/dt$

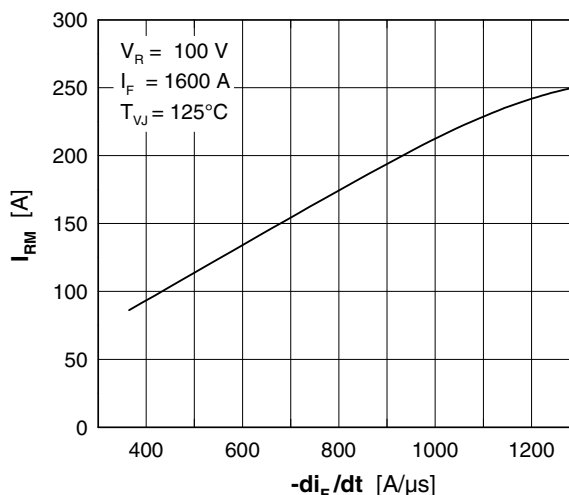


Fig. 12 Typ. reverse recovery current  $I_{RM}$  of the body diode versus  $di/dt$

