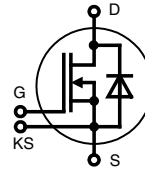


PolarHT™ Module

N-Channel Enhancement Mode

$V_{DSS} = 100\text{ V}$
 $I_{D25} = 1220\text{ A}$
 $R_{DS(on)} = 1.25\text{ m}\Omega\text{ max.}$



| MOSFET | | | | | |
|--------------|--|--|-------|------|---------------|
| Symbol | Conditions | Maximum Ratings | | | |
| V_{DSS} | $T_{VJ} = 25^\circ\text{C to } 150^\circ\text{C}$ | 100 | V | | |
| V_{GS} | | ± 20 | V | | |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 1220 | A | | |
| I_{D80} | $T_C = 80^\circ\text{C}$ | 970 | A | | |
| I_{F25} | $T_C = 25^\circ\text{C (diode)}$ | 1220 | A | | |
| I_{F80} | $T_C = 80^\circ\text{C (diode)}$ | 970 | A | | |
| Symbol | Conditions | Characteristic Values ($T_{VJ} = 25^\circ\text{C}$, unless otherwise specified) | | | |
| | | min. | typ. | max. | |
| $R_{DS(on)}$ | $V_{GS} = 10\text{ V}; I_D = I_{D80}$ | | 1.00 | 1.25 | m Ω |
| | | | 1.62 | 2.00 | m Ω |
| $V_{GS(th)}$ | $V_{DS} = 20\text{ V}; I_D = 3\text{ mA}$ | 3 | | 5 | V |
| I_{DSS} | $V_{DS} = 0.8 \cdot V_{DSS}; V_{GS} = 0\text{ V}; T_{VJ} = 25^\circ\text{C}$ | | | 0.3 | mA |
| | | | | 6 | mA |
| I_{GSS} | $V_{GS} = \pm 20\text{ V}; V_{DS} = 0\text{ V}$ | | | 1.2 | μA |
| Q_g | $V_{GS} = 10\text{ V}; V_{DS} = 50\text{ V}; I_D = 1000\text{ A}$ | | 1710 | | nC |
| Q_{gs} | | | 396 | | nC |
| Q_{gd} | | | 1020 | | nC |
| $t_{d(on)}$ | inductive load $V_{GS} = 10\text{ V}; V_{DS} = 50\text{ V}$ $I_D = 1000\text{ A}; R_G = 1.8\ \Omega$ $R_G = R_{G\text{ ext}} + R_{\text{out driver}}$ $T_{VJ} = 25^\circ\text{C}$ | | 360 | | ns |
| t_r | | | 1620 | | ns |
| $t_{d(off)}$ | | | 460 | | ns |
| t_f | | | 1020 | | ns |
| E_{on} | | | 7.7 | | mJ |
| E_{off} | | | 62.3 | | mJ |
| E_{rec} | | 0.57 | | mJ | |
| $t_{d(on)}$ | inductive load $V_{GS} = 10\text{ V}; V_{DS} = 50\text{ V}$ $I_D = 1000\text{ A}; R_G = 1.8\ \Omega$ $R_G = R_{G\text{ ext}} + R_{\text{out driver}}$ $T_{VJ} = 125^\circ\text{C}$ | | 400 | | ns |
| t_r | | | 1640 | | ns |
| $t_{d(off)}$ | | | 560 | | ns |
| t_f | | | 820 | | ns |
| E_{on} | | | 8.5 | | mJ |
| E_{off} | | | 58.9 | | mJ |
| E_{rec} | | 0.82 | | mJ | |
| R_{thJC} | | | 0.053 | | K/W |
| R_{thJH} | with heat transfer paste (IXYS test setup) | 0.065 | 0.088 | | K/W |

Features

- PolarHT™ MOSFET 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 DCB ceramic base plate

Applications

- converters with high power density for
 - main and auxiliary AC drives of electric vehicles
 - DC drives
 - power supplies

Source Drain Diode

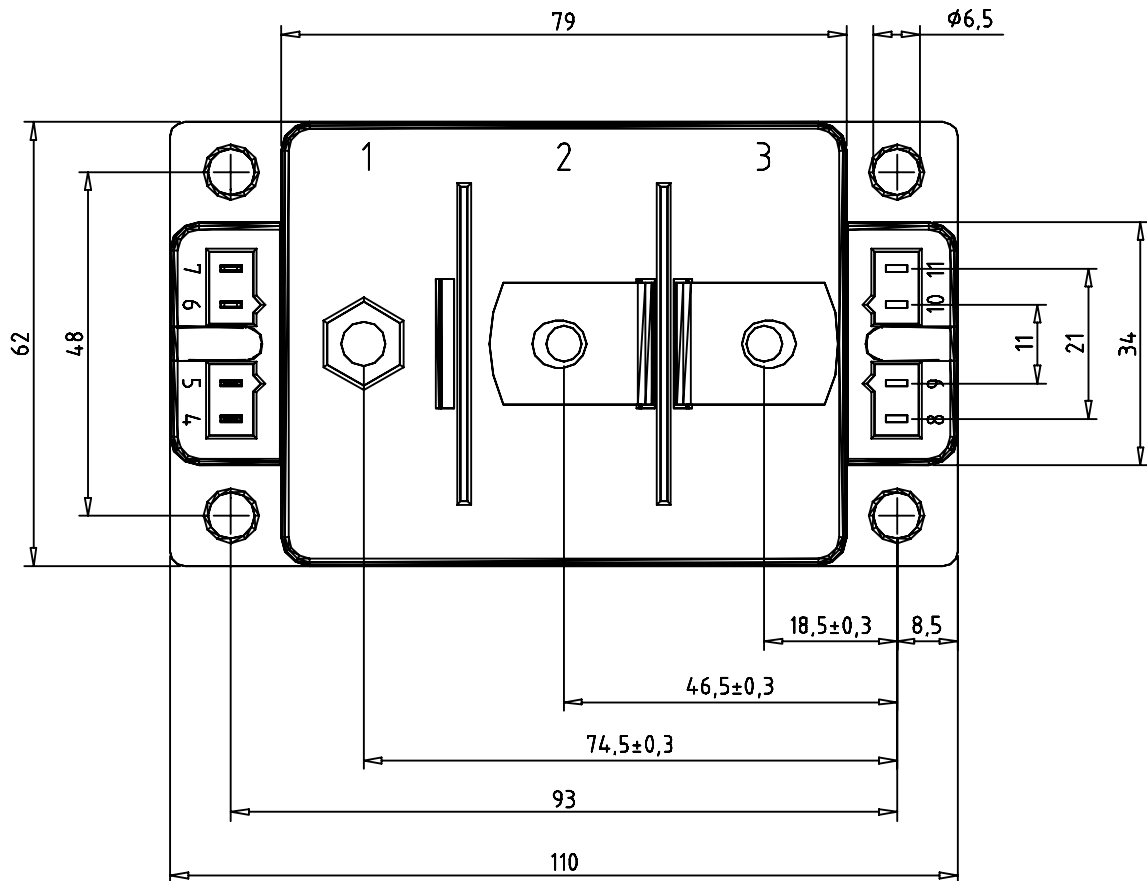
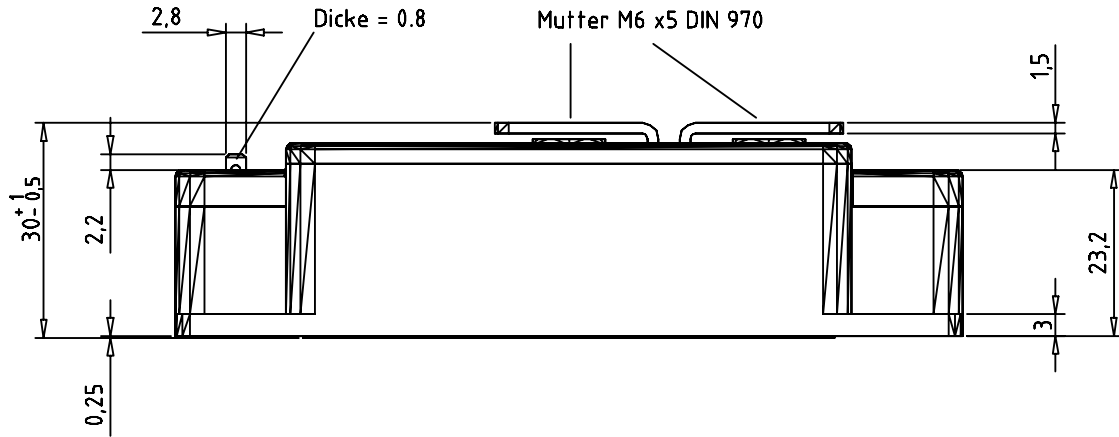
| Symbol | Conditions | Characteristic Values | | | |
|----------------------------------|--|------------------------------|------|------|---------------|
| | | min. | typ. | max. | |
| V_{SD} | $I_F = 1000 \text{ A}; V_{GS} = 0 \text{ V};$ | $T_{VJ} = 25^\circ\text{C}$ | | 1.03 | V |
| | | $T_{VJ} = 125^\circ\text{C}$ | | 0.96 | V |
| t_{rr} Q_{rr} I_{RM} | } $V_{DS} = 50 \text{ V}; I_F = 1000 \text{ A}$ $di_F/dt = 650 \text{ A}/\mu\text{s}$ | $T_{VJ} = 25^\circ\text{C}$ | | 300 | ns |
| | | | | 12.7 | μC |
| | | | | 72 | A |
| t_{rr} Q_{rr} I_{RM} | } $V_{DS} = 50 \text{ V}; I_F = 1000 \text{ A}$ $di_F/dt = 630 \text{ A}/\mu\text{s}$ | $T_{VJ} = 125^\circ\text{C}$ | | 340 | ns |
| | | | | 18 | μC |
| | | | | 88 | A |

Module

| Symbol | Conditions | Ratings | | | |
|---------------|--|---------|------|------|------------------|
| | | min. | typ. | max. | |
| 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) | 2.25 | | 2.75 | Nm |
| | Terminal connection torque (M6) | 4.5 | | 5.5 | Nm |
| Weight | | | 250 | | g |

Product Marking

| Ordering | Part Name | Marking on Product | Delivering Mode | Base Qty | Code Key |
|----------|-------------|--------------------|-----------------|----------|----------|
| Standard | VMO1200-01F | VMO1200-01F | Box | 2 | 501051 |



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

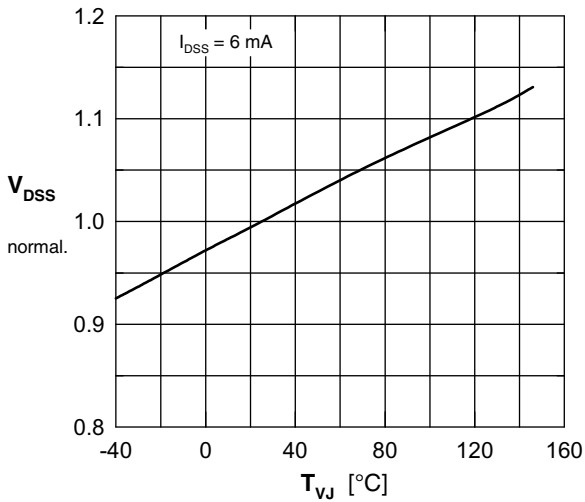


Fig. 1 Drain source breakdown voltage V_{DSS} versus junction temperature T_{VJ}

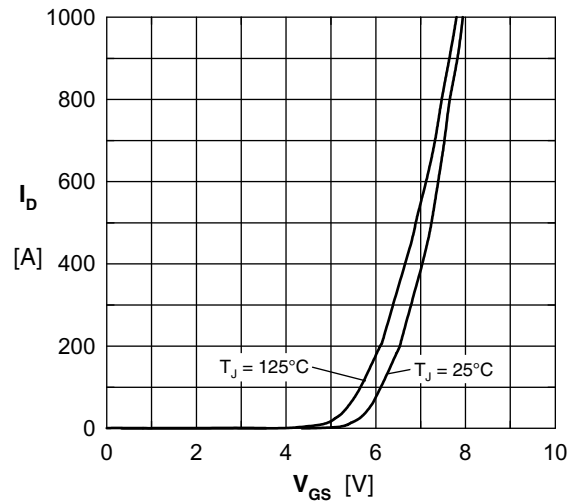


Fig. 2 Typical transfer characteristic

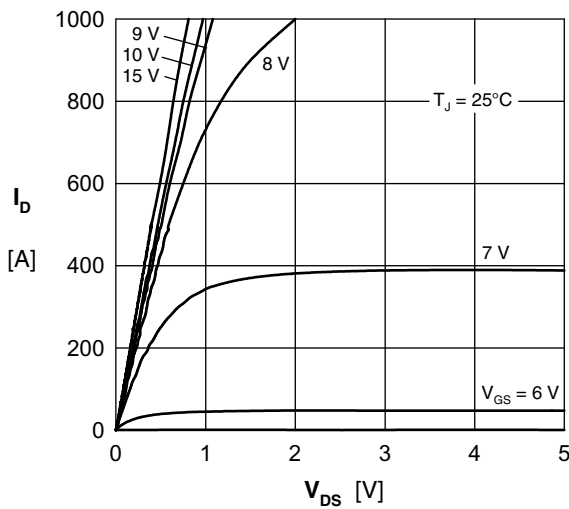


Fig. 3 Typical output characteristic

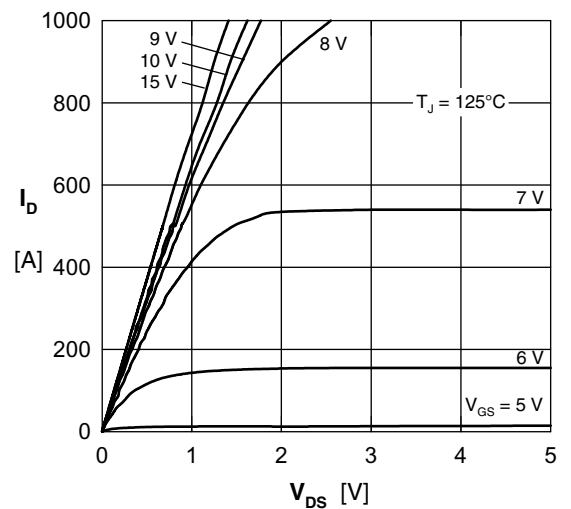


Fig. 4 Typical output characteristic

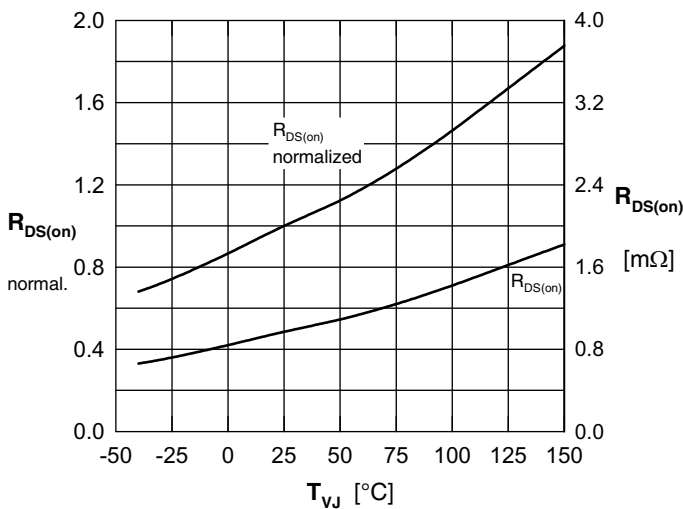


Fig. 5 Typ. drain source on-state resistance $R_{DS(on)}$ versus junction temperature T_{VJ}

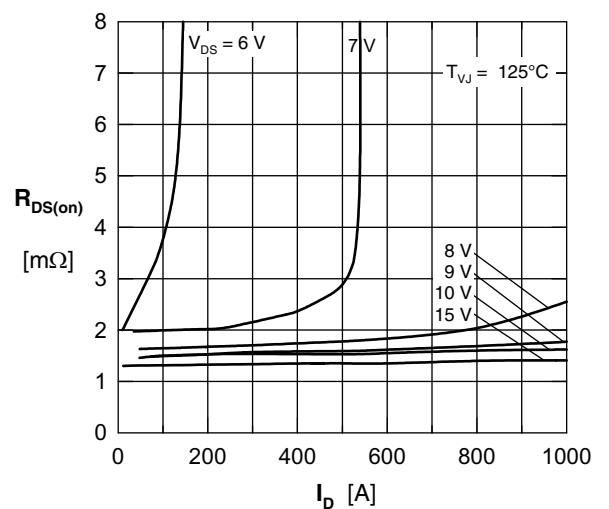


Fig. 5 Typ. drain source on-state resistance $R_{DS(on)}$ versus I_D

20100614b

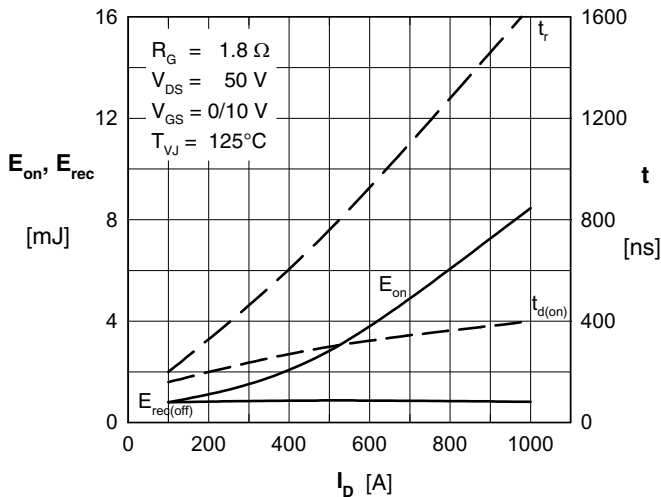


Fig. 6 Typ. turn-on energy & switching times vs. drain source current, inductive switching

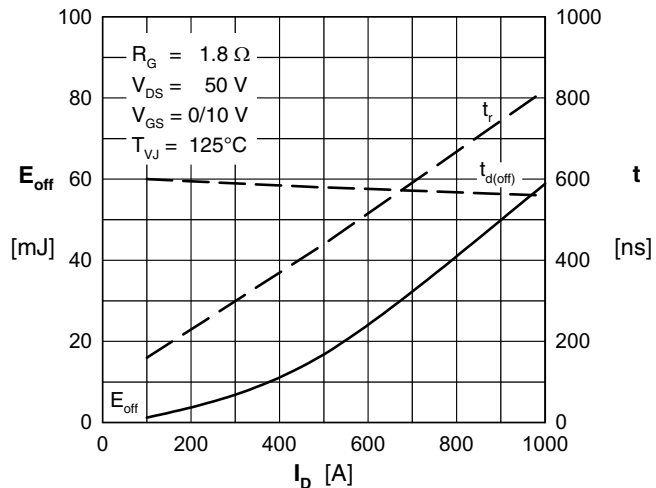


Fig. 7 Typ. turn-off energy & switching times vs. drain source current, inductive switching

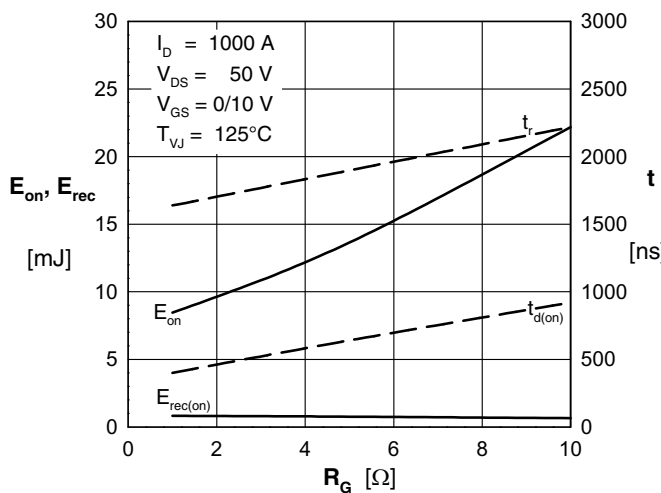


Fig. 8 Typ. turn-on energy & switching times vs. gate resistor, inductive switching

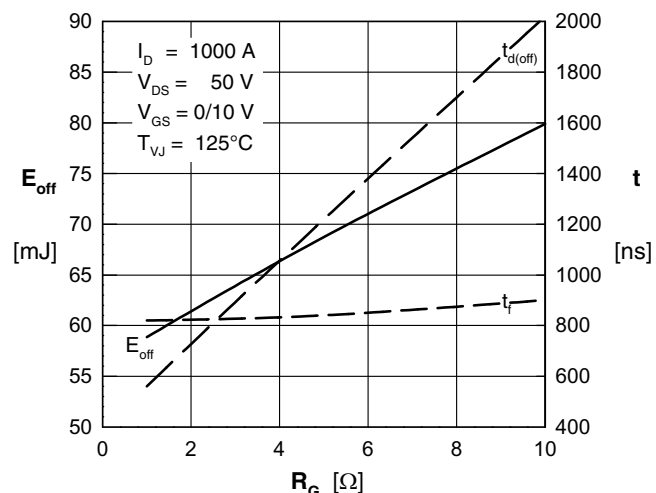


Fig. 9 Typ. turn-off energy & switching times vs. gate resistor, inductive switching

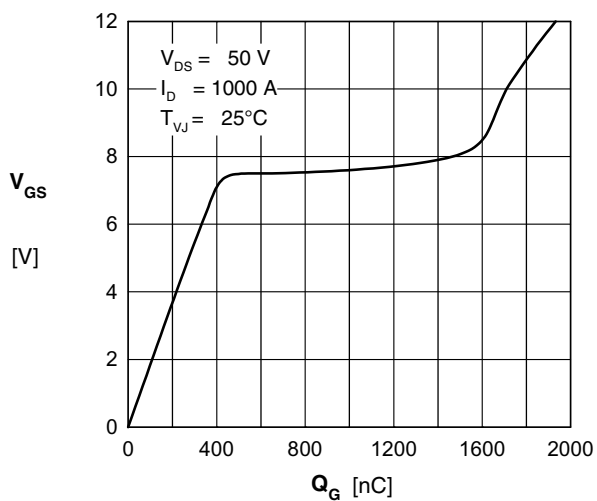


Fig. 10 Typical gate charge characteristic

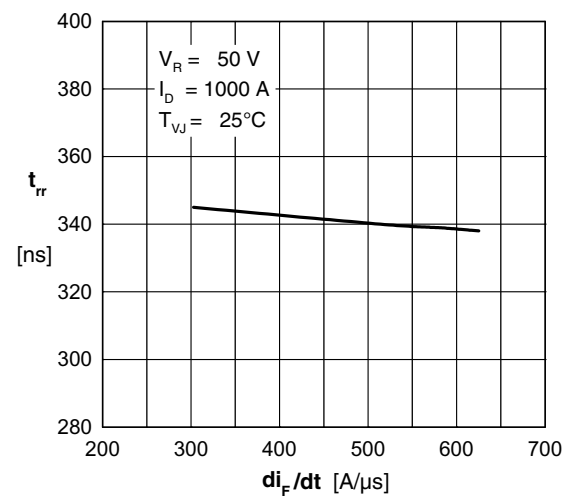


Fig. 11 Typ. reverse recovery time t_{rr} of the body diode versus di/dt

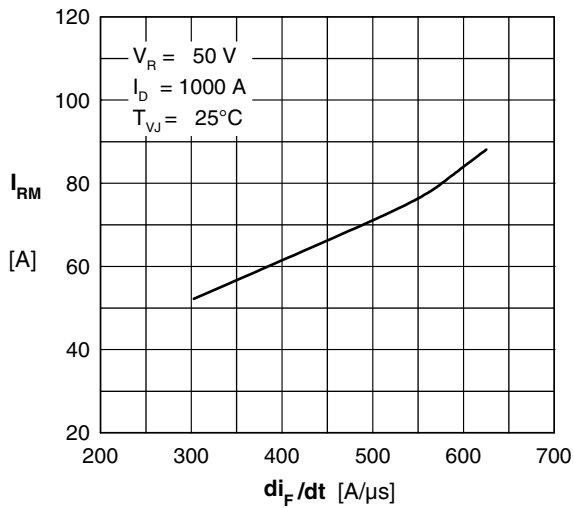


Fig. 13 Typ. reverse recovery current I_{RM} of the body diode versus di/dt

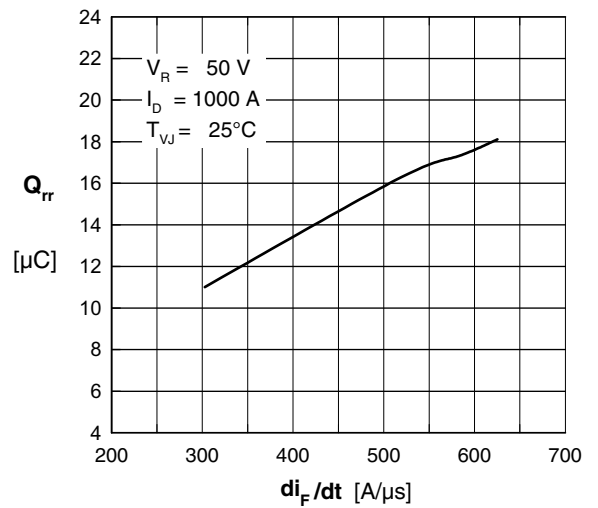


Fig. 14 Typical reverse recovery charge Q_{rr} of the body diode versus di/dt

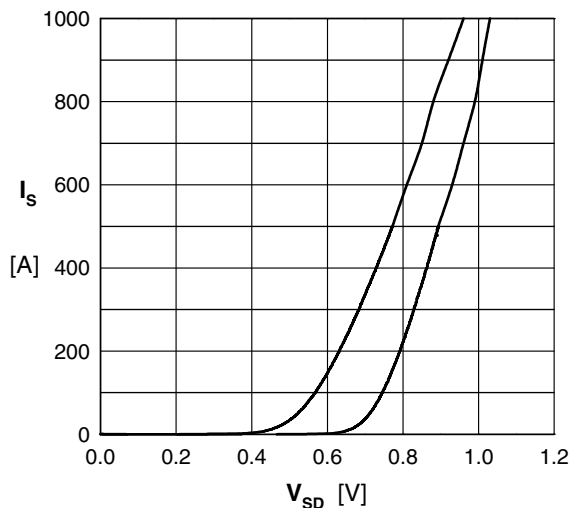


Fig. 15 Source drain current I_S (body diode) vs. typical source drain voltage V_{SD}

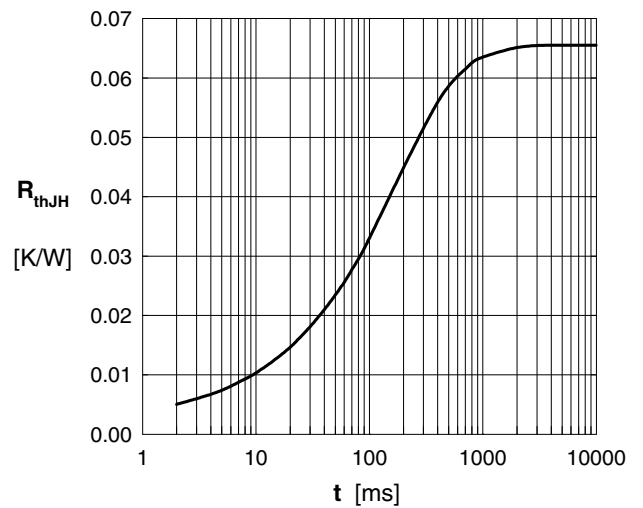


Fig. 16 Typ. transient thermal impedance with heat transfer paste (IXYS test setup)

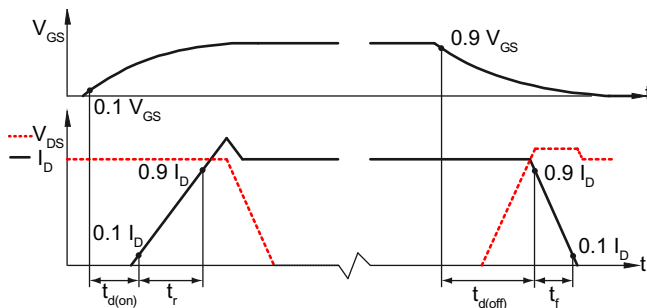


Fig. 17 Definition of switching times