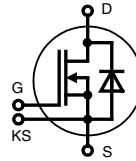


# PolarHT™ Module

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
$V_{GS}$		$\pm 20$	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 <sub>VJ</sub> = 25°C, unless otherwise specified)			
		min.	typ.	max.	
$R_{DS(on)}$	$V_{GS} = 10\text{ V}; I_D = I_{D80}$		1.00	1.25	mΩ
			1.62	2.00	mΩ
$V_{GS(th)}$	$V_{DS} = 20\text{ V}; I_D = 3\text{ mA}$	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
	$T_{VJ} = 125^\circ\text{C}$			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**

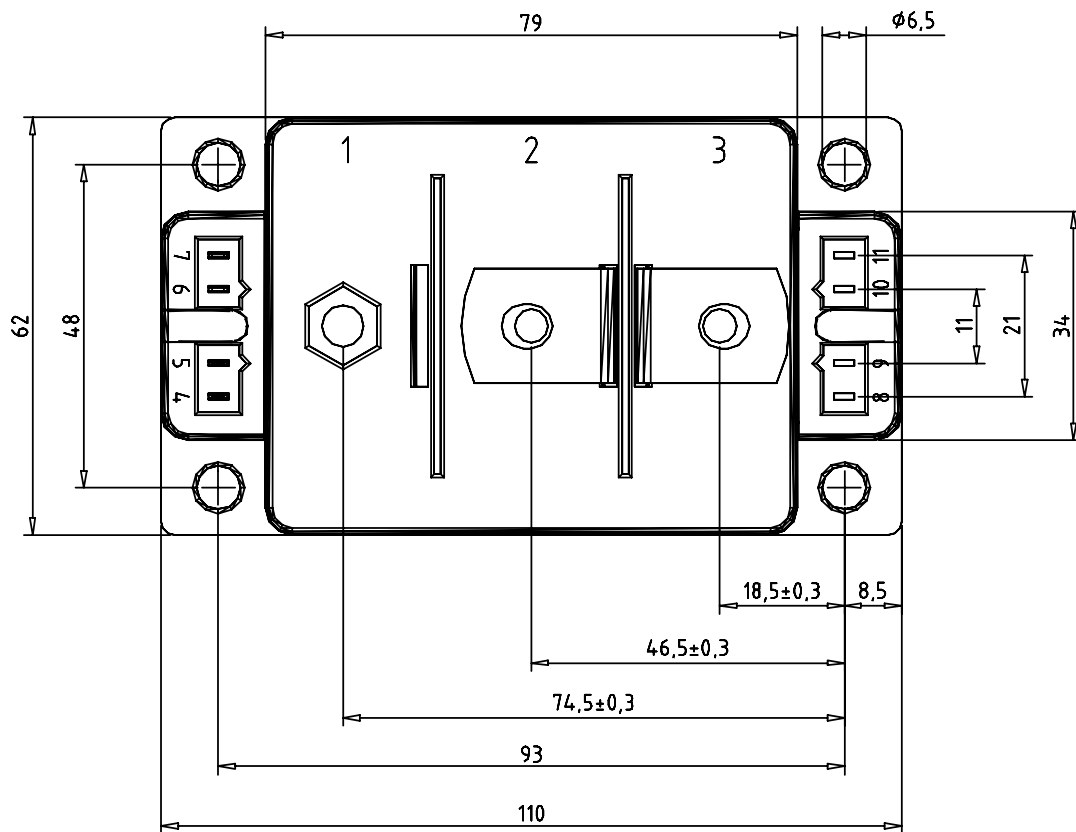
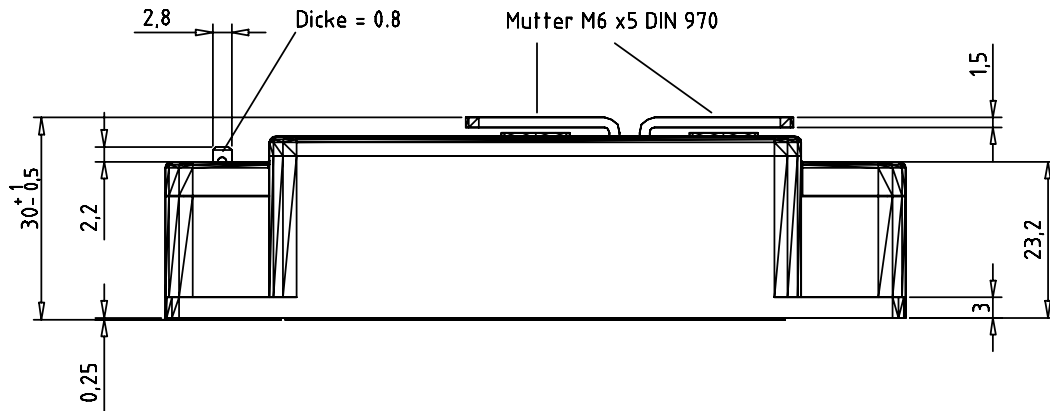
Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
$V_{SD}$	$I_F = 1000\text{ A}; V_{GS} = 0\text{ V};$ $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$		1.03	V
			0.96	V
$t_{rr}$	$V_{DS} = 50\text{ V}; I_F = 1000\text{ A}$ $di_F/dt = 650\text{ A}/\mu\text{s}$ $T_{VJ} = 25^\circ\text{C}$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

**Module**

Symbol	Conditions	Ratings		
		min.	typ.	max.
$T_{VJ}$		-40		150 °C
$T_{stg}$		-40		125 °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
<b>Weight</b>			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)

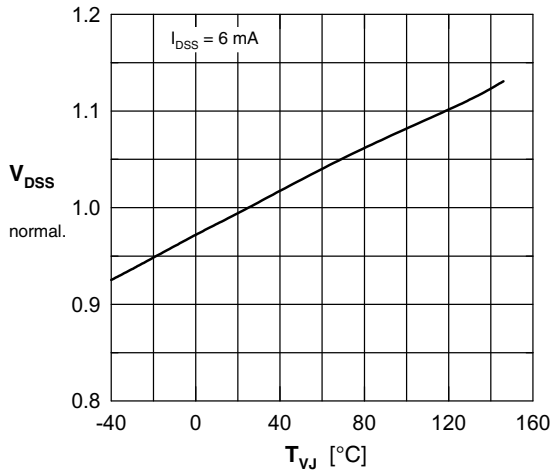


Fig. 1 Drain source breakdown voltage  $V_{DSS}$  versus junction temperature  $T_{VJ}$

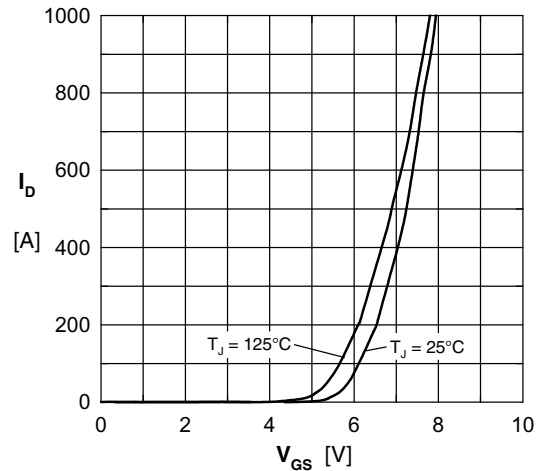


Fig. 2 Typical transfer characteristic

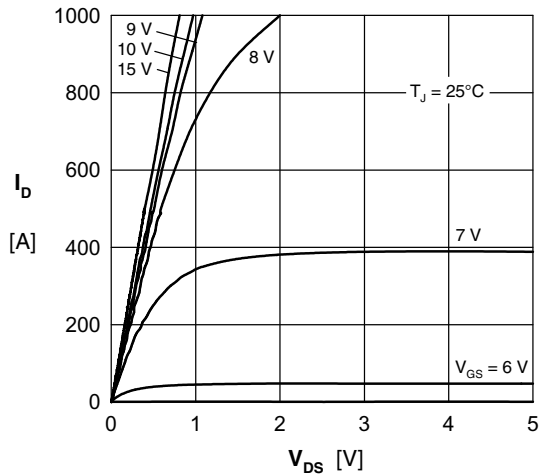


Fig. 3 Typical output characteristic

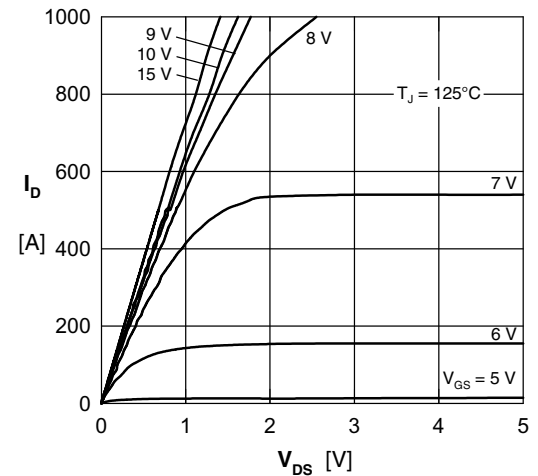


Fig. 4 Typical output characteristic

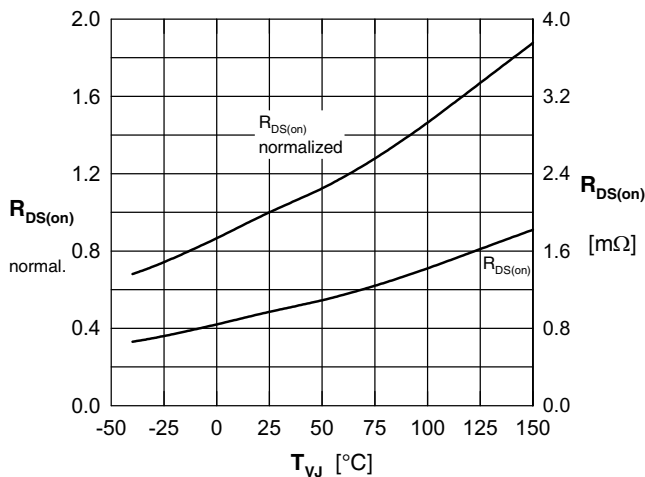


Fig. 5 Typ. drain source on-state resistance  $R_{DS(on)}$  versus junction temperature  $T_{VJ}$

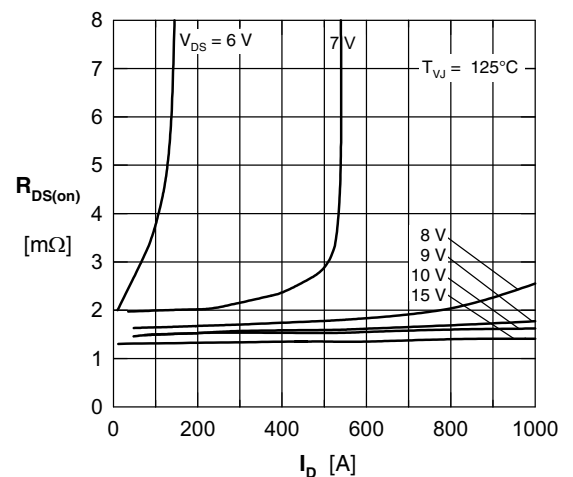


Fig. 5 Typ. drain source on-state resistance  $R_{DS(on)}$  versus  $I_D$

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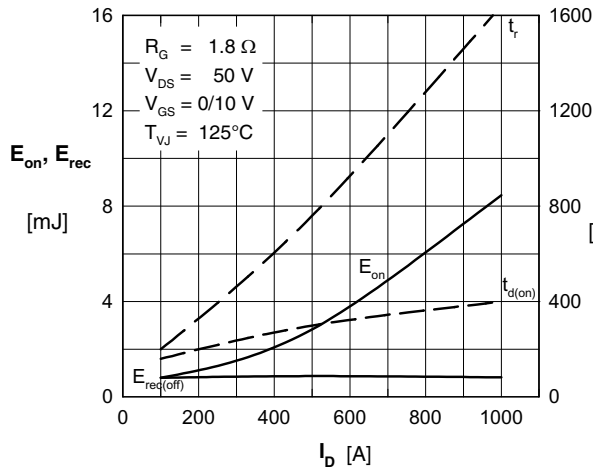


Fig. 6 Typ. turn-on energy & switching times vs. drain source current, inductive switching

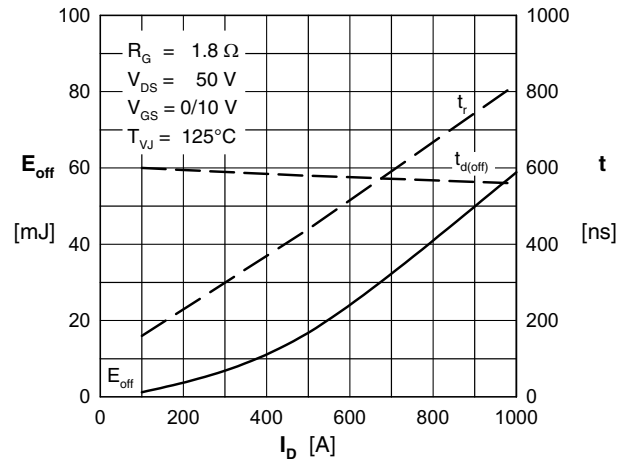


Fig. 7 Typ. turn-off energy & switching times vs. drain source current, inductive switching

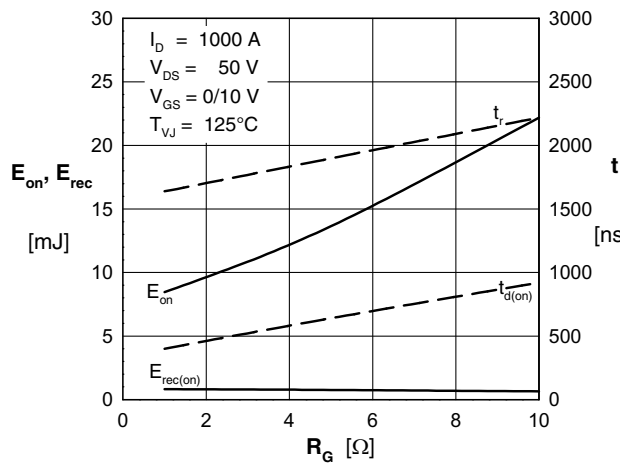


Fig. 8 Typ. turn-on energy & switching times vs. gate resistor, inductive switching

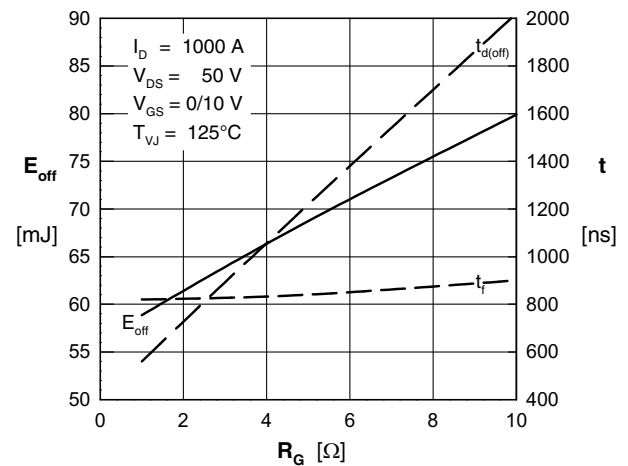


Fig. 9 Typ. turn-off energy & switching times vs. gate resistor, inductive switching

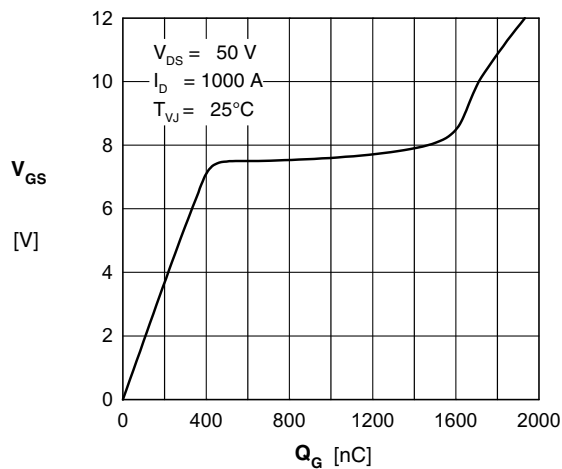


Fig. 10 Typical gate charge characteristic

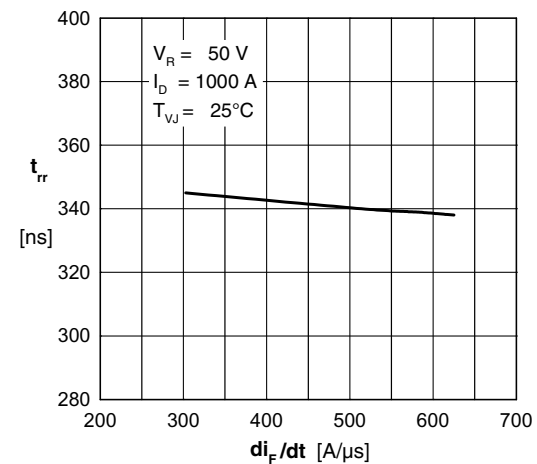


Fig. 11 Typ. reverse recovery time  $t_{rr}$  of the body diode versus  $di_e/dt$

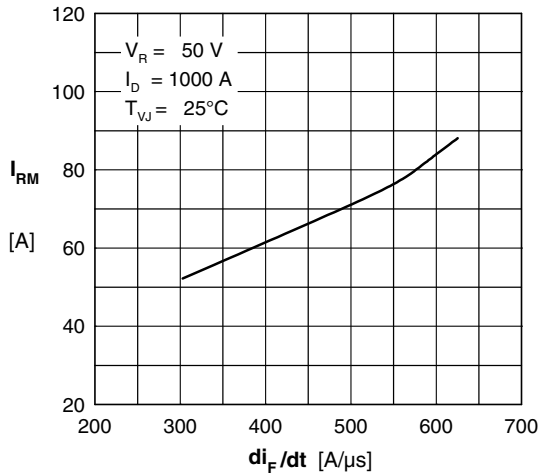


Fig. 13 Typ. reverse recovery current  $I_{RM}$  of the body diode versus  $di/dt$

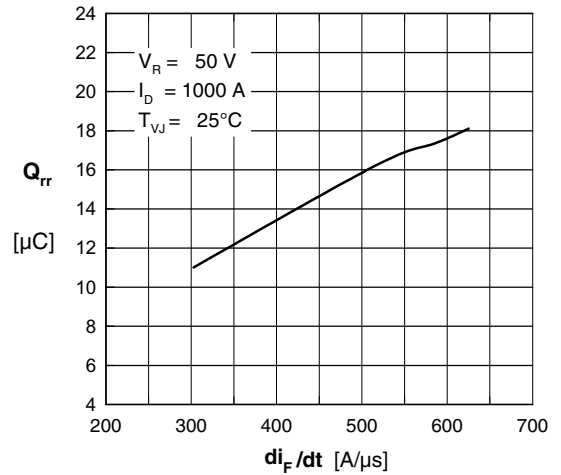


Fig. 14 Typical reverse recovery charge  $Q_{rr}$  of the body diode versus  $di/dt$

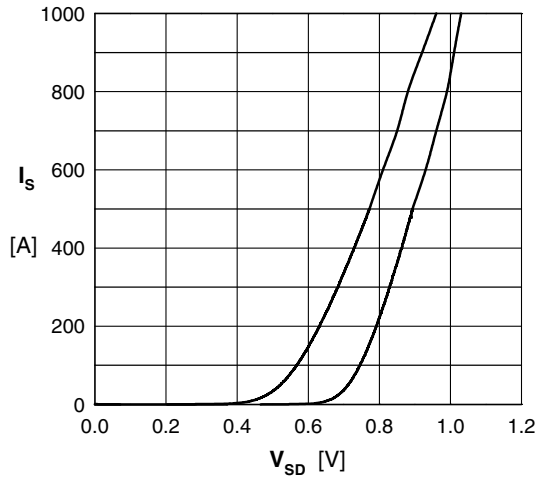


Fig. 15 Source drain current  $I_F$  (body diode) vs. typical source drain voltage  $V_{SD}$

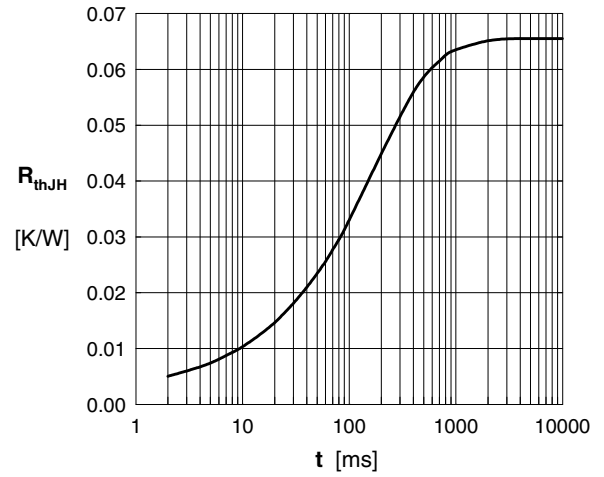


Fig. 16 Typ. transient thermal impedance with heat transfer paste (IXYS test setup)

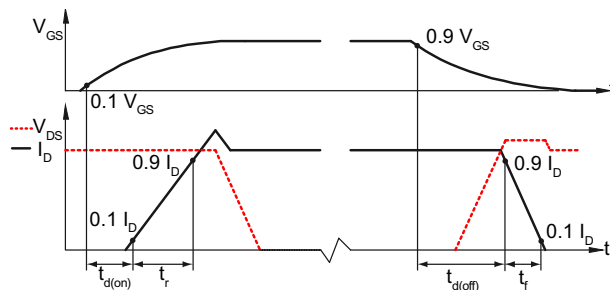


Fig. 17 Definition of switching times