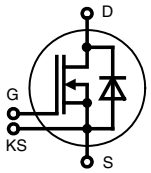
PolarHT™ Module

N-Channel Enhancement Mode

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



MOSFET

Symbol	Conditions	Maximum Ratings	
V_{DSS}	T_{VJ} = 25°C to 150°C	100	V
V_{GS}		± 20	V
I_{D25}	T_C = 25°C	1220	A
I_{D80}	T_C = 80°C	970	A
I_{F25}	T_C = 25°C (diode)	1220	A
I_{F80}	T_C = 80°C (diode)	970	A

Symbol	Conditions		Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
R_{DSon}	V_{GS} = 10 V; I_D = I_{D80}	T_{VJ} = 25°C		1.00	1.25	mΩ
		T_{VJ} = 125°C		1.62	2.00	mΩ
$V_{GS(th)}$	V_{DS} = 20 V; I_D = 3 mA		3		5	V
I_{DSS}	V_{DS} = 0.8 • V_{DSS}; V_{GS} = 0 V;	T_{VJ} = 25°C			0.3	mA
		T_{VJ} = 125°C			6	mA
I_{GSS}	V_{GS} = ± 20 V; V_{DS} = 0 V				1.2	µA
Q_g	V_{GS} = 10 V; V_{DS} = 50 V; I_D = 1000 A			1710		nC
Q_{gs}				396		nC
Q_{gd}				1020		nC
$t_{d(on)}$	inductive load			360		ns
t_r	V_{GS} = 10 V; V_{DS} = 50 V			1620		ns
$t_{d(off)}$	I_D = 1000 A; R_G = 1.8 Ω	T_{VJ} = 25°C		460		ns
t_f	R_G = $R_{G\ ext}$ + $R_{out\ driver}$			1020		ns
E_{on}				7.7		mJ
E_{off}				62.3		mJ
E_{rec}				0.57		mJ
$t_{d(on)}$	inductive load			400		ns
t_r	V_{GS} = 10 V; V_{DS} = 50 V			1640		ns
$t_{d(off)}$	I_D = 1000 A; R_G = 1.8 Ω	T_{VJ} = 125°C		560		ns
t_f	R_G = $R_{G\ ext}$ + $R_{out\ driver}$			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_{DSon}
  - 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

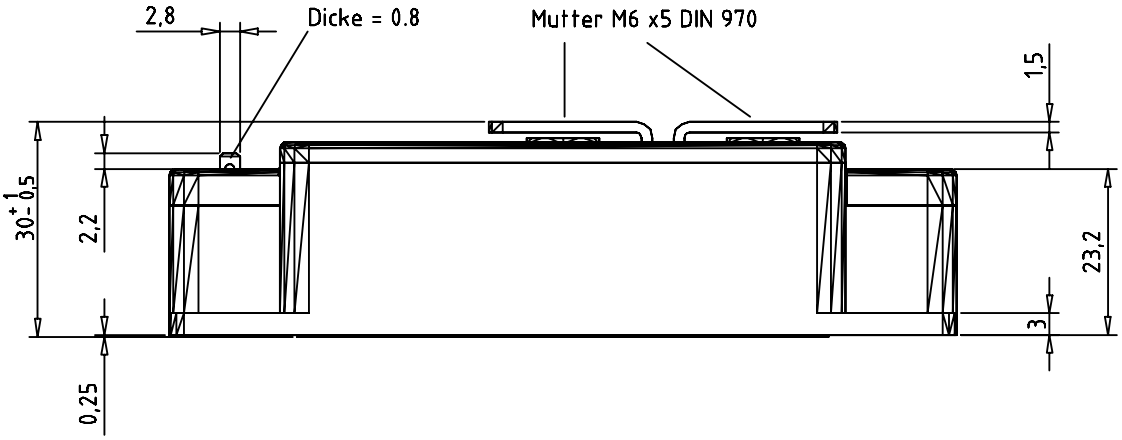
Symbol	Conditions		Characteristic Values min.	typ.	max.	
V_{SD}	I_F = 1000 A; V_{GS} = 0 V;	T_{VJ} = 25°C		1.03		V
		T_{VJ} = 125°C		0.96		V
t_{rr}	V_{DS} = 50 V; I_F = 1000 A	T_{VJ} = 25°C		300		ns
Q_{rr}	di_F/dt = 650 A/µs			12.7		µC
I_{RM}				72		A
t_{rr}	V_{DS} = 50 V; I_F = 1000 A	T_{VJ} = 125°C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

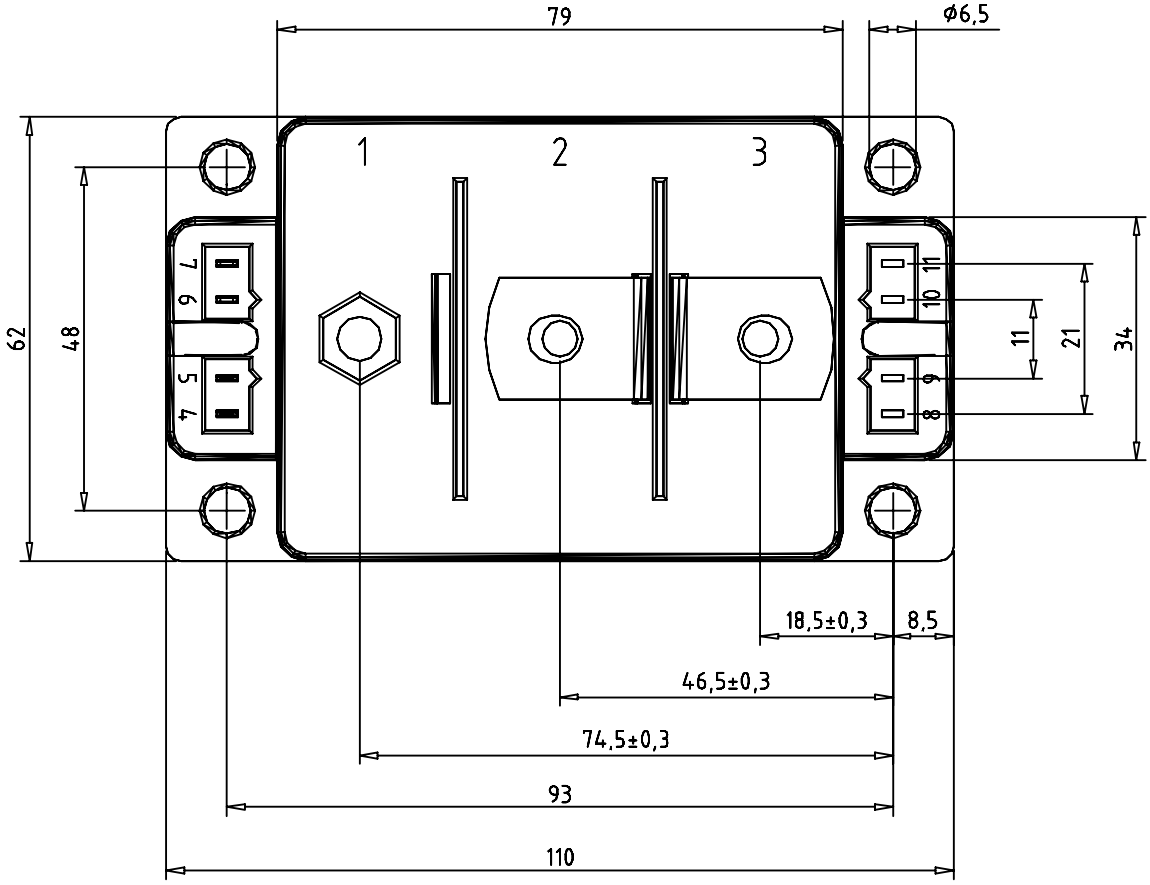
Module

Symbol	Conditions	Ratings min.	typ.	max.	
T_{VJ}		-40		150	°C
T_{stg}		-40		125	°C
V_{ISOL}	$I_{ISOL} \leq$ 1 mA, 50/60 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

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

- Type ZY180L with wire length 350mm
  - for pins 4 (**G**ate, yellow wire)
    and 5 (**K**elvin **S**ource, red wire)

Dimensions in mm (1 mm = 0.0394“)

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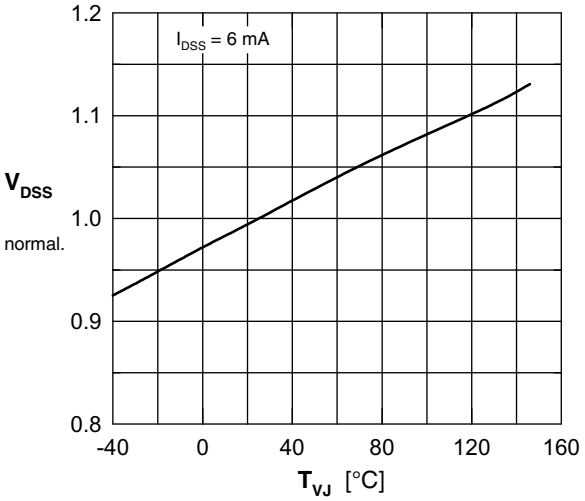

Fig. 1 Drain source breakdown voltage V_{DSS} versus junction temperature T_{VJ}

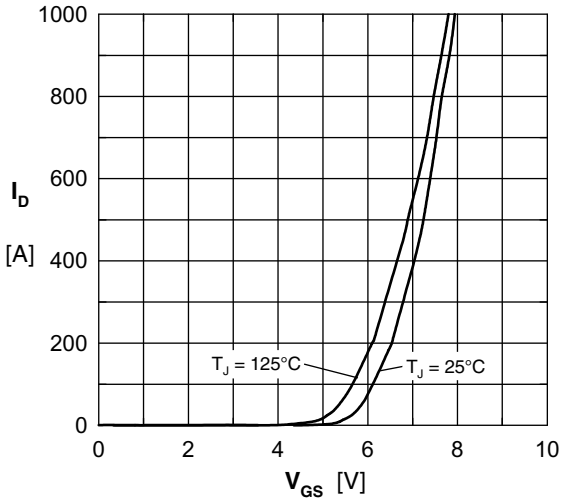

Fig. 2 Typical transfer characteristic

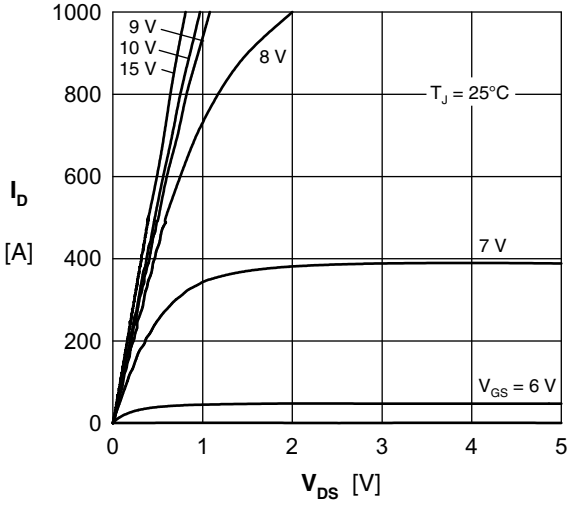

Fig. 3 Typical output characteristic

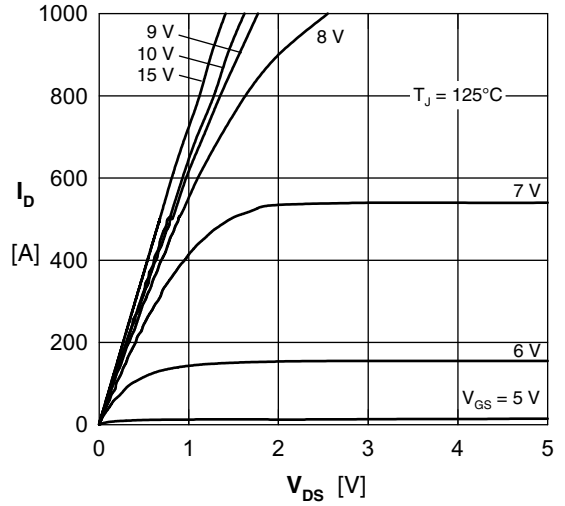

Fig. 4 Typical output characteristic

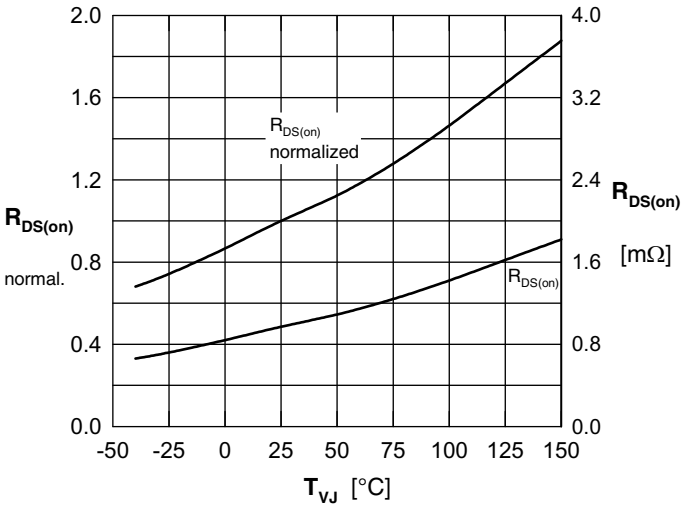

Fig. 5 Typ. drain source on-state resistance $R_{DS(on)}$ versus junction temperature T_{VJ}

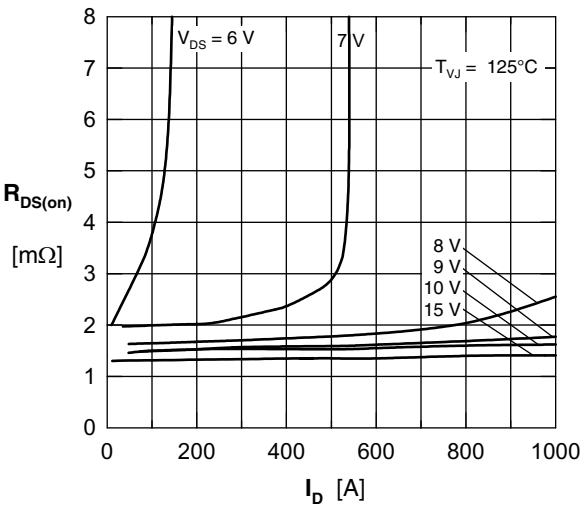

Fig. 5 Typ. drain source on-state resistance $R_{DS(on)}$ versus I_D

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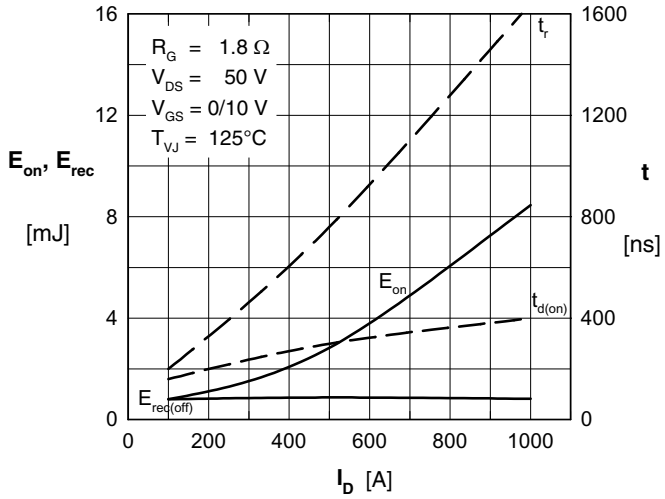

Fig. 6 Typ. turn-on energy & switching times vs. drain source current, inductive switching

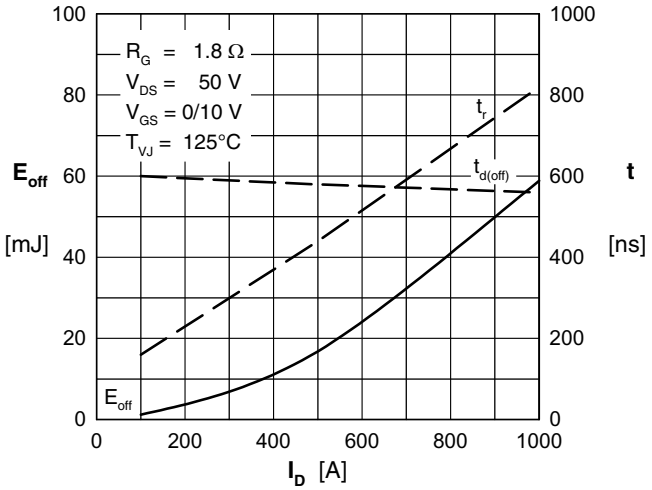

Fig. 7 Typ. turn-off energy & switching times vs. drain source current, inductive switching

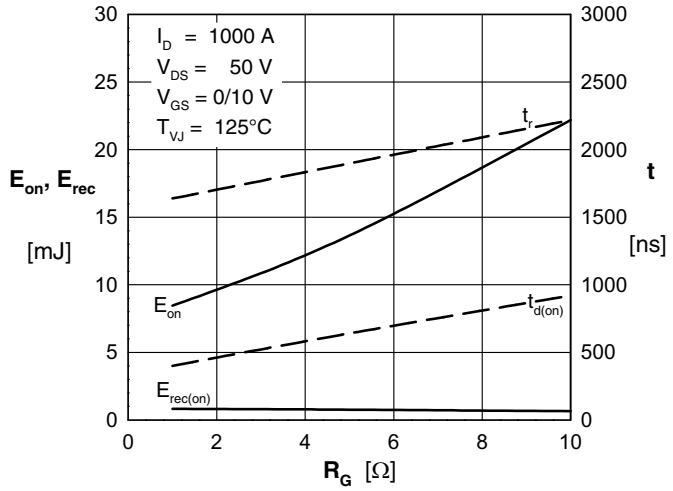

Fig. 8 Typ. turn-on energy & switching times vs. gate resistor, inductive switching

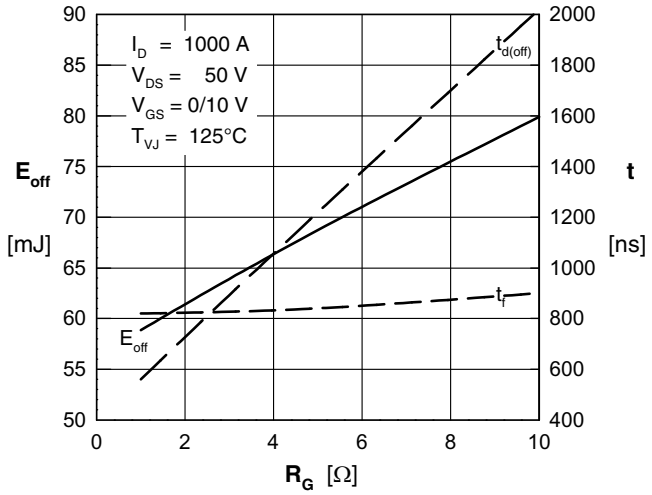

Fig. 9 Typ. turn-off energy & switching times vs. gate resistor, inductive switching

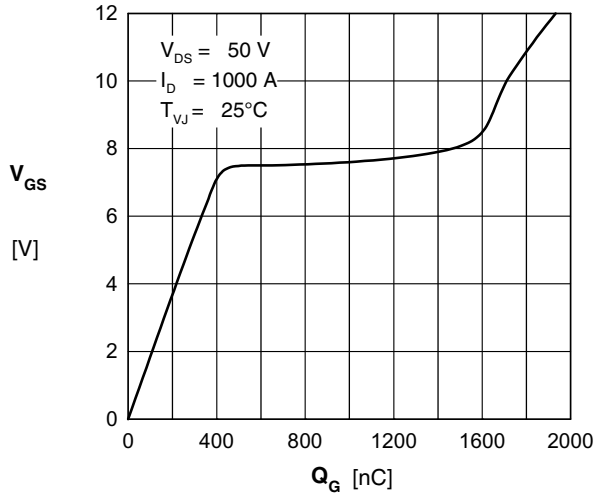

Fig. 10 Typical gate charge characteristic

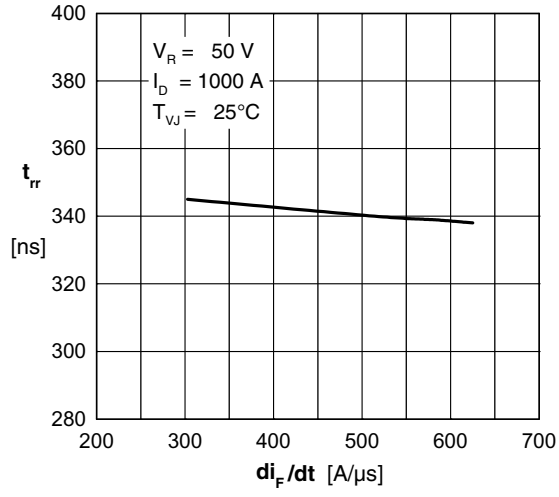

Fig. 11 Typ. reverse recovery time t_{rr} of the body diode versus di/dt

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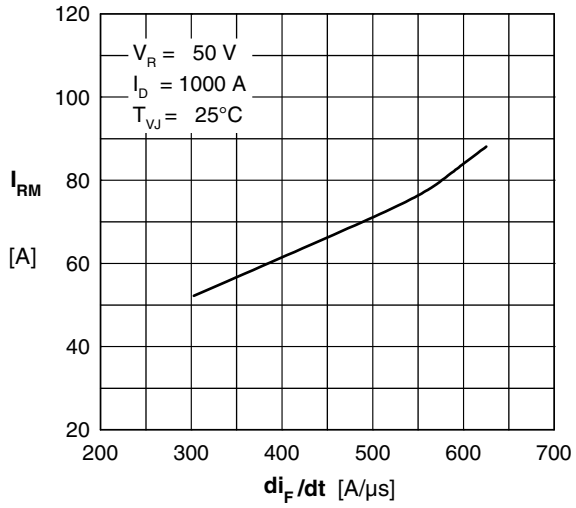

Fig. 13 Typ. reverse recovery current I_{RM} of the body diode versus di/dt

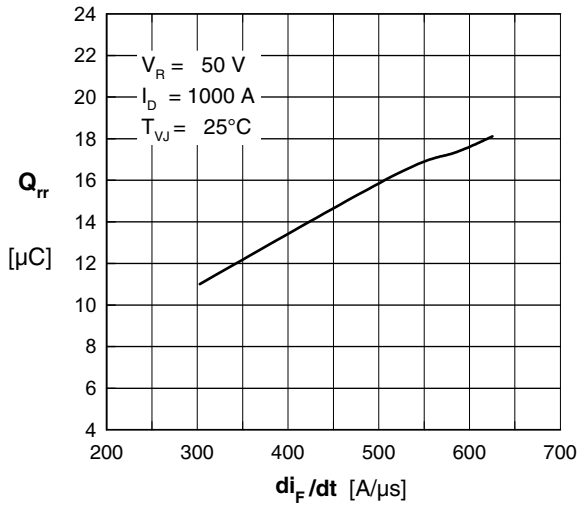

Fig. 14 Typical reverse recovery charge Q_{rr} of the body diode versus di/dt

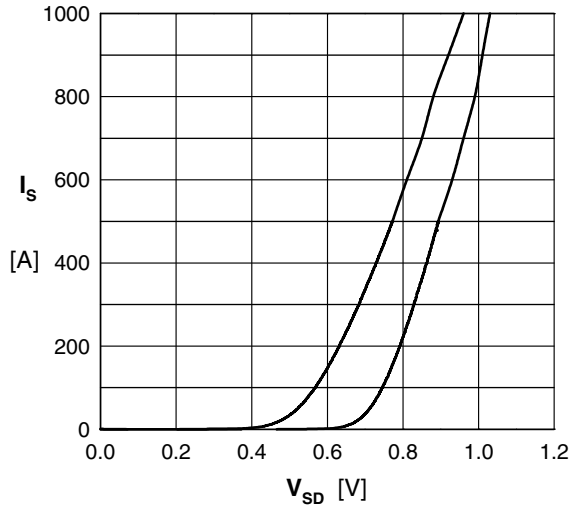

Fig. 15 Source drain current I_F (body diode) vs. typical source drain voltage V_{SD}

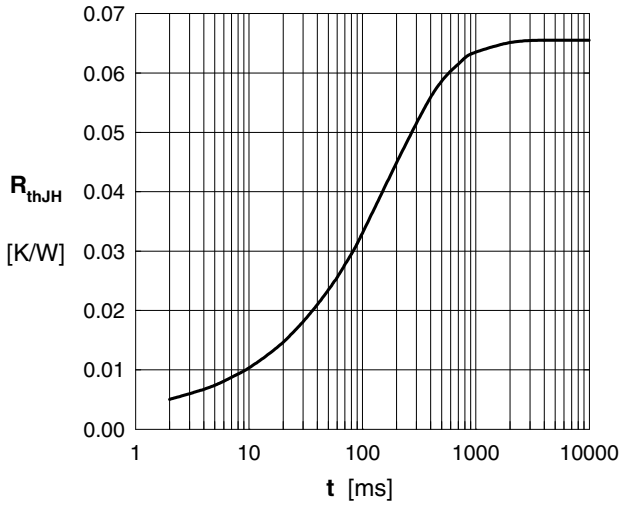

Fig. 16 Typ. transient thermal impedance with heat tranfer paste (IXYS test setup)

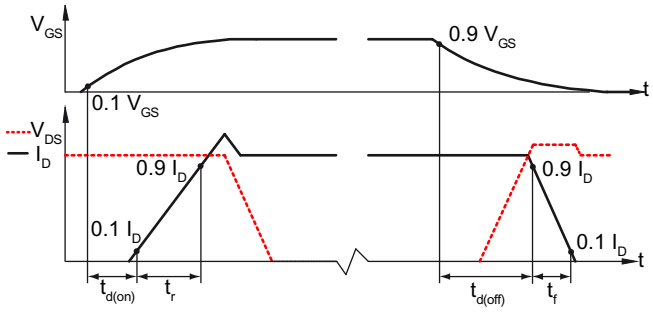

Fig. 17 Definition of switching times