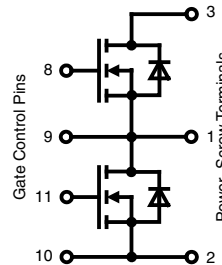


Dual Power MOSFET Module

$$\begin{aligned} V_{DSS} &= 75 \text{ V} \\ I_{D25} &= 1560 \text{ A} \\ R_{DS(on)} &= 0.38 \text{ m}\Omega \end{aligned}$$

Phaseleg Configuration



MOSFET T1 + T2					
Symbol	Conditions	Maximum Ratings			
V_{DSS}	$T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$	75			V
V_{GS}		± 20			V
I_{D25}	$T_C = 25^{\circ}\text{C}$ ①	1560			A
I_{D80}	$T_C = 80^{\circ}\text{C}$ ①	1240			A
I_{F25}	$T_C = 25^{\circ}\text{C (diode)}$ ①	1560			A
I_{F80}	$T_C = 80^{\circ}\text{C (diode)}$ ①	1240			A
Symbol	Conditions	Characteristic Values			
		$(T_{VJ} = 25^{\circ}\text{C, unless otherwise specified})$			
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}; I_D = I_{D80}; \text{ on chip level}$			0.38	m Ω
$V_{GS(th)}$	$V_{DS} = 20 \text{ V}; I_D = 2.5 \text{ mA}$	2		4	V
I_{DSS}	$V_{DS} = V_{DSS}; V_{GS} = 0 \text{ V}$ $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		1.5	0.15	mA mA
I_{GSS}	$V_{GS} = \pm 20 \text{ V}; V_{DS} = 0 \text{ V}$			3.0	μA
C_{iss}	$V_{GS} = 0 \text{ V}; V_{DS} = 25 \text{ V}; f = 1 \text{ MHz}$		115		nF
C_{oss}			12.8		nF
C_{rss}			1.38		nF
Q_g	$V_{GS} = 10 \text{ V}; V_{DS} = 37 \text{ V}; I_D = 1200 \text{ A}$		1950		nC
Q_{gs}			580		nC
Q_{gd}			450		nC
$t_{d(on)}$	inductive load $V_{GS} = 10 \text{ V}; V_{DS} = 37 \text{ V}$ $I_D = 1200 \text{ A}; R_G = 1.8 \Omega$ $T_{VJ} = 25^{\circ}\text{C}$ $R_G = R_{G \text{ ext}} + R_{\text{out driver}}$		260		ns
t_r			1680		ns
$t_{d(off)}$			500		ns
t_f			880		ns
E_{on}			3		mJ
E_{off}			54		mJ
E_{rec}			0.06		mJ
$t_{d(on)}$	inductive load $V_{GS} = 10 \text{ V}; V_{DS} = 37 \text{ V}$ $I_D = 1200 \text{ A}; R_G = 1.8 \Omega$ $T_{VJ} = 125^{\circ}\text{C}$ $R_G = R_{G \text{ ext}} + R_{\text{out driver}}$		260		ns
t_r			1680		ns
$t_{d(off)}$			520		ns
t_f			720		ns
E_{on}			3.5		mJ
E_{off}			49		mJ
E_{rec}			0.08		mJ
R_{thJC}	with heat transfer paste (IXYS test setup)		0.08		K/W
R_{thJH}			0.13		K/W

① additional current limitation by external leads

Features

- Trench MOSFETs
 - low $R_{DS(on)}$
 - optimized 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
 - 4 quadrant DC drives
 - power supplies with low input voltage, e.g. from fuel cells or solar cells

Source Drain Diode

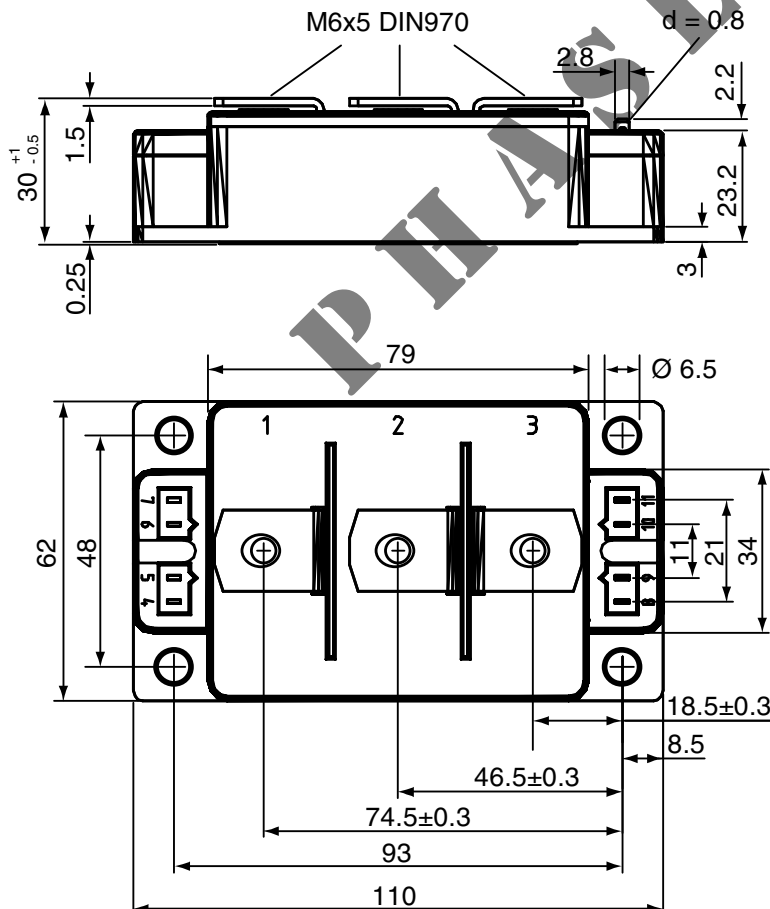
Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
V_{SD}	$I_F = 1200\text{ A}; V_{GS} = 10\text{ V};$ $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$		1.18 0.9	V V
t_{rr} Q_{rr} I_{RM}	$V_{DS} = 37\text{ V}; I_F = 1200\text{ A}$ $di_F/dt = 800\text{ A}/\mu\text{s}$ $T_{VJ} = 25^\circ\text{C}$		120 2.1 30	ns μC A
t_{rr} Q_{rr} I_{RM}	$V_{DS} = 50\text{ V}; I_F = 1000\text{ A}$ $di_F/dt = 760\text{ A}/\mu\text{s}$ $T_{VJ} = 125^\circ\text{C}$		120 2.8 34	ns μC A

Module

Symbol	Conditions	Maximum Ratings	
I_{RMS}	per main terminal	500	A
T_{VJ}		-40...+175	$^\circ\text{C}$
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	2.25 - 2.75	Nm
	Terminal connection torque (M6)	4.5 - 5.5	Nm

Characteristic Values			
	min.	typ.	max.
$R_{pin\text{ to chip}}^{*)}$		0.06	m Ω
Weight		250	g

$*) V_{DS} = I_D \cdot (R_{DS(on)} + R_{pin\text{ to chip}})$



Dimensions in mm (1 mm = 0.0394")

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 (yellow wire) and 5 (red wire)
- for pins 11 (yellow wire) and 10 (red wire)
- Type ZY180R with wire length 350mm
- for pins 7 (yellow wire) and 6 (red wire)
- for pins 8 (yellow wire) and 9 (red wire)

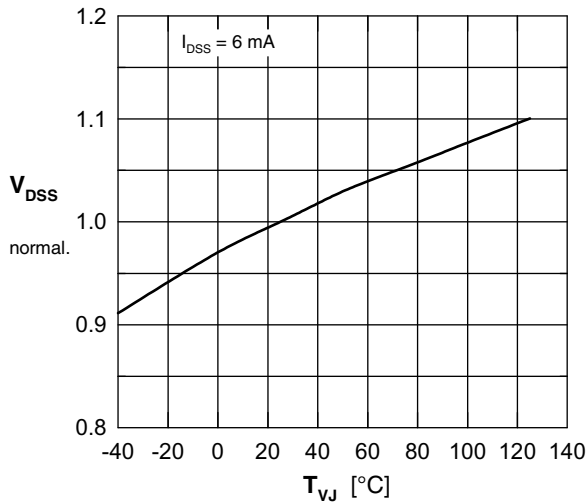


Fig. 1 Drain source breakdown voltage V_{DSS} versus junction temperature

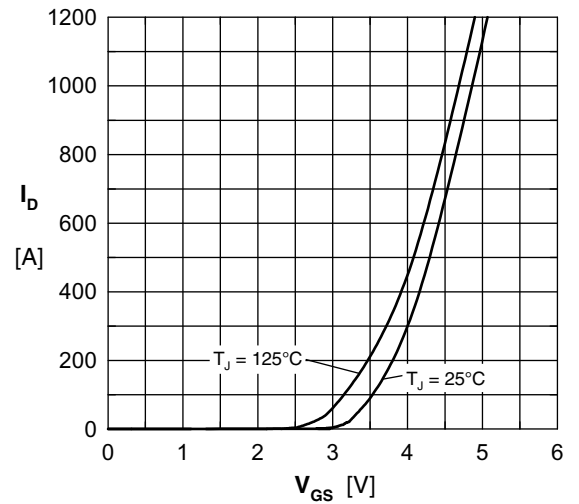


Fig. 2 Typical transfer characteristics

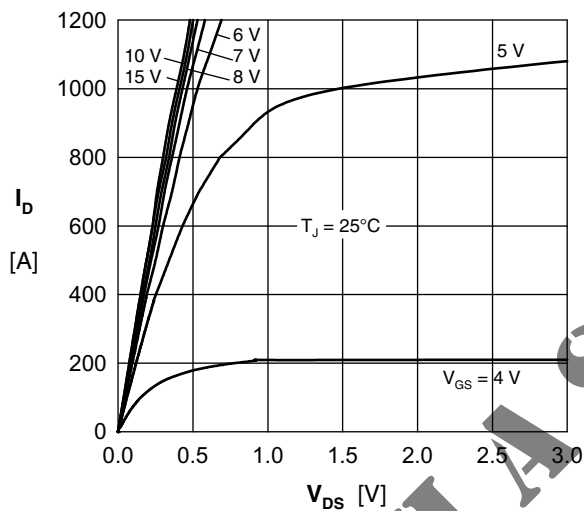


Fig. 3 Output characteristics at $T_J = 25^\circ\text{C}$

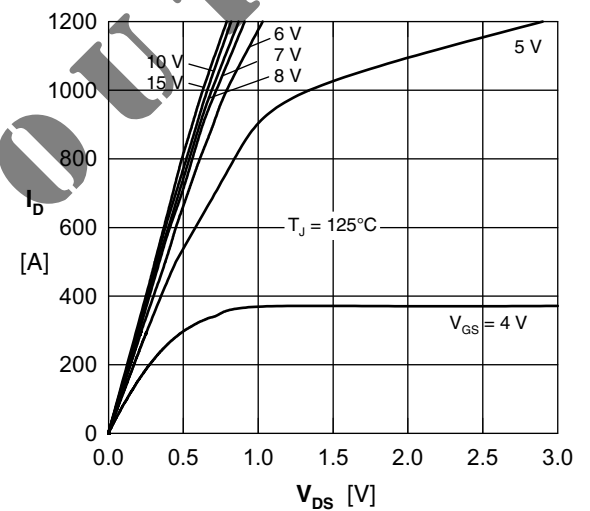


Fig. 4 Output characteristics at $T_J = 125^\circ\text{C}$

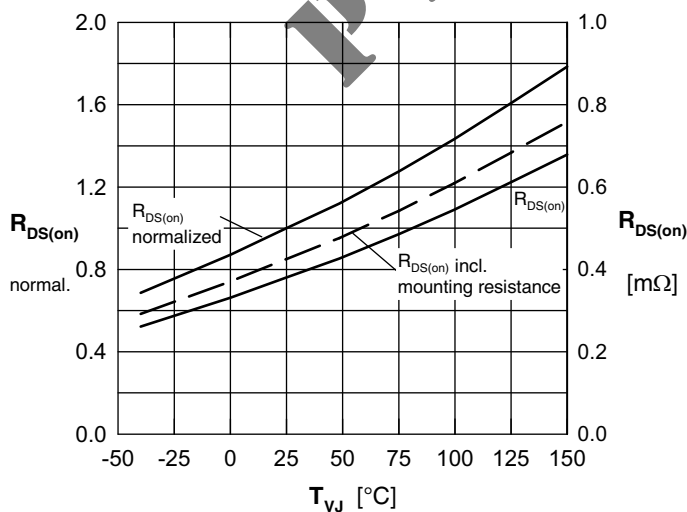


Fig. 5 $R_{DS(on)}$ normalized to $I_D = 1150\text{ A}$ value vs. junction temperature

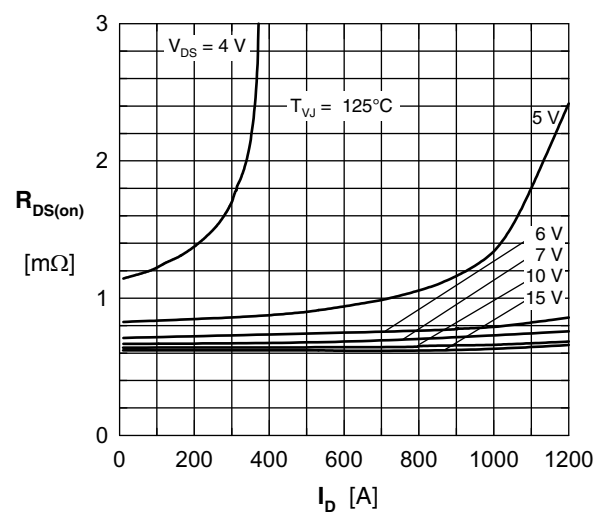


Fig. 6 Drain source on-state resistance versus I_D

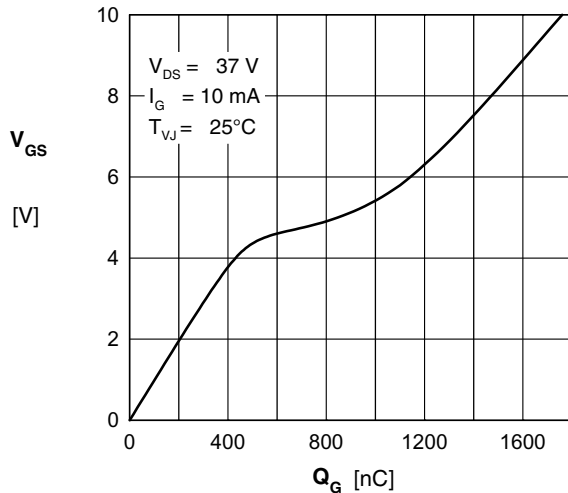


Fig. 7 Gate charge characteristics

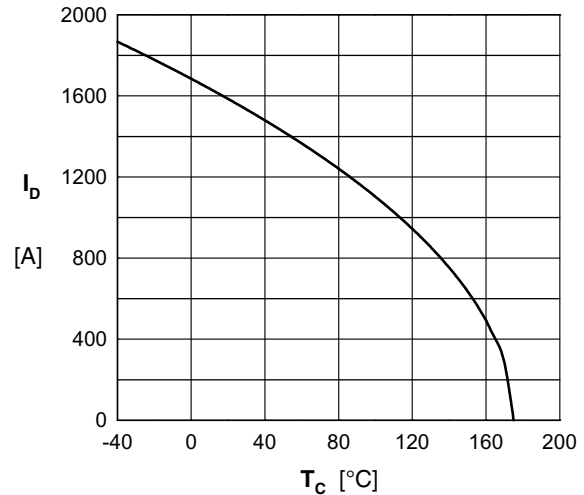


Fig. 8 Drain current I_D versus case temperature T_C

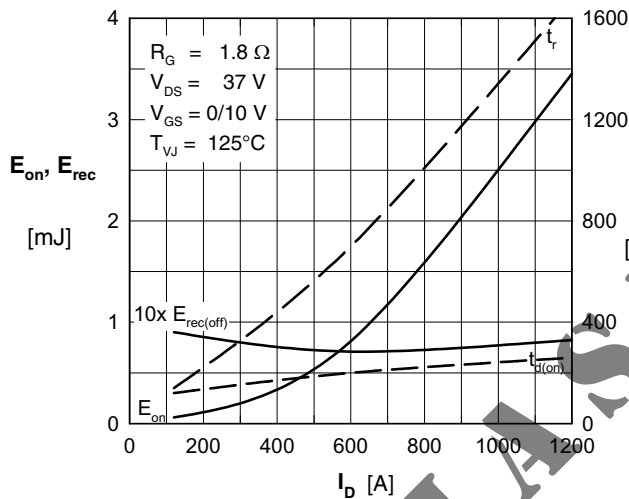


Fig. 9 Typ. turn-on energy and switching times versus drain current, inductive switching

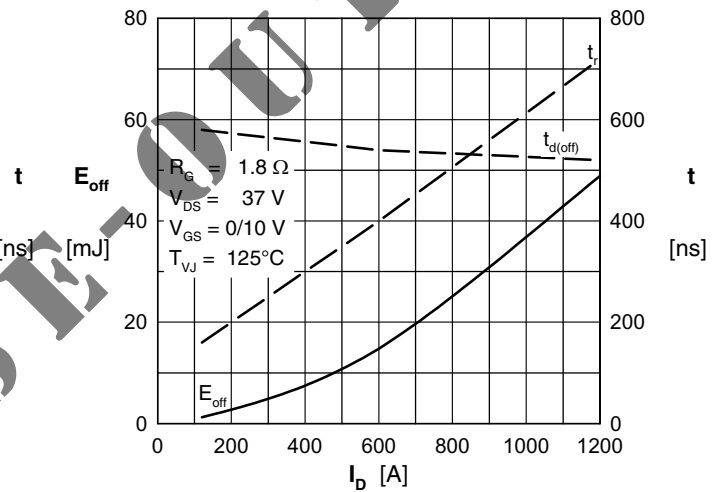


Fig. 10 Typ. turn-off energy and switching times versus drain current, inductive switching

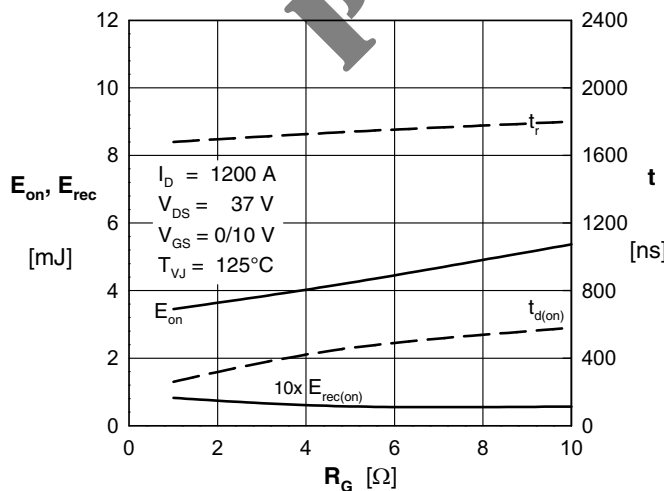


Fig. 11 Typ. turn-on energy and switching times versus gate resistor, inductive switching

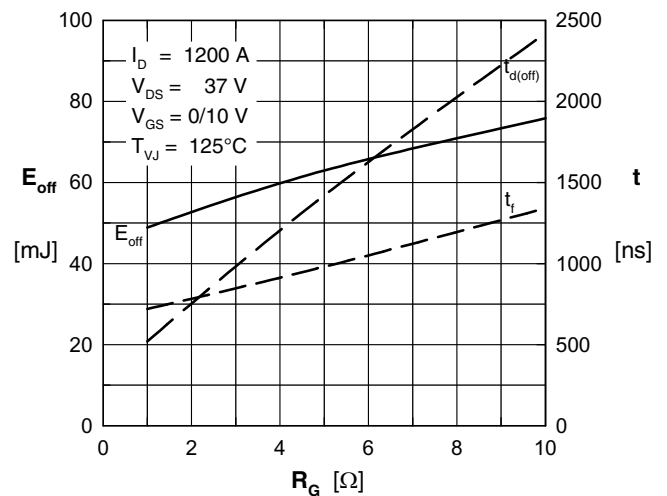


Fig. 12 Typ. turn-off energy and switching times versus gate resistor, inductive switching

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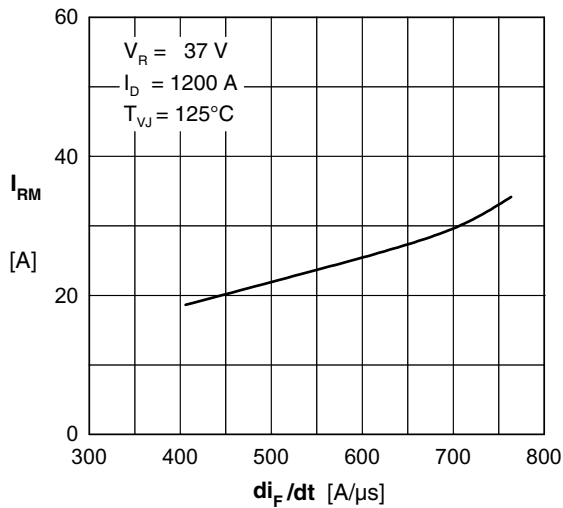


Fig. 13 Reverse recovery current I_{RM} of the body diode vs. di/dt

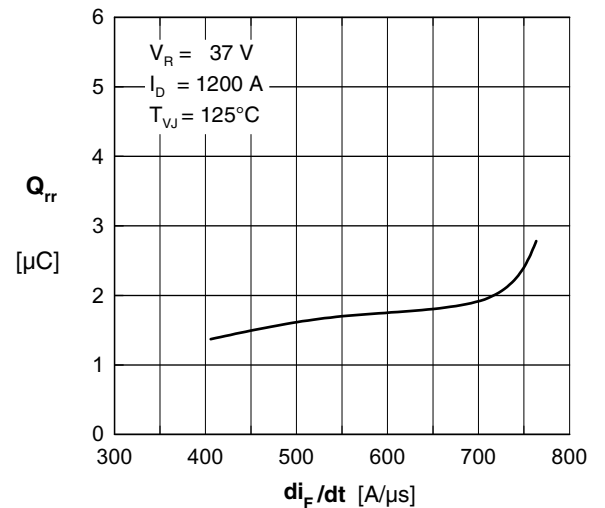


Fig. 14 Reverse recovery charge Q_{rr} of the body diode vs. di/dt

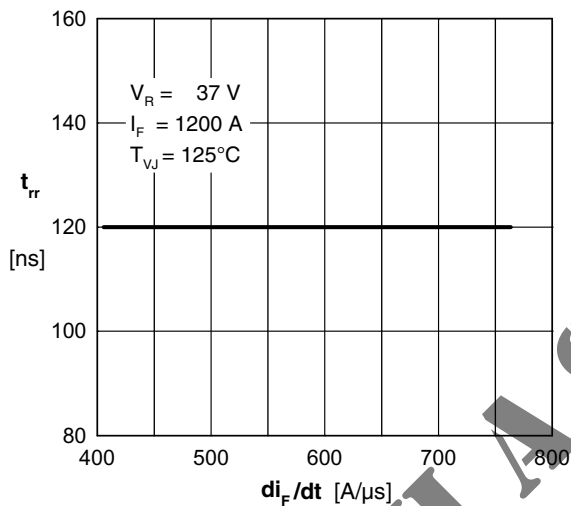


Fig. 15 Reverse recovery time t_{rr} of the body diode vs. di/dt

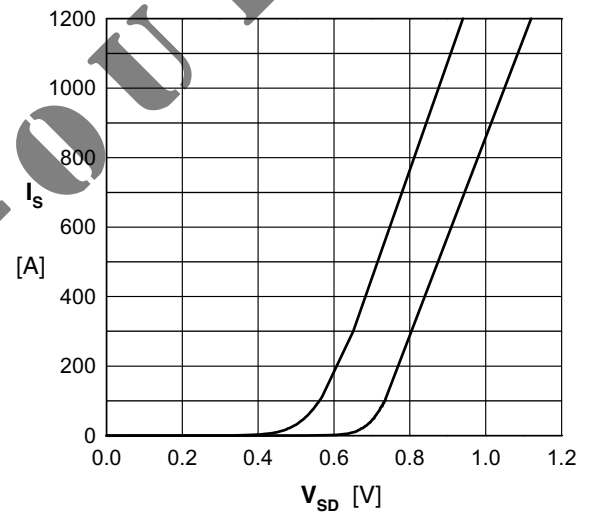


Fig. 16 Source current I_s vs. source drain voltage V_{SD} (body diode)

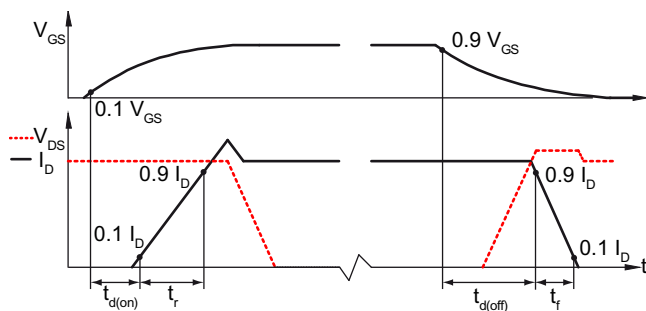


Fig. 17 Definition of switching times

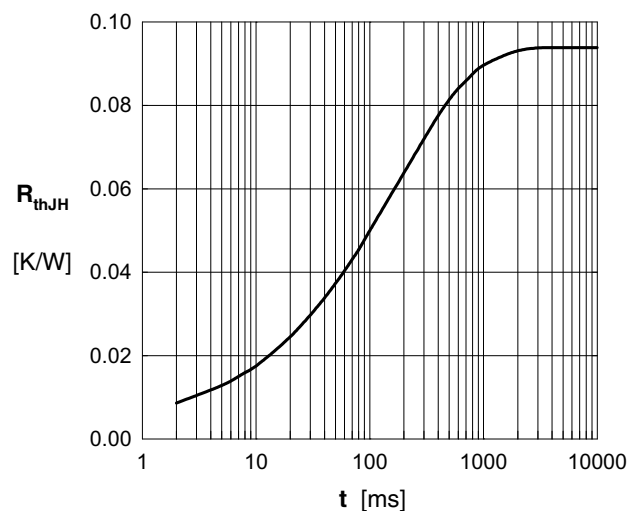


Fig. 18 Typ. transient thermal impedance

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