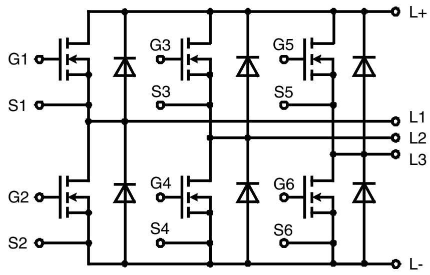
Three phase full Bridge
with Trench MOSFETs
in DCB isolated high current package

V_{DSS} = 40 V
I_{D25} = 180 A
$R_{DSon\ typ.}$ = 1.9 mΩ

Preliminary data




Straight leads


Surface Mount Device

MOSFETs			
Symbol	**Conditions**	**Maximum Ratings**	
V_{DSS}	T_J = 25°C to 150°C	40	V
V_{GS}		± 20	V
I_{D25} I_{D90} I_{D110}	T_C = 25°C T_C = 90°C T_C = 110°C	180 136 120	A A A
I_{F25} I_{F90} I_{F110}	T_C = 25°C (diode) T_C = 90°C (diode) T_C = 110°C (diode)	182 112 88	A A A

Symbol	Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified)			
			min.	typ.	max.	
R_{DSon} 1)	on chip level at V_{GS} = 10 V; I_D = 100 A	T_J = 25°C T_J = 125°C		1.9 2.8	2.5	mΩ mΩ
$V_{GS(th)}$	V_{DS} = 20 V; I_D = 1 mA		2.5		4.5	V
I_{DSS}	V_{DS} = V_{DSS}; V_{GS} = 0 V	T_J = 25°C T_J = 125°C		 50	5	µA µA
I_{GSS}	V_{GS} = ± 20 V; V_{DS} = 0 V				0.2	µA
Q_g Q_{gs} Q_{gd}	V_{GS} = 10 V; V_{DS} = 20 V; I_D = 100 A			110 33 30		nC nC nC
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off} E_{recoff}	inductive load V_{GS} = +10/0 V; V_{DS} = 24 V I_D = 135 A; R_G = 39 Ω; T_J = 125°C			150 240 350 170 0.12 0.51 0.003		ns ns ns ns mJ mJ mJ
R_{thJC} R_{thJH}	 with heat transfer paste (IXYS test setup)			 1.3	1.0 1.6	K/W K/W

1) $V_{DS} = I_D \cdot (R_{DS(on)} + R_{Pin\ to\ Chip})$

Applications

AC drives
- in automobiles
  - electric power steering
  - starter generator
- in industrial vehicles
  - propulsion drives
  - fork lift drives
- in battery supplied equipment

Features

- MOSFETs in trench technology:
  - low R_{DSon}
  - optimized intrinsic reverse diode
- package:
  - high level of integration
  - high current capability 300 A max.
  - aux. terminals for MOSFET control
  - terminals for soldering or welding connections
  - isolated DCB ceramic base plate with optimized heat transfer
- Space and weight savings

Package options

- 2 lead forms available
  - straight leads (SL)
  - SMD lead version (SMD)

IXYS reserves the right to change limits, test conditions and dimensions.

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Source-Drain Diode

Symbol	Conditions	min.	typ.	max.	
	(Characteristic Values, T_J = 25°C, unless otherwise specified)				
V_{SD}	(diode) I_F = 100 A; V_{GS} = 0 V		0.9	1.2	V
t_{rr}	I_F = 100 A; -di_F/dt = 600 A/µs; V_R = 15 V; T_{VJ} = 125°C		38		ns
Q_{RM}			0.31		µC
I_{RM}			14		A

Component

Symbol	Conditions	Maximum Ratings	
I_{RMS}	per pin in main current paths (P+, N-, L1, L2, L3) may be additionally limited by external connections	300	A
T_J		-55...+175	°C
T_{stg}		-55...+125	°C
V_{ISOL}	I_{ISOL} ≤ 1 mA, 50/60 Hz, f = 1 minute	1000	V~
F_C	mounting force with clip	50 - 250	N

Symbol	Conditions	Characteristic Values min.	typ.	max.	
$R_{pin\ to\ chip}$ [1]	L+ to L1/L2/L3 or L- to L1/L2/L3		1.0		mΩ
C_P	coupling capacity between shorted pins and mounting tab in the case		160		pF
Weight			25		g

[1] $V_{DS} = I_D \cdot (R_{DS(on)} + R_{Pin\ to\ Chip})$

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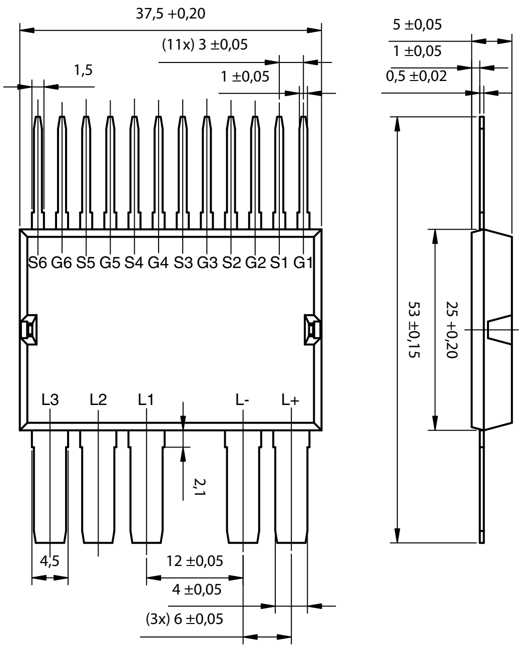
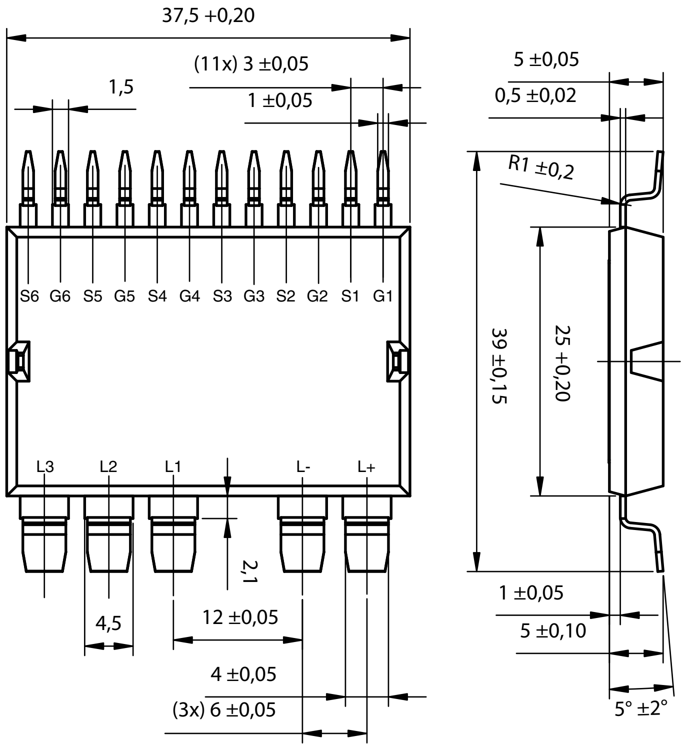
Straight Leads GWM 180-004X1-SL



Surface Mount Device GWM 180-004X1-SMD



Leads	Ordering	Part Name & Packing Unit Marking	Part Marking	Delivering Mode	Base Qty.	Ordering Code
Straight	Standard	GWM 180-004X2 - SL	GWM 180-004X2	Blister	28	508 772
SMD	Standard	GWM 180-004X2 - SMD	GWM 180-004X2	Blister	28	508 786

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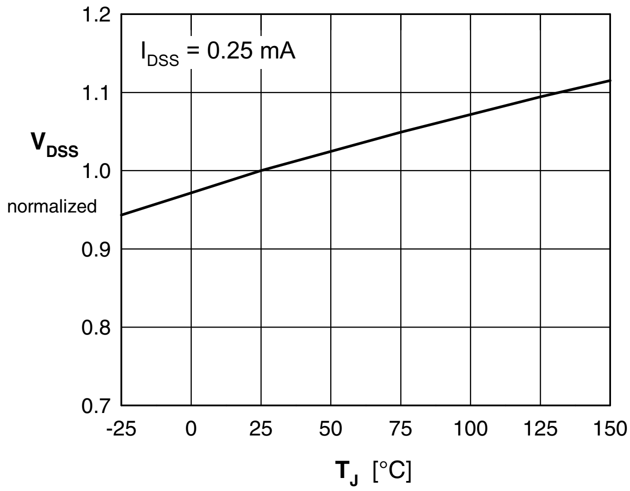

Fig. 1 Drain source breakdown voltage V_{DSS} versus junction temperature T_{VJ}

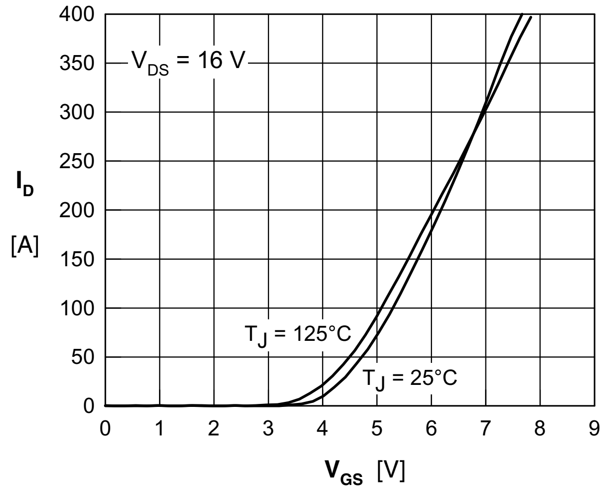

Fig. 2 Typical transfer characteristic

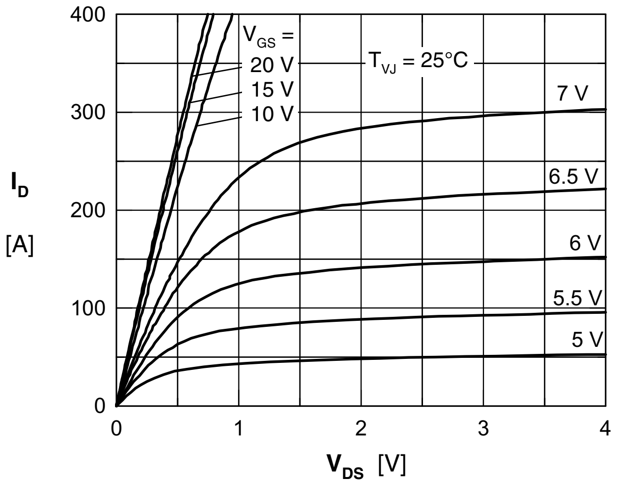

Fig. 3 Typical output characteristic

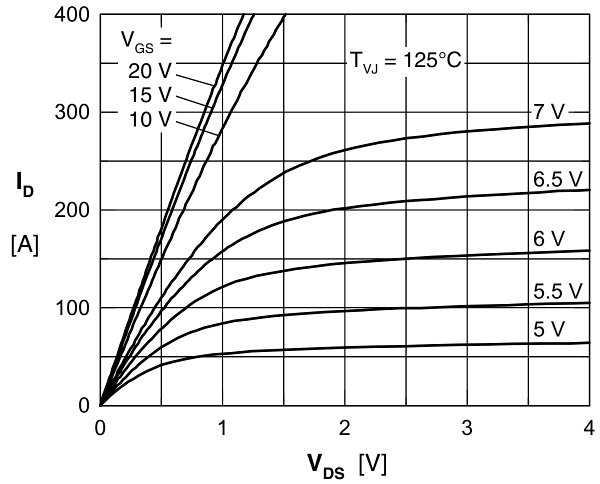

Fig. 4 Typical output characteristic

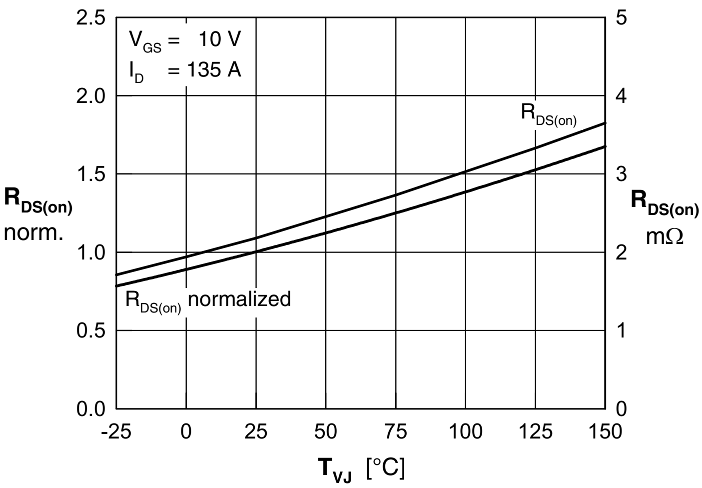

Fig. 5 Typ. drain source on-state resistance $R_{DS(on)}$ versus junction temperature T_J

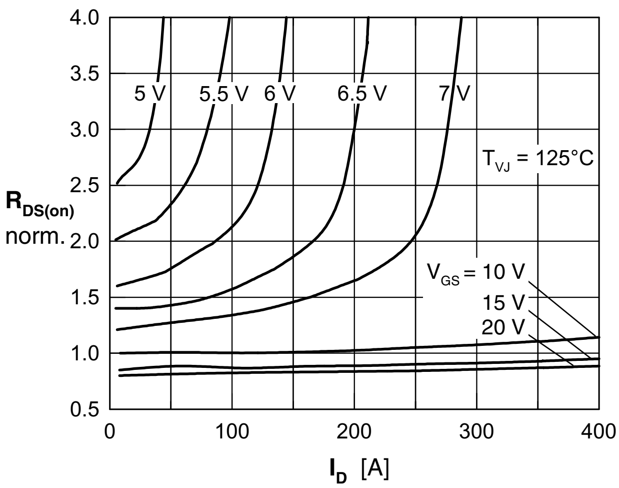

Fig. 6 Typ. drain source on-state resistance $R_{DS(on)}$ versus I_D

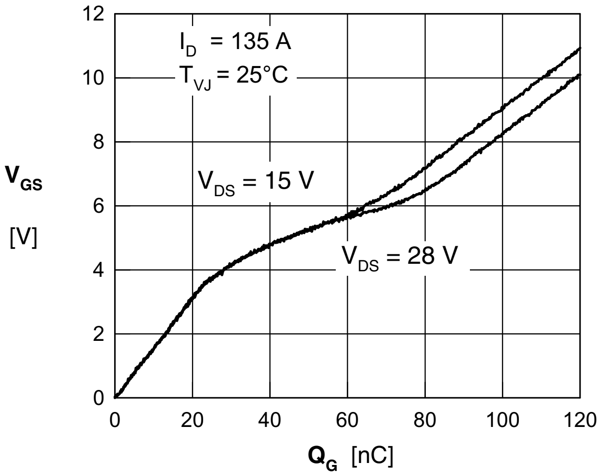

Fig. 7 Gate charge characteristics

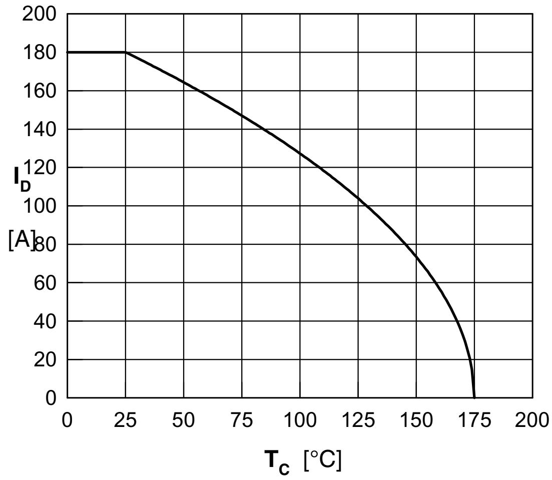

Fig. 8 Drain current I_D vs. temperature T_C

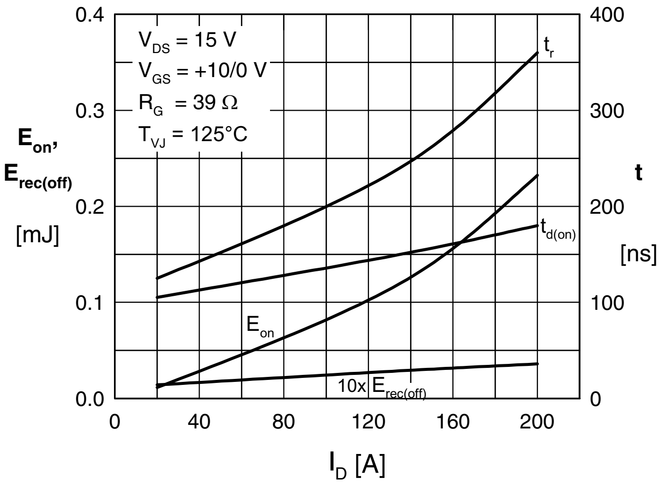

Fig. 9 Typ. turn-on energy & switching times vs. collector current, inductive switching

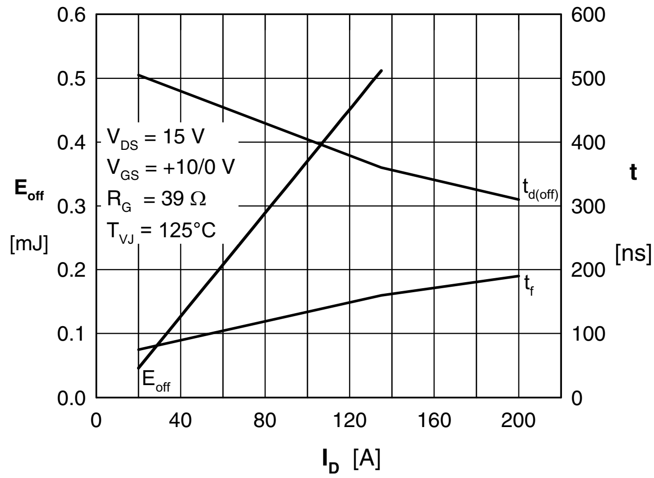

Fig. 10 Typ. turn-off energy & switching times vs. collector current, inductive switching

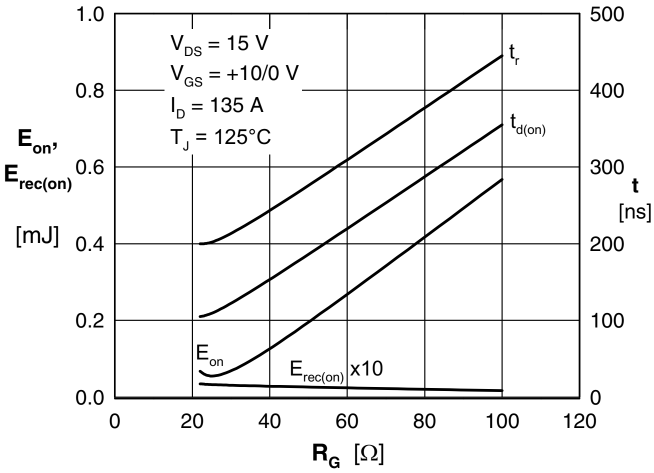

Fig. 11 Typ. turn-on energy & switching times vs. gate resistor, inductive switching

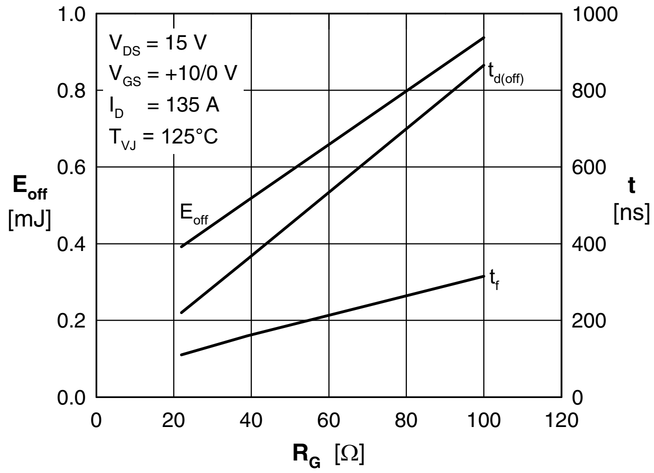

Fig. 12 Typ. turn-off energy & switching times vs. gate resistor, inductive switching

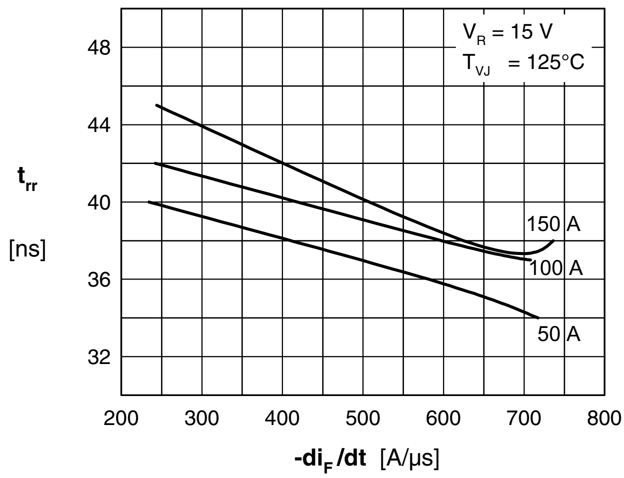

Fig. 13 Reverse recovery time t_{rr} of the body diodes vs. di/dt

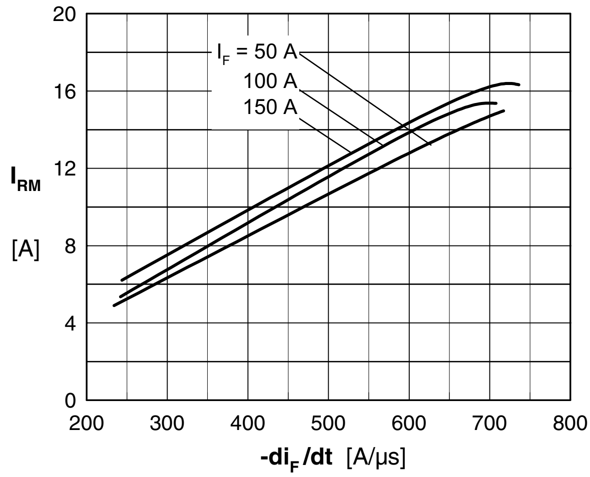

Fig. 14 Reverse recovery current I_{RM} of the body diodes versus di/dt

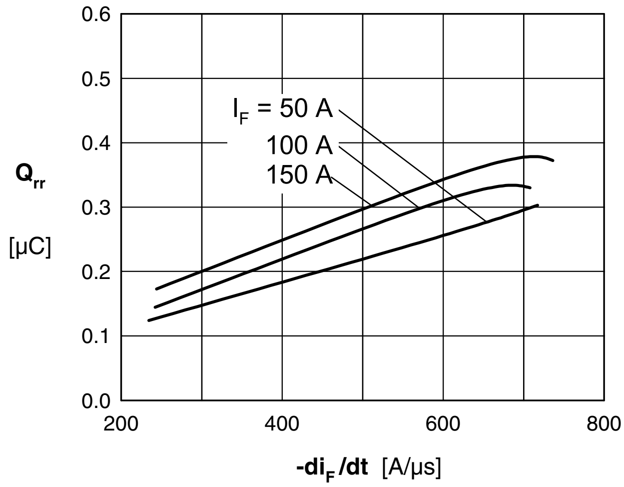

Fig. 15 Reverse recovery charge Q_{rr} of the body diodes versus di/dt

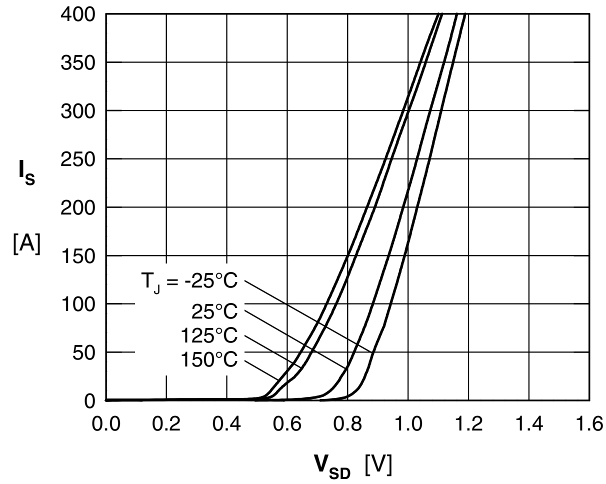

Fig. 16 Source current I_S versus source drain voltage V_{SD} (body diode)

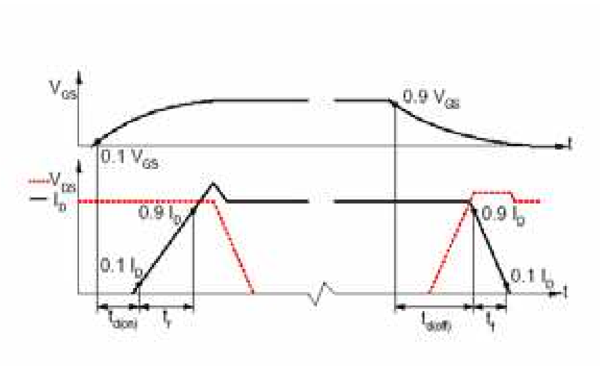

Fig. 17 Definition of switching times