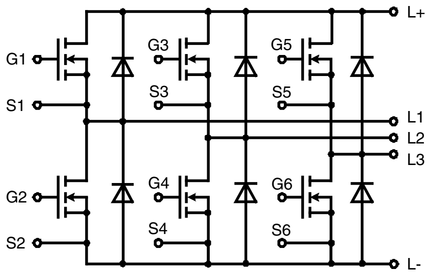
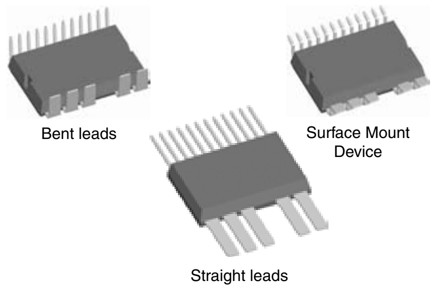
Three phase full Bridge

with Trench MOSFETs
in DCB isolated high current package

V_{DSS} = 75 V
I_{D25} = 118 A
$R_{DSon\ typ.}$ = 3.7 mΩ





MOSFETs

Symbol	Conditions	Maximum Ratings	
V_{DSS}	T_{VJ} = 25°C to 150°C	75	V
V_{GS}		± 20	V
I_{D25} I_{D90}	T_C = 25°C T_C = 90°C	118 85	A A
I_{F25} I_{F90}	T_C = 25°C (diode) T_C = 90°C (diode)	120 78	A A

Symbol	Conditions		Characteristic Values (T_{VJ} = 25°C, unless otherwise specified)			
			min.	typ.	max.	
R_{DSon}	on chip level at V_{GS} = 10 V; I_D = 60 A	T_{VJ} = 25°C T_{VJ} = 125°C		3.7 8.4	5.5	mΩ mΩ
$V_{GS(th)}$	V_{DS} = 20 V; I_D = 1 mA		2		4	V
I_{DSS}	$V_{DS} = V_{DSS}$; V_{GS} = 0 V	T_{VJ} = 25°C T_{VJ} = 125°C		 0.1	1	µA mA
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} = 55 V; I_D = 125 A			100 19 28		nC nC nC
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off} E_{recoff}	V_{GS} = 10 V; V_{DS} = 30 V I_D = 80 A; R_G = 39 Ω inductive load			80 80 510 100 0.12 0.40 0.02		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

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 RDSon
  - 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

- 3 lead forms available
  - straight leads (SL)
  - SMD lead version (SMD)
  - bent leads (BL)

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

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Source-Drain Diode

Symbol	Conditions	min.	typ.	max.	
	(T_J = 25°C, unless otherwise specified)				
V_{SD}	(diode) I_F = 60 A; V_{GS} = 0 V		0.9	1.2	V
t_{rr}			70		ns
Q_{RM}	I_F = 80 A; -di_F/dt = 800 A/µs; V_R = 30 V		1.1		µC
I_{RM}			30		A

Characteristic Values

Component

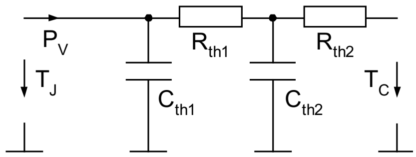
Symbol	Conditions	Maximum Ratings	
I_{RMS}	per pin in main current paths (P+, N-, L1, L2, L3) may be additionally limited by external connections	300	A
T_{VJ}		-55...+175	°C
T_{stg}		-55...+125	°C
V_{ISOL}	I_{ISOL} ≤ 1 mA, 50/60 Hz, f = 1 minute	1000	V~
F_C	mounting force with clip	50 - 250	N

Characteristic Values

Symbol	Conditions	min.	typ.	max.	
$R_{pin\ to\ chip}$	with heatsink compound		0.6		mΩ
C_P	coupling capacity between shorted pins and mounting tab in the case		160		pF
Weight	typ.		25		g

Equivalent Circuits for Simulation

Thermal Response



junction - case (typ.)

C_{th1} = 0.039 J/K; R_{th1} = 0.28 K/W

C_{th2} = 0.069 J/K; R_{th2} = 0.57 K/W

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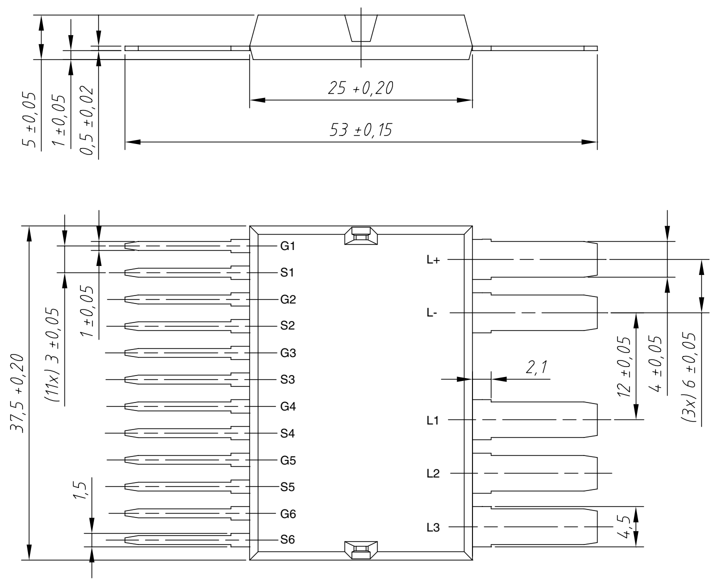
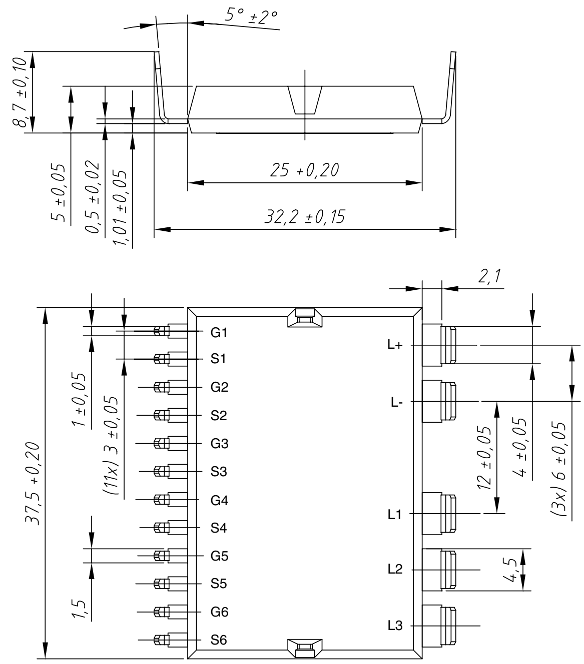
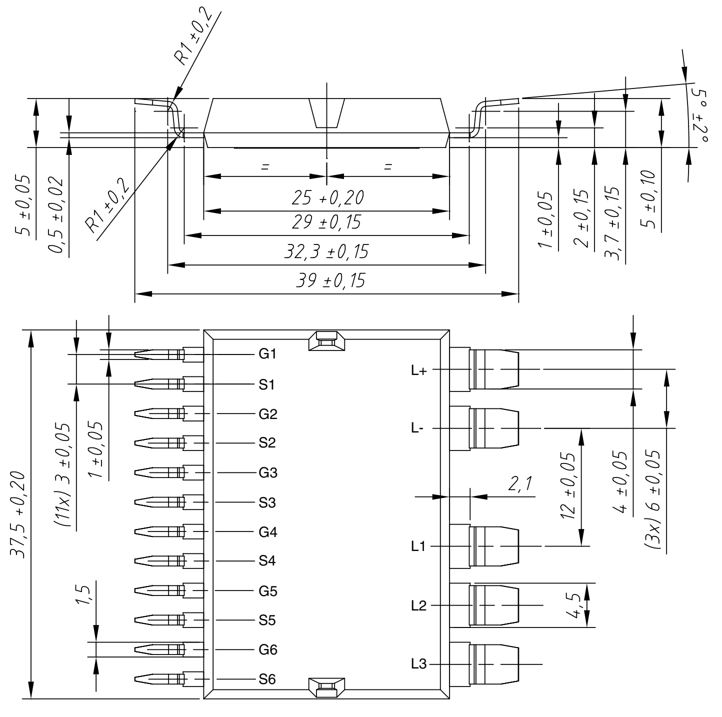
Straight Leads GWM 120-0075P3-SL



Bent Leads GWM 120-0075P3-BL



Surface Mount Device GWM 120-0075P3-SMD



Leads	Ordering	Part Name & Packing Unit Marking	Part Marking	Delivering Mode	Base Qty.	Ordering Code
Straight	Standard	GWM 120-0075P3 - SL	GWM 120-0075P3	Blister	36	502 843
SMD	Standard	GWM 120-0075P3 - SMD	GWM 120-0075P3	Blister	36	502 850
Bent	Standard	GWM 120-0075P3 - BL	GWM 120-0075P3	Blister	36	contact factory

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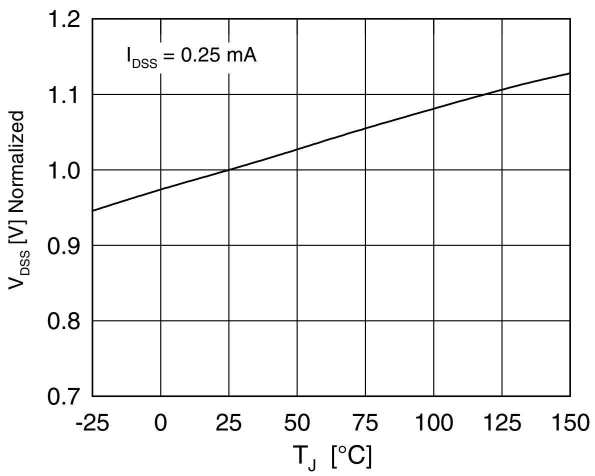

Fig. 1 Drain source breakdown voltage V_{DSS} vs. junction temperature T_{VJ}

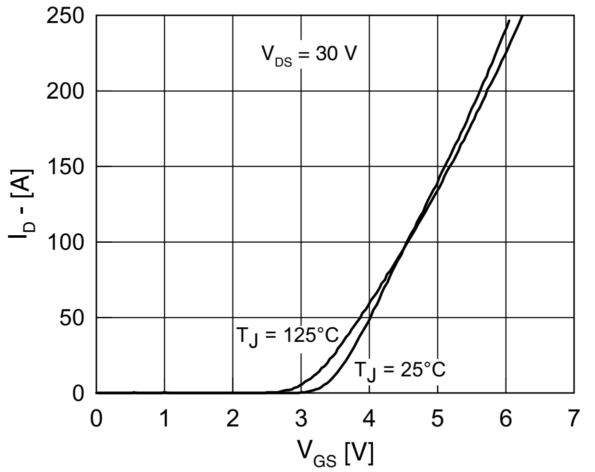

Fig. 2 Typical transfer characteristic

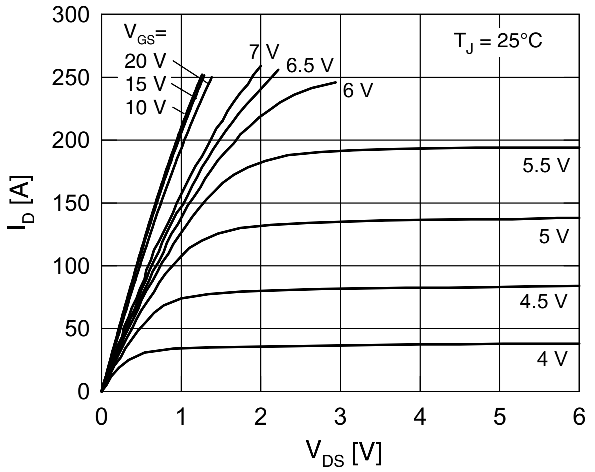

Fig. 3 Typical output characteristic

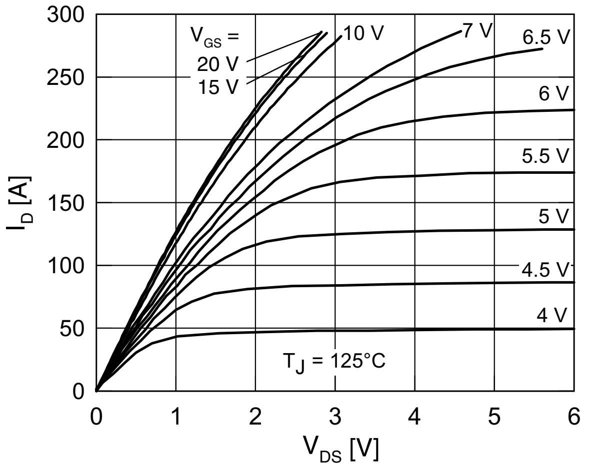

Fig. 4 Typical output characteristic

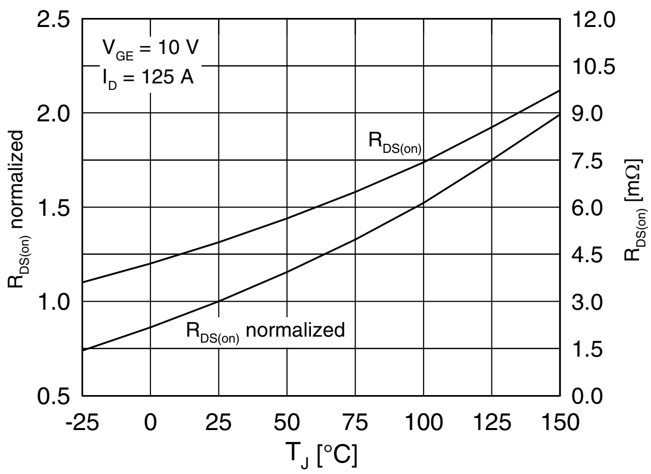

Fig. 5 Drain source on-state resistance $R_{DS(on)}$ versus junction temperature T_J

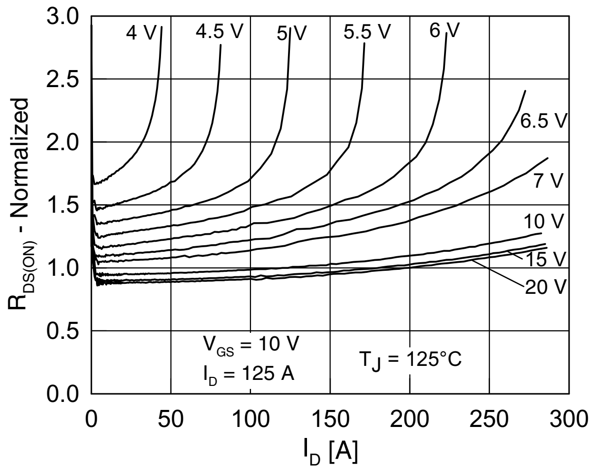

Fig. 6 Drain source on-state resistance $R_{DS(on)}$ versus I_D

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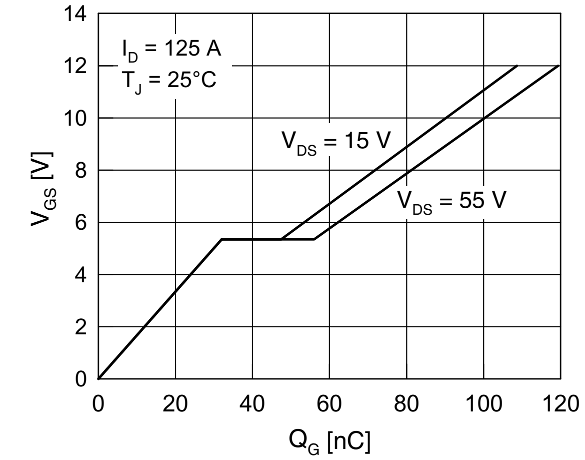

Fig.7 Gate charge characteristic

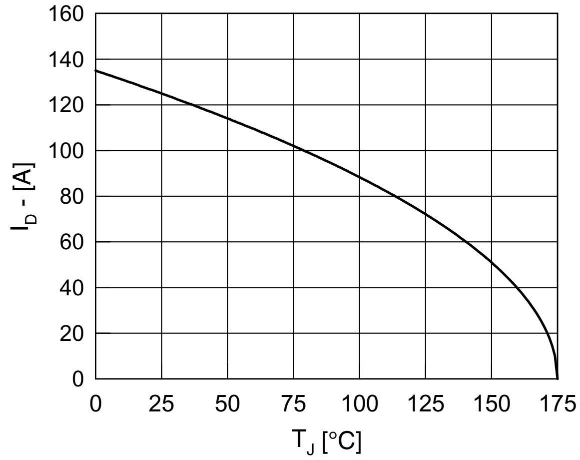

Fig. 8 Drain current I_D vs. case temperature T_C

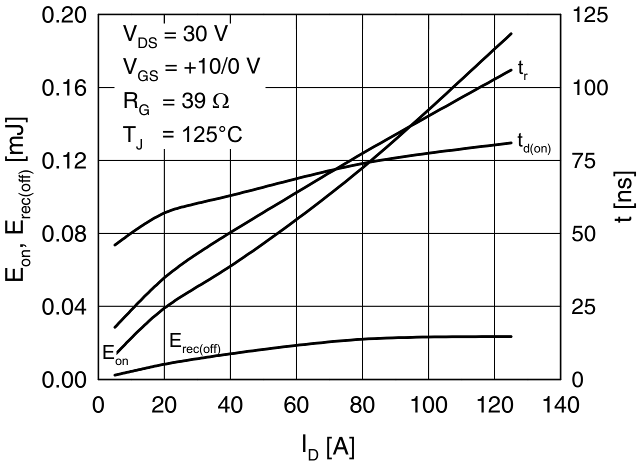

Fig. 9 Typ. turn-on energy & switching times vs. collector current, inductive switching

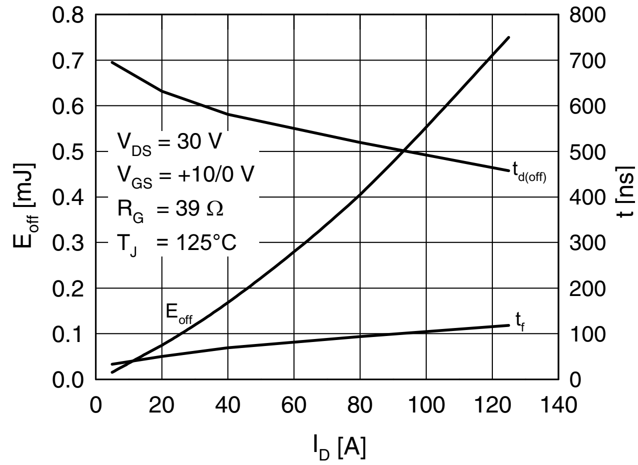

Fig. 10 Typ. turn-off energy & switching times vs. collector current, inductive switching

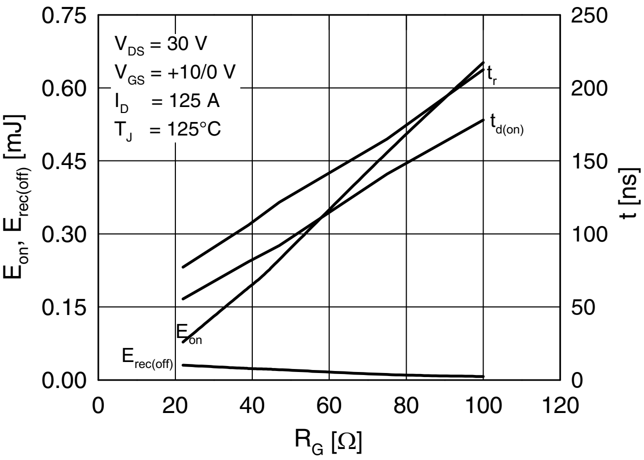

Fig. 11 Typ. turn-on energy & switching times vs. gate resistor, inductive switching

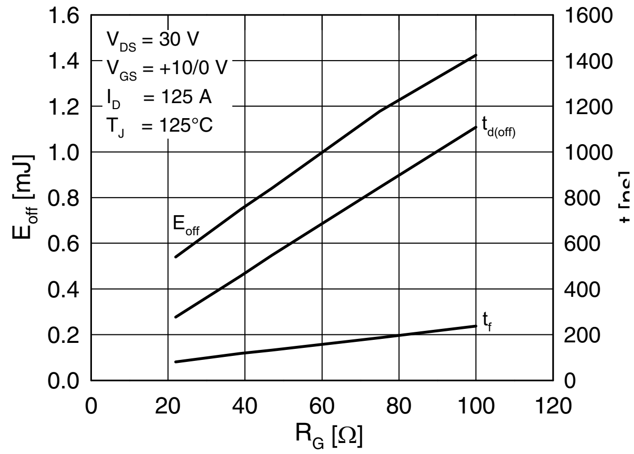

Fig. 12 Typ. turn-off energy & switching times vs. gate resistor, inductive switching

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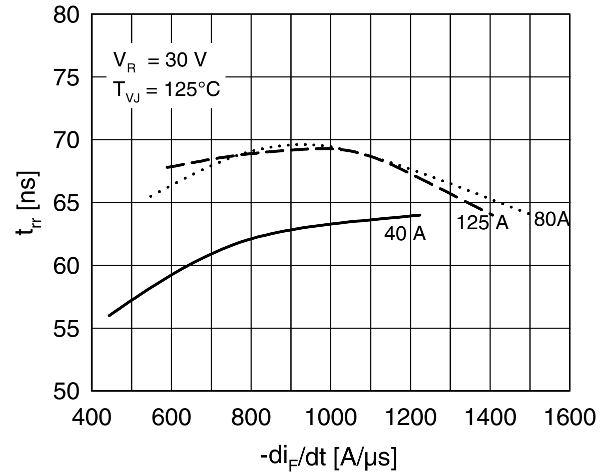

Fig. 13 Reverse recovery time t_{rr} of the body diode vs. di/dt

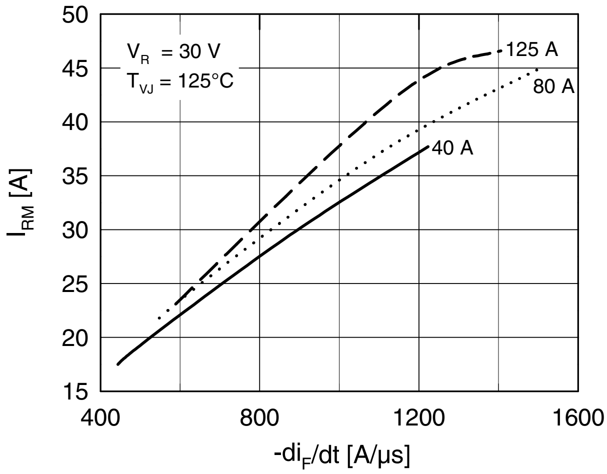

Fig. 14 Reverse recovery current I_{RM} of the body diode vs. di/dt

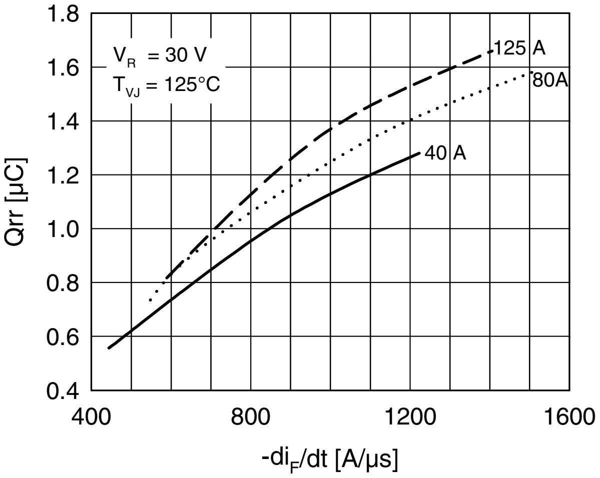

Fig. 15 Reverse recovery charge Q_{rr} of the body diode vs. di/dt

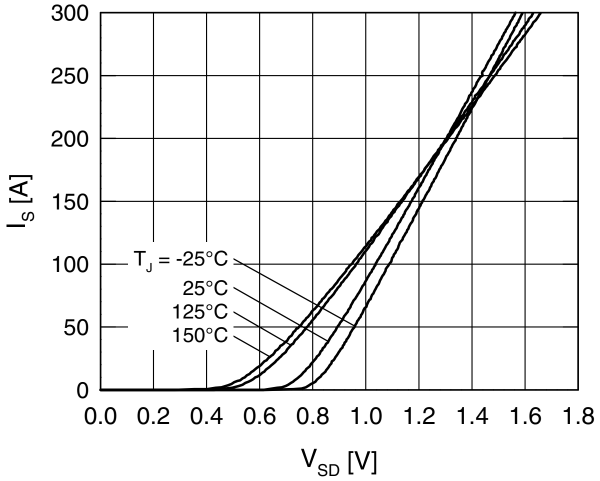

Fig. 16 Source current I_S vs. source drain voltage V_{SD} (body diode)

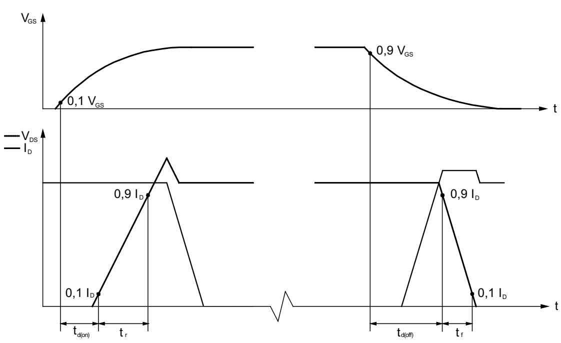

Fig. 17 Definition of switching times

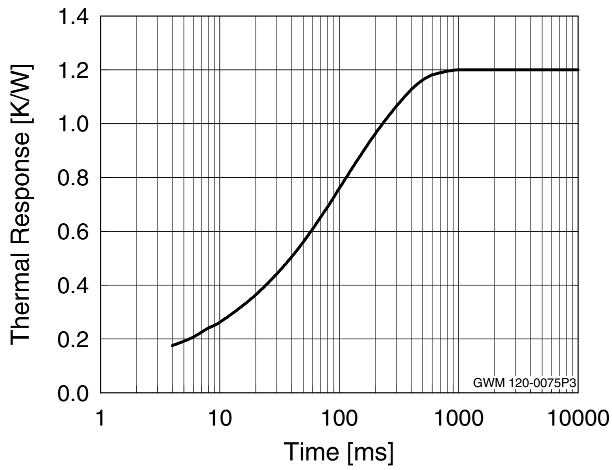

Fig. 18 Typ. therm. impedance junction to heatsink Z_{thJC}