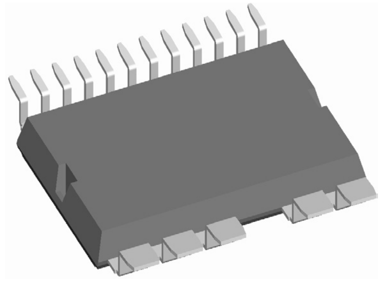
Three phase full Bridge

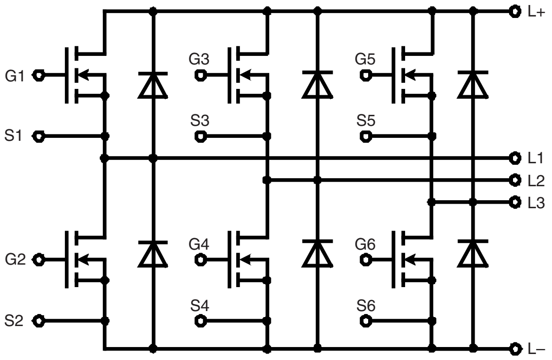
with Trench MOSFETs
in DCB-isolated high-current package

V_{DSS} = 100 V
I_{D25} = 120 A
$R_{DSon\ typ.}$ = 3.2 mΩ

Part number
MTI85W100GC



Surface Mount Device



Features / Advantages:

- 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

Applications:

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

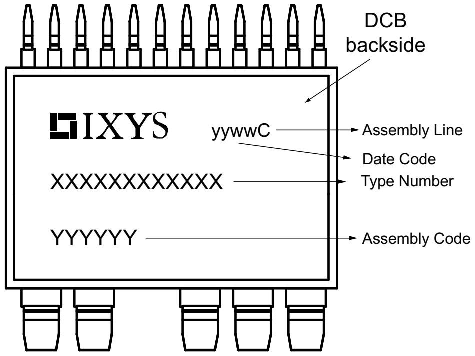
Package: ISOPLUS-DIL®

- High level of integration
- RoHS compliant
- High current capability
- Aux. Terminals for MOSFET control
- Terminals for soldering or welding connections
- Space and weight savings

Terms & Conditions of usage
The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact your local sales office.
Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact your local sales office.
Should you intend to use the product in aviation, in health or life endangering or life support applications, please notify. For any such application we urgently recommend
- to perform joint risk and quality assessments;
- the conclusion of quality agreements;
- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
MOSFETs				Ratings			
V_{DSS}	*drain source breakdown voltage*		T_{VJ} = 25°C to 150°C			100	V
V_{GS}	*gate source voltage*					±15	V
V_{GSM}	*max. transient gate source voltage*					±20	V
I_{D25}	*continuous drain current*		T_C = 25°C			120	A
I_{D90}			T_C = 90°C			90	A
I_{F25}	*forward current*		T_C = 25°C				A
I_{F90}			T_C = 90°C				A
$R_{DS(on)}$ 1)	*static drain source on resistance*	on-chip level at	T_{VJ} = 25°C		3.2	4	mΩ
		I_D = 80 A; V_{GS} = 10 V	T_{VJ} = 125°C		5.4		mΩ
$V_{GS(th)}$	*gate threshold voltage*	I_D = 150 µA; $V_{DS} = V_{GS}$	T_{VJ} = 25°C	2.0		3.5	V
I_{DSS}	*drain source leakage current*	$V_{DS} = V_{DSS}$; V_{GS} = 0 V	T_{VJ} = 25°C			1	µA
			T_{VJ} = 125°C		10	100	µA
I_{GSS}	*gate source leakage current*	V_{GS} = ±20 V; V_{DS} = 0 V				500	nA
R_G	*gate resistance*	on-chip level					Ω
Q_g	*total gate charge*	V_{GS} = 10 V; V_{DS} = 50 V; I_D = 80 A			88		nC
Q_{gs}	*gate source charge*				30		nC
Q_{gd}	*gate drain (Miller) charge*				18		nC
$t_{d(on)}$	*turn-on delay time*	inductive load V_{GS} = 10 V; V_{DS} = 50 V I_D = 80 A; R_G = 39 Ω	T_{VJ} = 125°C		90		ns
t_r	*current rise time*				55		ns
$t_{d(off)}$	*turn-off delay time*				480		ns
t_f	*current fall time*				40		ns
E_{on}	*turn-on energy per pulse*				130		µJ
E_{off}	*turn-off energy per pulse*				390		µJ
$E_{rec(off)}$	*turn-off reverse recovery losses*				10		µJ
R_{thJC}	*thermal resistance junction to case*					1.2	K/W
R_{thJH}	*thermal resistance junction to heatsink*	with heat transfer paste (IXYS test setup)			1.5		K/W
		1) $V_{DS} = I_D \cdot (R_{DS(on)} + 2 \cdot R_{Pin\ to\ Chip})$					
Source-Drain Diode							
V_{SD}	*source drain voltage*	I_F = 80 A; V_{GS} = 0 V	T_{VJ} = 25°C		0.9	1.2	V
Q_{RM}	*reverse recovery charge*	V_R = 50 V; I_F = 80 A; R_G = 39 Ω di/dt = 1500 A/µs	T_{VJ} = 125°C		1.3		µC
I_{RM}	*max. reverse recovery current*				44		A
t_{rr}	*reverse recovery time*				45		ns

Package ISOPLUS-DIL®					Ratings		
Symbol	**Definitions**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
I_{RMS}	*RMS current*	per pin in main current paths (P+, N–, L1, L2, L3) may be additionally limited by external connections (PCB tracks)				300	A
T_{stg}	*storage temperature*			-55		125	°C
T_{op}	*operation temperature*			-55		150	°C
T_{VJ}	*virtual junction temperature*			-55		175	°C
V_{ISOL}	*isolation voltage*	t = 1 second	50/60 Hz, RMS, $I_{ISOL} \leq 1$ mA	1200			V
		t = 1 minute		1000			V
$R_{pin\text{-}chip}$	*resistance terminal to chip*	$V_{DS} = I_D \cdot (R_{DS(on)} + 2 \cdot R_{pin\ to\ chip})$			0.6		mΩ
C_P	*coupling capacity*	between shorted pins and back side metallization			160		pF
F_C	*mounting force with clip*			50		250	N
Weight					13		g

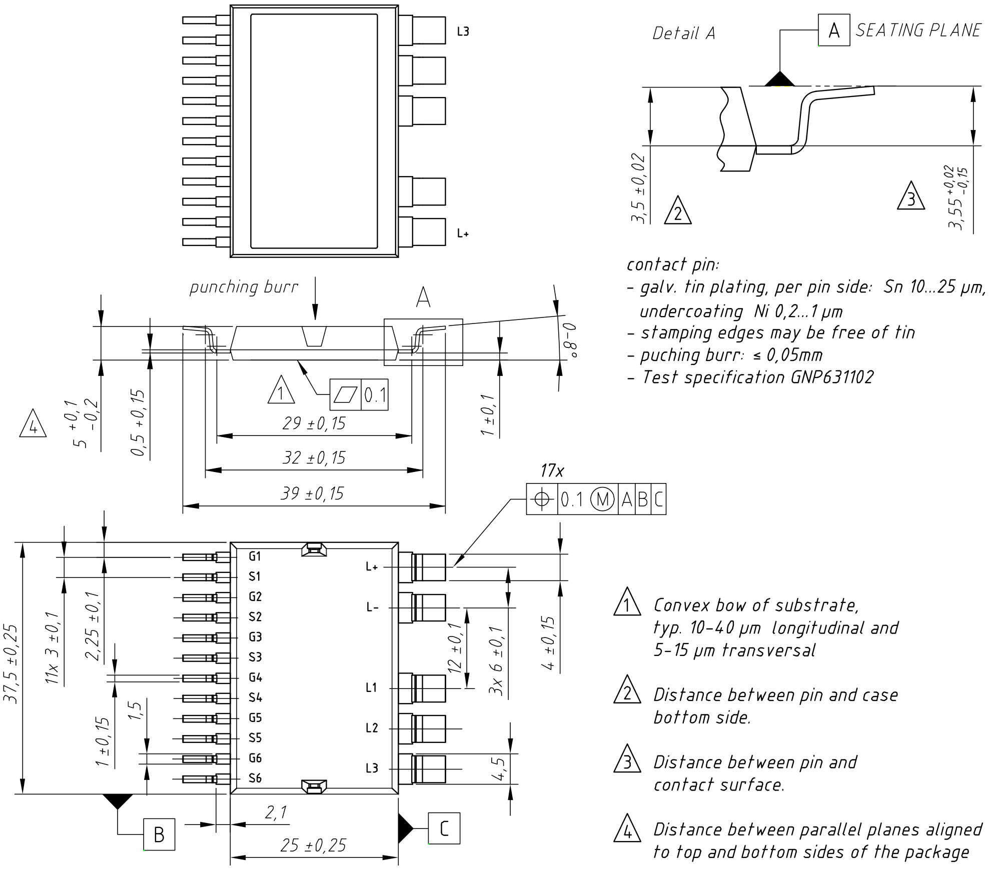


Part number

M = MOSFET
T = Trench
I = Infineon Trench
85 = Current Rating [A]
W = 6-Pack
100 = Reverse Voltage [V]
GC = ISOPLUS-DIL

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MTI85W100GC-SMD	MTI85W100GC	Tube	13	516941

Outlines ISOPLUS-DIL®



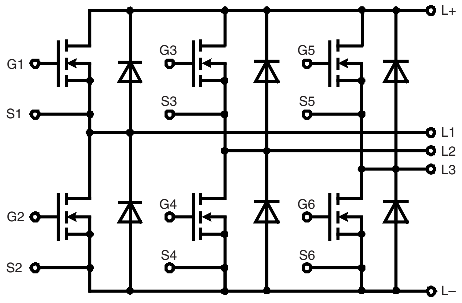
contact pin:
- *galv. tin plating, per pin side: Sn 10...25 µm,*
  undercoating Ni 0,2...1 µm
- *stamping edges may be free of tin*
- *puching burr: ≤ 0,05mm*
- *Test specification GNP631102*

1 Convex bow of substrate, typ. 10-40 µm longitudinal and 5-15 µm transversal

2 Distance between pin and case bottom side.

3 Distance between pin and contact surface.

4 Distance between parallel planes aligned to top and bottom sides of the package



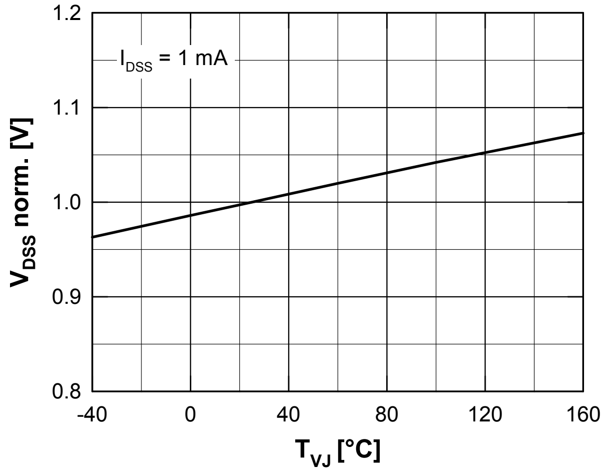


Fig. 1 Drain source breakdown voltage V_{DSS} vs. junction temperature T_{VJ}

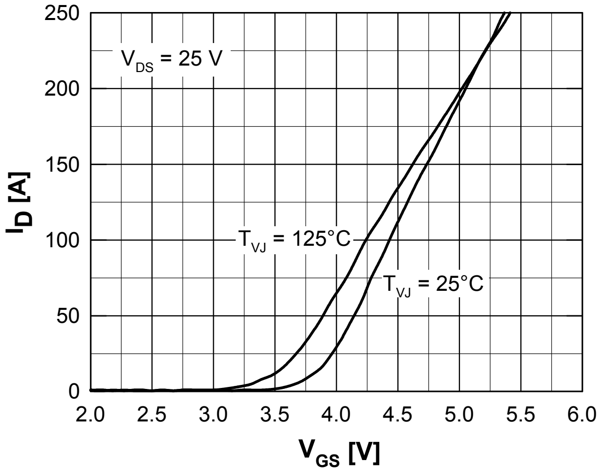


Fig. 2 Typ. transfer characteristics

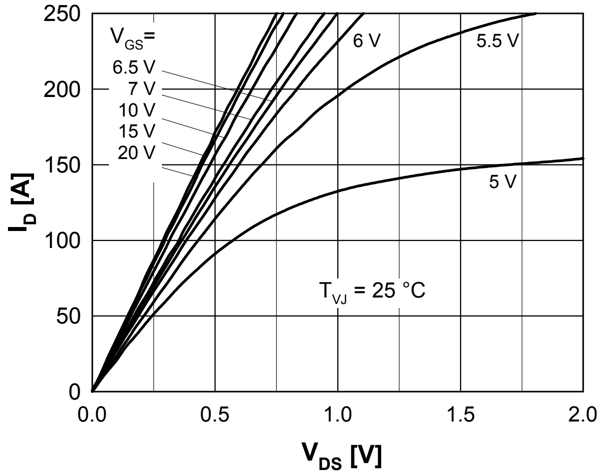


Fig. 3 Typ. output characteristics (25 °C)

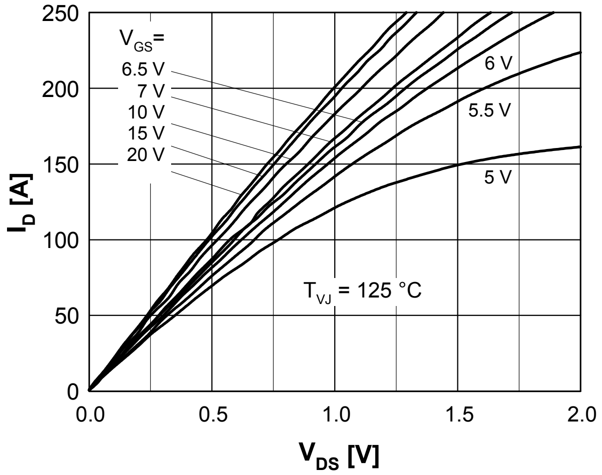


Fig. 4 Typ. output characteristics (125 °C)

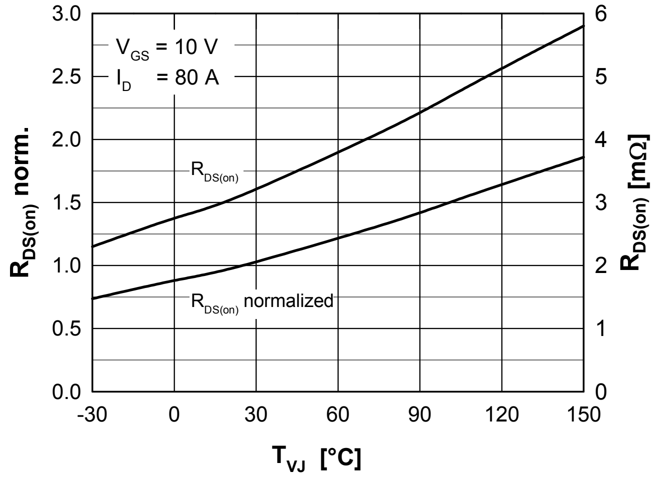


Fig. 5 Drain source on-state resistance versus junction temperature

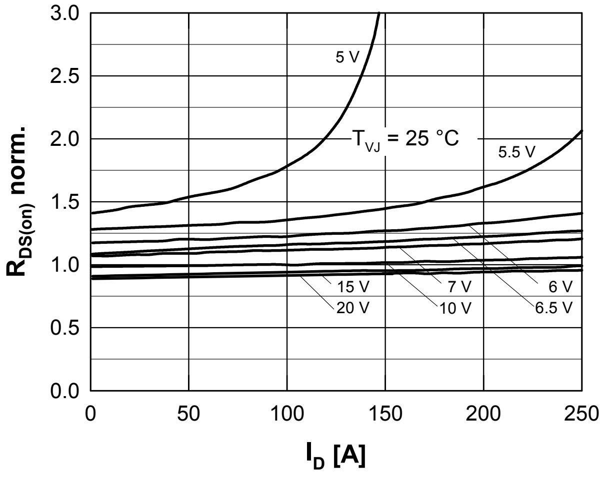


Fig. 6 Drain source on-state resistance versus I_D

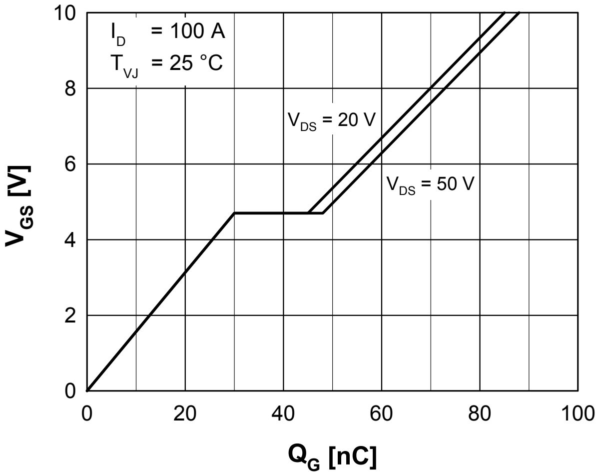


Fig. 7 Typical turn on gate charge

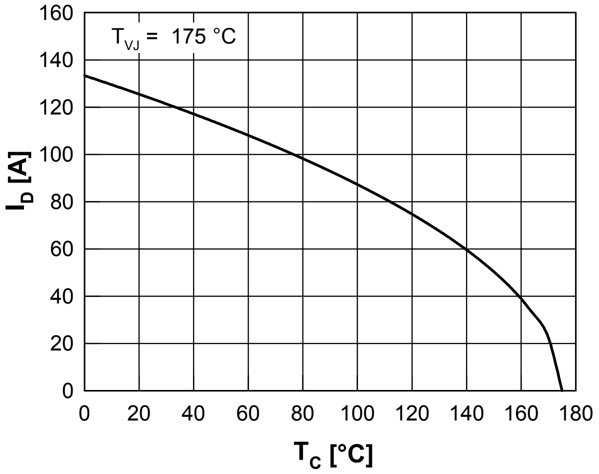


Fig. 8 Drain current I_D vs. case temperature T_C (chip capability)

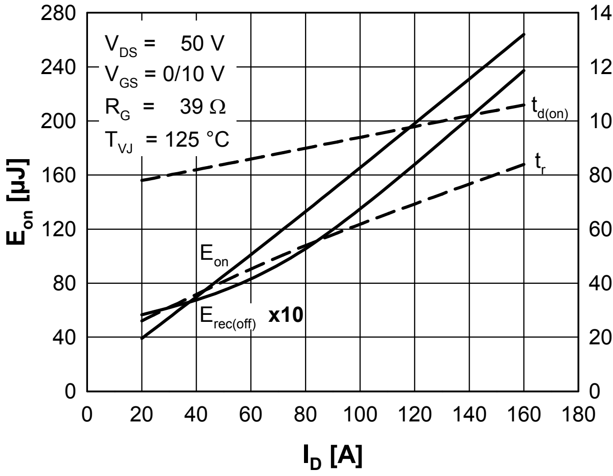


Fig. 9 Typ. turn-on energy and switching times versus drain current, inductive switching

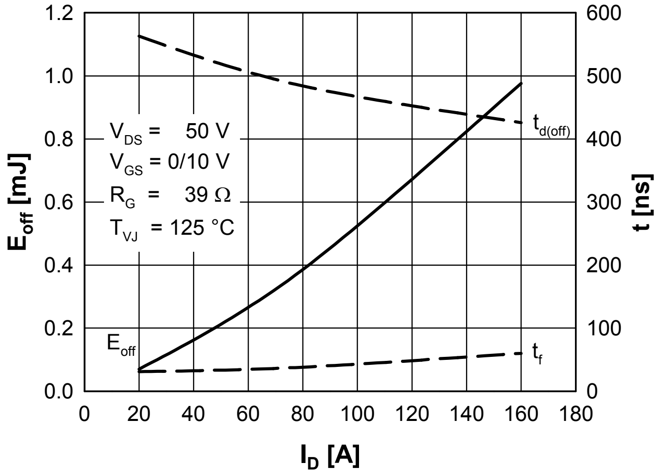


Fig. 10 Typ. turn-off energy and switching times versus drain-current, inductive switching

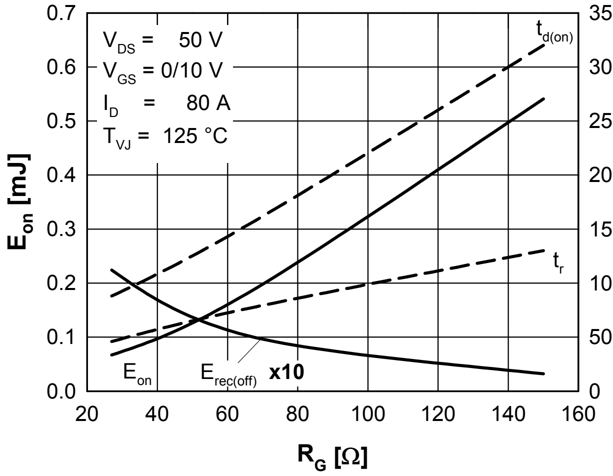


Fig. 11 Typ. turn-on energy and switching times versus gate resistor, inductive switching

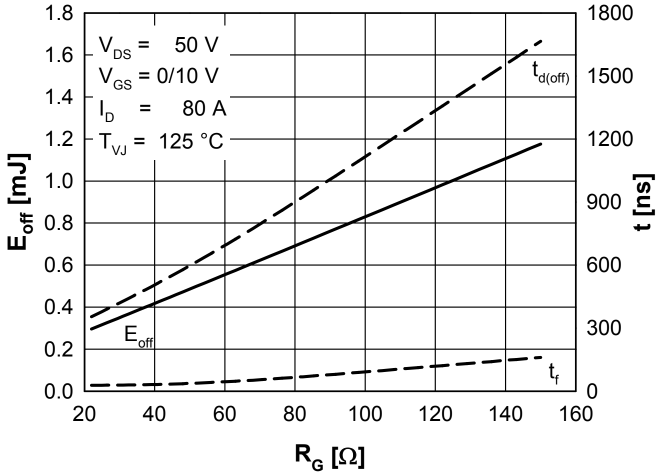


Fig. 12 Typ. turn-off energy and switching times versus gate resistor, inductive switching

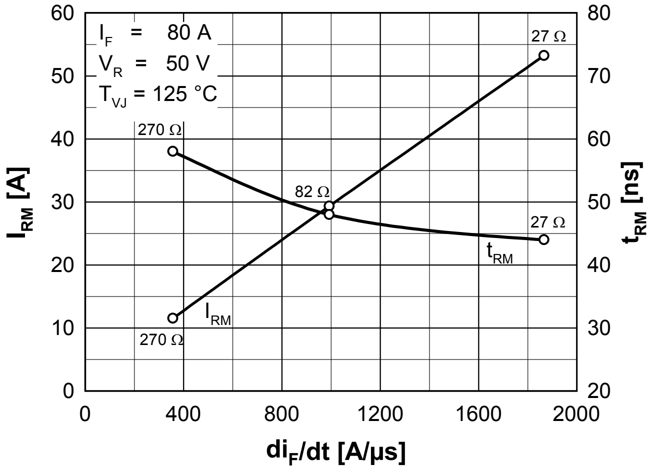


Fig. 13 Reverse recovery time t_{RM} of the body diode vs. di_F/dt

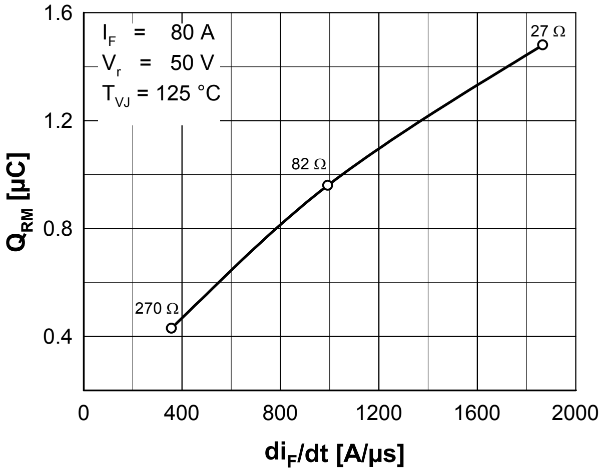


Fig. 14 Reverse recovery charge Q_{RM} of the body diode vs. di_F/dt

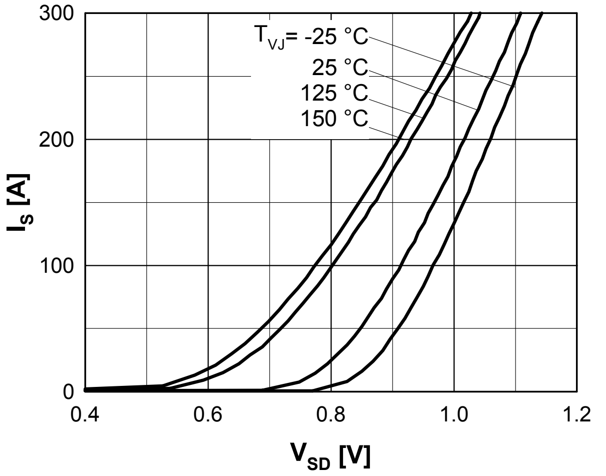


Fig.15 Source current I_S vs. source drain voltage V_{SD} (body diode)

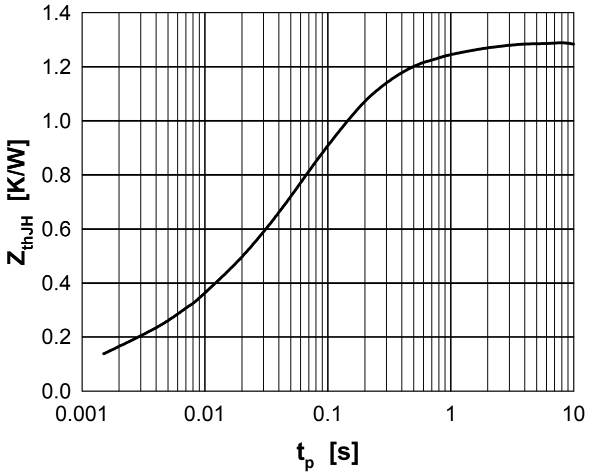


Fig. 16 Typ. thermal impedance junction to heatsink Z_{thJH} with heat transfer paste (IXYS test setup)

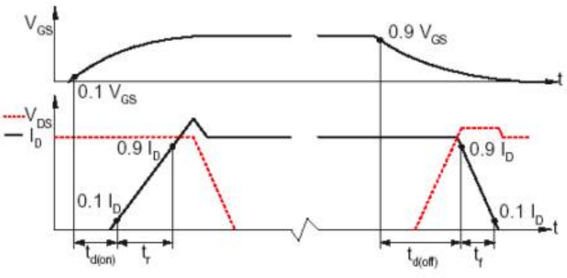


Fig. 17 Definition of switching times