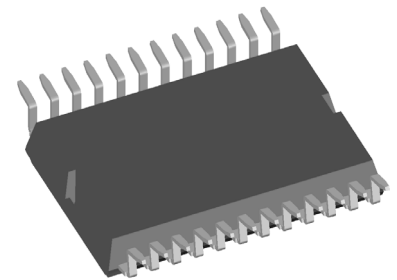


# Three phase full Bridge

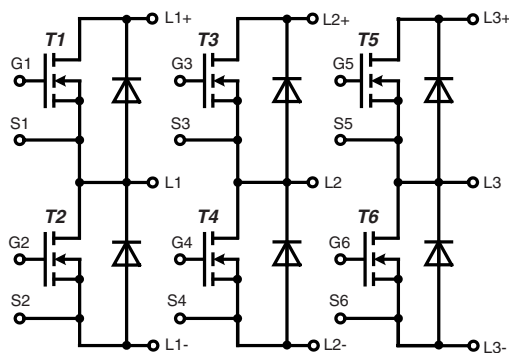
with Trench MOSFETs  
in DCB isolated high current package

$V_{DSS} = 75\text{ V}$   
 $I_{D25} = 255\text{ A}$   
 $R_{DSon\ typ.} = 1.1\text{ m}\Omega$

**Part number**  
**MTI200WX75GD**



Surface Mount Device



**Features / Advantages:**

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

**Applications:**

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

**Package: ISOPLUS-DIL®**

- High level of integration
- RoHS compliant
- Terminals for soldering or welding connections
- Space and weight savings
- High reliability
- Low thermal impedance

**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;

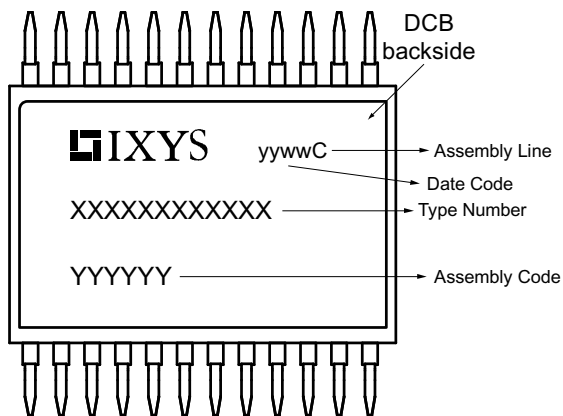
- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

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

20170614g

MOSFETs				Ratings			
Symbol	Definitions	Conditions	min.	typ.	max.	Unit	
$V_{DSS}$	drain source breakdown voltage	$T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$			75	V	
$V_{GS}$	max. DC gate source voltage				$\pm 15$	V	
$V_{GSM}$	max. transient gate source voltage				$\pm 20$	V	
$I_{D25}$	continuous drain current	$T_C = 25^{\circ}\text{C}$			255	A	
$I_{D90}$	(die capability)	$T_C = 90^{\circ}\text{C}$			190	A	
$R_{DS(on)}^{1)}$	static drain source on resistance	on chip level at $I_D = 100\text{ A}; V_{GS} = 10\text{ V}$		1.1 1.8	1.3	m $\Omega$ m $\Omega$	
$V_{GS(th)}$	gate threshold voltage	$I_D = 275\ \mu\text{A}; V_{DS} = V_{GS}$	2.3	3.1	3.8	V	
$I_{DSS}$	drain source leakage current	$V_{DS} = V_{DSS}; V_{GS} = 0\text{ V}$		10	1 100	$\mu\text{A}$ $\mu\text{A}$	
$I_{GSS}$	gate source leakage current	$V_{GS} = \pm 20\text{ V}; V_{DS} = 0\text{ V}$			500	nA	
$R_G$	gate resistance	on chip		2.7		$\Omega$	
$C_{iss}$	input capacitance	} $V_{GS} = 0\text{ V}; V_{DS} = 38\text{ V}; f = 1\text{ Mhz}$		10.8	14.4	nF	
$C_{oss}$	output capacitance		2.42	3.22	nF		
$C_{rss}$	reverse transfer capacitance		110	-	pF		
$Q_g$	total gate charge	} $V_{GS} = 10\text{ V}; V_{DS} = 38\text{ V}; I_D = 100\text{ A}$		155		nC	
$Q_{gs}$	gate source charge		53		nC		
$Q_{gd}$	gate drain (Miller) charge		32		nC		
$t_{d(on)}$	turn-on delay time	} inductive load $V_{GS} = 10\text{ V}; V_{DS} = 30\text{ V}$ $I_D = 100\text{ A}; R_G = 27\ \Omega$		145		ns	
$t_r$	current rise time		$T_{VJ} = 125^{\circ}\text{C}$		70		ns
$t_{d(off)}$	turn-off delay time		520			ns	
$t_f$	current fall time		55			ns	
$E_{on}$	turn-on energy per pulse		80			$\mu\text{J}$	
$E_{off}$	turn-off energy per pulse		350			$\mu\text{J}$	
$E_{rec(off)}$	turn-off reverse recovery losses	8			$\mu\text{J}$		
$R_{thJC}$	thermal resistance junction to case				0.85	K/W	
$R_{thJH}$	thermal resistance junction to heatsink	with heat transfer paste (IXYS test setup)		1.1	1.4	K/W	
		<sup>1)</sup> $V_{DS} = I_D \cdot (R_{DS(on)} + 2 \cdot R_{Pin\ to\ Chip})$					
Source-Drain Diode							
$I_{F25}$	forward current (body diode)	$V_{GS} = 0\text{ V}$			175	A	
$I_{F90}$					100	A	
$V_{SD}$	source drain voltage	$I_F = 100\text{ A}; V_{GS} = 0\text{ V}$		0.9	1.2	V	
$Q_{RM}$	reverse recovery charge	} $V_R = 30\text{ V}; I_F = 100\text{ A}$ $R_G = 27\ \Omega$		730		nC	
$I_{RM}$	max. reverse recovery current		27		A		
$t_{rr}$	reverse recovery time		42		ns		

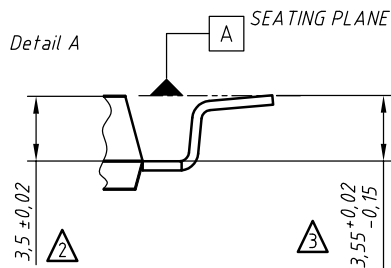
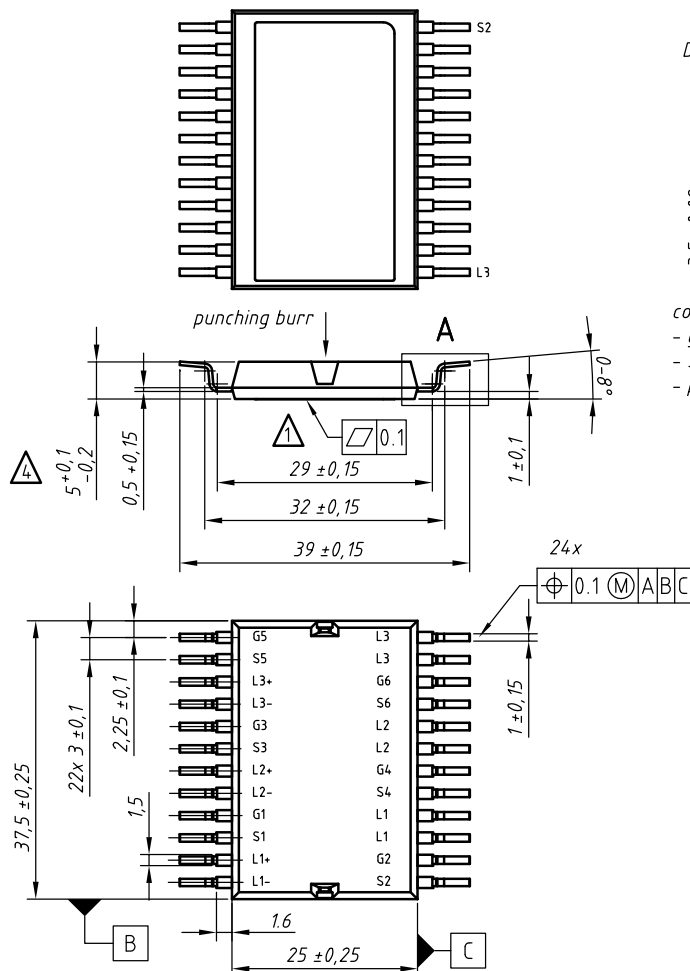
Package ISOPLUS-DIL®			Ratings			
Symbol	Definitions	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per pin in main current paths (L1+...L3+, L1-...L3-, L1...L3) may be additionally limited by external connections (PCB tracks) 2 pins for output L1, L2, L3			75	A
$T_{stg}$	storage temperature		-55		125	°C
$T_{op}$	operation temperature		-55		150	°C
$T_{vj}$	virtual junction temperature		-55		175	°C
<b>Weight</b>				13		g
$F_C$	mounting force with clip		50		250	N
$V_{ISOL}$	isolation voltage	$t = 1$ second	50/60 Hz, RMS, $I_{ISOL} \leq 1$ mA	1200		V
		$t = 1$ minute		1000		V
$R_{pin-chip}$	resistance terminal to chip	$V_{DS} = I_D \cdot (R_{DS(on)} + 2 \cdot R_{pin\ to\ chip})$		0.5		mΩ
$C_P$	coupling capacity	between shorted pins and back side metallization		160		pF


**Part number**

M = MOSFET  
 T = Trench  
 I = Infineon Trench  
 200 = Current Rating [A]  
 WX = 6-Pack with separated phase legs  
 75 = Reverse Voltage [V]  
 GD = ISOPLUS-DIL

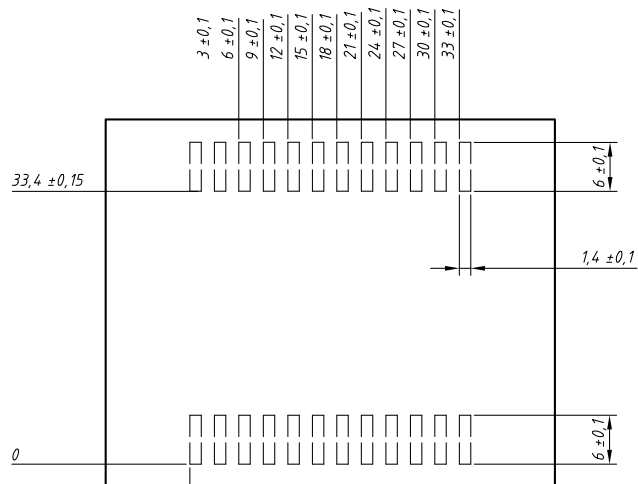
Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MTI200WX75GD-SMD	MTI200WX75GD	Tube	13	516955

## Outlines ISOPLUS-DIL®



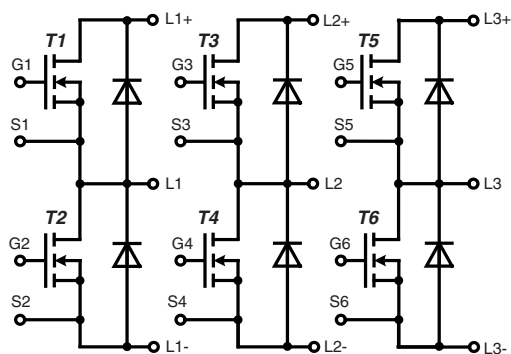
contact pin:  
 - galv. tin plating, per pin side: Sn 10...25 µm, undercoating Ni 0,2...1 µm  
 - stamping edges may be free of tin  
 - punching burr: ≤ 0,05mm

- △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



**Remarks:**

- 1) pin layout / dimensions are conditionally
- 2) soldering paste thickness: 200µm



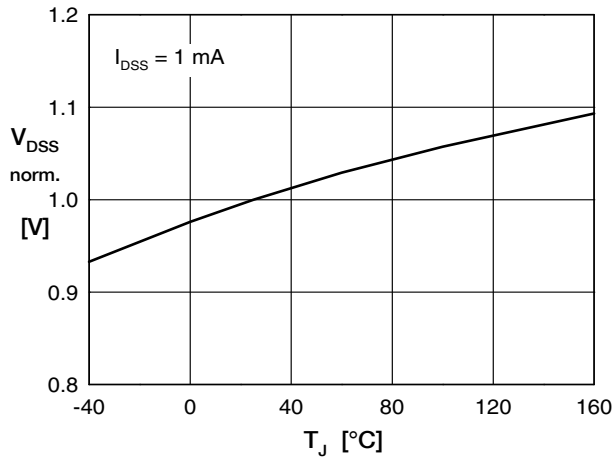


Fig. 1 Drain source breakdown voltage  $V_{DSS}$  vs. junction temperature  $T_{VJ}$

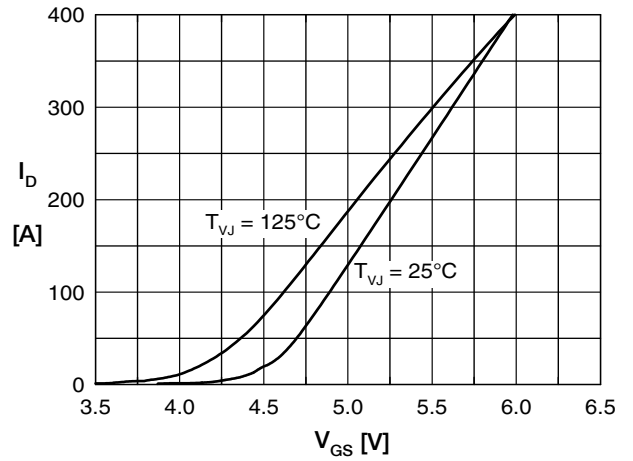


Fig. 2 Typ. transfer characteristics

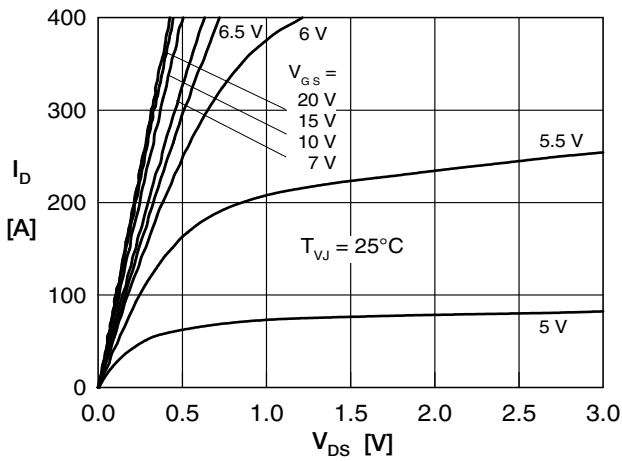


Fig. 3 Typ. output characteristics on die level

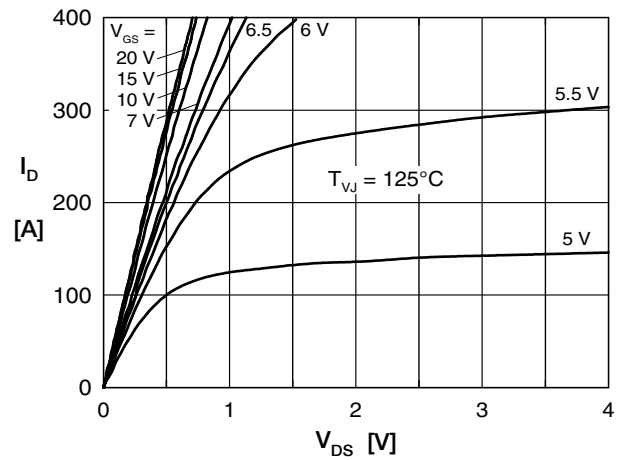


Fig. 4 Typ. output characteristics on die level

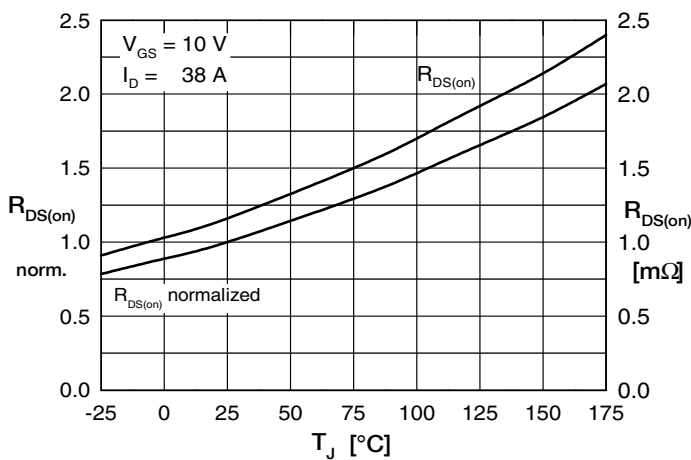


Fig. 5 Drain source on-state resistance  $R_{DS(on)}$  vs. junction temperature  $T_{VJ}$ , on die level

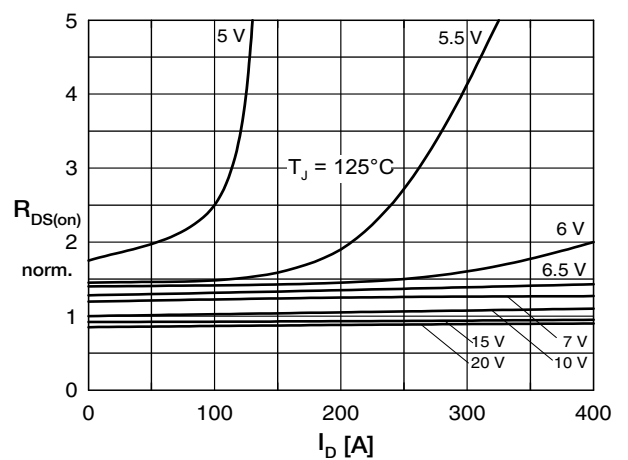


Fig. 6 Drain source on-state resistance  $R_{DS(on)}$  versus  $I_D$ , on die level

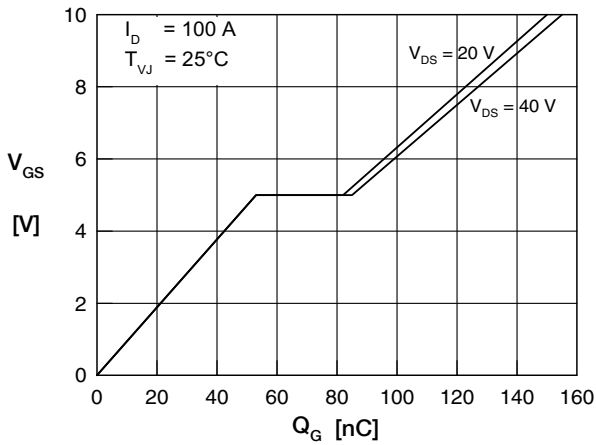


Fig. 7 Typical turn on gate charge

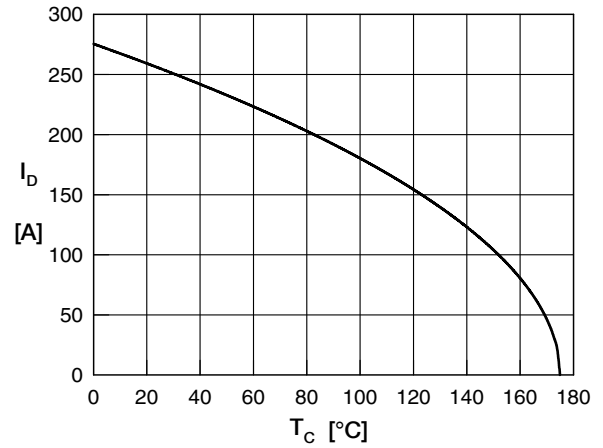


Fig. 8 Drain current  $I_D$  vs. case temperature  $T_C$  (Chip capability)

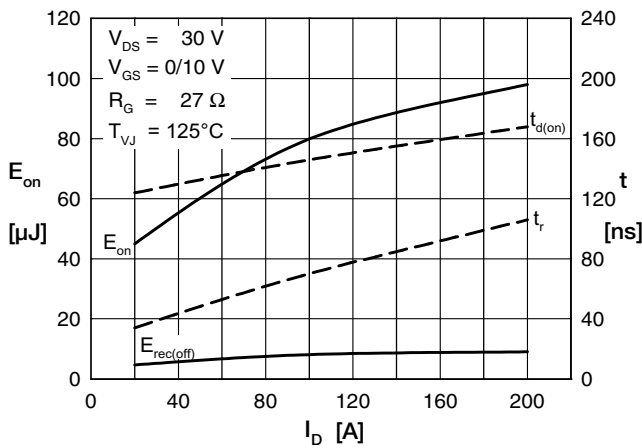


Fig. 9 Typ. turn-on energy and switching times versus drain current, inductive switching

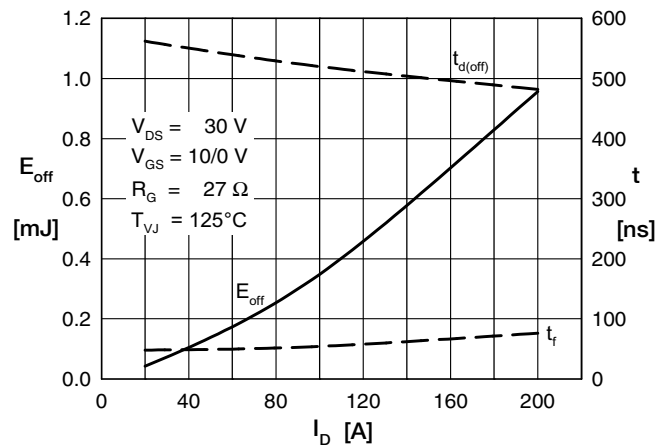


Fig. 10 Typ. turn-off energy and switching times versus drain-current, inductive switching

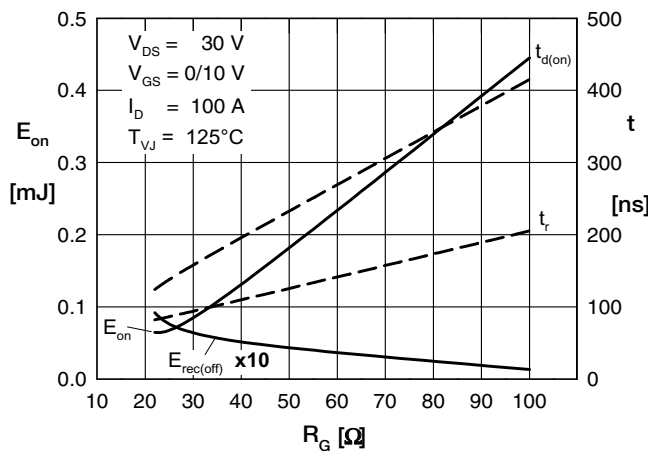


Fig. 11 Typ. turn-on energy and switching times versus gate resistor, inductive switching

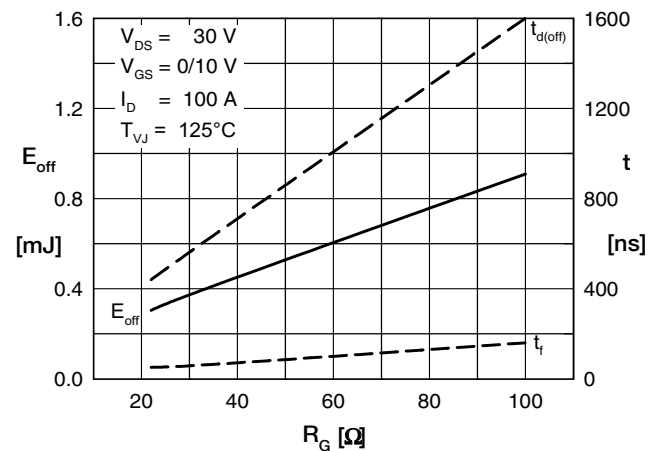


Fig. 12 Typ. turn-off energy and switching times versus gate resistor, inductive switching

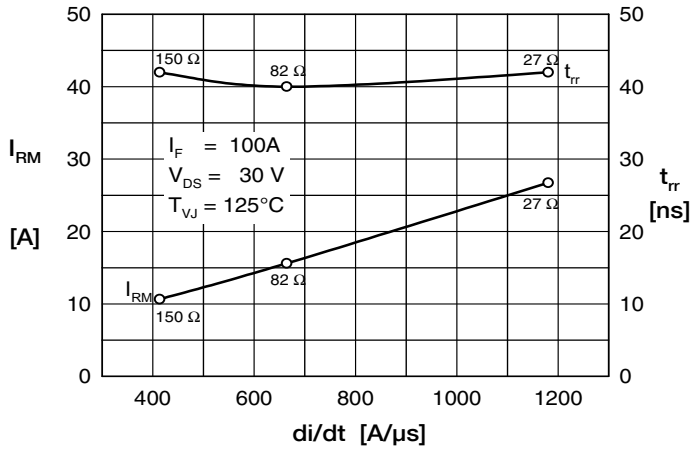


Fig. 13 Typ. reverse recovery characteristics

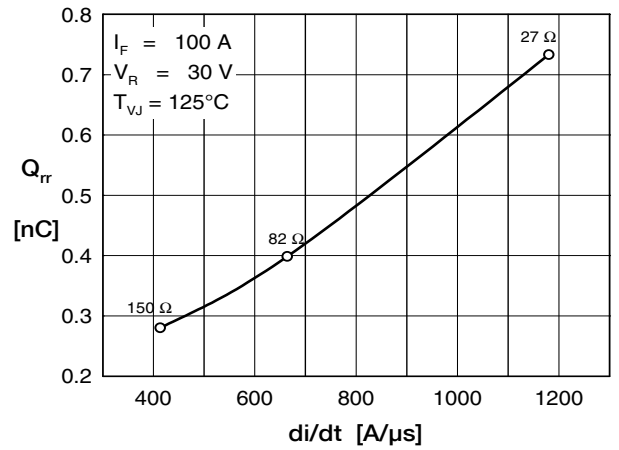


Fig. 14 Typ. reverse recovery characteristics

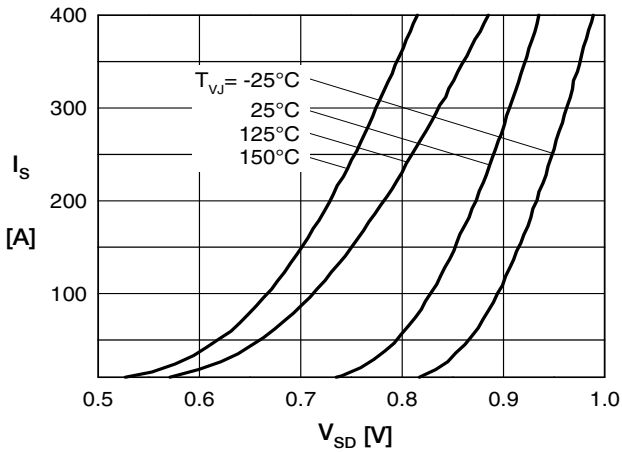


Fig.15 Source current  $I_s$  vs. source drain voltage  $V_{SD}$  (body diode) on die level

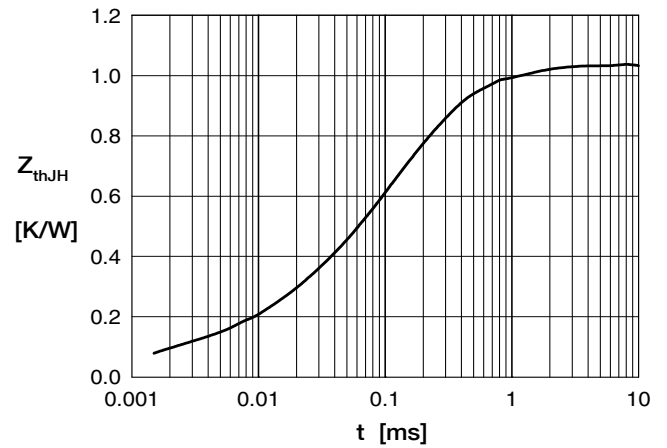


Fig. 16 Typ. thermal impedance junction to heatsink  $Z_{thJH}$  with heat transfer paste (IXYS test setup)

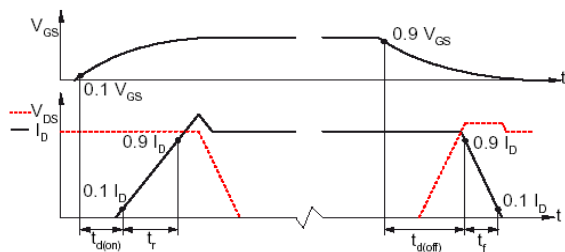


Fig. 17 Definition of switching times