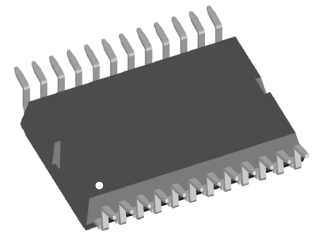
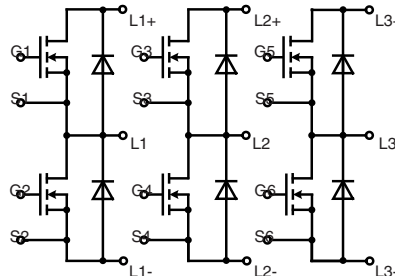


Three phase full Bridge

with Trench MOSFETs
in DCB isolated high current package

$V_{DSS} = 150\text{ V}$
 $I_{D25} = 50\text{ A}$
 $R_{DSon\ typ.} = 19\text{ m}\Omega$



MOSFETs

Symbol	Conditions	Maximum Ratings	
V_{DSS}	$T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$	150	V
V_{GS}	continous	± 15	V
	transient	± 20	V
I_{D25}	$T_C = 25^{\circ}\text{C}$	50	A
I_{D90}	$T_C = 90^{\circ}\text{C}$	38	A
I_{D110}	$T_C = 110^{\circ}\text{C}$	33	A
I_{F25}	$T_C = 25^{\circ}\text{C}$ (diode)	150	A
I_{F90}	$T_C = 90^{\circ}\text{C}$ (diode)	85	A
I_{F110}	$T_C = 110^{\circ}\text{C}$ (diode)	65	A

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
 - aux. terminals for MOSFET control
 - terminals for soldering or welding connections
 - isolated DCB ceramic base plate with optimized heat transfer
- Space and weight savings

Symbol	Conditions	Characteristic Values				
		$(T_{VJ} = 25^{\circ}\text{C}, \text{ unless otherwise specified})$				
		min.	typ.	max.		
$R_{DSon}^{1)}$	on chip level at $V_{GS} = 10\text{ V}; I_D = 38\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$		19	24	$\text{m}\Omega$
		$T_{VJ} = 125^{\circ}\text{C}$		38		$\text{m}\Omega$
$V_{GS(th)}$	$V_{DS} = 20\text{ V}; I_D = 1\text{ mA}$	2.5		4.5	V	
I_{DSS}	$V_{DS} = V_{DSS}; V_{GS} = 0\text{ V}$		0.5	5	μA mA	
I_{GSS}	$V_{GS} = \pm 20\text{ V}; V_{DS} = 0\text{ V}$			0.2	μA	
Q_g Q_{gs} Q_{gd}	$V_{GS} = 10\text{ V}; V_{DS} = 75\text{ V}; I_D = 38\text{ A}$		97		nC	
			29		nC	
			30		nC	
C_{iss} C_{oss} C_{rss}	$V_{GS} = 10\text{ V}; V_{DS} = 25\text{ V}; f = 1\text{ MHz}$		5800		pF	
			490		pF	
			85		pF	
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off} E_{recoff}	inductive load $V_{GS} = 10\text{ V}; V_{DS} = 75\text{ V}$ $I_D = 38\text{ A}; R_{G(on)} = 39\ \Omega; R_{G(off)} = 4.7\ \Omega$ $T_J = 125^{\circ}\text{C}$		120		ns	
			50		ns	
			100		ns	
			25		ns	
			0.25		mJ	
	0.05		mJ			
	0.02		mJ			
R_{thJC}			1.0		K/W	
R_{thJH}	with heat transfer paste (IXYS test setup)		1.3	1.6	K/W	

¹⁾ $V_{DS} = I_D \cdot (R_{DS(on)} + 2R_{Pin\ to\ Chip})$

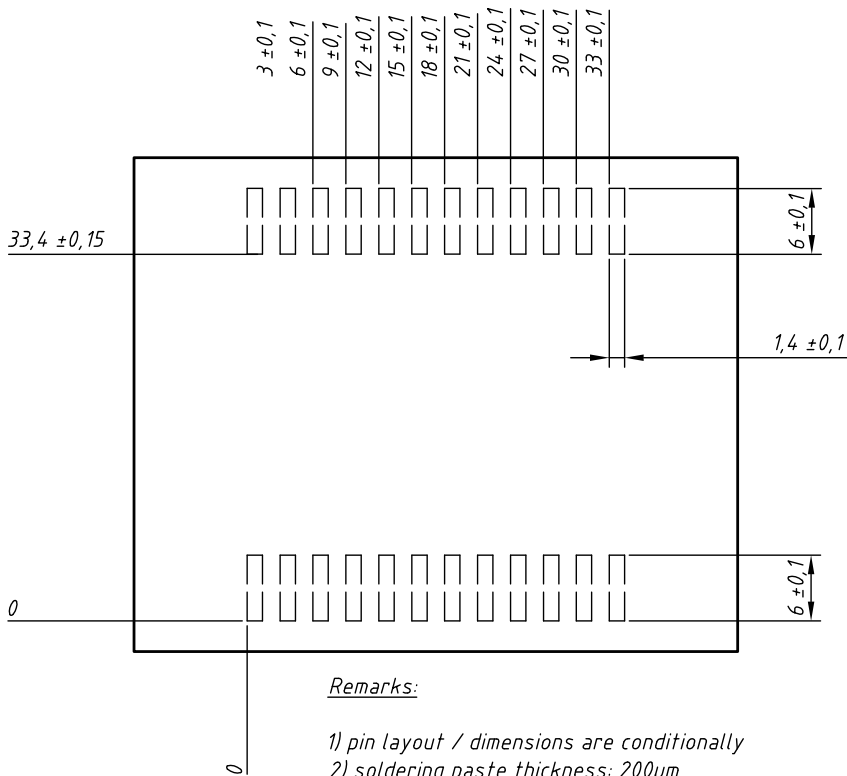
Source-Drain Diode

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
($T_J = 25^\circ\text{C}$, unless otherwise specified)				
V_{SD}	(diode) $I_F = 38\text{ A}$; $V_{GS} = 0\text{ V}$	0.85	1.0	V
t_{rr}	$I_F = 38\text{ A}$; $-di_F/dt = 900\text{ A}/\mu\text{s}$; $R_{G(on)} = 39\ \Omega$; $V_R = 75\text{ V}$; $T_{VJ} = 125^\circ\text{C}$	65		ns
Q_{RM}		1.6		μC
I_{RM}		40		A

Component

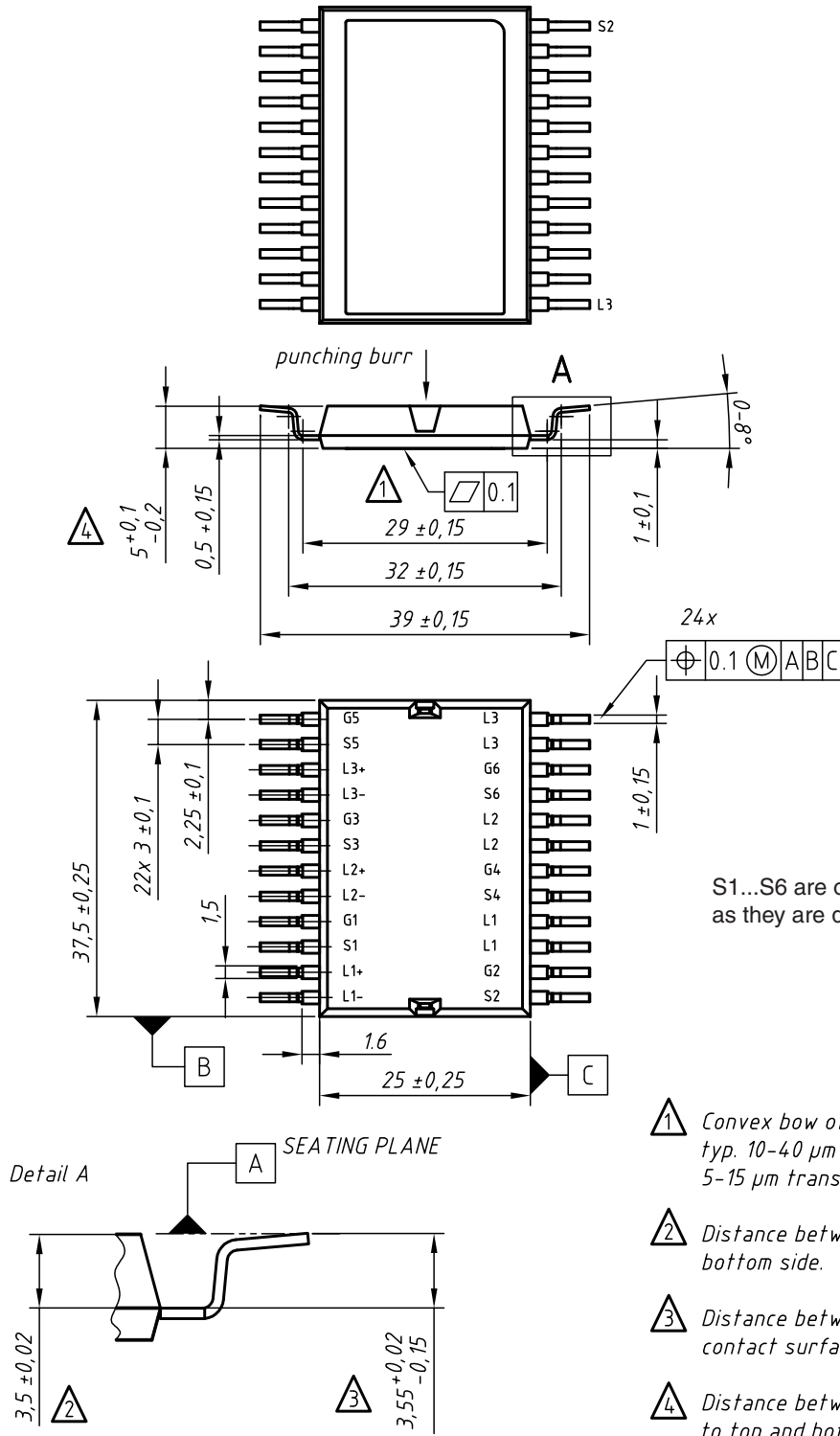
Symbol	Conditions	Maximum Ratings	
I_{RMS}	per pin in main current paths (L+, L-, N-, L1, L2, L3) may be additionally limited by external connections 2 pins for output L1, L2, L3	75	A
T_J		-55...+175	$^\circ\text{C}$
T_{stg}		-55...+125	$^\circ\text{C}$
V_{ISOL}	$I_{ISOL} \leq 1\text{ mA}$, 50/60 Hz, $f = 1\text{ minute}$	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		0.9	$\text{m}\Omega$
C_p	coupling capacity between shorted pins and back side metallization		160	pF
Weight			13	g

¹⁾ $V_{DS} = I_D \cdot (R_{DS(on)} + 2R_{Pin\ to\ Chip})$
Recommended printed circuit board lay-out


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

20170529c



S1...S6 are only for the use of the gate drive as they are designed as Kelvin contacts

contact pin:

- galv. tin plating, per pin side: Sn 10...25 μ m, undercoating Ni 0,2...1 μ m
- stamping edges may be free of tin
- punching burr: $\leq 0,05$ mm

Leads	Ordering	Part Name & Packing Unit Marking	Part Marking	Delivering Mode	Base Qty.	Ordering Code
SMD	Standard	GMM 3x60-015X2 - SMD	GMM 3x60-015X2	Tube	13	518037

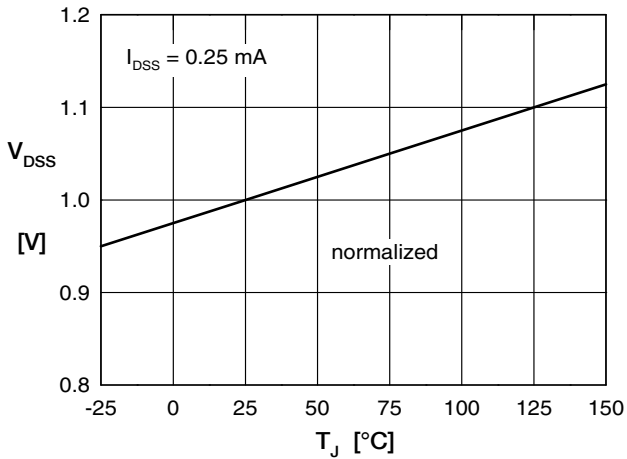


Fig. 1 Drain source breakdown voltage V_{DSS} vs. junction temperature T_{VJ}

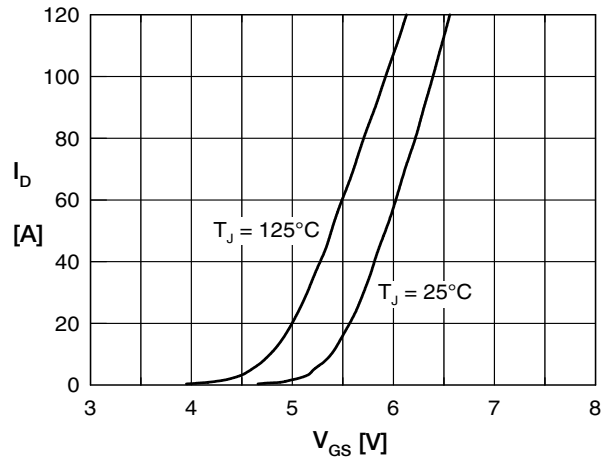


Fig. 2 Typ. transfer characteristics

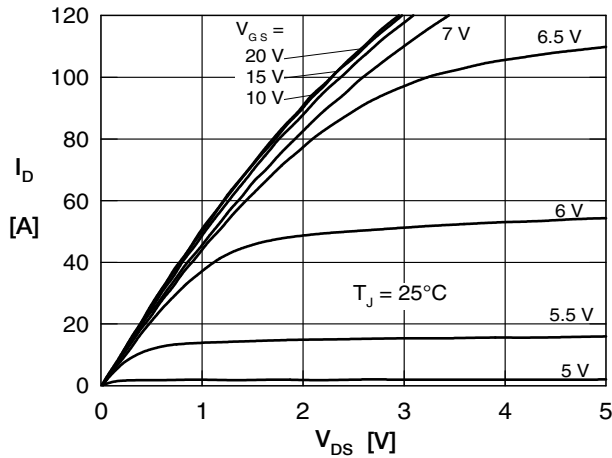


Fig. 3 Typ. output characteristics

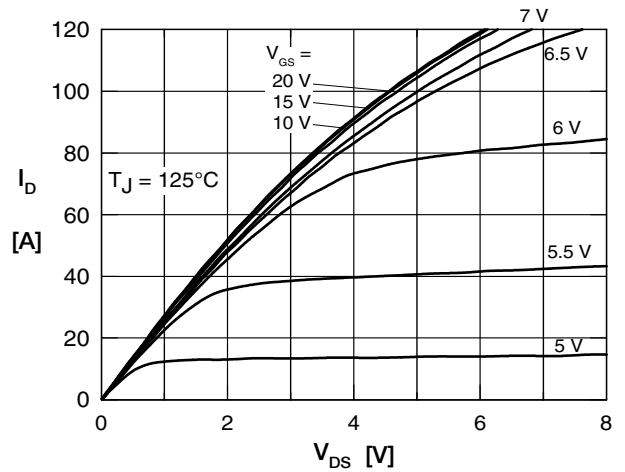


Fig. 4 Typ. output characteristics

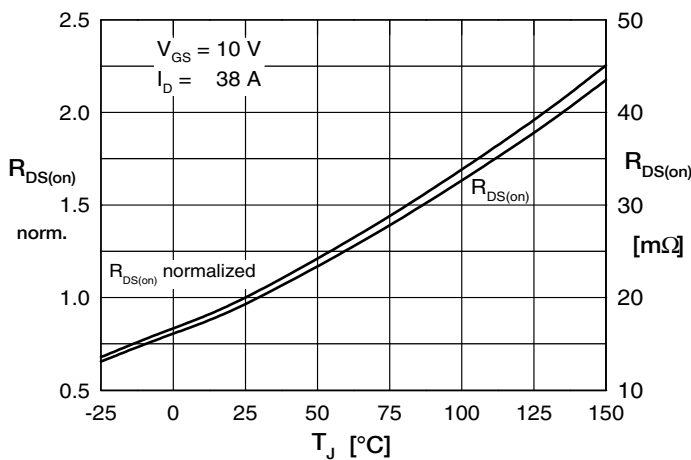


Fig. 5 Drain source on-state resistance $R_{DS(on)}$ versus junction temperature T_{VJ}

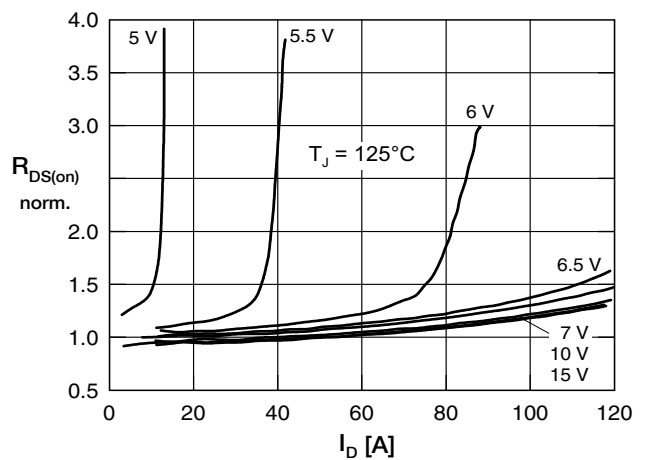


Fig. 6 Drain source on-state resistance $R_{DS(on)}$ versus I_D

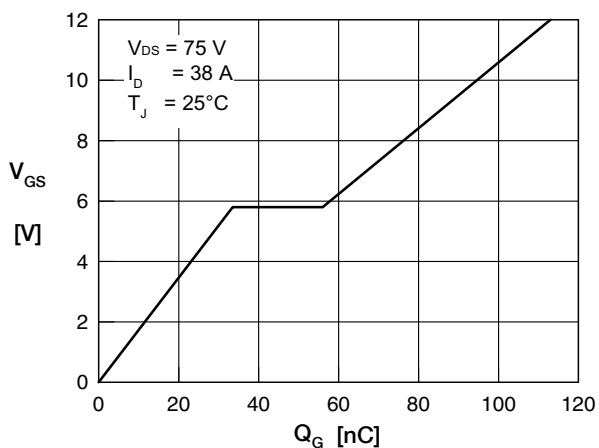


Fig. 7 Typical turn on gate charge

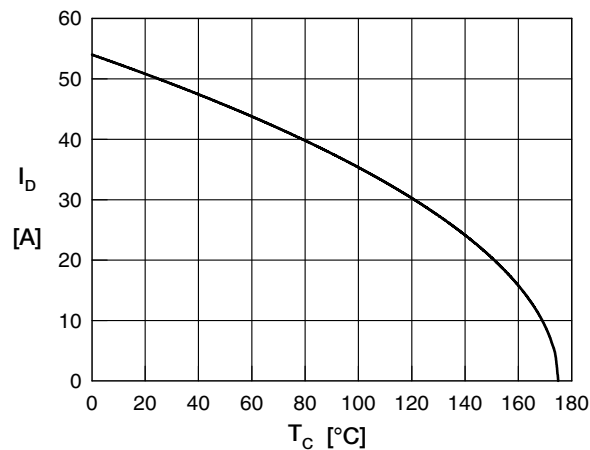
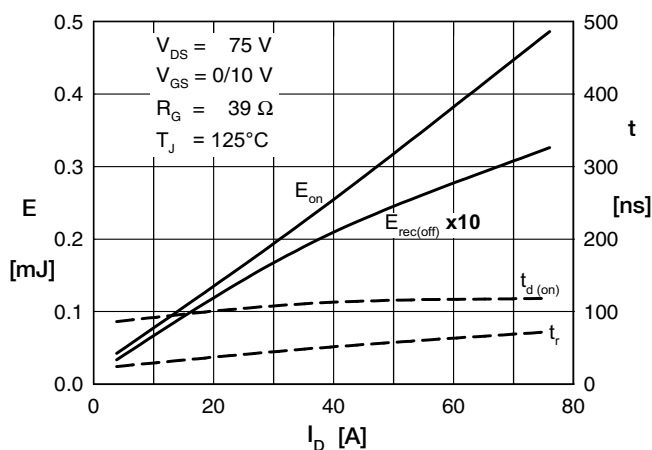

 Fig. 8 Drain current I_D vs. case temperature T_C


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

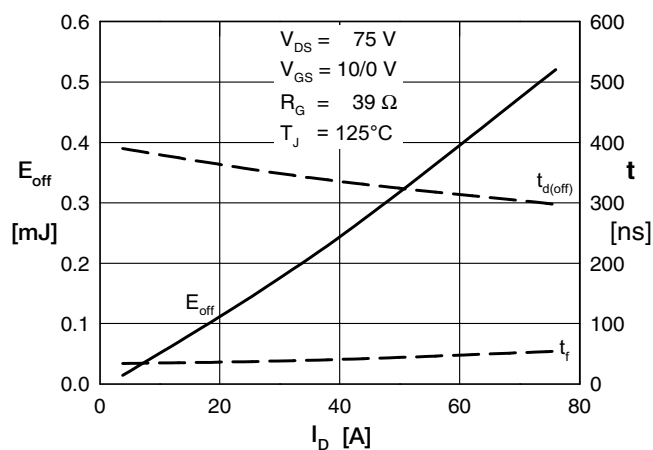


Fig. 10 Typ. turn-off energy and switching times versus drain-current, inductive switching

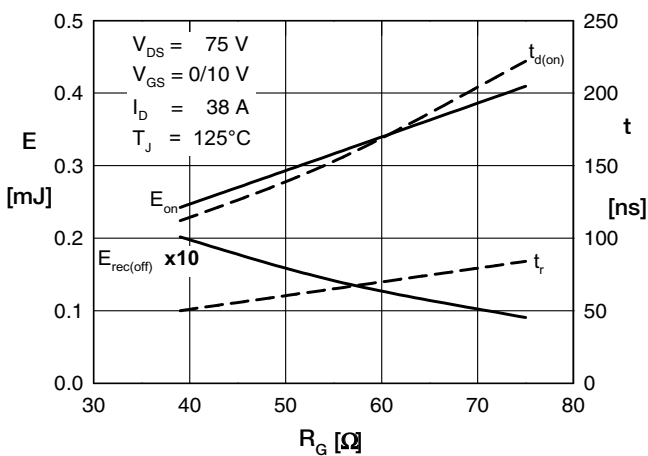


Fig. 11 Typ. turn-on energy and switching times versus gate resistor, inductive switching

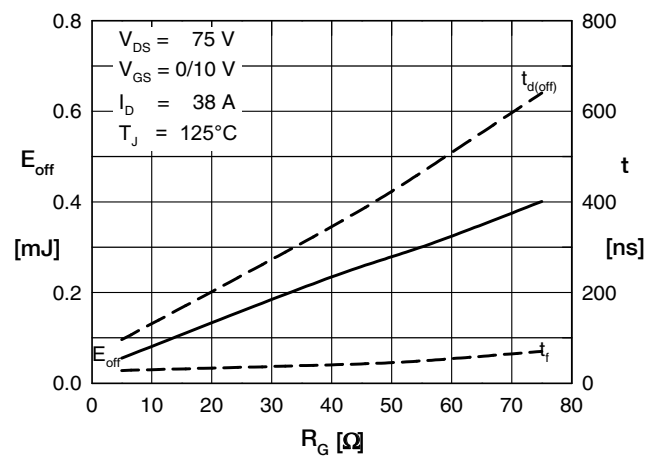


Fig. 12 Typ. turn-off energy and switching times versus gate resistor, inductive switching

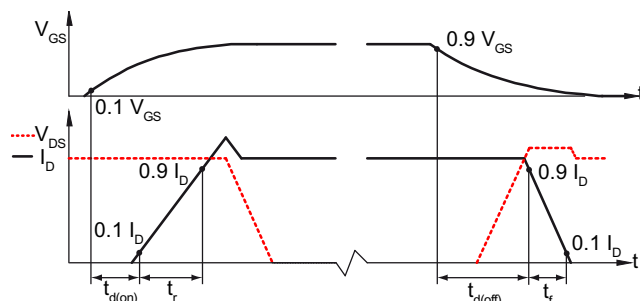
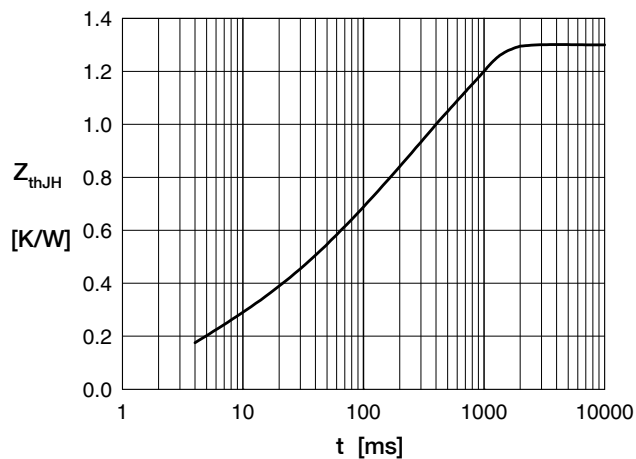
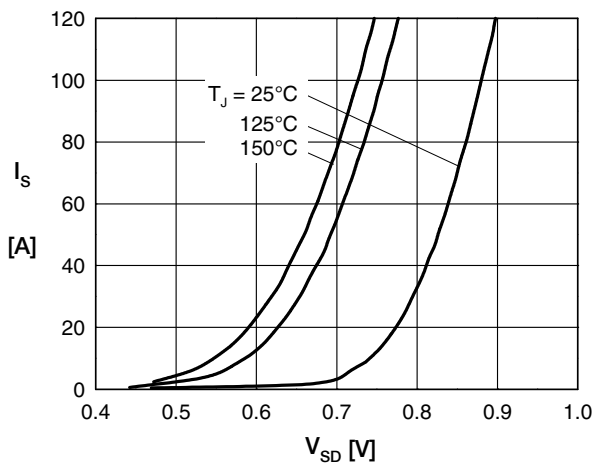
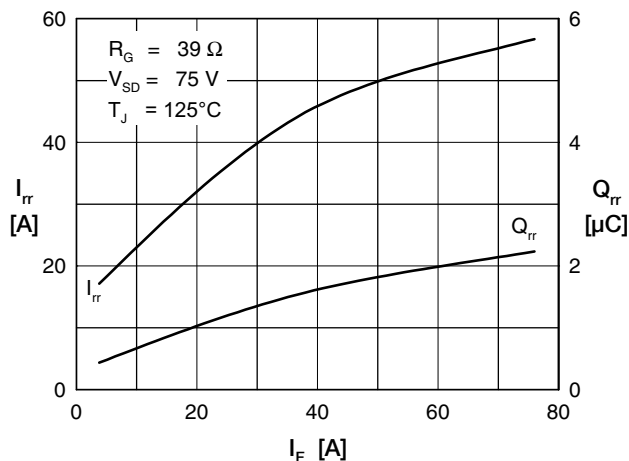
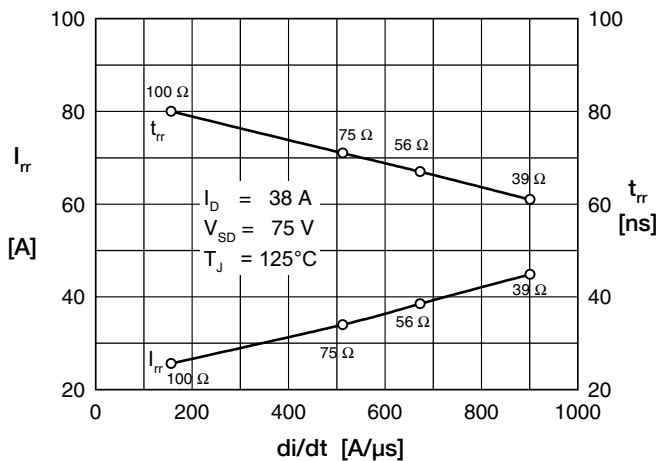


Fig. 17 Definition of switching times