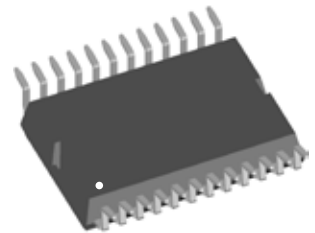
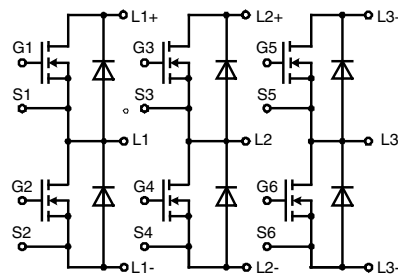


Three phase full Bridge

with Trench MOSFETs
in DCB isolated high current package

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

Preliminary data



MOSFETs		Maximum Ratings	
Symbol	Conditions		
V_{DSS}	$T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$	40	V
V_{GS}		± 20	V
I_{D25}	$T_C = 25^{\circ}\text{C}$	180	A
I_{D90}	$T_C = 90^{\circ}\text{C}$	136	A
I_{D110}	$T_C = 110^{\circ}\text{C}$	120	A
I_{F25}	$T_C = 25^{\circ}\text{C}$ (diode)	182	A
I_{F90}	$T_C = 90^{\circ}\text{C}$ (diode)	112	A
I_{F110}	$T_C = 110^{\circ}\text{C}$ (diode)	88	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 $V_{GS} = 10 \text{ V}$				
					$T_{VJ} = 25^{\circ}\text{C}$
			1.9	2.5	$T_{VJ} = 125^{\circ}\text{C}$
			2.8	5.3	
					mΩ
$V_{GS(th)}$	$V_{DS} = 20 \text{ V}; I_D = 1 \text{ mA}$	2.5		4.5	V
I_{DSS}	$V_{DS} = V_{DSS}; V_{GS} = 0 \text{ V}$			5	$T_{VJ} = 25^{\circ}\text{C}$
			50		$T_{VJ} = 125^{\circ}\text{C}$
					μA
I_{GSS}	$V_{GS} = \pm 20 \text{ V}; V_{DS} = 0 \text{ V}$			0.2	μA
Q_g	$V_{GS} = 10 \text{ V}; V_{DS} = 20 \text{ V}; I_D = 100 \text{ A}$		110		nC
Q_{gs}			33		nC
Q_{gd}			30		nC
$t_{d(on)}$	inductive load $V_{GS} = +10/0 \text{ V}; V_{DS} = 15 \text{ V}$ $I_D = 135 \text{ A}; R_G = 39 \Omega;$ $T_J = 125^{\circ}\text{C}$		150		ns
t_r			240		ns
$t_{d(off)}$			350		ns
t_f			170		ns
E_{on}			0.12		mJ
E_{off}		0.51		mJ	
E_{recoff}		0.003		mJ	
R_{thJC}				1.0	K/W
R_{thJH}	with heat transfer paste (IXYS test setup)		1.3	1.6	K/W

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

Source-Drain Diode

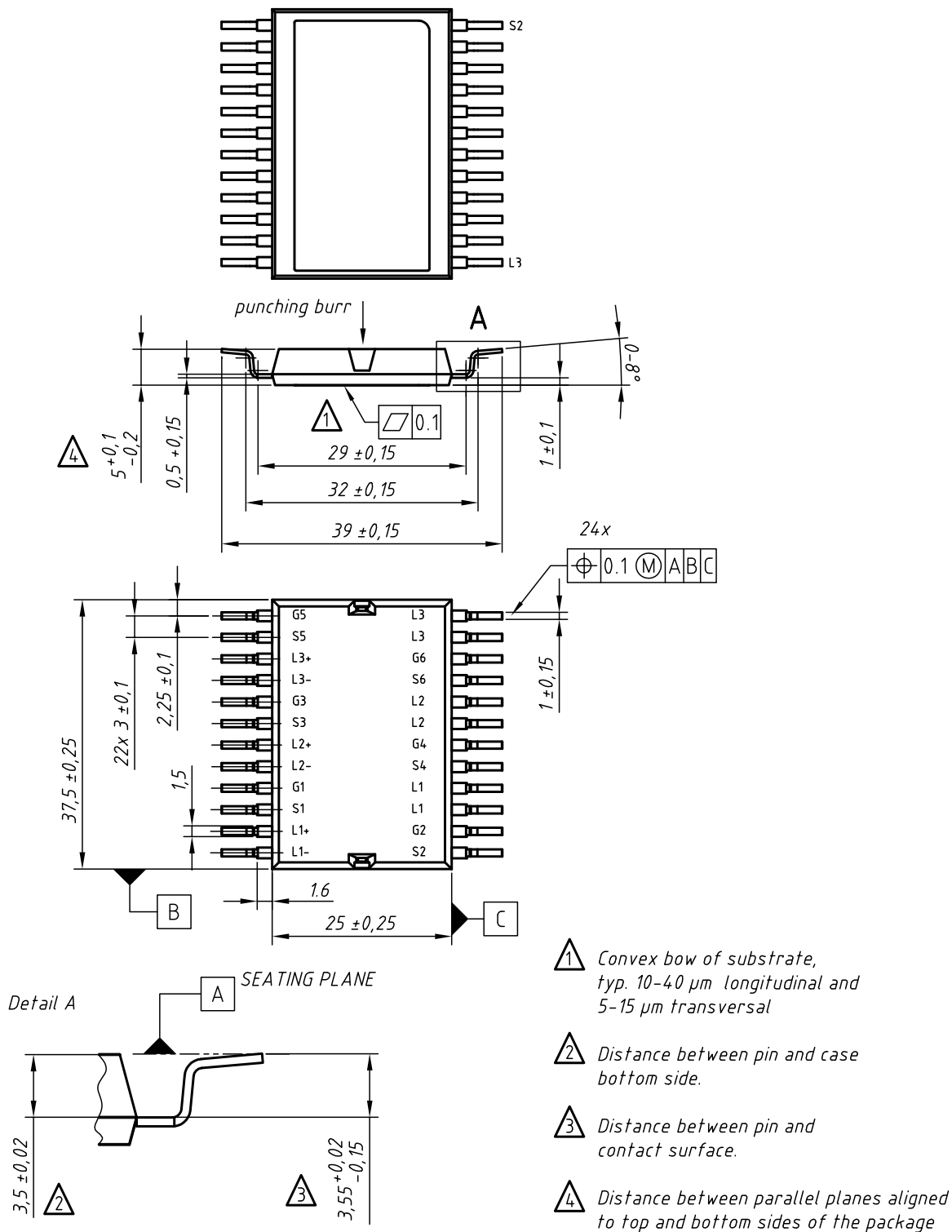
Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
(T _J = 25°C, unless otherwise specified)					
V _{SD}	(diode) I _F = 100 A; V _{GS} = 0 V		0.9	1.2	V
t _{rr}	I _F = 100 A; -di _F /dt = 600 A/μs V _R = 15 V; T _J = 125°C		38		ns
Q _{RM}			0.31		μC
I _{RM}			14		A

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 2 pins for output L1, L2, L3	75	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		0.9	mΩ
C _P	coupling capacity between shorted pins and back side metallization		160	pF
Weight			25	g

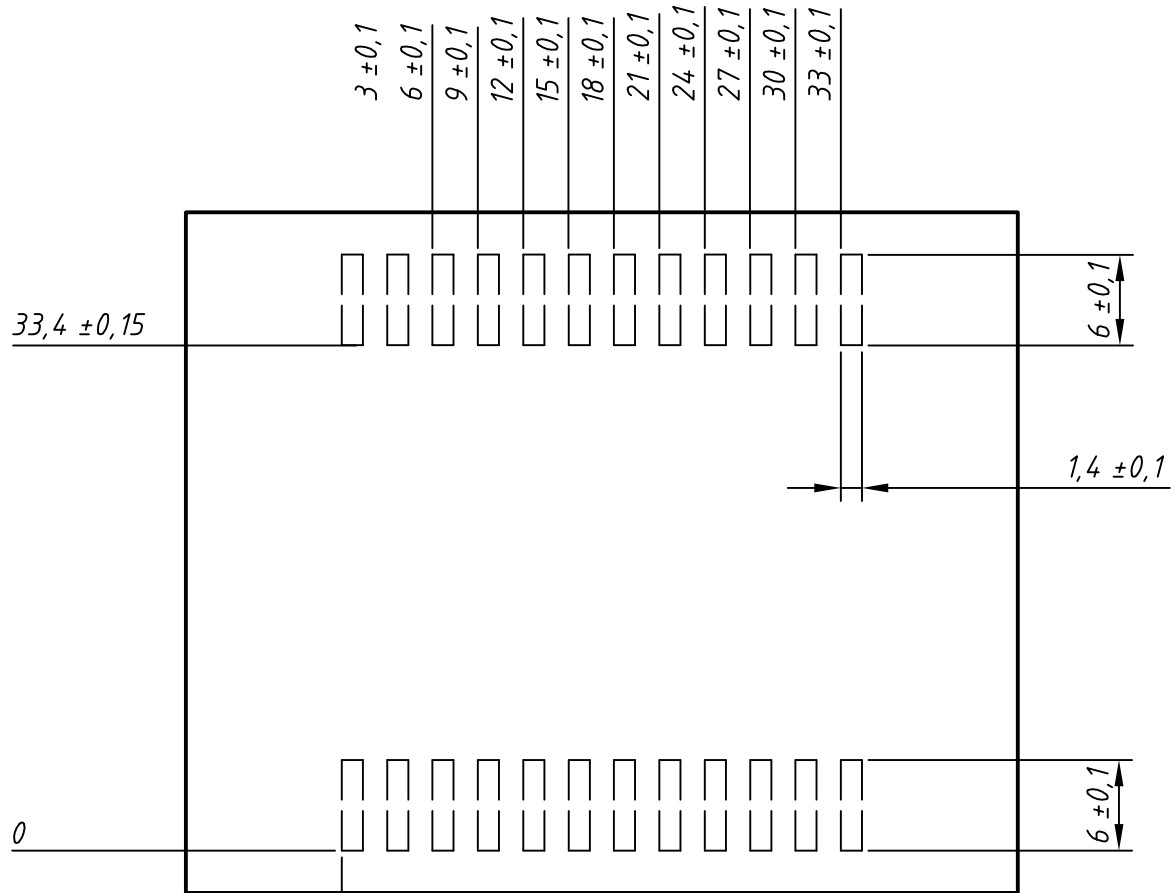
¹⁾ V_{DS} = I_D · (R_{DS(on)} + R_{Pin to Chip})



contact pin:

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

Leads	Ordering	Part Name & Packing Unit Marking	Part Marking	Delivering Mode	Base Qty.	Ordering Code
SMD	Standard	GMM 3x180-004X2 - SMD	GMM 3x180-004X2	Blister	28	509042



Remarks:

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

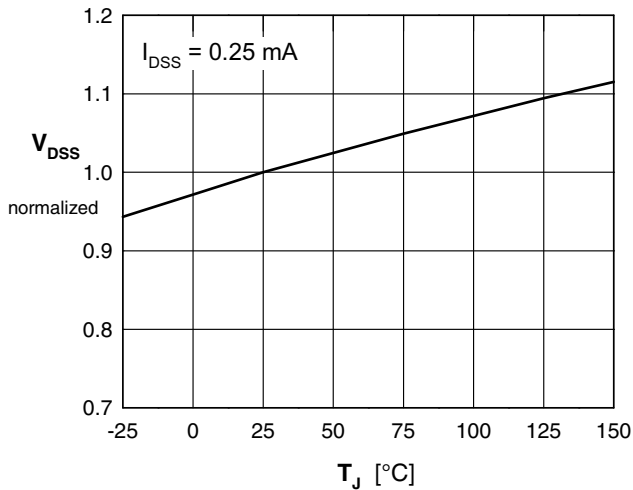


Fig. 1 Drain source breakdown voltage V_{DSS} vs. junction temperature T_{VJ}

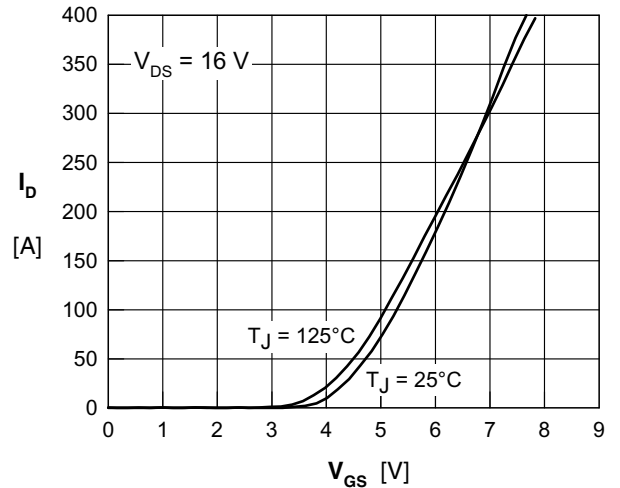


Fig. 2 Typical transfer characteristic

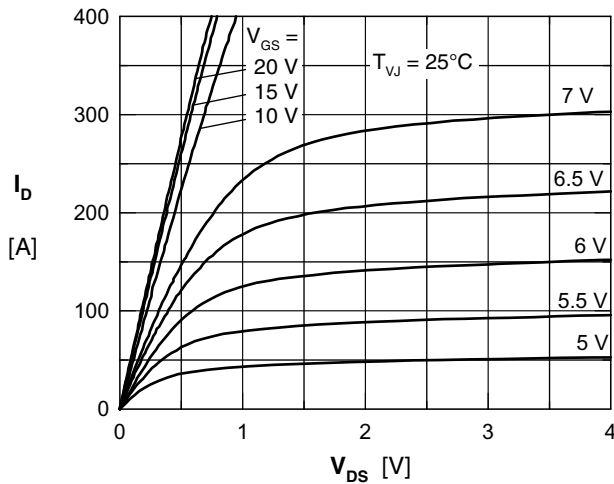


Fig. 3 Typical output characteristic

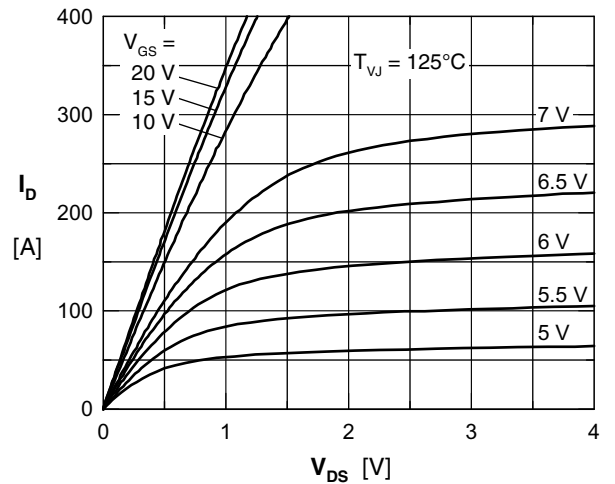


Fig. 4 Typical output characteristic

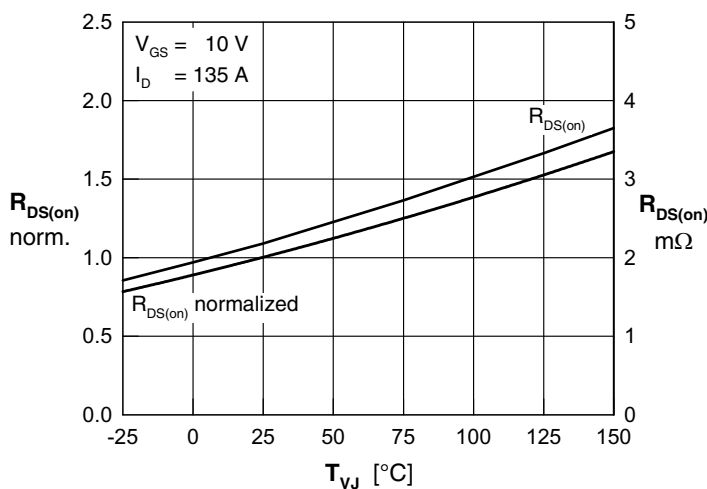


Fig. 5 Typ. drain source on-state resistance $R_{DS(on)}$ versus junction temperature T_J

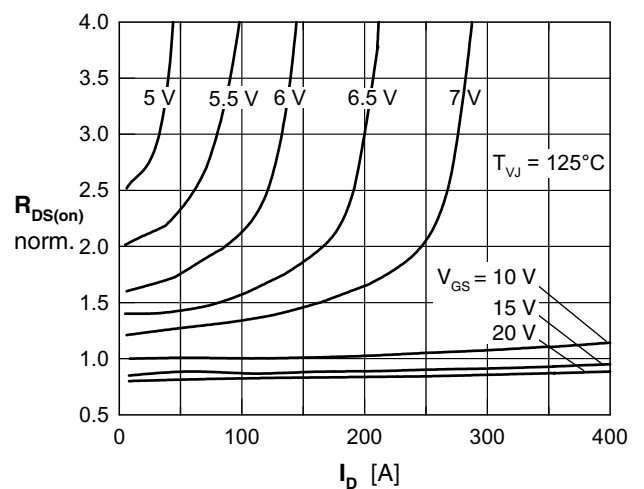


Fig. 6 Typ. drain source on-state resistance $R_{DS(on)}$ versus I_b

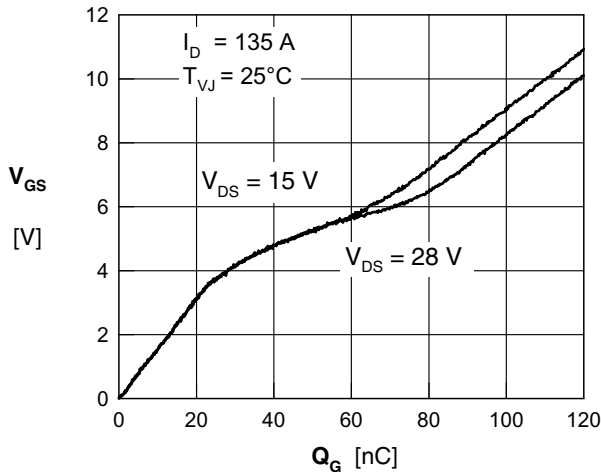


Fig. 7 Gate charge characteristics

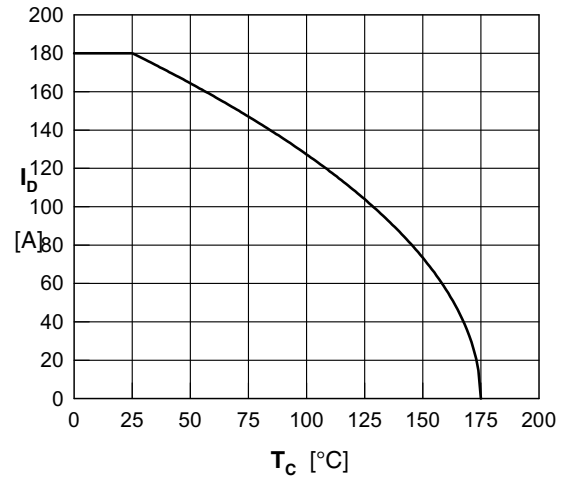
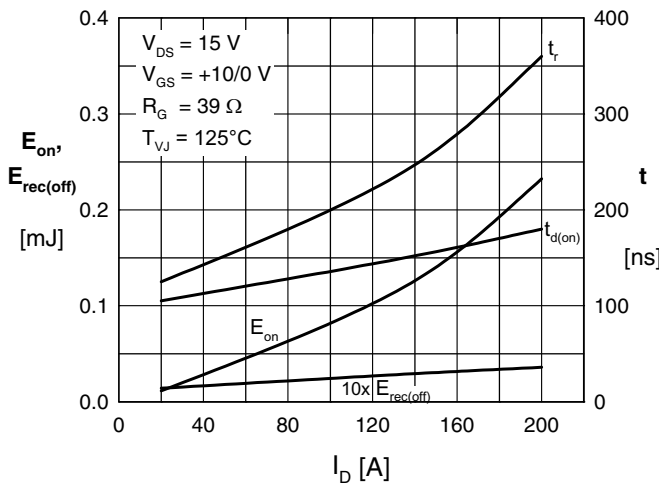

 Fig. 8 Drain current I_D vs. temperature T_C


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

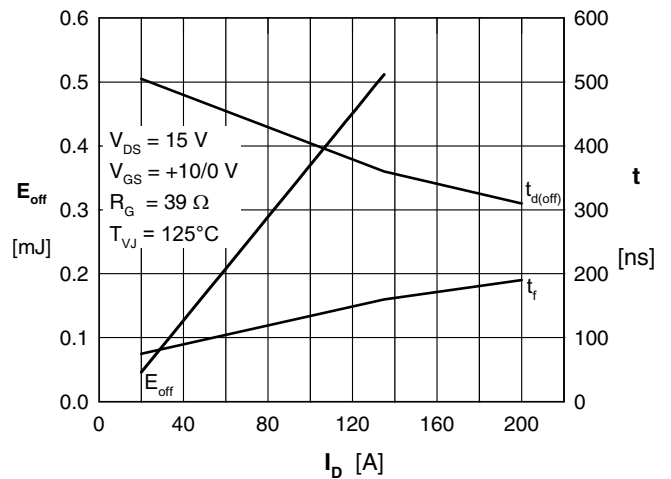


Fig. 10 Typ. turn-off energy & switching times vs. collector current, inductive switching

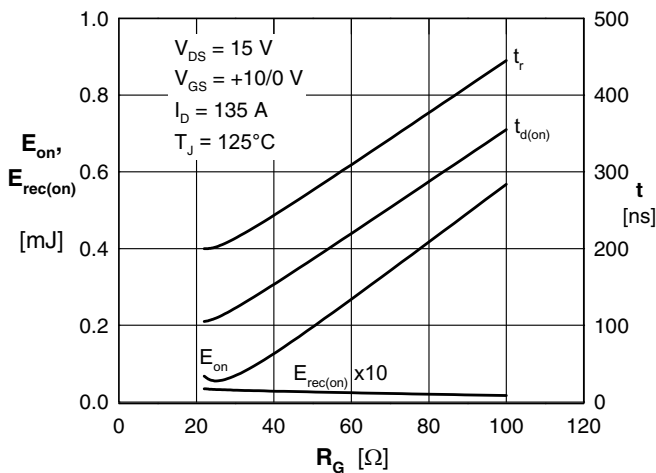


Fig. 11 Typ. turn-on energy & switching times vs. gate resistor, inductive switching

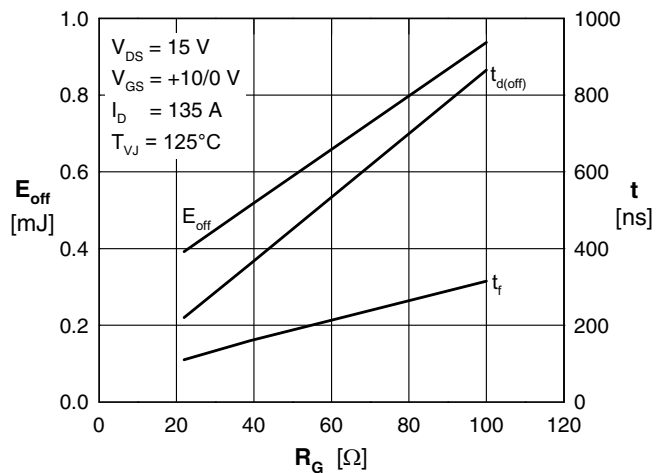


Fig. 12 Typ. turn-off energy & switching times vs. gate resistor, inductive switching

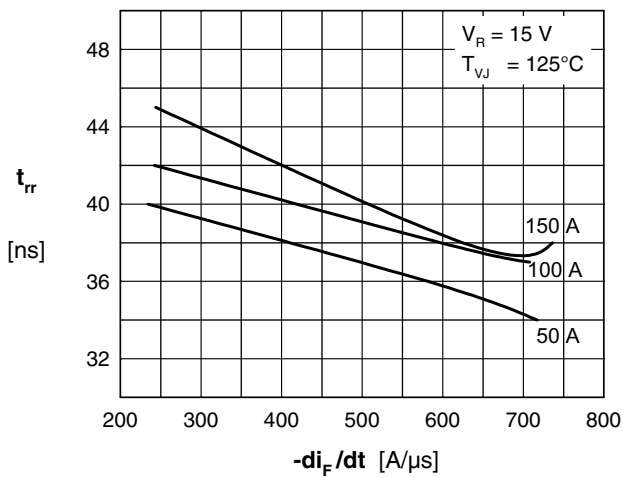


Fig. 13 Typ. reverse recovery time t_{rr} of the body diodes versus di/dt

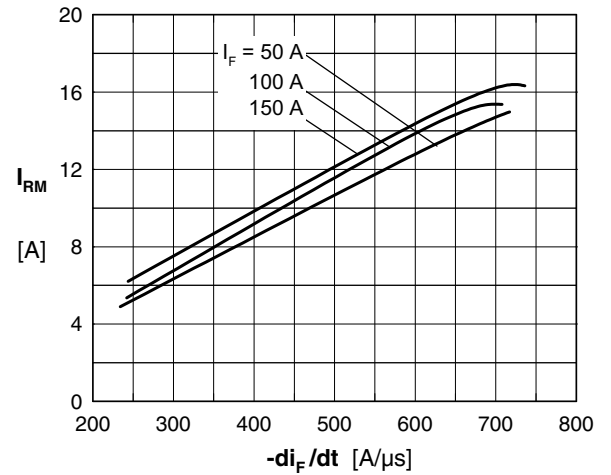


Fig. 14 Typ. reverse recovery current I_{RM} of the body diodes versus di/dt

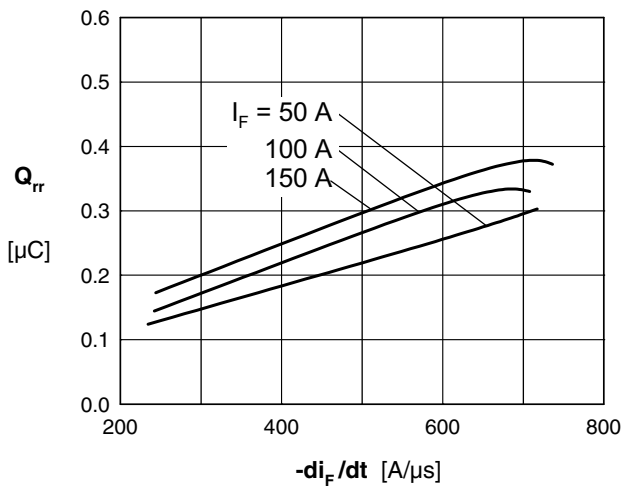


Fig. 15 Typ. reverse recovery charge Q_{rr} of the body diodes versus di/dt

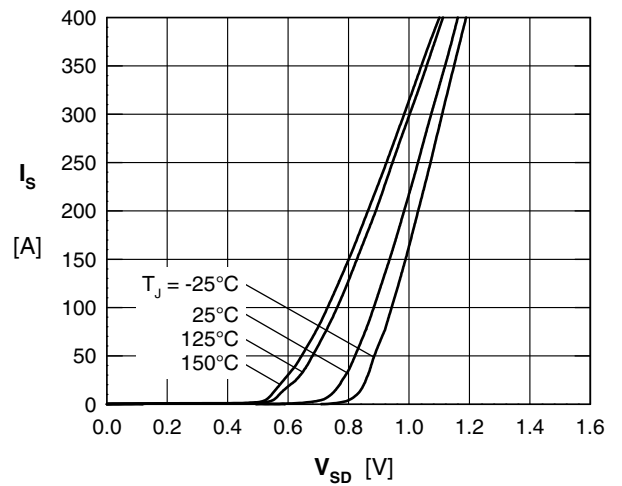


Fig. 16 Typ. source current I_s versus source drain voltage V_{SD} (body diode)

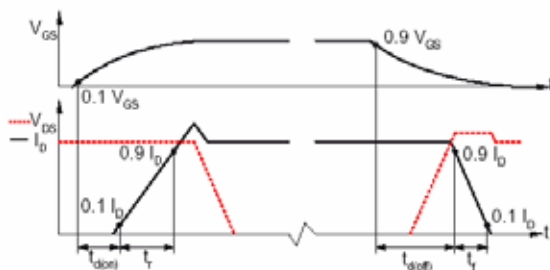


Fig. 17 Definition of switching times