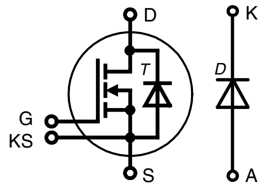
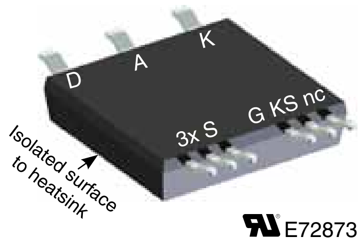
CoolMOS™ 1) Power MOSFET

ISOPLUS™ - electrically isolated surface to heatsink
Surface Mount Power Device

V_{DSS} = 600 V
I_{D25} = 50 A
$R_{DS(on)\ max}$ = 45 mΩ

Preliminary data





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MOSFET T			
Symbol	**Conditions**	**Maximum Ratings**	
V_{DSS}	T_{VJ} = 25°C to 150°C	600	V
V_{GS}		±20	V
I_{D25}	T_C = 25°C	50	A
I_{D80}	T_C = 80°C	38	A
E_{AS}	single pulse } I_D = 11 A; T_C = 25°C	1950	mJ
E_{AR}	repetitive	3	mJ
dV/dt	MOSFET dV/dt ruggedness V_{DS} = 0...480 V	50	V/ns

Symbol	**Conditions** (Characteristic Values, T_{VJ} = 25°C, unless otherwise specified)	**min.**	**typ.**	**max.**	
R_{DSon}	I_D = 44 A; V_{GS} = 10 V		40	45	mΩ
$V_{GS(th)}$	I_D = 3 mA; V_{DS} = V_{GS}	2.5	3	3.5	V
I_{DSS}	V_{DS} = V_{DSS}; V_{GS} = 0 V; T_{VJ} = 25°C			10	µA
	T_{VJ} = 125°C		50		µA
I_{GSS}	V_{DS} = 0 V; V_{GS} = ± 20 V			100	nA
$t_{d(on)}$	Inductive switching boost mode with diode D; V_{DS} = 380 V; I_D = 30 A; V_{GS} = 10 V; R_G = 33 Ω		80		ns
t_r			40		ns
$t_{d(off)}$			750		ns
t_f			40		ns
E_{on}			1.3		mJ
E_{off}			0.45		mJ
E_{rec}			0.35		mJ
C_{iss}	V_{GS} = 0 V; V_{DS} = 100 V; f = 1 MHz		6800		pF
C_{oss}			320		pF
Q_g	V_{DS} = 400 V; I_D = 44 A; V_{GS} = 10 V; R_G = 3.3 Ω		150	190	nC
Q_{gs}			35		nC
Q_{gd}			50		nC
R_{thJC}				0.4	K/W
R_{thJH}	with heatsink compound (IXYS test setup)		tbd	tbd	K/W

Features

- **Fast CoolMOS™ 1)** power MOSFET 4th generation
  - high blocking capability
  - lowest resistance
  - avalanche rated for unclamped inductive switching (UIS)
  - low thermal resistance due to reduced chip thickness
- **Package**
  - isolated surface to heatsink
  - low coupling capacity between pins and heatsink
  - PCB space saving
  - enlarged creepage towards heatsink
  - application friendly pinout
  - low inductive current path
  - high reliability

Applications

- Buck / boost chopper
- Optimized for boost configuration
- PFC stage

1) CoolMOS™ is a trademark of Infineon Technologies AG.

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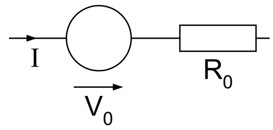
Source-Drain Diode of MOSFET T

Symbol	Conditions	Maximum Ratings	
I_{S25}	T_C = 25°C	50	A
I_{S80}	T_C = 80°C	38	A

Symbol	Conditions (Characteristic Values, T_{VJ} = 25°C, unless otherwise specified)	min.	typ.	max.	
V_{SD}	I_F = 44 A; V_{GS} = 0 V		0.9	1.0	V
t_{rr}	I_F = 44 A; $-di_F/dt$ = 100 A/µs; V_R = 400 V		600		ns
Q_{RM}			17		µC
I_{RM}			60		A

Equivalent Circuits for Simulation

Conduction



Boost Diode (typ. at T_J = 125°C)
V_0 = tbd V; R_0 = tbd mΩ

Diode D

Symbol	Conditions	Maximum Ratings	
I_{F25}	T_C = 25°C; DC	96	A
I_{F80}	T_C = 80°C; DC	61	A

Symbol	Conditions (Characteristic Values, T_{VJ} = 25°C, unless otherwise specified)		min.	typ.	max.	
V_{RRM}		T_{VJ} = 25°C			600	V
V_F	I_F = 25 A	T_{VJ} = 25°C		1.2	1.4	V
		T_{VJ} = 125°C		1.3		
I_R	V_R = V_{RRM}	T_{VJ} = 25°C			150	µA
		T_{VJ} = 125°C		tbd		mA
I_{RM}	I_F = 30 A; V_R = 350 V -di/dt = 240 A/µs	T_{VJ} = 100°C		10		A
t_{rr}	I_F = 1 A; V_R = 30 V -di/dt = 100 A/µs	T_{VJ} = 100°C		35	50	ns
R_{thJC}	per diode				0.7	K/W
R_{thJH}	with heatsink compound (IXYS test setup)			tbd		k/W

Component

Symbol	Conditions	Maximum Ratings	
T_{VJ}		-55...+150	°C
T_{stg}		-55...+125	°C
V_{ISOL}	I_{ISOL} ≤ 1 mA; 50/60 Hz	2500	V~
F_C	mounting force	40 ... 130	N

Symbol	Conditions (Characteristic Values)	min.	typ.	max.	
C_P	coupling capacity between shorted pins and backside metal		90		pF
d_S, d_A	pin - pin	1.65			mm
d_S, d_A	pin - backside metal	4			mm
CTI		400			
Weight			8		g

Ordering	Part Number	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MKE38RK600DFELB-TRR	MKE38RK600DFELB	Tape & Reel	200	510479
	MKE38RK600DFELB	MKE38RK600DFELB	Blister	45	510231

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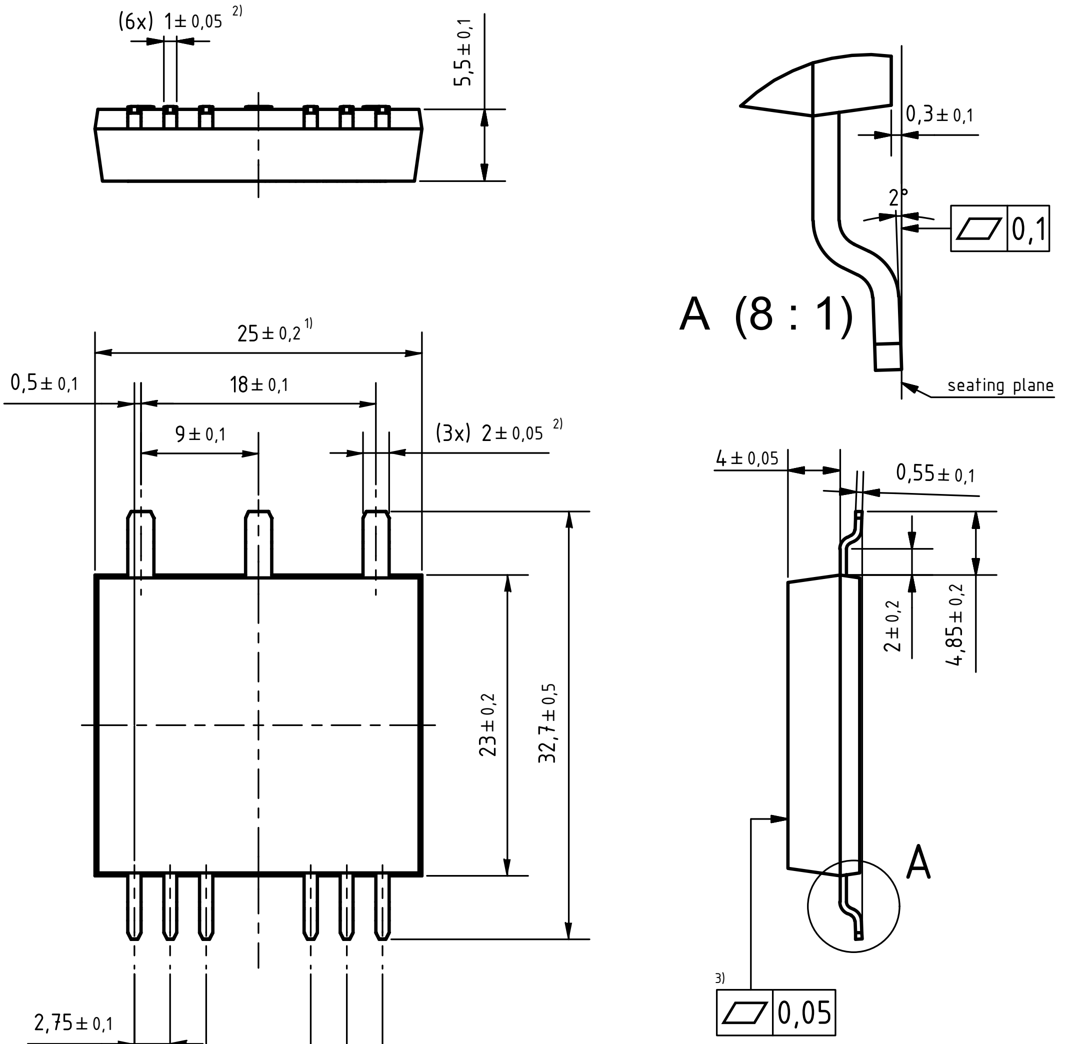
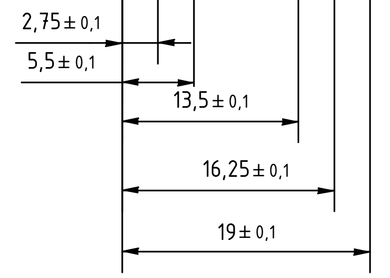
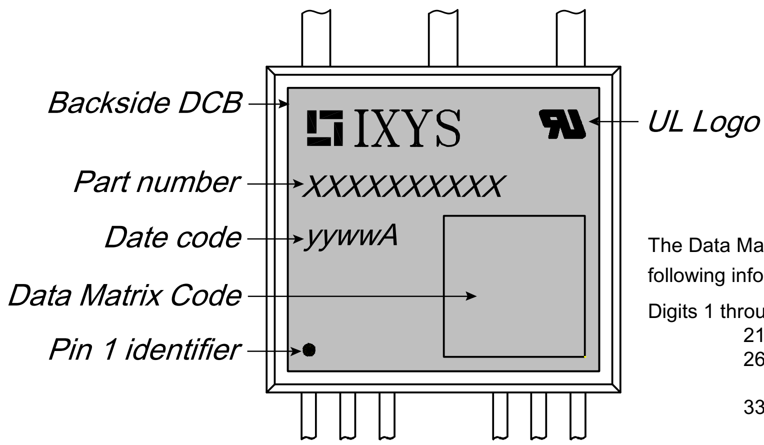




Notes:
1) potrusion may add 0.2 mm max. on each side
2) additional max. 0.05 mm per side by punching misalignement
or overlap of dam bar or bending compression
3) DCB area 10 to 50 µm convex;
position of DCB area in relation to plastic rim: ±25 µm
(measured 2 mm from Cu rim)
4) terminal plating: 0.2 - 1 µm Ni + 10 - 25 µm Sn (galv.)
cutting edges may be partially free of plating



The Data Matrix Code contains the following information in 36 digits:

Digits 1 through 20: part number
21 to 25: date code (YYWWA)
26 to 31: assembly lot code
32: reserved for special information
33 to 36: may be used for subsequent module numbering within the assembly lot

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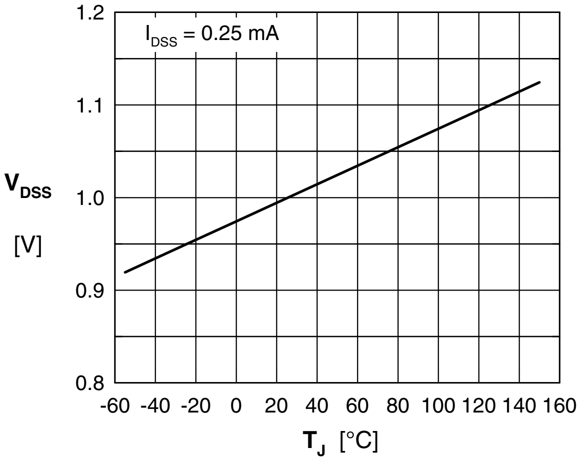

Fig.1 Drain source breakdown voltage versus temperature T_{VJ}

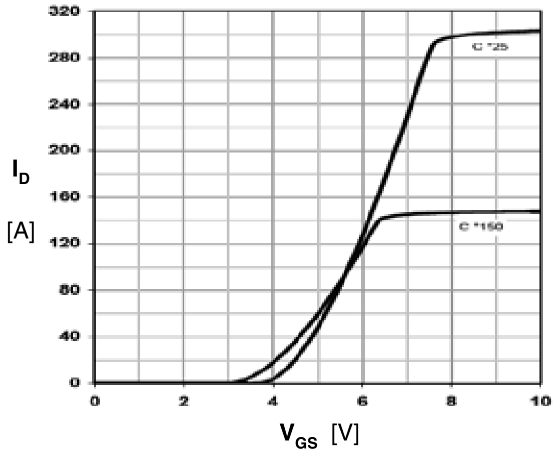

Fig. 2 Typ. transfer characteristics

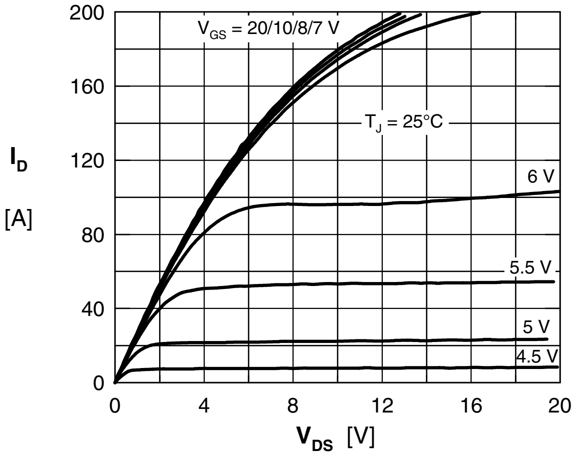

Fig. 3 Typical output characteristics

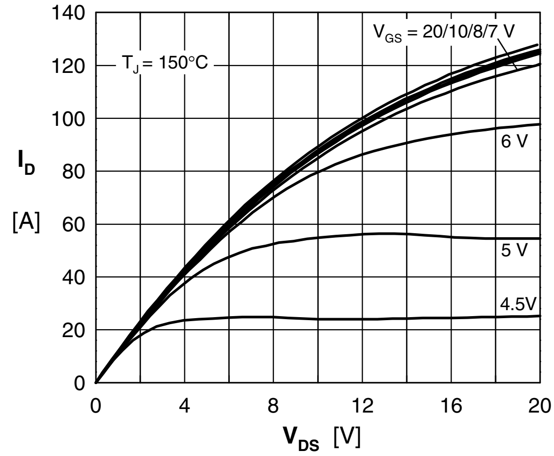

Fig. 4 Typical output characteristics

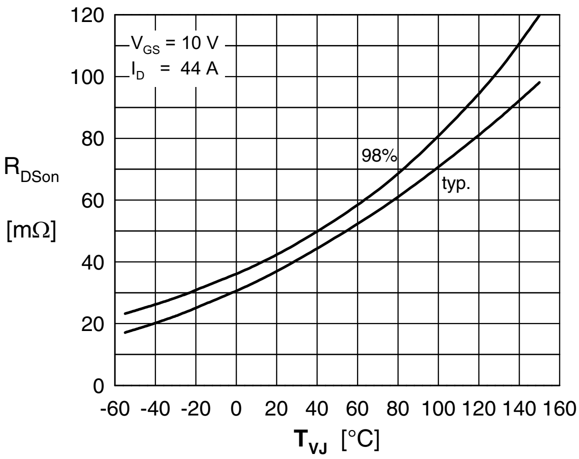

Fig.5 Drain source on-state resistance $R_{DS(on)}$ vs. junction temperature T_{VJ}

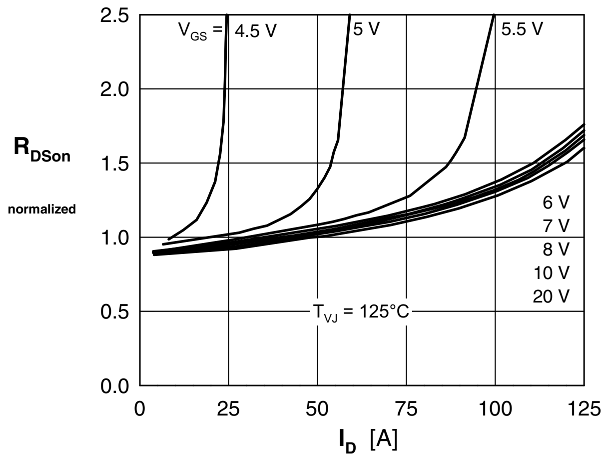

Fig. 6 Drain source on-state resistance, $R_{DS(on)}$ versus I_D

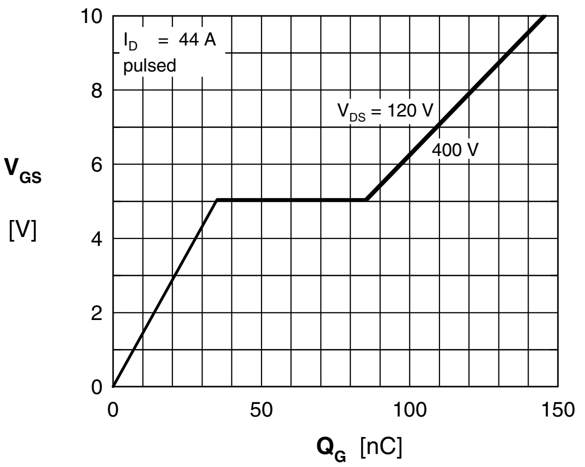

Fig. 7 Typ. turn-on gate charge

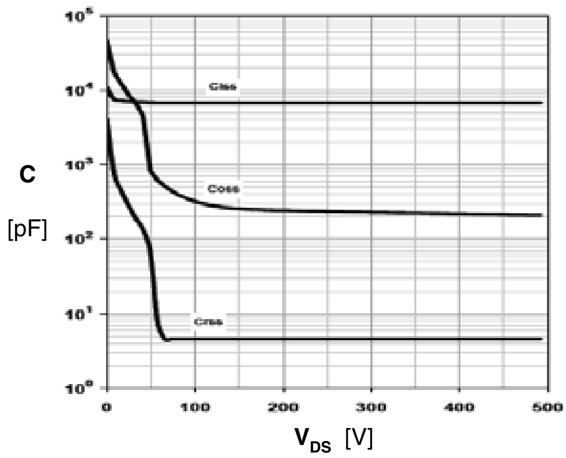

Fig. 8 Typ. capacities, MOSFET only

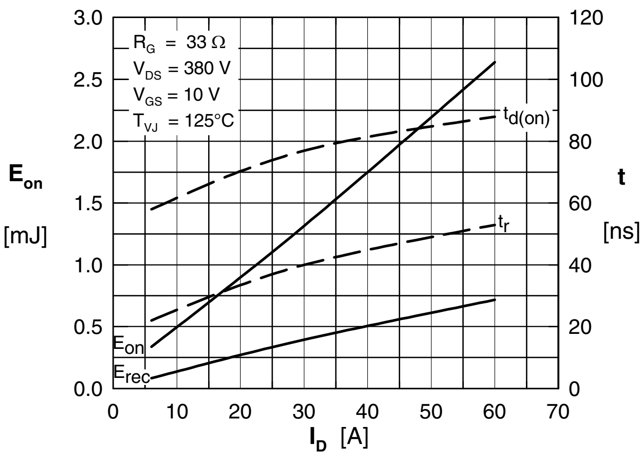

Fig. 9 Typ. turn-on energy and switching times
vs. collector current, induktive switching

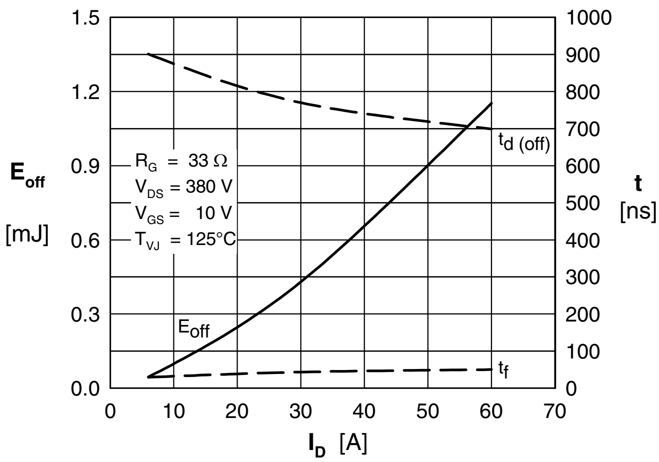

Fig. 10 Typ. turn-off energy and switching times
vs. collector-current, induktive switching

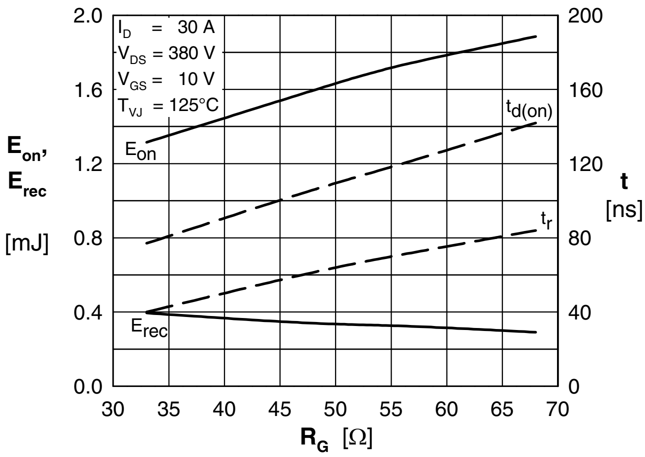

Fig. 11 Typ. turn-on energy and switching times
vs. gate resistor, induktive switching

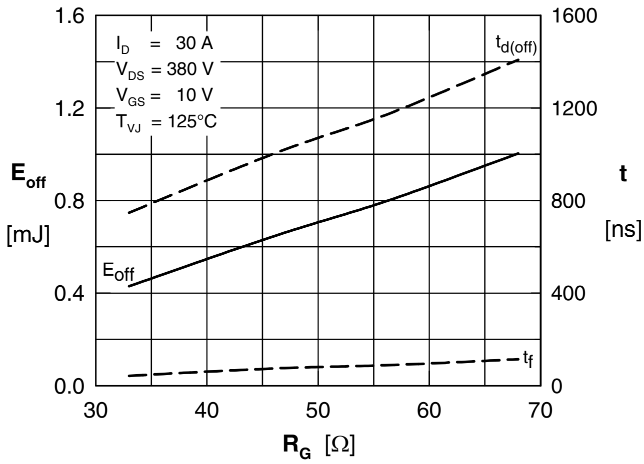

Fig. 12 Typ. turn-off energy and switching times
vs. gate resistor, induktive switching

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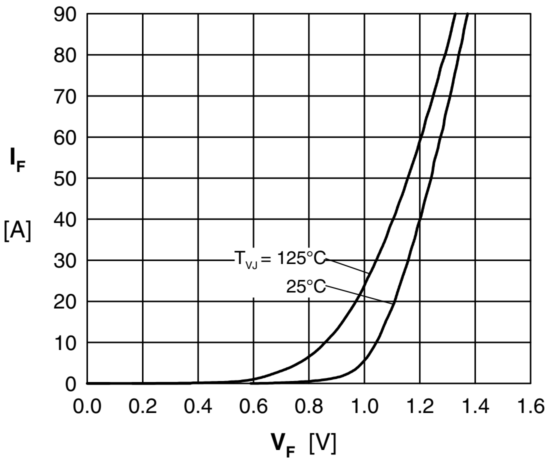

Fig. 13 Typ. forward characteristics of diode D

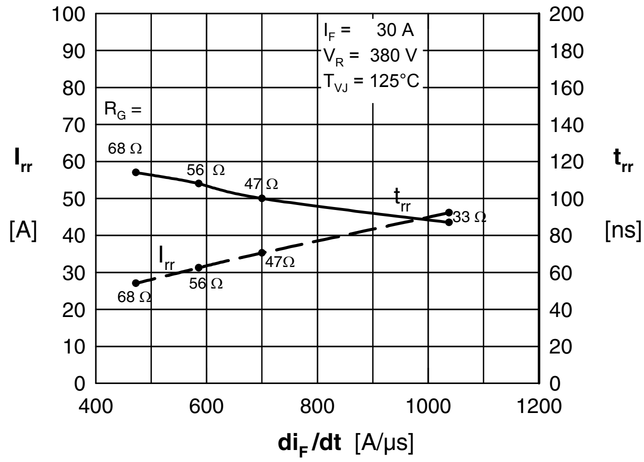

Fig. 14 Typ. reverse recovery characteristics of diode D

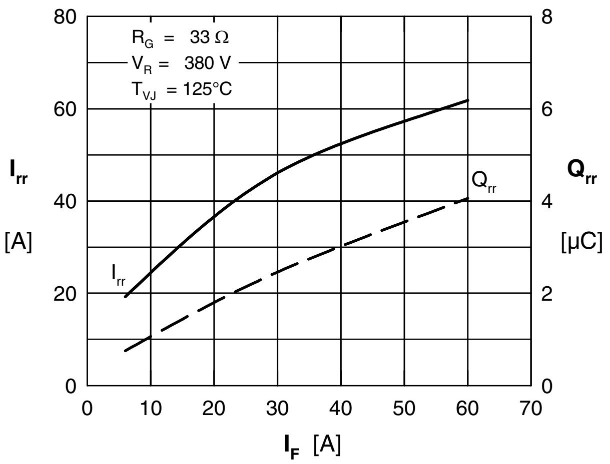

Fig. 15 Typ. reverse recovery characteristics of diode D