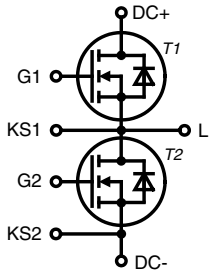
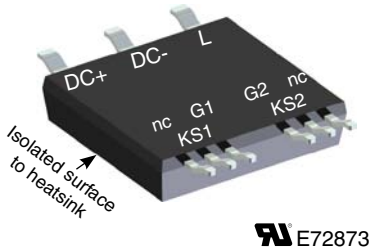
CoolMOS™ [1] Power MOSFET

ISOPLUS™ - electrically isolated surface to heatsink

Surface Mount Power Device

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





E72873

MOSFETs T1, T2

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; I_D = 11 A; T_C = 25°C	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
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		150	190	nC
Q_{gs}	V_{GS} = 10 V; R_G = 3.3 Ω		35		nC
Q_{gd}			50		nC
$t_{d(on)}$	Resistive switching T_{VJ} = 125°C		22		ns
t_r	V_{DS} = 380 V; I_D = 30 A		10		ns
$t_{d(off)}$	V_{GS} = 10 V; R_G = 3.3 Ω		120		ns
t_f			12		ns
E_{on}			70		µJ
E_{off}			22		µJ
$t_{d(on)}$	Inductive switching T_{VJ} = 25°C		900		ns
t_r	V_{DS} = 380 V; I_D = 30 A		400		ns
$t_{d(off)}$	V_{GS} = 10 V; R_G = 330 Ω				ns
t_f			520		ns
E_{on}			18		mJ
E_{off}			5.2		mJ
$E_{rec(off)}$			0.18		mJ
R_{thJC}				0.4	K/W
R_{thJH}	with heatsink compound; IXYS test setup		0.6		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

- Switch mode power supplies (SMPS)
- Soft switching topologie
- Resonant converter

[1] CoolMOS™ is a trademark of Infineon Technologies AG.

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Source-Drain Diodes of T1/T2

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		0.95	1.25	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

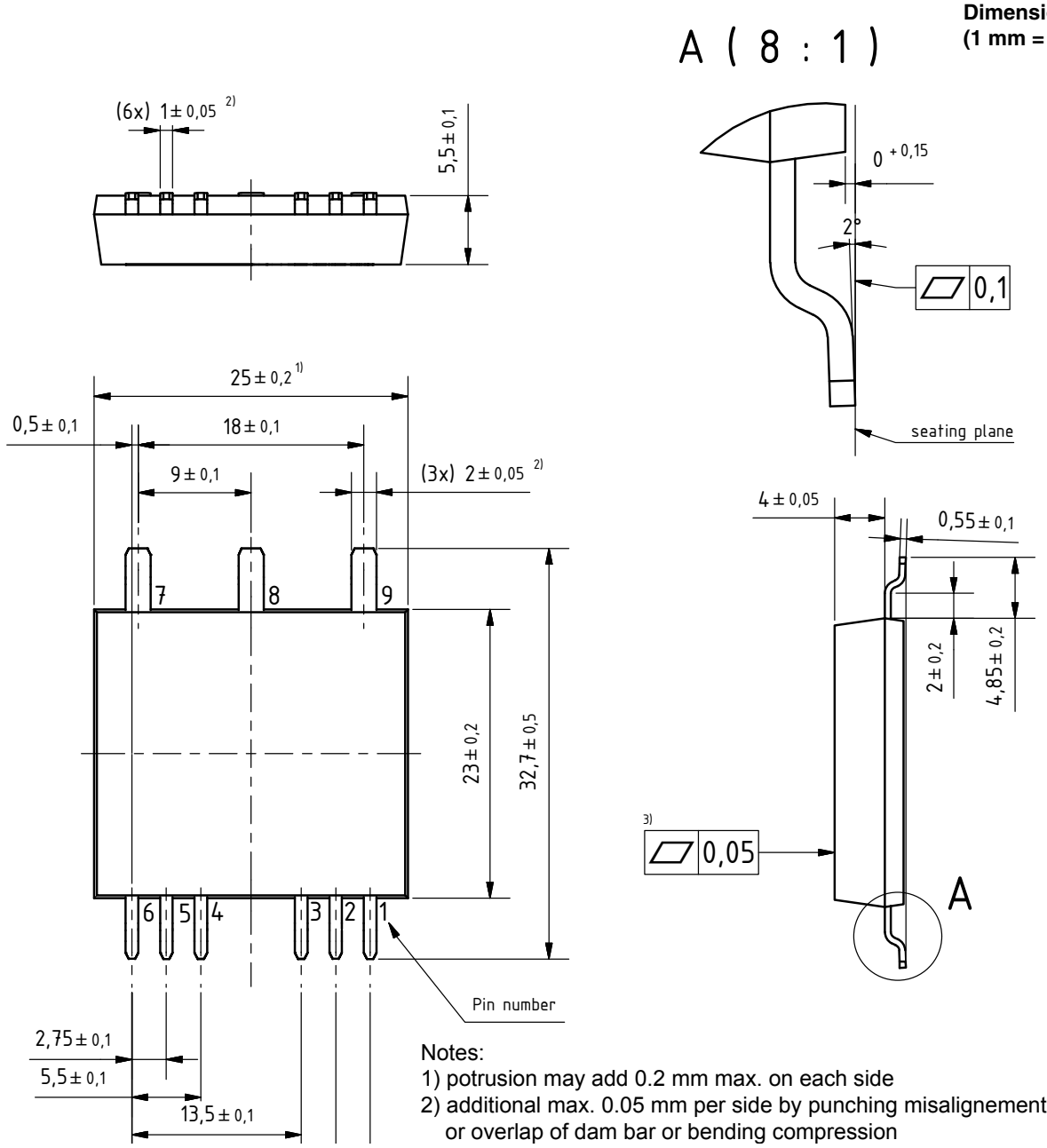
Component

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

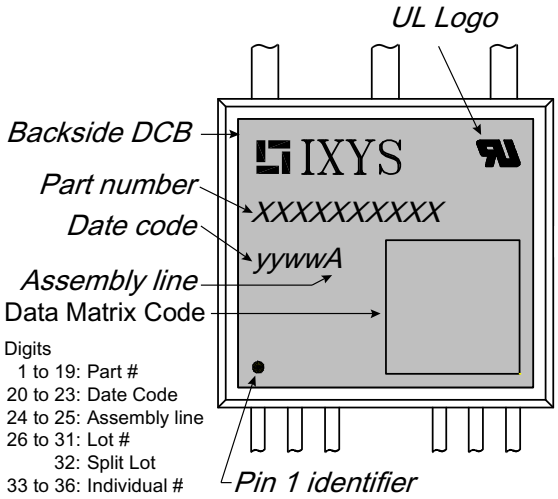
Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
C_P	coupling capacity between shorted pins and backside metal		90		pF
d_S, d_A	pin - pin	1.65			mm
d_S, d_A	pin - backside metal	4			mm
CTI		400			
Weight			8		g

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MKE38P600LB-TRR	MKE38P600LB	Tape&Reel	200	510486
	MKE38P600LB	MKE38P600LB	Blister	45	480601

Dimensions in mm
(1 mm = 0.0394“)



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



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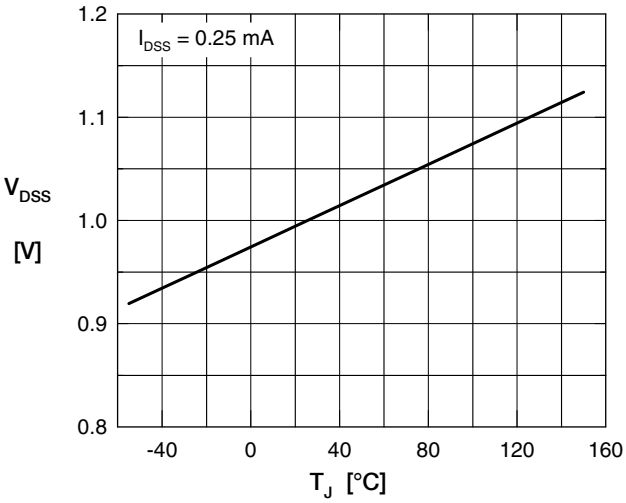

Fig.1 Drain source breakdown voltage versus temperature T_{VJ}

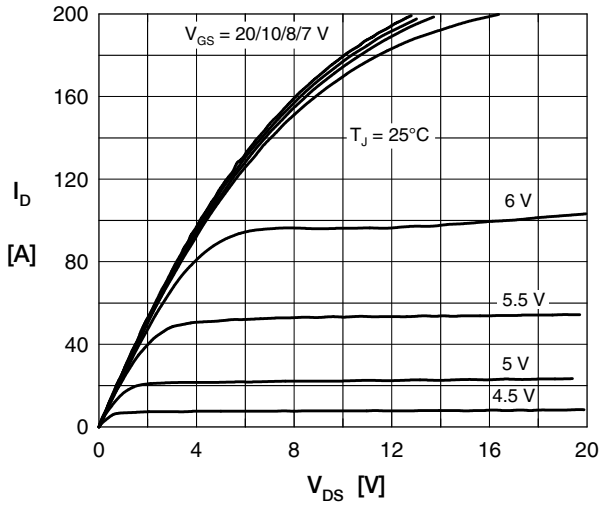

Fig. 2 Typ. output characteristics

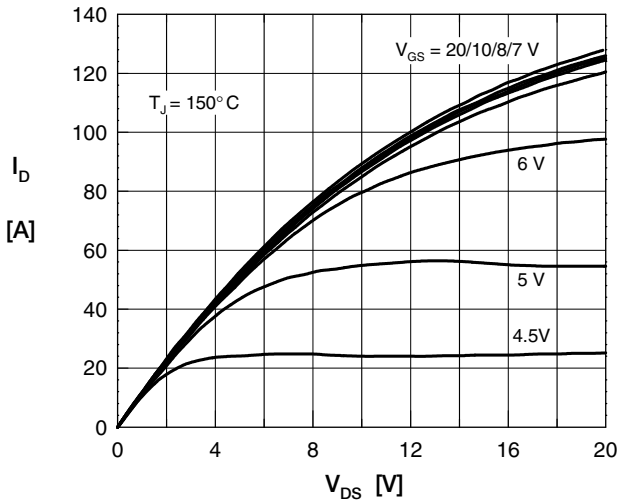

Fig. 3 Typ. output characteristics

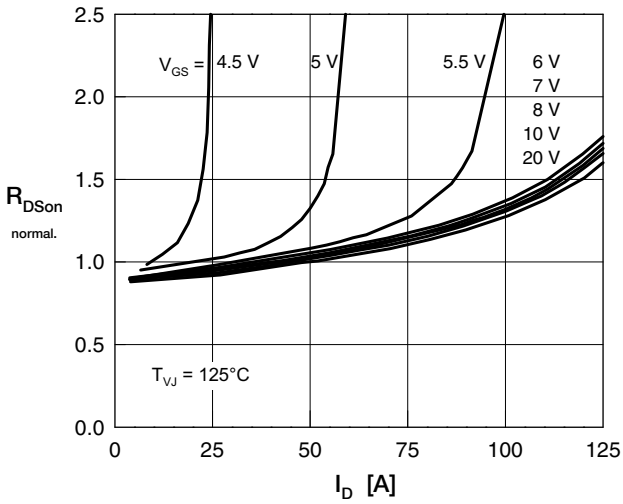

Fig. 4 Drain source on-state resistance $R_{DS(on)}$ versus I_D

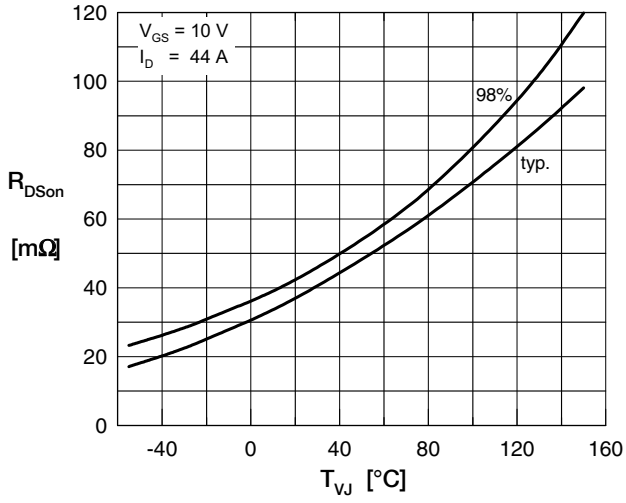

Fig.5 Drain source on-state resistance $R_{DS(on)}$ vs. junction temperature T_{VJ}

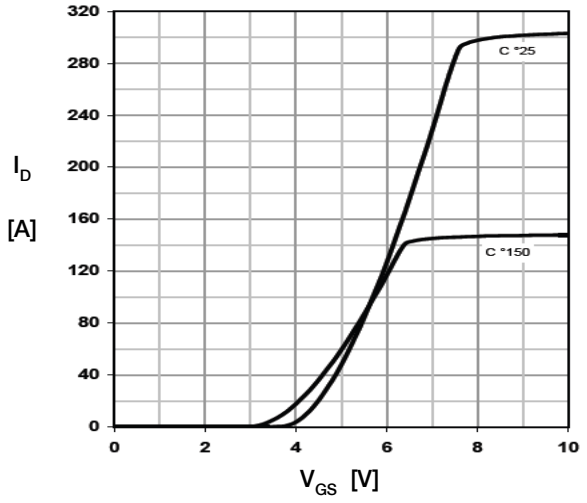

Fig.6 Typ. transfer characteristics

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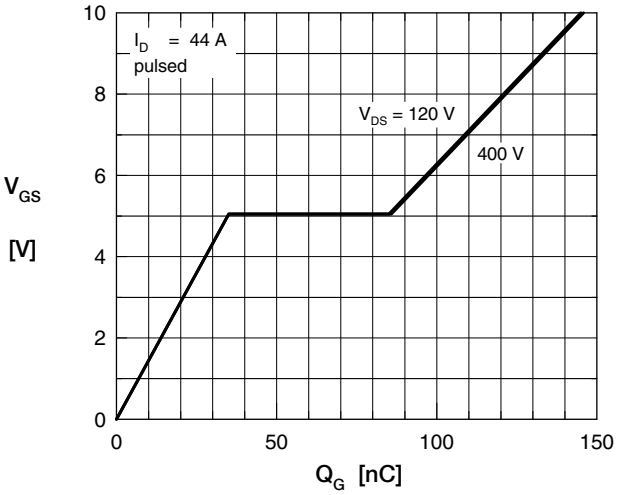

Fig. 7 Typ. turn-on gate charge

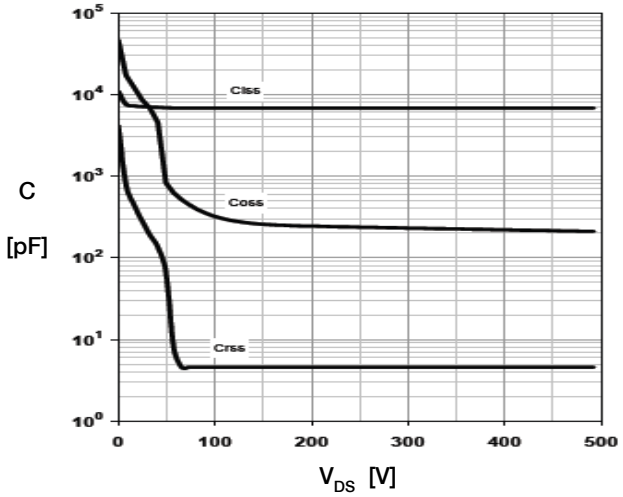

Fig. 8 Typ. capacities, MOSFET only

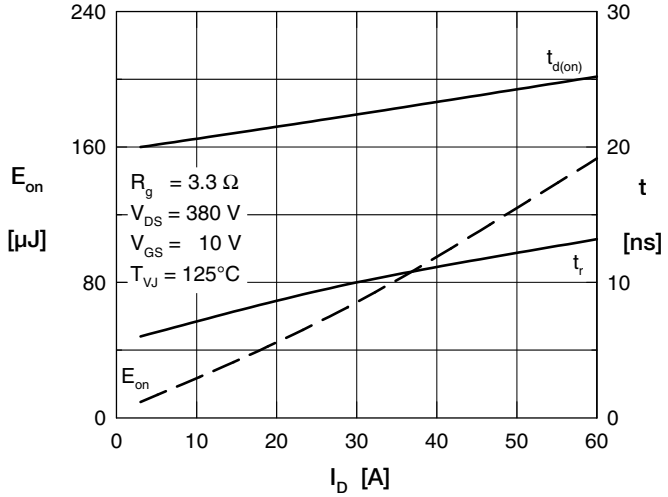

Fig.9 Typ. turn-on energy and switching times versus collector current, resistive switching

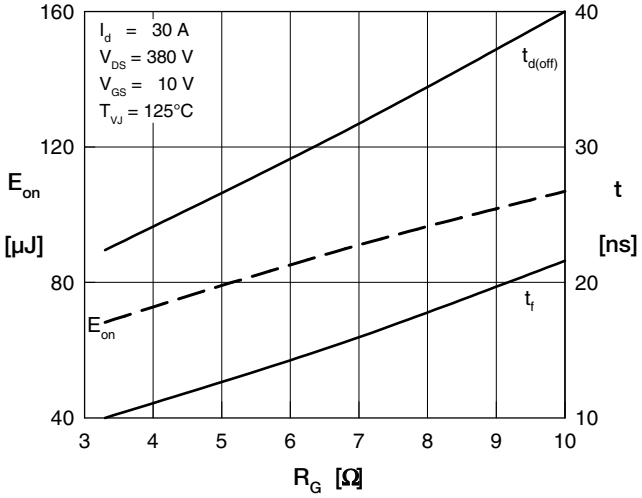

Fig. 10 Typ. turn-on energy and switching times versus gate resistor, resistive switching

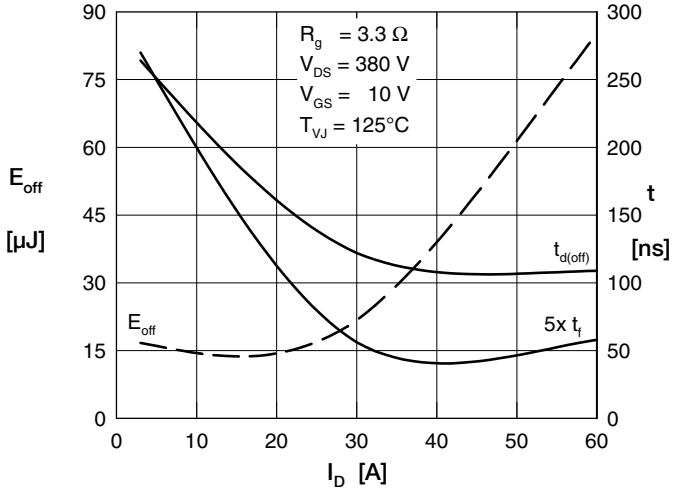

Fig.11 Typ. turn-off energy and switching times vs. collector current, resistive switching

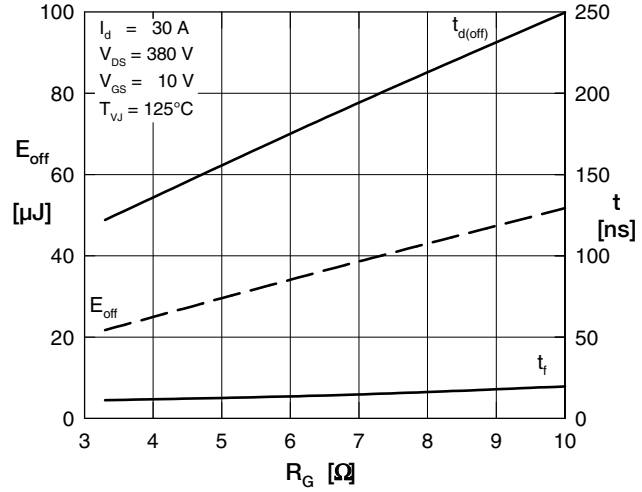

Fig. 12 Typ. turn-off energy and switching times versus gate resistor, resistive switching

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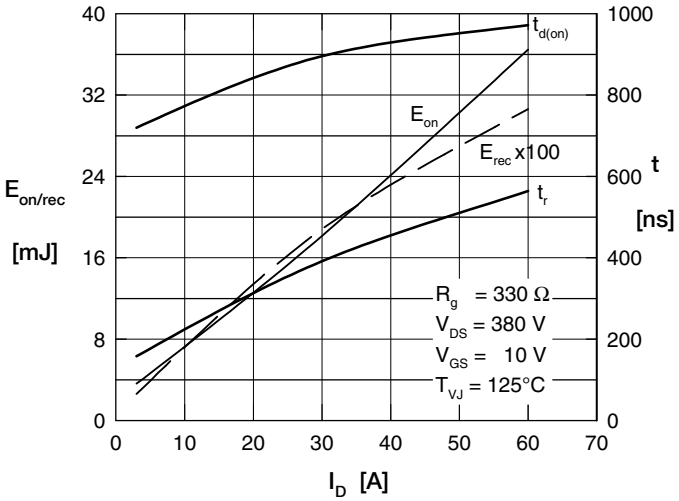

Fig. 13 Typ. turn-on energy & switching times versus collector current, inductive switching (phaseleg)

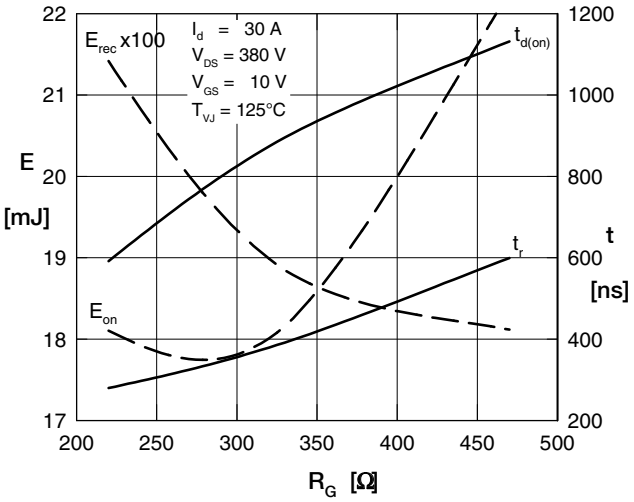

Fig. 14 Typ. turn-on energy & switching times versus gate resistor, inductive switching (phaseleg)

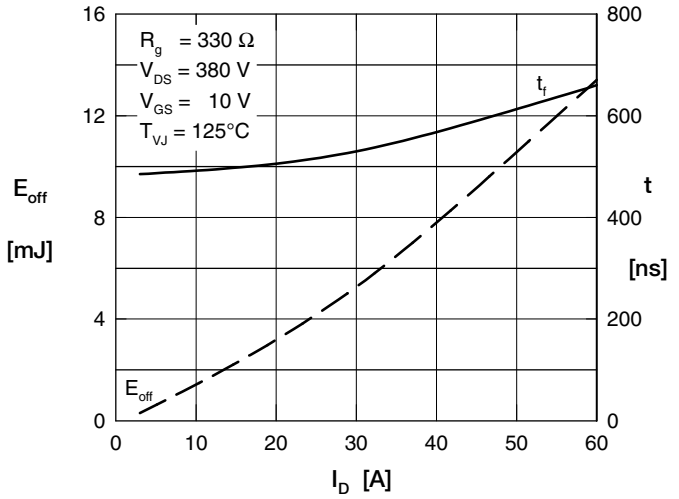

Fig. 15 Typ. turn-off energy & switching times versus collector-current, inductive switching (phaseleg)

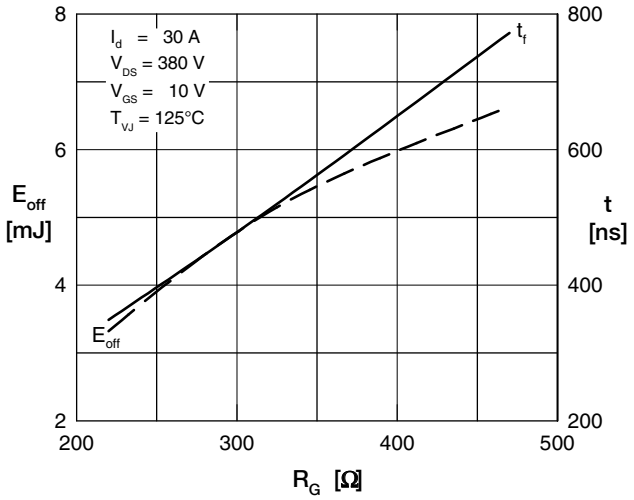

Fig. 16 Typ. turn-off energy & switching times versus gate resistor, inductive switching (phaseleg)

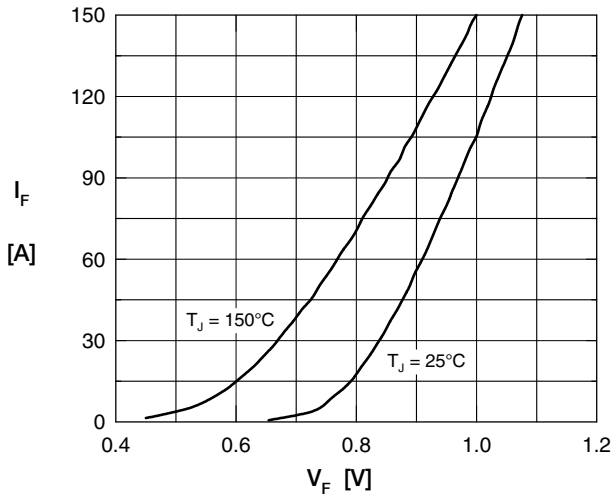

Fig. 17 Typ. forward characteristics of source drain diode D_{SD}

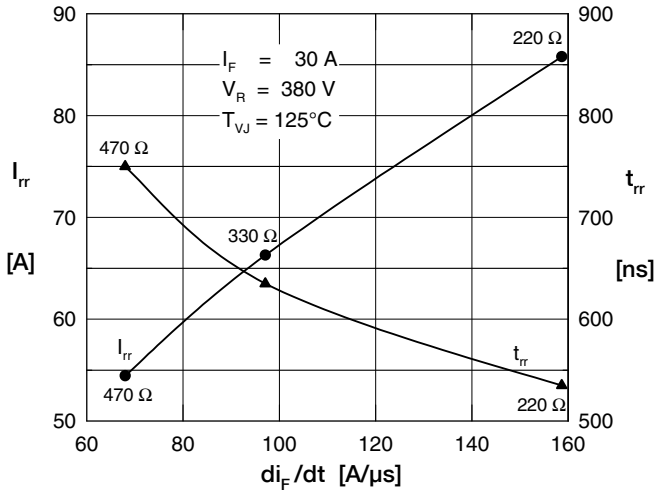

Fig. 18 Typ. reverse recovery of anti-parallel diode

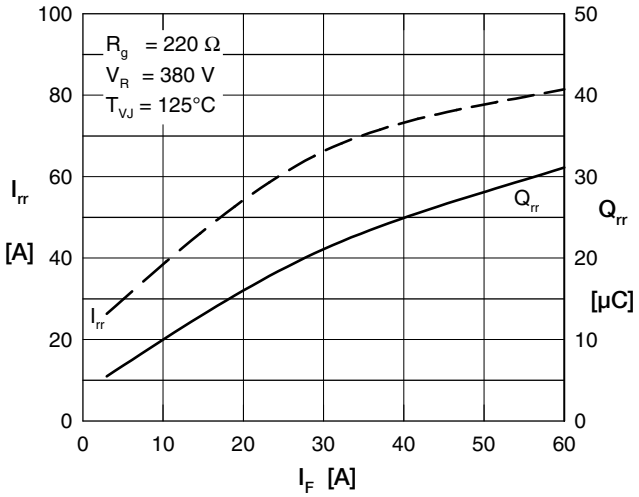

Fig. 19 Typ. reverse recovery characteristics

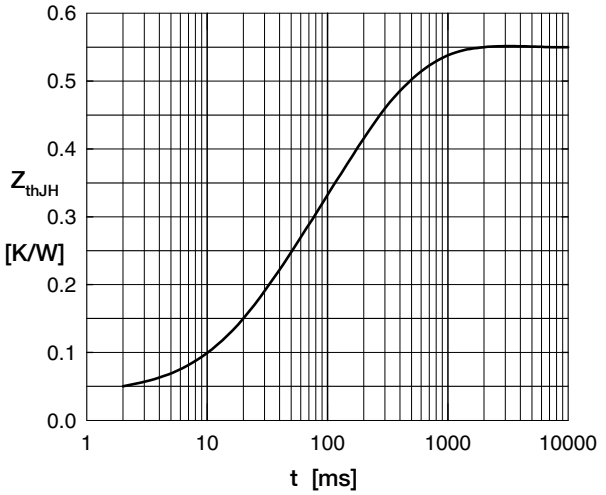

Fig. 20 Typ. transient thermal impedance of the MOSFET (IXYS test setup)