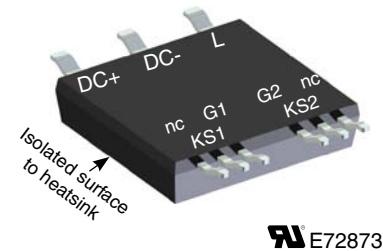
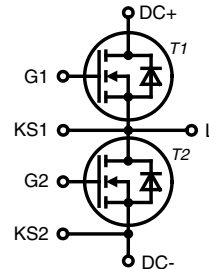


# CoolMOS™ 1) Power MOSFET

## ISOPLUS™ - electrically isolated surface to heatsink

### Surface Mount Power Device

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



E72873

MOSFETs T1, T2			
Symbol	Conditions	Maximum Ratings	
$V_{DSS}$	$T_{VJ} = 25^\circ\text{C to } 150^\circ\text{C}$	600	V
$V_{GS}$		$\pm 20$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	50	A
$I_{D80}$	$T_C = 80^\circ\text{C}$	38	A
$E_{AS}$ $E_{AR}$	single pulse repetitive } $I_D = 11 \text{ A}; T_C = 25^\circ\text{C}$	1950 3	mJ mJ
$dV/dt$	MOSFET $dV/dt$ ruggedness $V_{DS} = 0 \dots 480 \text{ V}$	50	V/ns

Symbol	Conditions	Characteristic Values				
		min.	typ.	max.		
$(T_{VJ} = 25^\circ\text{C}, \text{ unless otherwise specified})$						
$R_{DS(on)}$	$I_D = 44 \text{ A}; V_{GS} = 10 \text{ V}$		40	45	m $\Omega$	
$V_{GS(th)}$	$I_D = 3 \text{ mA}; V_{DS} = V_{GS}$	2.5	3	3.5	V	
$I_{DSS}$	$V_{DS} = V_{DSS}; V_{GS} = 0 \text{ V};$ $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$		50	10	$\mu\text{A}$ $\mu\text{A}$	
$I_{GSS}$	$V_{DS} = 0 \text{ V}; V_{GS} = \pm 20 \text{ V}$			100	nA	
$C_{iss}$ $C_{oss}$	} $V_{GS} = 0 \text{ V}; V_{DS} = 100 \text{ V}; f = 1 \text{ MHz}$		6800		pF	
				320		pF
$Q_g$ $Q_{gs}$ $Q_{gd}$	} $V_{DS} = 400 \text{ V}; I_D = 44 \text{ A}$ $V_{GS} = 10 \text{ V}; R_G = 3.3 \Omega$		150	190	nC	
				35		nC
				50		nC
$t_{d(on)}$ $t_r$ $t_{d(off)}$ $t_f$ $E_{on}$ $E_{off}$	} Resistive switching $T_{VJ} = 125^\circ\text{C}$ $V_{DS} = 380 \text{ V}; I_D = 30 \text{ A}$ $V_{GS} = 10 \text{ V}; R_G = 3.3 \Omega$		22		ns	
				10		ns
				120		ns
				12		ns
				70		$\mu\text{J}$
				22		$\mu\text{J}$
$t_{d(on)}$ $t_r$ $t_{d(off)}$ $t_f$ $E_{on}$ $E_{off}$ $E_{rec(off)}$	} Inductive switching $T_{VJ} = 25^\circ\text{C}$ $V_{DS} = 380 \text{ V}; I_D = 30 \text{ A}$ $V_{GS} = 10 \text{ V}; R_G = 330 \Omega$		900		ns	
				400		ns
						ns
				520		ns
				18		mJ
				5.2		mJ
				0.18		mJ
$R_{thJC}$ $R_{thJH}$	with heatsink compound; IXYS test setup			0.4	K/W	
				0.6		K/W

### Features

- **Fast CoolMOS™ 1)** power MOSFET 4<sup>th</sup> 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

<sup>1)</sup> CoolMOS™ is a trademark of Infineon Technologies AG.

**Source-Drain Diodes of T1/T2**

Symbol	Conditions	Maximum Ratings		
$I_{S25}$	$T_C = 25^\circ\text{C}$	50	A	
$I_{S80}$	$T_C = 80^\circ\text{C}$	38	A	

Symbol	Conditions	Characteristic Values			
( $T_{VJ} = 25^\circ\text{C}$ , unless otherwise specified)					
		min.	typ.	max.	
$V_{SD}$	$I_F = 44\text{ A}; V_{GS} = 0\text{ V}$		0.95	1.25	V
$t_{rr}$	$I_F = 44\text{ A}; -di_F/dt = 100\text{ A}/\mu\text{s}; V_R = 400\text{ V}$		600		ns
$Q_{RM}$			17		$\mu\text{C}$
$I_{RM}$			60		A

**Component**

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

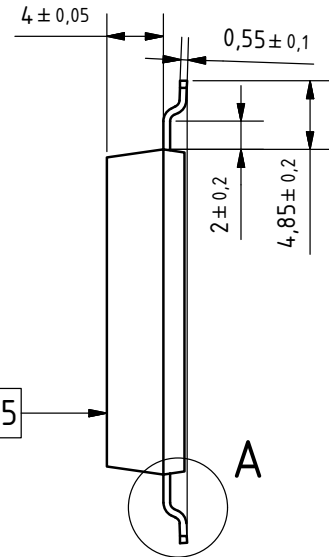
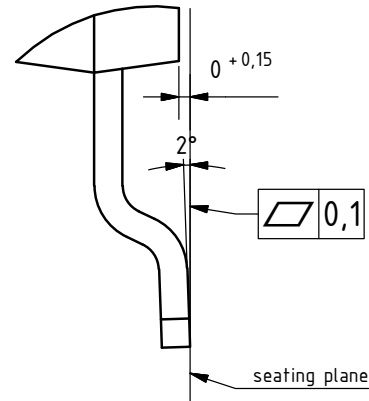
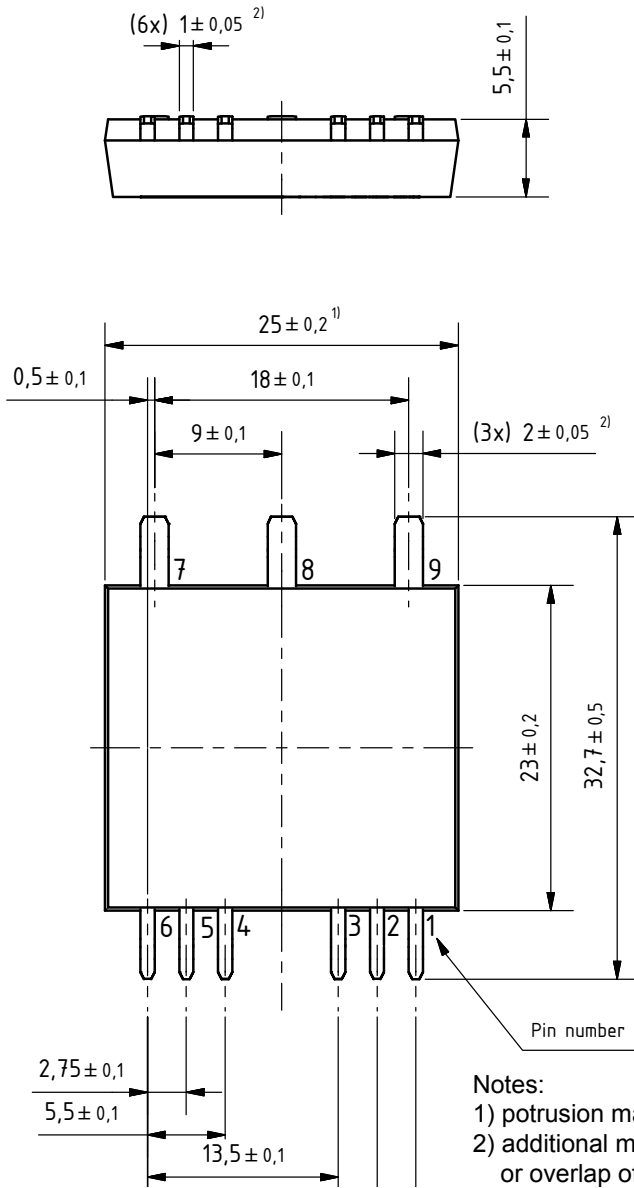
  

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
$C_p$	coupling capacity between shorted pins and backside metal		90		pF
$d_S, d_A$	pin - pin	1.65			mm
$d_S, d_A$	pin - backside metal	4			mm
<b>CTI</b>		400			
<b>Weight</b>			8		g

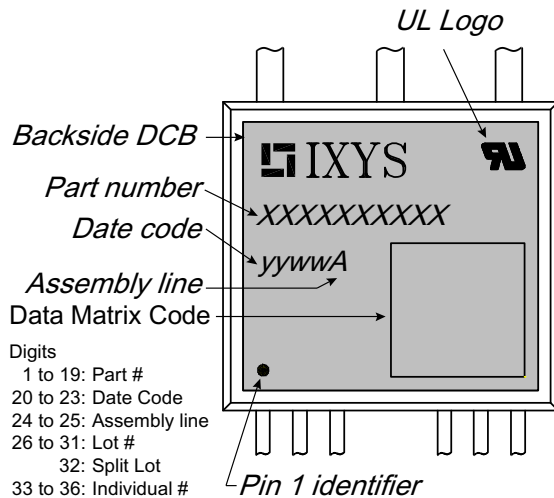
Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MKE38P600LB-TRR	MKE38P600LB	Tape&Reel	200	510486
	MKE38P600LB	MKE38P600LB	Blister	45	480601

Dimensions in mm  
(1 mm = 0.0394")

A ( 8 : 1 )



- Notes:
- 1) protrusion may add 0.2 mm max. on each side
  - 2) additional max. 0.05 mm per side by punching misalignment or overlap of dam bar or bending compression



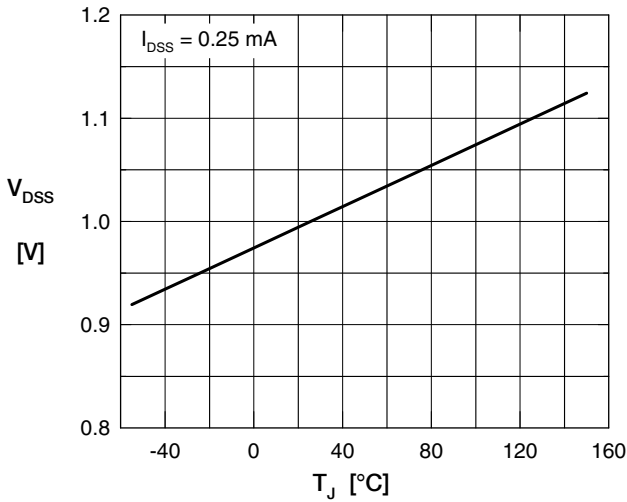


Fig.1 Drain source breakdown voltage versus temperature  $T_{VJ}$

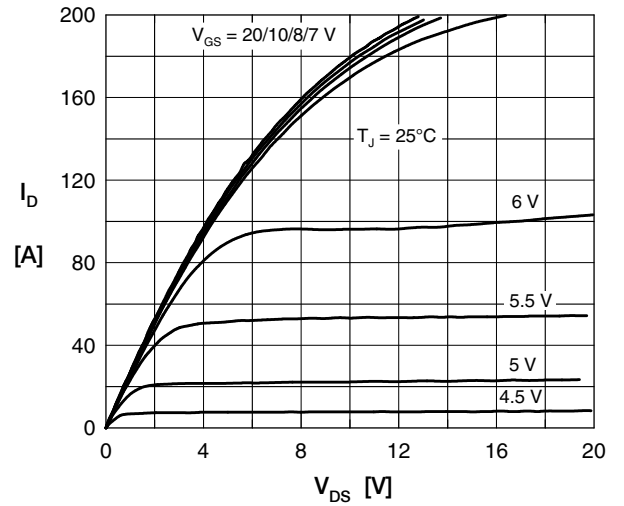


Fig. 2 Typ. output characteristics

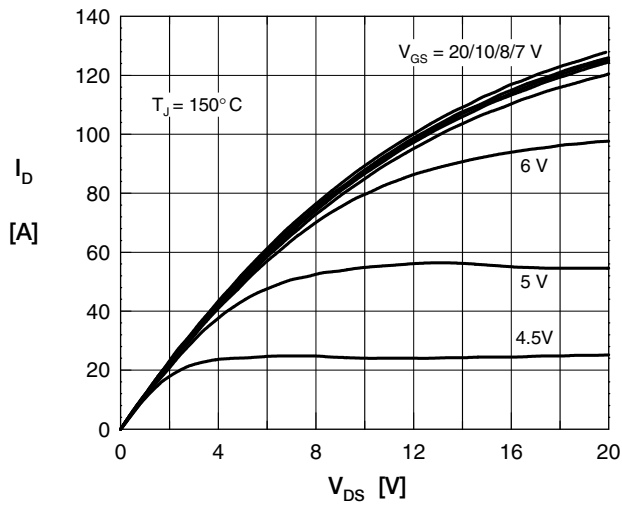


Fig. 3 Typ. output characteristics

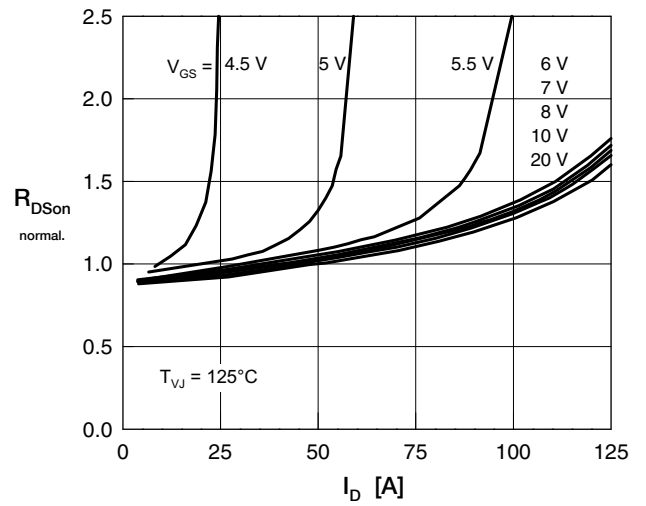


Fig. 4 Drain source on-state resistance  $R_{DS(on)}$  versus  $I_D$

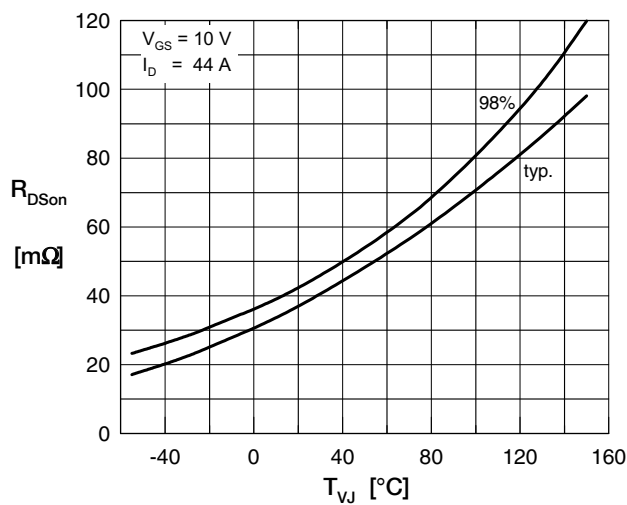


Fig.5 Drain source on-state resistance  $R_{DS(on)}$  vs. junction temperature  $T_{VJ}$

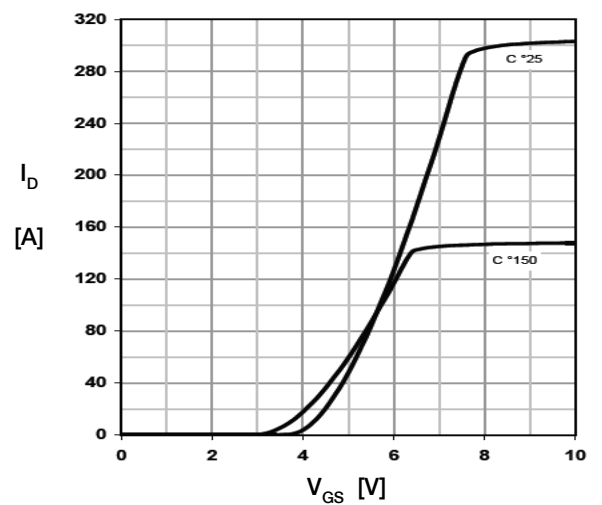


Fig.6 Typ. transfer characteristics

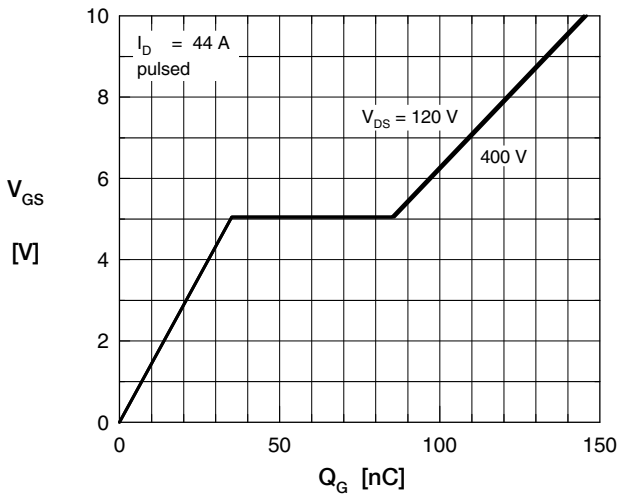


Fig. 7 Typ. turn-on gate charge

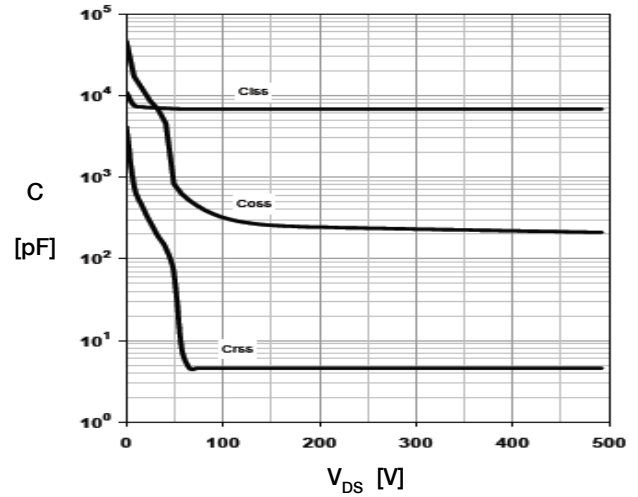


Fig. 8 Typ. capacities, MOSFET only

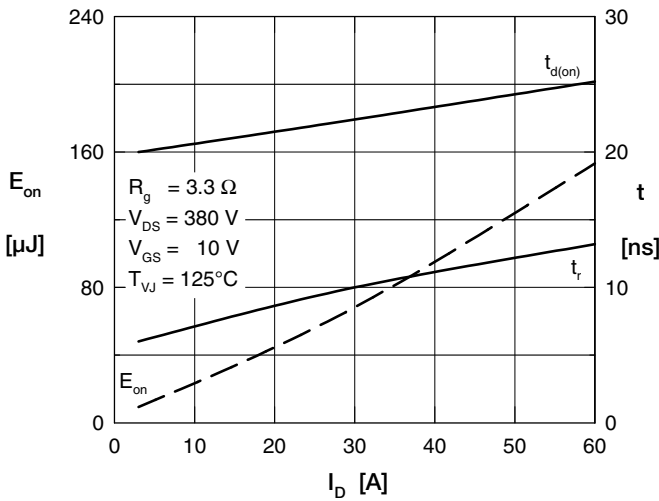


Fig.9 Typ. turn-on energy and switching times versus collector current, resistive switching

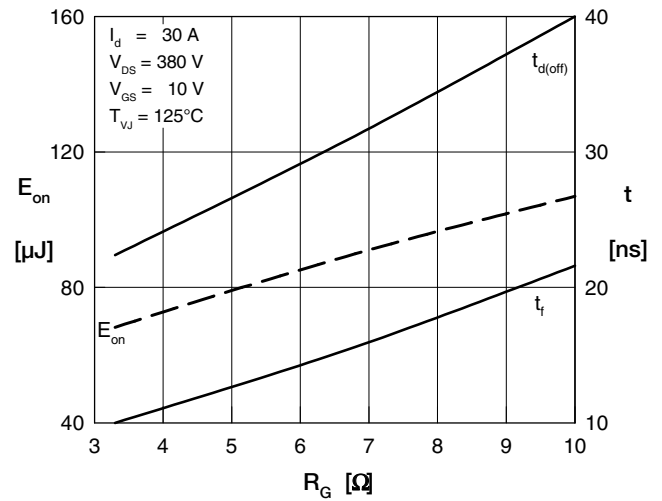


Fig. 10 Typ. turn-on energy and switching times versus gate resistor, resistive switching

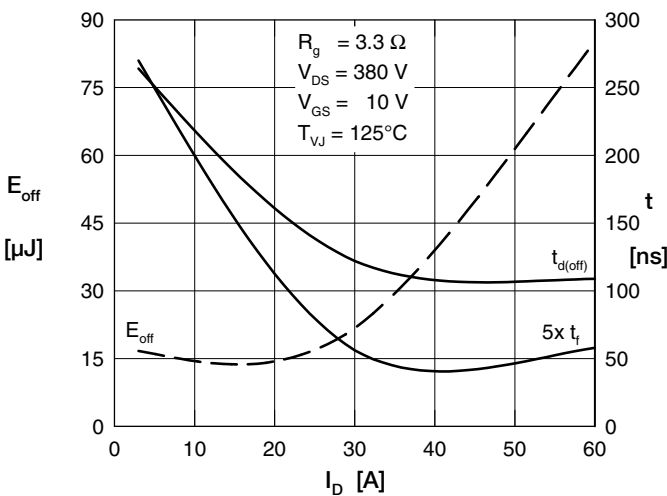


Fig.11 Typ. turn-off energy and switching times vs. collector current, resistive switching

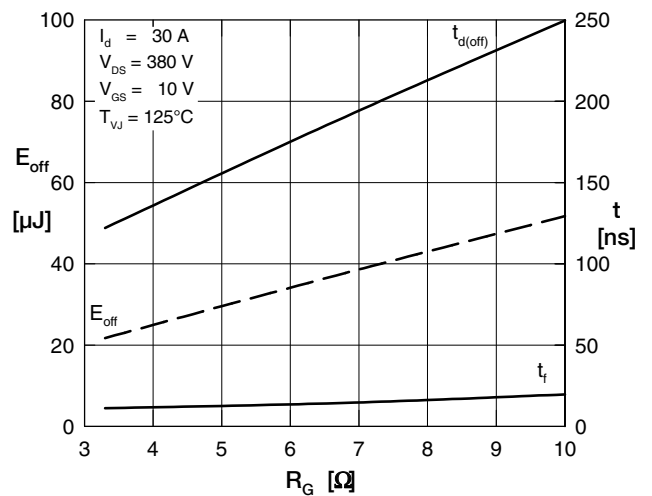


Fig. 12 Typ. turn-off energy and switching times versus gate resistor, resistive switching

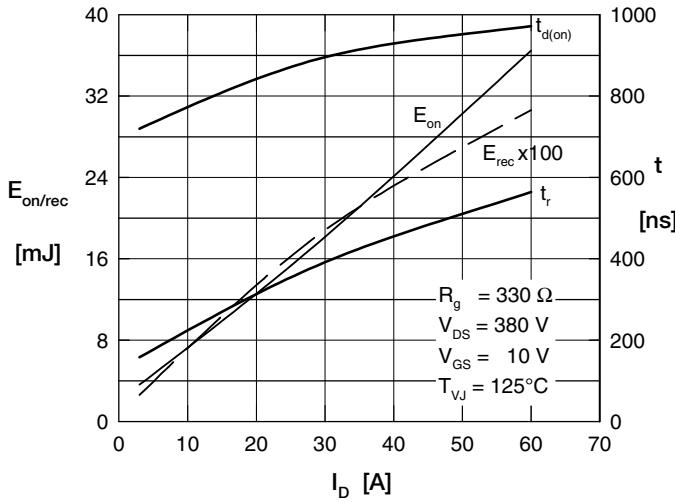


Fig. 13 Typ. turn-on energy & switching times versus collector current, inductive switching (phaseleg)

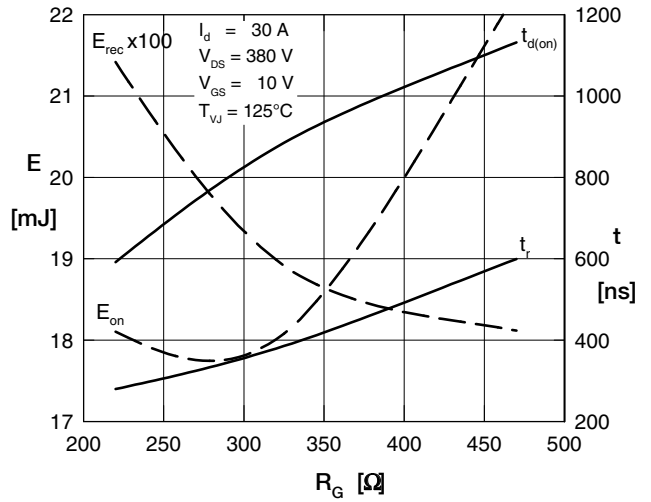


Fig. 14 Typ. turn-on energy & switching times versus gate resistor, inductive switching (phaseleg)

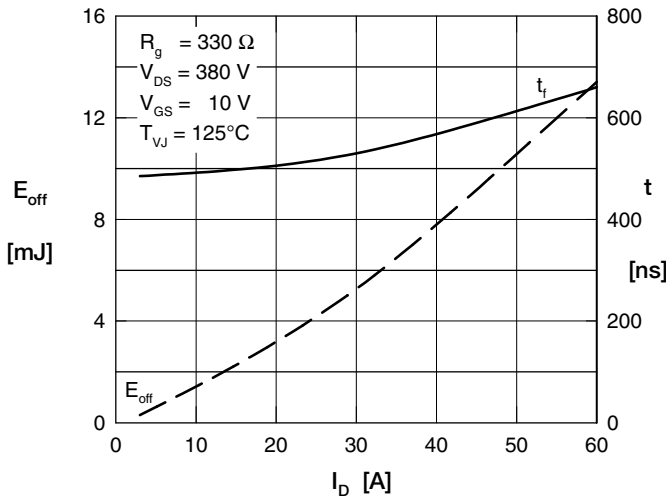


Fig. 15 Typ. turn-off energy & switching times versus collector-current, inductive switching (phaseleg)

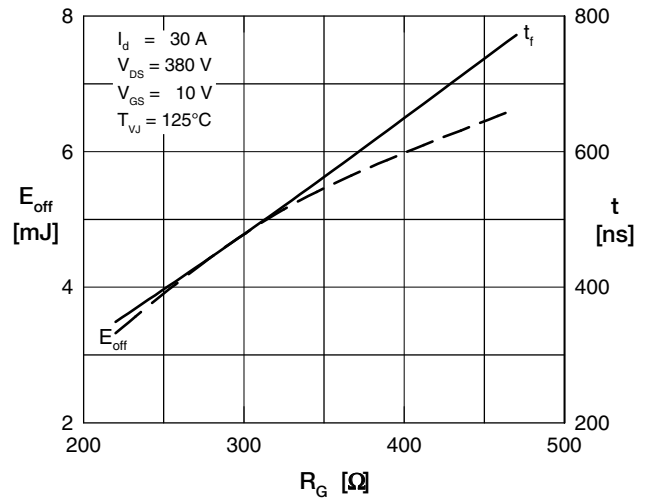


Fig. 16 Typ. turn-off energy & switching times versus gate resistor, inductive switching (phaseleg)

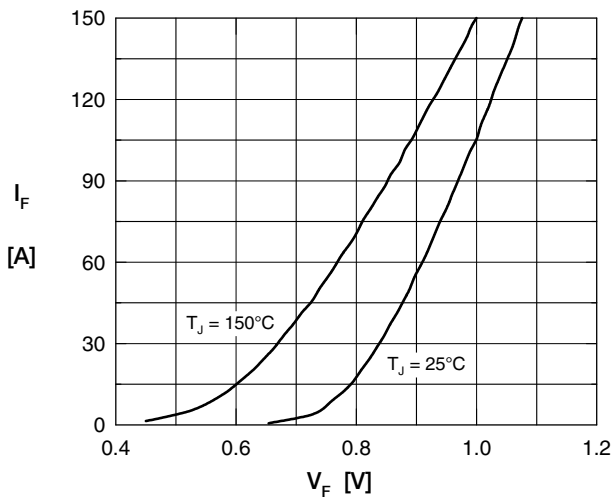


Fig. 17 Typ. forward characteristics of source drain diode  $D_{SD}$

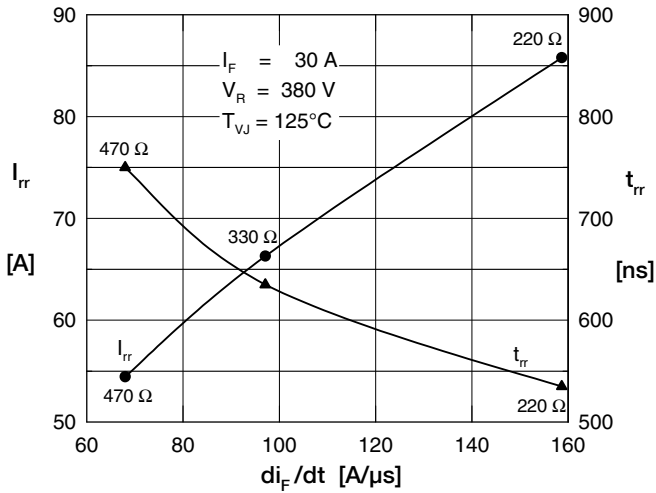


Fig. 18 Typ. reverse recovery of anti-parallel diode

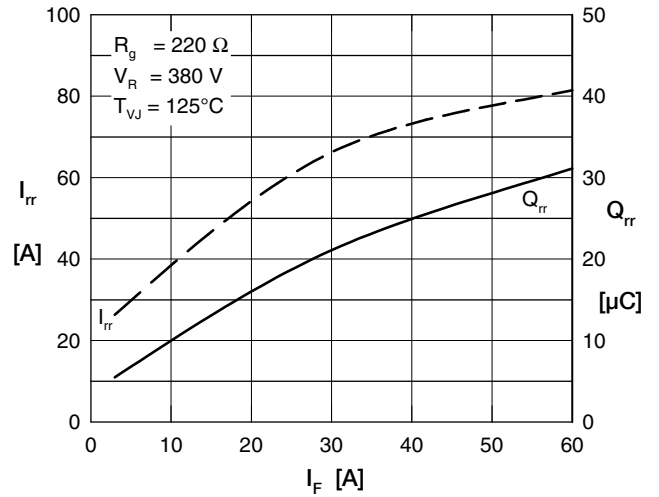


Fig. 19 Typ. reverse recovery characteristics

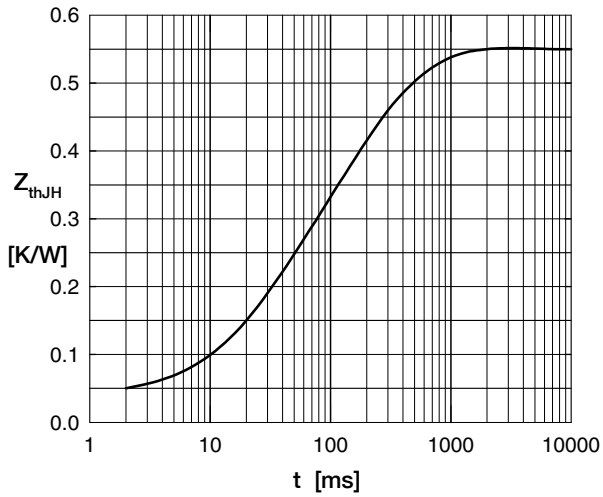


Fig. 20 Typ. transient thermal impedance of the MOSFET (IXYS test setup)