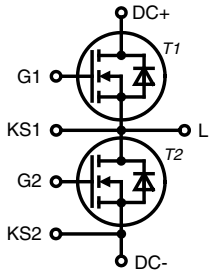
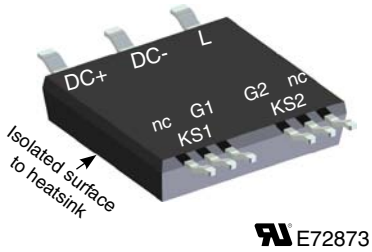
# CoolMOS™ [1] Power MOSFET

**ISOPLUS™ -** electrically isolated surface to heatsink

**Surface Mount Power Device**

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

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**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 |

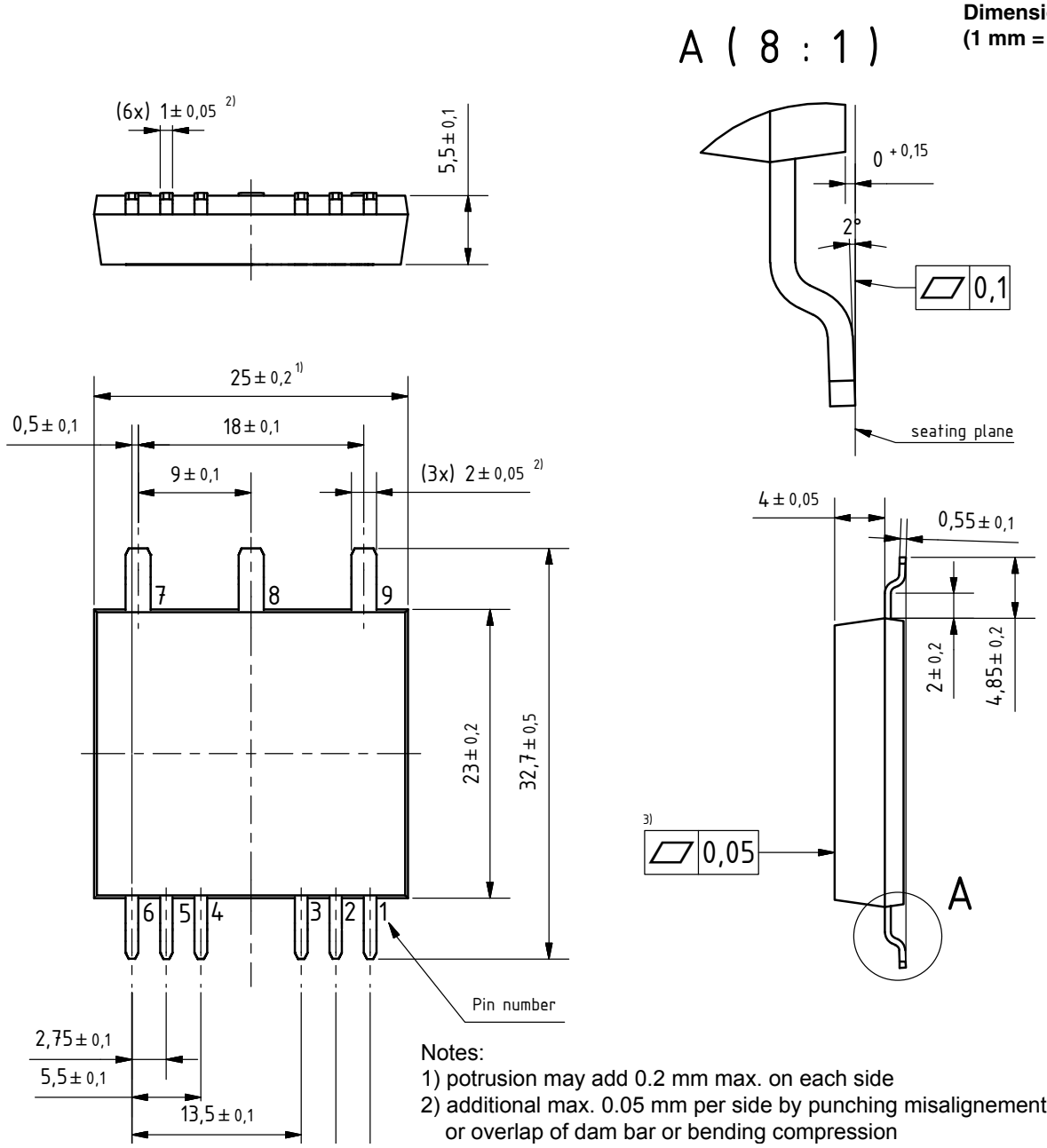
## Component

| 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 |

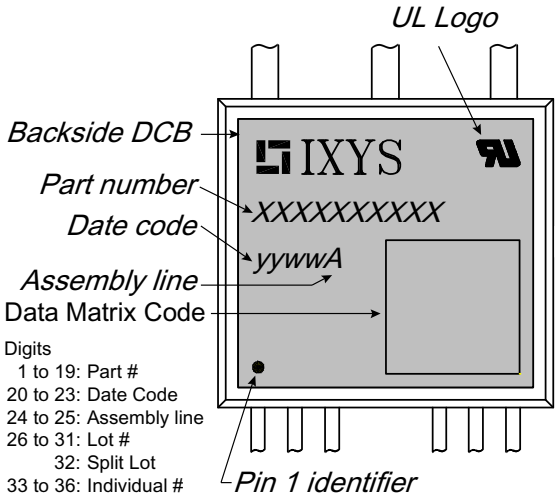
| Symbol | Conditions | Characteristic Values | | | |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| $C_P$ | coupling capacity between shorted pins and backside metal | | 90 | | pF |
| $d_S$, $d_A$ | pin - pin | 1.65 | | | mm |
| $d_S$, $d_A$ | pin - backside metal | 4 | | | mm |
| CTI | |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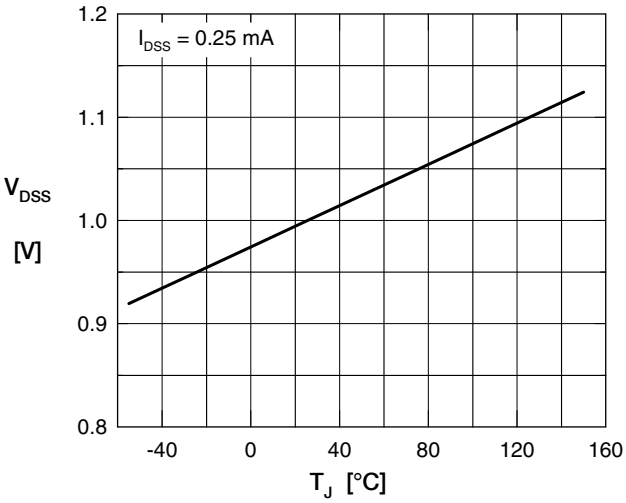


Fig.1 Drain source breakdown voltage versus temperature $T_{VJ}$

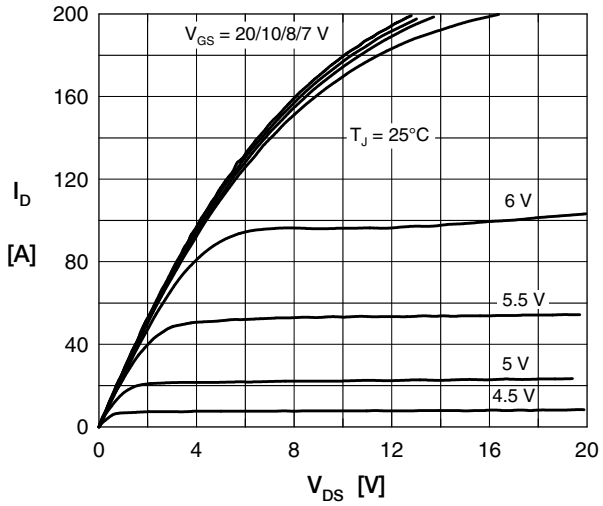


Fig. 2 Typ. output characteristics

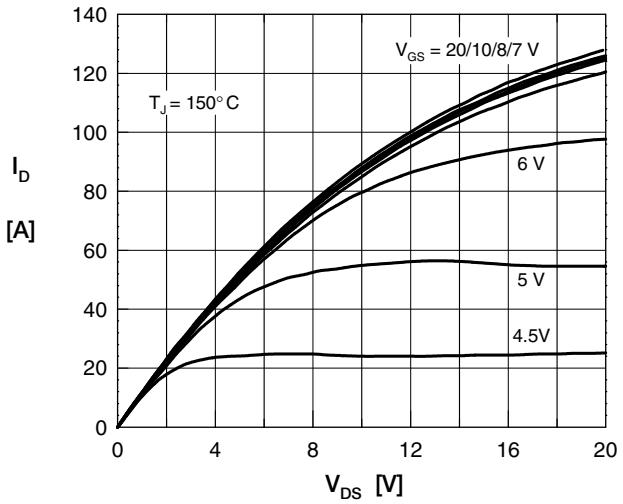


Fig. 3 Typ. output characteristics

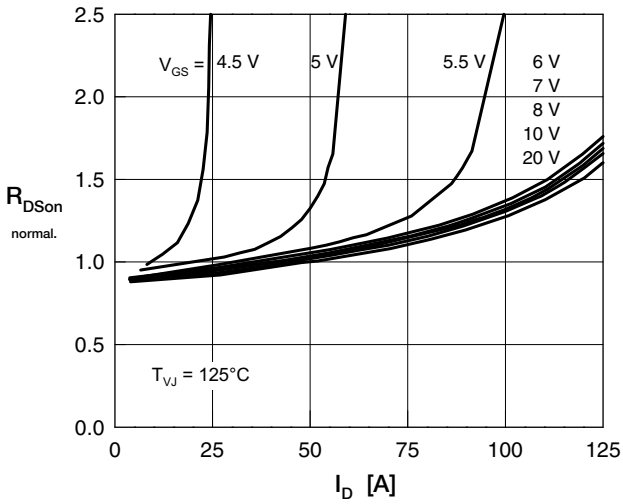


Fig. 4 Drain source on-state resistance $R_{DS(on)}$ versus $I_D$

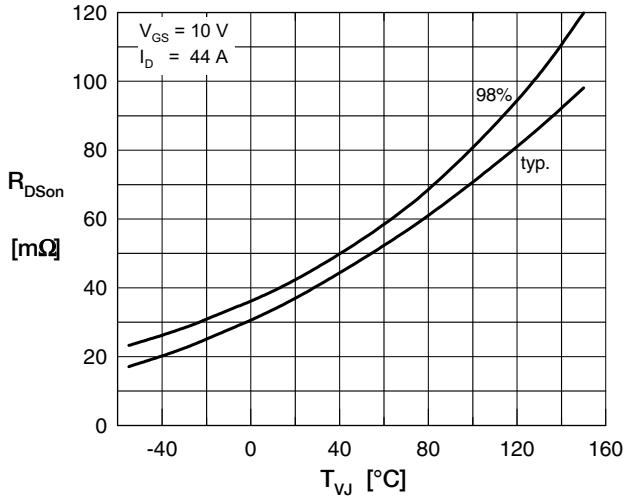


Fig.5 Drain source on-state resistance $R_{DS(on)}$ vs. junction temperature $T_{VJ}$

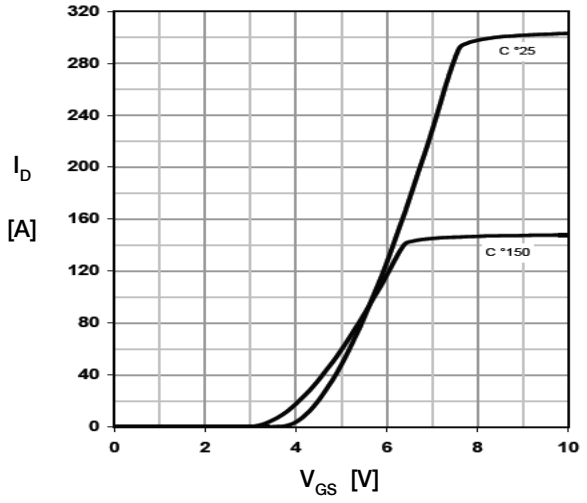


Fig.6 Typ. transfer characteristics

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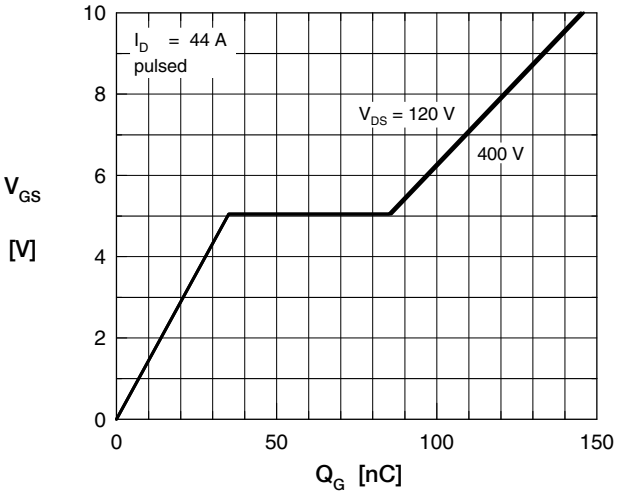


Fig. 7 Typ. turn-on gate charge

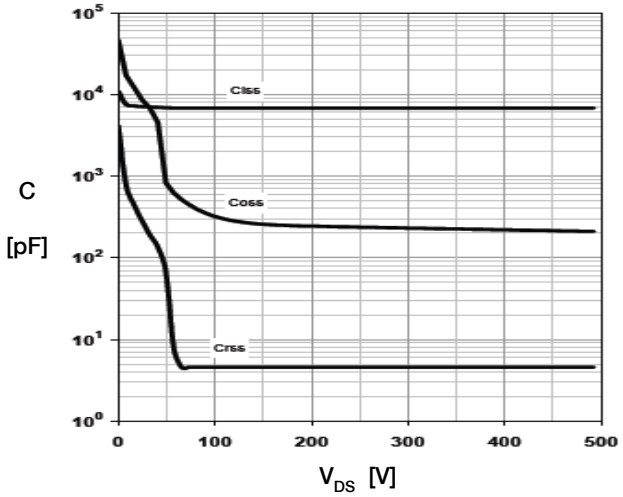


Fig. 8 Typ. capacities, MOSFET only

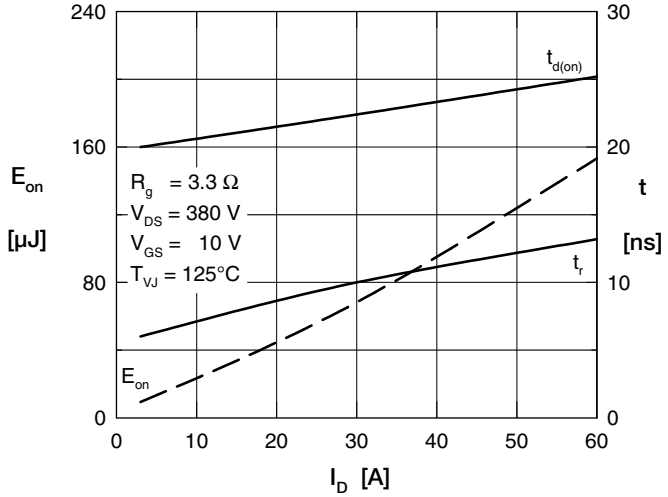


Fig.9 Typ. turn-on energy and switching times versus collector current, resistive switching

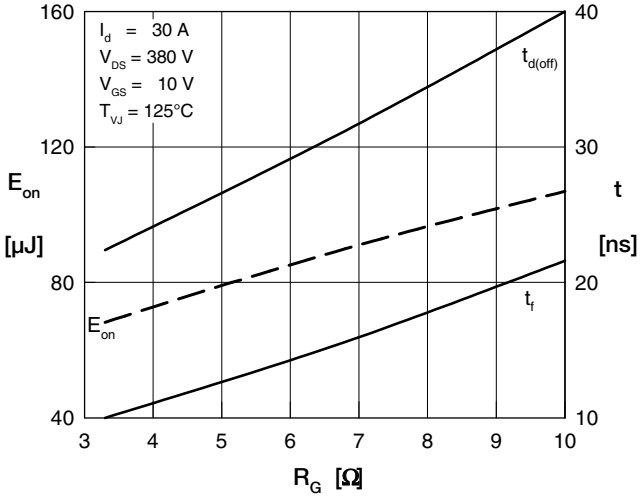


Fig. 10 Typ. turn-on energy and switching times versus gate resistor, resistive switching

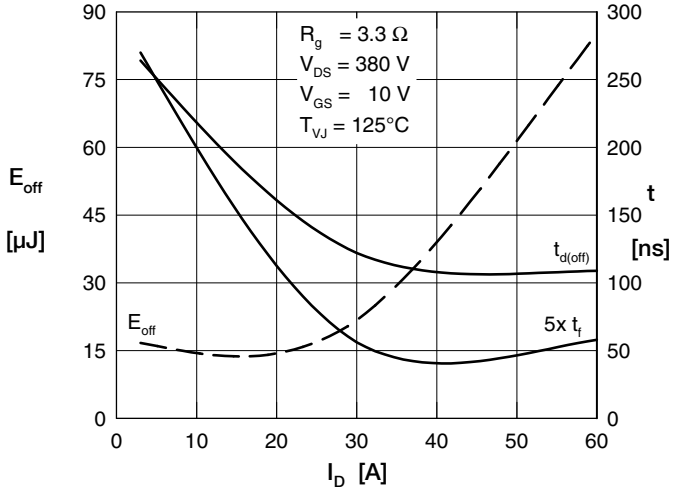


Fig.11 Typ. turn-off energy and switching times vs. collector current, resistive switching

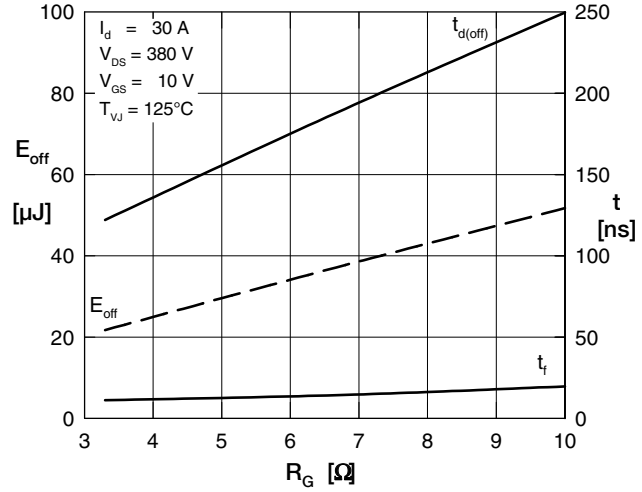


Fig. 12 Typ. turn-off energy and switching times versus gate resistor, resistive switching

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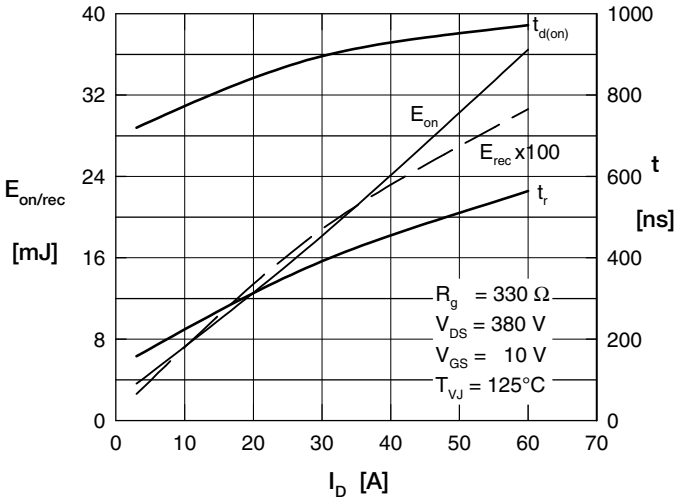


Fig. 13 Typ. turn-on energy & switching times versus collector current, inductive switching (phaseleg)

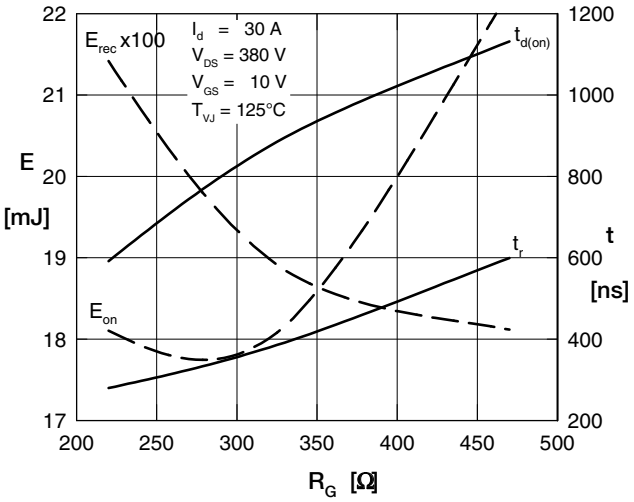


Fig. 14 Typ. turn-on energy & switching times versus gate resistor, inductive switching (phaseleg)

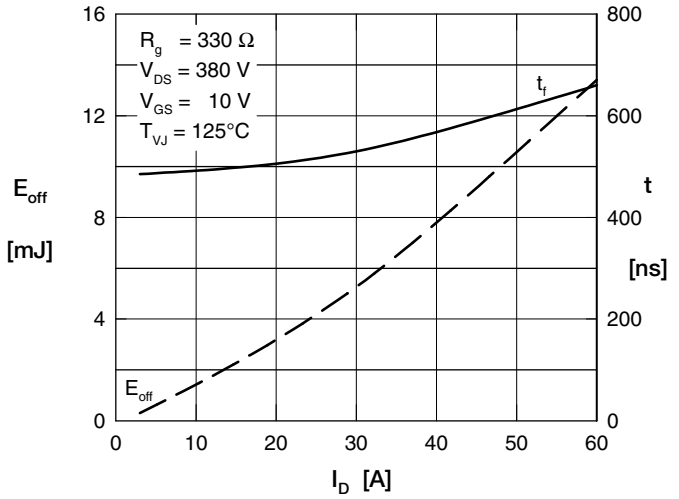


Fig. 15 Typ. turn-off energy & switching times versus collector-current, inductive switching (phaseleg)

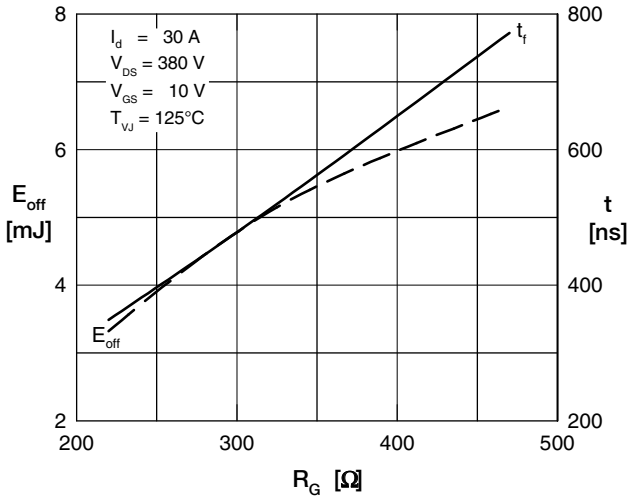


Fig. 16 Typ. turn-off energy & switching times versus gate resistor, inductive switching (phaseleg)

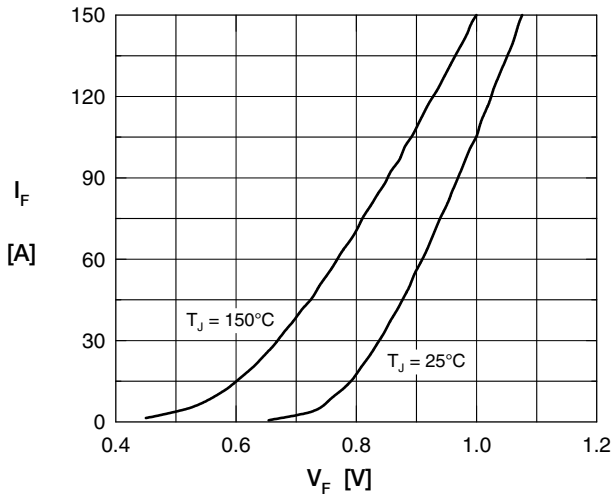


Fig. 17 Typ. forward characteristics of source drain diode $D_{SD}$