

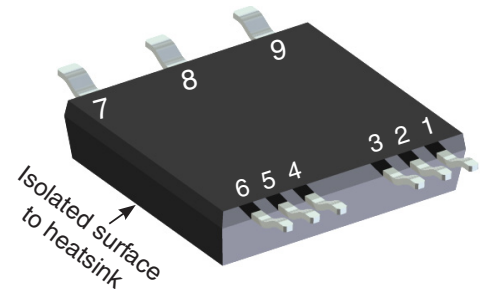
SiC Power MOSFET


$$I_{D25} = 38 \text{ A}$$

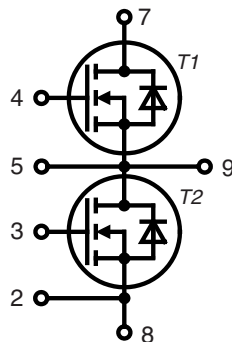
$$V_{DSS} = 1200 \text{ V}$$

$$R_{DS(on) \text{ max}} = 52 \text{ m}\Omega$$

Part number
 MCB30P1200LB



 E72873



Features / Advantages:

- High speed switching with low capacitances
- High blocking voltage with low $R_{DS(on)}$
- Easy to parallel and simple to drive
- Resistant to latch-up
- Real Kelvin source connection

Applications:

- Solar inverters
- High voltage DC/DC converters
- Motor drives
- Switch mode power supplies
- UPS
- Battery chargers
- Induction heating

Package: SMPD

- DCB isolated backside
- Isolation Voltage 2500 V
- Epoxy meets UL 94V-0
- RoHS compliant
- Advanced power cycling

Disclaimer Notice

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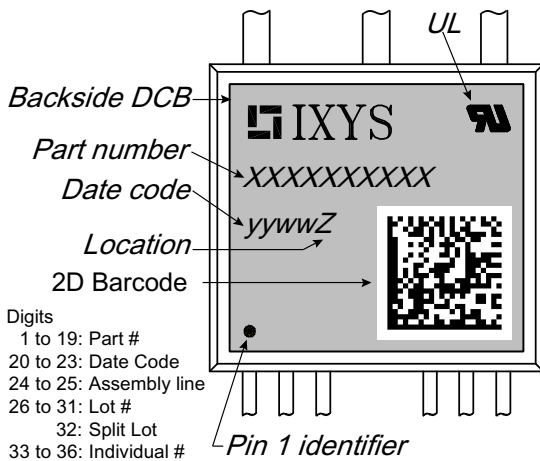
| MOSFET | | | | Ratings | | | |
|---------------|---|--|--------------------|---------|------|---------|---|
| Symbol | Definitions | Conditions | min. | typ. | max. | | |
| $V_{(BR)DSS}$ | drain source breakdown voltage | $I_D = 100 \mu A$ | 1200 | | | V | |
| $V_{GS(max)}$ | max transient gate source voltage | | -10 | | +25 | V | |
| V_{GS} | continous gate source voltage | recommended operational value | -5 | | +20 | V | |
| I_{D25} | drain current | $V_{GS} = 20 V$ | | | 38 | A | |
| I_{D80} | | | $T_C = 25^\circ C$ | | | 30 | A |
| I_{D100} | | | $T_C = 80^\circ C$ | | | 27 | A |
| R_{DSon} | static drain source on resistance | $I_D = 40 A; V_{GS} = 20 V$ | | | 40 | mΩ | |
| | | | | | 90 | mΩ | |
| $V_{GS(th)}$ | gate threshold voltage | $I_D = 10 mA; V_{GS} = V_{DS}$ | | 2.0 | 2.6 | 4.0 | V |
| | | | | | 2.0 | | V |
| I_{DSS} | drain source leakage current | $V_{DS} = 1200 V; V_{GS} = 0 V$ | | 1 | 100 | μA | |
| I_{GSS} | gate source leakage current | $V_{DS} = 0 V; V_{GS} = 20 V$ | | | 250 | nA | |
| R_G | internal gate resistance | $f = 1 MHz; V_{AC} = 25 mV; ESR \text{ of } C_{ISS}$ | | 1.8 | | Ω | |
| C_{iss} | input capacitance | $V_{DS} = 1000 V; V_{GS} = 0 V; f = 1 MHz; T_{VJ} = 25^\circ C$ | | 1895 | | pF | |
| C_{oss} | output capacitance | | | 150 | | pF | |
| C_{rss} | reverse transfer (Miller) capacitance | | | 10 | | pF | |
| Q_g | total gate charge | $V_{DS} = 800 V; I_D = 40 A; V_{GS} = -5/20 V; T_{VJ} = 25^\circ C$ | | 115 | | nC | |
| Q_{gs} | gate source charge | | | 28 | | nC | |
| Q_{gd} | gate drain (Miller) charge | | | 37 | | nC | |
| $t_{d(on)}$ | turn-on delay time | Inductive switching $T_{VJ} = 25^\circ C$ Free Wheeling Diode: Body Diode @ $V_{GS} = -5V$ $V_{DS} = 800 V; I_D = 40 A$ $V_{GS} = -5/20 V; R_G = 15 \Omega$ (external) | | 25.5 | | ns | |
| t_r | current rise time | | | 11.1 | | ns | |
| $t_{d(off)}$ | turn-off delay time | | | 85 | | ns | |
| t_f | current fall time | | | 23 | | ns | |
| E_{on} | turn-on energy per pulse | | | 0.92 | | mJ | |
| E_{off} | turn-off energy per pulse | | | 0.48 | | mJ | |
| $t_{d(on)}$ | turn-on delay time | Inductive switching $T_{VJ} = 150^\circ C$ Free Wheeling Diode: Body Diode @ $V_{GS} = -5V$ $V_{DS} = 800 V; I_D = 40 A$ $V_{GS} = -5/20 V; R_G = 15 \Omega$ (external) | | 23.5 | | ns | |
| t_r | current rise time | | | 9.8 | | ns | |
| $t_{d(off)}$ | turn-off delay time | | | 93 | | ns | |
| t_f | current fall time | | | 25 | | ns | |
| E_{on} | turn-on energy per pulse | | | 1.0 | | mJ | |
| E_{off} | turn-off energy per pulse | | | 0.4 | | mJ | |
| R_{thJC} | thermal resistance junction to case | | | | 0.9 | K/W | |
| R_{thJH} | thermal resistance junction to heatsink | with heatsink compound; IXYS test setup | | 1.15 | | K/W | |

| Source-Drain Diode | | | | Ratings | | |
|--------------------|---|---|------|---------|------|----|
| Symbol | Definitions | Conditions | min. | typ. | max. | |
| V_{SD} | forward voltage drop | $I_F = 20 A; V_{GS} = -5 V$ | | | 4.1 | V |
| | | | | | 3.5 | V |
| t_{rr} | reverse recovery time | $V_{GS} = -5 V; I_F = 40 A$ $V_R = 800 V; -di_F/dt = 1000 A/\mu s$ | | | 55 | ns |
| Q_{RM} | reverse recovery charge (intrinsic diode) | | | | 285 | nC |
| I_{RM} | max. reverse recovery current | | | | 15 | A |

Note:

 When using SiC Body Diode the maximum recommended $V_{GS} = -5V$

| Package SMPD | | | Ratings | | | |
|----------------|--------------------------------|--|---------|--------------|-----------|--------|
| Symbol | Definitions | Conditions | min. | typ. | max. | |
| I_{RMS} | RMS current | wide terminal standard terminal | | | 100 60 | A A |
| T_{stg} | storage temperature | | -55 | | 150 | °C |
| T_{op} | operation temperature | | -55 | | 150 | °C |
| T_{VJ} | virtual junction temperature | | -55 | | 175 | °C |
| Weight | | | | 8 | | g |
| F_c | mounting force with clip | | 40 | | 130 | N |
| $d_{Spp/App}$ | creepage distance on surface / | terminal to terminal | 1.6 | | | mm |
| $d_{Spb/Appb}$ | striking distance through air | terminal to backside | 4.0 | | | mm |
| V_{ISOL} | isolation voltage | t = 1 second t = 1 minute | | 3000 2500 | | V V |
| | | 50/60 Hz; RMS; $I_{ISOL} < 1 \text{ mA}$ | | | | |



Digits

1 to 19: Part #

20 to 23: Date Code

24 to 25: Assembly line

26 to 31: Lot #

32: Split Lot

33 to 36: Individual #

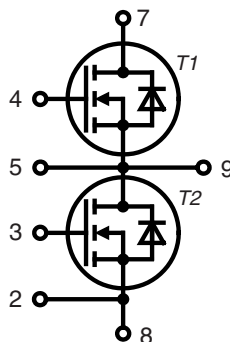
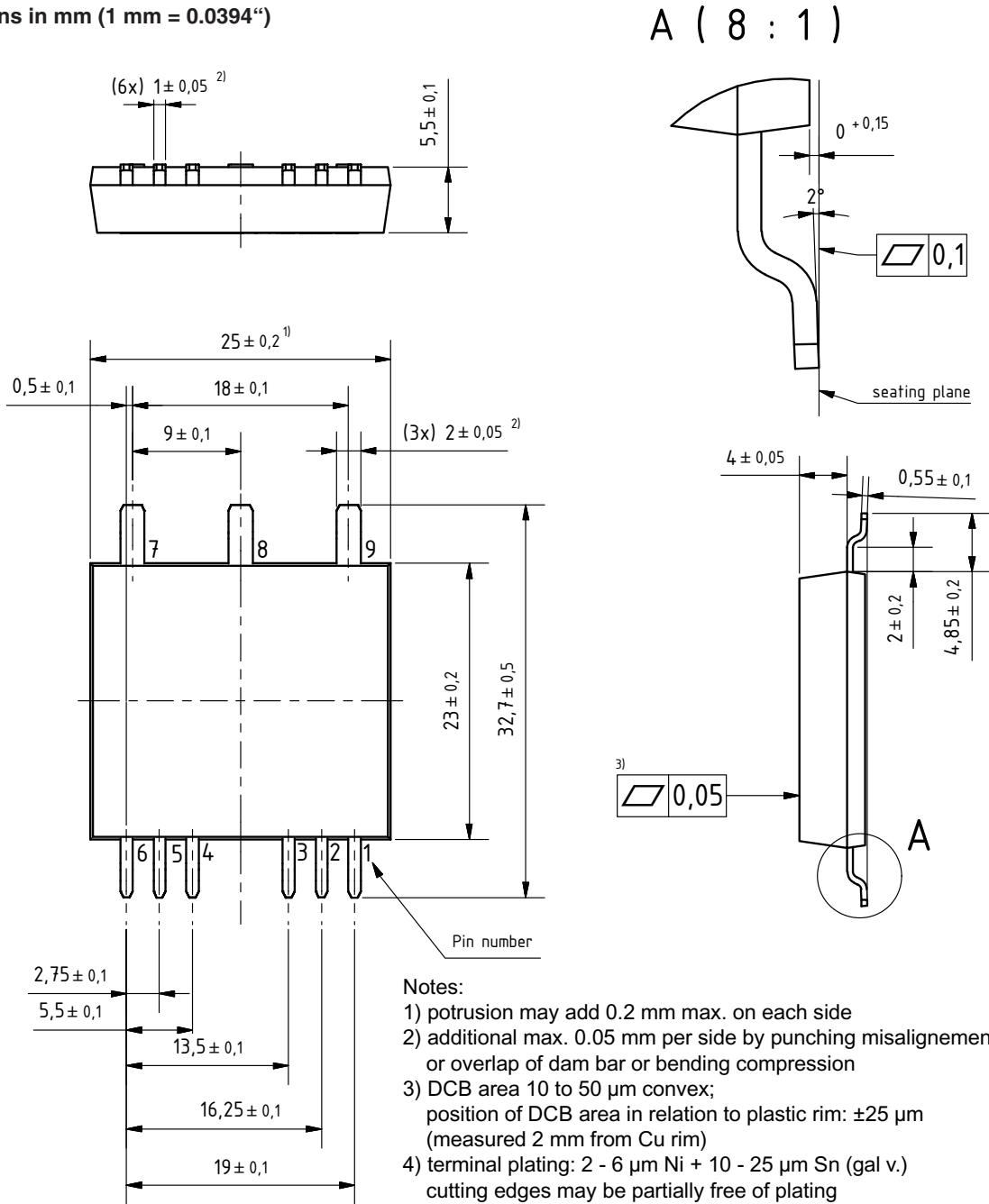
Part number

M = Mosfet
 C = SiC MOSFET
 B = Generation 2
 30 = Current Rating [A]
 P = Phase leg
 1200 = Reverse Voltage [V]
 LB = SMPD-B

| Ordering | Part Name | Marking on Product | Delivering Mode | Base Qty | Ordering Code |
|-------------|------------------|--------------------|-----------------|----------|------------------|
| Standard | MCB30P1200LB-TUB | MCB30P1200LB | Tube | 20 | MCB30P1200LB-TUB |
| Alternative | MCB30P1200LB-TRR | MCB30P1200LB | Tape&Reel | 200 | MCB30P1200LB-TRR |

Outlines SMPD-B

Dimensions in mm (1 mm = 0.0394")



Curves

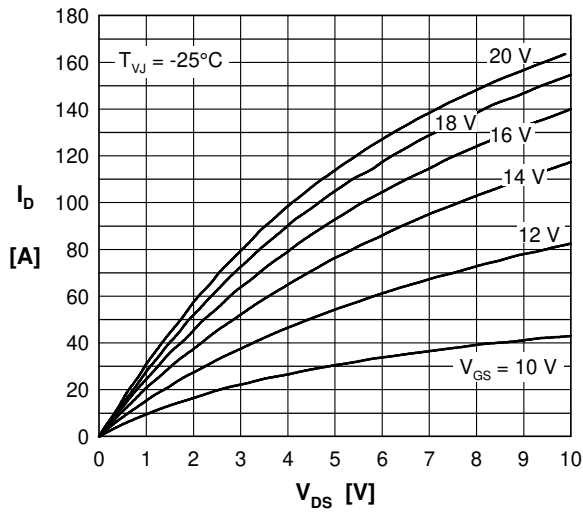


Fig. 1 Typical output characteristics (-25°C)

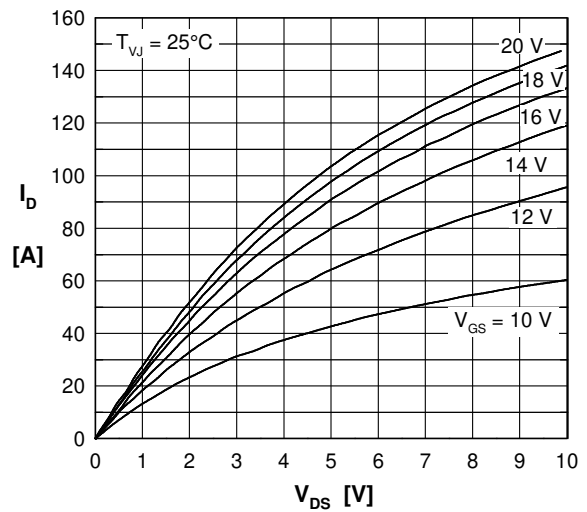


Fig. 2 Typical output characteristics (25°C)

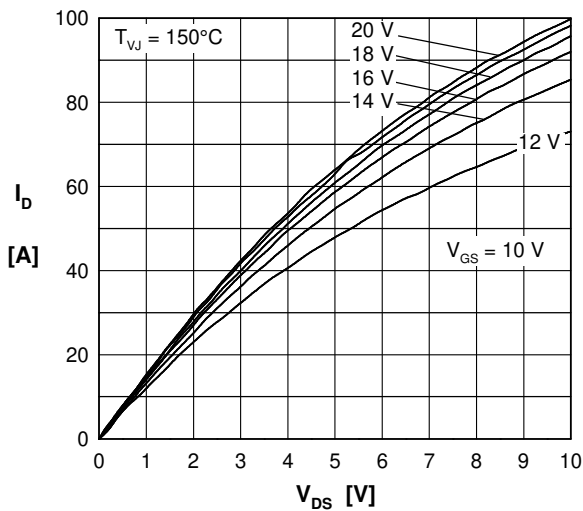


Fig. 3 Typical output characteristics (150°C)

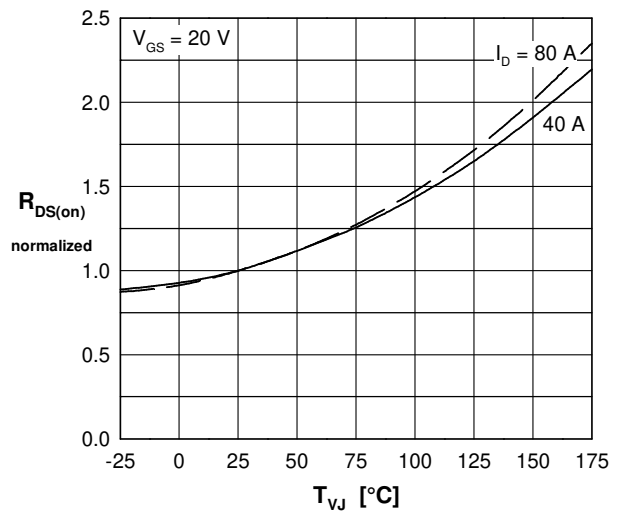


Fig. 4 $R_{DS(on)}$ normalized vs. junction temperature T_{VJ}

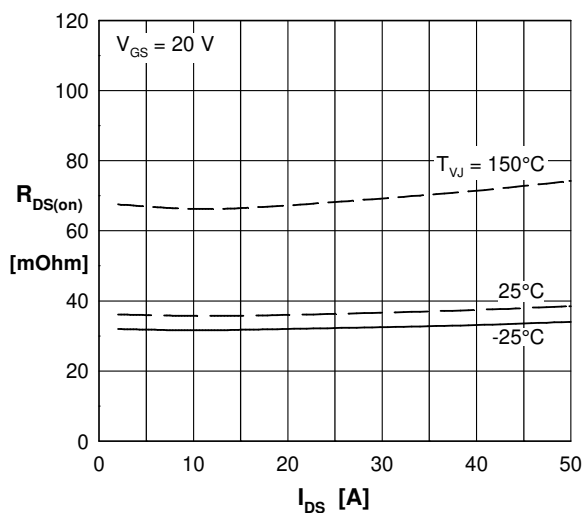


Fig. 5 $R_{DS(on)}$ versus drain current

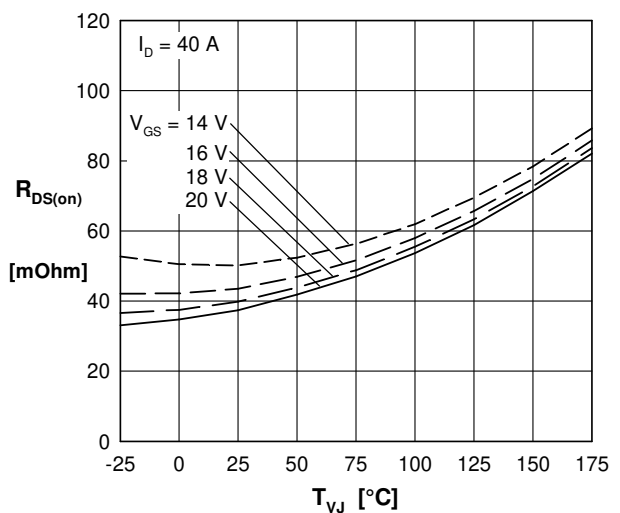


Fig. 6 $R_{DS(on)}$ versus junction temperature T_{VJ}

Curves

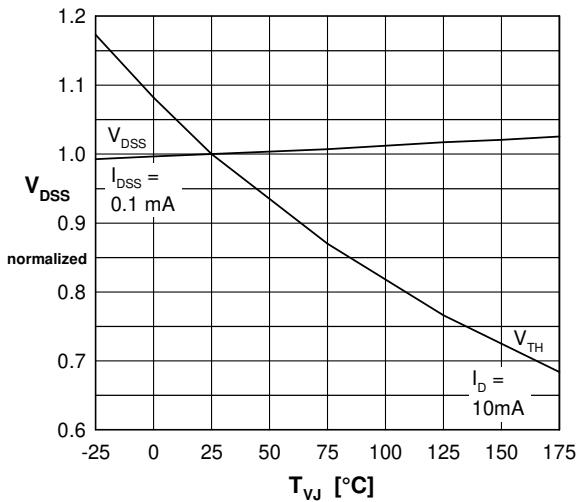


Fig. 7 Norm. breakdown V_{DSS} & threshold voltage V_{TH} versus junction temperature T_{VJ}

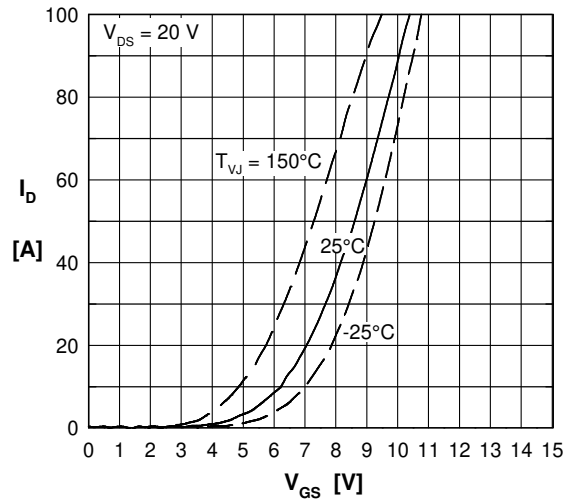


Fig. 8 Typical transfer characteristics

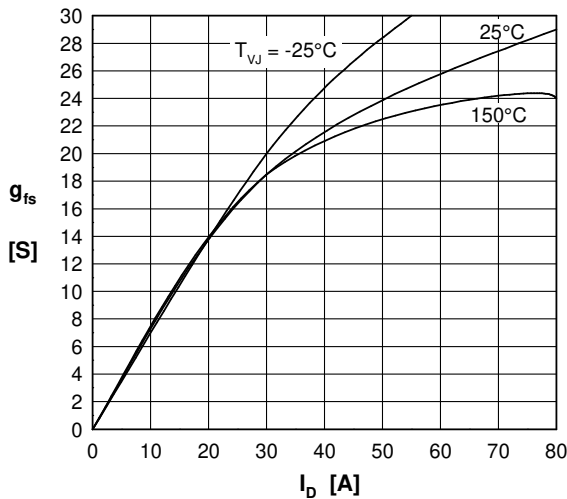


Fig. 9 Typical forward transconductance

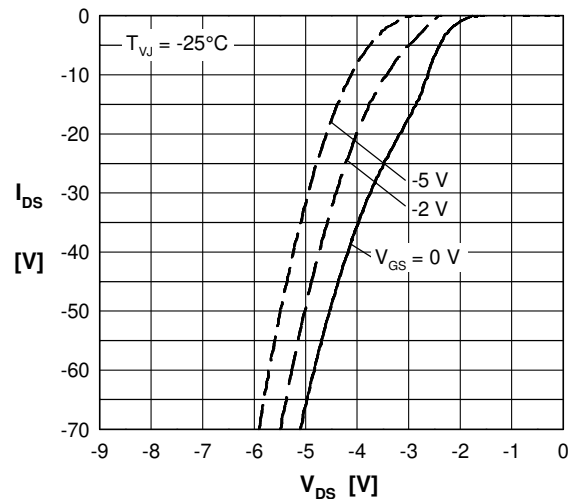


Fig. 10 Forward voltage drop of intrinsic diode versus V_{DS} measured at -55°C

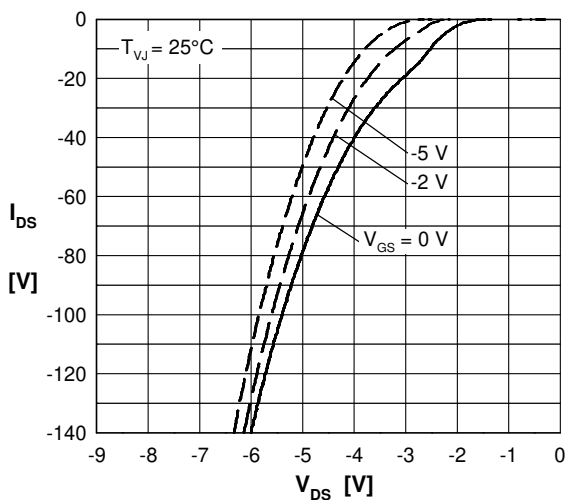


Fig. 11 Forward voltage drop of intrinsic diode versus V_{DS} measured at 25°C

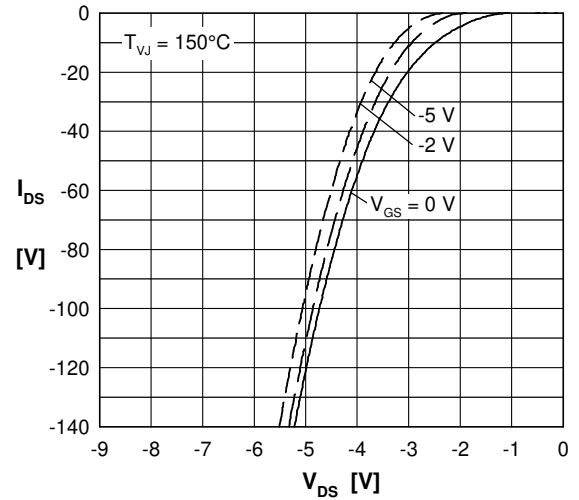


Fig. 12 Forward voltage drop of intrinsic diode versus V_{DS} measured at 150°C

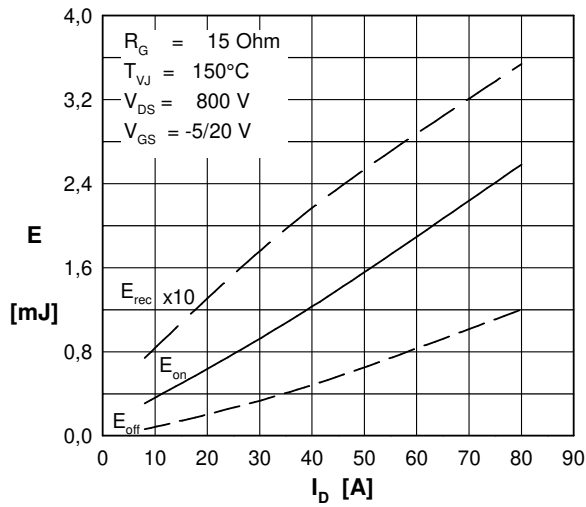
Curves


Fig. 13 Typical switching energy versus drain current

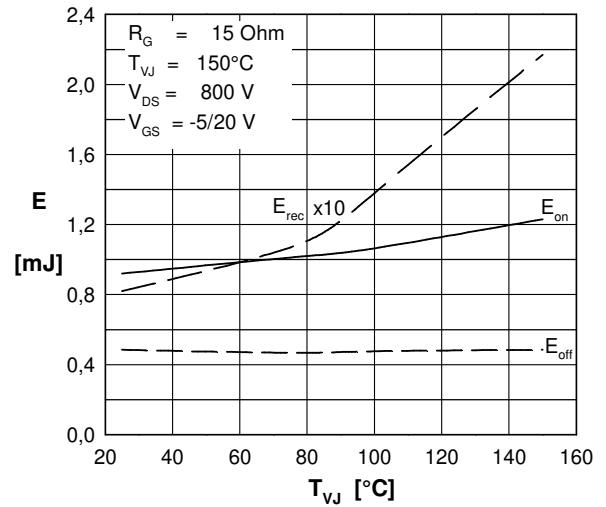


Fig. 14 Typical switching energy versus temperature

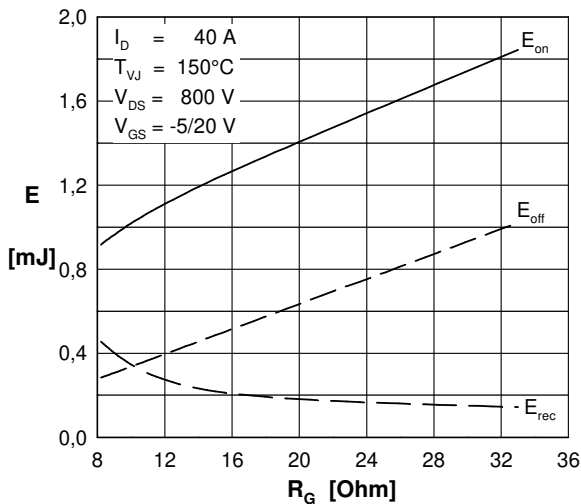


Fig. 15 Typical switching energy versus external gate resistor

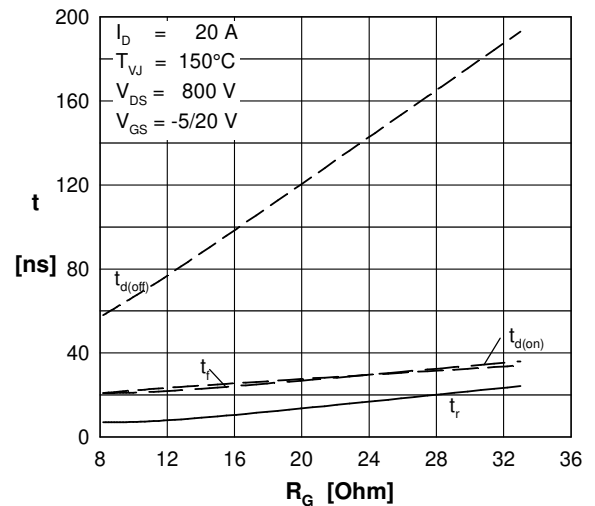


Fig. 16 Typical switching time versus external gate resistor

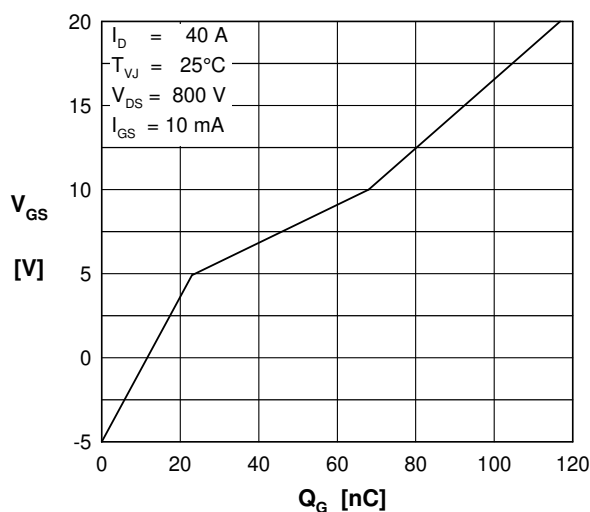


Fig. 17 Typical turn on gate charge, trendline

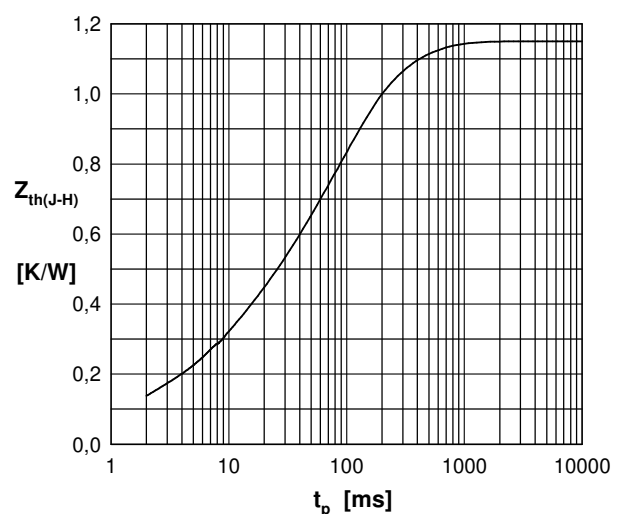


Fig. 18 Typical transient thermal impedance