

HiPerFET™ Power MOSFETs

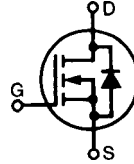
IXFK72N20
IXFK80N20

| V_{DSS} | I_{D25} | $R_{DS(on)}$ |
|--------------|-------------|--------------|
| 200 V | 72 A | 35 mΩ |
| 200 V | 80 A | 30 mΩ |

$t_{rr} \leq 200$ ns

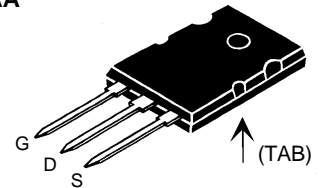
N-Channel Enhancement Mode
Avalanche Rated, High dv/dt, Low t_{rr}

Preliminary data



| Symbol | Test Conditions | Maximum Ratings | |
|---------------|--|-----------------|-----------|
| V_{DSS} | $T_J = 25^\circ\text{C}$ to 150°C | 200 | V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1$ MΩ | 200 | V |
| V_{GS} | Continuous | ±20 | V |
| V_{GSM} | Transient | ±30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 72N20 | 72 A |
| | | 80N20 | 80 A |
| I_{DM} | $T_C = 25^\circ\text{C}$, pulse width limited by T_{JM} | 72N20 | 288 A |
| | | 80N20 | 320 A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 74 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 45 | mJ |
| dv/dt | $I_S \leq I_{DM}$, $di/dt \leq 100$ A/μs, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$, $R_G = 2$ Ω | 5 | V/ns |
| P_D | $T_C = 25^\circ\text{C}$ | 360 | W |
| T_J | | -55 ... +150 | °C |
| T_{JM} | | 150 | °C |
| T_{stg} | | -55 ... +150 | °C |
| T_L | 1.6 mm (0.063 in) from case for 10 s | 300 - | °C |
| M_d | Mounting torque | 0.9/6 | Nm/lb.in. |
| Weight | | 10 | g |

TO-264 AA



G = Gate
S = Source

D = Drain
TAB = Drain

Features

- International standard packages
- Molding epoxies meet UL94 V-0 flammability classification
- Low $R_{DS(on)}$ HDMOS™ process
- Unclamped Inductive Switching (UIS) rated
- Fast intrinsic rectifier

Applications

- DC-DC converters
- Synchronous rectification
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- Temperature and lighting controls

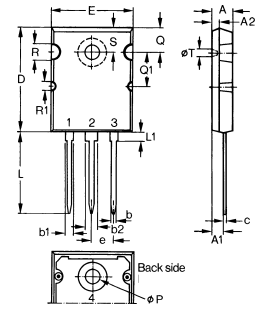
Advantages

- Easy to mount
- Space savings
- High power density

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|--|---|------|---------|
| | | min. | typ. | max. |
| V_{DSS} | $V_{GS} = 0$ V, $I_D = 1$ mA | 200 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 4$ mA | 2 | | V |
| I_{GSS} | $V_{GS} = \pm 20$ V _{DC} , $V_{DS} = 0$ | | | ±100 nA |
| I_{DSS} | $V_{DS} = 0.8 \cdot V_{DSS}$ $V_{GS} = 0$ V | $T_J = 25^\circ\text{C}$ | | 200 μA |
| | | $T_J = 125^\circ\text{C}$ | | 1 mA |
| $R_{DS(on)}$ | $V_{GS} = 10$ V, $I_D = 0.5 \cdot I_{D25}$ Pulse test, $t \leq 300$ μs, duty cycle $d \leq 2$ % | 72N20 | | 35 mΩ |
| | | 80N20 | | 30 mΩ |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|--|---|------|------|
| | | min. | typ. | max. |
| g_{fs} | $V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$, pulse test | 35 | 42 | S |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 5900 | pF |
| C_{oss} | | | 1140 | pF |
| C_{rss} | | | 480 | pF |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = \text{(External)}$ | | 40 | ns |
| t_r | | | 55 | ns |
| $t_{d(off)}$ | | | 120 | ns |
| t_f | | | 26 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ | | 280 | nC |
| Q_{gs} | | | 39 | nC |
| Q_{gd} | | | 120 | nC |
| R_{thJC} | | | 0.35 | K/W |
| R_{thCK} | | | 0.15 | K/W |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|----------|---|---|------|----------------|
| | | min. | typ. | max. |
| I_S | $V_{GS} = 0\text{ V}$ | 72N20 80N20 | | 72 A 80 A |
| I_{SM} | Repetitive; pulse width limited by T_{JM} | 72N20 80N20 | | 288 A 320 A |
| V_{SD} | $I_F = I_S, V_{GS} = 0\text{ V}$, Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$ | | | 1.5 V |
| t_{rr} | $I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$ | | 1.2 | 200 ns |
| Q_{RM} | | | 10 | μC |
| I_{RM} | | | | A |

TO-264 AA Outline


| Dim. | Millimeter | | Inches | |
|------|------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.82 | 5.13 | .190 | .202 |
| A1 | 2.54 | 2.89 | .100 | .114 |
| A2 | 2.00 | 2.10 | .079 | .083 |
| b | 1.12 | 1.42 | .044 | .056 |
| b1 | 2.39 | 2.69 | .094 | .106 |
| b2 | 2.90 | 3.09 | .114 | .122 |
| c | 0.53 | 0.83 | .021 | .033 |
| D | 25.91 | 26.16 | 1.020 | 1.030 |
| E | 19.81 | 19.96 | .780 | .786 |
| e | 5.46 | BSC | .215 | BSC |
| J | 0.00 | 0.25 | .000 | .010 |
| K | 0.00 | 0.25 | .000 | .010 |
| L | 20.32 | 20.83 | .800 | .820 |
| L1 | 2.29 | 2.59 | .090 | .102 |
| P | 3.17 | 3.66 | .125 | .144 |
| Q | 6.07 | 6.27 | .239 | .247 |
| Q1 | 8.38 | 8.69 | .330 | .342 |
| R | 3.81 | 4.32 | .150 | .170 |
| R1 | 1.78 | 2.29 | .070 | .090 |
| S | 6.04 | 6.30 | .238 | .248 |
| T | 1.57 | 1.83 | .062 | .072 |

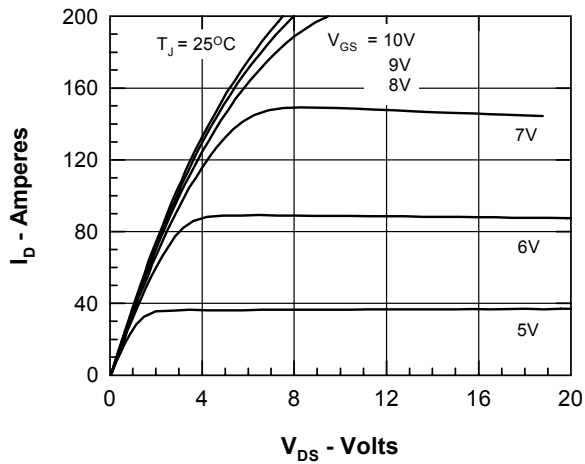


Figure 1. Output Characteristics at 25°C

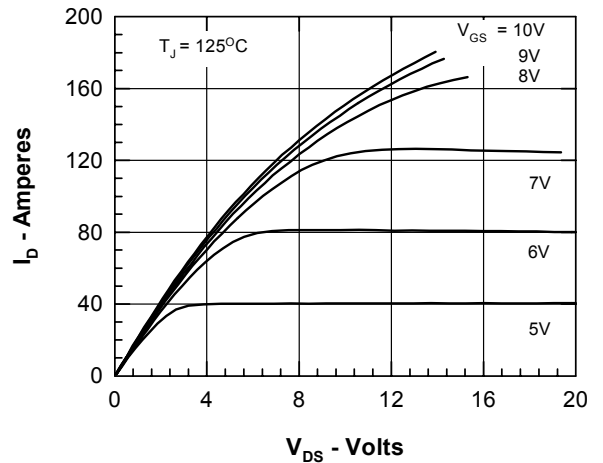


Figure 2. Output Characteristics at 125°C

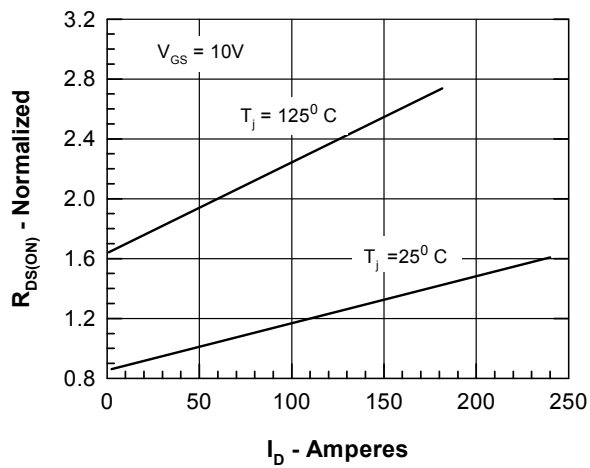


Figure 3. $R_{DS(on)}$ normalized to 0.5 I_{D25} value

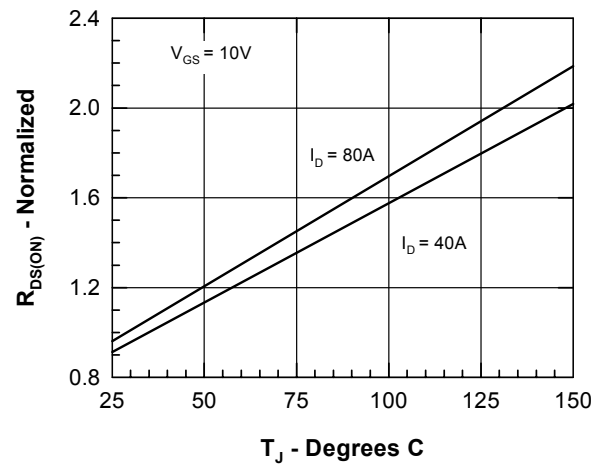


Figure 4. $R_{DS(on)}$ normalized to 0.5 I_{D25} value

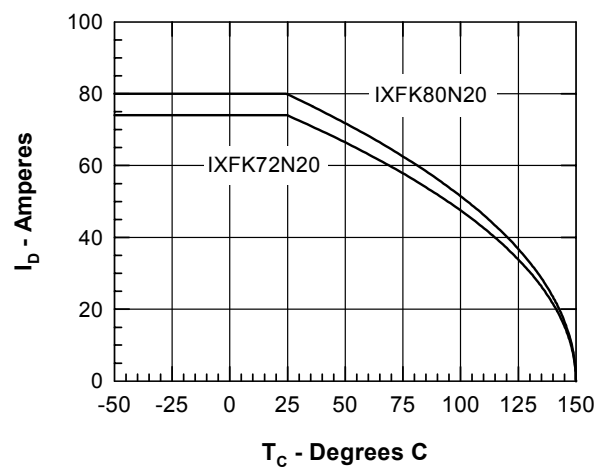


Figure 5. Drain Current vs. Case Temperature

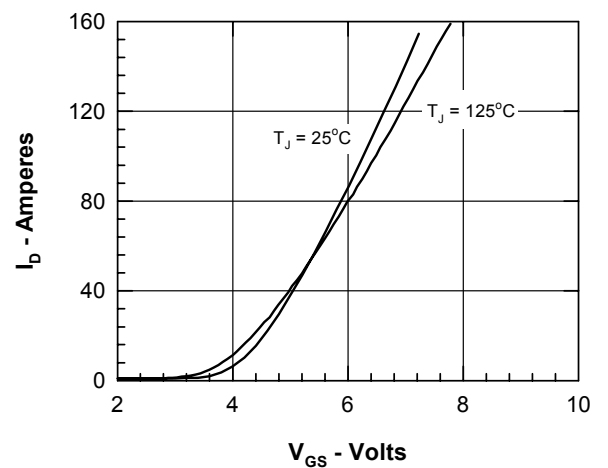


Figure 6. Admittance Curves

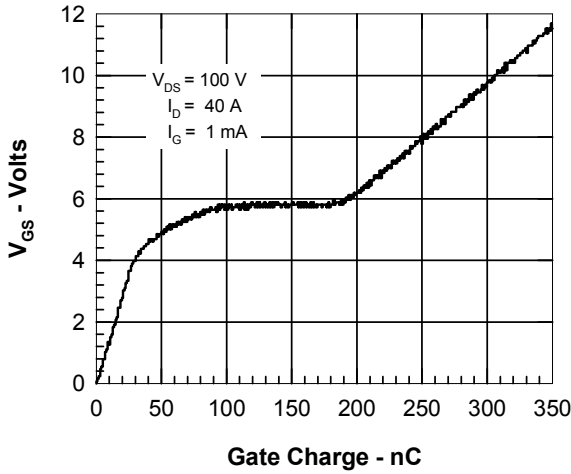


Figure 7. Gate Charge

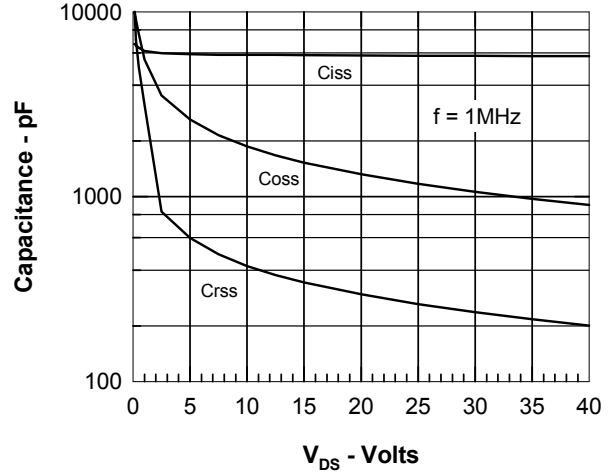


Figure 8. Capacitance Curves

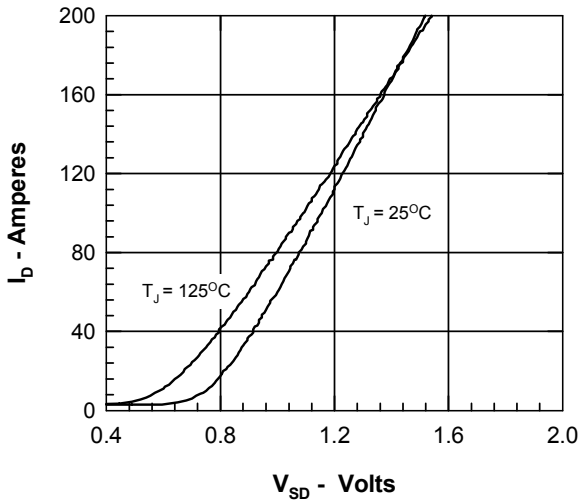


Figure 9. Source Current vs. Source to Drain Voltage

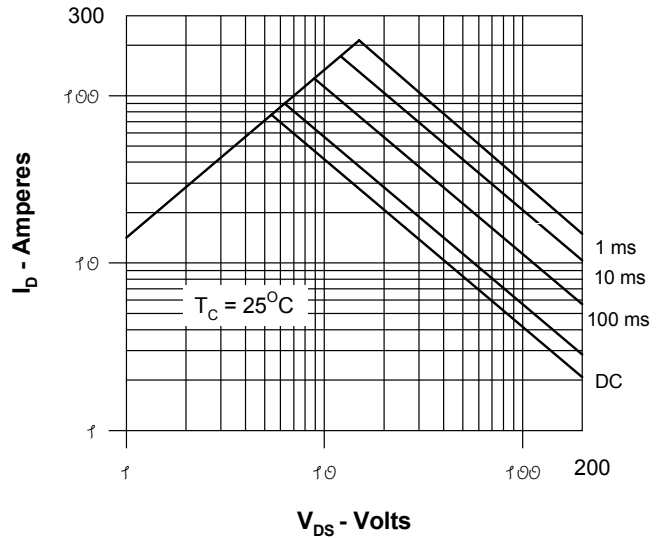


Figure 10. Forward Bias Safe Operating Area

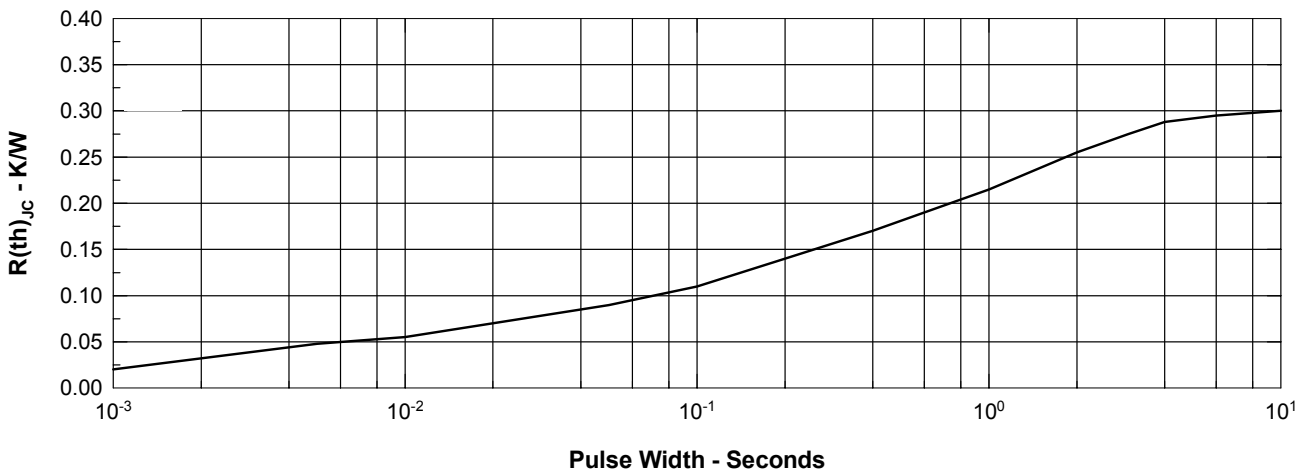


Figure 11. Transient Thermal Resistance



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