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[IXFK80N20](#)

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## HiPerFET™ Power MOSFETs

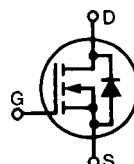
IXFK72N20  
IXFK80N20

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

$t_{rr} \leq 200 \text{ ns}$

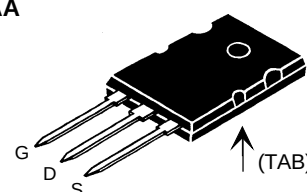
N-Channel Enhancement Mode  
Avalanche Rated, High  $dv/dt$ , Low  $t_{rr}$

Preliminary data



| Symbol    | Test Conditions                                                                                                                         | Maximum Ratings |                      |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------|
| $V_{DSS}$ | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                                                                                         | 200             | V                    |
| $V_{DGR}$ | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$                                                          | 200             | V                    |
| $V_{GS}$  | Continuous                                                                                                                              | $\pm 20$        | V                    |
| $V_{GSM}$ | Transient                                                                                                                               | $\pm 30$        | V                    |
| $I_{D25}$ | $T_C = 25^\circ\text{C}$                                                                                                                | 72N20<br>80N20  | 72<br>80<br>A<br>A   |
| $I_{DM}$  | $T_C = 25^\circ\text{C}$ ,<br>pulse width limited by $T_{JM}$                                                                           | 72N20<br>80N20  | 288<br>320<br>A<br>A |
| $I_{AR}$  | $T_C = 25^\circ\text{C}$                                                                                                                | 74              | A                    |
| $E_{AR}$  | $T_C = 25^\circ\text{C}$                                                                                                                | 45              | mJ                   |
| $dv/dt$   | $I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ ,<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$ | 5               | V/ns                 |
| $P_D$     | $T_C = 25^\circ\text{C}$                                                                                                                | 360             | W                    |
| $T_J$     |                                                                                                                                         | -55 ... +150    | $^\circ\text{C}$     |
| $T_{JM}$  |                                                                                                                                         | 150             | $^\circ\text{C}$     |
| $T_{stg}$ |                                                                                                                                         | -55 ... +150    | $^\circ\text{C}$     |
| $T_L$     | 1.6 mm (0.063 in) from case for 10 s                                                                                                    | 300 -           | $^\circ\text{C}$     |
| $M_d$     | 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 UL 94V-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<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                           |
|--------------|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|---------------------------|
|              |                                                                                                                        | min.                                                                              | typ. | max.                      |
| $V_{DSS}$    | $V_{GS} = 0 \text{ V}$ , $I_D = 1 \text{ mA}$                                                                          | 200                                                                               |      | V                         |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 4 \text{ mA}$                                                                               | 2                                                                                 |      | V                         |
| $I_{GSS}$    | $V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0$                                                                             |                                                                                   |      | $\pm 100 \text{ nA}$      |
| $I_{DSS}$    | $V_{DS} = 0.8 \cdot V_{DSS}$ , $T_J = 25^\circ\text{C}$<br>$V_{GS} = 0 \text{ V}$ , $T_J = 125^\circ\text{C}$          |                                                                                   |      | 200 $\mu\text{A}$<br>1 mA |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 0.5 \cdot I_{D25}$<br>Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2 \%$ | 72N20<br>80N20                                                                    |      | 35 mΩ<br>30 mΩ            |



**IXFK72N20**

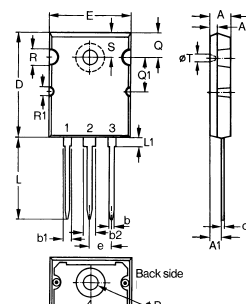
**IXFK80N20**

| Symbol       | Test Conditions                                                                                           | Characteristic Values<br>( $T_j = 25^\circ\text{C}$ , 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       |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$<br>$R_G = (\text{External}),$ |                                                                                   | 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      |

#### Source-Drain Diode

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



**IXFK72N20**

**IXFK80N20**

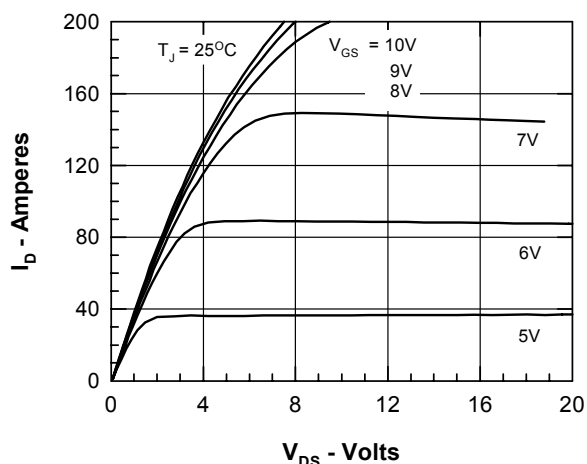


Figure 1. Output Characteristics at 25°C

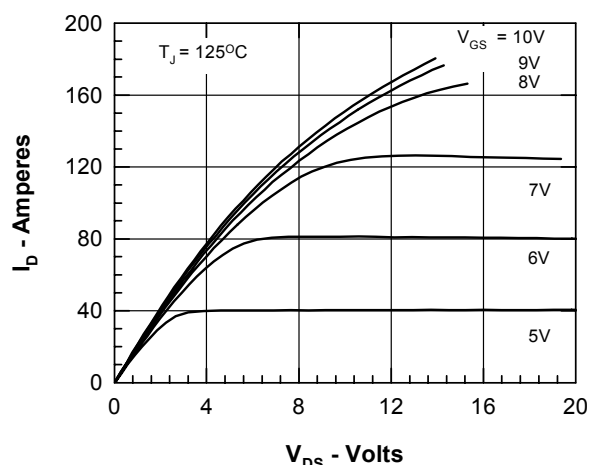


Figure 2. Output Characteristics at 125°C

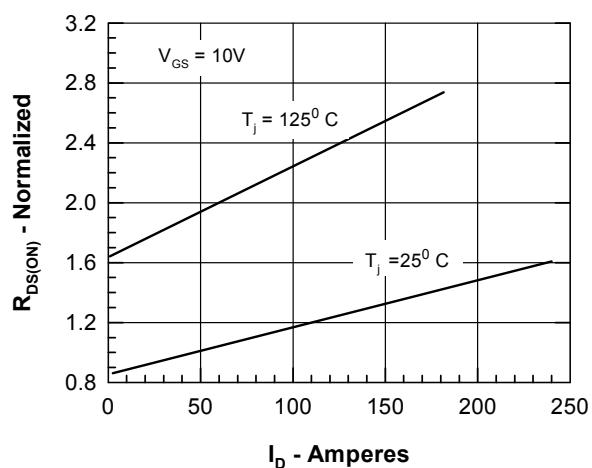


Figure 3.  $R_{DS(on)}$  normalized to  $0.5 I_{D25}$  value

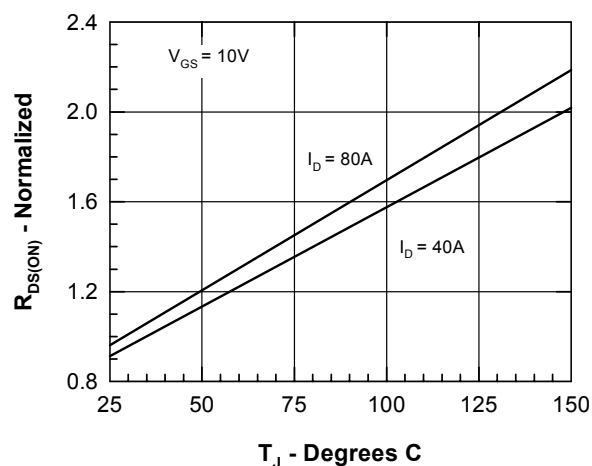


Figure 4.  $R_{DS(on)}$  normalized to  $0.5 I_{D25}$  value

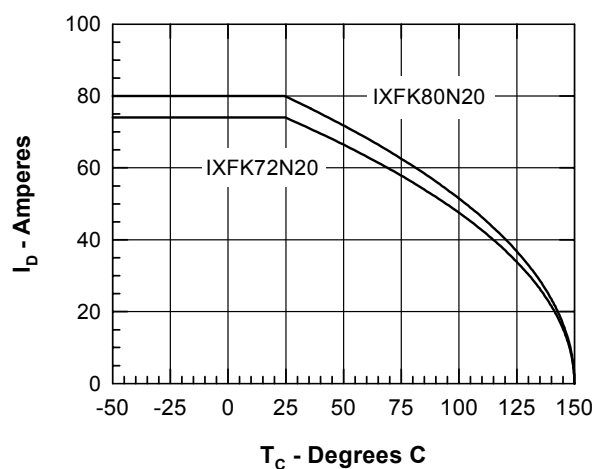


Figure 5. Drain Current vs. Case Temperature

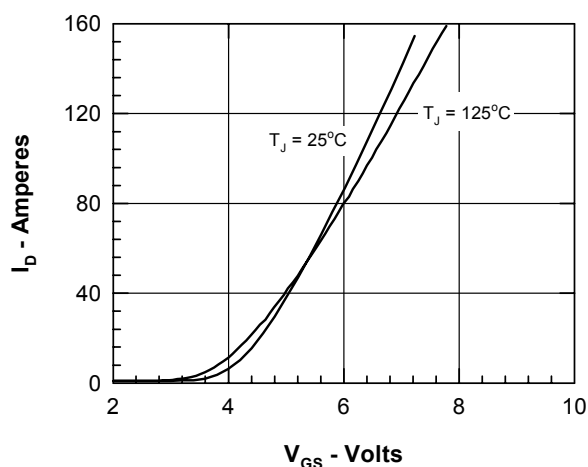


Figure 6. Admittance Curves



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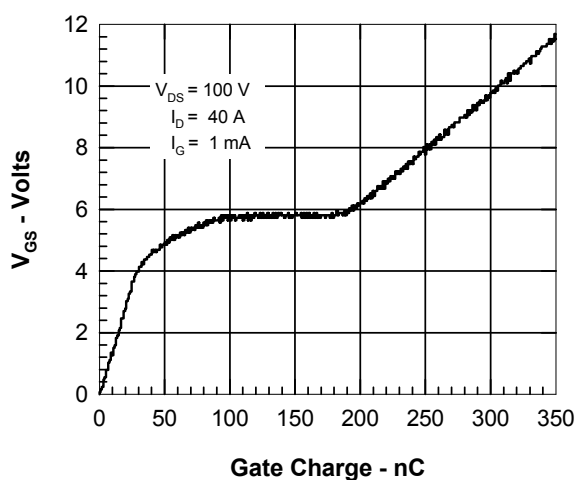


Figure 7. Gate Charge

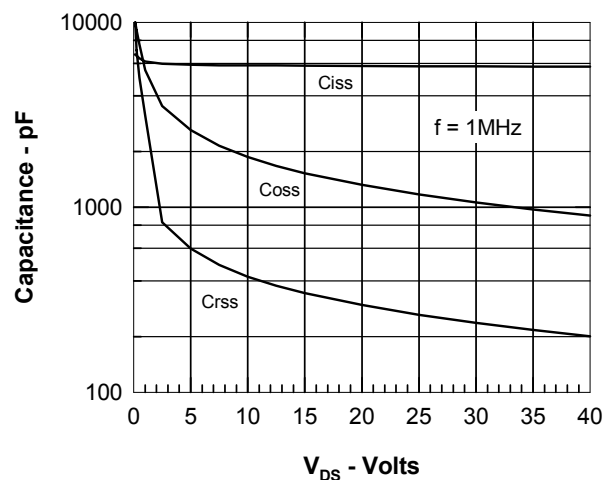


Figure 8. Capacitance Curves

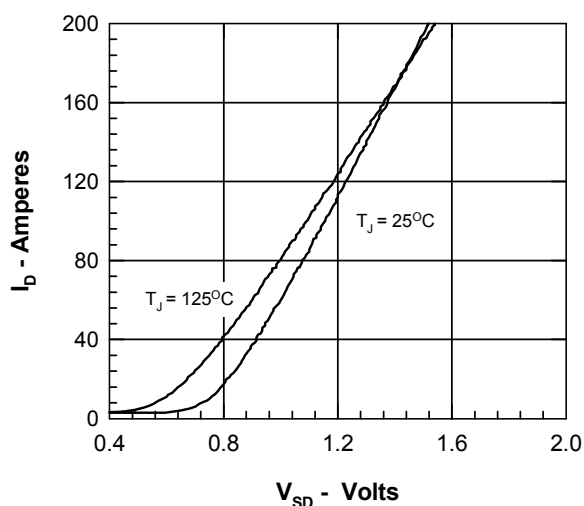


Figure 9. Source Current vs. Source to Drain Voltage

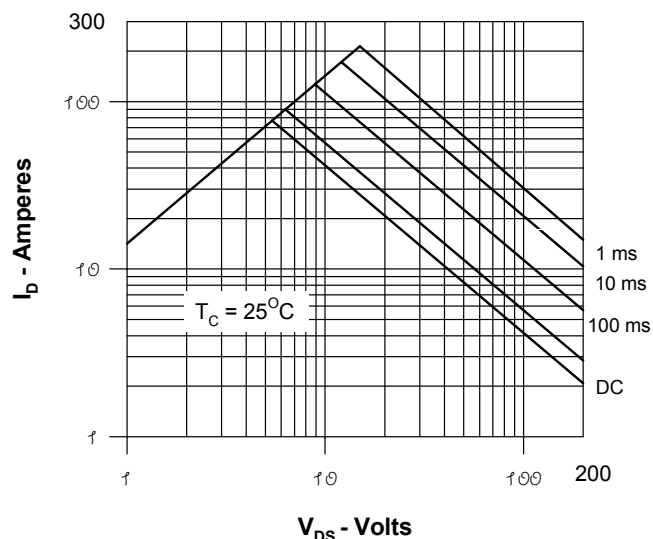


Figure 10. Forward Bias Safe Operating Area

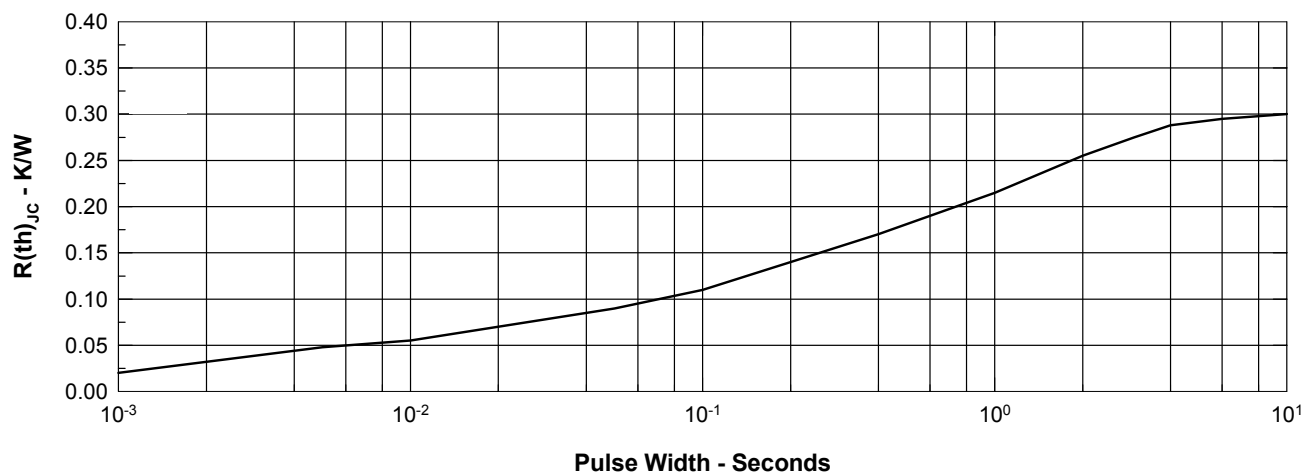


Figure 11. Transient Thermal Resistance