

# HiPerFET™ Power MOSFETs

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

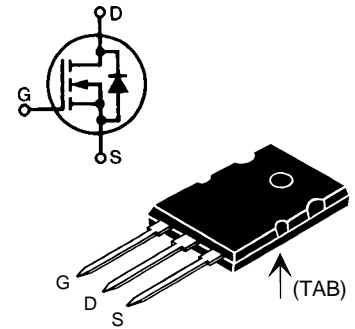
**IXFK 110 N06**  
**IXFK 105 N07**  
**IXFK 110 N07**

| $V_{DSS}$   | $I_{D25}$    | $R_{DS(on)}$ |
|-------------|--------------|--------------|
| <b>60 V</b> | <b>110 A</b> | <b>6 mΩ</b>  |
| <b>70 V</b> | <b>105 A</b> | <b>7 mΩ</b>  |
| <b>70 V</b> | <b>110 A</b> | <b>6 mΩ</b>  |

**$t_{rr} \leq 250$  ns**

| Symbol     | Test Conditions   | Maximum Ratings |                      |
|------------|---|-----------------|----------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$   | N07             | 70 V                 |
|            |   | N06             | 60 V                 |
| $V_{DGR}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1\text{ M}\Omega$   | N07             | 70 V                 |
|            |   | N06             | 60 V                 |
| $V_{GS}$   | Continuous  |                 | $\pm 20$ V           |
| $V_{GSM}$  | Transient   |                 | $\pm 30$ V           |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$ , die capability   |                 | 110 A                |
| $I_{D130}$ | $T_C = 130^\circ\text{C}$ , limited by external leads   |                 | 76 A                 |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$  |                 | 600 A                |
| $I_{AR}$   | $T_C = 25^\circ\text{C}$  |                 | 100 A                |
| $E_{AR}$   | $T_C = 25^\circ\text{C}$  |                 | 30 mJ                |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$  |                 | 2 J                  |
| 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               |
| $P_D$      | $T_C = 25^\circ\text{C}$  |                 | 500 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.            |
|            | Terminal connection torque  | -               | Nm/lb.in.            |
| Weight     |   | 10              | g                    |

## TO-264 AA (IXFK)



## Features

- International standard packages
- JEDEC TO-264 AA, epoxy meet UL94 V-0, flammability classification
- Low  $R_{DS(on)}$  HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
- Fast intrinsic Rectifier

## Applications

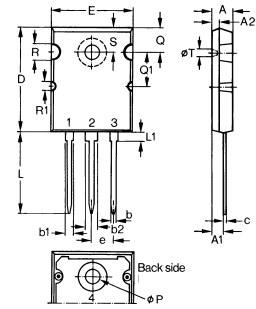
- DC-DC converters
- Synchronous rectification
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- Temperature and lighting controls
- Low voltage relays

## 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.                      |
| $V_{DSS}$    | $V_{GS} = 0\text{ V}$ , $I_D = 1\text{ mA}$                  | N06   | 60   | V                         |
|              |  | N07   | 70   | V                         |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 8\text{ mA}$                      |   | 2    | 4 V                       |
| $I_{GSS}$    | $V_{GS} = \pm 20\text{ V}_{DC}$ , $V_{DS} = 0$               |   |      | $\pm 200$ nA              |
| $I_{DSS}$    | $V_{DS} = 0.8 \cdot V_{DSS}$ ,<br>$V_{GS} = 0\text{ V}$      | $T_J = 25^\circ\text{C}$<br>$T_J = 125^\circ\text{C}$                             |      | 400 $\mu\text{A}$<br>2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10\text{ V}$ , $I_D = 0.5 \cdot I_{D25}$<br>Note 2 | 110N06/110N07<br>105N07   |      | 6 mΩ<br>7 mΩ              |

| Symbol       | Test Conditions  | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |      |
|--------------|--|---|------|------|
|              |  | min.  | typ. | max. |
| $g_{fs}$     | $V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$ , Note 2   | 60  | 80   | S    |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$  |   | 9000 | pF   |
| $C_{oss}$    |  |   | 4000 | pF   |
| $C_{rss}$    |  |   | 2400 | pF   |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$<br>$R_G = 1\ \Omega$ (External), |   | 30   | ns   |
| $t_r$        |  |   | 60   | ns   |
| $t_{d(off)}$ |  |   | 100  | ns   |
| $t_f$        |  |   | 60   | ns   |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$                                  |   | 480  | nC   |
| $Q_{gs}$     |  |   | 60   | nC   |
| $Q_{gd}$     |  |   | 240  | nC   |
| $R_{thJC}$   | TO-264 AA  |   | 0.25 | K/W  |
| $R_{thCK}$   | TO-264 AA  |   | 0.15 | K/W  |

**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  |

| Symbol   | Test Conditions   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                   |
|----------|---|---|------|-------------------|
|          |   | min.  | typ. | max.              |
| $I_s$    | $V_{GS} = 0\text{ V}$   | 110N06/110N07<br>105N07   |      | 110 A<br>105 A    |
| $I_{SM}$ | Repetitive; pulse width limited by $T_{JM}$                                       | 110N06/110N07<br>105N07   |      | 440 A<br>420 A    |
| $V_{SD}$ | $I_F = 100\text{ A}, V_{GS} = 0\text{ V}$ , Note 2                                |   |      | 1.7 V             |
| $t_{rr}$ | $I_F = 25\text{ A}$<br>$-di/dt = 100\text{ A}/\mu\text{s}$<br>$V_R = 50\text{ V}$ |   | 150  | 250 ns            |
| $Q_{RM}$ |   |   |      | 0.7 $\mu\text{C}$ |
| $I_{RM}$ |   |   |      | 9 A               |

Note: 1. Pulse width limited by  $T_{JM}$   
2. Pulse test,  $t \leq 300\ \mu\text{s}$ , duty cycle  $d \leq 2\%$

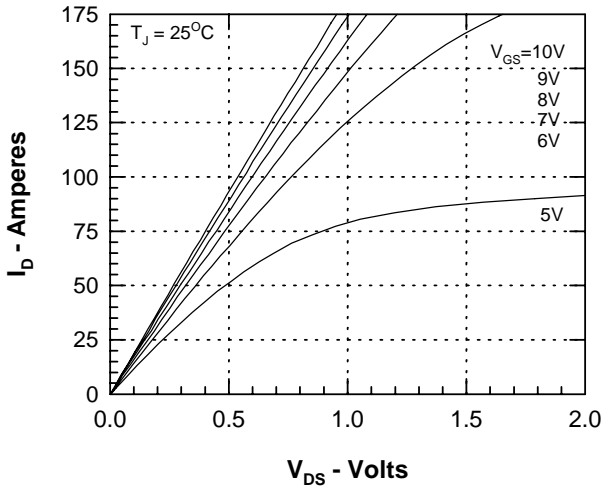


Figure 1. Output Characteristics at 25°C

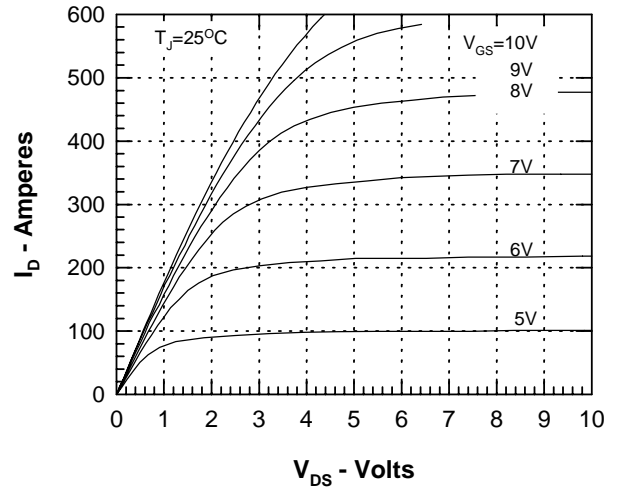


Figure 2. Extended Output Characteristics

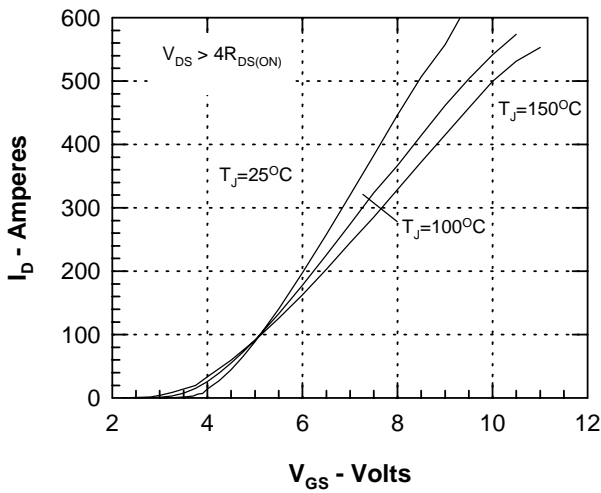


Figure 3. Admittance Curves

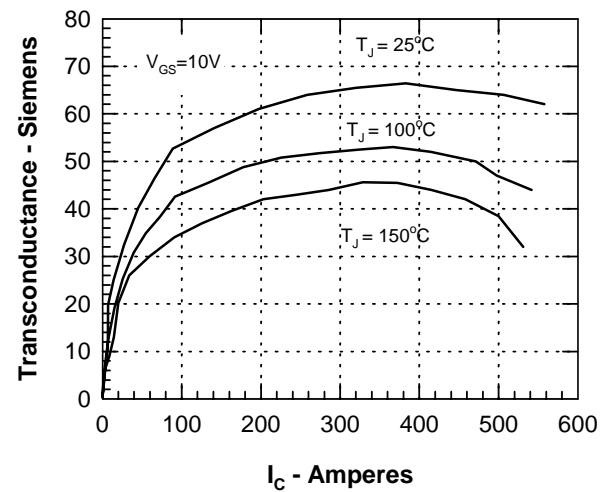
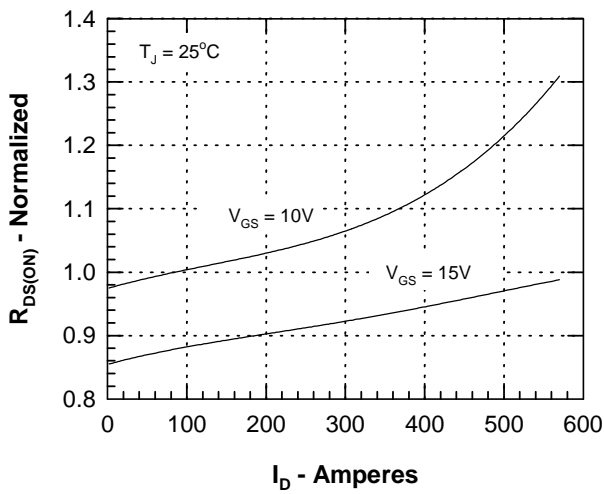
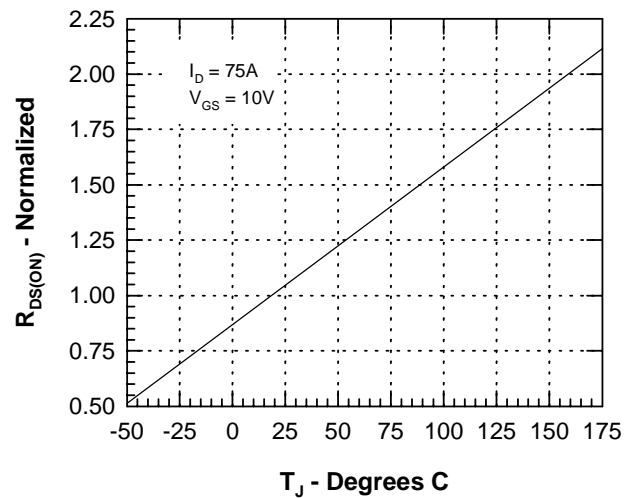


Figure 4. Transconductance vs. Drain Current


 Figure 5.  $R_{DS(on)}$  normalized to  $0.5 I_{D25}$  value

 Figure 6. Normalized  $R_{DS(on)}$  vs. Junction Temperature

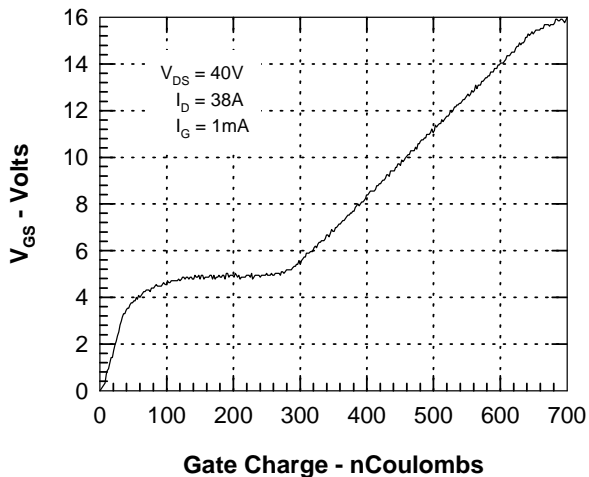


Figure 7. Gate Charge

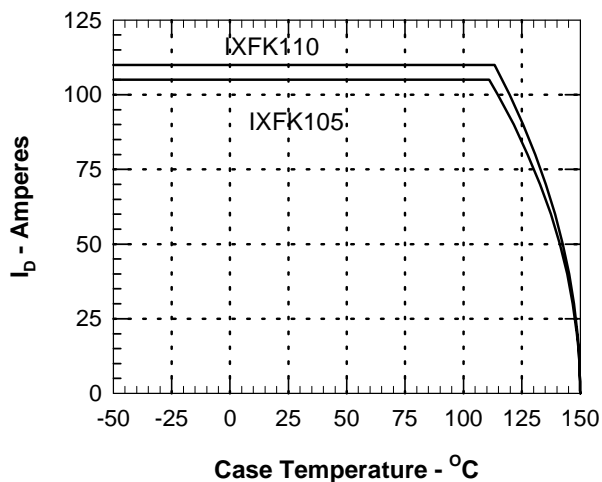


Figure 8. Drain Current vs. Case Temperature

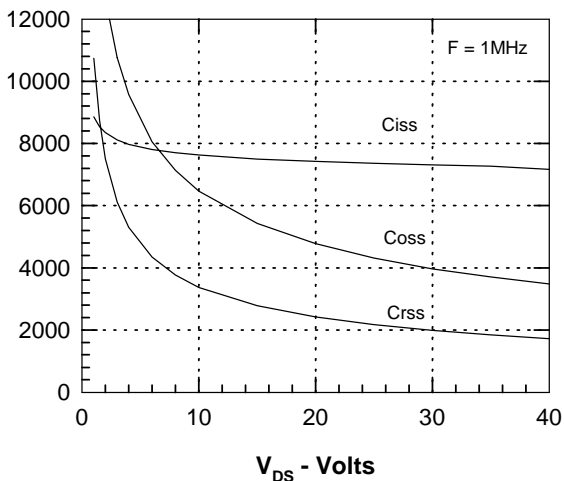


Figure 9. Capacitance Curves

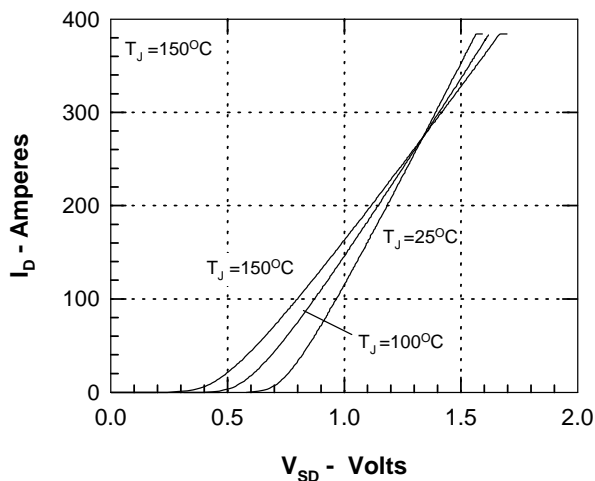


Figure 10. Source-Drain Voltage vs. Source Current

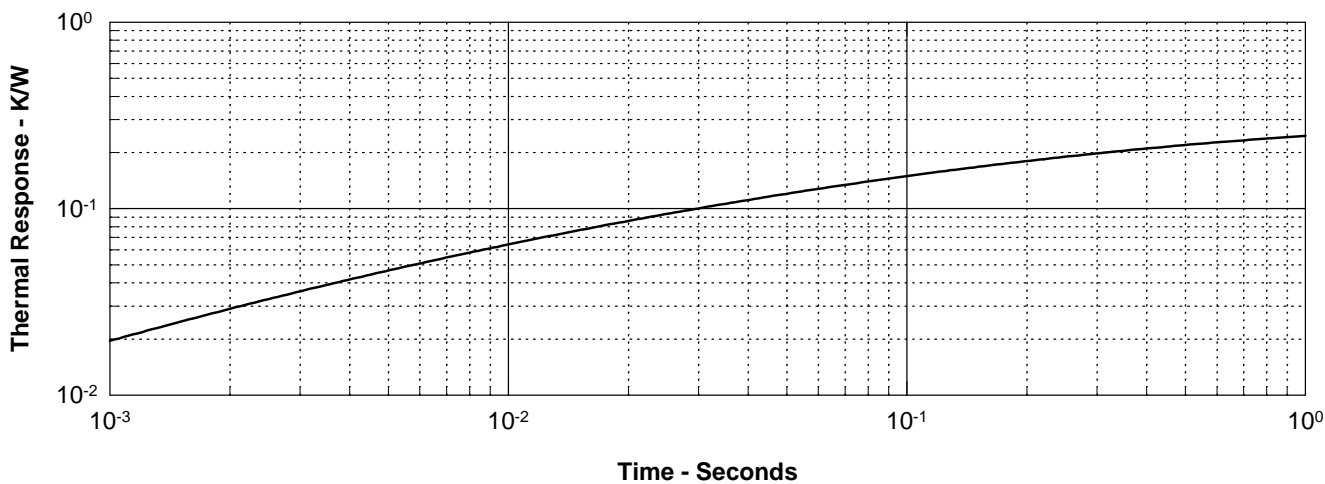


Figure 11. Transient Thermal Resistance