

HiPerFET™ Power MOSFET

IXFN170N10
IXFK170N10

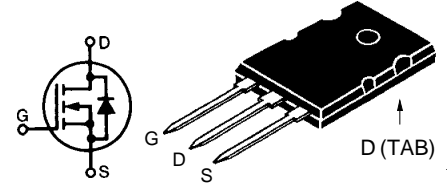
Single MOSFET Die

Preliminary data

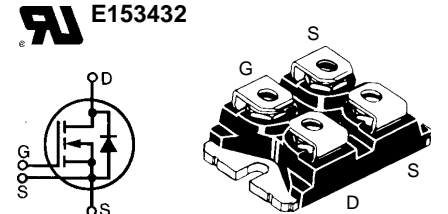
| V_{DSS} | I_{D25} | $R_{DS(on)}$ | t_{rr} |
|-----------|-----------|--------------|----------|
| 100V | 170A | 10mΩ | 200ns |
| 100V | 170A | 10mΩ | 200ns |

| Symbol | Test Conditions | Maximum Ratings | | |
|---------------|---|-----------------|----------------|-----------|
| | | IXFK 170N10 | IXFN 170N10 | |
| V_{DSS} | $T_J = 25^\circ\text{C}$ to 150°C | 100 | 100 | V |
| V_{DGR} ① | $T_J = 25^\circ\text{C}$ to 150°C | 100 | 100 | V |
| V_{GS} | Continuous | ±20 | ±20 | V |
| V_{GSM} | Transient | ±30 | ±30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 170③ | 170 | A |
| I_{D125} ④ | $T_C = 125^\circ\text{C}$ | 76 | NA | |
| I_{DM} ② | $T_C = 25^\circ\text{C}$ | 680 | 680 | A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 170 | 170 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 60 | 60 | mJ |
| dv/dt | $I_S \leq I_{DM}$, $di/dt \leq 100 \text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$ $T_J \leq 150^\circ\text{C}$, $R_G = 2 \Omega$ | 5 | 5 | V/ns |
| P_D | $T_C = 25^\circ\text{C}$ | 560 | 600 | 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 | N/A | °C |
| V_{ISOL} | 50/60 Hz, RMS $t = 1 \text{ min}$ | N/A | 2500 | V~ |
| | $I_{ISOL} \leq 1 \text{ mA}$ $t = 1 \text{ s}$ | N/A | 3000 | V~ |
| M_d | Mounting torque | 0.9/6 | 1.5/13 | Nm/lb.in. |
| | Terminal connection torque | N/A | 1.5/13 | Nm/lb.in. |
| Weight | | 10 | 30 | g |

TO-264 AA (IXFK)



miniBLOC, SOT-227 B (IXFN)



G = Gate
S = Source
D = Drain
TAB = Drain

Either Source terminal at miniBLOC can be used as Main or Kelvin Source

Features

- International standard packages
- Encapsulating epoxy meets UL94 V-0, flammability classification
- miniBLOC with Aluminium nitride isolation
- 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 | | |
|--------------|--|-----------------------|--------|---|
| | | Min. | Typ. | Max. |
| V_{DSS} | $V_{GS} = 0 \text{ V}$, $I_D = 3 \text{ mA}$ V_{DSS} temperature coefficient | 100 | 0.077 | V %/K |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 8 \text{ mA}$ $V_{GS(th)}$ temperature coefficient | 2 | -0.183 | V %/K |
| I_{GSS} | $V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0 \text{ V}$ | | | ±200 nA |
| I_{DSS} | $V_{DS} = 0.8 \cdot V_{DSS}$ V $V_{GS} = 0 \text{ V}$ | | | $T_J = 25^\circ\text{C}$ 400 μA $T_J = 125^\circ\text{C}$ 2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$, $I_D = 0.5 \cdot I_{D25}$ Pulse test, $t \leq 300 \text{ ms}$, duty cycle $d \leq 2 \%$ | | | 10 mΩ |

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, unless otherwise specified) | Characteristic Values | | |
|--------------|--|-----------------------|--------|------|
| | | Min. | Typ. | Max. |
| g_{fs} | $V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$, pulse test | | 65 | S |
| C_{iss} | | | 10,300 | pF |
| C_{oss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 2,200 | pF |
| C_{rss} | | | 1,200 | pF |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 1\ \Omega$ (External), | | 40 | ns |
| t_r | | | 90 | ns |
| $t_{d(off)}$ | | | 158 | ns |
| t_f | | | 79 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ | | 515 | nC |
| Q_{gs} | | | 62 | nC |
| Q_{gd} | | | 276 | nC |
| R_{thJC} | TO-264 AA | | 0.22 | K/W |
| R_{thCK} | TO-264 AA | | 0.15 | K/W |
| R_{thJC} | miniBLOC, SOT-227 B | | 0.21 | K/W |
| R_{thCK} | miniBLOC, SOT-227 B | | 0.05 | K/W |

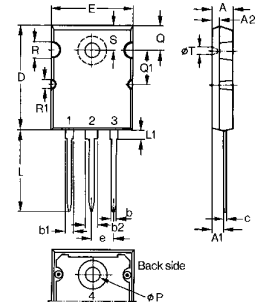
Source-Drain Diode

($T_J = 25^\circ\text{C}$, unless otherwise specified)

| Symbol | Test Conditions | Characteristic Values | | |
|----------|---|-----------------------|------|---------------|
| | | Min. | Typ. | Max. |
| I_S | $V_{GS} = 0$ | | | 170 A |
| I_{SM} | Repetitive; pulse width limited by T_{JM} | | | 680 A |
| V_{SD} | $I_F = 100\text{ A}, V_{GS} = 0\text{ V},$ Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$ | | | 1.5 V |
| t_{rr} | $I_F = 50\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$ | | 175 | ns |
| Q_{RM} | | | 1.1 | μC |
| I_{RM} | | | 12.6 | A |

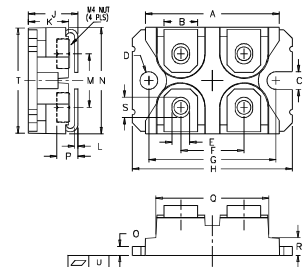
- Notes:
- $R_{GS} = 1\ \text{M}\Omega$
 - Pulse width limited by T_{JM} .
 - Chip capability
 - Current limited by external leads

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 |

miniBLOC, SOT-227 B



M4 screws (4x) supplied

| Dim. | Millimeter | | Inches | |
|------|------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 31.50 | 31.88 | 1.240 | 1.255 |
| B | 7.80 | 8.20 | 0.307 | 0.323 |
| C | 4.09 | 4.29 | 0.161 | 0.169 |
| D | 4.09 | 4.29 | 0.161 | 0.169 |
| E | 4.09 | 4.29 | 0.161 | 0.169 |
| F | 14.91 | 15.11 | 0.587 | 0.595 |
| G | 30.12 | 30.30 | 1.186 | 1.193 |
| H | 38.00 | 38.23 | 1.496 | 1.505 |
| J | 11.68 | 12.22 | 0.460 | 0.481 |
| K | 8.92 | 9.60 | 0.351 | 0.378 |
| L | 0.76 | 0.84 | 0.030 | 0.033 |
| M | 12.60 | 12.85 | 0.496 | 0.506 |
| N | 25.15 | 25.42 | 0.990 | 1.001 |
| O | 1.98 | 2.13 | 0.078 | 0.084 |
| P | 4.95 | 5.97 | 0.195 | 0.235 |
| Q | 26.54 | 26.90 | 1.045 | 1.059 |
| R | 3.94 | 4.42 | 0.155 | 0.174 |
| S | 4.72 | 4.85 | 0.186 | 0.191 |
| T | 24.59 | 25.07 | 0.968 | 0.987 |
| U | -0.05 | 0.1 | -0.002 | 0.004 |

Figure 1. Output Characteristics at 25°C

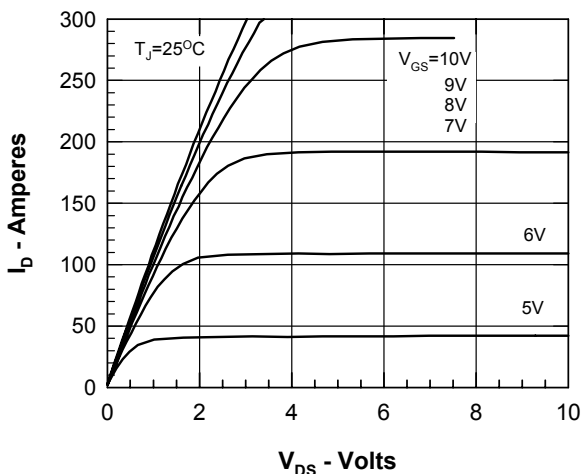


Figure 2. Output Characteristics at 125°C

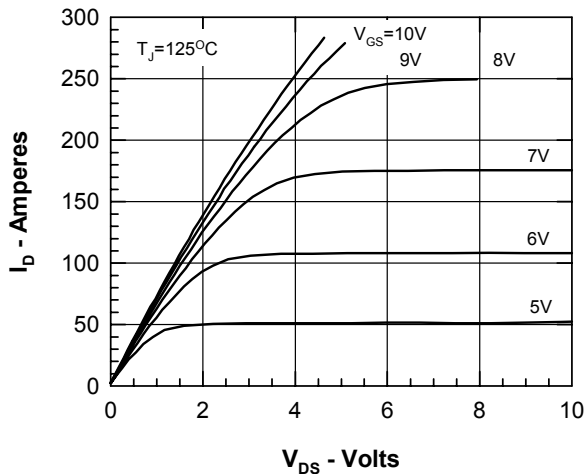


Figure 3. $R_{DS(on)}$ normalized to 0.5 I_{D25} value vs. I_D

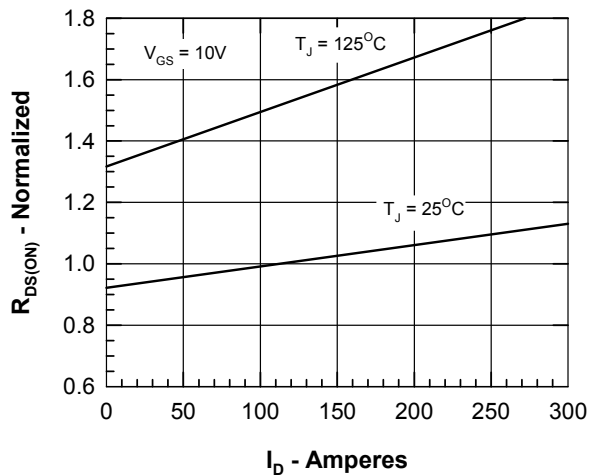


Figure 4. $R_{DS(on)}$ normalized to 0.5 I_{D25} value vs. T_J

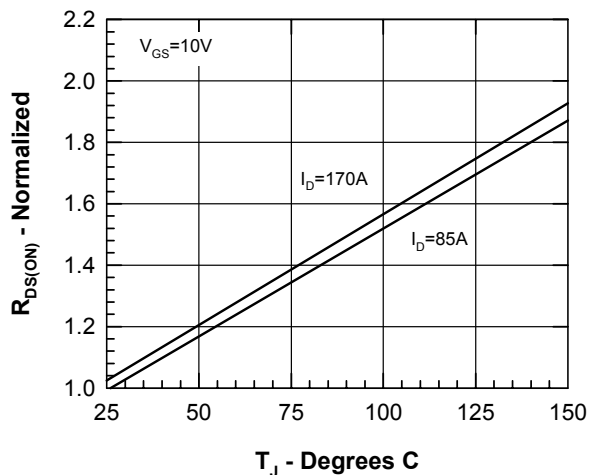


Figure 5. Drain Current vs. Case Temperature

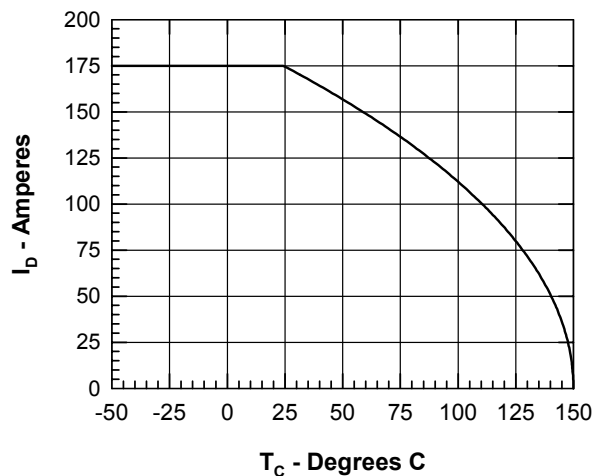


Figure 6. Admittance Curves

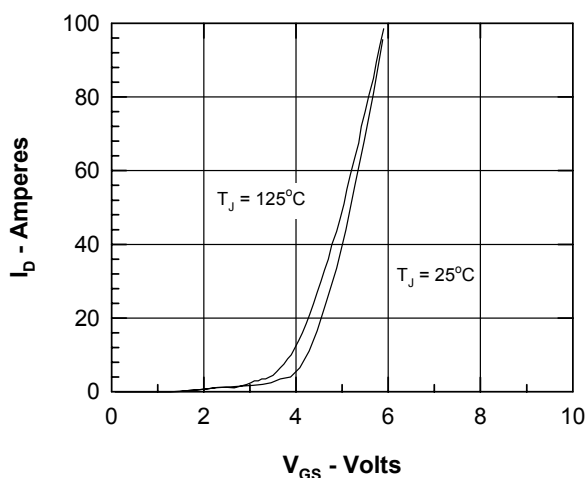


Figure 7. Gate Charge

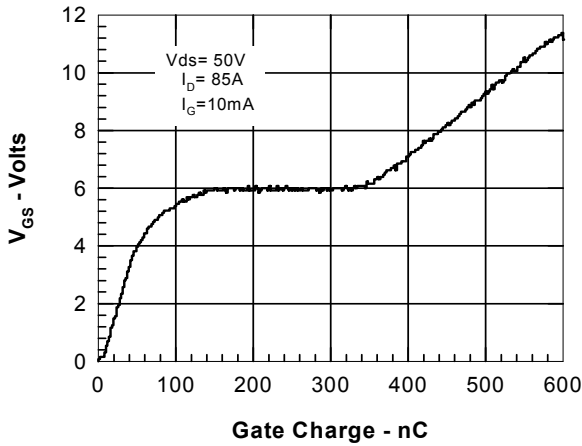


Figure 8. Capacitance Curves

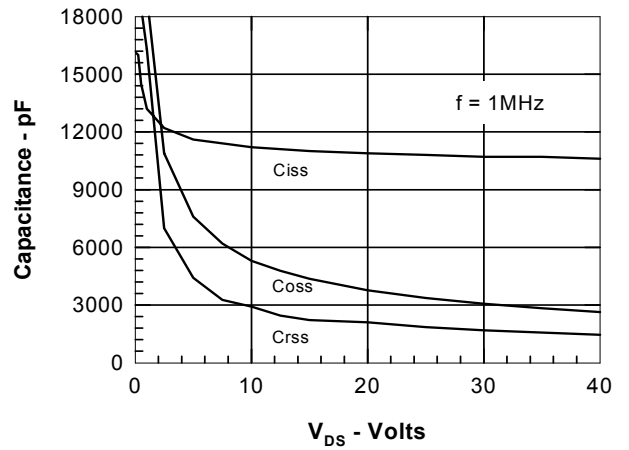


Figure 9. Forward Voltage Drop of the Intrinsic Diode

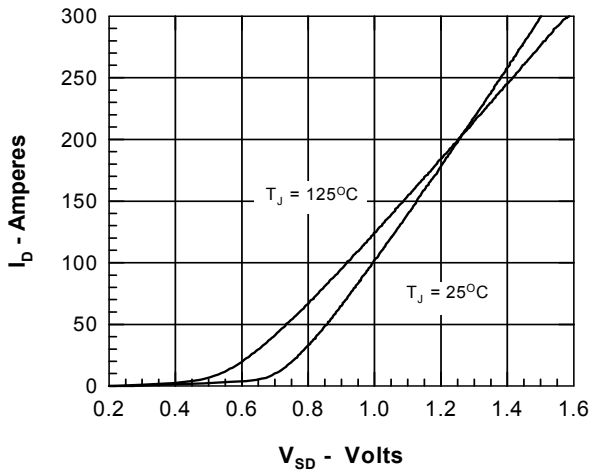


Figure 10. Forward Bias Safe Operating Area

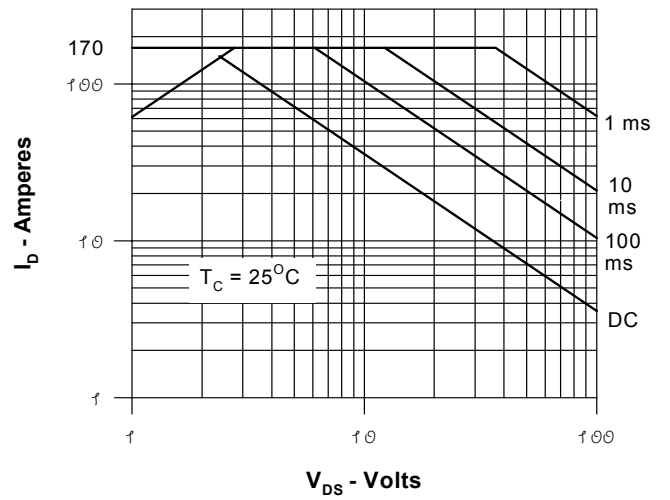
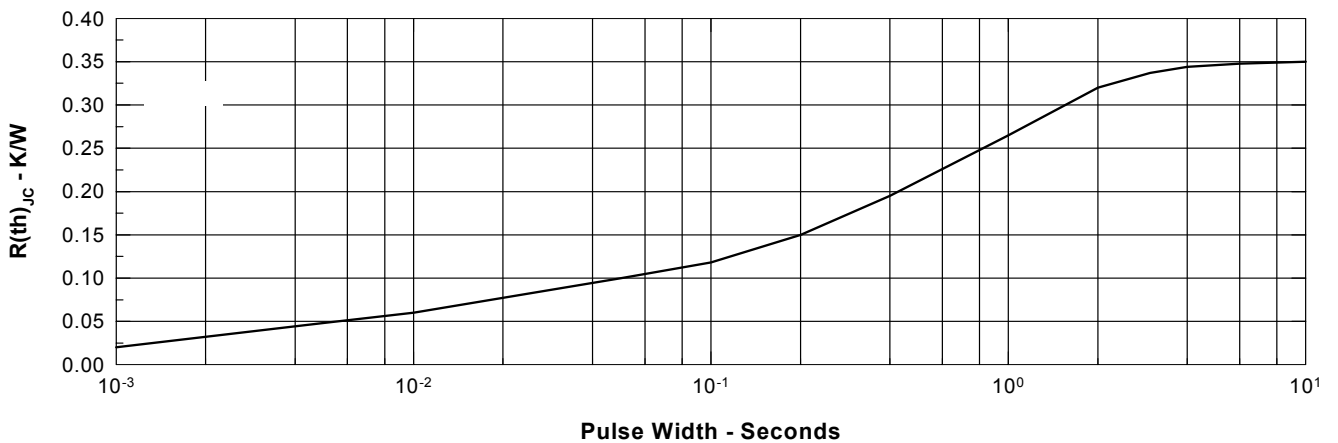


Figure 11. Transient Thermal Resistance





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