

HiPerFET™ Power MOSFETs

IXFK 90 N 20
IXFN 100 N 20
IXFN 106 N 20

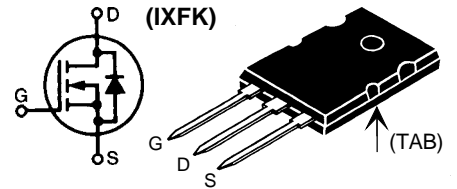
| V_{DSS} | I_{D25} | $R_{DS(on)}$ |
|-----------|-----------|--------------|
| 200 V | 90 A | 23 mΩ |
| 200 V | 100 A | 23 mΩ |
| 200 V | 106 A | 20 mΩ |

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

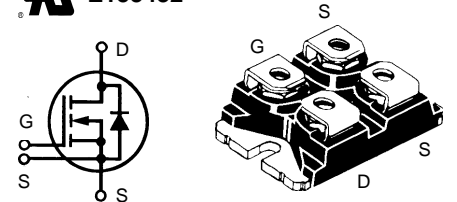
$t_{rr} \leq 200$ ns

| Symbol | Test Conditions | Maximum Ratings | | |
|------------|--|-----------------|---------------|-----------------|
| | | IXFK | IXFN | IXFN |
| V_{DSS} | $T_J = 25^\circ\text{C}$ to 150°C | 90N20 200 | 100N20 200 | 106N20 200 V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1$ MΩ | 200 | 200 | 200 V |
| V_{GS} | Continuous | ±20 | ±20 | 20 V |
| V_{GSM} | Transient | ±30 | ±30 | 20 V |
| I_{D25} | $T_C = 25^\circ\text{C}$, Chip capability | 90 ① | 100 | 106 A |
| I_{D80} | $T_C = 80^\circ\text{C}$, limited by external leads | 76 | - | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, pulse width limited by T_{JM} | 360 | 400 | 424 A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 50 | 50 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 30 | 30 | 30 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 | 5 | 5 V/ns |
| P_D | $T_C = 25^\circ\text{C}$ | 500 | 520 | 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 |
| V_{ISOL} | 50/60 Hz, RMS $t = 1$ min $I_{ISOL} \leq 1$ mA $t = 1$ s | - | 2500 | V~ |
| | | - | 3000 | V~ |
| M_d | Mounting torque | 0.9/6 | 1.5/13 | Nm/lb.in. |
| | Terminal connection torque | - | 1.5/13 | Nm/lb.in. |
| Weight | | 10 | 30 | g |

TO-264 AA



miniBLOC, SOT-227 B (IXFN)
E153432



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
- JEDEC TO-264 AA, epoxy meet 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 ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|------|---|
| | | min. | typ. | max. |
| V_{DSS} | $V_{GS} = 0$ V, $I_D = 1$ mA | 200 | | V |
| $V_{GH(th)}$ | $V_{DS} = V_{GS}$, $I_D = 8$ mA | 2 | | V |
| I_{GSS} | $V_{GS} = \pm 20$ V _{DC} , $V_{DS} = 0$ | | | ±200 nA |
| I_{DSS} | $V_{DS} = 0.8 \cdot V_{DSS}$, $T_J = 25^\circ\text{C}$ $V_{GS} = 0$ V, $T_J = 125^\circ\text{C}$ | | | 400 μA 2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10$ V, $I_D = 0.5 \cdot I_{D25}$ Pulse test, $t \leq 300$ μs, duty cycle $d \leq 2$ % | | | IXFK90N20 0.023 Ω IXFN100N20 0.023 Ω IXFN106N20 0.020 Ω |

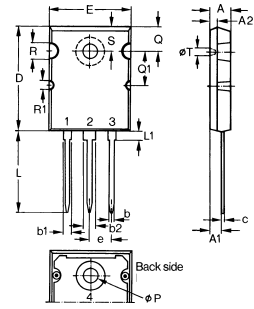
IXYS reserves the right to change limits, test conditions, and dimensions.

92804H (7/97)

| 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 | | 60 | S |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 9000 | pF |
| C_{oss} | | | 1600 | pF |
| C_{rss} | | | 590 | 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), | | 30 | ns |
| t_r | | | 80 | ns |
| $t_{d(off)}$ | | | 75 | ns |
| t_f | | | 30 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ | | 380 | nC |
| Q_{gs} | | | 70 | nC |
| Q_{gd} | | | 190 | nC |
| R_{thJC} | TO-264 AA | | 0.25 | K/W |
| R_{thCK} | TO-264 AA | | 0.15 | K/W |
| R_{thJC} | miniBLOC, SOT-227 B | | 0.24 | K/W |
| R_{thCK} | miniBLOC, SOT-227 B | | 0.05 | K/W |

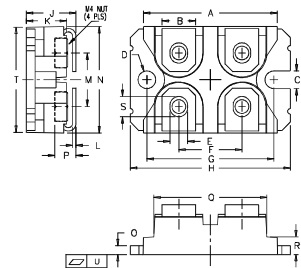
| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|----------|--|---|------|---|
| | | min. | typ. | max. |
| I_S | $V_{GS} = 0\text{ V}$ | | | 90 A IXFK90N20 IXFN100N20 IXFN106N20 |
| I_{SM} | Repetitive; pulse width limited by T_{JM} | | | 360 A IXFK90N20 IXFN100N20 424 A IXFN106N20 |
| 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} | $I_F = 50\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$ | | | 200 ns |
| Q_{RM} | | | 3 | μC |
| I_{RM} | | | 38 | 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 |

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 |

Fig. 1 Output Characteristics

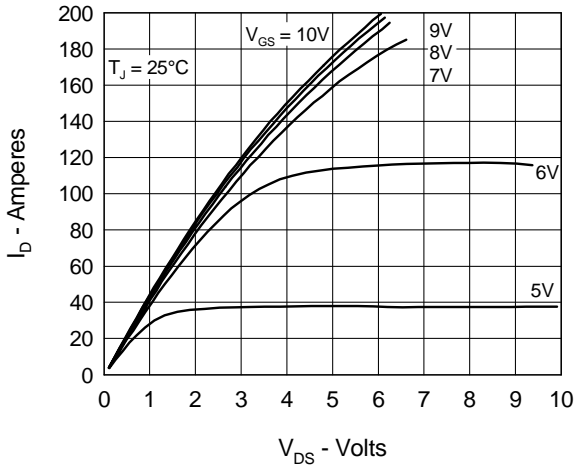


Fig. 2 Input Admittance

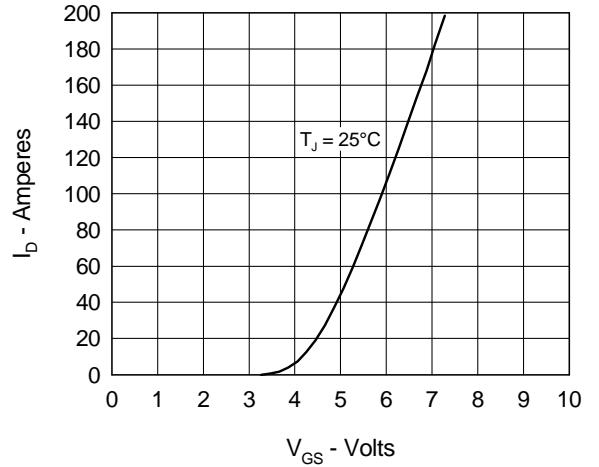


Fig. 3 $R_{DS(on)}$ vs. Drain Current

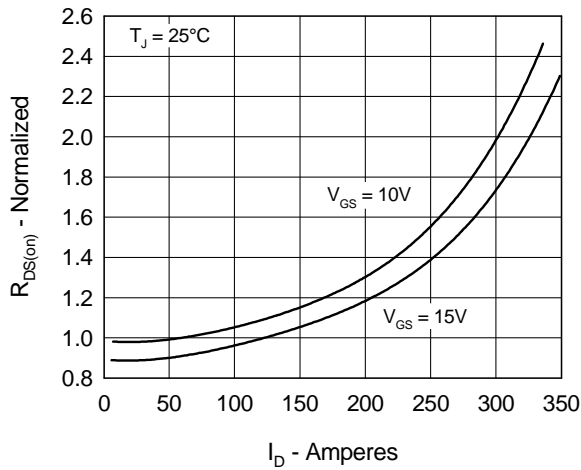


Fig. 4 Temperature Dependence of Drain to Source Resistance

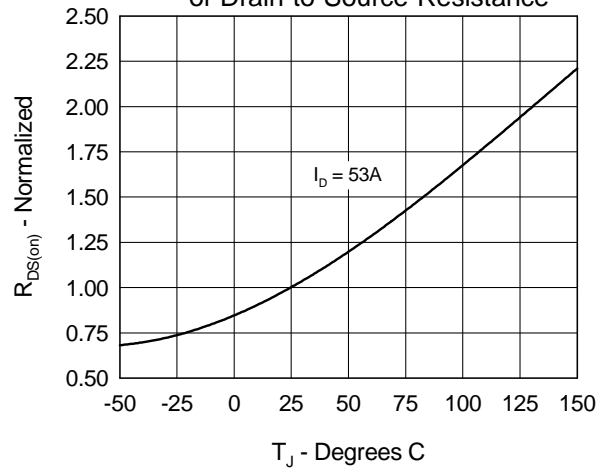


Fig. 5 Drain Current vs. Case Temperature

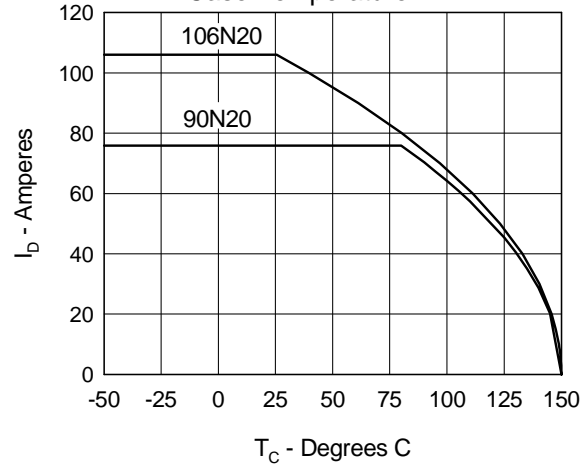


Fig. 6 Temperature Dependence of Breakdown and Threshold Voltage

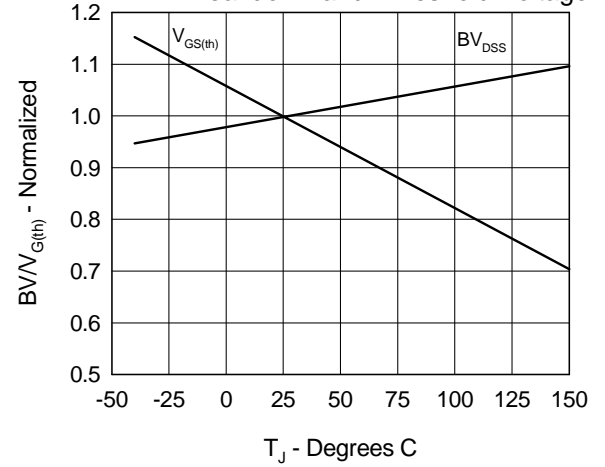


Fig.7 Gate Charge Characteristic Curve

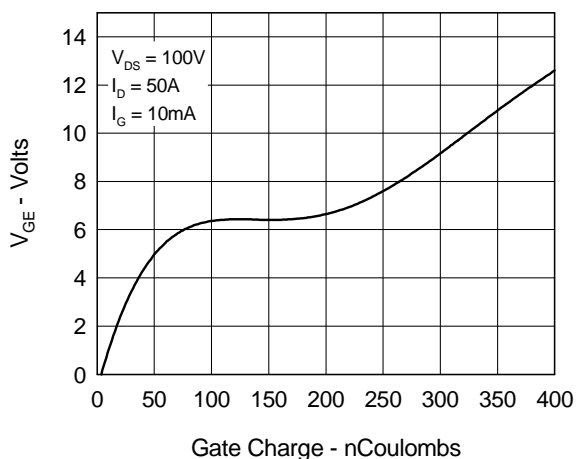


Fig.8 Capacitance Curves

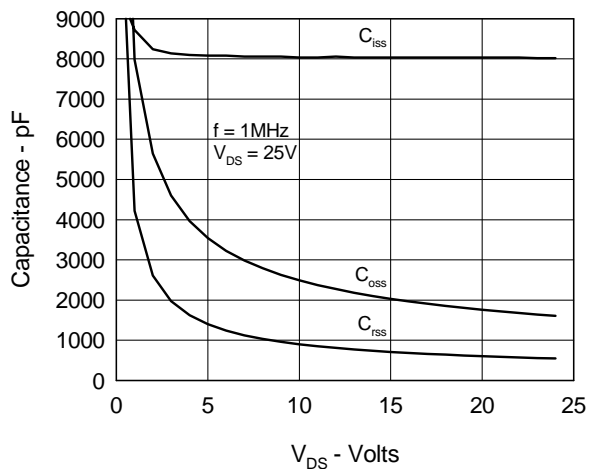


Fig.9 Source Current vs. Source to Drain Voltage

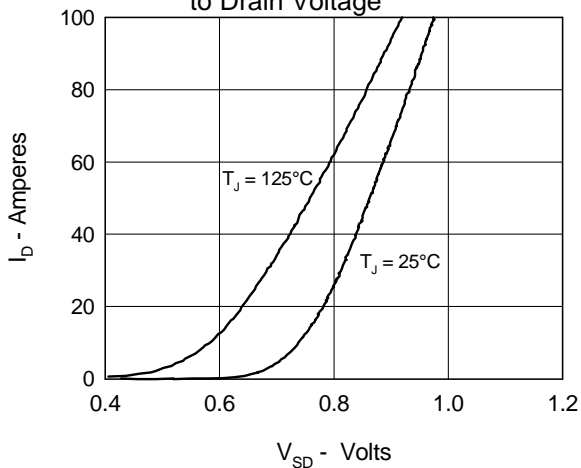
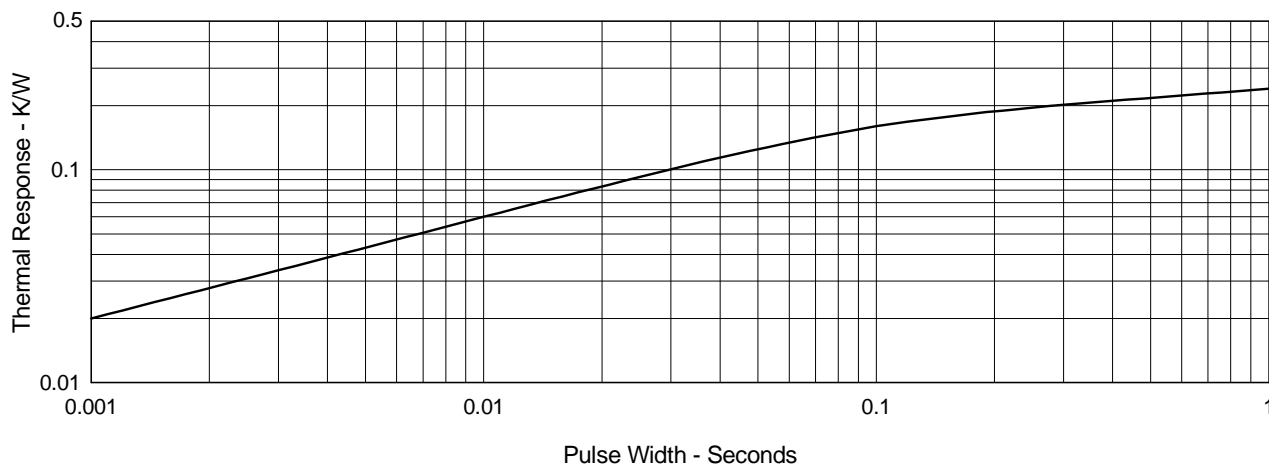


Fig.10 Transient Thermal Impedance





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