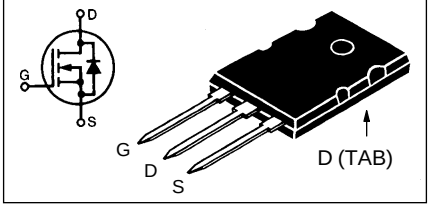
Preliminary Data

| | $V_{DSS}$ | $I_{D25}$ | $R_{DS(on)}$ | $t_{rr}$ |
|---|---|---|---|---|
| IXFK/FN 36N60 | 600V | 36A | 0.18Ω | 250ns |
| IXFK/FN 32N60 | 600V | 32A | 0.25Ω | 250ns |

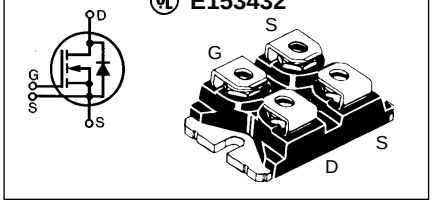
# HiPerFET™ Power MOSFET

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

**TO-264 AA (IXFK)**




**miniBLOC, SOT-227 B (IXFN)**
UL E153432




G = Gate D = Drain
S = Source TAB = Drain
Either Source terminal at miniBLOC can be used as Main or Kelvin Source

| Symbol | Test Conditions | | Maximum Ratings IXFK | IXFN | |
|---|---|---|---|---|---|
| $V_{DSS}$ | $T_J$ = 25°C to 150°C | | 600 | 600 | V |
| $V_{DGR}$ | $T_J$ = 25°C to 150°C; $R_{GS}$ = 1 MΩ | | 600 | 600 | V |
| $V_{GS}$ | Continuous | | ±20 | ±20 | V |
| $V_{GSM}$ | Transient | | ±30 | ±30 | V |
| $I_{D25}$ | $T_C$ = 25°C, Chip capability | 32N60 | 32 | 32 | A |
| | | 36N60 | 36 | 36 | A |
| $I_{DM}$ | $T_C$ = 25°C, pulse width limited by $T_{JM}$ | 32N60 | 128 | 128 | A |
| | | 36N60 | 144 | 144 | A |
| $I_{AR}$ | $T_C$ = 25°C | | 20 | 20 | A |
| $E_{AR}$ | $T_C$ = 25°C | | 30 | 30 | mJ |
| dv/dt | $I_S \le I_{DM}$, di/dt ≤ 100 A/µs, $V_{DD} \le V_{DSS}$ $T_J \le 150°C$, $R_G$ = 2 Ω | | 5 | 5 | V/ns |
| $P_D$ | $T_C$ = 25°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, RMSt = 1 min | | - | 2500 | V~ |
| | $I_{ISOL} \le$ 1 mAt = 1 s | | - | 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 |

| Symbol | Test Conditions | | Characteristic Values ($T_J$ = 25°C, unless otherwise specified) Min. | Typ. | Max. | |
|---|---|---|---|---|---|---|
| $V_{DSS}$ | $V_{GS}$ = 0 V, $I_D$ = 1 mA | | 600 | | | V |
| $V_{GH(th)}$ | $V_{DS} = V_{GS}$, $I_D$ = 8 mA | | 2 | | 4.5 | V |
| $I_{GSS}$ | $V_{GS}$ = ±20 $V_{DC}$, $V_{DS}$ = 0 | | | | ±200 | nA |
| $I_{DSS}$ | $V_{DS}$ = 0.8 $V_{DSS}$ | $T_J$ = 25°C | | | 400 | µA |
| | $V_{GS}$ = 0 V | $T_J$ = 125°C | | | 2 | mA |
| $R_{DS(on)}$ | $V_{GS}$ = 10 V, $I_D$ = 0.5 $I_{D25}$ | 36N60 | | | 0.18 | Ω |
| | Pulse test, t ≤ 300 µs, duty cycle ≤ 2 % | 32N60 | | | 0.25 | Ω |

### Features

- International standard packages
- JEDEC TO-264 AA, epoxy meet UL 94 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





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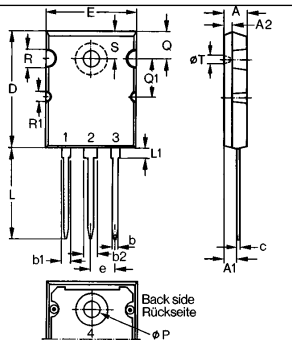
| Symbol | Test Conditions | Characteristic Values ($T_J$ = 25°C, unless otherwise specified) min. | typ. | max. | |
|---|---|---|---|---|---|
| $g_{fs}$ | $V_{DS}$ = 10 V; $I_D$ = 0.5 $I_{D25}$, pulse test | | 36 | | S |
| $C_{iss}$ | $V_{GS}$ = 0 V, $V_{DS}$ = 25 V, f = 1 MHz | | 9000 | | pF |
| $C_{oss}$ | | | 840 | | pF |
| $C_{rss}$ | | | 280 | | pF |
| $t_{d(on)}$ | $V_{GS}$ = 10 V, $V_{DS}$ = 0.5 $V_{DSS}$, $I_D$ = 0.5 $I_{D25}$ $R_G$ = 1 Ω (External), | | 30 | | ns |
| $t_r$ | | | 45 | | ns |
| $t_{d(off)}$ | | | 100 | | ns |
| $t_f$ | | | 60 | | ns |
| $Q_{g(on)}$ | $V_{GS}$ = 10 V, $V_{DS}$ = 0.5 $V_{DSS}$, $I_D$ = 0.5 $I_{D25}$ | | 325 | | nC |
| $Q_{gs}$ | | | 60 | | nC |
| $Q_{gd}$ | | | 120 | | 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 |

**Source-Drain Diode**

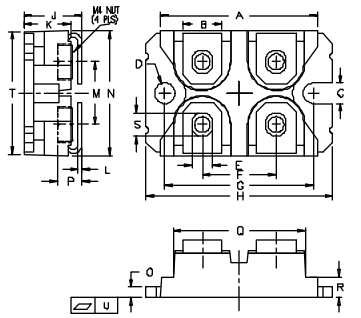
| Symbol | Test Conditions | Characteristic Values ($T_J$ = 25°C, unless otherwise specified) | Min. | Typ. | Max. | |
|---|---|---|---|---|---|---|
| $I_S$ | $V_{GS}$ = 0 | 36N60 | | | 36 | A |
| $I_S$ | $V_{GS}$ = 0 | 32N60 | | | 32 | A |
| $I_{SM}$ | Repetitive; pulse width limited by $T_{JM}$ | 36N60 | | | 144 | A |
| | | 32N60 | | | 128 | A |
| $V_{SD}$ | $I_F$ = $I_S$ A, $V_{GS}$ = 0 V, Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 % | | | | 1.5 | V |
| $t_{rr}$ | $I_F$ = $I_S$, -di/dt = 100 A/µs, $V_R$ = 100 V | | | | 250 | ns |
| $I_{RM}$ | | | | 20 | | A |

**TO-264 AA Outline**




| Dim. | Millimeter Min. | Max. | Inches 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 |

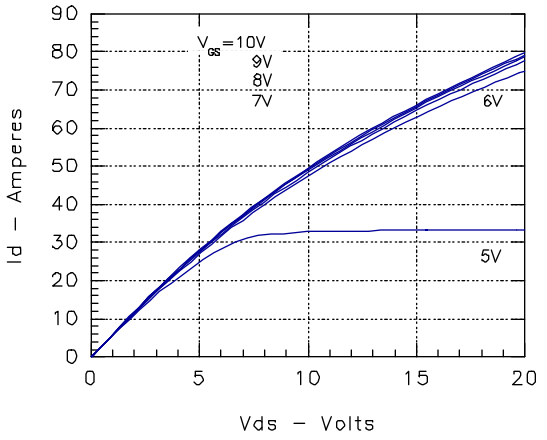
**miniBLOC, SOT-227 B**



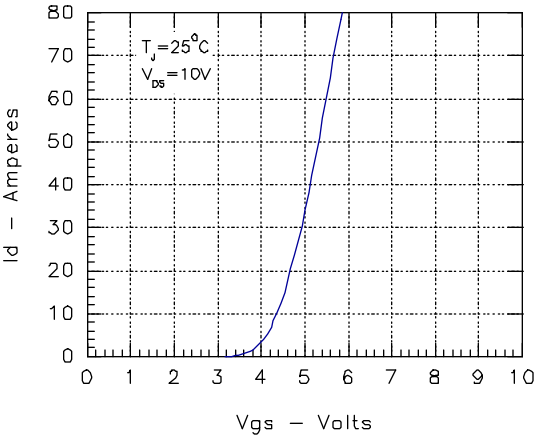

M4 screws (4x) supplied

| Dim. | Millimeter Min. | Max. | Inches 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 |

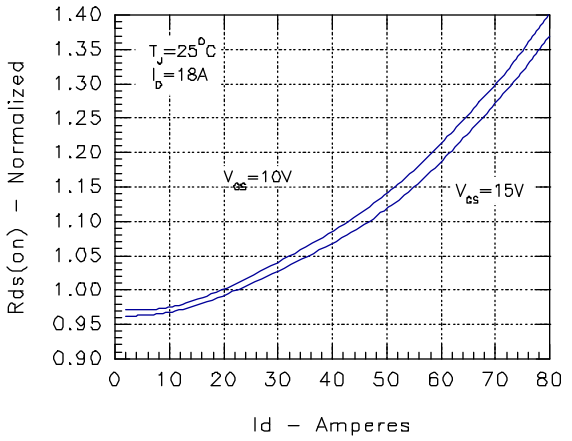
## Fig.1. Output Characteristics



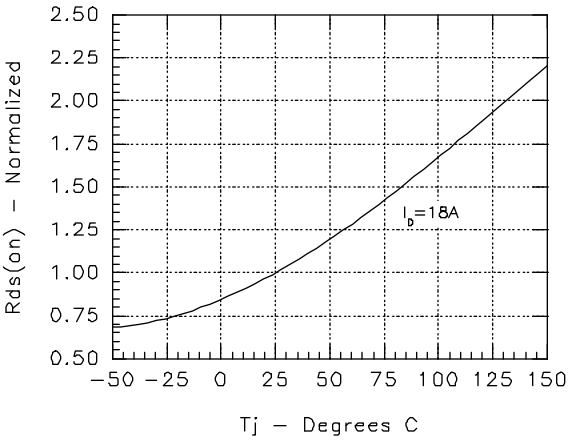

## Fig. 2. Input Admittance



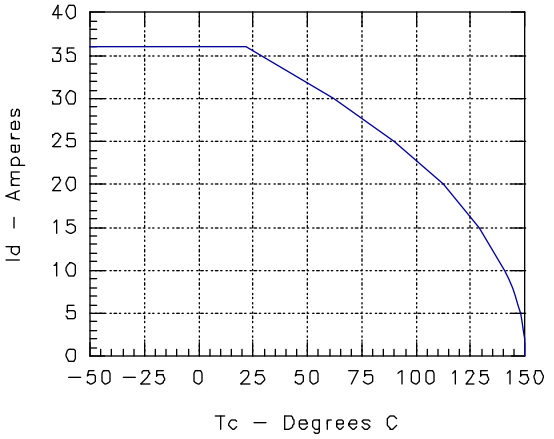

## Fig. 3. Rds(on) vs. Drain Currente




## Fig. 4. Temperature Dependence of Drain to Source Resistance




## Fig. 5. Drain Current vs. Case Temperature




## Fig. 6. Temperature Dependence of Breakdown Voltage and Threshold Voltage

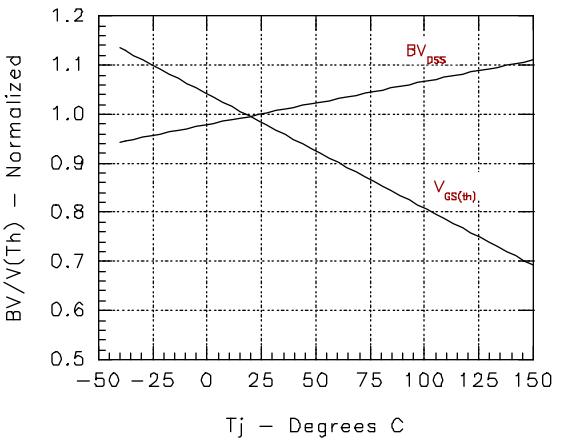





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Fig. 7. Gate Charge

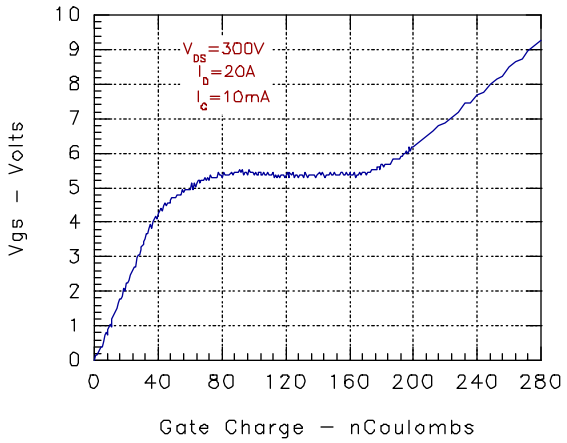


Fig. 8. Capacitance Curves

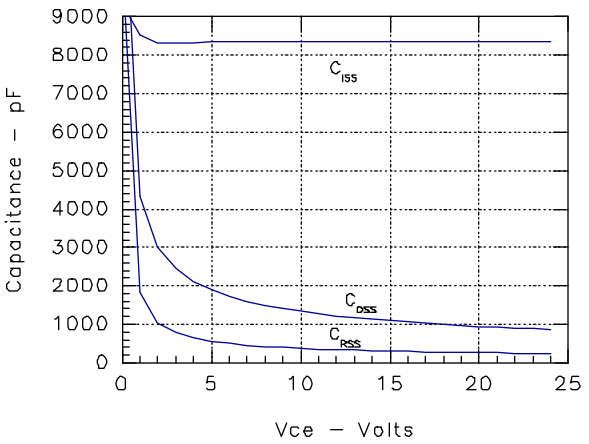


Fig. 9. Source Current vs. Source to Drain Voltage

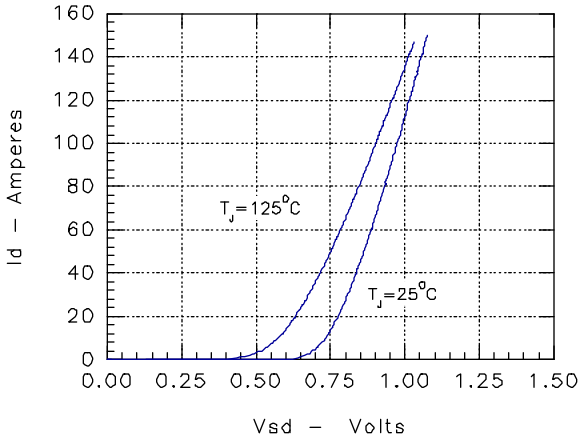


Fig. 10. Transient Thermal Impedance