

HiPerFET™ Power MOSFETs IXFK 27N80

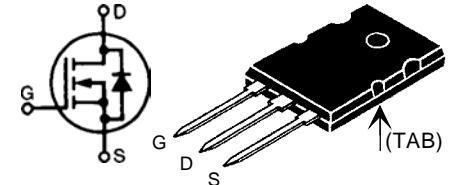
N-Channel Enhancement Mode
Avalanche Rated, High dv/dt, Low t_{rr}

IXFK 25N80
IXFN 27N80
IXFN 25N80

| V_{DSS} | I_{D25} | $R_{DS(on)}$ |
|-----------|-----------|---------------|
| 800 V | 27 A | 0.30 Ω |
| 800 V | 25 A | 0.35 Ω |
| 800 V | 27 A | 0.30 Ω |
| 800 V | 25 A | 0.35 Ω |

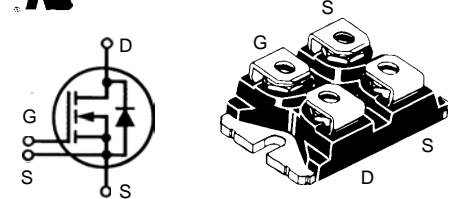
| Symbol | Test Conditions | Maximum Ratings | | |
|------------|---|-----------------|----------|------------------|
| | | IXFK | IXFN | |
| V_{DSS} | $T_J = 25^\circ\text{C}$ to 150°C | 800 | 800 | V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1\text{ M}\Omega$ | 800 | 800 | V |
| V_{GS} | Continuous | ± 20 | ± 20 | V |
| V_{GSM} | Transient | ± 30 | ± 30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$, Chip capability | 27N80 | 27 | A |
| | | 25N80 | 25 | A |
| | | IXFK 27N80 | 108 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, pulse width limited by T_{JM} | 25N80 | 100 | A |
| | | IXFK 27N80 | 14 | A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 25N80 | 13 | A |
| | | IXFK 27N80 | 13 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 30 | 30 | 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 | $T_C = 25^\circ\text{C}$ | 500 | 520 | 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 | - | $^\circ\text{C}$ |
| V_{ISOL} | 50/60 Hz, RMS $t = 1\text{ min}$ | - | 2500 | V~ |
| | $I_{ISOL} \leq 1\text{ mA}$ $t = 1\text{ s}$ | - | 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 |

TO-264 AA (IXFK)



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 UL 94 V-0, flammability classification
- miniBLOC, with Aluminium nitride isolation
- Low $R_{DS(on)}$ HDMOST™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
- Fast intrinsic Rectifier

Applications

- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- Temperature and lighting controls

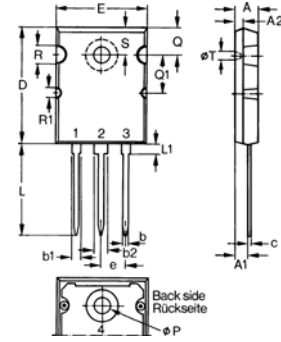
Advantages

- Easy to mount
- Space savings
- High power density

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|--|---|--------|--|
| | | min. | typ. | max. |
| V_{DSS} | $V_{GS} = 0\text{ V}$, $I_D = 3\text{ mA}$ V_{DSS} temperature coefficient | 800 | 0.096 | V %/K |
| $V_{GH(th)}$ | $V_{DS} = V_{GS}$, $I_D = 8\text{ mA}$ $V_{GS(th)}$ temperature coefficient | 2 | -0.214 | V %/K |
| I_{GSS} | $V_{GS} = \pm 20\text{ V}_{DC}$, $V_{DS} = 0$ | | | $\pm 200\text{ nA}$ |
| I_{DSS} | $V_{DS} = 0.8 \cdot V_{DSS}$, $T_J = 25^\circ\text{C}$ $V_{GS} = 0\text{ V}$, $T_J = 125^\circ\text{C}$ | | | 500 μA 2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10\text{ V}$, $I_D = 0.5 \cdot I_{D25}$ Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$ | | | 25N80 0.35 Ω 27N80 0.30 Ω |

| 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 | 16 | 28 | S |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | 7930 | 8400 | 9740 |
| C_{oss} | | 630 | 712 | 790 |
| C_{rss} | | 146 | 192 | 240 |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 1\ \Omega$ (External), | | 30 | ns |
| t_r | | | 80 | ns |
| $t_{d(off)}$ | | | 75 | ns |
| t_f | | | 40 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ | 320 | 350 | 400 |
| Q_{gs} | | 38 | 46 | 56 |
| Q_{gd} | | 120 | 130 | 142 |
| R_{thJC} | TO-264 AA | | 0.15 | 0.25 |
| R_{thCK} | TO-264 AA | | 0.15 | K/W |
| R_{thJC} | miniBLOC, SOT-227 B | | 0.05 | 0.24 |
| R_{thCK} | miniBLOC, SOT-227 B | | 0.05 | K/W |

TO-264 AA Outline

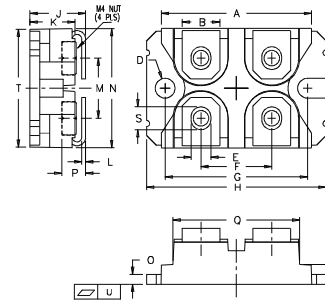


| Dim. | Millimeter | | Inches | |
|------|------------|-------|---------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.82 | 5.13 | .190 | .202 |
| A1 | 2.54 | 2.89 | .100 | .114 |
| A2 | 2.00 | 2.10 | .079 | .083 |
| b | 1.12 | 1.42 | .044 | .056 |
| b1 | 2.39 | 2.69 | .094 | .106 |
| b2 | 2.90 | 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 | 5.46BSC | | .215BSC | |
| 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 |

Source-Drain Diode

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|----------|---|---|------|--------------------|
| | | min. | typ. | max. |
| I_S | $V_{GS} = 0\text{ V}$ | 27N80 25N80 | | 27 25 |
| I_{SM} | Repetitive; pulse width limited by T_{JM} | 27N80 25N80 | | 108 100 |
| 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 |
| t_{rr} | $I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$ | $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ | | 250 400 |
| Q_{RM} | | $T_J = 25^\circ\text{C}$ | 2 | ns |
| I_{RM} | | | 17 | μC A |

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 |

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

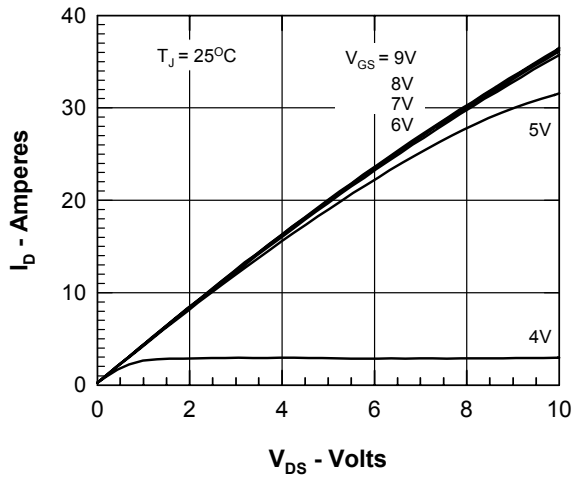


Figure 1. Output Characteristics at 25°C

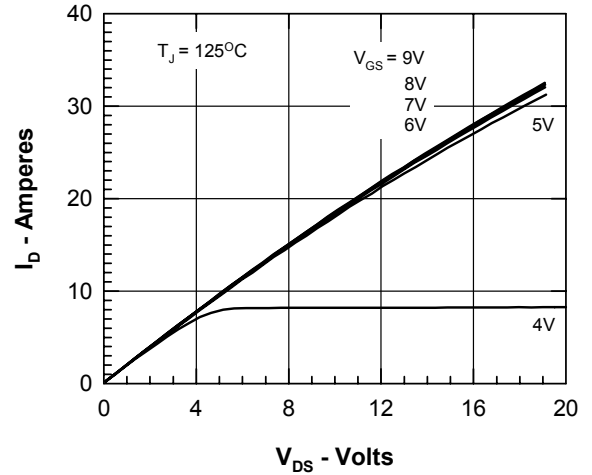


Figure 2. Output Characteristics at 125°C

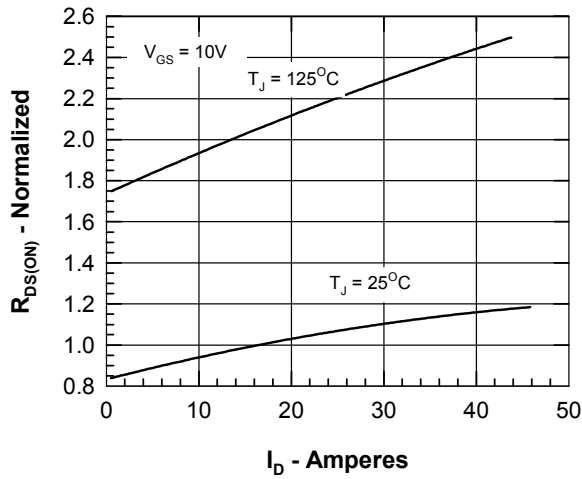
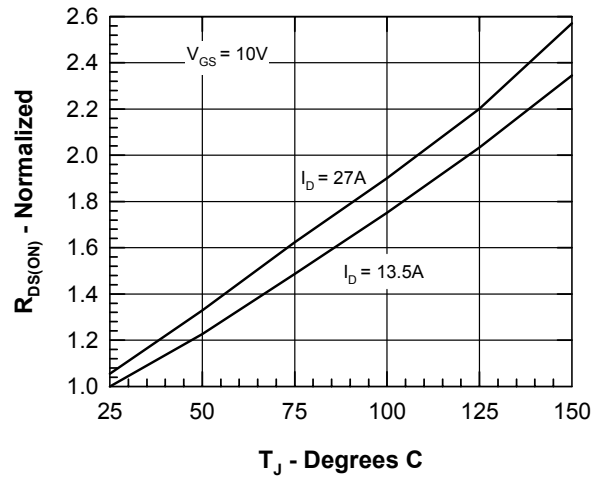
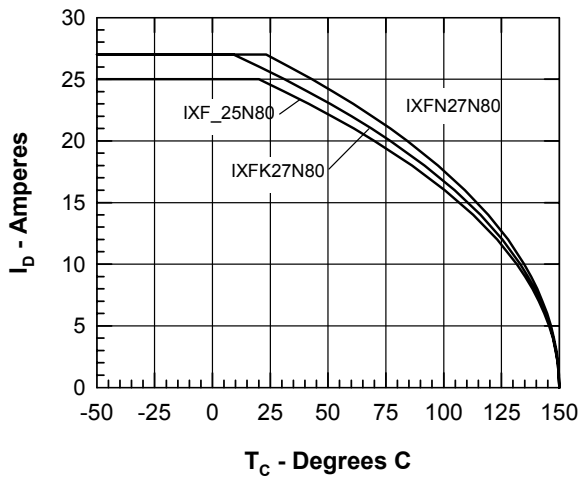

 Figure 3. $R_{DS(on)}$ normalized to $0.5 I_{D25}$ value vs. I_D

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


Figure 5. Drain Current vs. Case Temperature

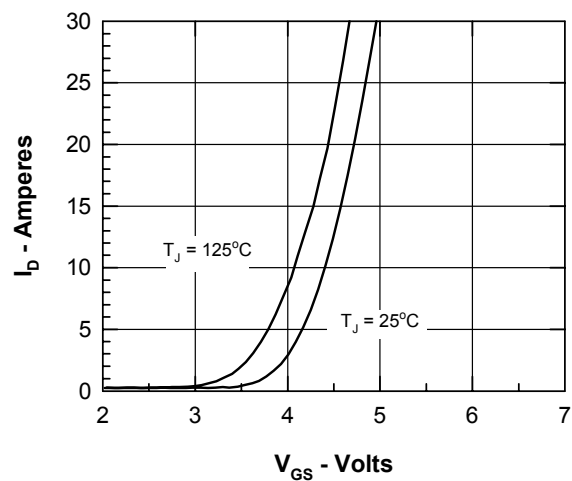


Figure 6. Admittance Curves

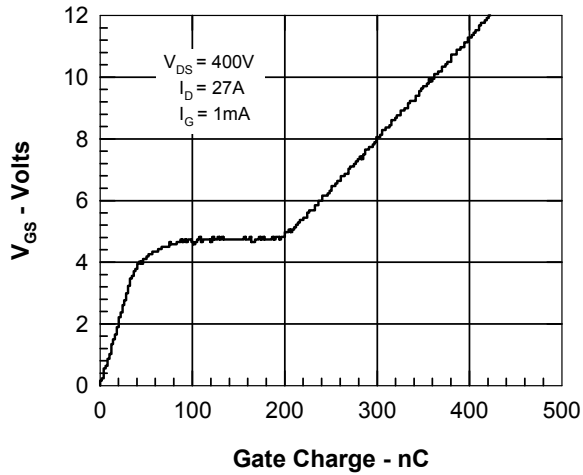


Figure 7. Gate Charge

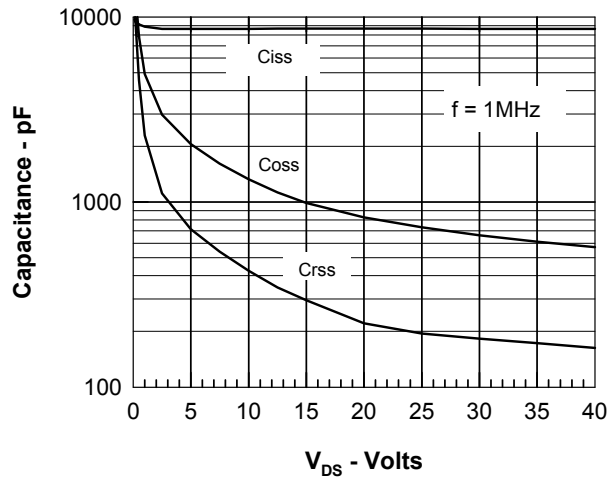


Figure 8. Capacitance Curves

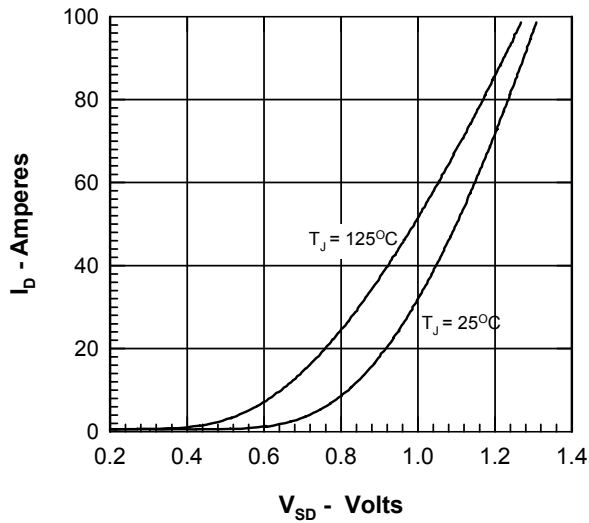


Figure 9. Forward Voltage Drop of the Intrinsic Diode

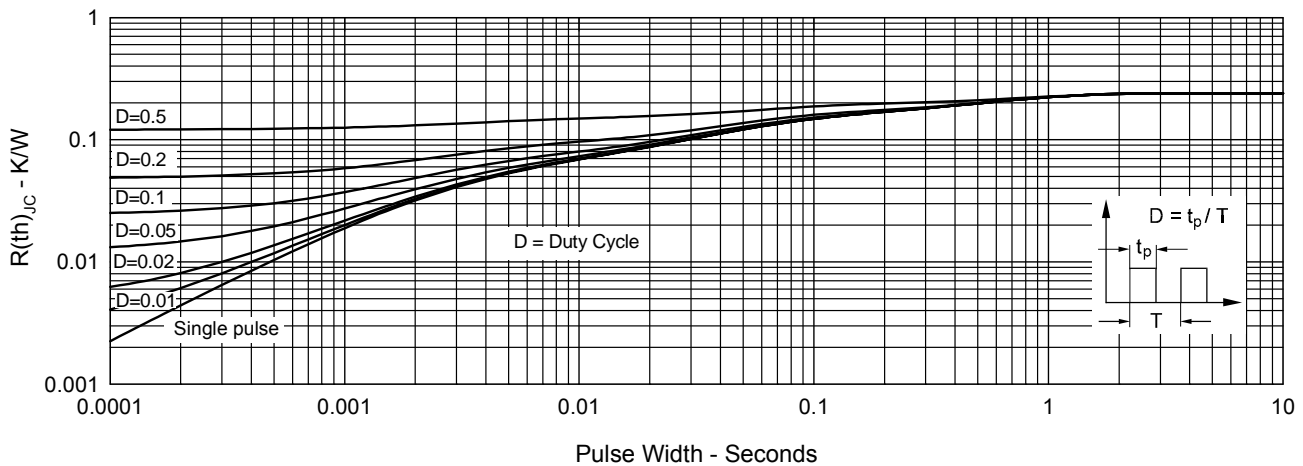


Figure 10. Transient Thermal Resistance



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