

HiPerFET™ Power MOSFET

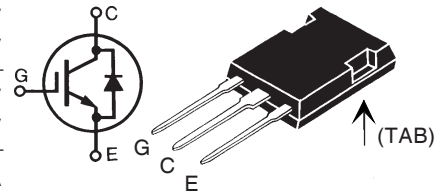
IXFK 55N50
IXFX 55N50
IXFN 55N50

V_{DSS} = 500 V
I_{D25} = 55 A
R_{DS(on)} = 90mΩ
t_{rr} ≤ 250 ns

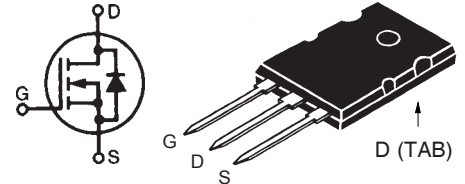
Single Die MOSFET

| Symbol | Test Conditions | Maximum Ratings | |
|-------------------|---|-----------------------------------|--------------------------|
| V _{DSS} | T _J = 25°C to 150°C | 500 | V |
| V _{DGR} | T _J = 25°C to 150°C | 500 | V |
| V _{GSS} | Continuous | ±20 | V |
| V _{GSM} | Transient | ±30 | V |
| I _{D25} | T _C = 25°C | 55 | A |
| I _{DM} | T _C = 25°C, pulse width limited by T _{JM} | 220 | A |
| I _{AR} | T _C = 25°C | 55 | A |
| E _{AR} | T _C = 25°C | 60 | mJ |
| dv/dt | I _S ≤ I _{DM} , di/dt ≤ 100 A/μs, V _{DD} ≤ V _{DSS} T _J ≤ 150°C, R _G = 4 Ω | 10 | V/ns |
| P _D | T _C = 25°C | 625 | W |
| T _J | | -55 ... +150 | °C |
| T _{JM} | | 150 | °C |
| T _{stg} | | -55 ... +150 | °C |
| T _L | 1.6 mm (0.062 in.) from case for 10 s (IXFK, IXFX) | 300 | °C |
| M _d | Mounting torque (IXFK, IXFX) Terminal leads (IXFN) | 1.13/10 1.13/10 | Nm/lb.in. Nm/lb.in. |
| V _{ISOL} | 50/60 Hz, RMS I _{ISOL} ≤ 1 mA | (IXFN) t = 1 minute t = 1 s | 2500 3000 V~ V~ |
| Weight | PLUS247 TO-264 SOT-227B | 5 10 30 | g g g |

PLUS247(IXFX)

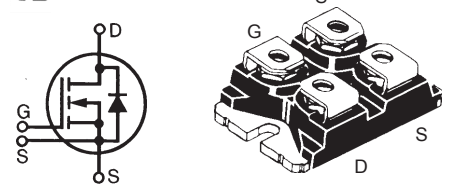


TO-264 AA (IXFK)



miniBLOC, SOT-227 B (IXFN)

E153432



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

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

Features

- International standard packages
- Encapsulating epoxy meets 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

Advantages

- PLUS247 package for clip or spring bar mounting
- Easy to mount
- Space savings
- High power density

| Symbol | Test Conditions (T _J = 25°C, unless otherwise specified) | Characteristic Values | | |
|---------------------|---|-----------------------|------|---------------|
| | | Min. | Typ. | Max. |
| V _{DSS} | V _{GS} = 0 V, I _D = 1 mA | 500 | | V |
| V _{GS(th)} | V _{DS} = V _{GS} , I _D = 8 mA | 2.5 | | 4.5 V |
| I _{GSS} | V _{GS} = ±20 V _{DC} , V _{DS} = 0 | | | ±200 nA |
| I _{DSS} | V _{DS} = V _{DSS} V _{GS} = 0 V T _J = 125°C | | | 25 μA 2 mA |
| R _{DS(on)} | V _{GS} = 10 V, I _D = 0.5 I _{D25} Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 % | | | 90 mΩ |

| Symbol | Test Conditions | Characteristic Values | | |
|--------------|--|-----------------------|------|------|
| | | Min. | Typ. | Max. |
| g_{fs} | $V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$ Note 1 | | 45 | S |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 9400 | pF |
| C_{oss} | | 1280 | pF | |
| C_{rss} | | 460 | 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), | | 45 | ns |
| t_r | | | 60 | ns |
| $t_{d(off)}$ | | | 120 | ns |
| t_f | | | 45 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ | | 330 | nC |
| Q_{gs} | | | 55 | nC |
| Q_{gd} | | | 155 | nC |
| R_{thJC} | IXFK, IXFX | | 0.20 | K/W |
| R_{thCK} | | 0.15 | K/W | |
| R_{thCK} | | 0.05 | K/W | |

Source-Drain Diode

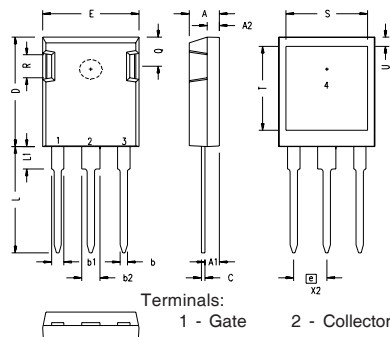
($T_J = 25^\circ\text{C}$, unless otherwise specified)

| Symbol | Test Conditions | Characteristic Values | | |
|----------|--|-----------------------|------|---------------|
| | | Min. | Typ. | Max. |
| I_s | $V_{GS} = 0$ | | | 55 A |
| I_{SM} | Repetitive; pulse width limited by T_{JM} | | | 220 A |
| V_{SD} | $I_F = 100\text{ A}, V_{GS} = 0\text{ V}$ Note 1 | | | 1.5 V |
| t_{rr} | $I_F = 25\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$ | | | 250 ns |
| Q_{RM} | | 1.0 | | μC |
| I_{RM} | | 10 | | A |

Notes: 1. Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$

PLUS247 Outline

| SYM | INCHES | | MILLIMETERS | |
|-----|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .190 | .205 | 4.83 | 5.21 |
| A1 | .090 | .100 | 2.29 | 2.54 |
| A2 | .075 | .085 | 1.91 | 2.16 |
| b | .045 | .055 | 1.14 | 1.40 |
| b1 | .075 | .084 | 1.91 | 2.13 |
| b2 | .115 | .123 | 2.92 | 3.12 |
| C | .024 | .031 | 0.61 | 0.80 |
| D | .819 | .840 | 20.80 | 21.34 |
| E | .620 | .635 | 15.75 | 16.13 |
| e | .215 BSC | | 5.45 BSC | |
| L | .780 | .800 | 19.81 | 20.32 |
| L1 | .150 | .170 | 3.81 | 4.32 |
| Q | .220 | .244 | 5.59 | 6.20 |
| R | .170 | .190 | 4.32 | 4.83 |
| S | .520 | .540 | 13.21 | 13.72 |
| T | .620 | .640 | 15.75 | 16.26 |
| U | .065 | .080 | 1.65 | 2.03 |

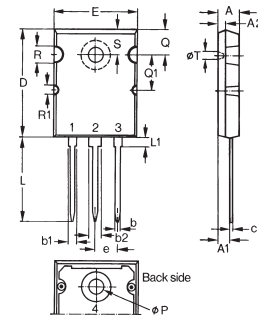


IXYS reserves the right to change limits, test conditions, and dimensions.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

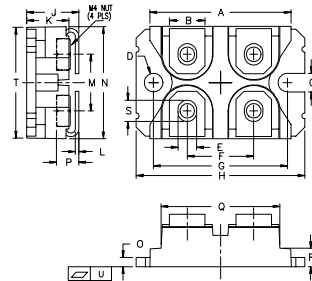
| | | | | | |
|-----------|-----------|-----------|-----------|--------------|-------------|
| 4,835,592 | 4,931,844 | 5,049,961 | 5,237,481 | 6,162,665 | 6,404,065B1 |
| 4,850,072 | 5,017,508 | 5,063,307 | 5,381,025 | 6,259,123B1 | 6,534,343 |
| 4,881,106 | 5,034,796 | 5,187,117 | 5,486,715 | 6,306,728 B1 | 6,583,505 |

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-227B) Outline



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 |

6,683,344
6,710,405B2
6,710,463

6,727,585
6,759,692

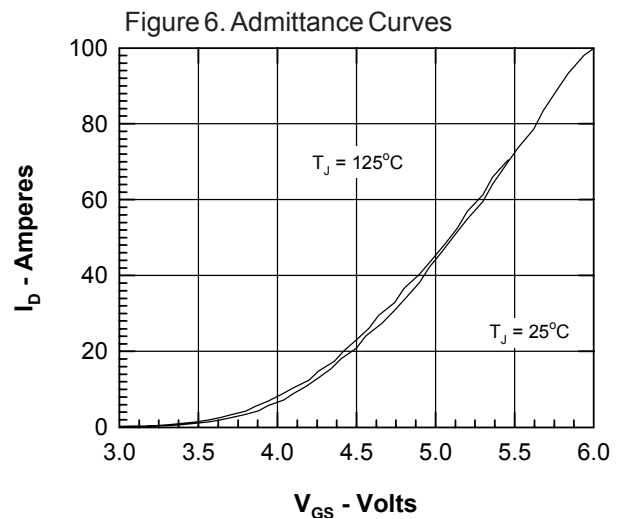
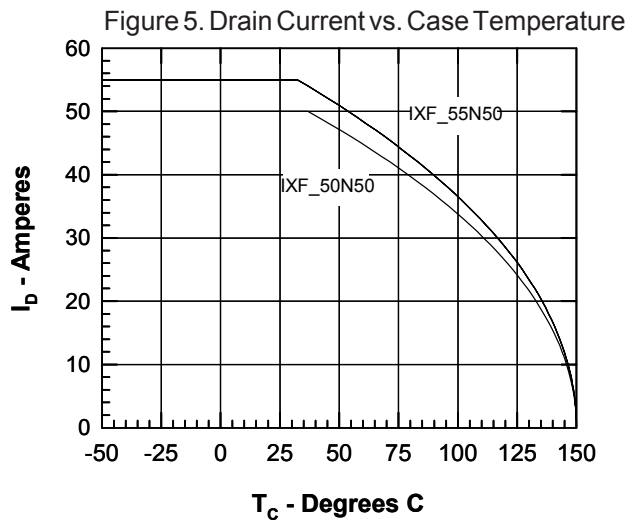
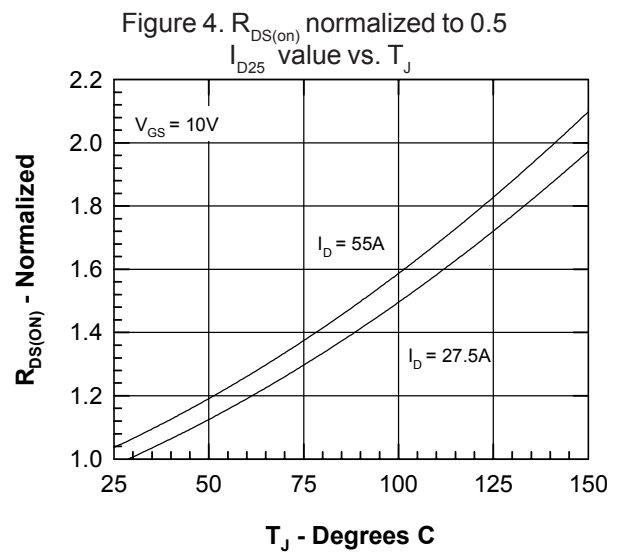
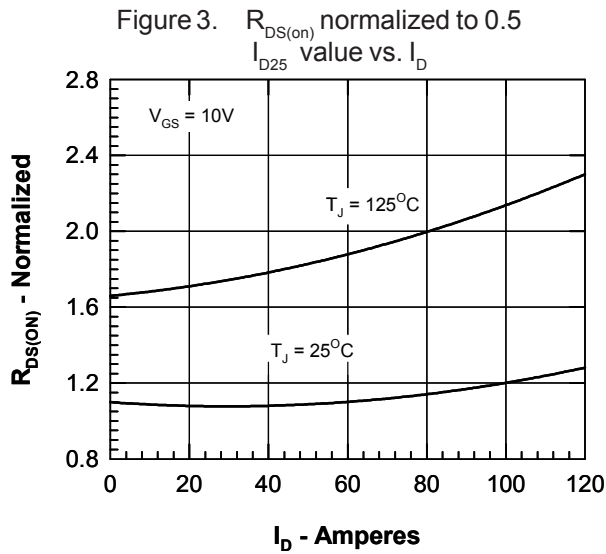
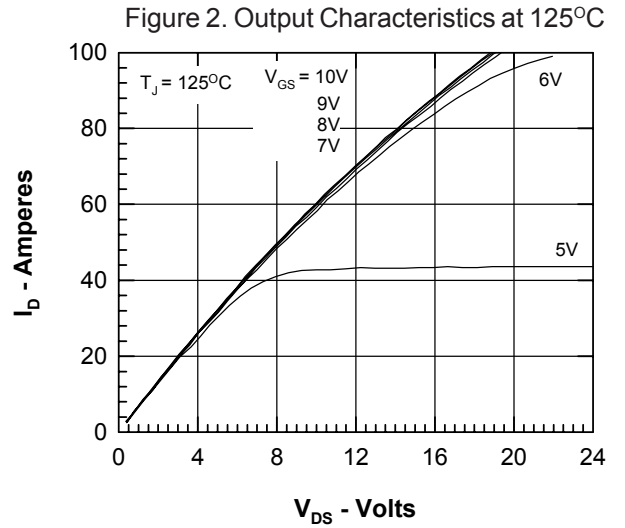
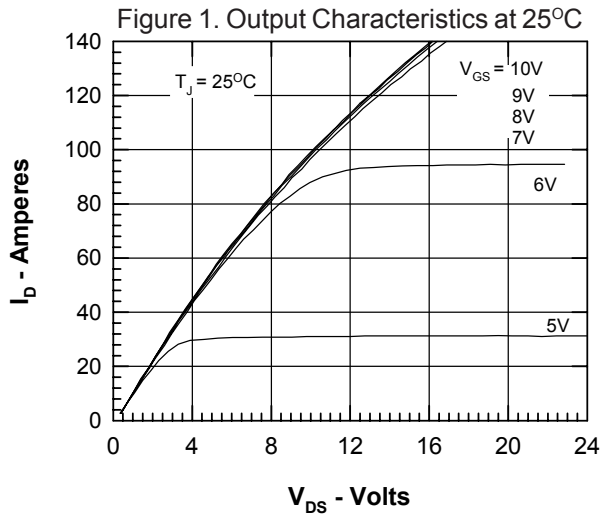


Figure 7. Gate Charge

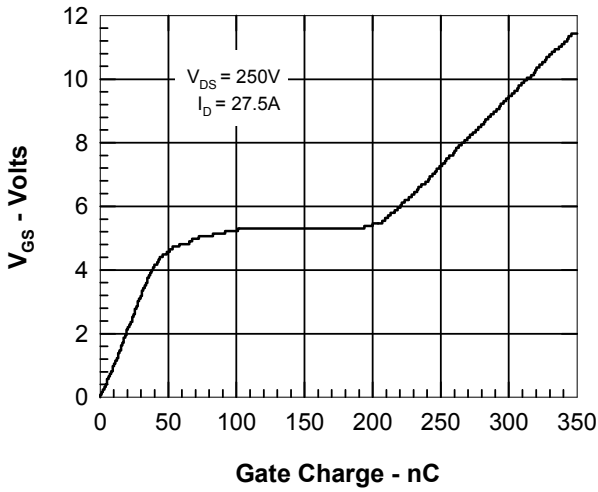


Figure 8. Capacitance Curves

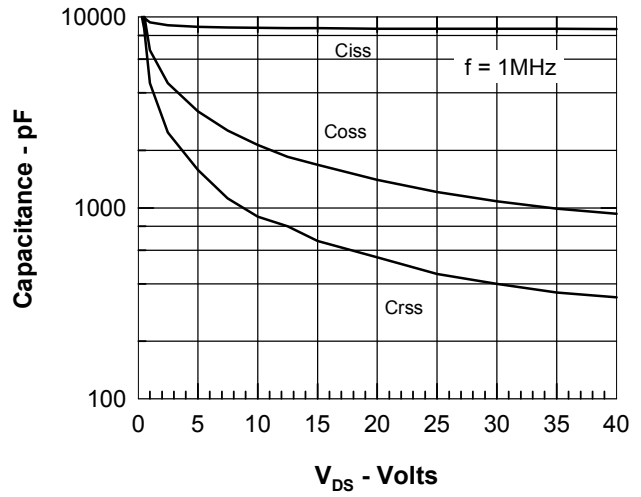


Figure 9. Forward Voltage Drop of the Intrinsic Diode

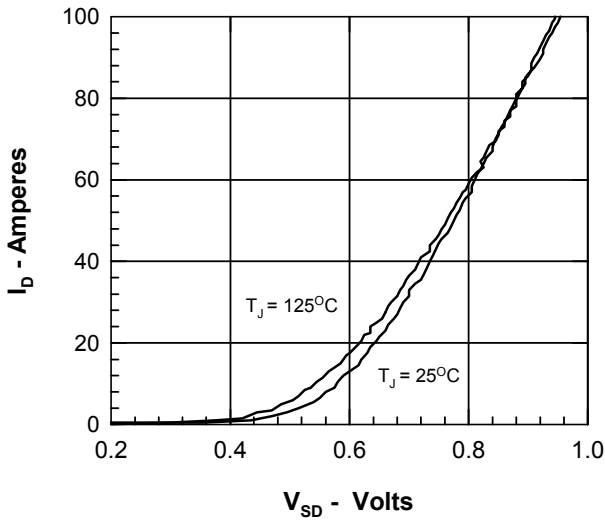


Figure 10. Transient Thermal Resistance

