

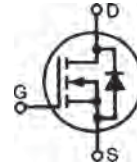
HiPerFET™ Power MOSFETs

IXFX 120N20
IXFK 120N20

$V_{DSS} = 200\text{ V}$
 $I_{D25} = 120\text{ A}$
 $R_{DS(on)} = 17\text{ m}\Omega$

Single MOSFET Die

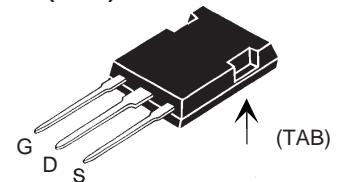
Preliminary data sheet



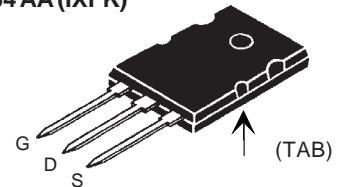
$t_{rr} \leq 250\text{ ns}$

| Symbol | Test Conditions | Maximum Ratings | |
|------------|---|-----------------|------------------|
| V_{DSS} | $T_J = 25^\circ\text{C}$ to 150°C | 200 | V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1\text{ M}\Omega$ | 200 | V |
| V_{GS} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ (MOSFET chip capability) | 120 | A |
| I_{D104} | $T_C = 104^\circ\text{C}$ (External lead capability) | 76 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, pulse width limited by T_{JM} | 480 | A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 120 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 64 | mJ |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 3 | J |
| dv/dt | $I_S \leq I_{DM}$, $di/dt \leq 100\text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$ $T_J \leq 150^\circ\text{C}$, $R_G = 2\ \Omega$ | 15 | V/ns |
| P_D | $T_C = 25^\circ\text{C}$ | 560 | 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 | $^\circ\text{C}$ |
| M_d | Mounting torque | TO-264 | 0.9/6 Nm/b.in. |
| Weight | | PLUS 247 | 6 g |
| | | TO-264 | 10 g |

PLUS 247™ (IXFX)



TO-264 AA (IXFK)



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

Features

- International standard packages
- Low $R_{DS(on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
- easy to drive and to protect
- Fast intrinsic rectifier

Applications

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

Advantages

- PLUS 247™ package for clip or spring mounting
- Space savings
- High power density

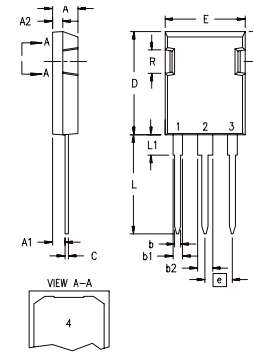
| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|--|---|------|---------------------|
| | | min. | typ. | max. |
| V_{DSS} | $V_{GS} = 0\text{ V}$, $I_D = 3\text{ mA}$ | 200 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 8\text{ mA}$ | 2.0 | | 4.0 V |
| I_{GSS} | $V_{GS} = \pm 20\text{ V}$, $V_{DS} = 0$ | | | $\pm 200\text{ nA}$ |
| I_{DSS} | $V_{DS} = V_{DSS}$ $V_{GS} = 0\text{ V}$ | $T_J = 25^\circ\text{C}$ | | 100 μA |
| | | $T_J = 125^\circ\text{C}$ | | 2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10\text{ V}$, $I_D = 0.5 \cdot I_{D25}$ Note 1 | | | 17 m Ω |

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

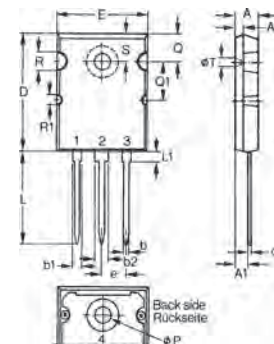
| Symbol | Test Conditions | Characteristic Values | | | |
|---------------------------|--|---|------|------|-----|
| | | (T _J = 25°C, unless otherwise specified) | | | |
| | | min. | typ. | max. | |
| g_{fs} | V _{DS} = 10 V; I _D = 0.5 • I _{D25} Note 1 | 40 | 77 | | S |
| C_{iss} | V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz | | 9100 | | pF |
| C_{oss} | | | 2200 | | pF |
| C_{rss} | | | 1000 | | 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), | | 40 | | ns |
| t_r | | | 65 | | ns |
| t_{d(off)} | | | 110 | | ns |
| t_f | | | 35 | | ns |
| Q_{g(on)} | V _{GS} = 10 V, V _{DS} = 0.5 • V _{DSS} ; I _D = 0.5 • I _{D25} | | 300 | | nC |
| Q_{gs} | | | 50 | | nC |
| Q_{gd} | | | 170 | | nC |
| R_{thJC} | | | 0.22 | | K/W |
| R_{thCK} | | 0.15 | | | K/W |

| Symbol | Test Conditions | Characteristic Values | | | |
|-----------------------|---|---|------|------|----|
| | | (T _J = 25°C, unless otherwise specified) | | | |
| | | min. | typ. | max. | |
| I_S | V _{GS} = 0 V | | | 120 | A |
| I_{SM} | Repetitive; pulse width limited by T _{JM} | | | 480 | A |
| V_{SD} | I _F = I _S , V _{GS} = 0 V, Note 1 | | | 1.5 | V |
| t_{rr} | I _F = 50A, -di/dt = 100 A/μs, V _R = 100 V | | | 250 | ns |
| Q_{RM} | | | 0.8 | | μC |
| I_{RM} | | | 8 | | A |

Note: 1. Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %

PLUS247™ (IXFX) Outline


| Dim. | Millimeter | | Inches | |
|----------------|------------|-------|----------|------|
| | Min. | Max. | Min. | Max. |
| A | 4.83 | 5.21 | .190 | .205 |
| A ₁ | 2.29 | 2.54 | .090 | .100 |
| A ₂ | 1.91 | 2.16 | .075 | .085 |
| b | 1.14 | 1.40 | .045 | .055 |
| b ₁ | 1.91 | 2.13 | .075 | .084 |
| b ₂ | 2.92 | 3.12 | .115 | .123 |
| C | 0.61 | 0.80 | .024 | .031 |
| D | 20.80 | 21.34 | .819 | .840 |
| E | 15.75 | 16.13 | .620 | .635 |
| e | 5.45 BSC | | .215 BSC | |
| L | 19.81 | 20.32 | .780 | .800 |
| L ₁ | 3.81 | 4.32 | .150 | .170 |
| Q | 5.59 | 6.20 | .220 | .244 |
| R | 4.32 | 4.83 | .170 | .190 |

TO-264 AA Outline


| Dim. | Millimeter | | Inches | |
|----------------|------------|-------|----------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.82 | 5.13 | .190 | .202 |
| A ₁ | 2.54 | 2.89 | .100 | .114 |
| A ₂ | 2.00 | 2.10 | .079 | .083 |
| b | 1.12 | 1.42 | .044 | .056 |
| b ₁ | 2.39 | 2.69 | .094 | .106 |
| b ₂ | 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 |
| L ₁ | 2.29 | 2.59 | .090 | .102 |
| P | 3.17 | 3.66 | .125 | .144 |
| Q | 6.07 | 6.27 | .239 | .247 |
| Q ₁ | 8.38 | 8.69 | .330 | .342 |
| R | 3.81 | 4.32 | .150 | .170 |
| R ₁ | 1.78 | 2.29 | .070 | .090 |
| S | 6.04 | 6.30 | .238 | .248 |
| T | 1.57 | 1.83 | .062 | .072 |

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Fig. 1. Output Characteristics at 25°C

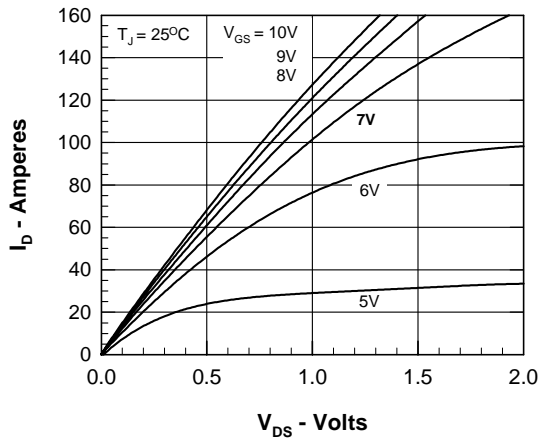


Fig. 2. Output Characteristics at 125°C

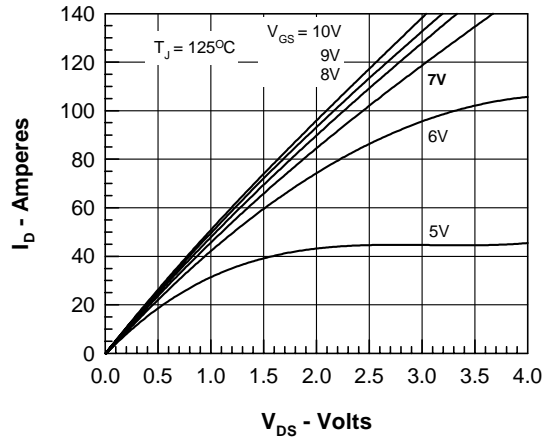


Fig. 3. $R_{DS(ON)}$ vs. Drain Current

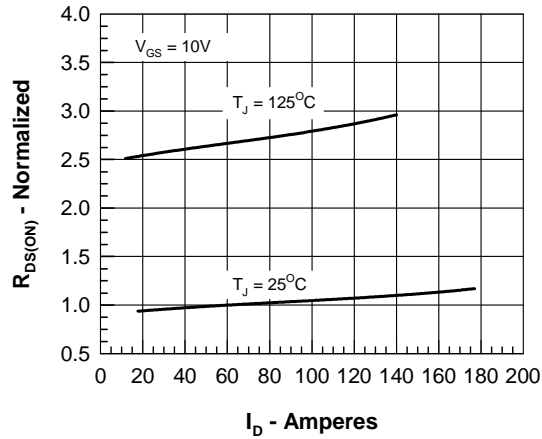


Fig. 4. $R_{DS(ON)}$ vs. T_J

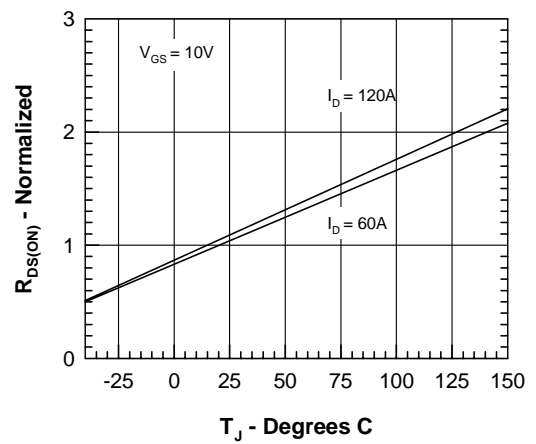


Fig. 5. Drain vs. Case Temperature

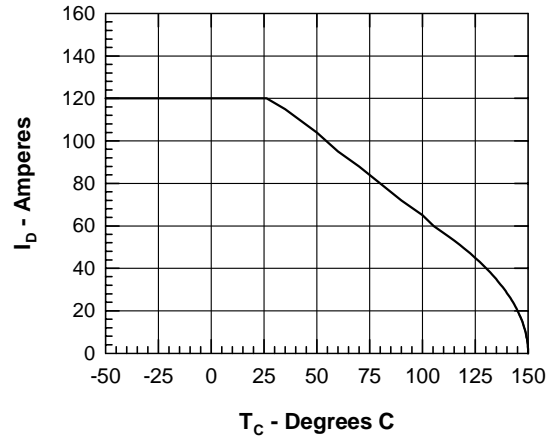


Fig. 6. Admittance Curves

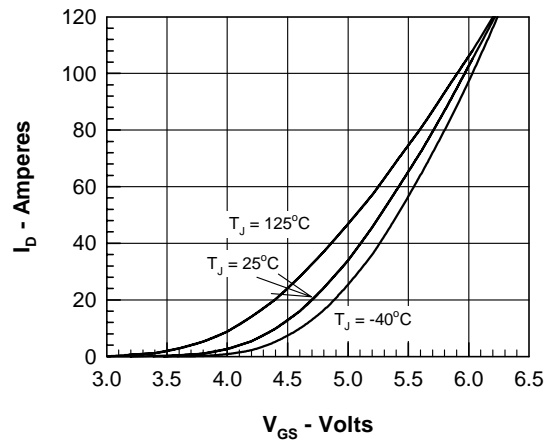


Fig. 7. Gate Charge Characteristic Curve

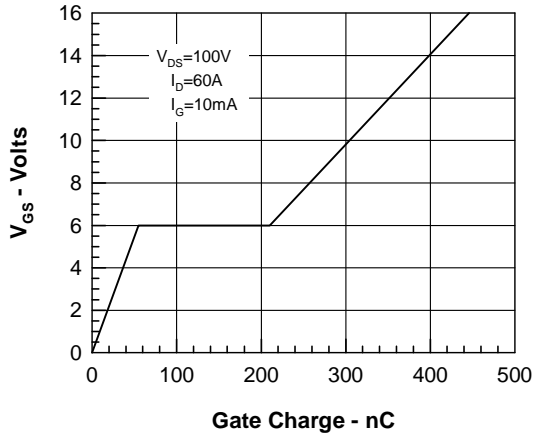


Fig. 8. Capacitance Curves

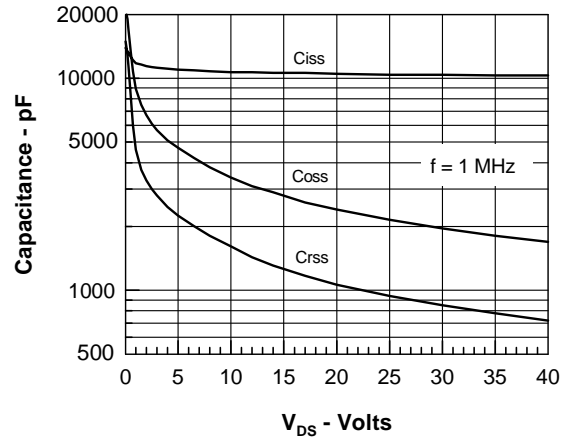


Fig. 9. Source Current vs. Source to Drain Voltage

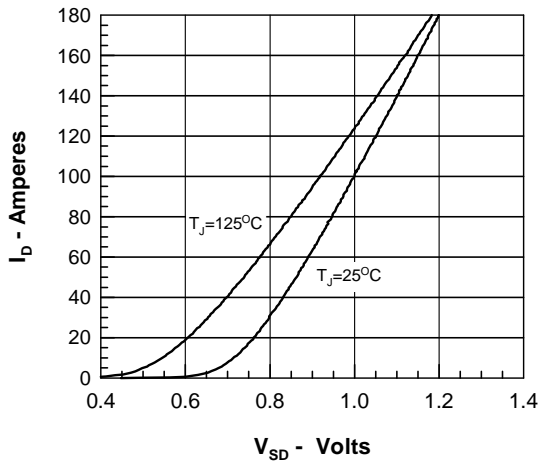
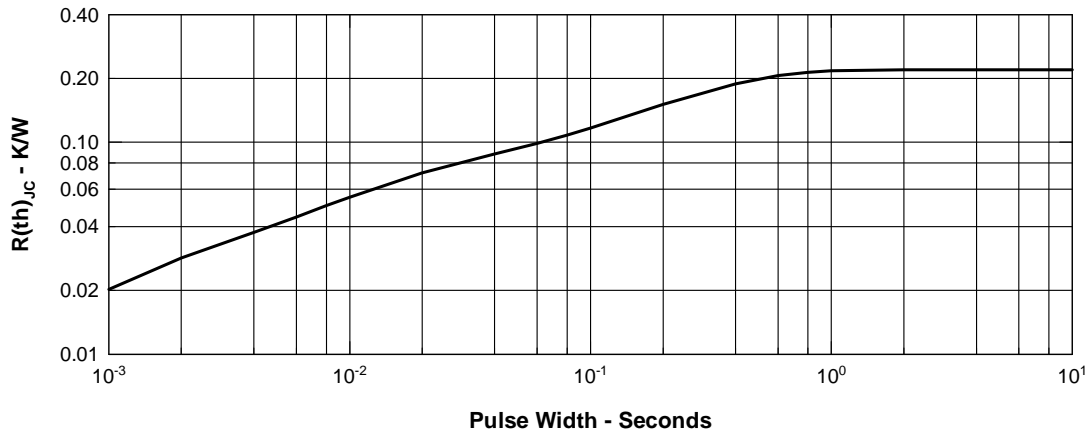


Fig. 10. Maximum Thermal Impedance





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