IXYS

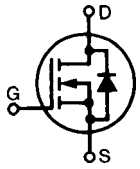
# High Current MegaMOS™FET

**IXTK 33N50**

$V_{DSS}$ = 500 V
$I_{D(cont)}$ = 33 A
$R_{DS(on)}$ = 0.17 Ω

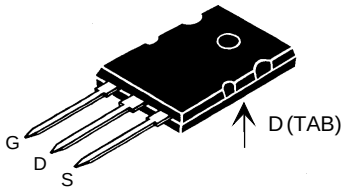
## N-Channel Enhancement Mode

Preliminary data




| 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; $R_{GS}$ = 1.0 MΩ | 500 | V |
| $V_{GS}$ | Continuous | ±20 | V |
| $V_{GSM}$ | Transient | ±30 | V |
| $I_{D25}$ | $T_C$ = 25°C | 33 | A |
| $I_{DM}$ | $T_C$ = 25°C, pulse width limited by $T_{JM}$ | 132 | A |
| $P_D$ | $T_C$ = 25°C | 416 | W |
| $T_J$ | | -55 ... +150 | °C |
| $T_{JM}$ | | 150 | °C |
| $T_{stg}$ | | -55 ... +150 | °C |
| Md | Mounting torque | 1.13/10 | Nm/lb.in. |
| **Weight** | | 10 | g |
| Max lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s | | 300 | °C |

**TO-264 AA**




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

| Symbol | Test Conditions ($T_J$ = 25°C unless otherwise specified) | | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|---|
| $V_{DSS}$ | $V_{GS}$ = 0 V, $I_D$ = 5 mA | | 500 | | | V |
| | $BV_{DSS}$ temperature coefficient | | | 0.087 | | %/K |
| $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250 µA | | 2.0 | | 4.0 | V |
| | $V_{GS(th)}$ temperature coefficient | | | -0.25 | | %/K |
| $I_{GSS}$ | $V_{GS}$ = ±20 V DC, $V_{DS}$ = 0 | | | | ±100 | nA |
| $I_{DSS}$ | $V_{DS}$ = 0.8 $V_{DSS}$ | $T_J$ = 25°C | | | 200 | µA |
| | $V_{GS}$ = 0 V | $T_J$ = 125°C | | | 3 | mA |
| $R_{DS(on)}$ | $V_{GS}$ = 10 V, $I_D$ = 0.5 $I_{D25}$ | | | | 0.17 | Ω |

### Features

- Low $R_{DS\ (on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- International standard package
- Fast switching times

### Applications

- Motor controls
- DC choppers
- Uninterruptable Power Supplies (UPS)
- Switch-mode and resonant-mode

### Advantages

- Easy to mount with one screw (isolated mounting screw hole)
- Space savings
- High power density

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

95513C (4/97)

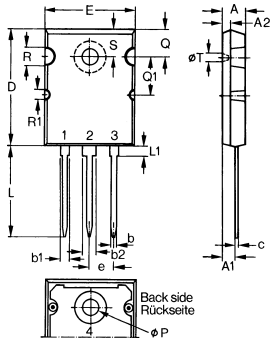
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| Symbol | Test Conditions ($T_J$ = 25°C unless otherwise specified) | Characteristic values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $g_{fs}$ | $V_{DS}$ = 10 V; $I_D$ = 0.5 $I_{D25}$, pulse test | | 24 | | S |
| $C_{iss}$ | $V_{GS}$ = 0 V, $V_{DS}$ = 25 V, f = 1 MHz | | 4900 | | pF |
| $C_{oss}$ | | | 690 | | pF |
| $C_{rss}$ | | | 300 | | 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) | | 53 | | ns |
| $t_r$ | | | 30 | | ns |
| $t_{d(off)}$ | | | 140 | | ns |
| $t_f$ | | | 40 | | ns |
| $Q_{g(on)}$ | $V_{GS}$ = 10 V, $V_{DS}$ = 0.5 $V_{DSS}$, $I_D$ = 0.5 $I_{D25}$ | | 250 | | nC |
| $Q_{gs}$ | | | 30 | | nC |
| $Q_{gd}$ | | | 115 | | nC |
| $R_{thJC}$ | | | | 0.30 | K/W |
| $R_{thCK}$ | | | 0.15 | | K/W |

**Source-Drain Diode** — **Ratings and Characteristics** ($T_J$ = 25°C unless otherwise specified)

| Symbol | Test Conditions | Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $I_S$ | $V_{GS}$ = 0 V | | | 33 | A |
| $I_{SM}$ | Repetitive; pulse width limited by $T_{JM}$ | | | 132 | A |
| $V_{SD}$ | $I_F$ = $I_S$, $V_{GS}$ = 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 | | 850 | | ns |

**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 |

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IXYS MOSFETS and IGBTs are covered by one or more of the following U.S. patents:
4,835,592 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715
4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025

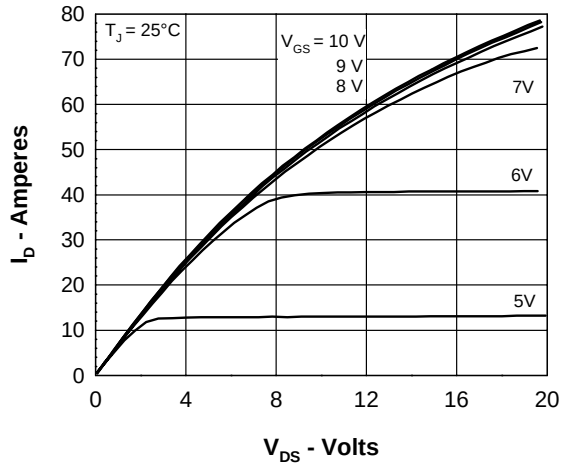



Figure 1. Output Characteristics at 25°C

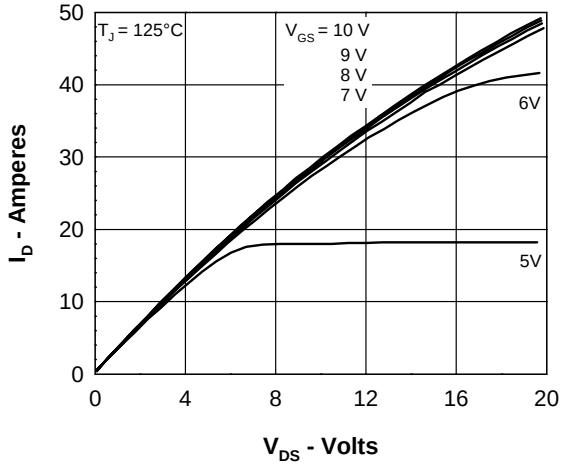



Figure 2. Output Characteristics at 125°C

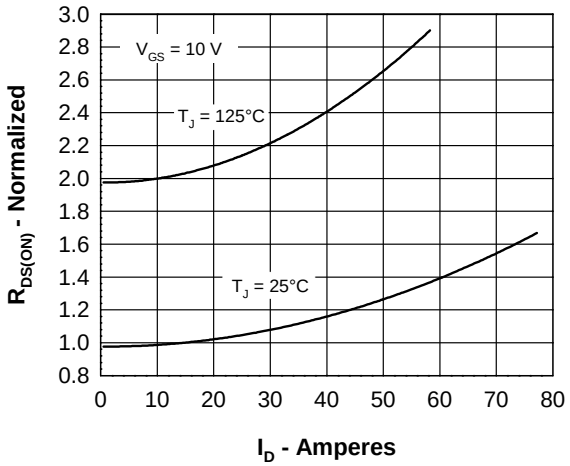



Figure 3. $R_{DS(on)}$ normalized to 16.5A/25°C vs. $I_D$

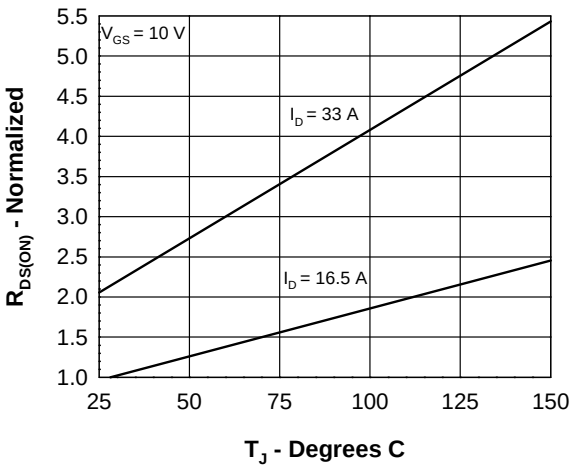



Figure 4. $R_{DS(on)}$ normalized to 16.5A/25°C vs. $T_J$

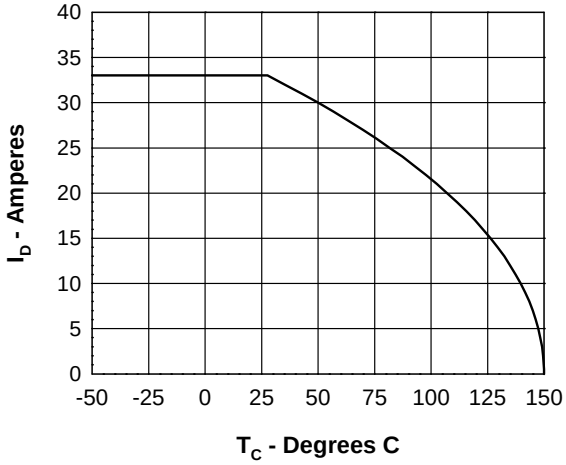



Figure 5. Drain Current vs. Case Temperature

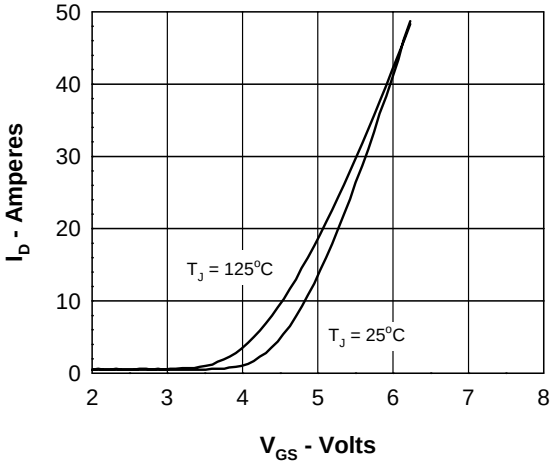



Figure 6. Admittance Curves

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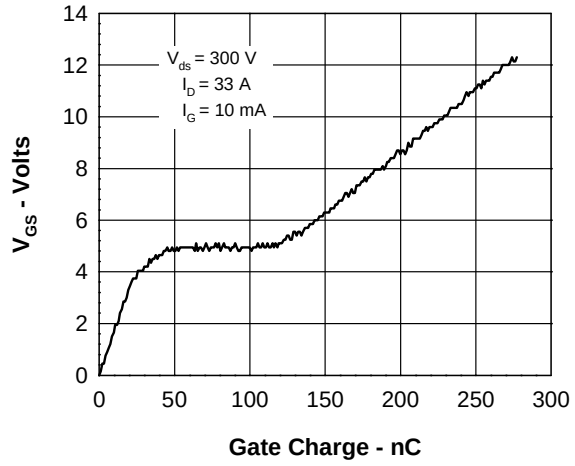



Figure 7. Gate Charge

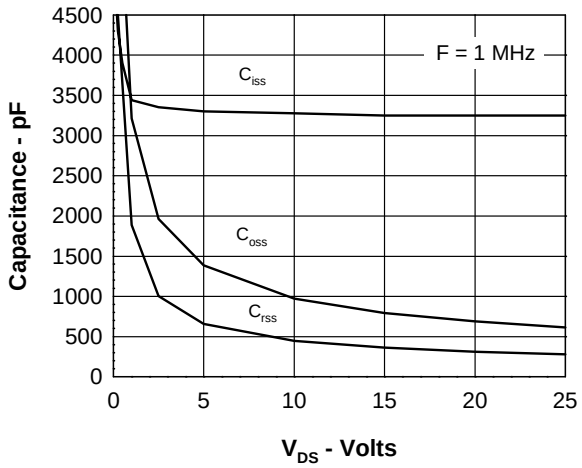



Figure 8. Capacitance Curves

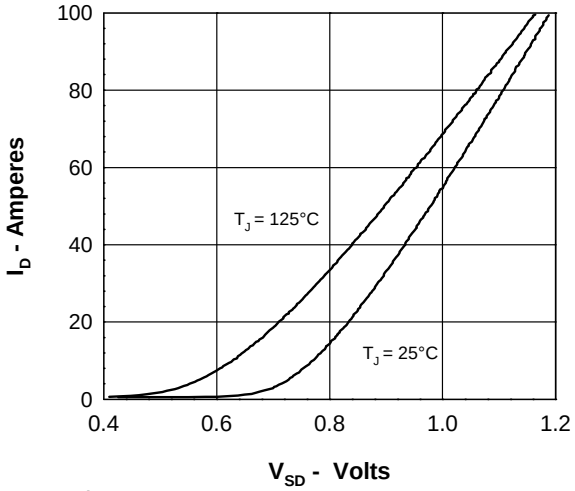



Figure 9. Source Current vs. Source-to-Drain Voltage

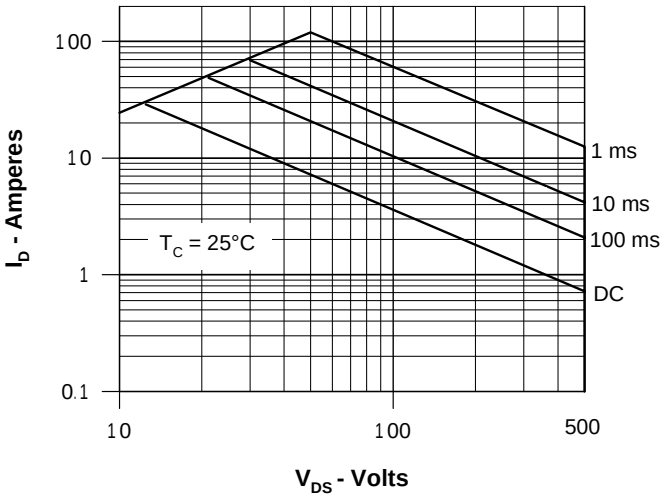



Figure 10. Forward Biased SOA

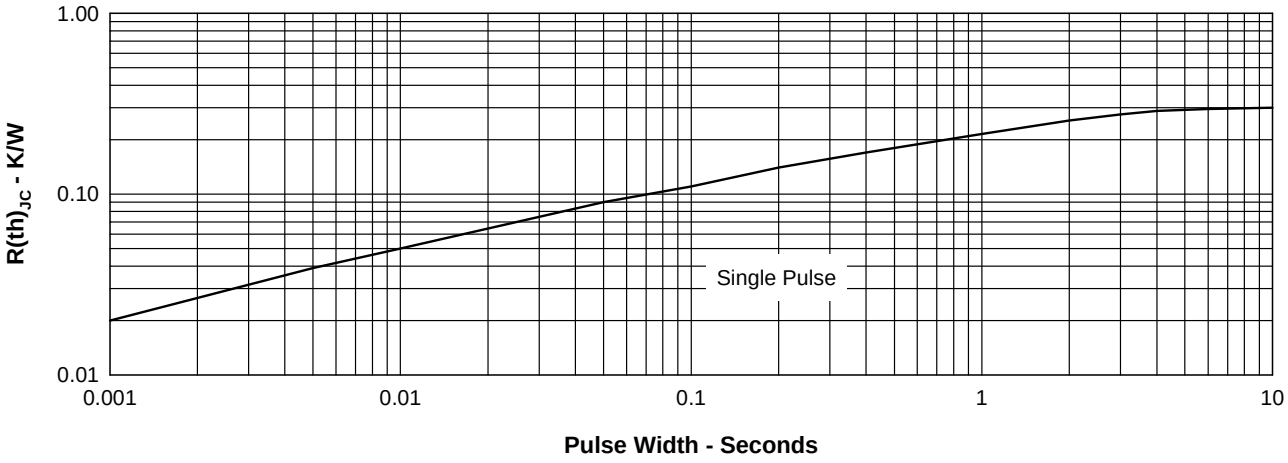



Figure 11. Transient Thermal Resistance

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