

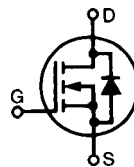
# High Current MegaMOS™FET

**IXTK 33N50**

$$\begin{aligned} V_{DSS} &= 500 \text{ V} \\ I_{D(\text{cont})} &= 33 \text{ A} \\ R_{DS(\text{on})} &= 0.17 \Omega \end{aligned}$$

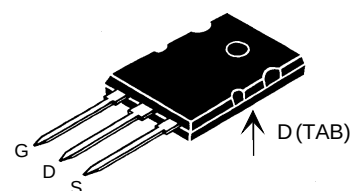
## N-Channel Enhancement Mode

Preliminary data



| Symbol                                                                      | Test conditions                                                              | Maximum ratings |                  |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$                                                                   | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$                               | 500             | V                |
| $V_{DGR}$                                                                   | $T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GS} = 1.0 \text{ M}\Omega$ | 500             | V                |
| $V_{GS}$                                                                    | Continuous                                                                   | $\pm 20$        | V                |
| $V_{GSM}$                                                                   | Transient                                                                    | $\pm 30$        | V                |
| $I_{D25}$                                                                   | $T_C = 25^\circ\text{C}$                                                     | 33              | A                |
| $I_{DM}$                                                                    | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$                   | 132             | A                |
| $P_D$                                                                       | $T_C = 25^\circ\text{C}$                                                     | 416             | W                |
| $T_J$                                                                       |                                                                              | -55 ... +150    | $^\circ\text{C}$ |
| $T_{JM}$                                                                    |                                                                              | 150             | $^\circ\text{C}$ |
| $T_{stg}$                                                                   |                                                                              | -55 ... +150    | $^\circ\text{C}$ |
| $M_d$                                                                       | Mounting torque                                                              | 1.13/10         | Nm/lb.in.        |
| <b>Weight</b>                                                               |                                                                              | 10              | g                |
| Max lead temperature for soldering<br>1.6 mm (0.062 in.) from case for 10 s |                                                                              | 300             | $^\circ\text{C}$ |

TO-264 AA



G = Gate  
S = Source

D = Drain  
TAB = Drain

| Symbol              | Test Conditions<br>( $T_J = 25^\circ\text{C}$ unless otherwise specified)               | Characteristic Values |       |                                                                                    |
|---------------------|-----------------------------------------------------------------------------------------|-----------------------|-------|------------------------------------------------------------------------------------|
|                     |                                                                                         | Min.                  | Typ.  | Max.                                                                               |
| $V_{DSS}$           | $V_{GS} = 0 \text{ V}, I_D = 5 \text{ mA}$<br>BV <sub>DSS</sub> temperature coefficient | 500                   | 0.087 | V<br>%/K                                                                           |
| $V_{GS(\text{th})}$ | $V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$<br>$V_{GS(\text{th})}$ temperature coefficient | 2.0                   | -0.25 | 4.0 V<br>%/K                                                                       |
| $I_{GSS}$           | $V_{GS} = \pm 20 \text{ V DC}, V_{DS} = 0$                                              |                       |       | $\pm 100 \text{ nA}$                                                               |
| $I_{DSS}$           | $V_{DS} = 0.8 V_{DSS}$<br>$V_{GS} = 0 \text{ V}$                                        |                       |       | $T_J = 25^\circ\text{C}$<br>$T_J = 125^\circ\text{C}$<br>200 $\mu\text{A}$<br>3 mA |
| $R_{DS(\text{on})}$ | $V_{GS} = 10 \text{ V}, I_D = 0.5 I_{D25}$                                              |                       |       | 0.17 $\Omega$                                                                      |

### Features

- Low  $R_{DS(\text{on})}$  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

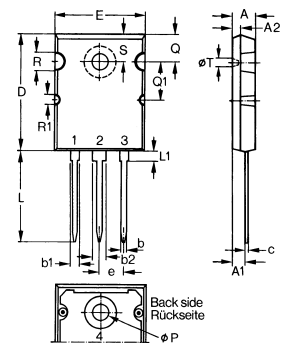
| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ unless otherwise specified)                       | Characteristic values |      |          |
|--------------|-------------------------------------------------------------------------------------------------|-----------------------|------|----------|
|              |                                                                                                 | Min.                  | Typ. | Max.     |
| $g_{fs}$     | $V_{DS} = 10\text{ V}; I_D = 0.5 I_{D25}$ , pulse test                                          |                       | 24   | S        |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$                                   |                       | 4900 | pF       |
| $C_{oss}$    |                                                                                                 |                       | 690  | pF       |
| $C_{rss}$    |                                                                                                 |                       | 300  | pF       |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$<br>$R_G = 1\ \Omega$ (External) |                       | 53   | ns       |
| $t_r$        |                                                                                                 |                       | 30   | ns       |
| $t_{d(off)}$ |                                                                                                 |                       | 140  | ns       |
| $t_f$        |                                                                                                 |                       | 40   | ns       |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$                                 |                       | 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 ( $T_J = 25^\circ\text{C}$ unless otherwise specified)

| Symbol   | Test Conditions                                                                                       | Min. | Typ. | Max.  |
|----------|-------------------------------------------------------------------------------------------------------|------|------|-------|
| $I_S$    | $V_{GS} = 0\text{ V}$                                                                                 |      |      | 33 A  |
| $I_{SM}$ | Repetitive; pulse width limited by $T_{JM}$                                                           |      |      | 132 A |
| $V_{SD}$ | $I_F = I_S, V_{GS} = 0\text{ V}$ ,<br>Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$ |      |      | 1.5 V |
| $t_{rr}$ | $I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$                                    |      | 850  | ns    |

### 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  |

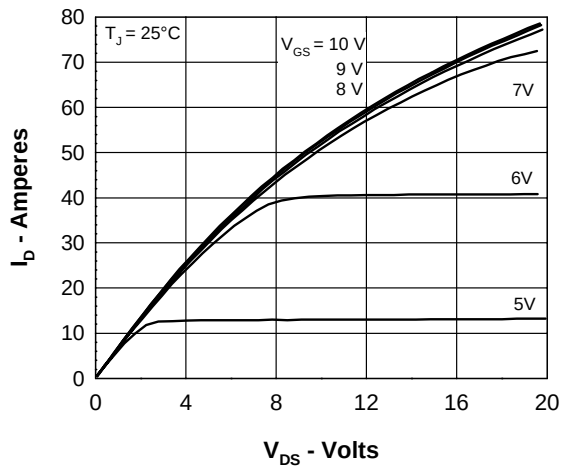


Figure 1. Output Characteristics at 25°C

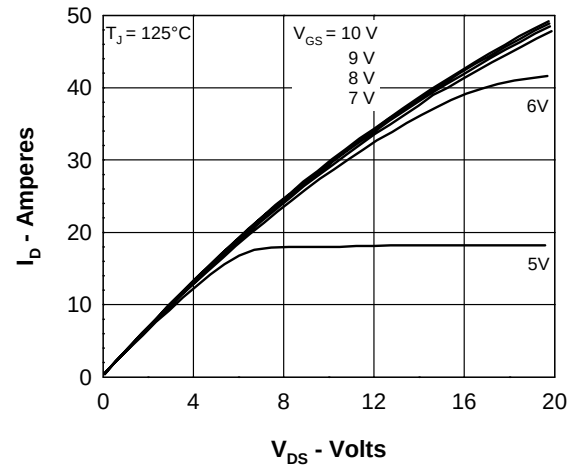


Figure 2. Output Characteristics at 125°C

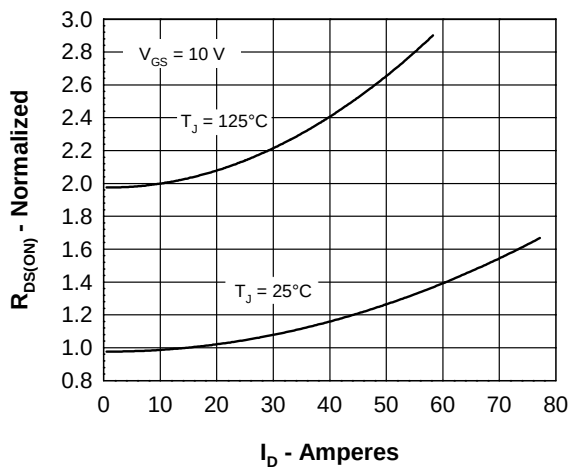
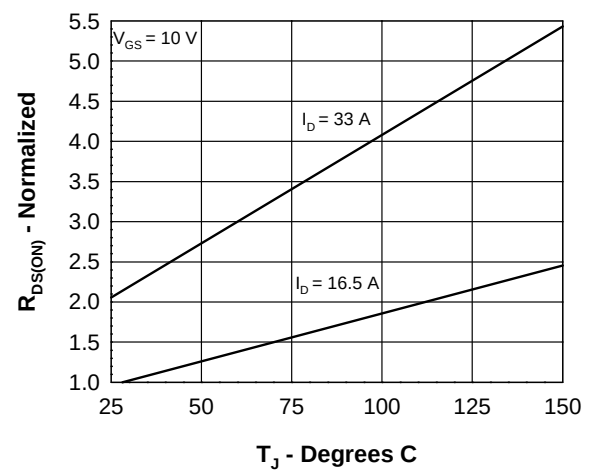
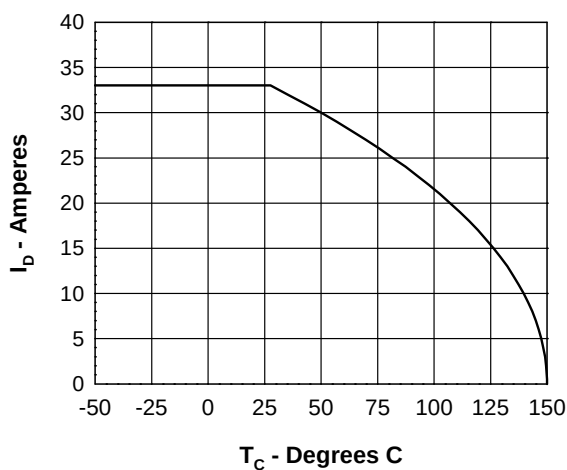

Figure 3.  $R_{DS(on)}$  normalized to 16.5A/25°C vs.  $I_D$ 

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


Figure 5. Drain Current vs. Case Temperature

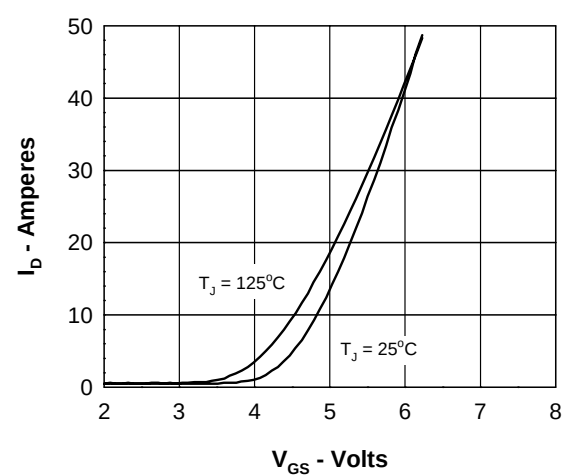


Figure 6. Admittance Curves

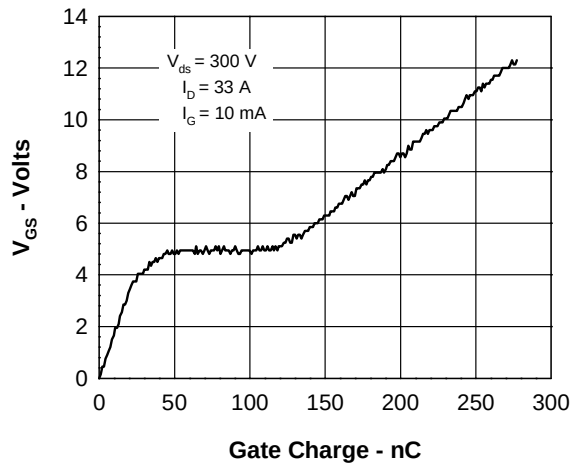


Figure 7. Gate Charge

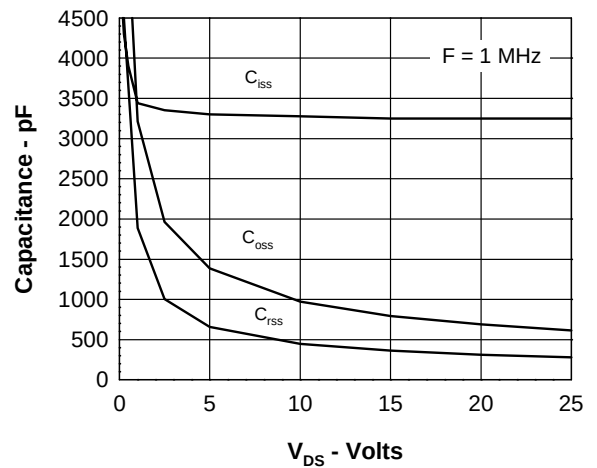


Figure 8. Capacitance Curves

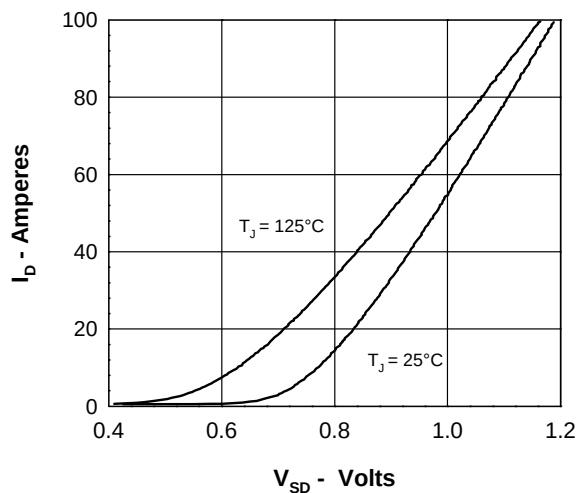


Figure 9. Source Current vs. Source-to-Drain Voltage

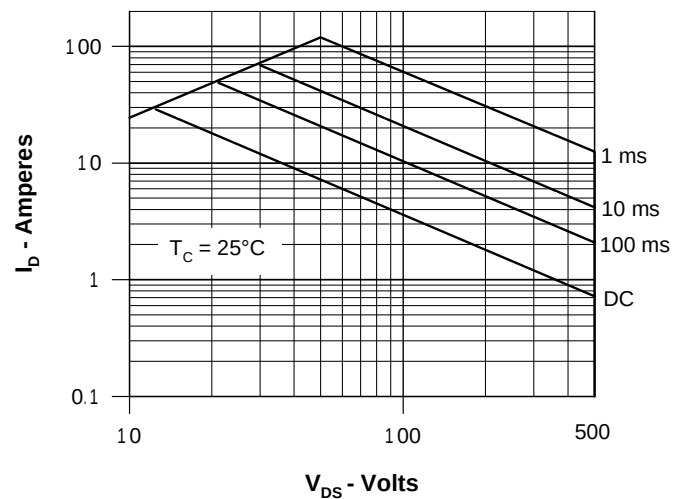


Figure 10. Forward Biased SOA

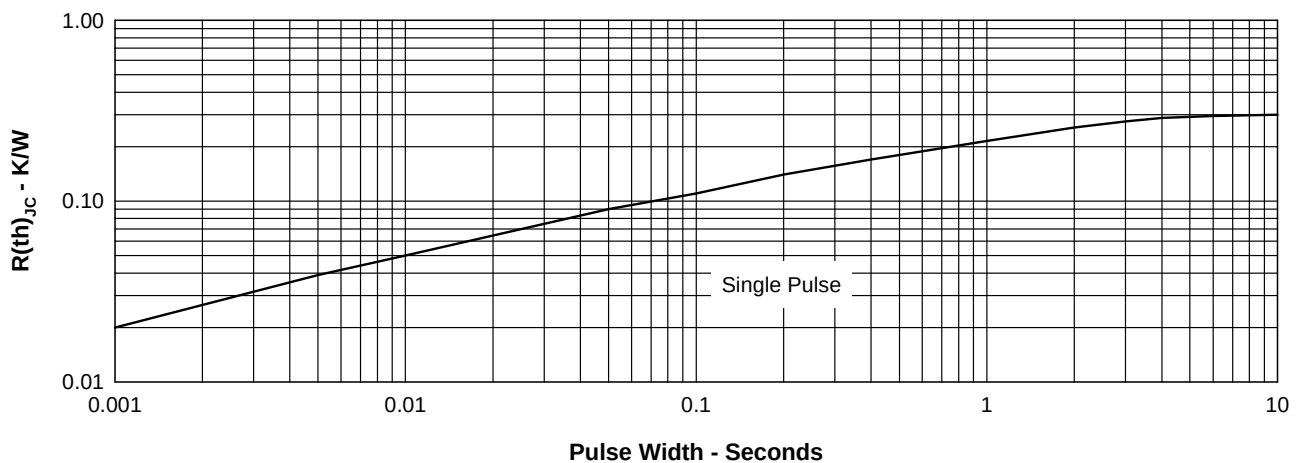


Figure 11. Transient Thermal Resistance



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