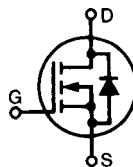


# MegaMOS™FET

IXTH 35N30  
IXTH 40N30  
IXTM 40N30

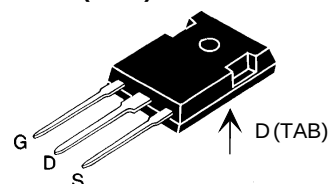
| $V_{DSS}$ | $I_{D25}$ | $R_{DS(on)}$   |
|-----------|-----------|----------------|
| 300 V     | 35 A      | 0.10 $\Omega$  |
| 300 V     | 40 A      | 0.085 $\Omega$ |
| 300 V     | 40 A      | 0.088 $\Omega$ |

## N-Channel Enhancement Mode

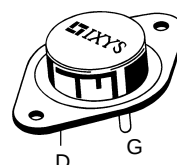


| Symbol                                                                          | Test Conditions                                                               | Maximum Ratings             |                  |
|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------|------------------|
| $V_{DSS}$                                                                       | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                               | 300                         | V                |
| $V_{DGR}$                                                                       | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1\text{ M}\Omega$ | 300                         | V                |
| $V_{GS}$                                                                        | Continuous                                                                    | $\pm 20$                    | V                |
| $V_{GSM}$                                                                       | Transient                                                                     | $\pm 30$                    | V                |
| $I_{D25}$                                                                       | $T_C = 25^\circ\text{C}$                                                      | 35N30<br>40N30              | 35<br>40 A       |
| $I_{DM}$                                                                        | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$                    | 35N30<br>40N30              | 140<br>160 A     |
| $P_D$                                                                           | $T_C = 25^\circ\text{C}$                                                      | 300                         | 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>                                                                   |                                                                               | TO-204 = 18 g, TO-247 = 6 g |                  |
| Maximum lead temperature for soldering<br>1.6 mm (0.062 in.) from case for 10 s |                                                                               | 300                         | $^\circ\text{C}$ |

TO-247 AD (IXTH)



TO-204 AE (IXTM)



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

## Features

- International standard packages
- Low  $R_{DS(on)}$  HDMOS™ process
- Rugged polysilicon gate cell structure
- Low package inductance (< 5 nH)
  - easy to drive and to protect
- Fast switching times

## Applications

- Switch-mode and resonant-mode power supplies
- Motor controls
- Uninterruptible Power Supplies (UPS)
- DC choppers

## Advantages

- Easy to mount with 1 screw (TO-247) (isolated mounting screw hole)
- Space savings
- High power density

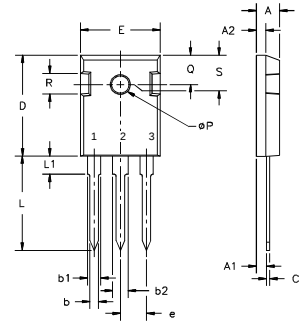
| Symbol                                                                | Test Conditions                                        | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                                                   |
|-----------------------------------------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------|------|---------------------------------------------------|
|                                                                       |                                                        | min.                                                                              | typ. | max.                                              |
| $V_{DSS}$                                                             | $V_{GS} = 0\text{ V}$ , $I_D = 250\text{ }\mu\text{A}$ | 300                                                                               |      | V                                                 |
| $V_{GS(th)}$                                                          | $V_{DS} = V_{GS}$ , $I_D = 250\text{ }\mu\text{A}$     | 2                                                                                 |      | V                                                 |
| $I_{GSS}$                                                             | $V_{GS} = \pm 20\text{ V}_{DC}$ , $V_{DS} = 0$         |                                                                                   |      | $\pm 100\text{ nA}$                               |
| $I_{DSS}$                                                             | $V_{DS} = 0.8 \cdot V_{DSS}$<br>$V_{GS} = 0\text{ V}$  |                                                                                   |      | 200 $\mu\text{A}$<br>1 mA                         |
| $R_{DS(on)}$                                                          | $V_{GS} = 10\text{ V}$ , $I_D = 0.5 I_{D25}$           |                                                                                   |      | 0.10 $\Omega$<br>0.085 $\Omega$<br>0.088 $\Omega$ |
| Pulse test, $t \leq 300\text{ }\mu\text{s}$ , duty cycle $d \leq 2\%$ |                                                        |                                                                                   |      |                                                   |

| Symbol       | Test Conditions                                                                                         | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |        |
|--------------|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|--------|
|              |                                                                                                         | min.                                                                              | typ. | max.   |
| $g_{fs}$     | $V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$ , pulse test                                            | 22                                                                                | 25   | S      |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$                                           |                                                                                   | 4600 | pF     |
| $C_{oss}$    |                                                                                                         |                                                                                   | 650  | pF     |
| $C_{rss}$    |                                                                                                         |                                                                                   | 240  | pF     |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 I_{D25}$<br>$R_G = 2\ \Omega$ , (External) |                                                                                   | 24   | 30 ns  |
| $t_r$        |                                                                                                         |                                                                                   | 40   | 90 ns  |
| $t_{d(off)}$ |                                                                                                         |                                                                                   | 75   | 100 ns |
| $t_f$        |                                                                                                         |                                                                                   | 40   | 90 ns  |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 I_{D25}$                                   |                                                                                   | 190  | nC     |
| $Q_{gs}$     |                                                                                                         |                                                                                   | 28   | nC     |
| $Q_{gd}$     |                                                                                                         |                                                                                   | 85   | nC     |
| $R_{thJC}$   |                                                                                                         |                                                                                   | 0.42 | K/W    |
| $R_{thCK}$   |                                                                                                         |                                                                                   | 0.25 | K/W    |

### Source-Drain Diode

| Symbol   | Test Conditions                                                                                       | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                |
|----------|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|----------------|
|          |                                                                                                       | min.                                                                              | typ. | max.           |
| $I_S$    | $V_{GS} = 0\text{ V}$                                                                                 | 35N30<br>40N30                                                                    |      | 35 A<br>40 A   |
| $I_{SM}$ | Repetitive;<br>pulse width limited by $T_{JM}$                                                        | 35N30<br>40N30                                                                    |      | 140 A<br>160 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          |
| $t_{rr}$ | $I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$                                    |                                                                                   | 400  | ns             |

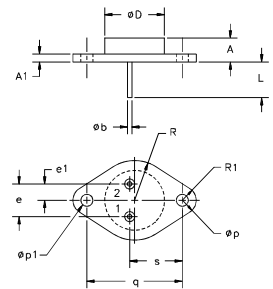
### TO-247 AD (IXTH) Outline



Terminals: 1 - Gate 2 - Drain  
3 - Source Tab - Drain

| Dim.           | Millimeter Min. | Max.  | Inches Min. | Max.  |
|----------------|-----------------|-------|-------------|-------|
| A              | 4.7             | 5.3   | .185        | .209  |
| A <sub>1</sub> | 2.2             | 2.54  | .087        | .102  |
| A <sub>2</sub> | 2.2             | 2.6   | .059        | .098  |
| b              | 1.0             | 1.4   | .040        | .055  |
| b <sub>1</sub> | 1.65            | 2.13  | .065        | .084  |
| b <sub>2</sub> | 2.87            | 3.12  | .113        | .123  |
| C              | .4              | .8    | .016        | .031  |
| D              | 20.80           | 21.46 | .819        | .845  |
| E              | 15.75           | 16.26 | .610        | .640  |
| e              | 5.20            | 5.72  | 0.205       | 0.225 |
| L              | 19.81           | 20.32 | .780        | .800  |
| L1             |                 | 4.50  |             | .177  |
| ØP             | 3.55            | 3.65  | .140        | .144  |
| Q              | 5.89            | 6.40  | 0.232       | 0.252 |
| R              | 4.32            | 5.49  | .170        | .216  |
| S              | 6.15            | BSC   | .242        | BSC   |

### TO-204AE (IXTM) Outline



Pins 1 - Gate 2 - Source  
Case - Drain

| Dim.            | Millimeter Min. | Max.  | Inches Min. | Max. |
|-----------------|-----------------|-------|-------------|------|
| A               | 6.4             | 11.4  | .250        | .450 |
| A <sub>1</sub>  | 1.53            | 3.42  | .060        | .135 |
| Øb              | 1.45            | 1.60  | .057        | .063 |
| ØD              |                 | 22.22 |             | .875 |
| e               | 10.67           | 11.17 | .420        | .440 |
| e <sub>1</sub>  | 5.21            | 5.71  | .205        | .225 |
| L               | 11.18           | 12.19 | .440        | .480 |
| Øp              | 3.84            | 4.19  | .151        | .165 |
| Øp <sub>1</sub> | 3.84            | 4.19  | .151        | .165 |
| q               | 30.15           | BSC   | 1.187       | BSC  |
| R               | 12.58           | 13.33 | .495        | .525 |
| R <sub>1</sub>  | 3.33            | 4.77  | .131        | .188 |
| s               | 16.64           | 17.14 | .655        | .675 |

Fig. 1 Output Characteristics

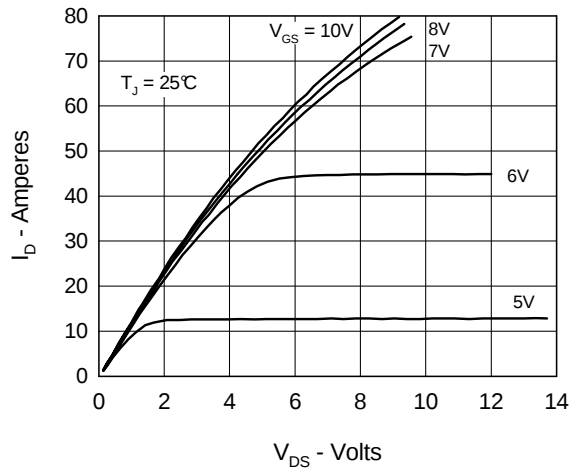


Fig. 2 Input Admittance

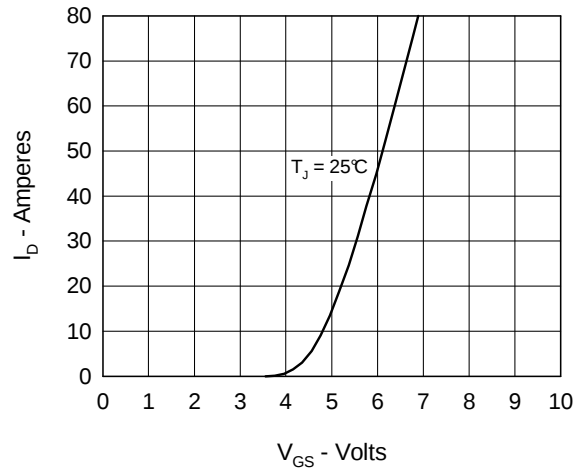
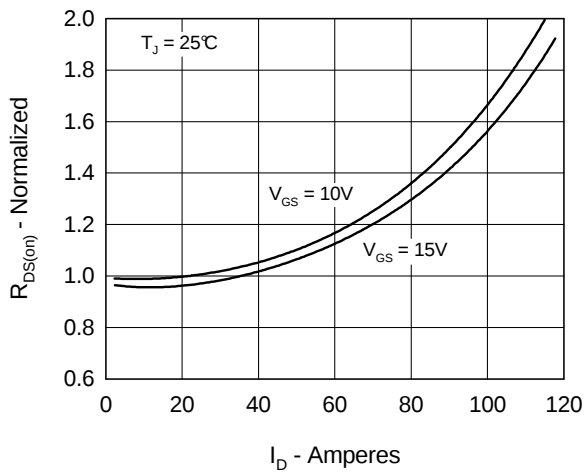

Fig. 3  $R_{DS(on)}$  vs. Drain Current


Fig. 4 Temperature Dependence of Drain to Source Resistance

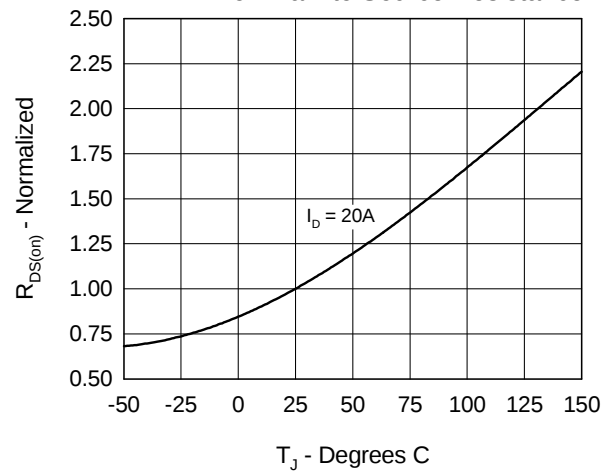


Fig. 5 Drain Current vs. Case Temperature

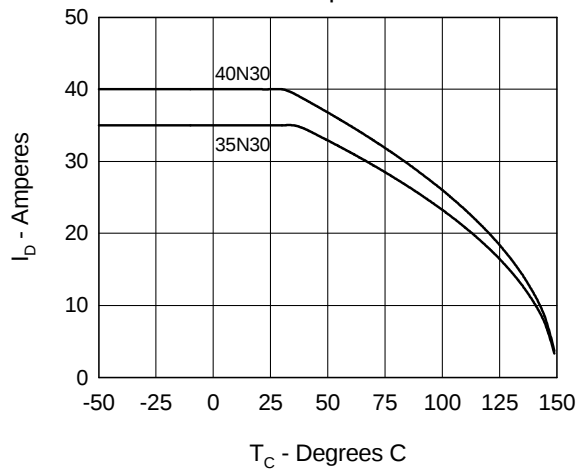


Fig. 6 Temperature Dependence of Breakdown and Threshold Voltage

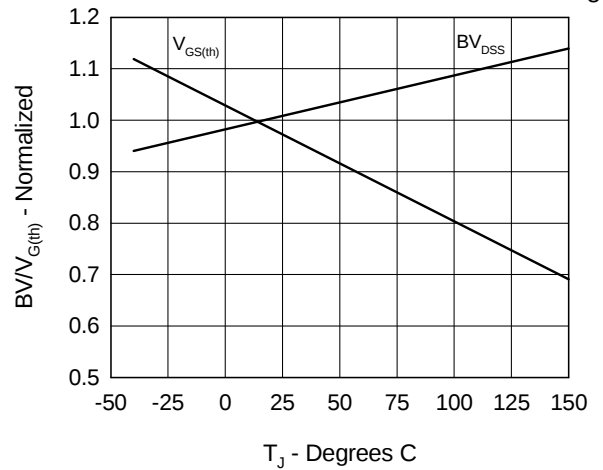


Fig.7 Gate Charge Characteristic Curve

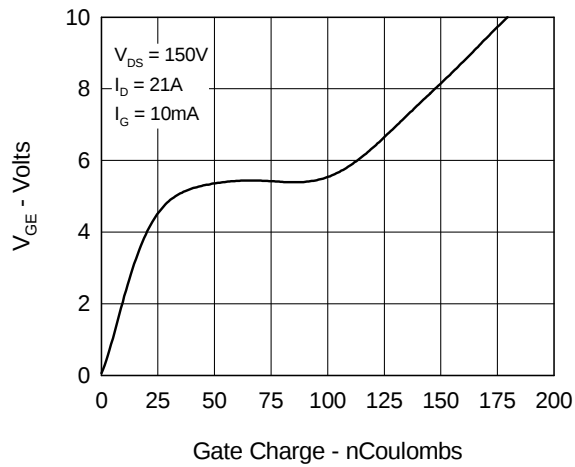


Fig.8 Forward Bias Safe Operating Area

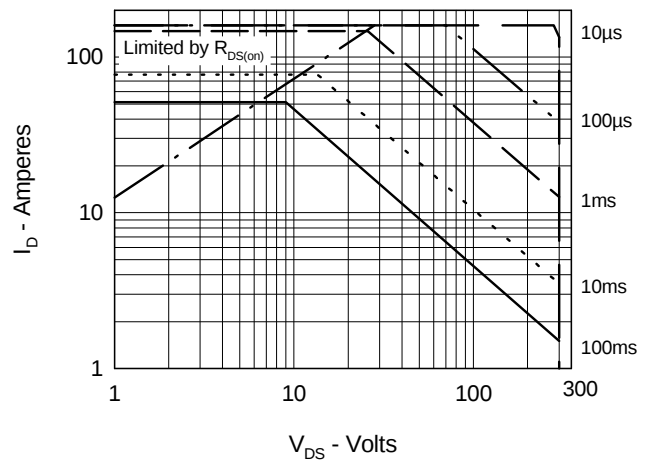


Fig.9 Capacitance Curves

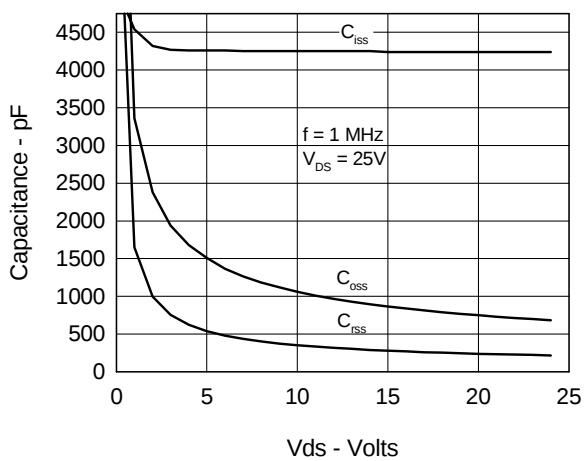


Fig.10 Source Current vs. Source to Drain Voltage

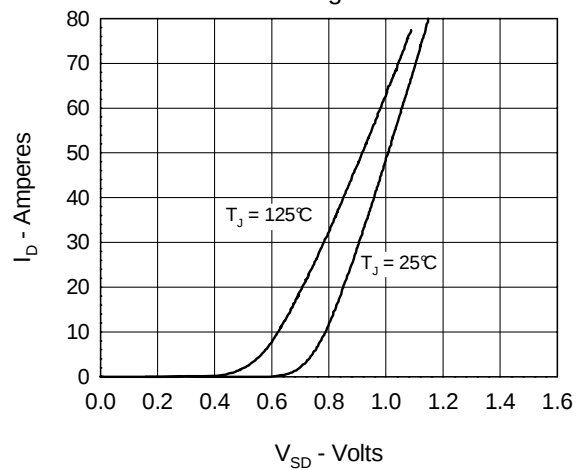


Fig.11 Transient Thermal Impedance

