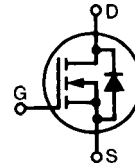


# Standard Power MOSFET

IXTH / IXTM 6N80  
IXTH / IXTM 6N80A

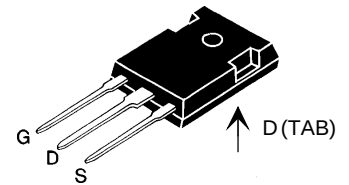
| $V_{DSS}$ | $I_{D25}$ | $R_{DS(on)}$ |
|-----------|-----------|--------------|
| 800 V     | 6 A       | 1.8 $\Omega$ |
| 800 V     | 6 A       | 1.4 $\Omega$ |

## N-Channel Enhancement Mode

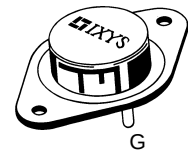


| Symbol                                                                          | Test Conditions                                                               | Maximum Ratings             |                  |
|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------|------------------|
| $V_{DSS}$                                                                       | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                               | 800                         | V                |
| $V_{DGR}$                                                                       | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1\text{ M}\Omega$ | 800                         | V                |
| $V_{GS}$                                                                        | Continuous                                                                    | $\pm 20$                    | V                |
| $V_{GSM}$                                                                       | Transient                                                                     | $\pm 30$                    | V                |
| $I_{D25}$                                                                       | $T_C = 25^\circ\text{C}$                                                      | 6                           | A                |
| $I_{DM}$                                                                        | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$                    | 24                          | A                |
| $P_D$                                                                           | $T_C = 25^\circ\text{C}$                                                      | 180                         | 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 AA (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

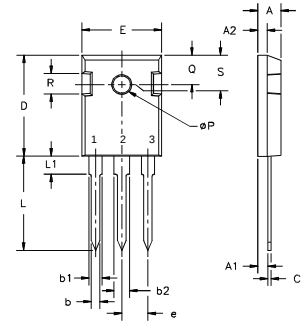
## Advantages

- 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.                         |
| $V_{DSS}$    | $V_{GS} = 0\text{ V}$ , $I_D = 3\text{ mA}$                                                                           | 800                                                                               |      | V                            |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250\text{ }\mu\text{A}$                                                                    | 2                                                                                 |      | 4.5 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>$V_{GS} = 0\text{ V}$                                                                 |                                                                                   |      | 250 $\mu\text{A}$<br>1 mA    |
| $R_{DS(on)}$ | $V_{GS} = 10\text{ V}$ , $I_D = 0.5 I_{D25}$<br>Pulse test, $t \leq 300\text{ }\mu\text{s}$ , duty cycle $d \leq 2\%$ |                                                                                   |      | 1.8 $\Omega$<br>1.4 $\Omega$ |

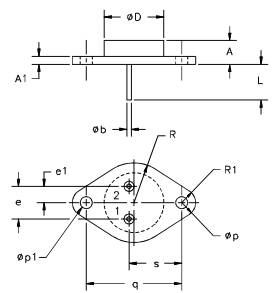
| Symbol       | Test Conditions                                                                                               | Characteristic Values<br>( $T_j = 25^\circ\text{C}$ , unless otherwise specified) |      |         |
|--------------|---------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|---------|
|              |                                                                                                               | min.                                                                              | typ. | max.    |
| $g_{fs}$     | $V_{DS} = 10\text{ V}$ ; $I_D = 0.5 \cdot I_{D25}$ , pulse test                                               | 4                                                                                 | 6    | S       |
| $C_{iss}$    | $V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                                           |                                                                                   | 2800 | pF      |
| $C_{oss}$    |                                                                                                               |                                                                                   | 250  | pF      |
| $C_{rss}$    |                                                                                                               |                                                                                   | 100  | 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) |                                                                                   | 35   | 100 ns  |
| $t_r$        |                                                                                                               |                                                                                   | 40   | 110 ns  |
| $t_{d(off)}$ |                                                                                                               |                                                                                   | 100  | 200 ns  |
| $t_f$        |                                                                                                               |                                                                                   | 60   | 100 ns  |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 I_{D25}$                                   |                                                                                   | 110  | 130 nC  |
| $Q_{gs}$     |                                                                                                               |                                                                                   | 15   | 30 nC   |
| $Q_{gd}$     |                                                                                                               |                                                                                   | 50   | 70 nC   |
| $R_{thJC}$   |                                                                                                               |                                                                                   |      | 0.7 K/W |
| $R_{thCK}$   |                                                                                                               | 0.25                                                                              |      | K/W     |

| Source-Drain Diode |                                                                                                          | Characteristic Values<br>( $T_j = 25^\circ\text{C}$ , unless otherwise specified) |      |       |
|--------------------|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-------|
| Symbol             | Test Conditions                                                                                          | min.                                                                              | typ. | max.  |
| $I_S$              | $V_{GS} = 0\text{ V}$                                                                                    |                                                                                   |      | 6 A   |
| $I_{SM}$           | Repetitive; pulse width limited by $T_{JM}$                                                              |                                                                                   |      | 24 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 |
| $t_{rr}$           | $I_F = I_S$ , $-di/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 100\text{ V}$                                 |                                                                                   | 900  | ns    |

**TO-247 AD (IXTH) Outline**


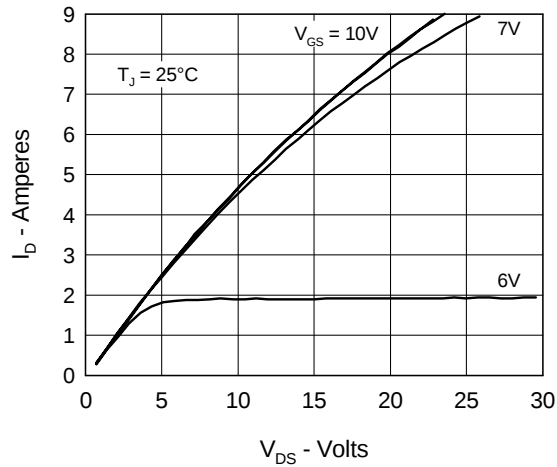
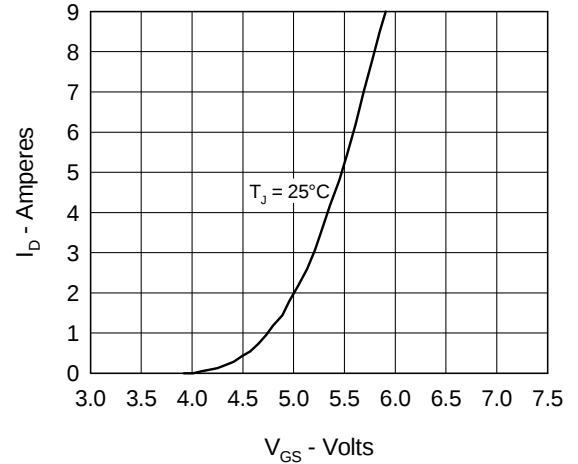
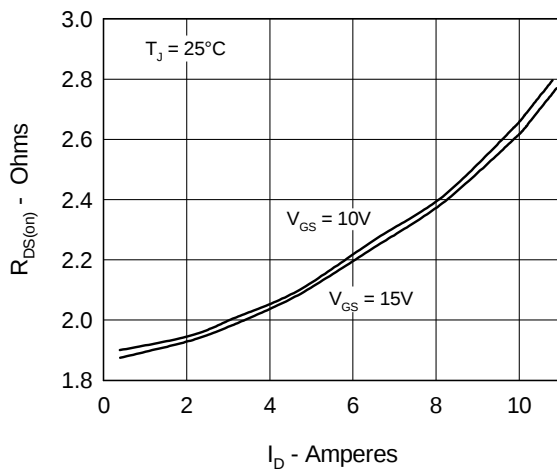
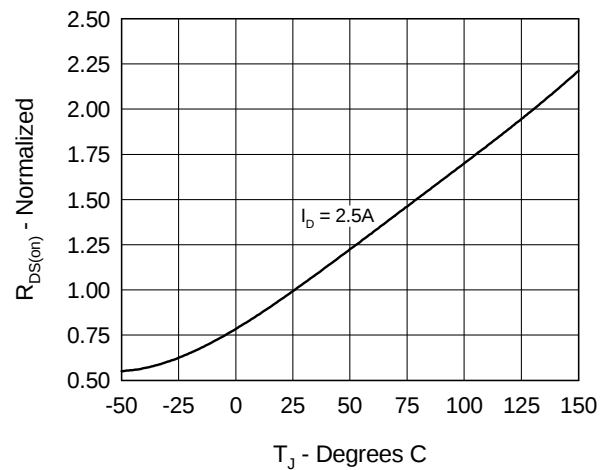
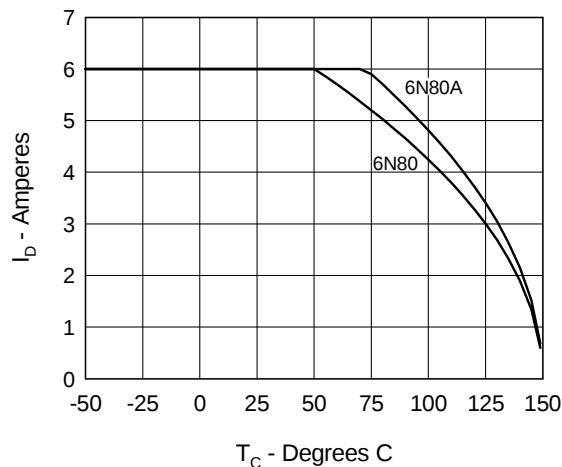
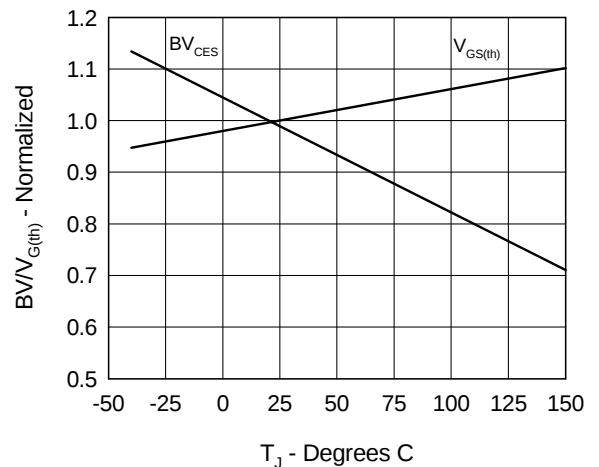
Terminals: 1 - Gate 2 - Drain  
3 - Source Tab - Drain

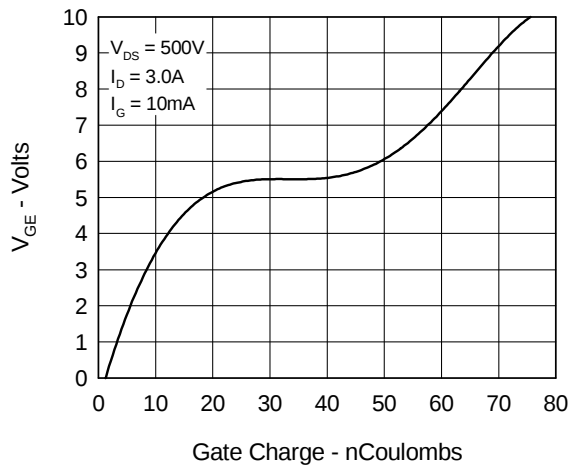
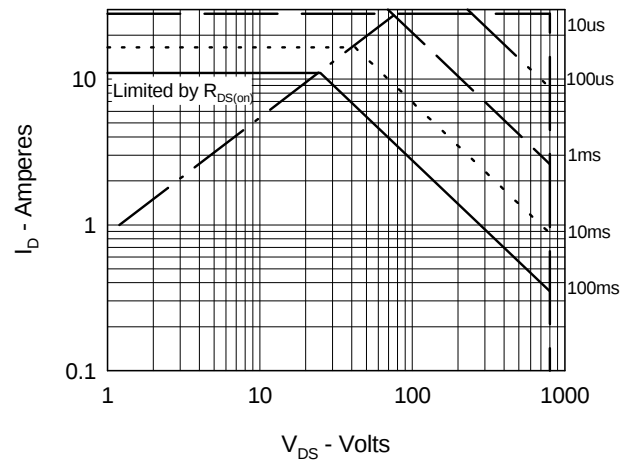
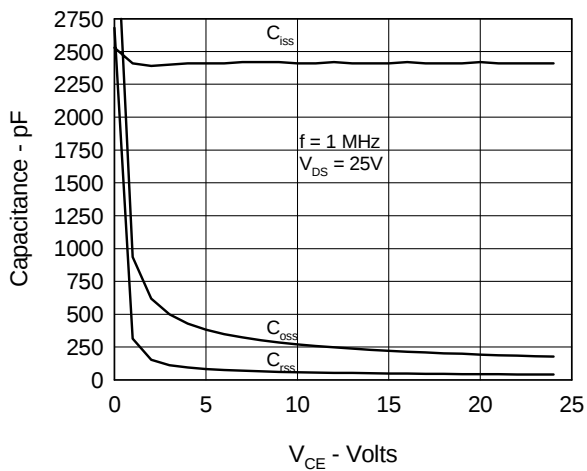
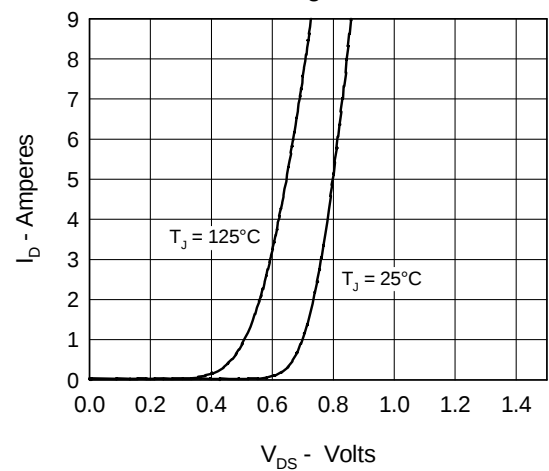
| Dim.           | Millimeter<br>Min. Max. | Inches<br>Min. Max. |
|----------------|-------------------------|---------------------|
| A              | 4.7 5.3                 | .185 .209           |
| A <sub>1</sub> | 2.2 2.54                | .087 .102           |
| A <sub>2</sub> | 2.2 2.6                 | .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-204AA (IXTM) Outline**


Pins 1 - Gate 2 - Source  
Case - Drain

| Dim.            | Millimeter<br>Min. Max. | Inches<br>Min. Max. |
|-----------------|-------------------------|---------------------|
| A               | 6.4 11.4                | .250 .450           |
| A <sub>1</sub>  | 3.42                    | .135                |
| Øb              | .97 1.09                | .038 .043           |
| ØD              | 22.22                   | .875                |
| e               | 10.67 11.17             | .420 .440           |
| e <sub>1</sub>  | 5.21 5.71               | .205 .225           |
| L               | 7.93                    | .312                |
| 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               | 13.33                   | .525                |
| R <sub>1</sub>  | 4.77                    | .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**
