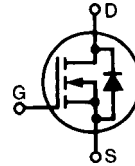


# High Current Power MOSFET

**IXTH 72N20**  
**IXTT 72N20**

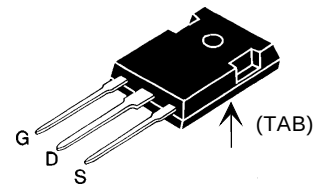
$V_{DSS} = 200 \text{ V}$   
 $I_{D25} = 72 \text{ A}$   
 $R_{DS(on)} = 33 \text{ m}\Omega$

N-Channel Enhancement Mode

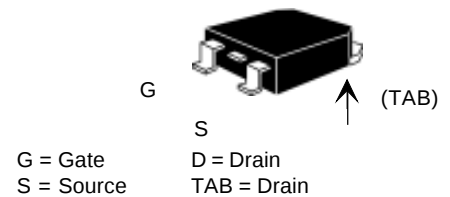


| Symbol    | Test Conditions                                                                                                                         | Maximum Ratings |                  |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$ | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                                                                                         | 200             | V                |
| $V_{DGR}$ | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$                                                          | 200             | V                |
| $V_{GS}$  | Continuous                                                                                                                              | $\pm 20$        | V                |
| $V_{GSM}$ | Transient                                                                                                                               | $\pm 30$        | V                |
| $I_{D25}$ | $T_C = 25^\circ\text{C}$                                                                                                                | 72              | A                |
| $I_{DM}$  | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$                                                                              | 288             | A                |
| $I_{AR}$  | $T_C = 25^\circ\text{C}$                                                                                                                | 72              | A                |
| $E_{AR}$  | $T_C = 25^\circ\text{C}$                                                                                                                | 50              | mJ               |
| $E_{AS}$  | $T_C = 25^\circ\text{C}$                                                                                                                | 1.5             | J                |
| $dv/dt$   | $I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ ,<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$ | 5               | V/ns             |
| $P_D$     | $T_C = 25^\circ\text{C}$                                                                                                                | 400             | 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 (0.062 in.) from case for 10 s                                                                                                   | 300             | $^\circ\text{C}$ |
| $M_d$     | Mounting torque                                                                                                                         | 1.13/10         | Nm/lb.in.        |
| Weight    | TO-247 AD                                                                                                                               | 6               | g                |
|           | TO-268                                                                                                                                  | 4               | g                |

TO-247 AD (IXTH)



TO-268 (IXTT) Case Style



## 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

## Advantages

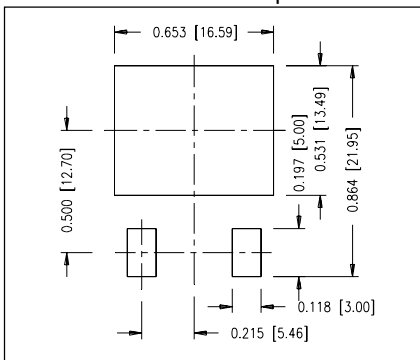
- Easy to mount
- Space savings
- High power density

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified)                                      | Characteristic Values |      |                      |
|--------------|------------------------------------------------------------------------------------------------------------------|-----------------------|------|----------------------|
|              |                                                                                                                  | Min.                  | Typ. | Max.                 |
| $V_{DSS}$    | $V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$                                                                 | 200                   |      | V                    |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250 \mu\text{A}$                                                                      | 2.0                   |      | 4.0 V                |
| $I_{GSS}$    | $V_{GS} = \pm 20 \text{ V}_{DC}$ , $V_{DS} = 0$                                                                  |                       |      | $\pm 100 \text{ nA}$ |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $T_J = 25^\circ\text{C}$                                                                    |                       |      | 25 $\mu\text{A}$     |
|              | $V_{GS} = 0 \text{ V}$ , $T_J = 125^\circ\text{C}$                                                               |                       |      | 1 mA                 |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 0.5 I_{D25}$<br>Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2 \%$ |                       |      | 33 m $\Omega$        |

| Symbol                    | Test Conditions                                                                                                                           | Characteristic Values<br>(T <sub>j</sub> = 25°C, unless otherwise specified) |      |      |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|------|------|
|                           |                                                                                                                                           | Min.                                                                         | Typ. | Max. |
| <b>g<sub>fs</sub></b>     | V <sub>DS</sub> = 10 V; I <sub>D</sub> = 0.5 I <sub>D25</sub> , pulse test                                                                | 30                                                                           | 40   | S    |
| <b>C<sub>iss</sub></b>    | V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz                                                                                  |                                                                              | 4400 | pF   |
| <b>C<sub>oss</sub></b>    |                                                                                                                                           |                                                                              | 950  | pF   |
| <b>C<sub>rss</sub></b>    |                                                                                                                                           |                                                                              | 330  | pF   |
| <b>t<sub>d(on)</sub></b>  | V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 V <sub>DSS</sub> , I <sub>D</sub> = 0.5 I <sub>D25</sub><br>R <sub>G</sub> = 2 Ω (External) |                                                                              | 24   | ns   |
| <b>t<sub>r</sub></b>      |                                                                                                                                           |                                                                              | 30   | ns   |
| <b>t<sub>d(off)</sub></b> |                                                                                                                                           |                                                                              | 80   | ns   |
| <b>t<sub>f</sub></b>      |                                                                                                                                           |                                                                              | 20   | ns   |
| <b>Q<sub>g(on)</sub></b>  | V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 V <sub>DSS</sub> , I <sub>D</sub> = 0.5 I <sub>D25</sub>                                    |                                                                              | 170  | nC   |
| <b>Q<sub>gs</sub></b>     |                                                                                                                                           |                                                                              | 40   | nC   |
| <b>Q<sub>gd</sub></b>     |                                                                                                                                           |                                                                              | 105  | nC   |
| <b>R<sub>thJC</sub></b>   | (TO-247)                                                                                                                                  |                                                                              | 0.31 | K/W  |
| <b>R<sub>thCK</sub></b>   |                                                                                                                                           |                                                                              |      | K/W  |

| Source-Drain Diode    |                                                                                                        | Characteristic Values<br>(T <sub>j</sub> = 25°C, unless otherwise specified) |      |       |
|-----------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|------|-------|
| Symbol                | Test Conditions                                                                                        | min.                                                                         | typ. | max.  |
| <b>I<sub>s</sub></b>  | V <sub>GS</sub> = 0 V                                                                                  |                                                                              |      | 72 A  |
| <b>I<sub>SM</sub></b> | Repetitive                                                                                             |                                                                              |      | 288 A |
| <b>V<sub>SD</sub></b> | I <sub>F</sub> = I <sub>S</sub> , V <sub>GS</sub> = 0 V,<br>Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 % |                                                                              |      | 1.5 V |
| <b>T<sub>rr</sub></b> | I <sub>F</sub> = 25A<br>-di/dt = 100 A/μs<br>V <sub>R</sub> = 100V                                     |                                                                              | 200  | ns    |
| <b>Q<sub>RM</sub></b> |                                                                                                        |                                                                              | 2.6  | μC    |

## Min Recommended Footprint



## TO-247 AD Outline

