## TrenchP™ Power MOSFET

**IXTN120P20T**

- **P-Channel Enhancement Mode**
- **Avalanche Rated**
- **Fast Intrinsic Rectifier**

### Symbol Test Conditions

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Test Conditions</th>
<th>Maximum Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{dss}$</td>
<td>$T_J = 25°C$ to $150°C$</td>
<td>$-200$ V</td>
</tr>
<tr>
<td>$I_{D25}$</td>
<td>$V_{DS} = V_{GS}$, $V_{DS} = 0$</td>
<td>$-106$ A</td>
</tr>
<tr>
<td>$R_{DS(on)}$</td>
<td>$V_{GS} = 0$, $I_D = 250\mu A$</td>
<td>$30\ m\Omega$</td>
</tr>
</tbody>
</table>

### Characteristic Values

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Test Conditions</th>
<th>Characteristic Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>$BVDSS$</td>
<td>$V_{GS} = 0V$, $I_D = 250\mu A$</td>
<td>Min.</td>
</tr>
<tr>
<td>$V_{GS(th)}$</td>
<td>$V_{DS} = V_{GS}$, $I_D = 250\mu A$</td>
<td>-2.5</td>
</tr>
<tr>
<td>$I_{GS}$</td>
<td>$V_{GS} = \pm 15V$, $I_D = 0V$</td>
<td>±200 nA</td>
</tr>
<tr>
<td>$I_{DS}$</td>
<td>$V_{GS} = V_{DS}$, $I_D = 0V$</td>
<td>$T_J = 125°C$</td>
</tr>
<tr>
<td>$R_{DS(on)}$</td>
<td>$V_{GS} = -10V$, $I_D = 60A$, Note 1</td>
<td>30 mΩ</td>
</tr>
</tbody>
</table>

### Applications

- High-Side Switching
- Push Pull Amplifiers
- DC Choppers
- Automatic Test Equipment
- Current Regulators
- Battery Charger Applications
**Symbol** | **Test Conditions** | **Characteristic Values** |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$g_{fs}$</td>
<td>$V_{DS} = -10V$, $I_D = -60A$, Note 1</td>
<td>Min. 85 Typ. 145 Max. S</td>
</tr>
<tr>
<td>$C_{iss}$</td>
<td>$V_{GS} = 0V$, $V_{DS} = -25V$, $f = 1MHz$</td>
<td>73 nF</td>
</tr>
<tr>
<td>$C_{oss}$</td>
<td>$V_{GS} = 0V$, $V_{DS} = -25V$, $f = 1MHz$</td>
<td>2550 pF</td>
</tr>
<tr>
<td>$C_{rss}$</td>
<td>$V_{GS} = 0V$, $V_{DS} = -25V$, $f = 1MHz$</td>
<td>480 pF</td>
</tr>
<tr>
<td>$t_{d(on)}$</td>
<td>Resistive Switching Times</td>
<td>90 ns</td>
</tr>
<tr>
<td>$t_{f}$</td>
<td>$V_{GS} = -10V$, $V_{DS} = -60A$</td>
<td>85 ns</td>
</tr>
<tr>
<td>$t_{d(off)}$</td>
<td>$R_G = 1\Omega$ (External)</td>
<td>200 ns</td>
</tr>
<tr>
<td>$Q_{g(on)}$</td>
<td>$V_{GS} = -10V$, $V_{DS} = -60A$</td>
<td>740 nC</td>
</tr>
<tr>
<td>$Q_{gs}$</td>
<td>$V_{GS} = -10V$, $V_{DS} = -60A$</td>
<td>220 nC</td>
</tr>
<tr>
<td>$Q_{gd}$</td>
<td>$V_{GS} = -10V$, $V_{DS} = -60A$</td>
<td>120 nC</td>
</tr>
<tr>
<td>$R_{thJC}$</td>
<td>$R_{thCS}$</td>
<td>0.15 °C/W</td>
</tr>
<tr>
<td>$R_{thCS}$</td>
<td>$R_{thCS}$</td>
<td>0.05 °C/W</td>
</tr>
</tbody>
</table>

**Source-Drain Diode**

<table>
<thead>
<tr>
<th><strong>Symbol</strong></th>
<th><strong>Test Conditions</strong></th>
<th><strong>Characteristic Values</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_S$</td>
<td>$V_{GS} = 0V$</td>
<td>Min. -120 A</td>
</tr>
<tr>
<td>$I_{SM}$</td>
<td>Repetitive, Pulse Width Limited by $T_{JM}$</td>
<td>-480 A</td>
</tr>
<tr>
<td>$V_{SD}$</td>
<td>$I_F = -100A$, $V_{GS} = 0V$, Note 1</td>
<td>-1.4 V</td>
</tr>
<tr>
<td>$t_{hr}$</td>
<td>$I_F = -60A$, $-dI/dt = -100A/\mu s$</td>
<td>300 ns</td>
</tr>
<tr>
<td>$Q_{RM}$</td>
<td>$V_{R} = -600V$, $V_{GS} = 0V$</td>
<td>3.3 μC</td>
</tr>
<tr>
<td>$I_{RM}$</td>
<td>$V_{R} = -600V$, $V_{GS} = 0V$</td>
<td>25.6 A</td>
</tr>
</tbody>
</table>

Note 1. Pulse test, $t \leq 300\mu s$, duty cycle, $d \leq 2\%$.

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**PRELIMINARY TECHNICAL INFORMATION**

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,881,106 5,034,796 5,187,117 5,486,715 6,306,728 6,583,505 6,771,478 7,071,537

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Fig. 1. Output Characteristics @ T_J = 25ºC

Fig. 2. Extended Output Characteristics @ T_J = 25ºC

Fig. 3. Output Characteristics @ T_J = 125ºC

Fig. 4. R_DS(on) Normalized to I_D = - 60A Value vs. Junction Temperature

Fig. 5. R_DS(on) Normalized to I_D = - 60A Value vs. Drain Current

Fig. 6. Maximum Drain Current vs. Case Temperature
Fig. 7. Input Admittance

Fig. 8. Transconductance

Fig. 9. Forward Voltage Drop of Intrinsic Diode

Fig. 10. Gate Charge

Fig. 11. Capacitance

Fig. 12. Forward-Bias Safe Operating Area

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Fig. 19. Maximum Transient Thermal Impedance

![Graph showing the maximum transient thermal impedance as a function of pulse width in seconds. The x-axis represents pulse width in seconds, ranging from 0.0001 to 10, while the y-axis represents the thermal impedance in °C/W, ranging from 0.00001 to 1. The graph shows a steady increase in thermal impedance with increasing pulse width.]