I**SYNC**  Preliminary Technical Information

**TrenchP™**  IXTR120P20T  **Power MOSFET**

P-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Rectifier

\[ V_{DSS} = -200V \]  
\[ I_{D25} = -90A \]  
\[ R_{DS(on)} \leq 32m\Omega \]  
\[ t_{rr} \leq 300ns \]

**Symbol**  
**Test Conditions**  
**Maximum Ratings**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Test Conditions</th>
<th>V_{DSS}</th>
<th>TJ = 25°C to 150°C</th>
<th>- 200 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{DGR}</td>
<td>T_{J} = 25°C to 150°C, R_{DS} = 1MΩ</td>
<td>- 200 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V_{GSS}</td>
<td>Continuous</td>
<td>±15 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V_{GSM}</td>
<td>Transient</td>
<td>±25 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I_{DSS}</td>
<td>T_{C} = 25°C</td>
<td>- 90 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I_{OM}</td>
<td>T_{C} = 25°C, Pulse Width Limited by T_{JM}</td>
<td>- 400 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I_{A}</td>
<td>T_{C} = 25°C</td>
<td>-100 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E_{AS}</td>
<td>T_{C} = 25°C</td>
<td>3 J</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dv/dt</td>
<td>I_{DAM}, V_{DS} \leq V_{DSS}, T_{J} \leq 150°C</td>
<td>10 V/ns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P_{D}</td>
<td>T_{C} = 25°C</td>
<td>595 W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T_{J}</td>
<td></td>
<td>-55 ... +150 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T_{JM}</td>
<td></td>
<td>150 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T_{stg}</td>
<td></td>
<td>-55 ... +150 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T_{L}</td>
<td>1.6mm (0.062 in.) from Case for 10s</td>
<td>300 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T_{SOL}</td>
<td>Plastic Body for 10s</td>
<td>260 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V_{ISOL}</td>
<td>50/60 Hz, 1 Minute</td>
<td>2500 V~</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F_{c}</td>
<td>Mounting Force</td>
<td>20..120/4.5..27 N/lb.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td></td>
<td>5 g</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Features**
- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 2500V~ Electrical Isolation
- Avalanche Rated
- Extended FBSOA
- Fast Intrinsic Rectifier
- Low R_{DS(on)} and Q_{G}

**Advantages**
- Easy to Mount
- Space Savings
- High Power Density

**Applications**
- High-Side Switching
- Push Pull Amplifiers
- DC Choppers
- Automatic Test Equipment
- Current Regulators
- Battery Charger Applications

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Symbol | Test Conditions (T_J = 25°C Unless Otherwise Specified) | Characteristic Values
--- | --- | ---
\(g_{fs}\) | \(V_{DS} = -10V, I_D = -60A, \text{Note 1}\) | Min. 85  Typ. 145  Max. S
\(C_{oss}\) | \(V_{GS} = 0V, V_{DS} = -25V, f = 1MHz\) | 73 nF
\(R_{on}\) | \(V_{GS} = -10V, V_{DS} = -60A\) | 2550 pF
\(R_{off}\) | \(R_G = 1\Omega \text{ (External)}\) | 480 pF
|  | \(t_{on}\) | 90 ns
|  | \(t_{off}\) | 200 ns
|  | \(t_{on}\) | 50 ns
| \(Q_{g(on)}\) | \(V_{GS} = -10V, V_{DS} = 0.5 \cdot V_{DSS}, I_D = -60A\) | 740 nC
| \(Q_{gs}\) | \(V_{GS} = -10V, V_{DS} = 0.5 \cdot V_{DSS}, I_D = -60A\) | 220 nC
| \(Q_{gd}\) | \(V_{GS} = -10V, V_{DS} = 0.5 \cdot V_{DSS}, I_D = -60A\) | 120 nC
| \(R_{thJC}\) | \(V_{DS} = -10V, I_D = -60A\) | 0.21 °C/W
| \(R_{thCS}\) | \(V_{DS} = -10V, I_D = -60A\) | 0.15 °C/W

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Test Conditions</th>
<th>Characteristic Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>(I_S)</td>
<td>(V_{GS} = 0V)</td>
<td>-120 A</td>
</tr>
<tr>
<td>(I_{RM})</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, \text{Note 1})</td>
<td>-1.4 V</td>
</tr>
<tr>
<td>(t_{r})</td>
<td>(I_F = -60A, -dI/dt = -100A/\mu s)</td>
<td>300 ns</td>
</tr>
<tr>
<td>(Q_{RM})</td>
<td>(V_n = -100V, V_{GS} = 0V)</td>
<td>3.3 μC</td>
</tr>
<tr>
<td>(I_{RM})</td>
<td>25.6 A</td>
<td></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.
Fig. 1. Output Characteristics @ T_J = 25°C

Fig. 2. Extended Output Characteristics @ T_J = 25°C

Fig. 3. Output Characteristics @ T_J = 125°C

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

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

Fig. 6. Maximum Drain Current vs. Case Temperature
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.
Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

- $R_G = 1\, \Omega$, $V_{GS} = -10\, V$
- $V_{DS} = -100\, V$

$t_r$ - Nanoseconds

$T_J$ - Degrees Centigrade

- $I_D = -120\, A$
- $I_D = -60\, A$

Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

- $R_G = 1\, \Omega$, $V_{GS} = -10\, V$
- $V_{DS} = -100\, V$

$t_r$ - Nanoseconds

$I_D$ - Amperes

- $T_J = 125\, ^\circ C$
- $T_J = 25\, ^\circ C$

Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

$t_r$ - Nanoseconds

$R_G$ - Ohms

- $T_J = 125\, ^\circ C$, $V_{GS} = -10\, V$
- $V_{DS} = -100\, V$
- $I_D = -120\, A$, $-60\, A$

Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

$t_f$ - Nanoseconds

$T_J$ - Degrees Centigrade

- $R_G = 1\, \Omega$, $V_{GS} = -10\, V$
- $V_{DS} = -100\, V$
- $I_D = -120\, A$, $-60\, A$

Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

$t_f$ - Nanoseconds

$I_D$ - Amperes

- $T_J = 125\, ^\circ C$, $V_{GS} = -10\, V$
- $V_{DS} = -100\, V$

Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

$t_f$ - Nanoseconds

$R_G$ - Ohms

- $T_J = 125\, ^\circ C$, $V_{GS} = -10\, V$
- $V_{DS} = -100\, V$
- $I_D = -120\, A$, $-60\, A$
Fig. 19. Maximum Transient Thermal Impedance

Pulse Width - Seconds

Z_{th JC} - °C / W