High Voltage IGBT  IXGF20N300
For Capacitor Discharge Applications

( Electrically Isolated Tab)

Symbol Test Conditions Maximum Ratings

\( V_{\text{CES}} \) \( T_J = 25^\circ C \) to 150°C 3000 V
\( V_{\text{CGR}} \) \( T_J = 25^\circ C \) to 150°C, \( R_{\text{GE}} = 1\Omega \) 3000 V
\( V_{\text{GES}} \) Continuous \( \pm 20 \) V
\( V_{\text{GEM}} \) Transient \( \pm 30 \) V
\( I_{\text{C25}} \) \( T_J = 25^\circ C \) 22 A
\( I_{\text{C90}} \) \( T_J = 90^\circ C \) 14 A
\( I_{\text{CM}} \) \( T_J = 25^\circ C, V_{\text{GE}} = 20V, 1\text{ms} \) 103 A
\( \text{SSOA} \) \( V_{\text{GE}} = 20V, T_{\text{JU}} = 125^\circ C, R_{\text{g}} = 10\Omega \) \( I_{\text{CM}} = 200 \) A
\( \text{SSOA} \) (RBSOA) Clamped Inductive Load @ 0.8 \( V_{\text{CES}} \)
\( P_{\text{C}} \) \( T_J = 25^\circ C \) 100 W
\( T_J \) -55 ... +150 \( ^\circ C \)
\( T_{\text{JM}} \) 150 \( ^\circ C \)
\( T_{\text{stg}} \) -55 ... +150 \( ^\circ C \)
\( T_L \) 1.6 mm (0.062 in.) from Case for 10s 300 \( ^\circ C \)
\( T_{\text{SOLD}} \) Plastic Body for 10s 260 \( ^\circ C \)
\( F_{\text{C}} \) Mounting Force 20..120/4.5..27 Nm/lb-in.
\( V_{\text{ISOL}} \) 50/60Hz, 1 Minute 4000 V~
Weight 6 g

Features
- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 4000V Electrical Isolation
- High Peak Current Capability
- Low Saturation Voltage
- Molding Epoxies Meet UL 94 V-0 Flammability Classification

Applications
- Capacitor Discharge
- Pulser Circuits

Advantages
- High Power Density
- Easy to Mount
<table>
<thead>
<tr>
<th>Symbol</th>
<th>Test Conditions</th>
<th>Characteristic Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min.</td>
<td>Typ.</td>
<td>Max.</td>
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<tr>
<td>$g_{ds}$</td>
<td>$I_C = 20A, V_{CE} = 10V$, Note 1</td>
<td>8</td>
</tr>
<tr>
<td>$I_{QON}$</td>
<td>$V_{GE} = 20V, V_{CE} = 20V$, Note 1</td>
<td>180</td>
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<tr>
<td>$C_{res}$</td>
<td>$V_{CE} = 25V, V_{GE} = 0V$, $f = 1MHz$</td>
<td>1125</td>
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<tr>
<td>$C_{res}$</td>
<td>$V_{CE} = 25V, V_{GE} = 0V$, $f = 1MHz$</td>
<td>48</td>
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<td>$Q_g$</td>
<td>$I_C = 20A, V_{GE} = 15V$, $V_{CE} = 600V$</td>
<td>31</td>
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<td>$Q_{ge}$</td>
<td>$I_C = 20A, V_{GE} = 15V$, $V_{CE} = 600V$</td>
<td>5.8</td>
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<td>$Q_{gc}$</td>
<td>$I_C = 20A, V_{GE} = 15V$, $V_{CE} = 600V$</td>
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<td>$t_{d(on)}$</td>
<td>Resistive Switching Times</td>
<td>38</td>
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<td>$t_{r}$</td>
<td>$I_C = 20A, V_{GE} = 15V$</td>
<td>486</td>
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<tr>
<td>$t_{d(off)}$</td>
<td>$V_{CE} = 960V, R_G = 10Ω$</td>
<td>145</td>
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<td>$t_f$</td>
<td>$V_{CE} = 960V, R_G = 10Ω$</td>
<td>210</td>
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<td>$R_{thJC}$</td>
<td>0.15</td>
<td>1.25 $°C/W$</td>
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<tr>
<td>$R_{thCS}$</td>
<td>30</td>
<td>$°C/W$</td>
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</tbody>
</table>

Notes:
1. Pulse test, $t < 300\mu s$, duty cycle, $d < 2\%$.
2. Device must be heatsunk for high-temperature leakage current measurements to avoid thermal runaway.
Fig. 7. Transconductance

Fig. 8. Gate Charge

Fig. 9. Reverse-Bias Safe Operating Area

Fig. 10. Capacitance

Fig. 11. Maximum Transient Thermal Impedance
Fig. 12. Resistive Turn-on Rise Time vs. Junction Temperature

Fig. 13. Resistive Turn-on Rise Time vs. Collector Current

Fig. 14. Resistive Turn-on Switching Times vs. Gate Resistance

Fig. 15. Resistive Turn-off Switching Times vs. Junction Temperature

Fig. 16. Resistive Turn-off Switching Times vs. Collector Current

Fig. 17. Resistive Turn-off Switching Times vs. Gate Resistance