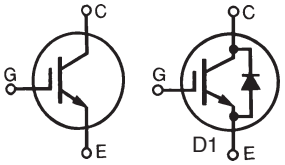
# HiPerFAST™ IGBT
# B2-Class High Speed
# IGBT in ISOPLUS220™ Case
## Electrically Isolated Back Surface

**IXGC 16N60B2**
**IXGC 16N60B2D1**

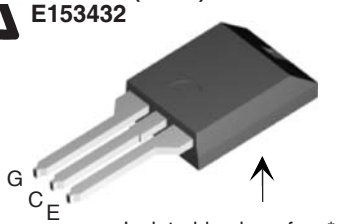
Preliminary Data Sheet

$V_{CES}$ = 600 V
$I_{C25}$ = 28 A
$V_{CE(sat)}$ = 2.3 V
$t_{fi(typ)}$ = 80 ns




| Symbol | Test Conditions | Maximum Ratings | |
|---|---|---|---|
| $V_{CES}$ | $T_J$ = 25°C to 150°C | 600 | V |
| $V_{CGR}$ | $T_J$ = 25°C to 150°C; $R_{GE}$ = 1 MΩ | 600 | V |
| $V_{GES}$ | Continuous | ±20 | V |
| $V_{GEM}$ | Transient | ±30 | V |
| $I_{C25}$ | $T_C$ = 25°C | 28 | A |
| $I_{C110}$ | $T_C$ = 110°C | 13 | A |
| $I_{D110}$ | $T_C$ = 110°C (IXGC16N60B2D1 diode) | 10 | A |
| $I_{CM}$ | $T_C$ = 25°C, 1 ms | 100 | A |
| **SSOA (RBSOA)** | $V_{GE}$= 15 V, $T_J$ = 125°C, $R_G$ = 22 Ω<br>Clamped inductive load | $I_{CM}$ = 32<br>@0.8 $V_{CES}$ | A |
| $P_C$ | $T_C$ = 25°C | 63 | W |
| $T_J$ | | -55 ... +150 | °C |
| $T_{JM}$ | | 150 | °C |
| $T_{stg}$ | | -55 ... +150 | °C |
| $F_C$ | Mounting Force | 11..65/2.5..15 | N/lb. |
| $V_{ISOL}$ | Isolation Voltage; 50/60Hz; t = 1minute; RMS | 2500 | V |
| | Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s | 300 | °C |
| **Weight** | | 2 | g |

**ISOPLUS 220™ (IXGC)**
E153432




Isolated back surface*

G = Gate C = Collector
E = Emitter

### Features
- DCB Isolated mounting tab
- UL recognized (E153432)
- Meets TO-273 package Outline
- High current handling capability
- MOS Gate turn-on
  - drive simplicity
- Epoxy meets UL94V-0 flammability classification

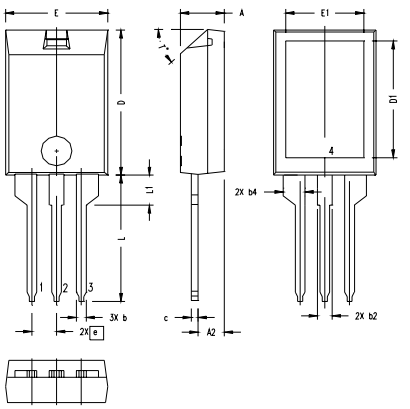
### Applications
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies
- AC motor speed control
- DC servo and robot drives
- DC choppers

### Advantages
- Easy assembly
- High power density
- Very fast switching speeds for high frequency applications

| Symbol | Test Conditions | | Characteristic Values ($T_J$ = 25°C, unless otherwise specified) min. | typ. | max. | |
|---|---|---|---|---|---|---|
| $V_{GE(th)}$ | $I_C$ = 250 μA, $V_{CE}$ = $V_{GE}$ | | 2.5 | | 5.0 | V |
| $I_{CES}$ | $V_{CE}$ = $V_{CES}$<br>$V_{GE}$ = 0 V | 16N60B2<br>16N60B2D1 | | | 25<br>50 | μA<br>μA |
| $I_{GES}$ | $V_{CE}$ = 0 V, $V_{GE}$ = ±20 V | | | | ±100 | nA |
| $V_{CE(sat)}$ | $I_C$ = 12 A, $V_{GE}$ = 15 V<br>Note 2 | <br>$T_J$=125°C | | <br>1.8 | 2.3 | V<br>V |

| Symbol | Test Conditions | | Characteristic Values ($T_J$ = 25°C, unless otherwise specified) min. | typ. | max. | |
|---|---|---|---|---|---|---|
| $g_{fs}$ | $I_C$ = 12A; $V_{CE}$ = 10 V, Note 2. | | 8 | 12 | | S |
| $C_{ies}$ | $V_{CE}$ = 25 V, $V_{GE}$ = 0 V, f = 1 MHz | | | 780 | | pF |
| $C_{oes}$ | | 16N60B2 | | 55 | | pF |
| | | 16N60B2D1 | | 65 | | pF |
| $C_{res}$ | | | | 19 | | pF |
| $Q_g$ | $I_C$ = 20A, $V_{GE}$ = 15 V, $V_{CE}$ = 0.5 $V_{CES}$ | | | 32 | | nC |
| $Q_{ge}$ | | | | 6 | | nC |
| $Q_{gc}$ | | | | 10 | | nC |
| $t_{d(on)}$ | **Inductive load, $T_J$ = 125°C** | | | 25 | | ns |
| $t_{ri}$ | | | | 15 | | ns |
| $t_{d(off)}$ | $I_C$ = 12A; $V_{GE}$ = 15 V | | | 70 | 150 | ns |
| $t_{fi}$ | $V_{CE}$ = 400 V; $R_G$ = $R_{off}$ = 22 Ω | | | 80 | 150 | ns |
| $E_{off}$ | Note 1 | | | 150 | 260 | mJ |
| $t_{d(on)}$ | | | | 25 | | ns |
| $t_{ri}$ | **Inductive load, $T_J$ = 125°C** | | | 18 | | ns |
| $E_{on}$ | | 16N60B2 | | 0.38 | | mJ |
| | $I_C$ = 12A; $V_{GE}$ = 15 V | 16N60B2D 1 | | 0.8 | | mJ |
| $t_{d(off)}$ | $V_{CE}$ = 400 V; $R_G$ = $R_{off}$ = 22 Ω | | | 110 | | ns |
| $t_{fi}$ | Note 1 | | | 170 | | ns |
| $E_{off}$ | | | | 350 | | mJ |
| $R_{thJC}$ | | | | | 2.0 | K/W |
| $R_{thCK}$ | | | | 0.25 | | K/W |

**ISOPLUS220 Outline**




| SYM | INCHES MIN | INCHES MAX | MILLIMETERS MIN | MILLIMETERS MAX |
|---|---|---|---|---|
| A | .157 | .197 | 4.00 | 5.00 |
| A2 | .098 | .118 | 2.50 | 3.00 |
| b | .035 | .051 | 0.90 | 1.30 |
| b2 | .049 | .065 | 1.25 | 1.65 |
| b4 | .093 | .100 | 2.35 | 2.55 |
| c | .028 | .039 | 0.70 | 1.00 |
| D | .591 | .630 | 15.00 | 16.00 |
| D1 | .472 | .512 | 12.00 | 13.00 |
| E | .394 | .433 | 10.00 | 11.00 |
| E1 | .295 | .335 | 7.50 | 8.50 |
| e | .100 BASIC | | 2.55 BASIC | |
| L | .512 | .571 | 13.00 | 14.50 |
| L1 | .118 | .138 | 3.00 | 3.50 |
| T° | | | 42.5° | 47.5° |

NOTE:
1. Bottom heatsink (Pin 4) is electrically isolated from Pin 1, 2, or 3.
2. This drawing will meet dimensional requirement of JEDEC SS Product Outline TO-273 except D and D1 dimension.

**Reverse Diode (FRED)**

| Symbol | Test Conditions | Characteristic Values ($T_J$ = 25°C, unless otherwise specified) min. | typ. | max. | |
|---|---|---|---|---|---|
| $V_F$ | $I_F$ = 10 A, $V_{GE}$ = 0 V | | | 2.66 | V |
| | $T_J$ = 125°C | | | 1.66 | V |
| $I_{RM}$ | $I_F$ = 12 A; -di$_F$/dt = 100 A/µs, $V_R$ = 100 V | | 2.5 | | A |
| $t_{rr}$ | $V_{GE}$ = 0 V; $T_J$ = 125°C | | 110 | | ns |
| $t_{rr}$ | $I_F$ = 1 A; -di$_F$/dt = 100 A/µs; $V_R$ = 30 V, $V_{GE}$ = 0 V | | 30 | | ns |
| $R_{thJC}$ | | | | 2.5 | K/W |

Notes: 1. Switching times may increase for $V_{CE}$ (Clamp) > 0.8 • $V_{CES}$, higher $T_J$, or increased $R_G$.
2. Pulse test, t < 300 ms, duty cycle d < 2 %