

HiPerFAST™ IGBT

C2-Class High Speed

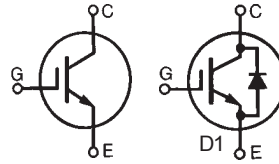
IGBT in ISOPLUS220™ Case

Electrically Isolated Back Surface

IXGC 16N60C2
IXGC 16N60C2D1

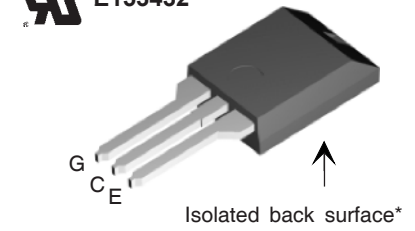
$V_{CES} = 600 \text{ V}$
 $I_{C25} = 20 \text{ A}$
 $V_{CE(sat)} = 3.0 \text{ V}$
 $t_{fi(typ)} = 35 \text{ ns}$

Preliminary Data Sheet



| Symbol | Test Conditions | Maximum Ratings | |
|---------------------|---|----------------------------------|------------------|
| V_{CES} | $T_J = 25^\circ\text{C}$ to 150°C | 600 | V |
| V_{CGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GE} = 1 \text{ M}\Omega$ | 600 | V |
| V_{GES} | Continuous | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ\text{C}$ | 20 | A |
| I_{C110} | $T_C = 110^\circ\text{C}$ | 8 | A |
| I_{D110} | $T_C = 110^\circ\text{C}$ (IXGC16N60C2D1 diode) | 10 | A |
| I_{CM} | $T_C = 25^\circ\text{C}$, 1 ms | 100 | A |
| SSOA (RBSOA) | $V_{GE} = 15 \text{ V}$, $T_J = 125^\circ\text{C}$, $R_G = 22 \Omega$ Clamped inductive load | $I_{CM} = 32$ @ $0.8 V_{CES}$ | A |
| P_C | $T_C = 25^\circ\text{C}$ | 63 | W |
| T_J | | -55 ... +150 | $^\circ\text{C}$ |
| T_{JM} | | 150 | $^\circ\text{C}$ |
| T_{stg} | | -55 ... +150 | $^\circ\text{C}$ |
| 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 | $^\circ\text{C}$ |
| Weight | | 2 | g |

ISOPLUS 220™ (IXGC)
E153432



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

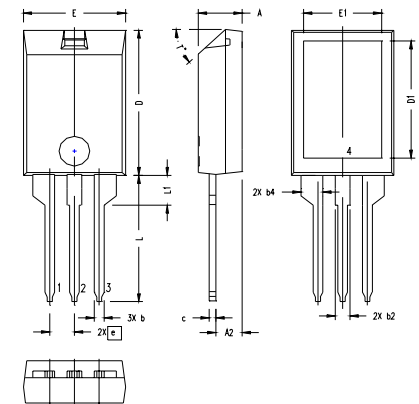
Advantages

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

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|---------------|--|---|------------|--------------------------------------|
| | | min. | typ. | max. |
| $V_{GE(th)}$ | $I_C = 250 \mu\text{A}$, $V_{CE} = V_{GE}$ | 2.5 | | 5.0 V |
| I_{CES} | $V_{CE} = V_{CES}$ $V_{GE} = 0 \text{ V}$ | | | 25 μA 50 μA |
| I_{GES} | $V_{CE} = 0 \text{ V}$, $V_{GE} = \pm 20 \text{ V}$ | | | $\pm 100 \text{ nA}$ |
| $V_{CE(sat)}$ | $I_C = 12 \text{ A}$, $V_{GE} = 15 \text{ V}$ Note 2 | | 2.7 2.1 | 3.0 V V |
| | | | | $T_J = 125^\circ\text{C}$ |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|------|-------------------|
| | | min. | typ. | max. |
| g_{fs} | $I_C = 12\text{A}; V_{CE} = 10\text{V}$, Note 2. | 8 | 12 | S |
| C_{ies} | $V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$ | | 720 | pF |
| C_{oes} | | | 55 | pF |
| | 16N60C2 | | 65 | pF |
| | 16N60C2D1 | | | |
| C_{res} | | | 19 | pF |
| Q_g | $I_C = 20\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 V_{CES}$ | | 32 | nC |
| Q_{ge} | | | 6 | nC |
| Q_{gc} | | | 10 | nC |
| $t_{d(on)}$ | Inductive load, $T_J = 25^\circ\text{C}$ | | 25 | ns |
| t_{ri} | $I_C = 12\text{A}; V_{GE} = 15\text{V}$ | | 15 | ns |
| $t_{d(off)}$ | $V_{CE} = 400\text{V}; R_G = R_{off} = 22\ \Omega$ | | 60 | 120 ns |
| t_{fi} | Note 1. | | 35 | 100 ns |
| E_{off} | | | 60 | 100 μJ |
| $t_{d(on)}$ | Inductive load, $T_J = 125^\circ\text{C}$ | | 25 | ns |
| t_{ri} | $I_C = 12\text{A}; V_{GE} = 15\text{V}$ | | 18 | ns |
| E_{on} | $V_{CE} = 400\text{V}; R_G = R_{off} = 22\ \Omega$ | 16N60C2D1 | 0.38 | mJ |
| $t_{d(off)}$ | Note 1 | | 115 | ns |
| t_{fi} | | | 70 | ns |
| E_{off} | | | 150 | μJ |
| R_{thJC} | | | | 2.0 K/W |
| R_{thCK} | | | 0.25 | K/W |

ISOPLUS220 Outline



| SYM | INCHES | | MILLIMETERS | |
|-----|------------|------|-------------|-------|
| | MIN | MAX | MIN | 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 10-273 except D and D1 dimension.

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

- Notes: 1. Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$, higher T_J , or increased R_G .
2. Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$

IXYS reserves the right to change limits, test conditions, and dimensions.

| | | | | | | | | |
|--|-----------|-----------|-----------|-----------|--------------|--------------|--------------|-----------|
| IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: | 4,835,592 | 4,931,844 | 5,049,961 | 5,237,481 | 6,162,665 | 6,404,065 B1 | 6,683,344 | 6,727,585 |
| | 4,850,072 | 5,017,508 | 5,063,307 | 5,381,025 | 6,259,123 B1 | 6,534,343 | 6,710,405 B2 | 6,759,692 |
| | 4,881,106 | 5,034,796 | 5,187,117 | 5,486,715 | 6,306,728 B1 | 6,583,505 | 6,710,463 | |