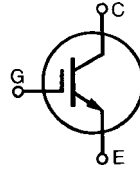


# IGBT

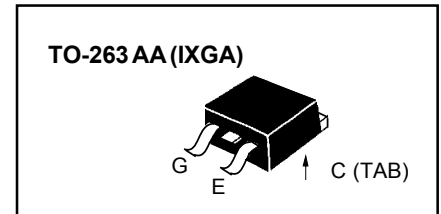
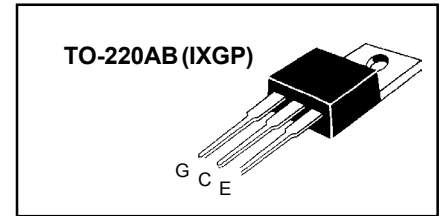
**IXGA 20N100**  
**IXGP 20N100**

$V_{CES} = 1000 \text{ V}$   
 $I_{C25} = 40 \text{ A}$   
 $V_{CE(sat)} = 3.0 \text{ V}$

Preliminary Data Sheet



| Symbol  | Test Conditions   | Maximum Ratings                      |                  |
|---|---|--------------------------------------|------------------|
| $V_{CES}$   | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$  | 1000                                 | V                |
| $V_{CGR}$   | $T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1 \text{ M}\Omega$  | 1000                                 | V                |
| $V_{GES}$   | Continuous  | $\pm 20$                             | V                |
| $V_{GEM}$   | Transient   | $\pm 30$                             | V                |
| $I_{C25}$   | $T_C = 25^\circ\text{C}$  | 40                                   | A                |
| $I_{C90}$   | $T_C = 90^\circ\text{C}$  | 20                                   | A                |
| $I_{CM}$  | $T_C = 25^\circ\text{C}, 1 \text{ ms}$  | 80                                   | A                |
| <b>SSOA</b><br><b>(RBSOA)</b>   | $V_{GE} = 15 \text{ V}, T_{VJ} = 125^\circ\text{C}, R_G = 47 \Omega$<br>Clamped inductive load, $L = 300 \mu\text{H}$ | $I_{CM} = 40$<br>@ $0.8 V_{CES}$     | A                |
| $P_C$   | $T_C = 25^\circ\text{C}$  | 150                                  | W                |
| $T_J$   |   | -55 ... +150                         | $^\circ\text{C}$ |
| $T_{JM}$  |   | 150                                  | $^\circ\text{C}$ |
| $T_{stg}$   |   | -55 ... +150                         | $^\circ\text{C}$ |
| Maximum lead temperature for soldering<br>1.6 mm (0.062 in.) from case for 10 s |   | 300                                  | $^\circ\text{C}$ |
| $M_d$   | Mounting torque with screw M3<br>Mounting torque with screw M3.5  | 0.45/4 Nm/lb.in.<br>0.55/5 Nm/lb.in. |                  |
| <b>Weight</b>   | TO-220<br>TO-263  | 4<br>2                               | g<br>g           |



### Features

- International standard packages JEDEC TO-220AB and TO-263AA
- High current handling capability
- MOS Gate turn-on - drive simplicity

### Applications

- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switch-mode and resonant-mode power supplies
- Capacitor discharge

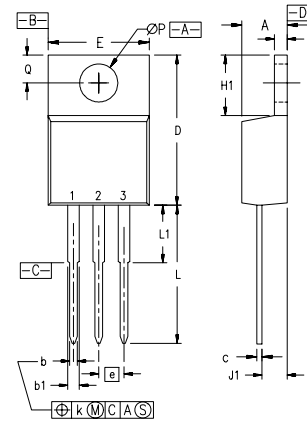
### Advantages

- Easy to mount with one screw
- Reduces assembly time and cost
- High power density

| Symbol        | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) | Characteristic Values |   |                           |
|---------------|---|-----------------------|---|---------------------------|
|               |   | Min.                  | Typ.  | Max.                      |
| $BV_{CES}$    | $I_C = 1 \text{ mA}, V_{GE} = 0 \text{ V}$                                  | 1000                  |   | V                         |
| $V_{GE(th)}$  | $I_C = 250 \mu\text{A}, V_{CE} = V_{GE}$                                    | 2.5                   |   | V                         |
| $I_{CES}$     | $V_{CE} = V_{CES}$<br>$V_{GE} = 0 \text{ V}$                                |                       | $T_J = 25^\circ\text{C}$<br>$T_J = 125^\circ\text{C}$ | 250 $\mu\text{A}$<br>1 mA |
| $I_{GES}$     | $V_{CE} = 0 \text{ V}, V_{GE} = \pm 20 \text{ V}$                           |                       |   | $\pm 100 \text{ nA}$      |
| $V_{CE(sat)}$ | $I_C = I_{CE90}, V_{GE} = 15$   |                       | 2.2   | 3.0 V                     |

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified)   | Characteristic Values |      |      |    |
|--------------|---|-----------------------|------|------|----|
|              |   | Min.                  | Typ. | Max. |    |
| $g_{fs}$     | $I_C = I_{C90}$ ; $V_{CE} = 10\text{ V}$ ,<br>Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $\leq 2\%$   | 12                    | 16   | S    |    |
| $C_{ies}$    | $V_{CE} = 25\text{ V}$ , $V_{GE} = 0\text{ V}$ , $f = 1\text{ MHz}$   |                       | 1750 | pF   |    |
| $C_{oes}$    |   |                       | 100  | pF   |    |
| $C_{res}$    |   |                       | 38   | pF   |    |
| $I_{C(ON)}$  | $V_{GE} = 10\text{ V}$ , $V_{CE} = 10\text{ V}$   |                       | 90   | A    |    |
| $Q_g$        | $I_C = I_{C90}$ ; $V_{GE} = 15\text{ V}$ , $V_{CE} = 0.5 V_{CES}$   |                       | 73   | nC   |    |
| $Q_{ge}$     |   |                       | 13   | nC   |    |
| $Q_{gc}$     |   |                       | 26   | nC   |    |
| $t_{d(on)}$  | <b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b><br>$I_C = I_{C90}$ ; $V_{GE} = 15\text{ V}$<br>$V_{CE} = 800\text{ V}$ , $R_G = R_{off} = 47\ \Omega$<br>Remarks: Switching times may increase for $V_{CE}$ (Clamp) $> 0.8 V_{CES}$ , higher $T_J$ or increased $R_G$  |                       | 30   | ns   |    |
| $t_{ri}$     |   |                       | 30   | ns   |    |
| $t_{d(off)}$ |   |                       | 350  | 700  | ns |
| $t_{fi}$     |   |                       | 280  | 700  | ns |
| $E_{off}$    |   |                       | 3.5  | 8.0  | mJ |
| $t_{d(on)}$  | <b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b><br>$I_C = I_{C90}$ ; $V_{GE} = 15\text{ V}$<br>$V_{CE} = 800\text{ V}$ , $R_G = R_{off} = 47\ \Omega$<br>Remarks: Switching times may increase for $V_{CE}$ (Clamp) $> 0.8 V_{CES}$ , higher $T_J$ or increased $R_G$ |                       | 30   | ns   |    |
| $t_{ri}$     |   |                       | 30   | ns   |    |
| $E_{on}$     |   |                       | 0.65 | mJ   |    |
| $t_{d(off)}$ |   |                       | 700  | ns   |    |
| $t_{fi}$     |   |                       | 520  | ns   |    |
| $E_{off}$    |   | 6.5                   | mJ   |      |    |
| $R_{thJC}$   |   |                       | 0.83 | K/W  |    |
| $R_{thCK}$   | TO-220  |                       | 0.5  | K/W  |    |

### TO-220 AB Dimensions

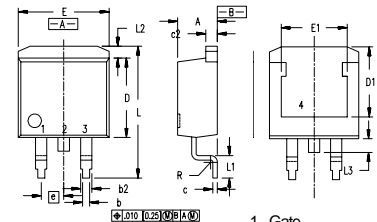


Pins: 1 - Gate  
2 - Collector  
3 - Emitter  
4 - Collector  
Bottom Side

| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .170     | .190 | 4.32        | 4.83  |
| b   | .025     | .040 | 0.64        | 1.02  |
| b1  | .045     | .065 | 1.15        | 1.65  |
| c   | .014     | .022 | 0.35        | 0.56  |
| D   | .580     | .630 | 14.73       | 16.00 |
| E   | .390     | .420 | 9.91        | 10.66 |
| e   | .100 BSC |      | 2.54 BSC    |       |
| F   | .045     | .055 | 1.14        | 1.40  |
| H1  | .230     | .270 | 5.85        | 6.85  |
| J1  | .090     | .110 | 2.29        | 2.79  |
| k   | 0        | .015 | 0           | 0.38  |
| L   | .500     | .550 | 12.70       | 13.97 |
| L1  | .110     | .230 | 2.79        | 5.84  |
| ØP  | .139     | .161 | 3.53        | 4.08  |
| Q   | .100     | .125 | 2.54        | 3.18  |

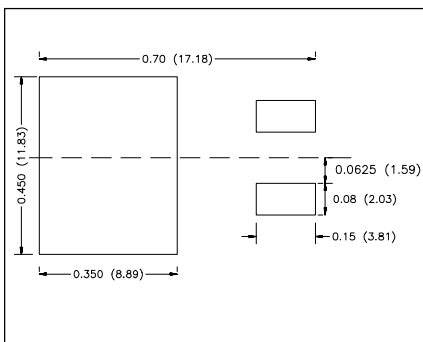
NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO-220 AB.

### TO-263 AA Outline



1. Gate  
2. Collector  
3. Emitter  
4. Collector  
Bottom Side

| Dim. | Millimeter |       | Inches   |      |
|------|------------|-------|----------|------|
|      | Min.       | Max.  | Min.     | Max. |
| A    | 4.06       | 4.83  | .160     | .190 |
| A1   | 2.03       | 2.79  | .080     | .110 |
| b    | 0.51       | 0.99  | .020     | .039 |
| b2   | 1.14       | 1.40  | .045     | .055 |
| c    | 0.46       | 0.74  | .018     | .029 |
| c2   | 1.14       | 1.40  | .045     | .055 |
| D    | 8.64       | 9.65  | .340     | .380 |
| D1   | 7.11       | 8.13  | .280     | .320 |
| E    | 9.65       | 10.29 | .380     | .405 |
| E1   | 6.86       | 8.13  | .270     | .320 |
| e    | 2.54 BSC   |       | .100 BSC |      |
| L    | 14.61      | 15.88 | .575     | .625 |
| L1   | 2.29       | 2.79  | .090     | .110 |
| L2   | 1.02       | 1.40  | .040     | .055 |
| L3   | 1.27       | 1.78  | .050     | .070 |
| L4   | 0          | 0.38  | 0        | .015 |
| R    | 0.46       | 0.74  | .018     | .029 |



### Min. Recommended Footprint (Dimensions in inches and mm)

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



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