

**IXGH20N80, 90, 100****IXGM20N80, 90, 100**

20 AMPS, 800–1000 VOLTS

**MAXIMUM RATINGS**

| Parameter                                                         | Sym.              | IXGH20N80<br>IXGM20N80 | IXGH20N90<br>IXGM20N90 | IXGH20N100<br>IXGM20N100 | Unit     |
|-------------------------------------------------------------------|-------------------|------------------------|------------------------|--------------------------|----------|
| Drain-Source Voltage (1)                                          | $V_{DSS}$         | 800                    | 900                    | 1000                     | $V_{dc}$ |
| Drain-Gate Voltage ( $R_{GS} = 1.0M\Omega$ ) (1)                  | $V_{DGR}$         | 800                    | 900                    | 1000                     | $V_{dc}$ |
| Gate-Source Voltage                                               | $V_{GS}$          | $\pm 30$               | $\pm 30$               | $\pm 30$                 | $V_{dc}$ |
| Drain Current Continuous $T_C = 25^\circ C$<br>$T_C = 90^\circ C$ | $I_D$             | 40                     | 40                     | 40                       | $A_{dc}$ |
|                                                                   |                   | 20                     | 20                     | 20                       |          |
| Drain Current Peak (3)                                            | $I_{DM}$          | 70                     | 70                     | 70                       | $A_{dc}$ |
| Total Power Dissipation ( $\theta$ 25°C)                          | $P_D$             |                        | 150                    |                          | W        |
| Power Dissipation Derating > 25°C                                 |                   |                        | 1.25                   |                          | W/°C     |
| Operating and Storage Junction Temperature                        | $T_J$ & $T_{stg}$ |                        | -65 to +150            |                          | °C       |
| Thermal Resistance                                                | $R_{thJC}$        |                        | 0.8                    |                          | °C/W     |

**ELECTRICAL CHARACTERISTICS**  $T_C = 25^\circ C$  unless otherwise specified

| Parameter                                 | Type                | Min. | Typ. | Max. | Units   | Test Conditions                                                                |
|-------------------------------------------|---------------------|------|------|------|---------|--------------------------------------------------------------------------------|
| $BV_{DSS}$ Drain-Source Breakdown Voltage | 20N80, 80A          | 800  | —    | —    | V       | $V_{GS} = 0V$<br>$I_D = 250\mu A$                                              |
|                                           | 20N90, 90A          | 900  | —    | —    | V       |                                                                                |
|                                           | 20N100, 100A        | 1000 | —    | —    | V       |                                                                                |
| $V_{GS(th)}$ Gate Threshold Voltage       | ALL                 | 2.5  | —    | 5.0  | V       | $V_{DS} = V_{GS}$ , $I_D = 250\mu A$                                           |
| $I_{GSS}$ Gate-Source Leakage             | ALL                 | —    | —    | 100  | nA      | $V_{GS} = \pm 30V$                                                             |
| $I_{DSS}$ Zero Gate Voltage Drain Current | ALL                 | —    | —    | 200  | $\mu A$ | $V_{DS} = \text{Max. Rating} \times 0.8$ , $V_{GS} = 0V$                       |
|                                           |                     | —    | —    | 1000 | $\mu A$ | $V_{DS} = \text{Max. Rating} \times 0.8$ , $V_{GS} = 0V$ , $T_C = 125^\circ C$ |
| $V_{DS(ON)}$ Drain-Source On Voltage      | 20N80, 90, 100      | —    | —    | 2.7  | V       | $V_{GS} = 15V$ , $I_D = 20A$                                                   |
|                                           | 20N80A, 90A<br>100A | —    | —    | 3.5  | V       |                                                                                |
| $G_{fs}$ Forward Transconductance (2)     | ALL                 | 6.0  | —    | —    | S       | $V_{DS} = 10V$ , $I_D = 10A$                                                   |
| $C_{iss}$ Input Capacitance               | ALL                 | —    | —    | 2000 | pF      | $V_{GS} = 0V$ , $V_{DS} = 25V$ , $f = 1.0 \text{ MHz}$                         |
| $C_{oss}$ Output Capacitance              | ALL                 | —    | —    | 200  | pF      |                                                                                |
| $C_{rss}$ Reverse Transfer Capacitance    | ALL                 | —    | —    | 40   | pF      |                                                                                |

**SWITCHING CHARACTERISTICS****RESISTIVE LOAD**

|                                  |                      |   |   |     |         |                                                                                                                                            |
|----------------------------------|----------------------|---|---|-----|---------|--------------------------------------------------------------------------------------------------------------------------------------------|
| $t_{d(on)}$ Turn-On Delay Time   | ALL                  | — | — | 100 | ns      | Resistive Load, $T_J = 125^\circ C$<br>$I_D = 20A$ , $V_{DS} = \text{Rated } V_{DSS} \times 0.8$<br>$V_{GS} = 15V$<br>$R_{GS} = 100\Omega$ |
| $t_r$ Current Rise Time          | ALL                  | — | — | 200 | ns      |                                                                                                                                            |
| $t_{d(off)}$ Turn-Off Delay Time | ALL                  | — | — | 500 | ns      |                                                                                                                                            |
| $t_f$ Current Fall Time          | 20N80, 90, 100       | — | — | 2.0 | $\mu s$ |                                                                                                                                            |
|                                  | 20N80A, 90A,<br>100A | — | — | 1.0 | $\mu s$ |                                                                                                                                            |

**INDUCTIVE LOAD**

|                                  |                      |   |   |     |         |                                                                                                                                                                            |
|----------------------------------|----------------------|---|---|-----|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $t_{d(off)}$ Turn-Off Delay Time | ALL                  | — | — | 500 | ns      | Inductive Load, $T_J = 125^\circ C$<br>$L = 100 \mu H$ , $I_D = 20A$<br>$V_{DS}(\text{Clamp}) = \text{Rated } V_{DSS} \times 0.8$<br>$V_{GS} = 15V$ , $R_{GS} = 100\Omega$ |
| $t_f$ Current Fall Time          | 20N80, 90, 100       | — | — | 3.0 | $\mu s$ |                                                                                                                                                                            |
|                                  | 20N80A, 90A,<br>100A | — | — | 1.0 | $\mu s$ |                                                                                                                                                                            |

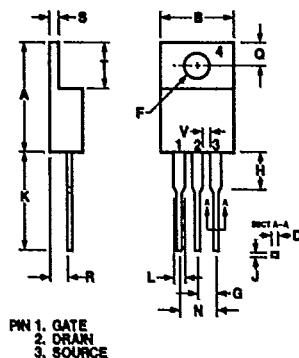
1.  $T_J = 25^\circ C$  to  $150^\circ C$ 2. Pulse Test: Pulse width  $\approx 300ms$ , duty cycle  $\approx 2\%$ 

3. Repetitive Rating: Pulse width limited by max junction temperature

# DETAILED PACKAGE OUTLINES

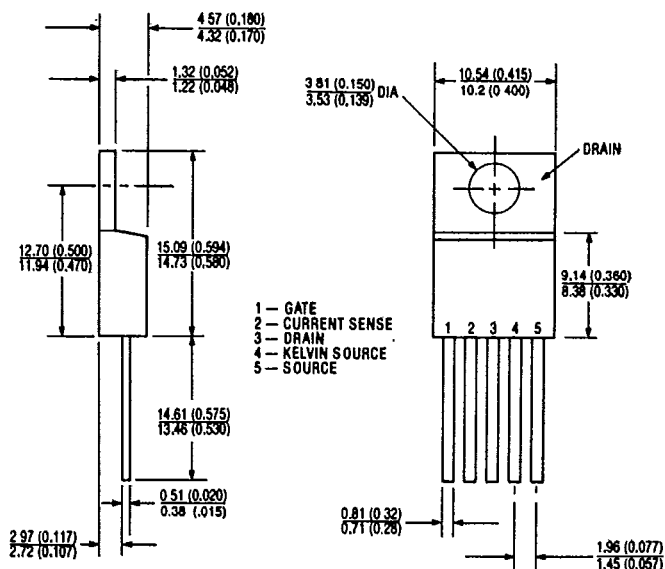
T-91-20

TO-220 AB

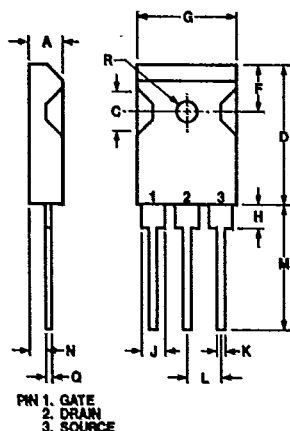


| Dim. | Millimeter |       | Inches |      |
|------|------------|-------|--------|------|
|      | Min.       | Max.  | Min.   | Max. |
| A    | 14.23      | 16.51 | .560   | .650 |
| B    | 9.66       | 10.66 | .380   | .420 |
| C    | 3.56       | 4.82  | .140   | .190 |
| D    | 0.64       | 0.89  | .025   | .035 |
| F    | 3.54       | 4.08  | .139   | .161 |
| G    | 2.29       | 2.79  | .090   | .110 |
| H    | —          | 6.35  | —      | .250 |
| J    | 0.51       | .76   | .020   | .030 |
| K    | 12.70      | 14.73 | .500   | .580 |
| L    | 1.15       | 1.77  | .045   | .070 |
| N    | 4.83       | 5.33  | .190   | .210 |
| Q    | 2.54       | 3.42  | .100   | .135 |
| R    | 2.04       | 2.49  | .080   | .115 |
| S    | 0.64       | 1.39  | .025   | .055 |
| T    | 5.85       | 6.85  | .230   | .270 |
| V    | 1.15       | —     | .045   | —    |

CONFORMS TO OUTLINE TO-220 (IR H-7)  
Dimensions in Millimeters (Inches)

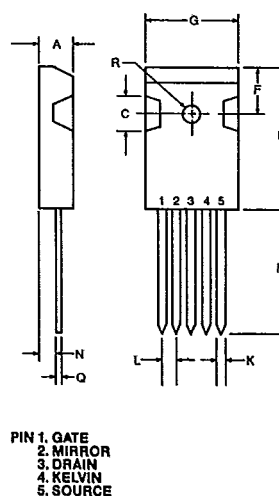


TO-247 (3 LEADED)



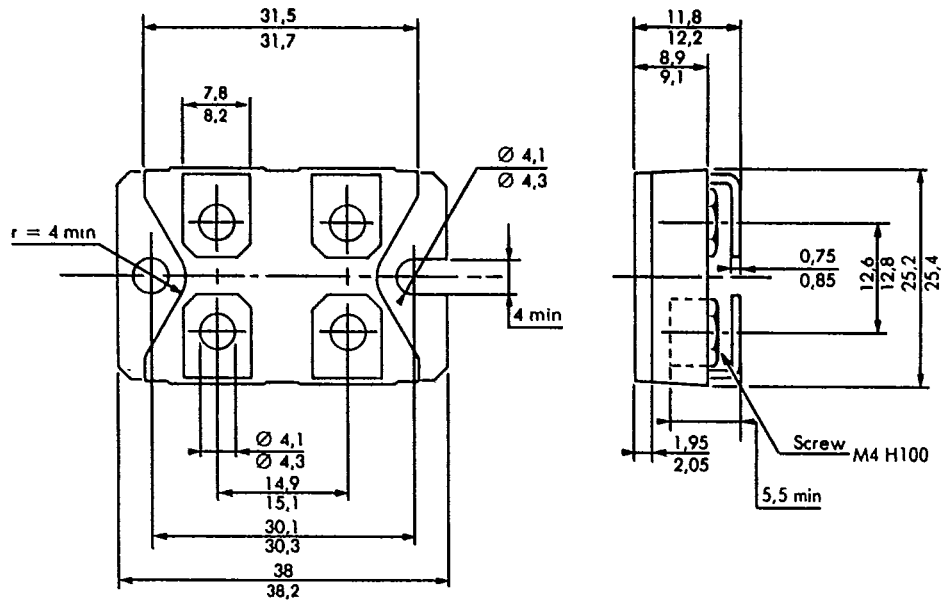
| Dim.           | Millimeter |      | Inches |      |
|----------------|------------|------|--------|------|
|                | Min.       | Max. | Min.   | Max. |
| A              | 4.7        | 5.3  | .185   | .209 |
| C              | 4.5        | 6.0  | .178   | .236 |
| D              | 19.7       | 21.4 | .776   | .843 |
| F              | 5.3        | 6.1  | .209   | .240 |
| G              | 15.3       | 15.9 | .602   | .625 |
| H              | 3.7        | 4.3  | .146   | .169 |
| J              | 1.95       | 2.4  | .077   | .094 |
| J <sub>1</sub> | 2.97       | 3.4  | .117   | .134 |
| K              | 1.0        | 1.4  | .040   | .055 |
| L              | 5.4        | 5.5  | .213   | .217 |
| M              | 19.9       | 20.2 | .783   | .795 |
| N              | 2.2        | 2.6  | .087   | .102 |
| Q              | 0.4        | 0.8  | .016   | .031 |
| R              | 2.9        | 3.3  | .114   | .129 |

TO-247 (5 LEADED)

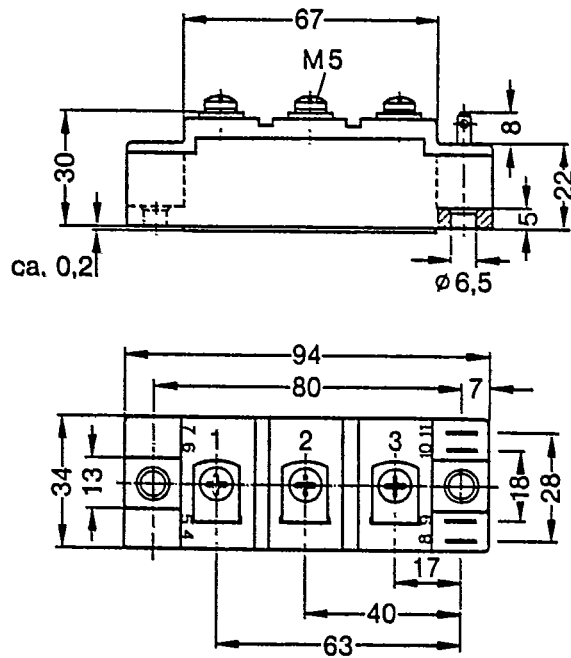


| Dim. | Millimeter |      | Inches |      |
|------|------------|------|--------|------|
|      | Min.       | Max. | Min.   | Max. |
| A    | 4.7        | 5.3  | .185   | .209 |
| C    | 4.5        | 6.0  | .178   | .236 |
| D    | 19.7       | 21.4 | .776   | .843 |
| F    | 5.3        | 6.1  | .209   | .240 |
| G    | 15.3       | 15.9 | .602   | .625 |
| K    | 1.1        | 1.3  | .043   | .051 |
| L    | 2.51       | 2.56 | .099   | .101 |
| M    | 19.9       | 20.2 | .783   | .795 |
| N    | 2.2        | 2.6  | .087   | .102 |
| Q    | 0.4        | 0.8  | .016   | .031 |
| R    | 2.9        | 3.3  | .114   | .129 |

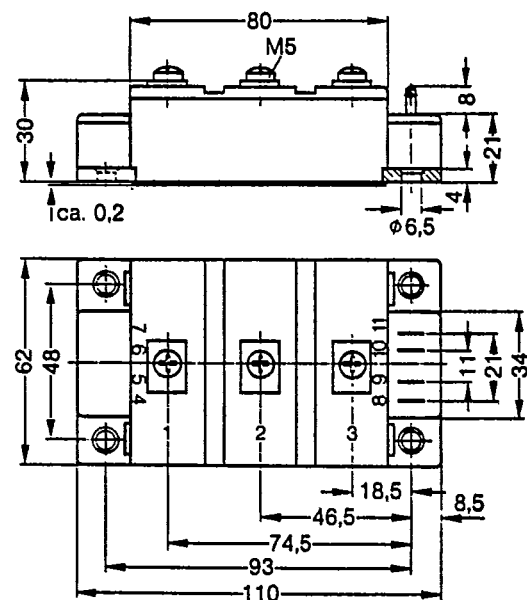
**TO-238**  
Dimensions in Millimeters



**Y-4**  
Dimensions in Millimeters

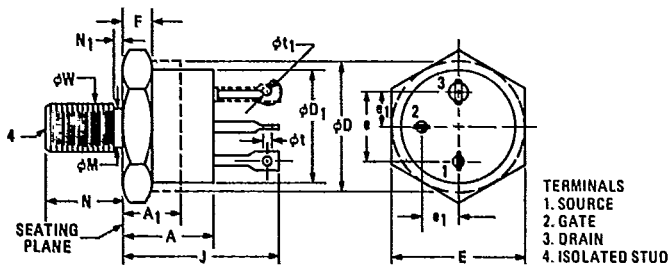


**Y-3**  
Dimensions in Millimeters





# CONFORMS TO JEDEC OUTLINE TO-210AC (TO-61) Dimensions in Millimeters (Inches)



TERMINALS  
1. SOURCE  
2. GATE  
3. DRAIN  
4. ISOLATED STUD

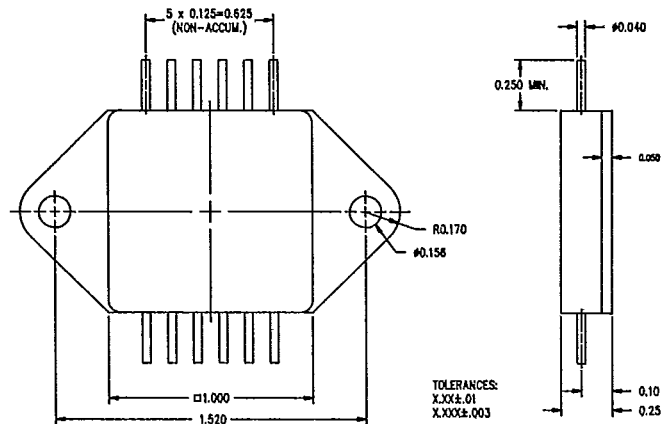
| Symbol          | Inches | Millimeters | Notes |
|-----------------|--------|-------------|-------|
| A               | 0.325  | 8.26        | 11.68 |
| A <sub>1</sub>  | 0.270  | 6.86        | 2     |
| ϕD              | 0.610  | 15.49       | 17.45 |
| ϕD <sub>1</sub> | 0.570  | 14.48       | 15.49 |
| E               | 0.667  | 16.94       | 17.45 |
| e               | 0.340  | 8.64        | 10.54 |
| e <sub>1</sub>  | 0.170  | 4.32        | 5.41  |
| F               | 0.090  | 2.29        | 3.81  |

| Symbol          | Inches | Millimeters | Notes |
|-----------------|--------|-------------|-------|
| J               | 0.640  | 16.26       | 22.23 |
| ϕM              | 0.220  | 5.59        | 6.32  |
| N               | 0.422  | 10.72       | 11.56 |
| N <sub>1</sub>  | 0.090  | 2.29        |       |
| ϕt              | 0.055  | 1.19        | 1.83  |
| ϕt <sub>1</sub> | 0.046  | 1.17        | 1.96  |
| ϕW              | 0.2225 | 5.661       | 5.761 |

## NOTES

1. DIMENSION DOES NOT INCLUDE SEALING FLANGES.
2. PACKAGE CONTOUR OPTIONAL WITHIN DIMENSIONS SPECIFIED.
3. PITCH DIAMETER - THREAD 1/4 28 UNF 2A (COATED).  
REFERENCE IS SCREW THREAD STANDARDS FOR FEDERAL SERVICES - HANDBOOK H 281.
4. THIS TERMINAL CAN BE FLATTENED AND PIERCED OR HOOK TYPE.
5. POSITION OF LEADS IN RELATION TO THE HEXAGON IS NOT CONTROLLED.

# QUADPAC



# Z-Pac

