

N-Channel Enhancement Mode Switch Mode RF MOSFET  
Low Capacitance Z-MOS™ MOSFET Process  
Optimized for RF Operation  
Ideal for Class C, D, & E Applications

| Symbol      | Test Conditions                                                                                                                        | Maximum Ratings |      |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------|-----------------|------|
| $V_{DSS}$   | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                                                                                        | 600             | V    |
| $V_{DGR}$   | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1\text{ M}\Omega$                                                          | 600             | V    |
| $V_{GS}$    | Continuous                                                                                                                             | $\pm 20$        | V    |
| $V_{GSM}$   | Transient                                                                                                                              | $\pm 30$        | V    |
| $I_{D25}$   | $T_c = 25^\circ\text{C}$                                                                                                               | 18              | A    |
| $I_{DM}$    | $T_c = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$                                                                             | 90              | A    |
| $I_{AR}$    | $T_c = 25^\circ\text{C}$                                                                                                               | 18              | A    |
| $E_{AR}$    | $T_c = 25^\circ\text{C}$                                                                                                               | TBD             | mJ   |
| $dv/dt$     | $I_S \leq I_{DM}$ , $di/dt \leq 100\text{A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ ,<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 0.2\Omega$ | 5               | V/ns |
|             | $I_S = 0$                                                                                                                              | >200            | V/ns |
| $P_{DC}$    |                                                                                                                                        | 350             | W    |
| $P_{DHS}$   | $T_c = 25^\circ\text{C}$ , Derate $4.4\text{W}/^\circ\text{C}$ above $25^\circ\text{C}$                                                | TBD             | W    |
| $P_{DAMB}$  | $T_c = 25^\circ\text{C}$                                                                                                               | 3.0             | W    |
| $R_{thJC}$  |                                                                                                                                        | TBD             | C/W  |
| $R_{thJHS}$ |                                                                                                                                        | TBD             | C/W  |

| Symbol       | Test Conditions                                                                                              | Characteristic Values                                 |      |                        |
|--------------|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|------|------------------------|
|              |                                                                                                              | $(T_J = 25^\circ\text{C}$ unless otherwise specified) |      |                        |
|              |                                                                                                              | min.                                                  | typ. | max.                   |
| $V_{DSS}$    | $V_{GS} = 0\text{ V}$ , $I_D = 4\text{ ma}$                                                                  | 600                                                   |      | V                      |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250\mu\text{A}$                                                                   |                                                       | 4.6  | V                      |
| $I_{GSS}$    | $V_{GS} = \pm 20\text{ V}_{DC}$ , $V_{DS} = 0$                                                               |                                                       |      | $\pm 100$ nA           |
| $I_{DSS}$    | $V_{DS} = 0.8V_{DSS}$<br>$V_{GS} = 0$                                                                        | $T_J = 25^\circ\text{C}$<br>$T_J = 125^\circ\text{C}$ |      | 50 $\mu\text{A}$       |
|              |                                                                                                              |                                                       |      | 1 mA                   |
| $R_{DS(on)}$ | $V_{GS} = 20\text{ V}$ , $I_D = 0.5I_{D25}$<br>Pulse test, $t \leq 300\mu\text{s}$ , duty cycle $d \leq 2\%$ |                                                       | 0.53 | $\Omega$               |
| $g_{fs}$     | $V_{DS} = 50\text{ V}$ , $I_D = 0.5I_{D25}$ , pulse test                                                     |                                                       | 6.4  | S                      |
| $T_J$        |                                                                                                              | -55                                                   |      | +175 $^\circ\text{C}$  |
| $T_{JM}$     |                                                                                                              |                                                       | 175  | $^\circ\text{C}$       |
| $T_{stg}$    |                                                                                                              | -55                                                   |      | + 175 $^\circ\text{C}$ |
| $T_L$        | 1.6mm(0.063 in) from case for 10 s                                                                           |                                                       | 300  | $^\circ\text{C}$       |
| Weight       |                                                                                                              |                                                       | 3.5  | g                      |

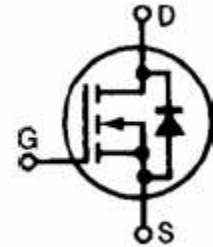
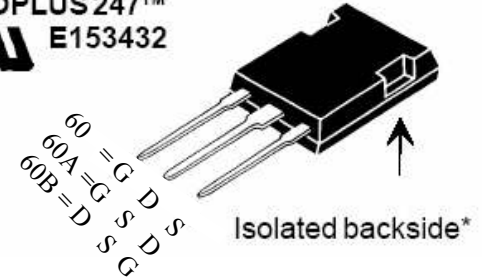
$$V_{DSS} = 600\text{ V}$$

$$I_{D25} = 18\text{ A}$$

$$R_{DS(on)} \leq 0.56\ \Omega$$

$$P_{DC} = 350$$

ISOPLUS247™  
E153432



### Features

- Isolated Substrate
  - high isolation voltage (>2500V)
  - excellent thermal transfer
  - Increased temperature and power cycling capability
- IXYS advanced Z-MOS process
- Low gate charge and capacitances
  - easier to drive
  - faster switching
- Low  $R_{DS(on)}$
- Very low insertion inductance (<2nH)
- No beryllium oxide (BeO) or other hazardous materials

### Advantages

- High Performance RF Z-MOS™
- Optimized for RF and high speed
- Common Source RF Package
  - A = Gate Source Drain
  - B = Drain Source Gate
- Isolated Package, no insulator required



# IXZR16N60 & IXZR16N60A/B Z-MOS RF Power MOSFET

| Symbol       | Test Conditions                                                                            | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ unless otherwise specified) |      |            |
|--------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|------|------------|
|              |                                                                                            | min.                                                                            | typ. | max.       |
| $R_G$        |                                                                                            |                                                                                 |      | 1 $\Omega$ |
| $C_{iss}$    |                                                                                            |                                                                                 | 2040 | pF         |
| $C_{oss}$    | $V_{GS} = 0\text{ V}$ , $V_{DS} = 0.8 V_{DSS(max)}$ ,<br>$f = 1\text{ MHz}$                |                                                                                 | 160  | pF         |
| $C_{rss}$    |                                                                                            |                                                                                 | 20   | pF         |
| $C_{stray}$  | Back Metal to any Pin                                                                      |                                                                                 | 33   | pF         |
| $T_{d(on)}$  |                                                                                            |                                                                                 | 4    | ns         |
| $T_{on}$     | $V_{GS} = 15\text{ V}$ , $V_{DS} = 0.8 V_{DSS}$<br>$I_D = 0.5 I_{DM}$                      |                                                                                 | 4    | ns         |
| $T_{d(off)}$ | $R_G = 1\text{ }\Omega$ (External)                                                         |                                                                                 | 4    | ns         |
| $T_{off}$    |                                                                                            |                                                                                 | 6    | ns         |
| $Q_{g(on)}$  |                                                                                            |                                                                                 | 42   | nC         |
| $Q_{gs}$     | $V_{GS} = 10\text{ V}$ , $V_{DS} = 0.5 V_{DSS}$<br>$I_D = 0.5 I_{D25}$ $I_G = 3\text{ mA}$ |                                                                                 | 13   | nC         |
| $Q_{gd}$     |                                                                                            |                                                                                 | 18   | nC         |

| Source-Drain Diode |                                                                                                   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ unless otherwise specified) |      |       |
|--------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|------|-------|
| Symbol             | Test Conditions                                                                                   | min.                                                                            | typ. | max.  |
| $I_S$              | $V_{GS} = 0\text{ V}$                                                                             |                                                                                 |      | 18 A  |
| $I_{SM}$           | Repetitive; pulse width limited by $T_{JM}$                                                       |                                                                                 |      | 108 A |
| $V_{SD}$           | $I_F = I_S$ , $V_{GS} = 0\text{ V}$ , Pulse test, $t \leq 300\mu\text{s}$ , duty cycle $\leq 2\%$ |                                                                                 |      | 1.5 V |
| $T_{rr}$           |                                                                                                   |                                                                                 | 200  | ns    |

CAUTION: Operation at or above the Maximum Ratings values may impact device reliability or cause permanent damage to the device.

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

IXYS RF MOSFETS are covered by one or more of the following U.S. patents:

|           |           |           |           |           |           |
|-----------|-----------|-----------|-----------|-----------|-----------|
| 4,835,592 | 4,860,072 | 4,881,106 | 4,891,686 | 4,931,844 | 5,017,508 |
| 5,034,796 | 5,049,961 | 5,063,307 | 5,187,117 | 5,237,481 | 5,486,715 |
| 5,381,025 | 5,640,045 | 6,404,065 | 6,583,505 | 6,710,463 | 6,727,585 |
| 6,731,002 |           |           |           |           |           |

Fig. 1

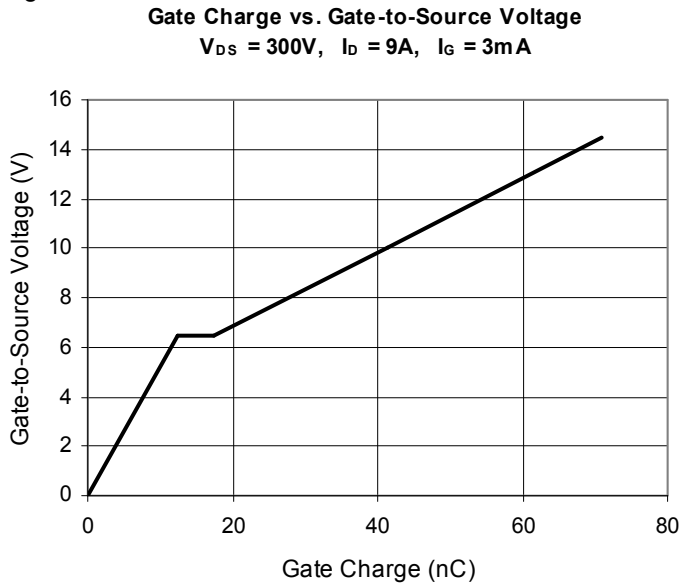


Fig. 2

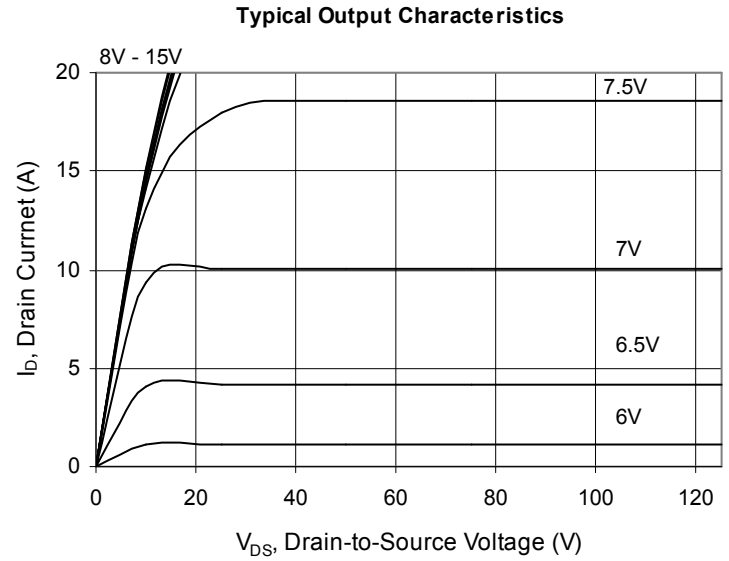


Fig. 3

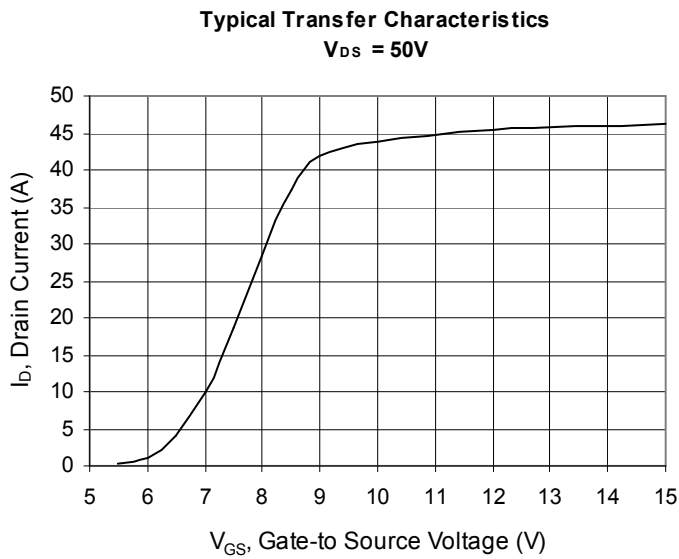


Fig. 4

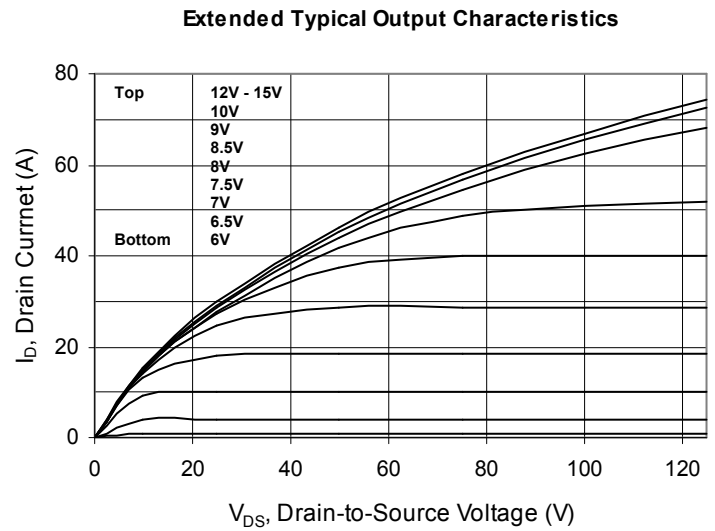


Fig. 5

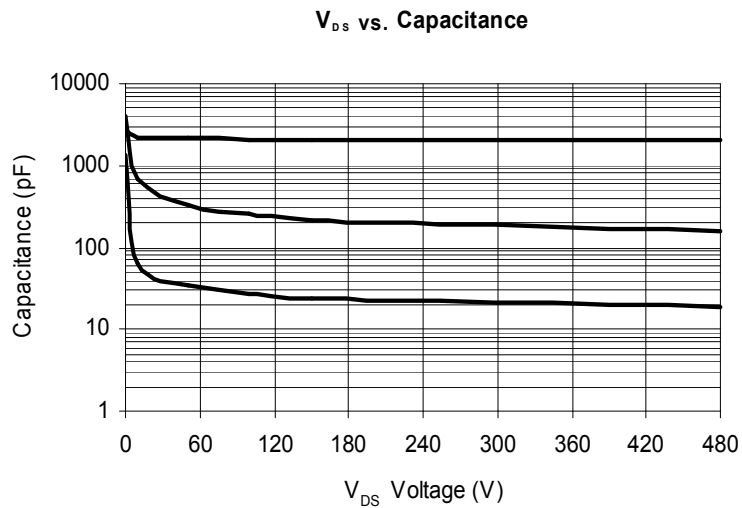
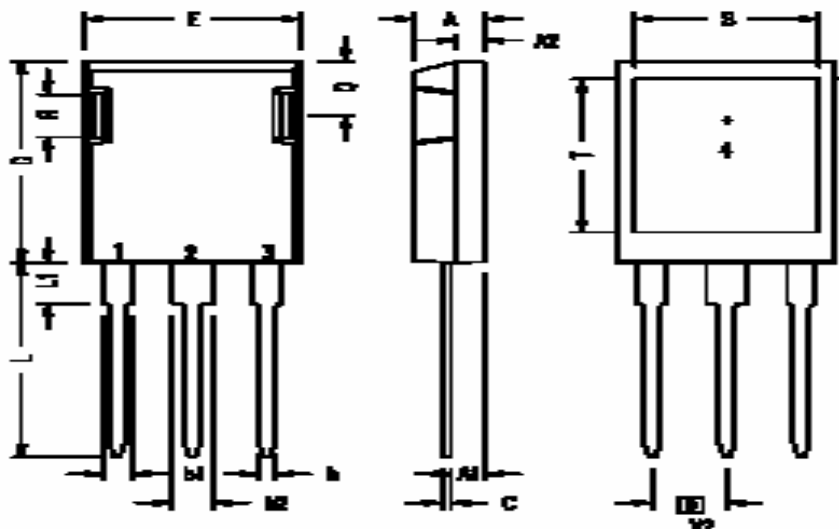


Fig. 6 Package Drawing

### ISOPLUS 247 OUTLINE



60: 1=G, 2=D, 3=S  
 60A: 1=G, 2=S, 3=D  
 60B: 1=D, 2=S, 3=G



1 Gate, 2 Drain (Collector)  
 3 Source (Emitter)  
 4 no connection

| Dim.           | Millimeter |       | Inches   |      |
|----------------|------------|-------|----------|------|
|                | Min.       | Max.  | Min.     | Max. |
| A              | 4.83       | 5.21  | .190     | .205 |
| A <sub>1</sub> | 2.29       | 2.54  | .090     | .100 |
| A <sub>2</sub> | 1.91       | 2.16  | .075     | .085 |
| b              | 1.14       | 1.40  | .045     | .055 |
| b <sub>1</sub> | 1.91       | 2.13  | .075     | .084 |
| b <sub>2</sub> | 2.92       | 3.12  | .115     | .123 |
| C              | 0.61       | 0.80  | .024     | .031 |
| D              | 20.80      | 21.34 | .819     | .840 |
| E              | 15.75      | 16.13 | .620     | .635 |
| e              | 5.45 BSC   |       | .215 BSC |      |
| L              | 19.81      | 20.32 | .780     | .800 |
| L1             | 3.81       | 4.32  | .150     | .170 |
| Q              | 5.59       | 6.20  | .220     | .244 |
| R              | 4.32       | 4.83  | .170     | .190 |

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