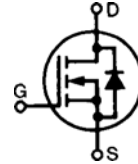


HiPerFET™ Power MOSFETs IXFR 58N20Q

ISOPLUS247™ Q-Class

(Electrically Isolated Back Surface)

N-Channel Enhancement Mode
 Avalanche Rated, High dV/dt
 Low Gate Charge and Capacitances
 Preliminary Data Sheet



$$V_{DSS} = 200 \text{ V}$$

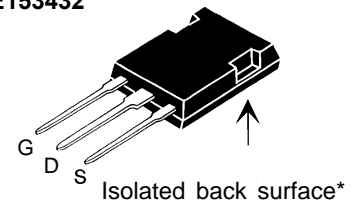
$$I_{D25} = 50 \text{ A}$$

$$R_{DS(on)} = 40 \text{ m}\Omega$$

$$t_{rr} \leq 200 \text{ ns}$$

| Symbol | Test Conditions | Maximum Ratings | |
|------------|---|-----------------|------------------|
| V_{DSS} | $T_J = 25^\circ\text{C}$ to 150°C | 200 | V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1 \text{ M}\Omega$ | 200 | V |
| V_{GS} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 50 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, Note 1 | 232 | A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 58 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 30 | mJ |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 1.0 | J |
| dv/dt | $I_S \leq I_{DM}$, $di/dt \leq 100 \text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$ $T_J \leq 150^\circ\text{C}$, $R_G = 2 \Omega$ | 5 | V/ns |
| P_D | $T_C = 25^\circ\text{C}$ | 300 | W |
| T_J | | -55 ... +150 | $^\circ\text{C}$ |
| T_{JM} | | 150 | $^\circ\text{C}$ |
| T_{stg} | | -55 ... +150 | $^\circ\text{C}$ |
| T_L | 1.6 mm (0.062 in.) from case for 10 s | 250 | $^\circ\text{C}$ |
| V_{ISOL} | 50/60 Hz, RMS $t = 1 \text{ min}$ | 2500 | V~ |
| Weight | | 5 | g |

ISOPLUS247™
 E153432



G = Gate D = Drain
 S = Source

* Patent pending

Features

- Silicon chip on Direct-Copper-Bond substrate
 - High power dissipation
 - Isolated mounting surface
 - 2500V electrical isolation
- Low drain to tab capacitance (<50pF)
- IXYS advanced low Q_g process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Fast intrinsic diode

Applications

- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC motor control

Advantages

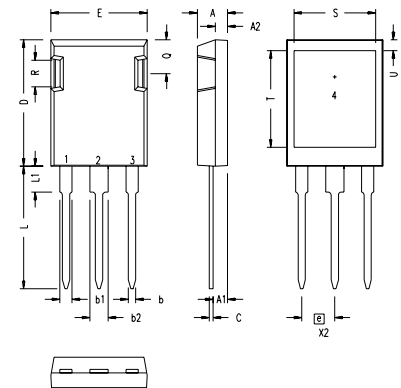
- Easy assembly
- Space savings
- High power density

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|------|--------------------------|
| | | min. | typ. | max. |
| V_{DSS} | $V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$ | 200 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 4 \text{ mA}$ | 2.0 | | 4.0 V |
| I_{GSS} | $V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0$ | | | $\pm 100 \text{ nA}$ |
| I_{DSS} | $V_{DS} = V_{DSS}$, $T_J = 25^\circ\text{C}$ $V_{GS} = 0 \text{ V}$, $T_J = 125^\circ\text{C}$ | | | 25 μA 1 mA |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$, $I_D = 29 \text{ A}$ Note 2 | | | 40 m Ω |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | Characteristic Values | | | |
|--------------|--|---|-----------------------|------|------|----|
| | | | min. | typ. | max. | |
| g_{fs} | $V_{DS} = 10\text{ V}; I_D = 29\text{ A}$ | Note 2 | 24 | 34 | S | |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | | 3600 | pF | |
| C_{oss} | | | | 870 | pF | |
| C_{rss} | | | | 280 | pF | |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 29\text{ A}$ $R_G = 1.5\ \Omega$ (External), | | | 20 | ns | |
| t_r | | | | 40 | ns | |
| $t_{d(off)}$ | | | | 40 | ns | |
| t_f | | | | 13 | ns | |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 29\text{ A}$ | | | 98 | 140 | nC |
| Q_{gs} | | | | 25 | 35 | nC |
| Q_{gd} | | | | 45 | 70 | nC |
| R_{thJC} | | | | 0.5 | K/W | |
| R_{thCK} | (TO-247) | | 0.15 | | K/W | |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | Characteristic Values | | | | | |
|----------|--|---|-----------------------|------|------|----|---|---|
| | | | min. | typ. | max. | | | |
| I_S | $V_{GS} = 0\text{ V}$ | | | 58 | A | | | |
| I_{SM} | Repetitive, Note 1 | | | 232 | A | | | |
| V_{SD} | $I_F = I_S, V_{GS} = 0\text{ V}$, Note 2 | | | 1.5 | V | | | |
| t_{rr} | $I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$ | | | 0.7 | 200 | ns | | |
| Q_{RM} | | | | | | | 7 | A |
| I_{RM} | | | | | | | | |

ISOPLUS 247 OUTLINE



| SYM | INCHES | | MILLIMETERS | |
|-----|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .190 | .205 | 4.83 | 5.21 |
| A1 | .090 | .100 | 2.29 | 2.54 |
| A2 | .075 | .085 | 1.91 | 2.16 |
| b | .045 | .055 | 1.14 | 1.40 |
| b1 | .075 | .084 | 1.91 | 2.13 |
| b2 | .115 | .123 | 2.92 | 3.12 |
| C | .024 | .031 | 0.61 | 0.80 |
| D | .819 | .840 | 20.80 | 21.34 |
| E | .620 | .635 | 15.75 | 16.13 |
| e | .215 BSC | | 5.45 BSC | |
| L | .780 | .800 | 19.81 | 20.32 |
| L1 | .150 | .170 | 3.81 | 4.32 |
| Q | .220 | .244 | 5.59 | 6.20 |
| R | .170 | .190 | 4.32 | 4.83 |
| S | .520 | .540 | 13.21 | 13.72 |
| T | .620 | .640 | 15.75 | 16.26 |
| U | .065 | .080 | 1.65 | 2.03 |

- 1 - GATE
- 2 - DRAIN (COLLECTOR)
- 3 - SOURCE (EMITTER)
- 4 - NO CONNECTION

NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO-247AD except screw hole.

Note: 1. Pulse width limited by T_{JM}
2. Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$



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