

HiPerFET™ Power MOSFETs

ISOPLUS247™

(Electrically Isolated Back Surface)

IXFR 50N50
IXFR 55N50

| V_{DSS} | I_{D25} | $R_{DS(on)}$ |
|-----------|-----------|--------------|
| 500 V | 43 A | 100 mΩ |
| 500 V | 48 A | 90 mΩ |

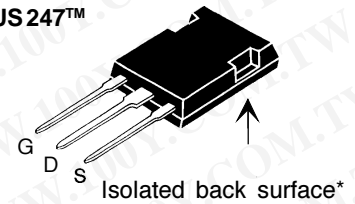
$t_{rr} \leq 250$ ns

Single Die MOSFET



| Symbol | Test Conditions | Maximum Ratings | |
|------------|---|--------------------------|------|
| V_{DSS} | $T_J = 25^\circ\text{C}$ to 150°C | 500 | V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1$ MΩ | 500 | V |
| V_{GS} | Continuous | ±20 | V |
| V_{GSM} | Transient | ±30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 50N50: 43 55N50: 48 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, Pulse width limited by T_{JM} | 50N50: 200 55N50: 220 | A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 50N50: 50 55N50: 55 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 60 | mJ |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 3 | J |
| dv/dt | $I_S \leq I_{DM}$, di/dt ≤ 100 A/μs, $V_{DD} \leq V_{DSS}$ $T_J \leq 150^\circ\text{C}$, $R_G = 2$ Ω | 5 | V/ns |
| P_D | $T_C = 25^\circ\text{C}$ | 400 | W |
| T_J | | -40 ... +150 | °C |
| T_{JM} | | 150 | °C |
| T_{stg} | | -40 ... +150 | °C |
| T_L | 1.6 mm (0.063 in.) from case for 10 s | 300 | °C |
| V_{ISOL} | 50/60 Hz, RMS t = 1 min | 2500 | V~ |
| Weight | | 5 | g |

ISOPLUS247™



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)
- Low $R_{DS(on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Fast intrinsic Rectifier

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

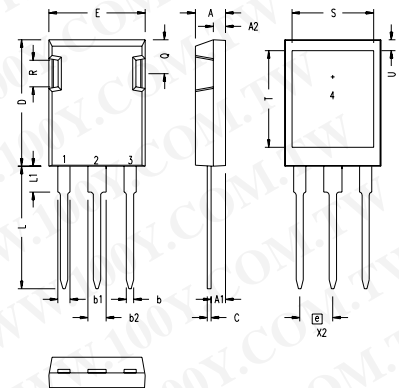
| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|--|---|---|-----------------|
| | | min. | typ. | max. |
| V_{DSS} | $V_{GS} = 0$ V, $I_D = 1$ mA | 500 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 8$ mA | 2.5 | | 4.5 V |
| I_{GSS} | $V_{GS} = \pm 20$ V, $V_{DS} = 0$ | | | ±200 nA |
| I_{DSS} | $V_{DS} = V_{DSS}$, $V_{GS} = 0$ V | | $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ | 25 μA 2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10$ V, $I_D = I_T$ Note 1 | | 50N50 55N50 | 100 mΩ 90 mΩ |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | min. | | typ. | | max. | |
|--------------|--|---|------|--|------|--|------|-----|
| | | | | | | | | |
| g_{fs} | $V_{DS} = 10\text{ V}; I_D = I_T$ | Note 1 | | | 45 | | | S |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | | | 9400 | | | pF |
| C_{oss} | | | | | 1280 | | | pF |
| C_{rss} | | | | | 460 | | | pF |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = I_T$ $R_G = 1\ \Omega$ (External), | | | | 45 | | | ns |
| t_r | | | | | 60 | | | ns |
| $t_{d(off)}$ | | | | | 120 | | | ns |
| t_f | | | | | 45 | | | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = I_T$ | | | | 330 | | | nC |
| Q_{gs} | | | | | 55 | | | nC |
| Q_{gd} | | | | | 155 | | | nC |
| R_{thJC} | | | | | | | 0.30 | K/W |
| R_{thCK} | | | | | 0.15 | | | K/W |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | min. | | typ. | | max. | |
|----------|--|---|------|--|------|--|------|---------------|
| | | | | | | | | |
| I_S | $V_{GS} = 0\text{ V}$ | 55N50 50N50 | | | 55 | | | A |
| I_{SM} | Repetitive; pulse width limited by T_{JM} | 55N50 50N50 | | | 220 | | | A |
| V_{SD} | $I_F = I_S, V_{GS} = 0\text{ V}$ | | | | 1.5 | | | V |
| t_{rr} | $I_F = 25\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$ | | | | 250 | | | ns |
| Q_{RM} | | | | | 1.0 | | | μC |
| I_{RM} | | | | | 10 | | | |

Note: 1. Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$
 2. I_T test current: 50N50 $I_T = 25\text{ A}$
 55N50 $I_T = 27.5\text{ A}$

ISOPLUS247 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.

See IXFK55N50 data sheet for characteristic curves.