

HiPerFET™ Power MOSFETs

ISOPLUS247™

(Electrically Isolated Back Surface)

IXFR 44N60

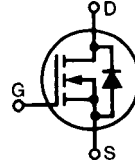
$$V_{DSS} = 600 \text{ V}$$

$$I_{D25} = 38 \text{ A}$$

$$R_{DS(on)} = 130 \text{ m}\Omega$$

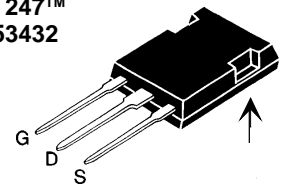
Single MOSFET Die

$$t_{rr} \leq 250 \text{ ns}$$



| Symbol | Test Conditions | Maximum Ratings | |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|
| V_{DSS} | $T_J = 25^\circ\text{C}$ to 150°C | 600 | V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1 \text{ M}\Omega$ | 600 | V |
| V_{GS} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 38 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, Note 1 | 60 | A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 44 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 60 | mJ |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 3 | J |
| dv/dt | $I_S \leq I_{DM}$, $di/dt \leq 100 \text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$ $T_J \leq 150^\circ\text{C}$, $R_G = 2 \Omega$ | 5 | V/ns |
| P_D | $T_C = 25^\circ\text{C}$ | 400 | 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 (0.063 in.) from case for 10 s | 300 | $^\circ\text{C}$ |
| V_{ISOL} | 50/60 Hz, RMS $t = 1 \text{ min}$ | 2500 | V~ |
| Weight | | 5 | g |

ISOPLUS 247™
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 (<30pF)
- Low $R_{DS(on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Fast intrinsic Rectifier

Applications

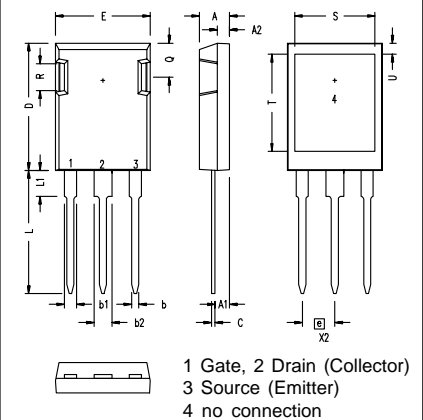
- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC & DC motor control

Advantages

- Easy assembly
- Space savings
- High power density
- Low noise to ground

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|-----------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------|
| | | min. | typ. | max. |
| V_{DSS} | $V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$ | 600 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 4 \text{ mA}$ | 2.5 | | 4.5 V |
| I_{GSS} | $V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0$ | | | $\pm 100 \text{ nA}$ |
| I_{DSS} | $V_{DS} = V_{DSS}$, $V_{GS} = 0 \text{ V}$ | | $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ | 100 μA 2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$, $I_D = I_T$ Notes 2, 3 | | | 130 m Ω |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|------|
| | | min. | typ. | max. |
| g_{fs} | $V_{DS} = 10\text{ V}; I_D = I_T$ Notes 2, 3 | 30 | 45 | S |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 8900 | pF |
| C_{oss} | | | 1000 | pF |
| C_{rss} | | | 330 | pF |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = I_T$ $R_G = 2.0\ \Omega$ (External), Notes 2, 3 | | 42 | ns |
| t_r | | | 55 | ns |
| $t_{d(off)}$ | | | 110 | ns |
| t_f | | | 45 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = I_T$ Notes 2, 3 | | 330 | nC |
| Q_{gs} | | | 60 | nC |
| Q_{gd} | | | 65 | nC |
| R_{thJC} | | | 0.30 | K/W |
| R_{thCK} | | 0.15 | | K/W |

ISOPLUS 247 (IXFR) OUTLINE


| Dim. | Millimeter | | Inches | |
|----------------|------------|-------|----------|------|
| | Min. | Max. | Min. | Max. |
| A | 4.83 | 5.21 | .190 | .205 |
| A ₁ | 2.29 | 2.54 | .090 | .100 |
| A ₂ | 1.91 | 2.16 | .075 | .085 |
| b | 1.14 | 1.40 | .045 | .055 |
| b ₁ | 1.91 | 2.13 | .075 | .084 |
| b ₂ | 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 |
| S | 13.21 | 13.72 | .520 | .540 |
| T | 15.75 | 16.26 | .620 | .640 |
| U | 1.65 | 3.03 | .065 | .080 |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|----------|----------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|---------------|
| | | min. | typ. | max. |
| I_s | $V_{GS} = 0\text{ V}$ | | | 44 A |
| I_{SM} | Repetitive; Note 1 | | | 176 A |
| V_{SD} | $I_F = I_T, V_{GS} = 0\text{ V}$, Notes 2, 3 | | | 1.3 V |
| t_{rr} | $I_F = 50\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$ | | | 250 ns |
| Q_{RM} | | | 1.4 | μC |
| I_{RM} | | | 8 | A |

- Note: 1. Pulse width limited by T_{JM}
 2. Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$
 3. $I_T = 22\text{ A}$