

PowerMOS transistor

**BUK445-400A
BUK445-400B**

T-39-09

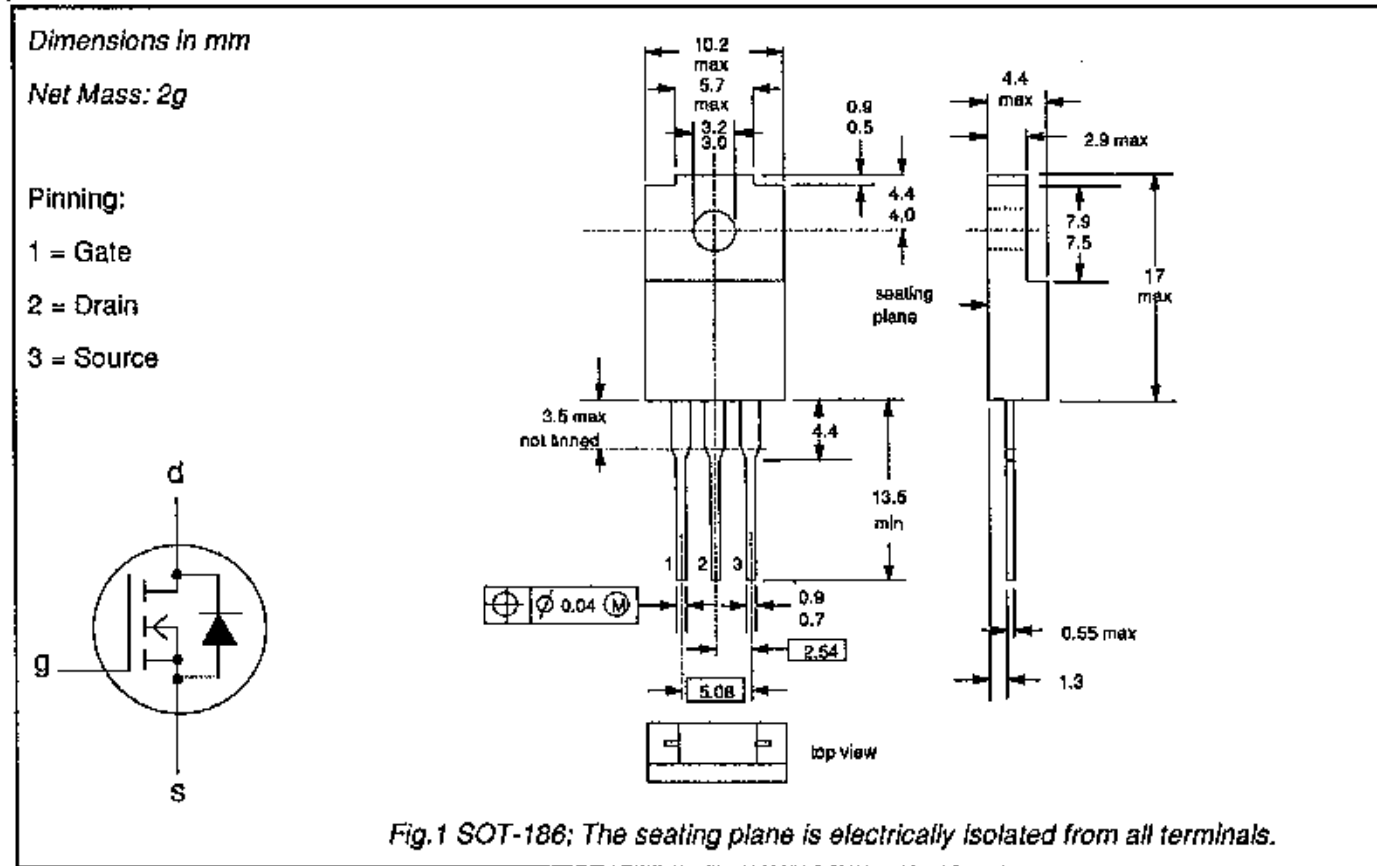
GENERAL DESCRIPTION

N-channel enhancement mode field-effect power transistor in a plastic full-pack envelope. The device is intended for use in Switched Mode Power Supplies (SMPS), motor control, welding, DC/DC and AC/DC converters, and in general purpose switching applications.

QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | UNIT |
|--------------|----------------------------------|--------------|--------------|----------|
| | BUK445 | -400A | -400B | |
| V_{DS} | Drain-source voltage | 400 | 400 | V |
| I_D | Drain current (DC) | 4.0 | 3.8 | A |
| P_{tot} | Total power dissipation | 30 | 30 | W |
| $R_{DS(ON)}$ | Drain-source on-state resistance | 0.8 | 1.0 | Ω |

MECHANICAL DATA



Notes

1. Observe the general handling precautions for electrostatic-discharge sensitive devices (ESDs) to prevent damage to MOS gate oxide.
2. Accessories supplied on request: refer to Mounting instructions for F-pack envelopes.

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RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | | UNIT |
|--------------|----------------------------------|---------------------------------------|------|-------|-------|------------------|
| | | | | -400A | -400B | |
| V_{DS} | Drain-source voltage | - | - | 400 | | V |
| V_{DGR} | Drain-gate voltage | $R_{GS} = 20 \text{ k}\Omega$ | - | 400 | | V |
| $\pm V_{GS}$ | Gate-source voltage | - | - | 30 | | V |
| I_D | Drain current (DC) | $T_{hs} = 25 \text{ }^\circ\text{C}$ | - | 4.0 | 3.6 | A |
| I_D | Drain current (DC) | $T_{hs} = 100 \text{ }^\circ\text{C}$ | - | 2.5 | 2.3 | A |
| I_{DM} | Drain current (pulse peak value) | $T_{hs} = 25 \text{ }^\circ\text{C}$ | - | 16 | 14 | A |
| P_{tot} | Total power dissipation | $T_{hs} = 25 \text{ }^\circ\text{C}$ | - | 30 | | W |
| T_{sig} | Storage temperature | - | -55 | 150 | | $^\circ\text{C}$ |
| T_j | Junction Temperature | - | - | 150 | | $^\circ\text{C}$ |

THERMAL RESISTANCES

| | | |
|---------------------------|------------------------|----------------------------------|
| From junction to heatsink | with heatsink compound | $R_{th(j-hs)} = 4.1 \text{ K/W}$ |
| From junction to ambient | | $R_{th(j-a)} = 55 \text{ K/W}$ |

STATIC CHARACTERISTICS

$T_{hs} = 25 \text{ }^\circ\text{C}$ unless otherwise specified

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---------------|----------------------------------|--|------|------|------|---------------|
| $V_{(BR)DSS}$ | Drain-source breakdown voltage | $V_{GS} = 0 \text{ V}; I_D = 0.25 \text{ mA}$ | 400 | - | - | V |
| $V_{GS(TH)}$ | Gate threshold voltage | $V_{DS} = V_{GS}; I_D = 1 \text{ mA}$ | 2.1 | 3.0 | 4.0 | V |
| I_{DSS} | Zero gate voltage drain current | $V_{DS} = 400 \text{ V}; V_{GS} = 0 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$ | - | 2 | 20 | μA |
| I_{DSS} | Zero gate voltage drain current | $V_{DS} = 400 \text{ V}; V_{GS} = 0 \text{ V}; T_j = 125 \text{ }^\circ\text{C}$ | - | 0.1 | 1.0 | mA |
| I_{GSS} | Gate source leakage current | $V_{GS} = \pm 30 \text{ V}; V_{DS} = 0 \text{ V}$ | - | 10 | 100 | nA |
| $R_{DS(ON)}$ | Drain-source on-state resistance | $V_{GS} = 10 \text{ V}; I_D = 2.5 \text{ A}$ | - | 0.7 | 0.8 | Ω |
| | | BUK445-400A | - | 0.9 | 1.0 | Ω |
| | | BUK445-400B | - | | | |

DYNAMIC CHARACTERISTICS

$T_{hs} = 25 \text{ }^\circ\text{C}$ unless otherwise specified

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|------------|----------------------------|--|------|------|------|------|
| g_{fs} | Forward transconductance | $V_{DS} = 25 \text{ V}; I_D = 2.5 \text{ A}$ | 3.5 | 4.5 | - | S |
| C_{iss} | Input capacitance | $V_{GS} = 0 \text{ V}; V_{DS} = 25 \text{ V}; f = 1 \text{ MHz}$ | - | 750 | 1000 | pF |
| C_{oss} | Output capacitance | | - | 120 | 180 | pF |
| C_{rss} | Feedback capacitance | | - | 50 | 70 | pF |
| t_{don} | Turn-on delay time | $V_{DD} = 30 \text{ V}; I_D = 2.7 \text{ A}; V_{GS} = 10 \text{ V}; R_{GS} = 50 \text{ }\Omega;$ | - | 10 | 25 | ns |
| t_r | Turn-on rise time | $R_{gen} = 50 \text{ }\Omega$ | - | 25 | 40 | ns |
| t_{doff} | Turn-off delay time | | - | 120 | 140 | ns |
| t_f | Turn-off fall time | | - | 40 | 65 | ns |
| L_d | Internal drain inductance | Measured from drain lead 6 mm from package to centre of die | - | 4.5 | - | nH |
| L_s | Internal source inductance | Measured from source lead 6 mm from package to source bond pad | - | 7.5 | - | nH |

ISOLATION

$T_{hs} = 25 \text{ }^\circ\text{C}$ unless otherwise specified

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|------------|---|---------------------------------------|------|------|------|------|
| V_{isol} | Repetitive peak voltage from all three terminals to external heatsink | R.H. $\leq 65\%$; clean and dustfree | - | - | 1500 | V |
| C_{isol} | Capacitance from T2 to external heatsink | $f = 1 \text{ MHz}$ | - | 12 | - | pF |