

*PK*  
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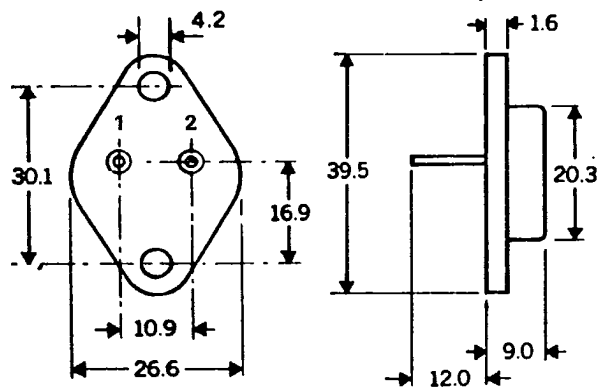
**BUZ 46**

# MECHANICAL DATA

Dimensions in mm

# MOS POWER

## N-Channel Enhancement Mode



# APPLICATIONS

- SMPS
- ARC WELDING
- D.C. MOTOR CONTROL

PIN 1—Gate PIN 2—Source CASE—Drain  
T03Thin

# ABSOLUTE MAXIMUM RATINGS ( $T_{CASE} = 25^{\circ}\text{C}$ unless otherwise specified)

|                                   |                                                    |                                |
|-----------------------------------|----------------------------------------------------|--------------------------------|
| $V_{DS}$                          | Drain source voltage                               | 500V                           |
| $V_{DGR}$                         | Drain gate voltage ( $R_{GS} = 1\text{ M}\Omega$ ) | 500V                           |
| $I_D @ T_c = 25^{\circ}\text{C}$  | Continuous drain current                           | $\pm 4.2\text{ A}$             |
| $I_D @ T_c = 100^{\circ}\text{C}$ | Continuous drain current                           | $\pm 2.6\text{ A}$             |
| $I_{DM}$                          | Pulsed drain current (i)                           | $\pm 12\text{ A}$              |
| $V_{GS}$                          | Gate-source voltage                                | $\pm 40\text{ V}$              |
| $P_D @ T_c = 25^{\circ}\text{C}$  | Maximum power dissipation                          | 78W                            |
| $P_D @ T_c = 100^{\circ}\text{C}$ | Maximum power dissipation                          | 31W                            |
| Junction to case                  | Linear derating factor                             | 0.625 W/ $^{\circ}\text{C}$    |
| Junction to ambient               | Linear derating factor                             | 0.029 W/ $^{\circ}\text{C}$    |
| $T_J$                             | Operating and                                      | $-55$ to $150^{\circ}\text{C}$ |
| $T_{slg}$                         | storage temperature range                          |                                |
| Lead temperature                  | (1/16" from case for 10 secs.)                     | 300 $^{\circ}\text{C}$         |

(i) Pulse test: Pulse width  $\leq 300\mu\text{sec}$ , duty cycle  $\leq$

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BUZ 46

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ELECTRICAL CHARACTERISTICS ( $T_{CASE} = 25^{\circ}\text{C}$  unless otherwise specified)

## STATIC

| Parameter                                                         | Type   | Min. | Typ. | Max. | Units    | Test Conditions                                                               |
|-------------------------------------------------------------------|--------|------|------|------|----------|-------------------------------------------------------------------------------|
| $BV_{DSS}$ Drain Source Breakdown Voltage                         | BUZ 46 | 500  |      |      | V        | $V_{GS} = 0$<br>$I_D = 1 \text{ mA}$                                          |
| $V_{GS(th)}$ Gate-Threshold Voltage                               | BUZ 46 | 2.1  | 3    | 4    | V        | $V_{DS} = V_{GS}$ , $I_D = 10 \text{ mA}$                                     |
| $I_{GSSF}$ Gate-Body Leakage Forward                              | BUZ 46 |      | 10   | 100  | nA       | $V_{GS} = 20$                                                                 |
| $I_{GSSR}$ Gate-Body Leakage Reverse                              | BUZ 46 |      | -10  | -100 | nA       | $V_{GS} = -20$                                                                |
| $I_{DSS}$ Zero Gate Voltage Drain Current                         | BUZ 46 |      | 0.1  | 1    | mA       | $V_{DS} = \text{Max. Rating}$ , $V_{GS} = 0$                                  |
|                                                                   |        |      | 0.2  | 4    | mA       | $V_{DS} = \text{Max. Rating}$ , $V_{GS} = 0$<br>$T_C = 125^{\circ}\text{C}$   |
| $I_{D(on)}$ On-State Drain Current <sup>1</sup>                   | BUZ 46 | 4.2  |      |      | A        | $V_{DS} \geq 2 V_{DS(ON)}$ , $V_{GS} = 10 \text{ V}$                          |
| $V_{DS(on)}$ Static Drain-Source On-State Voltage <sup>1</sup>    | BUZ 46 |      | 4.5  | 5    | V        | $V_{GS} = 10 \text{ V}$ , $I_D = 2.5 \text{ A}$                               |
| $R_{DS(on)}$ Static Drain-Source On-State Resistance <sup>1</sup> | BUZ 46 |      | 1.8  | 2    | $\Omega$ | $V_{GS} = 10 \text{ V}$ , $I_D = 2.5 \text{ A}$                               |
| $R_{DS(on)}$ Static Drain-Source On-State Resistance <sup>1</sup> | BUZ 46 |      | 3.6  | 4    | $\Omega$ | $V_{GS} = 10 \text{ V}$ , $I_D = 2.5 \text{ A}$ , $T_C = 125^{\circ}\text{C}$ |

## DYNAMIC

|                                                |        |     |      |  |       |                                                                                                                                                                                   |
|------------------------------------------------|--------|-----|------|--|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $g_{fs}$ Forward Transconductance <sup>1</sup> | BUZ 46 | 1.5 | 2.5  |  | S (1) | $V_{DS} \geq 2 V_{DS(ON)}$ , $I_D = 2.5 \text{ A}$                                                                                                                                |
| $C_{iss}$ Input Capacitance                    | BUZ 46 |     | 1600 |  | pF    | $V_{GS} = 0$ , $V_{DS} = 25 \text{ V}$<br>$f = 1 \text{ MHz}$                                                                                                                     |
| $C_{oss}$ Output Capacitance                   | BUZ 46 |     | 90   |  | pF    |                                                                                                                                                                                   |
| $C_{rss}$ Reverse Transfer Capacitance         | BUZ 46 |     | 30   |  | pF    | $V_{DD} = 30 \text{ V}$ , $I_D \approx 2.5 \text{ A}$<br>$R_G = 50 \Omega$ , $R_L = 10 \Omega$<br>(MOS FET switching times are essentially independent of operating temperature.) |
| $t_{d(on)}$ Turn-On Delay Time                 | BUZ 46 |     | 30   |  | ns    |                                                                                                                                                                                   |
| $t_r$ Rise Time                                | BUZ 46 |     | 70   |  | ns    |                                                                                                                                                                                   |
| $t_{d(off)}$ Turn-Off Delay Time               | BUZ 46 |     | 160  |  | ns    |                                                                                                                                                                                   |
| $t_f$ Fall Time                                | BUZ 46 |     | 100  |  | ns    |                                                                                                                                                                                   |

## THERMAL RESISTANCE

|                                |        |  |  |     |                      |                    |
|--------------------------------|--------|--|--|-----|----------------------|--------------------|
| $R_{thJC}$ Junction-to Case    | BUZ 46 |  |  | 1.6 | $^{\circ}\text{C/W}$ | Free Air Operation |
| $R_{thJA}$ Junction-to-Ambient | BUZ 46 |  |  | 35  | $^{\circ}\text{C/W}$ |                    |

## BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

|                                                   |        |  |     |      |    |                                                                                                                                                               |
|---------------------------------------------------|--------|--|-----|------|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $I_S$ Continuous Source Current (Body Diode)      | BUZ 46 |  |     | -4.2 | A  | Modified MOS POWER symbol showing the integral P-N junction rectifier.<br> |
| $I_{SM}$ Source Current <sup>1</sup> (Body Diode) | BUZ 46 |  |     | -12  | A  |                                                                                                                                                               |
| $V_{SD}$ Diode Forward Voltage <sup>1</sup>       | BUZ 46 |  |     | -1.4 | V  |                                                                                                                                                               |
| $t_{rr}$ Reverse Recovery Time                    | BUZ 46 |  | 400 |      | ns | $T_J = 150^{\circ}\text{C}$ , $I_F = I_S$ ,<br>$dI_F/dt = 100 \text{ A}/\mu\text{s}$                                                                          |

<sup>1</sup> Pulse Test: Pulse Width  $< 300 \mu\text{sec}$ , Duty Cycle  $< 2\%$