



# BUZ71

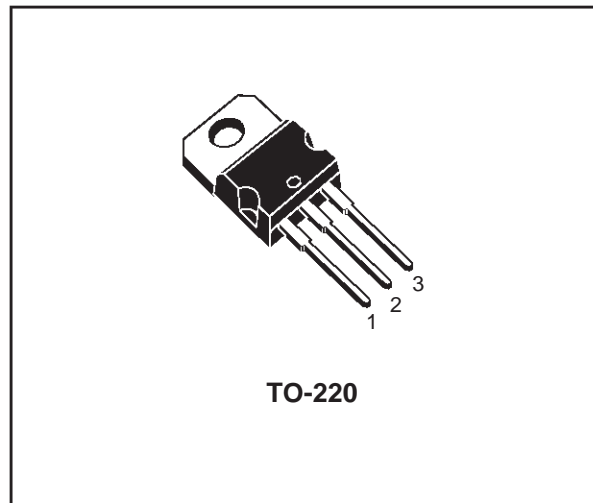
## N - CHANNEL 50V - 0.085Ω - 17A TO-220 STripFET™ POWER MOSFET

| TYPE  | V <sub>DSS</sub> | R <sub>DS(on)</sub> | I <sub>D</sub> |
|-------|------------------|---------------------|----------------|
| BUZ71 | 50 V             | < 0.1 Ω             | 17 A           |

- TYPICAL R<sub>DS(on)</sub> = 0.085 Ω
- AVALANCHE RUGGED TECHNOLOGY
- 100% AVALANCHE TESTED
- HIGH CURRENT CAPABILITY
- 175°C OPERATING TEMPERATURE

### APPLICATIONS

- HIGH CURRENT, HIGH SPEED SWITCHING
- SOLENOID AND RELAY DRIVERS
- REGULATORS
- DC-DC & DC-AC CONVERTERS
- MOTOR CONTROL, AUDIO AMPLIFIERS
- AUTOMOTIVE ENVIRONMENT (INJECTION, ABS, AIR-BAG, LAMPDRIVERS, Etc.)



### ABSOLUTE MAXIMUM RATINGS

| Symbol           | Parameter  | Value      | Unit |
|------------------|--|------------|------|
| V <sub>DS</sub>  | Drain-source Voltage (V <sub>GS</sub> = 0)           | 50         | V    |
| V <sub>DGR</sub> | Drain- gate Voltage (R <sub>GS</sub> = 20 kΩ)        | 50         | V    |
| V <sub>GS</sub>  | Gate-source Voltage                                  | ± 20       | V    |
| I <sub>D</sub>   | Drain Current (continuous) at T <sub>c</sub> = 25 °C | 17         | A    |
| I <sub>DM</sub>  | Drain Current (pulsed)                               | 68         | A    |
| P <sub>tot</sub> | Total Dissipation at T <sub>c</sub> = 25 °C          | 60         | W    |
| T <sub>stg</sub> | Storage Temperature                                  | -65 to 175 | °C   |
| T <sub>j</sub>   | Max. Operating Junction Temperature                  | 175        | °C   |
|                  | DIN HUMIDITY CATEGORY (DIN 40040)                    | E          |      |
|                  | IEC CLIMATIC CATEGORY (DIN IEC 68-1)                 | 55/150/56  |      |

First digit of the datecode being Z or K identifies silicon characterized in this datasheet.

## BUZ71

### THERMAL DATA

|                       |                                     |     |      |      |
|-----------------------|-------------------------------------|-----|------|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-case    | Max | 2.5  | °C/W |
| R <sub>thj-amb</sub>  | Thermal Resistance Junction-ambient | Max | 62.5 | °C/W |

### AVALANCHE CHARACTERISTICS

| Symbol          | Parameter  | Value | Unit |
|-----------------|--|-------|------|
| I <sub>AR</sub> | Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T <sub>j</sub> max)                                | 17    | A    |
| E <sub>AS</sub> | Single Pulse Avalanche Energy (starting T <sub>j</sub> = 25 °C, I <sub>D</sub> = I <sub>AR</sub> , V <sub>DD</sub> = 25 V) | 50    | mJ   |

### ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

OFF

| Symbol               | Parameter   | Test Conditions  | Min. | Typ. | Max.    | Unit     |
|----------------------|---|--|------|------|---------|----------|
| V <sub>(BR)DSS</sub> | Drain-source Breakdown Voltage                        | I <sub>D</sub> = 250 μA V <sub>GS</sub> = 0  | 50   |      |         | V        |
| I <sub>DSS</sub>     | Zero Gate Voltage Drain Current (V <sub>GS</sub> = 0) | V <sub>DS</sub> = Max Rating<br>V <sub>DS</sub> = Max Rating T <sub>j</sub> = 125 °C |      |      | 1<br>10 | μA<br>μA |
| I <sub>GSS</sub>     | Gate-body Leakage Current (V <sub>DS</sub> = 0)       | V <sub>GS</sub> = ± 20 V   |      |      | ± 100   | nA       |

ON (\*)

| Symbol              | Parameter                         | Test Conditions   | Min. | Typ.  | Max. | Unit |
|---------------------|-----------------------------------|---|------|-------|------|------|
| V <sub>GS(th)</sub> | Gate Threshold Voltage            | V <sub>DS</sub> = V <sub>GS</sub> I <sub>D</sub> = 1 mA | 2.1  | 3     | 4    | V    |
| R <sub>DS(on)</sub> | Static Drain-source On Resistance | V <sub>GS</sub> = 10 V I <sub>D</sub> = 9 A             |      | 0.085 | 0.1  | Ω    |

### DYNAMIC

| Symbol   | Parameter   | Test Conditions                                      | Min. | Typ.             | Max. | Unit           |
|--|---|--|------|------------------|------|----------------|
| g <sub>fs</sub> (*)                                      | Forward Transconductance  | V <sub>DS</sub> = 25 V I <sub>D</sub> = 9 A          | 4    | 7.7              |      | S              |
| C <sub>iss</sub><br>C <sub>oss</sub><br>C <sub>rss</sub> | Input Capacitance<br>Output Capacitance<br>Reverse Transfer Capacitance | V <sub>DS</sub> = 25 V f = 1 MHz V <sub>GS</sub> = 0 |      | 760<br>100<br>30 |      | pF<br>pF<br>pF |

### SWITCHING

| Symbol              | Parameter           | Test Conditions                               | Min. | Typ. | Max. | Unit |
|---------------------|---------------------|---|------|------|------|------|
| t <sub>d(on)</sub>  | Turn-on Time        | V <sub>DD</sub> = 30 V I <sub>D</sub> = 8 A   |      | 20   |      | ns   |
| t <sub>r</sub>      | Rise Time           | R <sub>GS</sub> = 50 Ω V <sub>GS</sub> = 10 V |      | 65   |      | ns   |
| t <sub>d(off)</sub> | Turn-off Delay Time |   |      | 70   |      | ns   |
| t <sub>f</sub>      | Fall Time           |   |      | 35   |      | ns   |

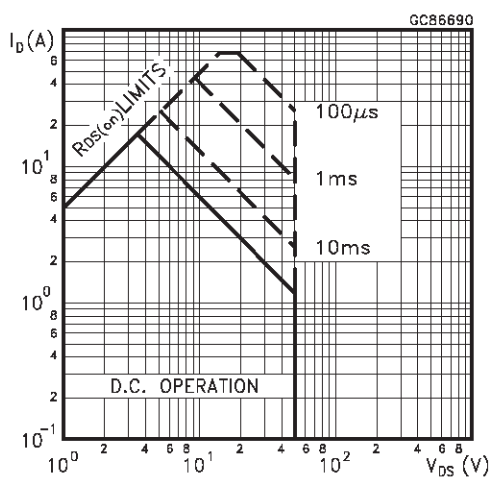
**ELECTRICAL CHARACTERISTICS** (continued)

**SOURCE DRAIN DIODE**

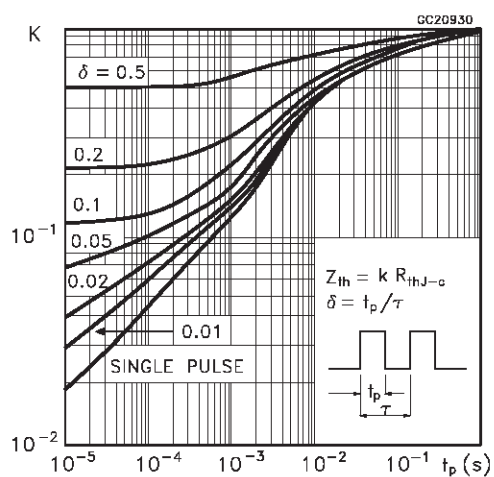
| Symbol       | Parameter                     | Test Conditions   | Min. | Typ. | Max. | Unit          |
|--------------|-------------------------------|---|------|------|------|---------------|
| $I_{SD}$     | Source-drain Current          |   |      |      | 17   | A             |
| $I_{SDM}$    | Source-drain Current (pulsed) |   |      |      | 68   | A             |
| $V_{SD} (*)$ | Forward On Voltage            | $I_{SD} = 28\text{ A}$ $V_{GS} = 0$   |      |      | 1.8  | V             |
| $t_{rr}$     | Reverse Recovery Time         | $I_{SD} = 14\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$<br>$V_{DD} = 30\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$ |      | 65   |      | ns            |
| $Q_{rr}$     | Reverse Recovery Charge       |   |      | 0.17 |      | $\mu\text{C}$ |

(\*) Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %

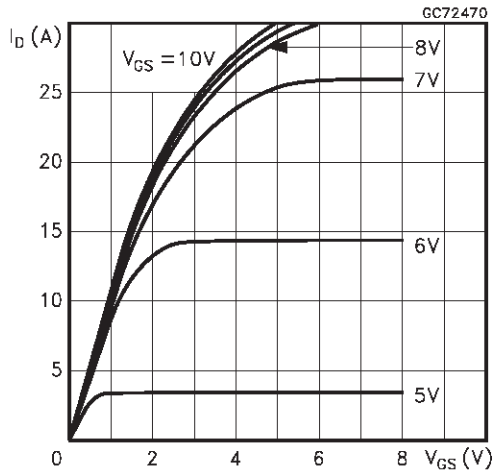
Safe Operating Area



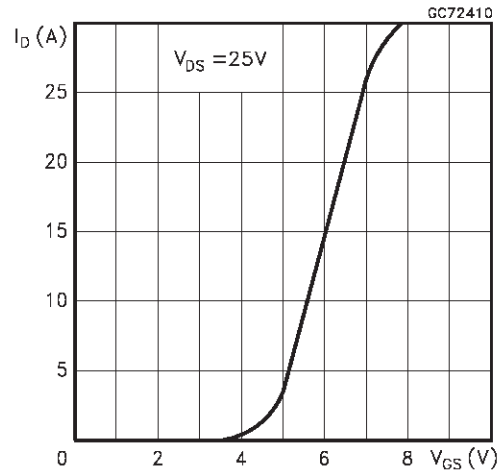
Thermal Impedance



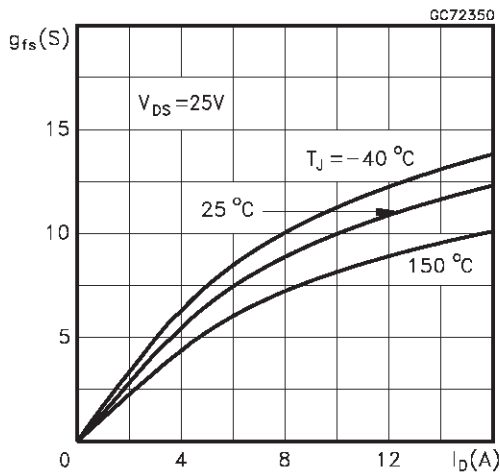
Output Characteristics



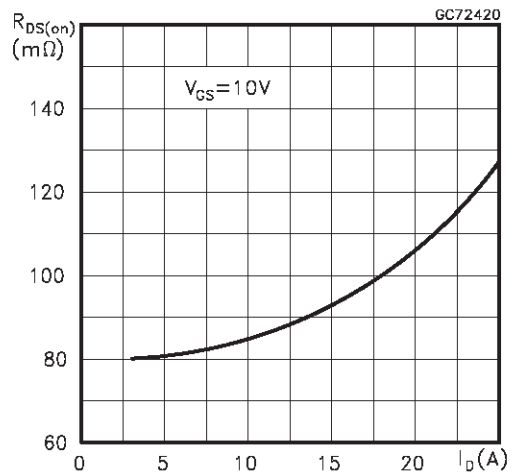
Transfer Characteristics



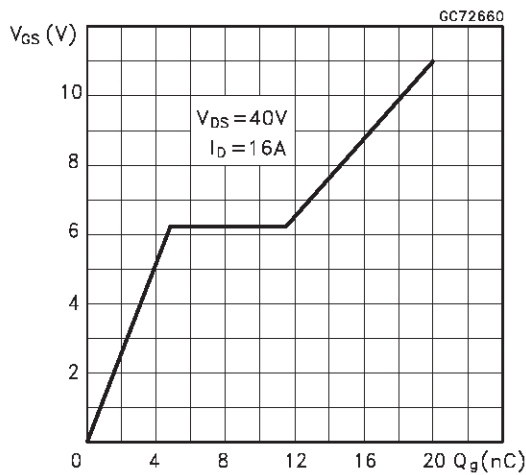
Transconductance



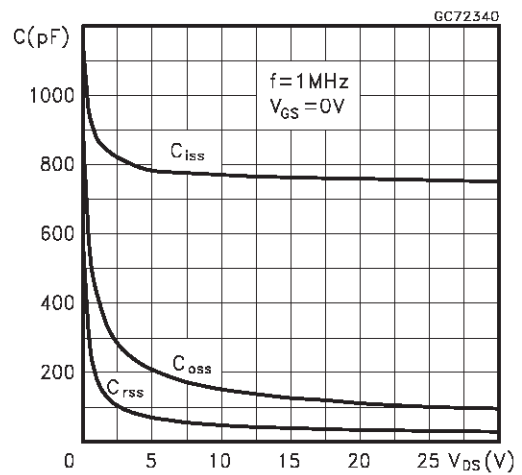
Static Drain-source On Resistance



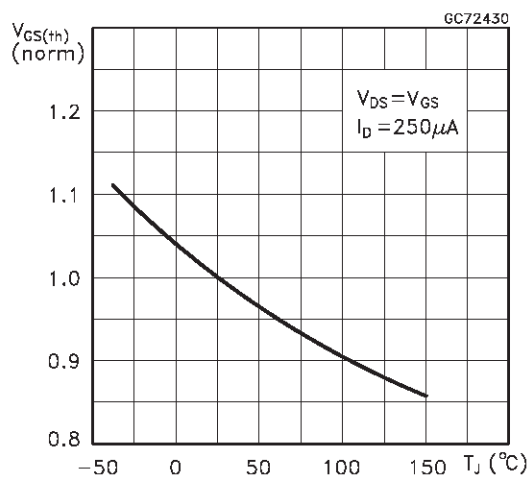
Gate Charge vs Gate-source Voltage



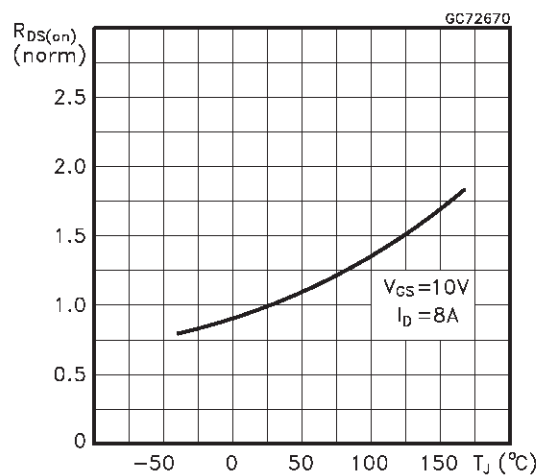
Capacitance Variations



Normalized Gate Threshold Voltage vs Temperature



Normalized On Resistance vs Temperature



Source-drain Diode Forward Characteristics

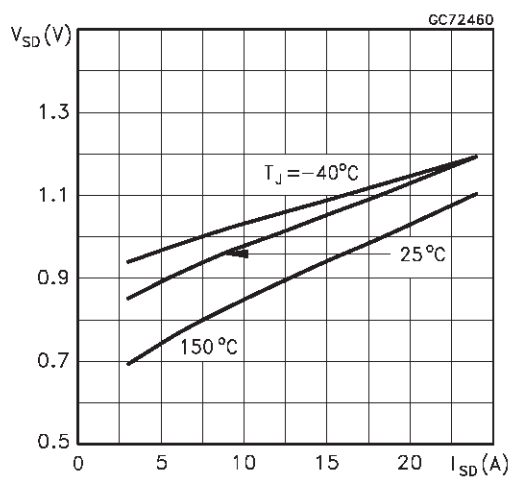


Fig. 1: Unclamped Inductive Load Test Circuit



Fig. 2: Unclamped Inductive Waveform

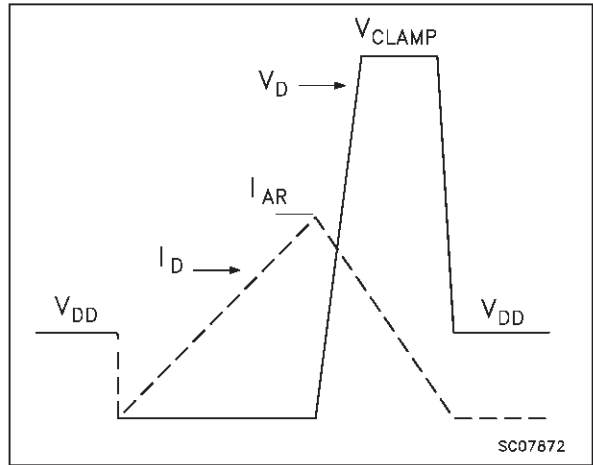


Fig. 3: Switching Times Test Circuits For Resistive Load



Fig. 4: Gate Charge test Circuit

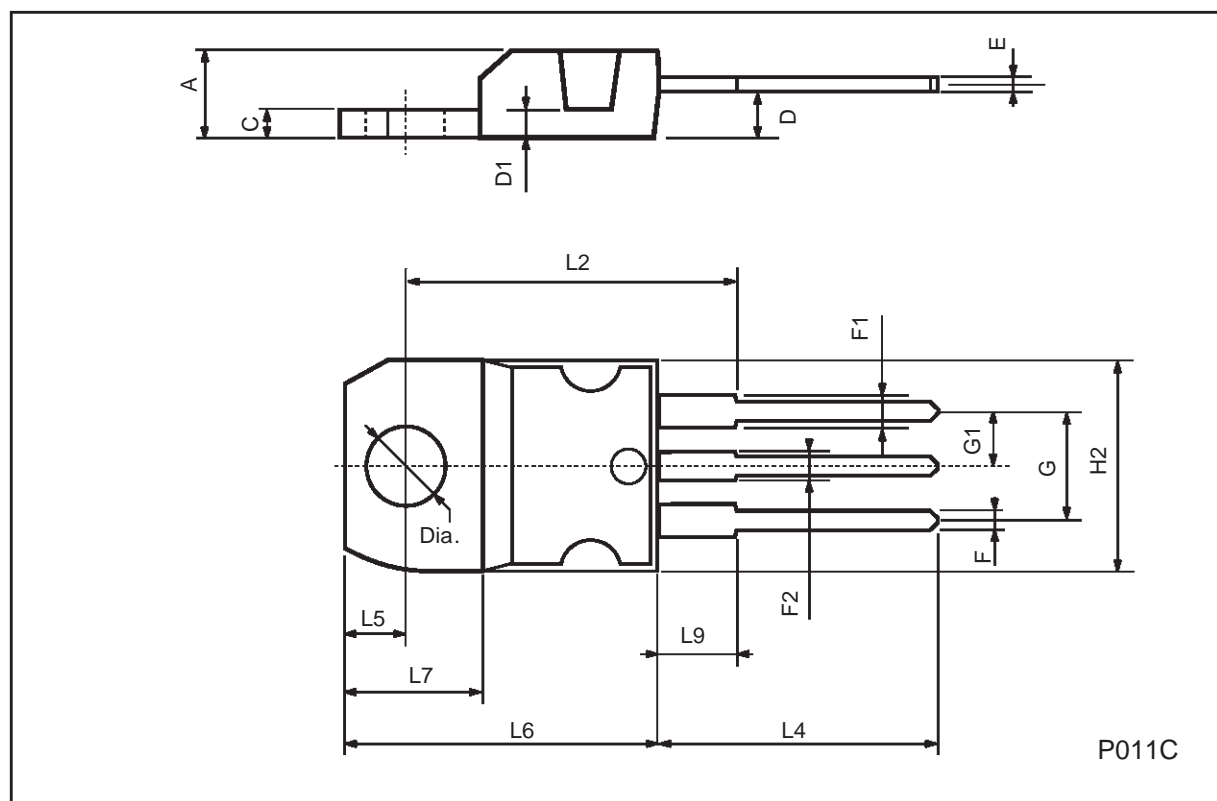


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



## TO-220 MECHANICAL DATA

| DIM. | mm    |      |       | inch  |       |       |
|------|-------|------|-------|-------|-------|-------|
|      | MIN.  | TYP. | MAX.  | MIN.  | TYP.  | MAX.  |
| A    | 4.40  |      | 4.60  | 0.173 |       | 0.181 |
| C    | 1.23  |      | 1.32  | 0.048 |       | 0.051 |
| D    | 2.40  |      | 2.72  | 0.094 |       | 0.107 |
| D1   |       | 1.27 |       |       | 0.050 |       |
| E    | 0.49  |      | 0.70  | 0.019 |       | 0.027 |
| F    | 0.61  |      | 0.88  | 0.024 |       | 0.034 |
| F1   | 1.14  |      | 1.70  | 0.044 |       | 0.067 |
| F2   | 1.14  |      | 1.70  | 0.044 |       | 0.067 |
| G    | 4.95  |      | 5.15  | 0.194 |       | 0.203 |
| G1   | 2.4   |      | 2.7   | 0.094 |       | 0.106 |
| H2   | 10.0  |      | 10.40 | 0.393 |       | 0.409 |
| L2   |       | 16.4 |       |       | 0.645 |       |
| L4   | 13.0  |      | 14.0  | 0.511 |       | 0.551 |
| L5   | 2.65  |      | 2.95  | 0.104 |       | 0.116 |
| L6   | 15.25 |      | 15.75 | 0.600 |       | 0.620 |
| L7   | 6.2   |      | 6.6   | 0.244 |       | 0.260 |
| L9   | 3.5   |      | 3.93  | 0.137 |       | 0.154 |
| DIA. | 3.75  |      | 3.85  | 0.147 |       | 0.151 |



Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specification mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a trademark of STMicroelectronics

© 1999 STMicroelectronics – Printed in Italy – All Rights Reserved  
STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - China - Finland - France - Germany - Hong Kong - India - Italy - Japan - Malaysia - Malta - Morocco -  
Singapore - Spain - Sweden - Switzerland - United Kingdom - U.S.A.



Copyright © Each Manufacturing Company.

All Datasheets cannot be modified without permission.

This datasheet has been download from :

[www.AllDataSheet.com](http://www.AllDataSheet.com)

100% Free DataSheet Search Site.

Free Download.

No Register.

Fast Search System.

[www.AllDataSheet.com](http://www.AllDataSheet.com)