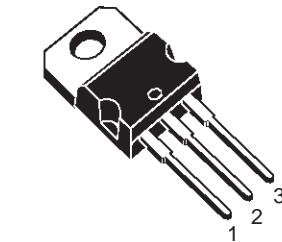


**BUZ11****N - CHANNEL 50V - 0.03Ω - 33A TO-220
STripFET™ MOSFET**

TYPE	V _{DSS}	R _{DS(on)}	I _D
BUZ11	50 V	< 0.04 Ω	33 A

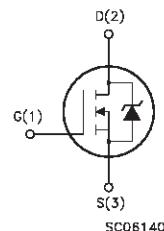
- TYPICAL R_{DS(on)} = 0.03 Ω
- AVALANCHE RUGGED TECHNOLOGY
- 100% AVALANCHE TESTED
- HIGH CURRENT CAPABILITY
- 175°C OPERATING TEMPERATURE



TO-220

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.)

INTERNAL SCHEMATIC DIAGRAM**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
V _{DS}	Drain-source Voltage (V _{GS} = 0)	50	V
V _{DGR}	Drain-gate Voltage (R _{GS} = 20 kΩ)	50	V
V _{GS}	Gate-source Voltage	± 20	V
I _D	Drain Current (continuous) at T _c = 25 °C	33	A
I _{DM}	Drain Current (pulsed)	134	A
P _{tot}	Total Dissipation at T _c = 25 °C	90	W
T _{stg}	Storage Temperature	-65 to 175	°C
T _j	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.

BUZ11

THERMAL DATA

R _{thj-case}	Thermal Resistance Junction-case	Max	1.67	°C/W
R _{thj-amb}	Thermal Resistance Junction-ambient	Max	62.5	°C/W

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Value	Unit
I _{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T _j max, δ < 1%)	33	A
E _{AS}	Single Pulse Avalanche Energy (starting T _j = 25 °C, I _D = I _{AR} , V _{DD} = 25 V)	200	mJ

ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{(BR)DSS}	Drain-source Breakdown Voltage	I _D = 250 μA V _{GS} = 0	50			V
I _{DSS}	Zero Gate Voltage Drain Current (V _{GS} = 0)	V _{DS} = Max Rating V _{DS} = Max Rating T _j = 125 °C			1 10	μA μA
I _{GSS}	Gate-body Leakage Current (V _{DS} = 0)	V _{GS} = ± 20 V			± 100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} I _D = 1 mA	2.1	3	4	V
R _{D(on)}	Static Drain-source On Resistance	V _{GS} = 10V I _D = 19 A		0.03	0.04	Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (*)	Forward Transconductance	V _{DS} = 15 V I _D = 19 A	10	17		s
C _{iss} C _{oss} C _{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V _{DS} = 25 V f = 1 MHz V _{GS} = 0		2100 260 65		pF pF pF

SWITCHING

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t _{d(on)} t _r	Turn-on Time Rise Time	V _{DD} = 30 V I _D = 18 A R _{GS} = 50 Ω V _{GS} = 10 V		40 200		ns ns
t _{d(off)} t _f	Turn-off Delay Time Fall Time			220 110		ns ns

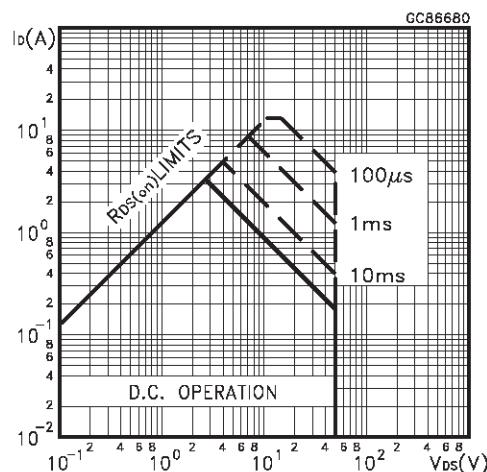
ELECTRICAL CHARACTERISTICS (continued)

SOURCE DRAIN DIODE

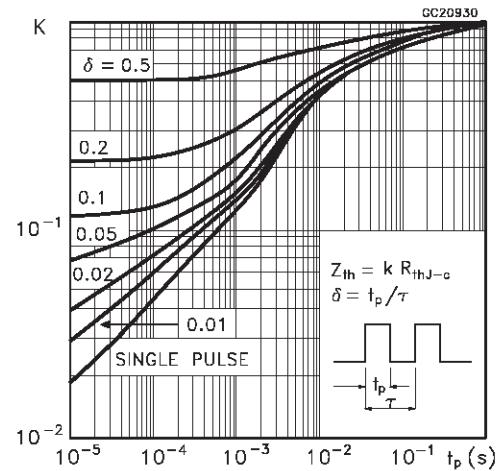
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM}	Source-drain Current Source-drain Current (pulsed)				33 134	A A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = 60 \text{ A}$ $V_{GS} = 0$			1.8	V
t_{rr} Q_{rr}	Reverse Recovery Time Reverse Recovery Charge	$I_{SD} = 36 \text{ A}$ $di/dt = 100 \text{ A}/\mu\text{s}$ $V_{DD} = 30 \text{ V}$ $T_j = 150^\circ\text{C}$		75 0.24		ns μC

(*) Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %

Safe Operating Area

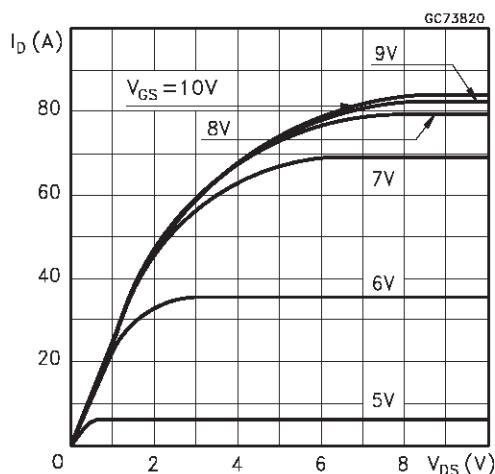


Thermal Impedance

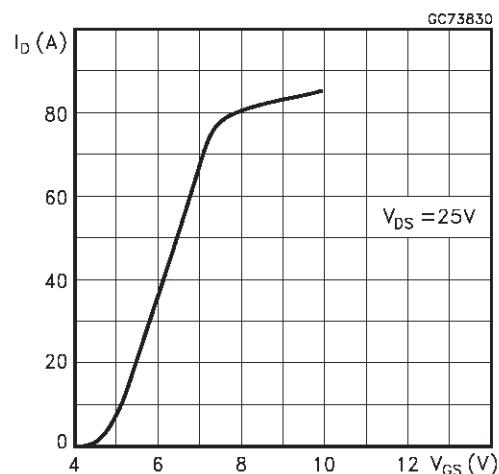


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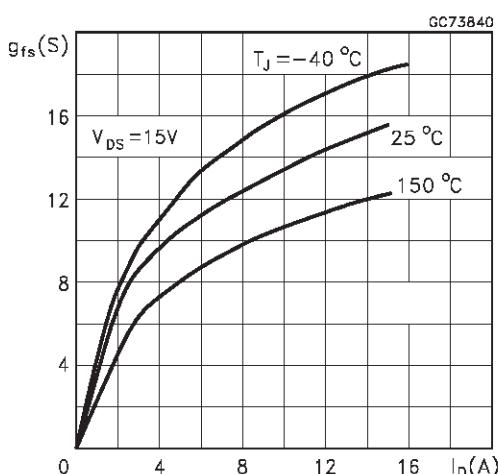
Output Characteristics



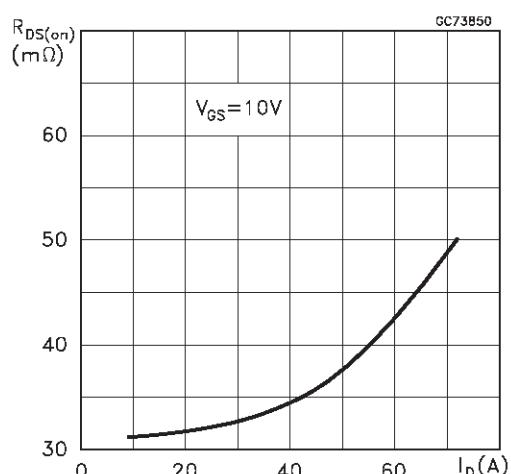
Transfer Characteristics



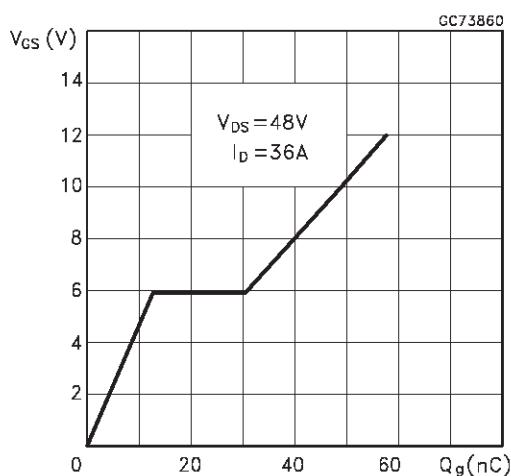
Transconductance



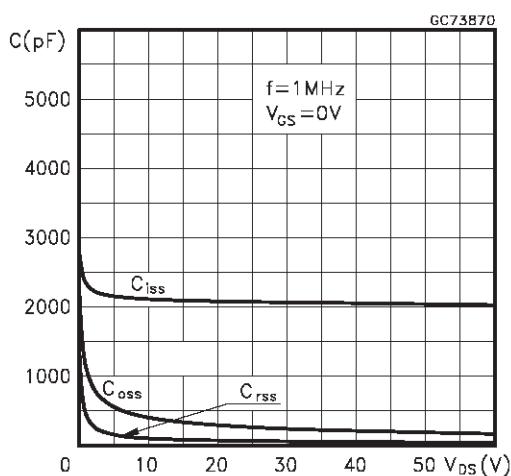
Static Drain-source On Resistance



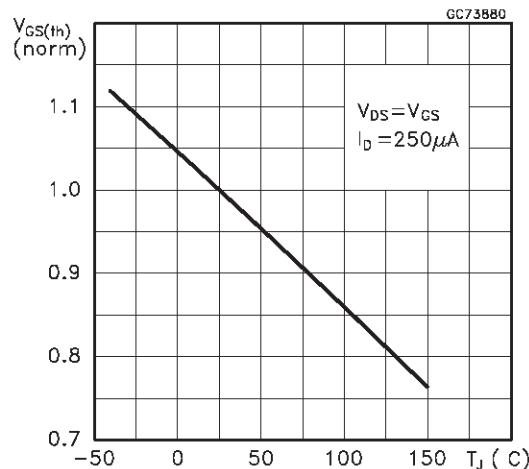
Gate Charge vs Gate-source Voltage



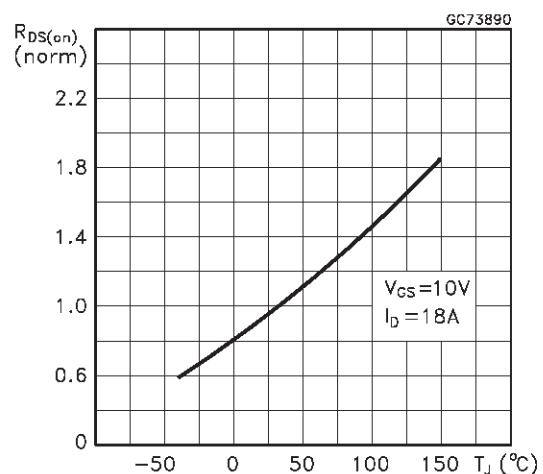
Capacitance Variations



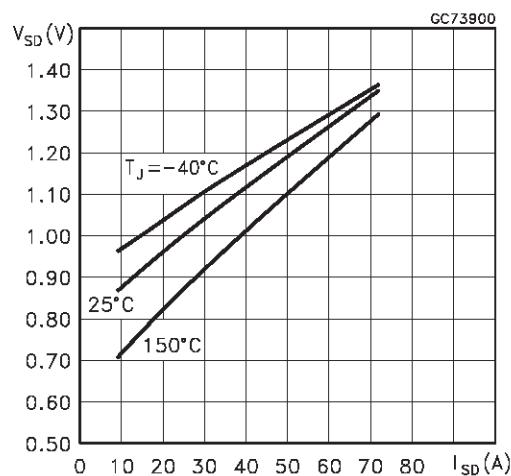
Normalized Gate Threshold Voltage vs Temperature



Normalized On Resistance vs Temperature



Source-drain Diode Forward Characteristics



BUZ11

Fig. 1: Unclamped Inductive Load Test Circuit

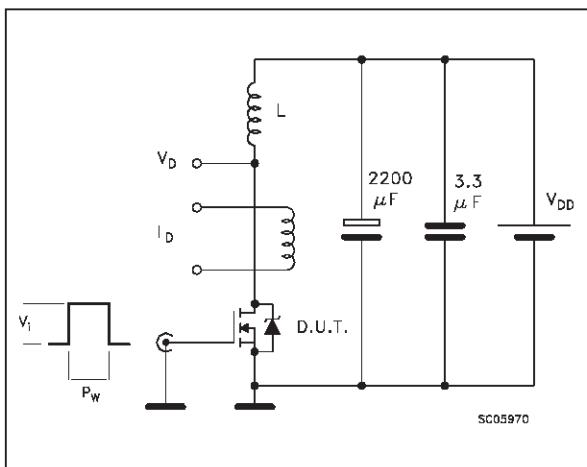


Fig. 2: Unclamped Inductive Waveform

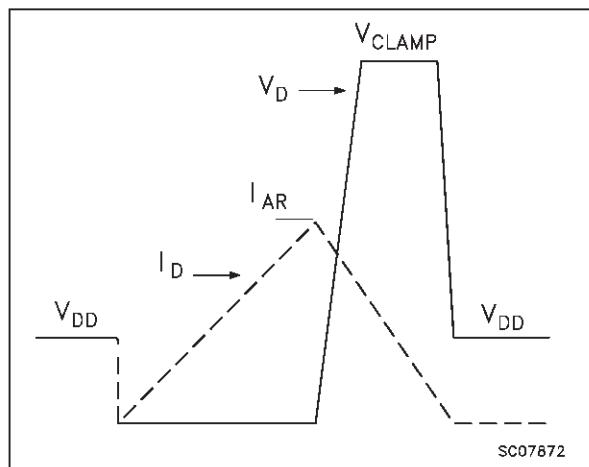


Fig. 3: Switching Times Test Circuits For Resistive Load

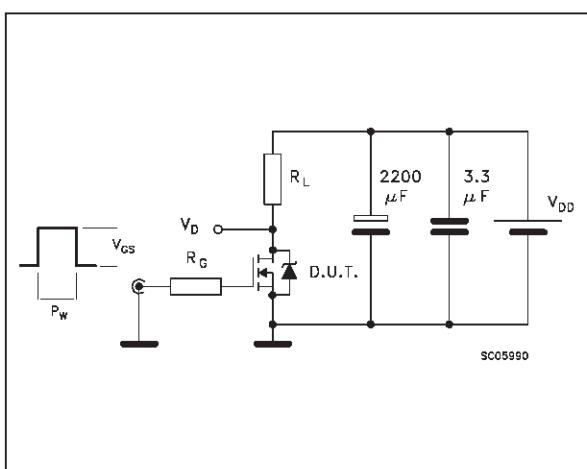


Fig. 4: Gate Charge test Circuit

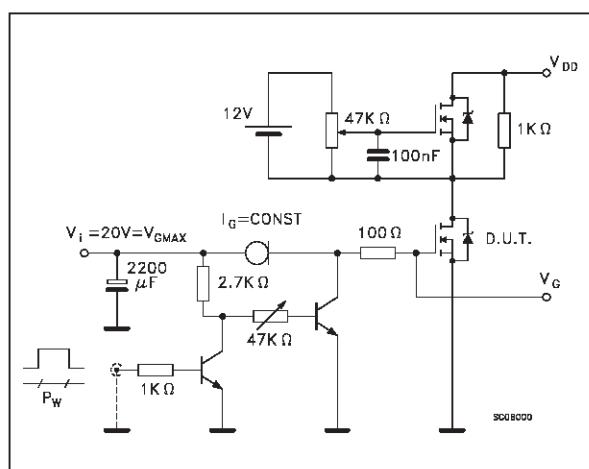
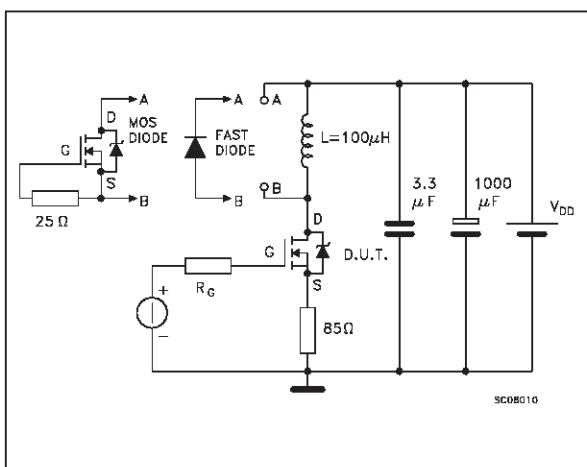
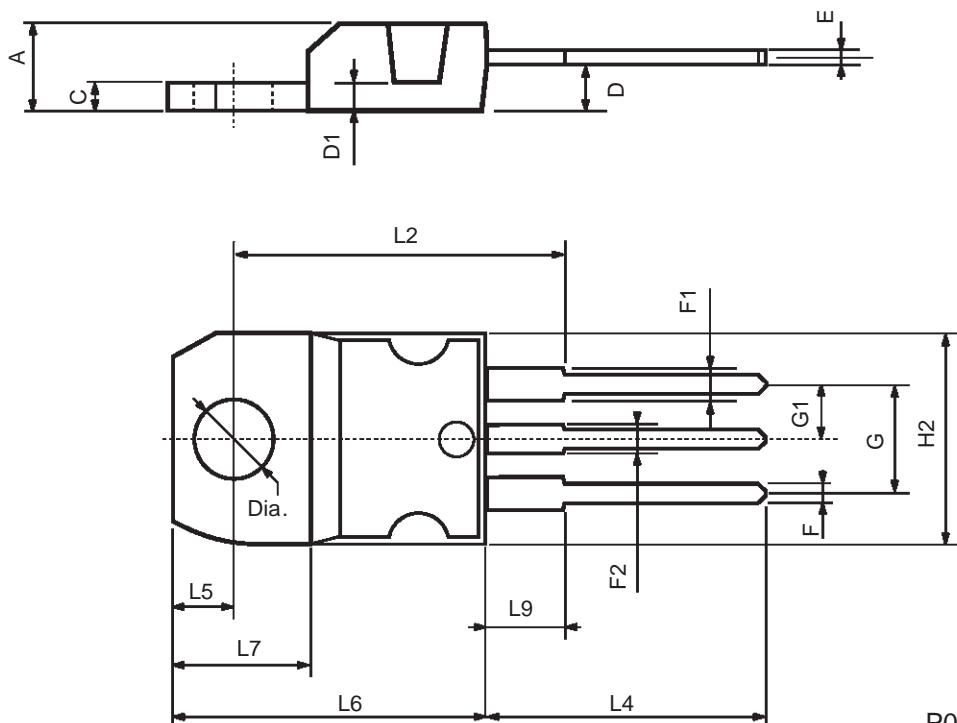


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



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



P011C

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