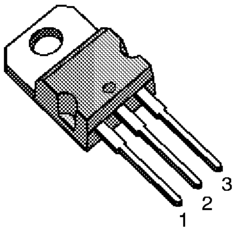
SGS-THOMSON
MICROELECTRONICS

BUZ71
BUZ71FI

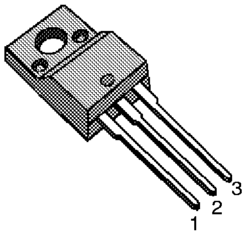
N - CHANNEL ENHANCEMENT MODE POWER MOS TRANSISTORS

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
BUZ71	50 V	< 0.1 Ω	18 A
BUZ71FI	50 V	< 0.1 Ω	12 A

- TYPICAL $R_{DS(on)} = 0.06\ \Omega$
- AVALANCHE RUGGED TECHNOLOGY
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100°C
- LOW GATE CHARGE
- HIGH CURRENT CAPABILITY
- 175°C OPERATING TEMPERATURE



TO-220

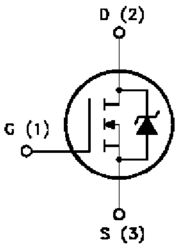


ISOWATT220

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
		BUZ71	BUZ71FI	
V_{DS}	Drain-source Voltage ($V_{GS} = 0$)	50		V
V_{DGR}	Drain- gate Voltage ($R_{GS} = 20\ k\Omega$)	50		V
V_{GS}	Gate-source Voltage	± 20		V
I_D	Drain Current (continuous) at $T_c = 25\ ^oC$	18	12	A
I_{DM}	Drain Current (pulsed)	72	72	A
P_{tot}	Total Dissipation at $T_c = 25\ ^oC$	80	35	W
V_{ISO}	Insulation Withstand Voltage (DC)	—	2000	V
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		

THERMAL DATA

			TO-220	ISOWATT220	
$R_{thj\text{-}case}$	Thermal Resistance Junction-case	Max	1.88	4.29	°C/W
$R_{thj\text{-}amb}$	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, $\delta < 1\%$)	18	A
E_{AS}	Single Pulse Avalanche Energy (starting $T_j = 25$ °C, $I_D = I_{AR}$, $V_{DD} = 25$ V)	60	mJ
E_{AR}	Repetitive Avalanche Energy (pulse width limited by T_j max, $\delta < 1\%$)	15	mJ
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive ($T_c = 100$ °C, pulse width limited by T_j max, $\delta < 1\%$)	12	A

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 ($V_{DS} = 0$)	$V_{GS} = \pm 20$ 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
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10$ V $I_D = 9$ A		0.06	0.1	Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (∗)	Forward Transconductance	$V_{DS} = 25$ V $I_D = 9$ A	5	8		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	$V_{DS} = 25$ V f = 1 MHz $V_{GS} = 0$		520 250 80	700 350 120	pF pF pF

SWITCHING

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r $t_{d(off)}$ t_f	Turn-on Time Rise Time Turn-off Delay Time Fall Time	$V_{DD} = 30$ V $I_D = 3$ A $R_{GS} = 50$ Ω $V_{GS} = 10$ V		45 65 115 80	65 95 160 120	ns ns ns ns

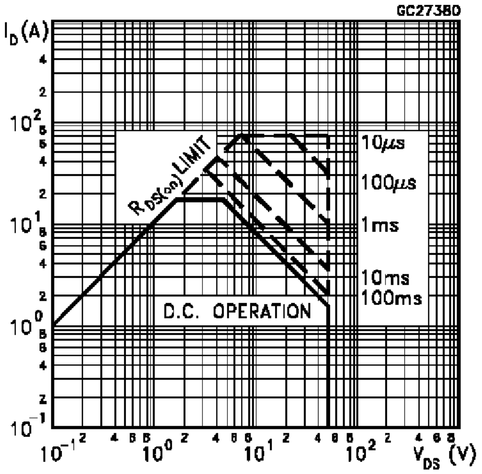
ELECTRICAL CHARACTERISTICS (continued)

SOURCE DRAIN DIODE

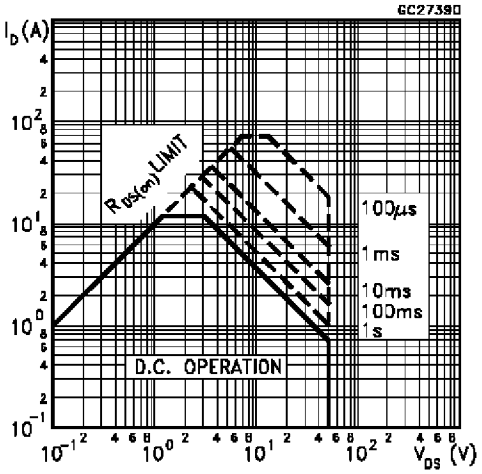
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM}	Source-drain Current Source-drain Current (pulsed)				18 72	A A
V_{SD} (∗)	Forward On Voltage	I_{SD} = 36 A V_{GS} = 0			2	V
t_{rr}	Reverse Recovery Time	I_{SD} = 18 A di/dt = 100 A/µs V_{DD} = 15 V T_j = 150 °C		85		ns
Q_{rr}	Reverse Recovery Charge			0.13		µC

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

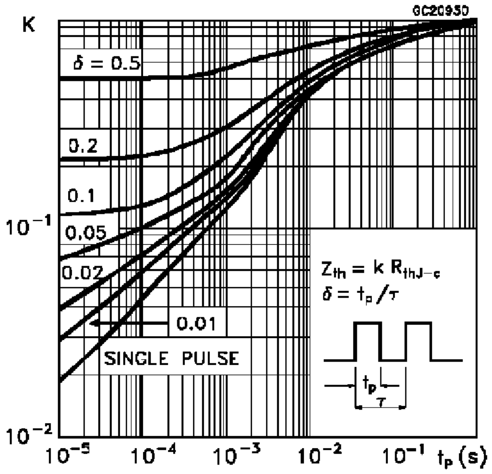
Safe Operating Area For TO-220 Package



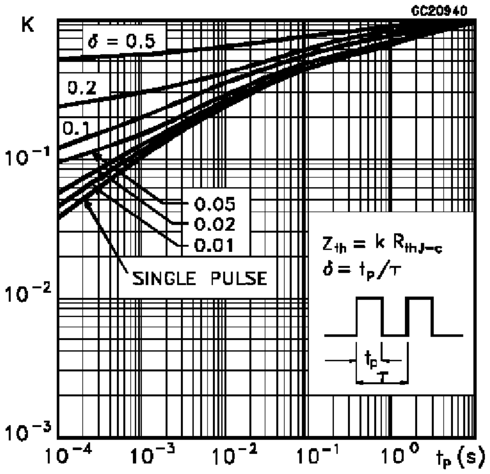
Safe Operating Area For ISOWATT220 Package



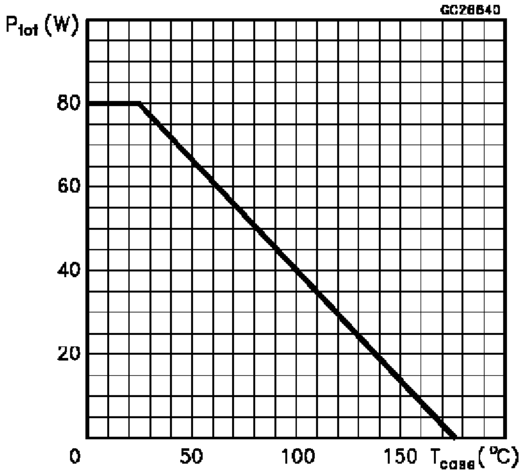
Thermal Impedance For TO-220 Package



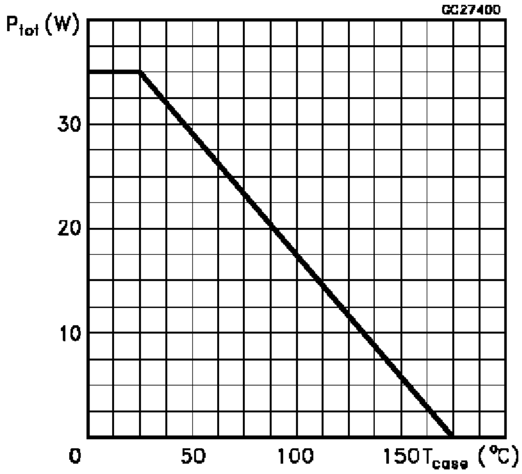
Thermal Impedance For ISOWATT220 Package



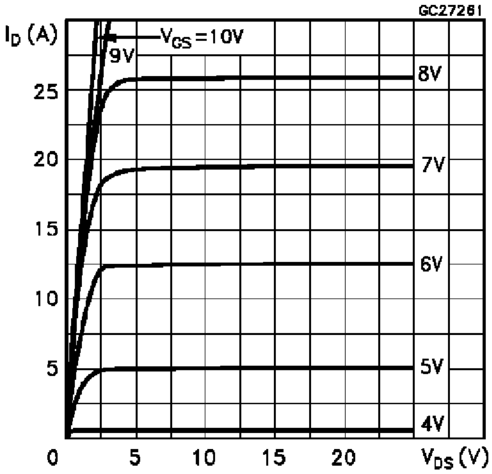
Derating Curve For TO-220 Package



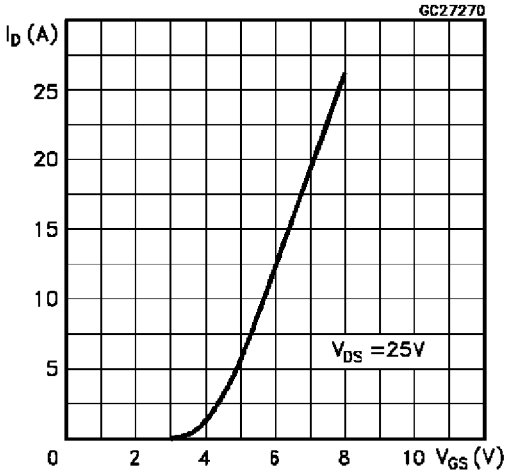
Derating Curve For ISOWATT220 Package



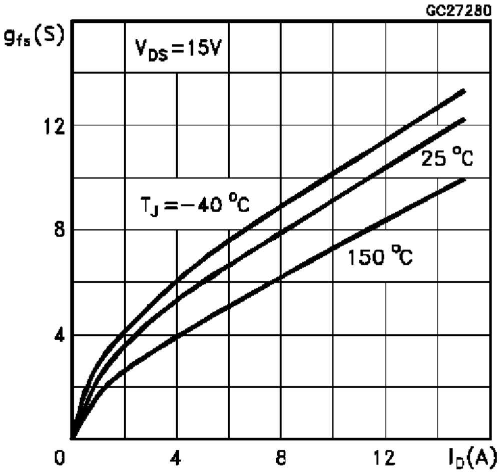
Output Characteristics



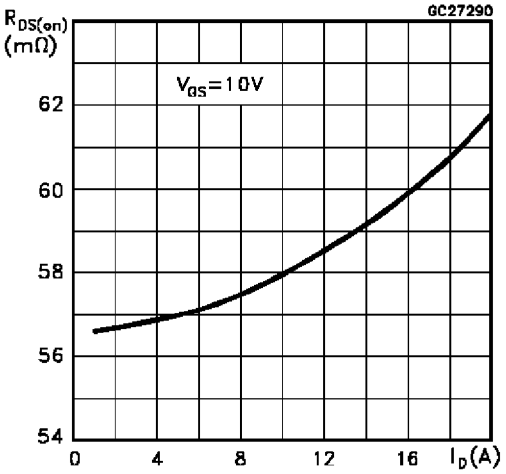
Transfer Characteristics



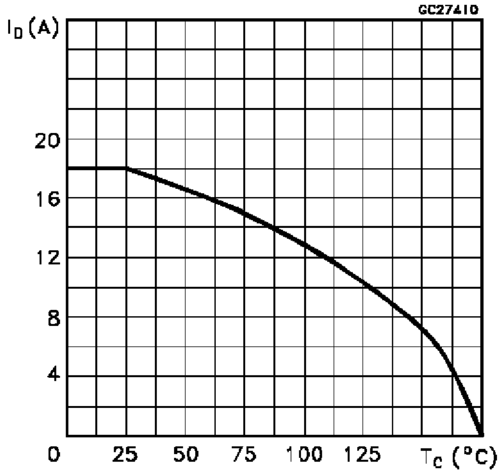
Transconductance



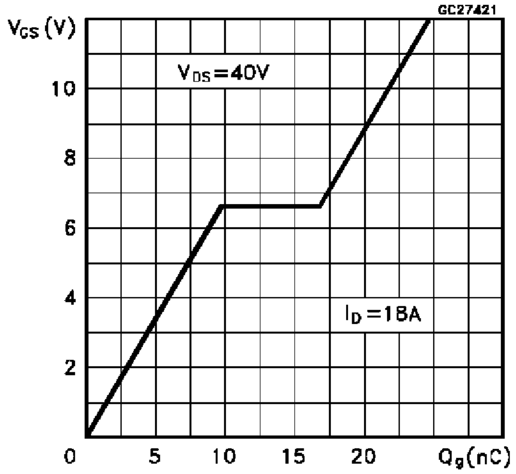
Static Drain-Source On Resistance



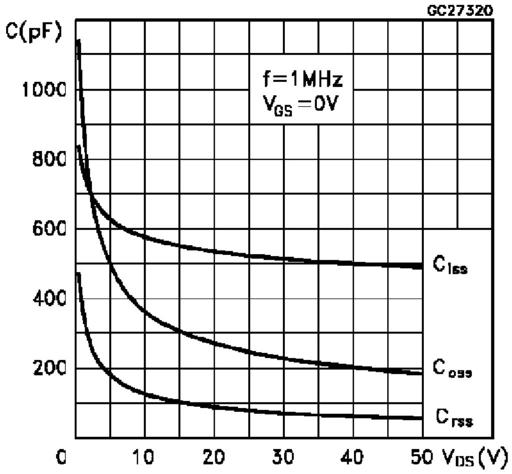
Maximum Drain Current vs Temperature



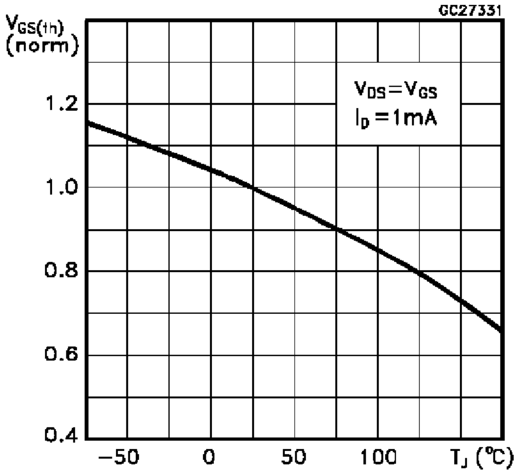
Gate Charge vs Gate-Source Voltage



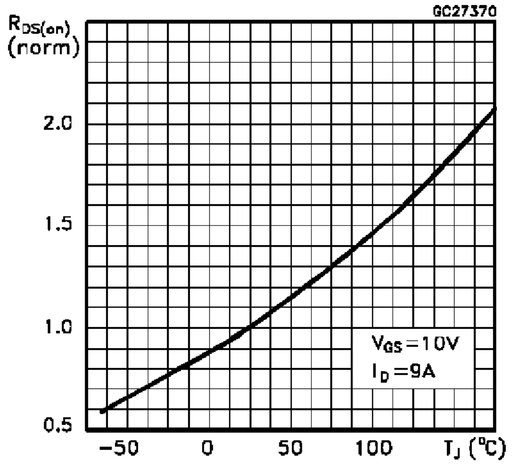
Capacitance Variation



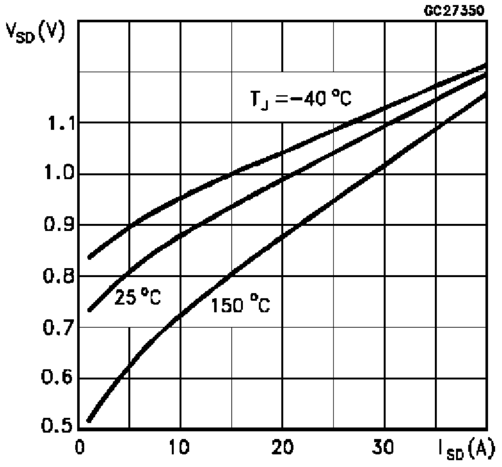
Normalized Gate Threshold Voltage vs Temperature



Normalized On Resistance vs Temperature

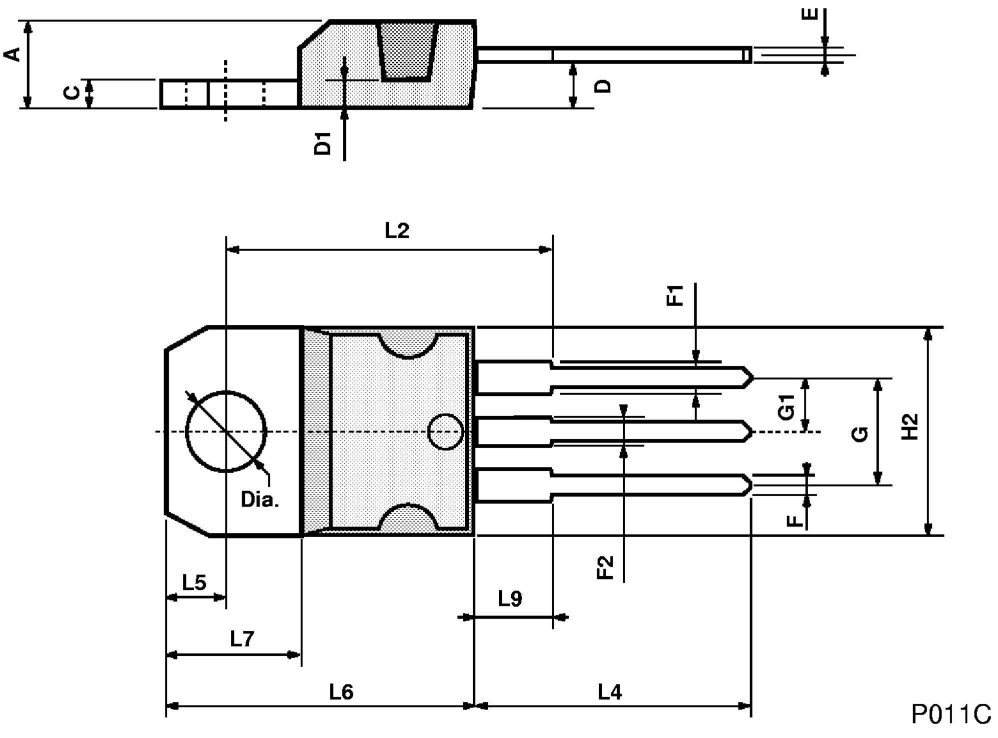


Source-Drain Diode Forward Characteristics



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



ISOWATT220 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.4		4.6	0.173		0.181
B	2.5		2.7	0.098		0.106
D	2.5		2.75	0.098		0.108
E	0.4		0.7	0.015		0.027
F	0.75		1	0.030		0.039
F1	1.15		1.7	0.045		0.067
F2	1.15		1.7	0.045		0.067
G	4.95		5.2	0.195		0.204
G1	2.4		2.7	0.094		0.106
H	10		10.4	0.393		0.409
L2		16			0.630	
L3	28.6		30.6	1.126		1.204
L4	9.8		10.6	0.385		0.417
L6	15.9		16.4	0.626		0.645
L7	9		9.3	0.354		0.366
Ø	3		3.2	0.118		0.126