

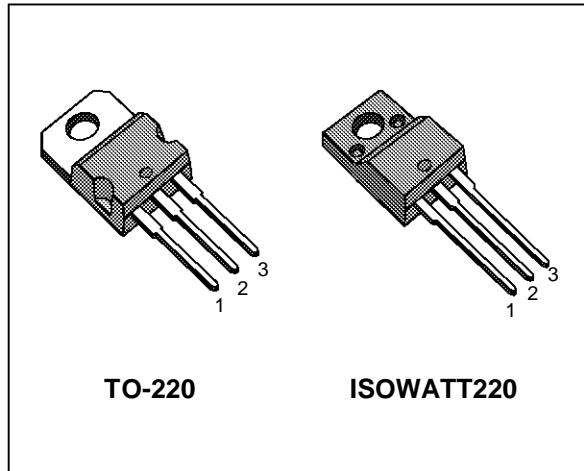
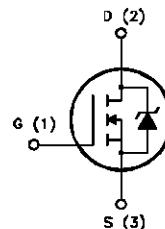
N - CHANNEL ENHANCEMENT MODE
 POWER MOS TRANSISTOR

TYPE	V _{DSS}	R _{DS(on)}	I _D
BUZ80	800 V	< 4 Ω	3.4 A
BUZ80FI	800 V	< 4 Ω	2.1 A

- TYPICAL R_{DS(on)} = 3.3 Ω
- AVALANCHE RUGGEDNESS TECHNOLOGY
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100°C
- LOW INPUT CAPACITANCE
- LOW GATE CHARGE
- APPLICATION ORIENTED CHARACTERIZATION

APPLICATIONS

- HIGH CURRENT, HIGH SPEED SWITCHING
- SWITCH MODE POWER SUPPLIES (SMPS)
- CONSUMER AND INDUSTRIAL LIGHTING
- DC-AC INVERTERS FOR WELDING EQUIPMENT AND UNINTERRUPTIBLE POWER SUPPLY (UPS)


INTERNAL SCHEMATIC DIAGRAM

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		BUZ80	BUZ80FI	
V _{DS}	Drain-source Voltage (V _{GS} = 0)	800	800	V
V _{DGR}	Drain-gate Voltage (R _{GS} = 20 kΩ)	800	800	V
V _{GS}	Gate-source Voltage	± 20	± 20	V
I _D	Drain Current (continuous) at T _c = 25 °C	3.4	2.1	A
I _D	Drain Current (continuous) at T _c = 100 °C	2.1	1.3	A
I _{DM(•)}	Drain Current (pulsed)	13	13	A
P _{tot}	Total Dissipation at T _c = 25 °C	100	40	W
	Derating Factor	0.8	0.32	W/°C
V _{ISO}	Insulation Withstand Voltage (DC)	—	2000	V
T _{stg}	Storage Temperature	-65 to 150		°C
T _j	Max. Operating Junction Temperature	150		°C

(•) Pulse width limited by safe operating area

BUZ80/FI

THERMAL DATA

			TO-220	ISOWATT220	
R _{thj-case}	Thermal Resistance Junction-case	Max	1.25	3.12	°C/W
R _{thj-amb} R _{thc-sink} T ₁	Thermal Resistance Junction-ambient Thermal Resistance Case-sink Maximum Lead Temperature For Soldering Purpose	Max Typ	62.5 0.5 300		°C/W °C/W °C

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I _{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T _j max, δ < 1%)	3.4	A
E _{AS}	Single Pulse Avalanche Energy (starting T _j = 25 °C, I _D = I _{AR} , V _{DD} = 50 V)	180	mJ
E _{AR}	Repetitive Avalanche Energy (pulse width limited by T _j max, δ < 1%)	4.8	mJ
I _{AR}	Avalanche Current, Repetitive or Not-Repetitive (T _c = 100 °C, pulse width limited by T _j max, δ < 1%)	2.1	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	800			V
I _{dss}	Zero Gate Voltage Drain Current (V _{GS} = 0)	V _{DS} = Max Rating V _{DS} = Max Rating × 0.8 T _c = 125 °C			25 250	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	3	4	V
R _{D(on)}	Static Drain-source On Resistance	V _{GS} = 10 V I _D = 1.7 A		3.3	4	Ω
I _{D(on)}	On State Drain Current	V _{DS} > I _{D(on)} × R _{D(on)max} V _{GS} = 10 V	3.4			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (*)	Forward Transconductance	V _{DS} > I _{D(on)} × R _{D(on)max} I _D = 1.7 A	1	3.5		S
C _{iss} C _{oss} C _{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V _{DS} = 25 V f = 1 MHz V _{GS} = 0		650 82 28	850 105 40	pF pF pF

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Time Rise Time	$V_{DD} = 30 \text{ V}$ $I_D = 2.1 \text{ A}$ $R_G = 50 \Omega$ $V_{GS} = 10 \text{ V}$ (see test circuit, figure 3)			50 110	ns ns
$(di/dt)_{on}$	Turn-on Current Slope	$V_{DD} = 640 \text{ V}$ $I_D = 3 \text{ A}$ $R_G = 50 \Omega$ $V_{GS} = 10 \text{ V}$ (see test circuit, figure 5)		170		$\text{A}/\mu\text{s}$
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD} = 400 \text{ V}$ $I_D = 3 \text{ A}$ $V_{GS} = 10 \text{ V}$		42 6 17	55	nC nC nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{r(Voff)}$ t_f t_c	Off-voltage Rise Time Fall Time Cross-over Time	$V_{DD} = 640 \text{ V}$ $I_D = 3 \text{ A}$ $R_G = 50 \Omega$ $V_{GS} = 10 \text{ V}$ (see test circuit, figure 5)		95 20 120	120 25 165	ns ns ns

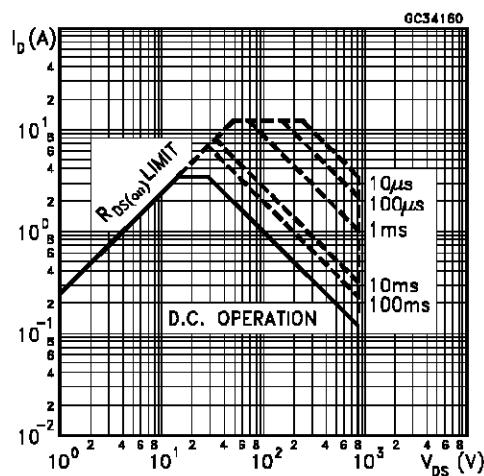
SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} $I_{SDM}(\bullet)$	Source-drain Current Source-drain Current (pulsed)				3.4 13	A A
$V_{SD} (\ast)$	Forward On Voltage	$I_{SD} = 6 \text{ A}$ $V_{GS} = 0$			2.5	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 3 \text{ A}$ $di/dt = 100 \text{ A}/\mu\text{s}$ $V_{DD} = 80 \text{ V}$ $T_j = 150^\circ\text{C}$		700		ns
Q_{rr}	Reverse Recovery Charge	(see test circuit, figure 5)		8.8		μC
I_{RRM}	Reverse Recovery Current			25		A

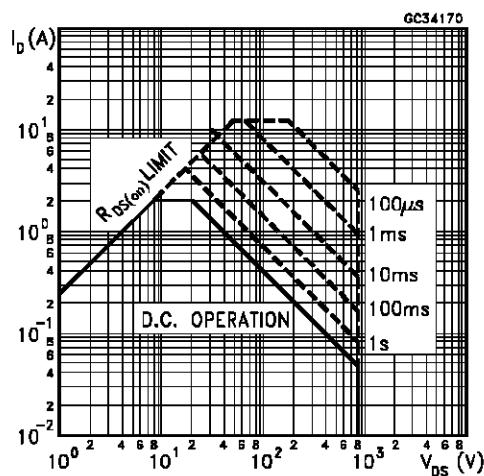
(*) Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %

(*) Pulse width limited by safe operating area

Safe Operating Areas For TO-220

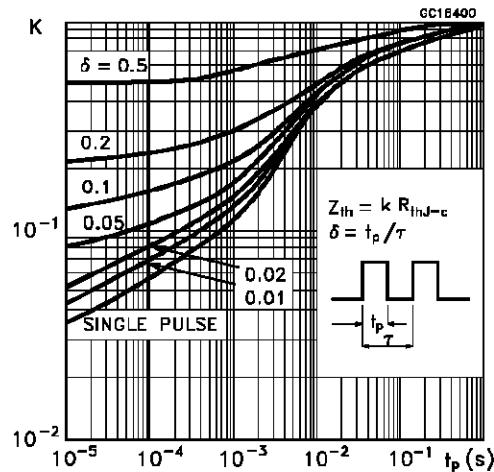


Safe Operating Areas For ISOWATT220

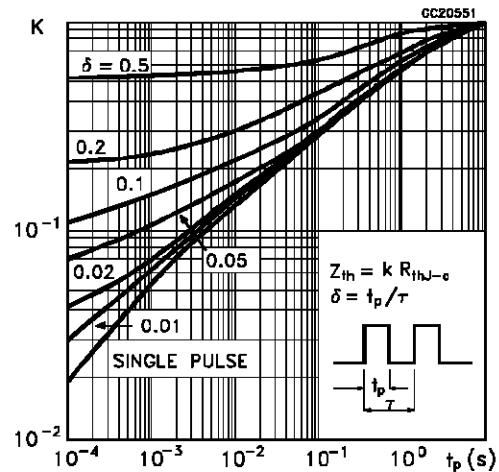


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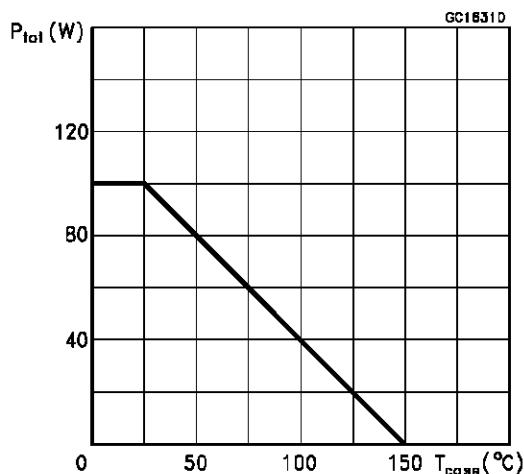
Thermal Impedance For TO-220



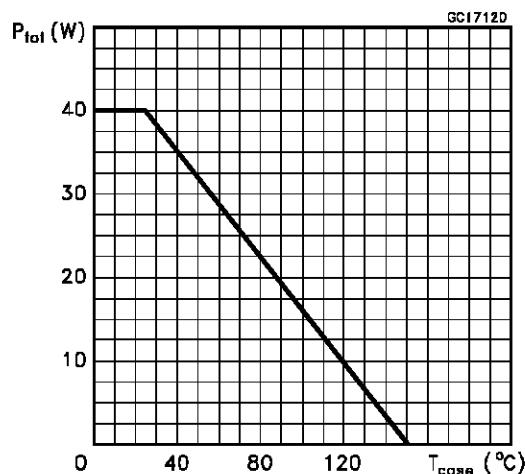
Thermal Impedance For ISOWATT220



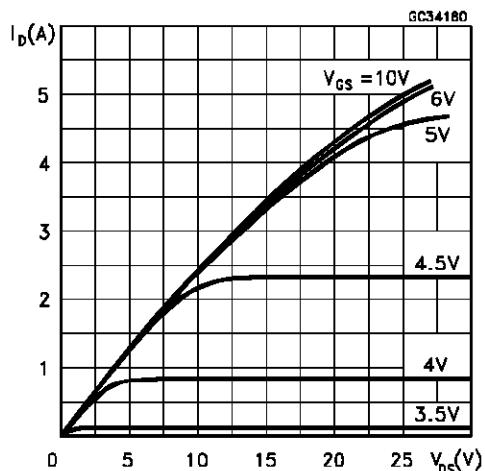
Derating Curve For TO-220



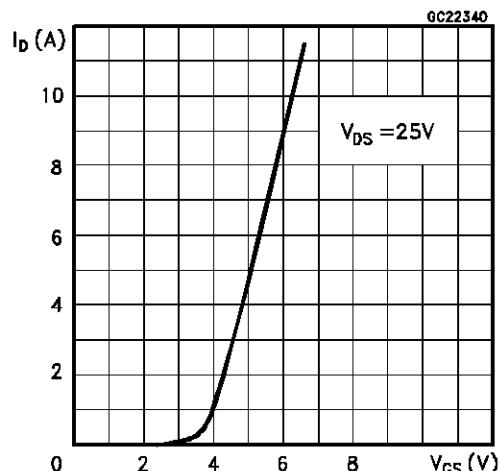
Derating Curve For ISOWATT220



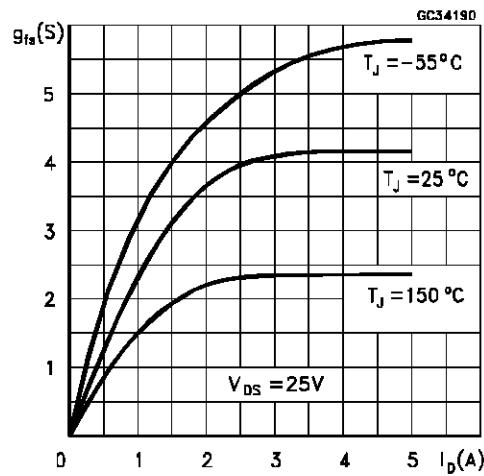
Output Characteristics



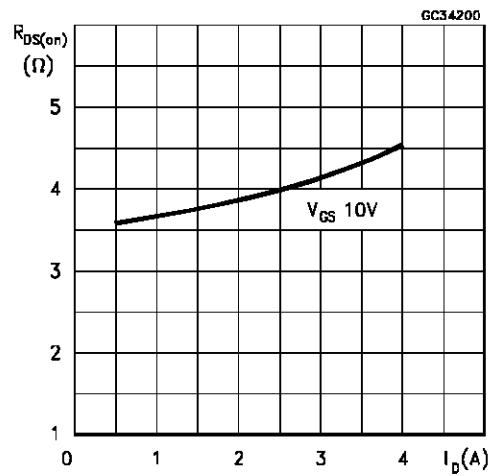
Transfer Characteristics



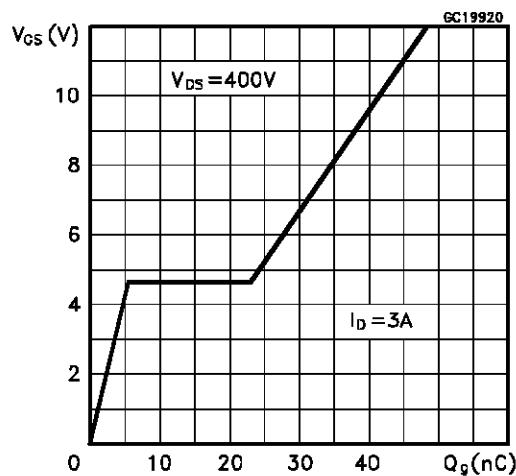
Transconductance



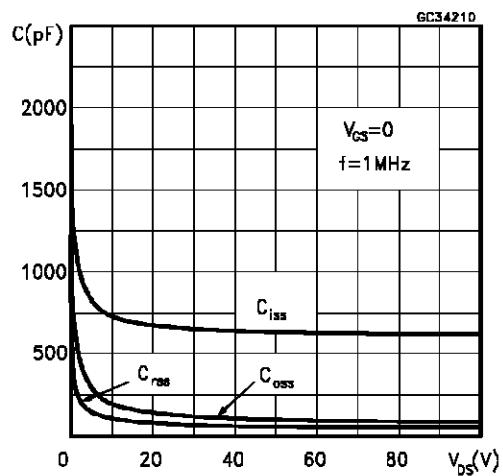
Static Drain-source On Resistance



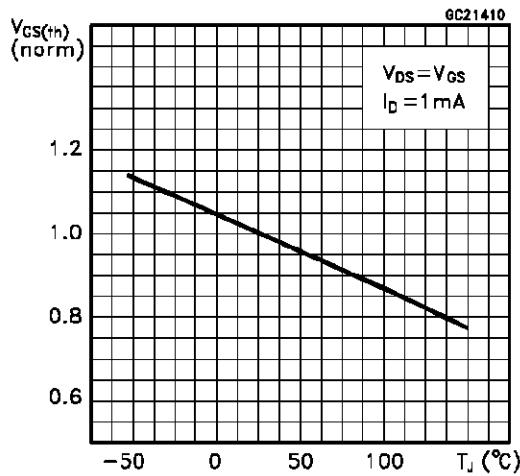
Gate Charge vs Gate-source Voltage



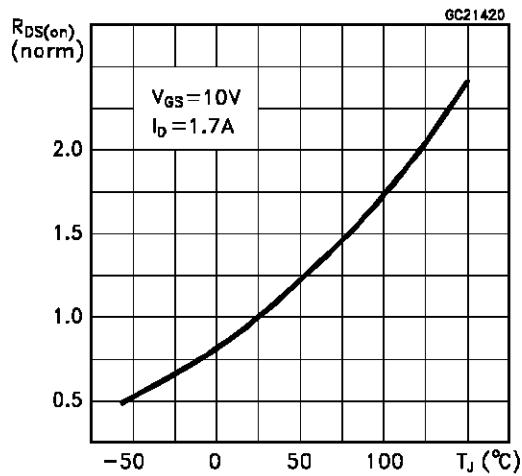
Capacitance Variations



Normalized Gate Threshold Voltage vs Temperature

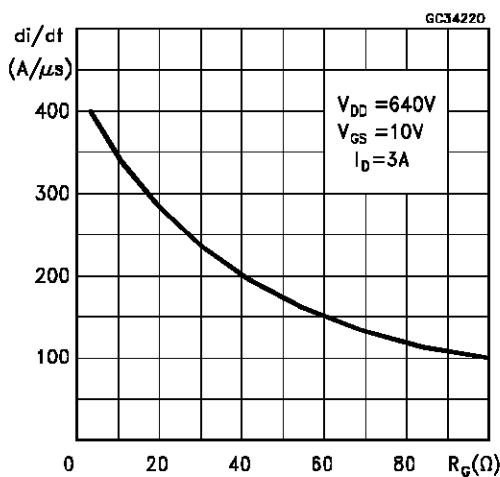


Normalized On Resistance vs Temperature

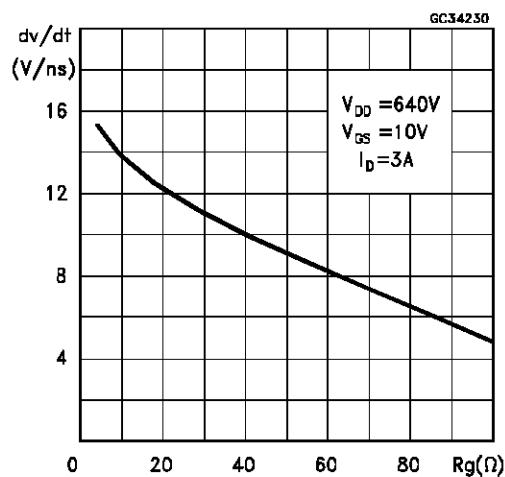


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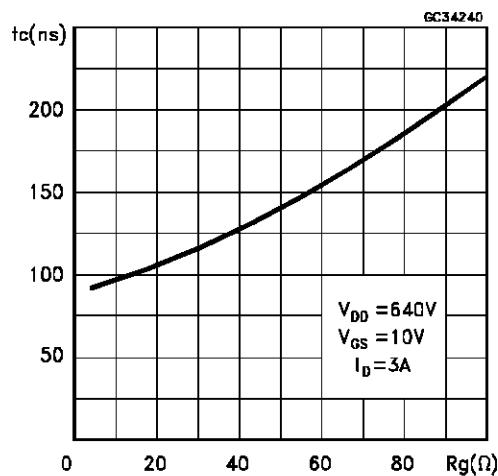
Turn-on Current Slope



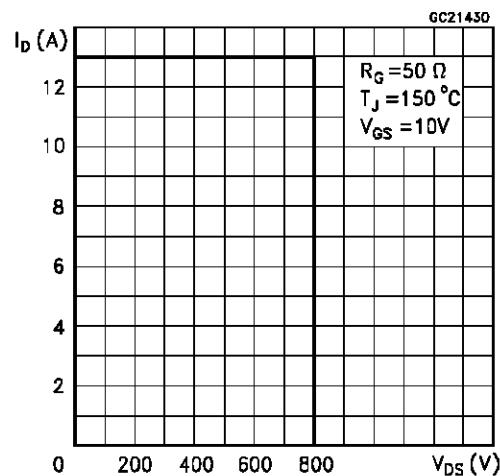
Turn-off Drain-source Voltage Slope



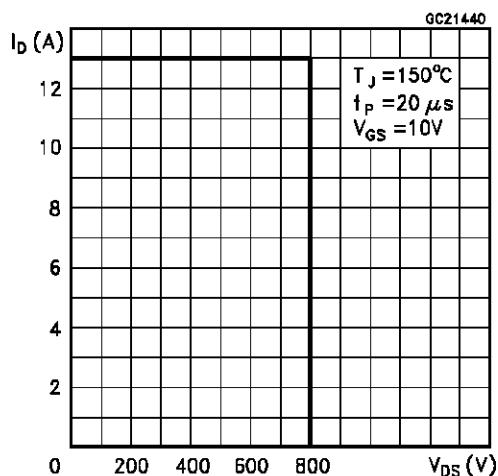
Cross-over Time



Switching Safe Operating Area



Accidental Overload Area



Source-drain Diode Forward Characteristics

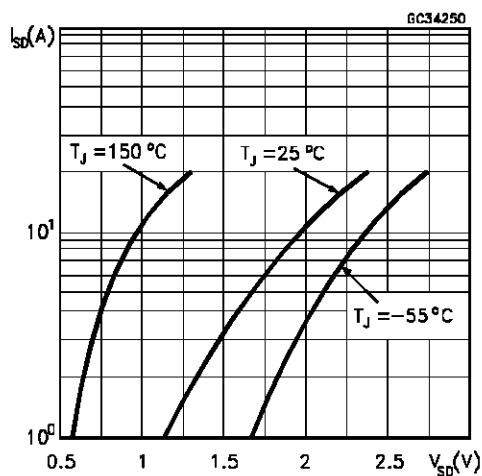
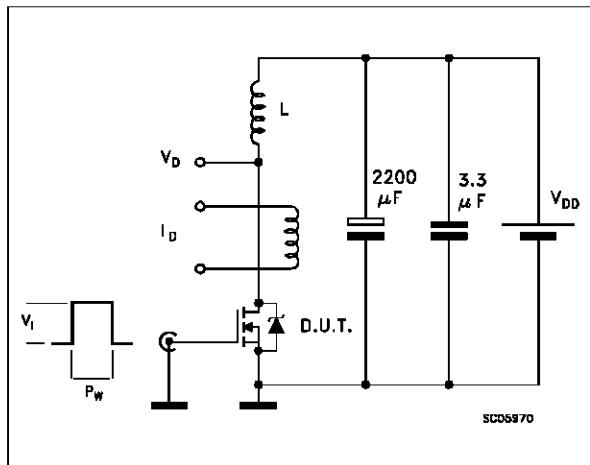
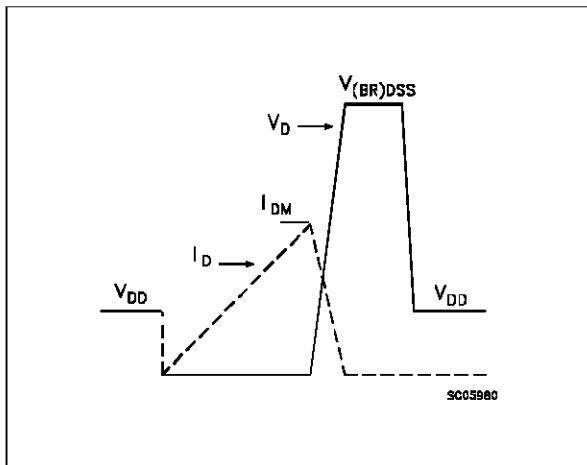
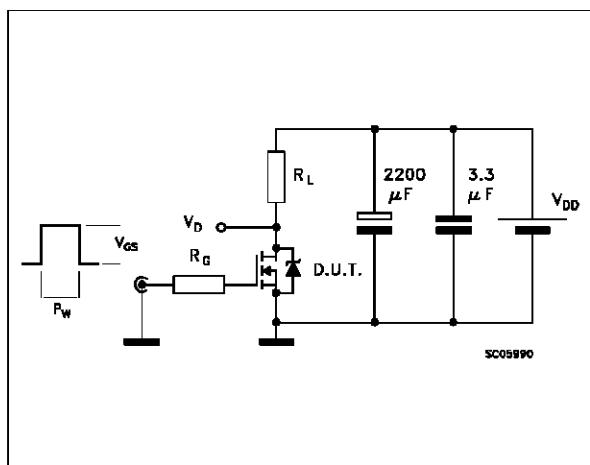
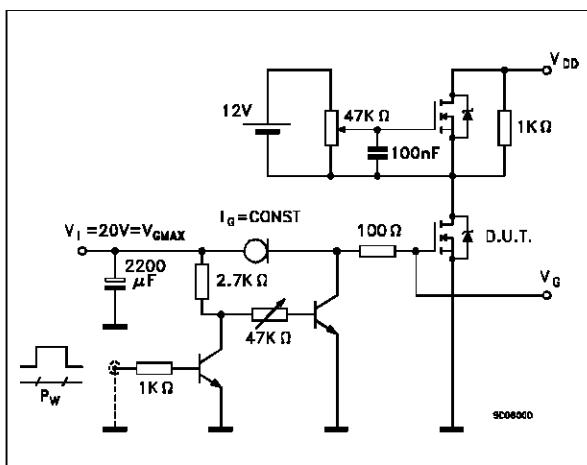
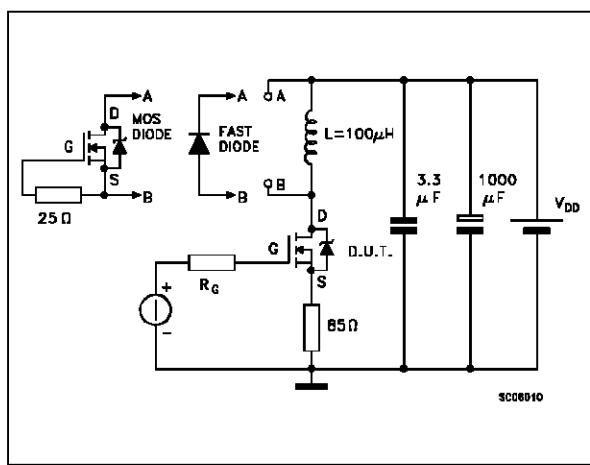
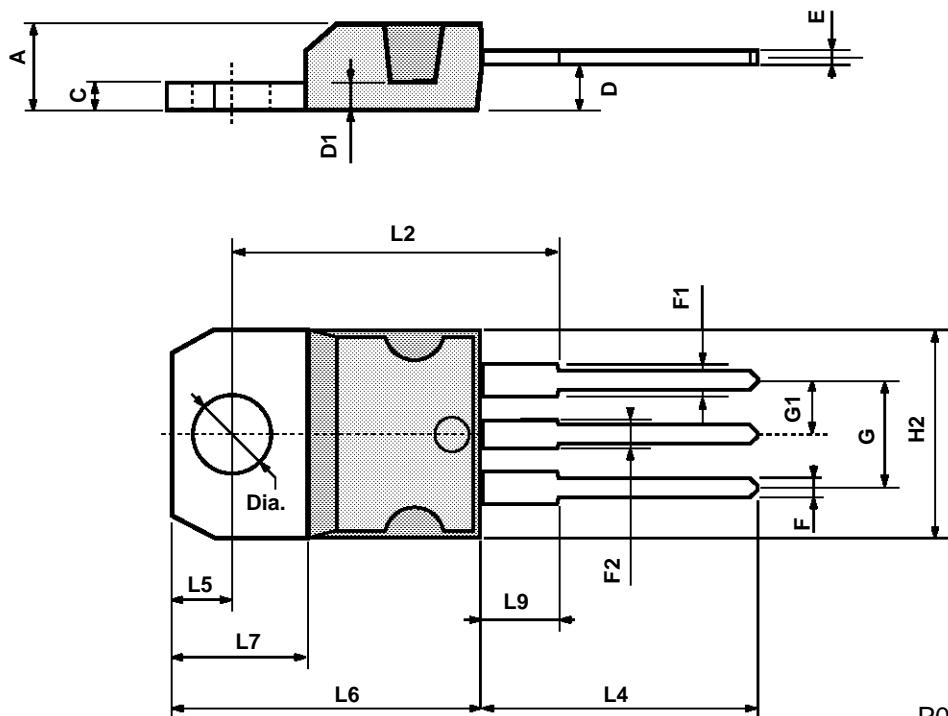


Fig. 1: Unclamped Inductive Load Test Circuits**Fig. 2:** Unclamped Inductive Waveforms**Fig. 3:** Switching Times Test Circuits For Resistive Load**Fig. 4:** Gate Charge Test Circuit**Fig. 5:** Test Circuit For Inductive Load Switching And Diode Reverse Recovery Time

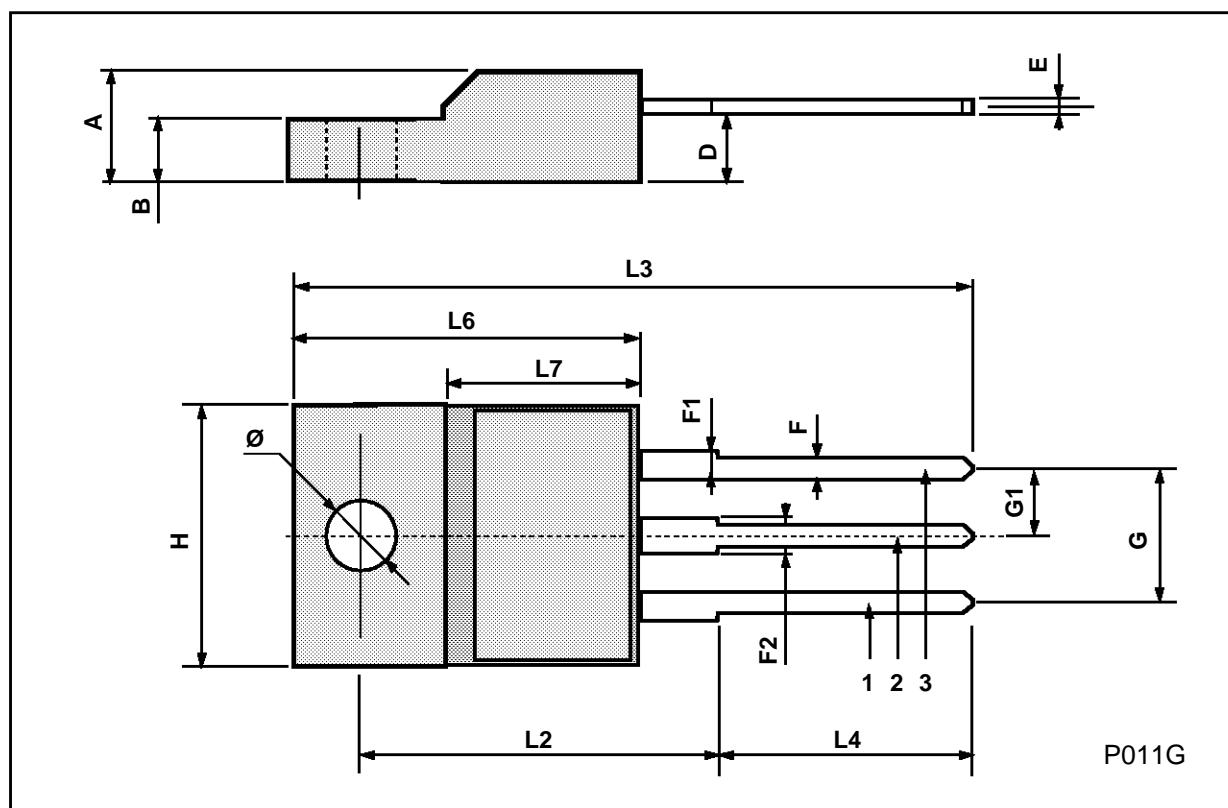
TO-220 MECHANICAL DATA

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



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