

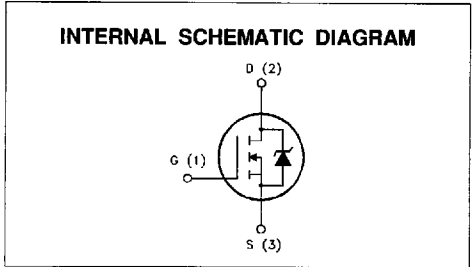
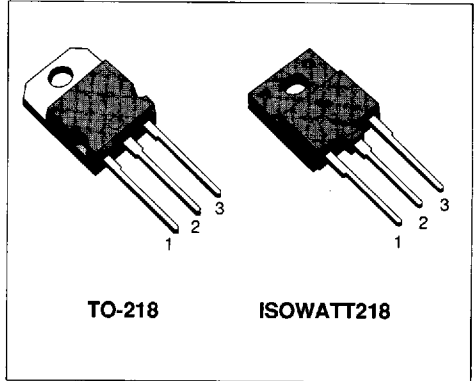
**N - CHANNEL ENHANCEMENT MODE
POWER MOS TRANSISTORS**

TYPE	V _{DSS}	R _{DS(on)}	I _D
IRFP240	200 V	< 0.18 Ω	20 A
IRFP240FI	200 V	< 0.18 Ω	12 A

- TYPICAL R_{DS(on)} = 0.145 Ω
- AVALANCHE RUGGED TECHNOLOGY
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100°C

APPLICATIONS

- HIGH CURRENT, HIGH SPEED SWITCHING
- UNINTERRUPTIBLE POWER SUPPLY (UPS)
- MOTOR CONTROL, AUDIO AMPLIFIERS
- INDUSTRIAL ACTUATORS
- DC-DC & DC-AC CONVERTERS FOR TELECOM, INDUSTRIAL AND CONSUMER ENVIRONMENT



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		IRFP240	IRFP240FI	
V _{DS}	Drain-source Voltage (V _{GS} = 0)	200		V
V _{DGR}	Drain- gate Voltage (R _{GS} = 20 kΩ)	200		V
V _{GS}	Gate-source Voltage	± 20		V
I _D	Drain Current (cont.) at T _C = 25 °C	20	12	A
I _D	Drain Current (cont.) at T _C = 100 °C	12	7	A
I _{DM} (*)	Drain Current (pulsed)	80	80	A
P _{tot}	Total Dissipation at T _C = 25 °C	150	55	W
	Derating Factor	1.2	0.44	W/°C
V _{ISO}	Insulation Withstand Voltage (DC)	—	4000	V
T _{stg}	Storage Temperature	-65 to 150		°C
T _J	Max. Operating Junction Temperature	150		°C

(*) Pulse width limited by safe operating area

THERMAL DATA

		TO-218	ISOWATT218		
R _{thj-case}	Thermal Resistance Junction-case	Max	0.83	2.27	°C/W
R _{thj-amb}	Thermal Resistance Junction-ambient	Max	30		°C/W
R _{thc-s}	Thermal Resistance Case-sink	Typ	0.1		°C/W
T _l	Maximum Lead Temperature For Soldering Purpose		300		°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%)	20	A
E _{AS}	Single Pulse Avalanche Energy (starting T _j = 25 °C, I _D = I _{AR} , V _{DD} = 25 V)	50	mJ
E _{AR}	Repetitive Avalanche Energy (pulse width limited by T _j max, δ < 1%)	10	mJ
I _{AR}	Avalanche Current, Repetitive or Not-Repetitive (T _c = 100 °C, pulse width limited by T _j max, δ < 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	200			V
I _{DSS}	Zero Gate Voltage Drain Current (V _{GS} = 0)	V _{DS} = Max Rating V _{DS} = Max Rating x 0.8 T _c = 125 °C			250 1000	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 = 250 μA	2	3	4	V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} = 10V I _D = 10 A		0.145	0.18	Ω
I _{D(on)}	On State Drain Current	V _{DS} > I _{D(on)} × R _{DS(on)max} V _{GS} = 10 V	20			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (*)	Forward Transconductance	V _{DS} > I _{D(on)} × R _{DS(on)max} I _D = 10 A	6.5	13		S
C _{iss}	Input Capacitance	V _{DS} = 25 V f = 1 MHz V _{GS} = 0		1600	2100	pF
C _{oss}	Output Capacitance			270	350	pF
C _{rss}	Reverse Transfer Capacitance			50	70	pF

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING RESISTIVE LOAD

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Time	$V_{DD} = 100\text{ V}$ $I_D = 20\text{ A}$		25	35	ns
t_r	Rise Time	$R_G = 9.1\ \Omega$ $V_{GS} = 10\text{ V}$		85	120	ns
$t_{d(off)}$	Turn-off Delay Time	(see test circuit)		65	90	ns
t_f	Fall Time			60	85	ns
Q_g	Total Gate Charge	$I_D = 20\text{ A}$ $V_{GS} = 10\text{ V}$		57	80	nC
Q_{gs}	Gate-Source Charge	$V_{DD} = \text{Max Rating} \times 0.8$		11		nC
Q_{gd}	Gate-Drain Charge	(see test circuit)		26		nC

SOURCE DRAIN DIODE

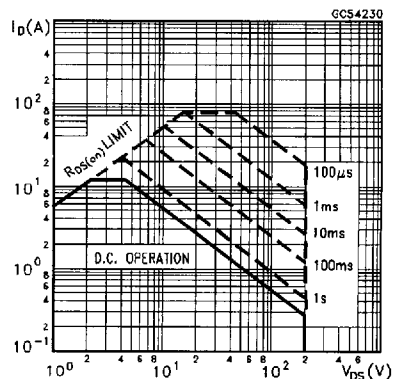
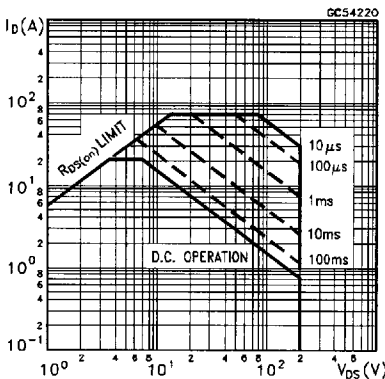
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				20	A
$I_{SDM}(\bullet)$	Source-drain Current (pulsed)				80	A
$V_{SD}(\ast)$	Forward On Voltage	$I_{SD} = 20\text{ A}$ $V_{GS} = 0$			1.5	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 20\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 100\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$		310		ns
Q_{rr}	Reverse Recovery Charge			3.4		μC

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

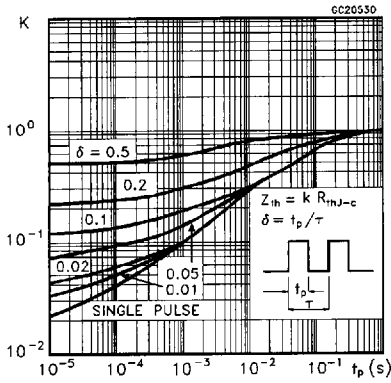
(\bullet) Pulse width limited by safe operating area

Safe Operating Area for TO-218

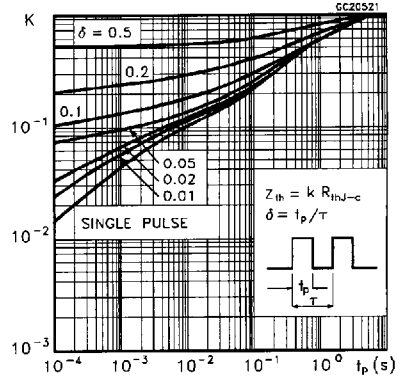
Safe Operating Area for ISOWATT218



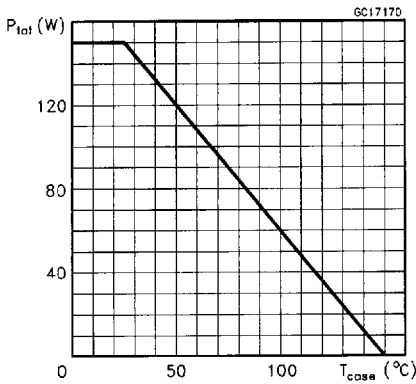
Thermal Impedance for TO-218



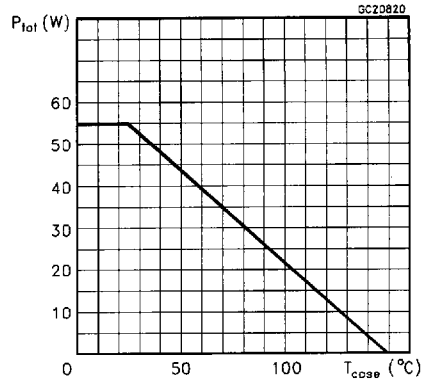
Thermal Impedance for ISOWATT218



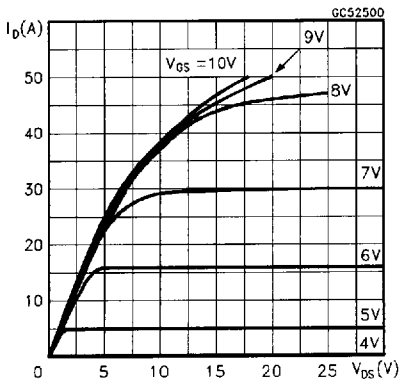
Derating Curve for TO-218



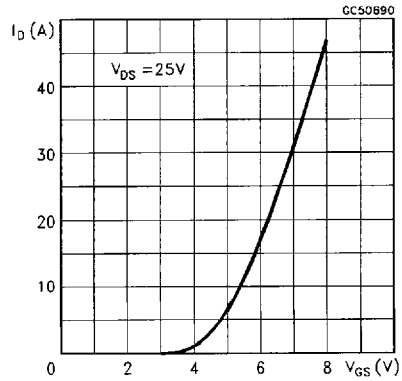
Derating Curve for ISOWATT218



Output Characteristics

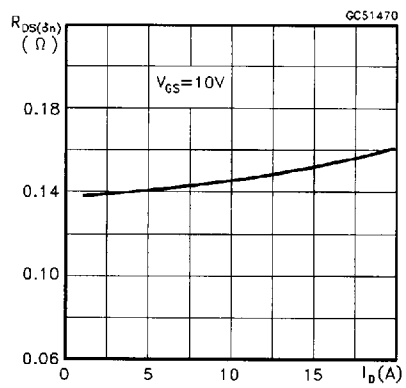
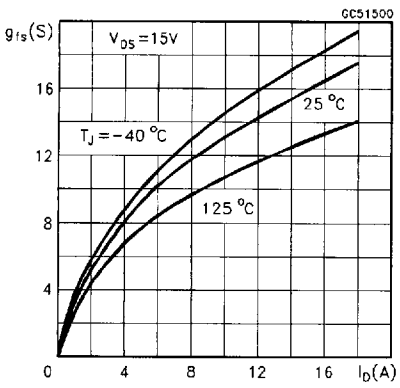


Transfer Characteristics



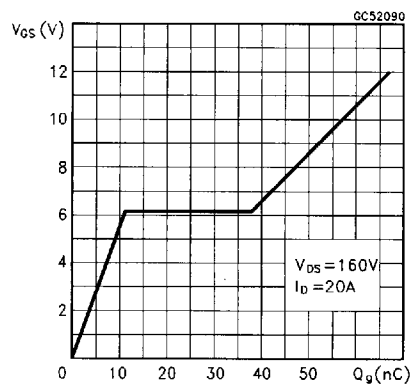
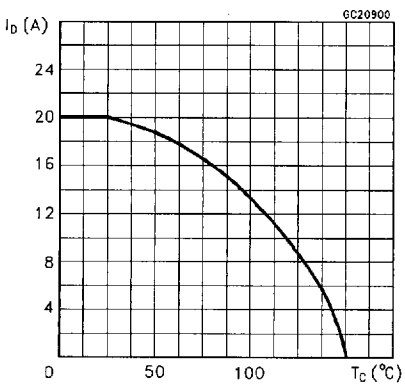
Transconductance

Static Drain-source On Resistance



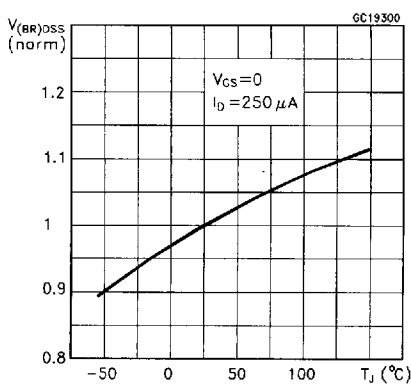
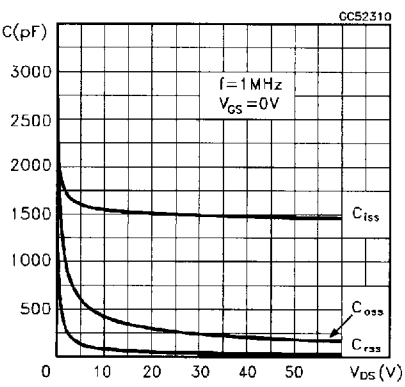
Maximum Drain Current vs Temperature

Gate Charge vs Gate-source Voltage

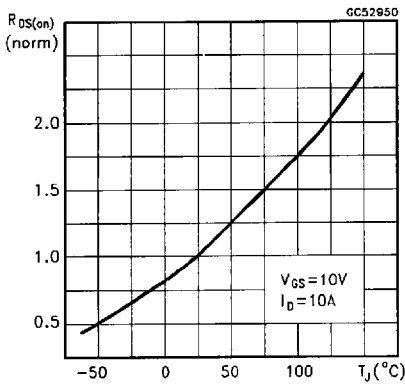


Capacitance Variations

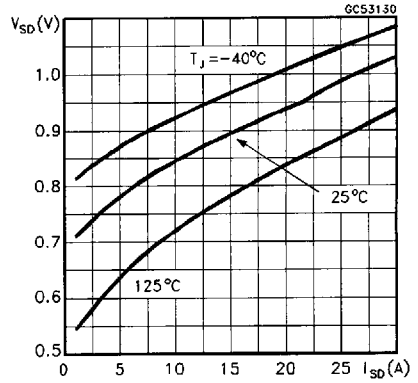
Normalized Breakdown Voltage vs Temperature



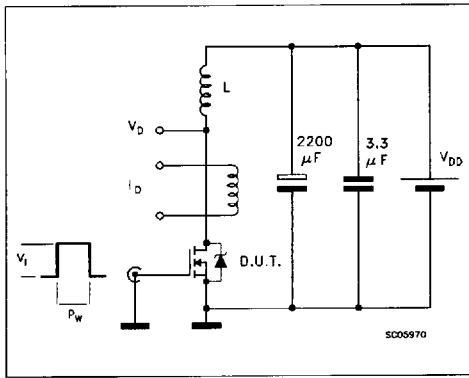
Normalized On Resistance vs Temperature



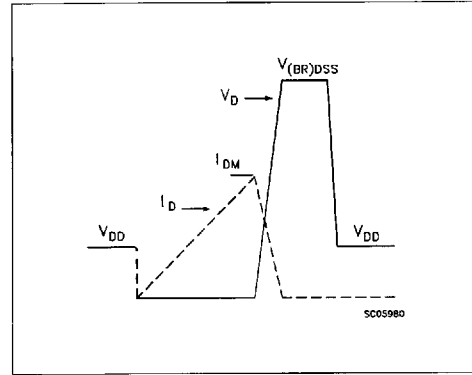
Source-drain Diode Forward Characteristics



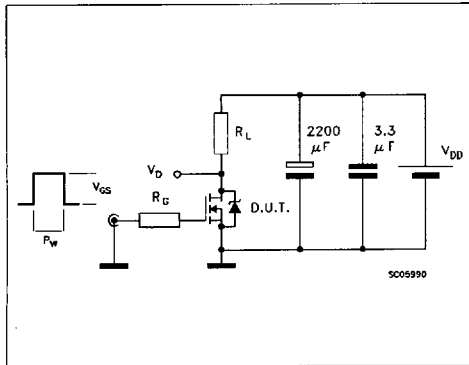
Unclamped Inductive Load Test Circuit



Unclamped Inductive Waveforms



Switching Time Test Circuit



Gate Charge Test Circuit

