

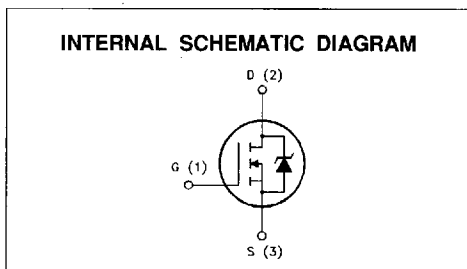
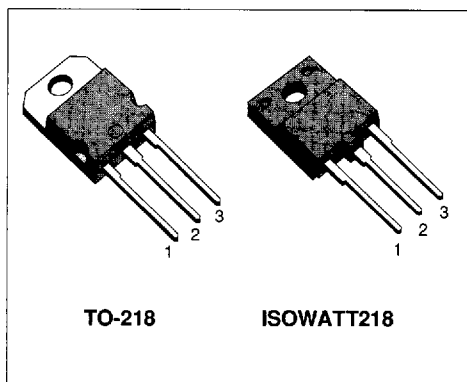
N - CHANNEL ENHANCEMENT MODE POWER MOS TRANSISTORS

TYPE	V _{DS}	R _{DS(on)}	I _D
IRFP150	100 V	< 0.055 Ω	40 A
IRFP150FI	100 V	< 0.055 Ω	23 A

- TYPICAL R_{DS(on)} = 0.035 Ω
- AVALANCHE RUGGED TECHNOLOGY
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100°C
- LOW GATE CHARGE
- HIGH CURRENT CAPABILITY
- 175°C OPERATING TEMPERATURE FOR STANDARD PACKAGE
- APPLICATION ORIENTED CHARACTERIZATION

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
		IRFP150	IRFP150FI	
V _{DS}	Drain-source Voltage (V _{GS} = 0)	100		V
V _{DGR}	Drain- gate Voltage (R _{GS} = 20 k Ω)	100		V
V _{GS}	Gate-source Voltage	± 20		V
I _D	Drain Current (cont.) at T _c = 25 °C	40	23	A
I _D	Drain Current (cont.) at T _c = 100 °C	28	14	A
I _{DM} (*)	Drain Current (pulsed)	160	160	A
P _{tot}	Total Dissipation at T _c = 25 °C	180	60	W
	Derating Factor	1.2	0.48	W/°C
V _{ISO}	Insulation Withstand Voltage (DC)	4000		V
T _{sig}	Storage Temperature	-65 to 175	-65 to 150	°C
T _j	Max. Operating Junction Temperature	175	150	°C

(*) Pulse width limited by safe operating area

THERMAL DATA

		TO-218	ISOWATT218	
$R_{thj-case}$	Thermal Resistance Junction-case Max	0.83	2.08	$^{\circ}\text{C/W}$
$R_{thj-amb}$	Thermal Resistance Junction-ambient Max	30		$^{\circ}\text{C/W}$
R_{thc-s}	Thermal Resistance Case-sink Typ	0.1		$^{\circ}\text{C/W}$
T_l	Maximum Lead Temperature For Soldering Purpose	300		$^{\circ}\text{C}$

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T_j max, $\delta < 1\%$)	40	A
E_{AS}	Single Pulse Avalanche Energy (starting $T_j = 25^{\circ}\text{C}$, $I_D = I_{AR}$, $V_{DS} = 25\text{ V}$)	210	mJ
E_{AR}	Repetitive Avalanche Energy (pulse width limited by T_j max, $\delta < 1\%$)	50	mJ
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive ($T_c = 100^{\circ}\text{C}$, pulse width limited by T_j max, $\delta < 1\%$)	28	A

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}\text{C}$ unless otherwise specified)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	$I_D = 250\text{ }\mu\text{A}$ $V_{GS} = 0$	100			V
I_{DSS}	Zero Gate Voltage Drain Current ($V_{GS} = 0$)	$V_{DS} = \text{Max Rating}$ $V_{DS} = \text{Max Rating} \times 0.8$ $T_c = 125^{\circ}\text{C}$			250 1000	μA μA
I_{GSS}	Gate-body Leakage Current ($V_{DS} = 0$)	$V_{GS} = \pm 20\text{ V}$			± 100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ $I_D = 250\text{ }\mu\text{A}$	2	2.9	4	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10\text{ V}$ $I_D = 22\text{ A}$		0.035	0.055	Ω
$I_{D(on)}$	On State Drain Current	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $V_{GS} = 10\text{ V}$	40			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$g_{fs} (*)$	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $I_D = 22\text{ A}$	12	26		S
C_{iss}	Input Capacitance	$V_{DS} = 25\text{ V}$ $f = 1\text{ MHz}$ $V_{GS} = 0$		2150	2800	pF
C_{oss}	Output Capacitance			600	800	pF
C_{rss}	Reverse Transfer Capacitance			150	200	pF

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING RESISTIVE LOAD

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Time	$V_{DD} = 24\text{ V}$ $I_D = 20\text{ A}$		20	30	ns
t_r	Rise Time	$R_i = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$		130	190	ns
$t_{d(off)}$	Turn-off Delay Time	(see test circuit)		80	120	ns
t_f	Fall Time			80	120	ns
Q_g	Total Gate Charge	$I_D = 40\text{ A}$ $V_{GS} = 10\text{ V}$ $V_{DD} = \text{Max Rating} \times 0.8$ (see test circuit)		70 12 30	100	nC

SOURCE DRAIN DIODE

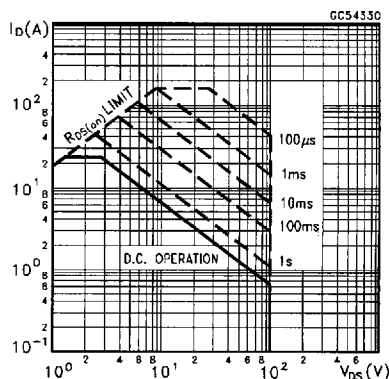
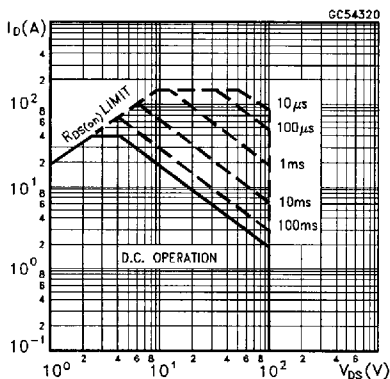
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				40	A
$I_{SDM}(\bullet)$	Source-drain Current (pulsed)				160	A
$V_{SD}(\ast)$	Forward On Voltage	$I_{SD} = 40\text{ A}$ $V_{GS} = 0$			2	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 40\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 30\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$		130		ns
Q_{rr}	Reverse Recovery Charge			0.65		μC

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

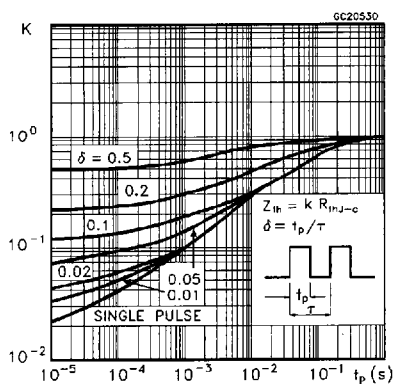
(•) Pulse width limited by safe operating area

Safe Operating Area for TO-218

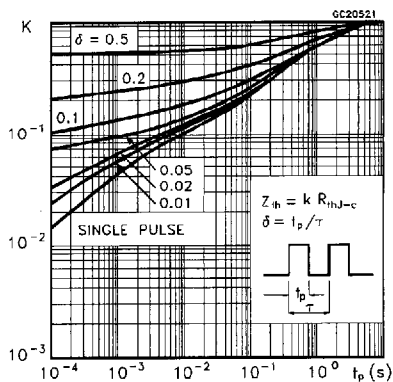
Safe Operating Area for ISOWATT218



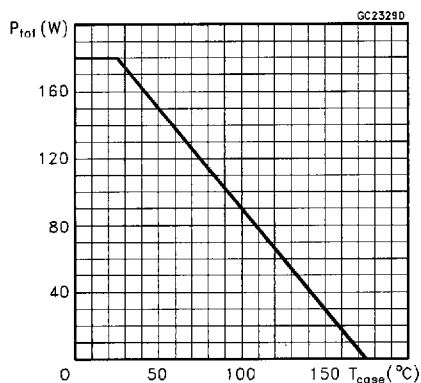
Thermal Impedance for TO-218



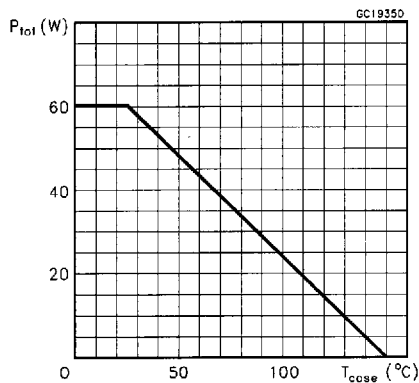
Thermal Impedance for ISOWATT218



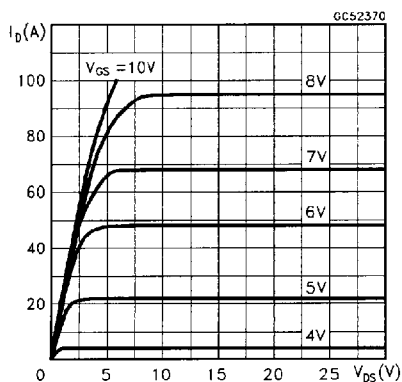
Derating Curve for TO-218



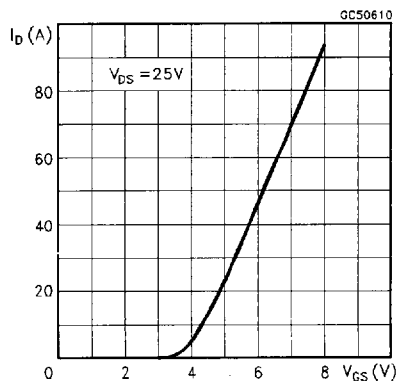
Derating Curve for ISOWATT218



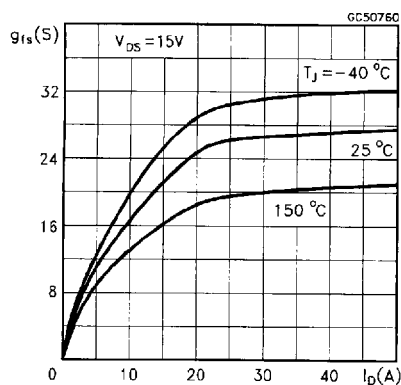
Output Characteristics



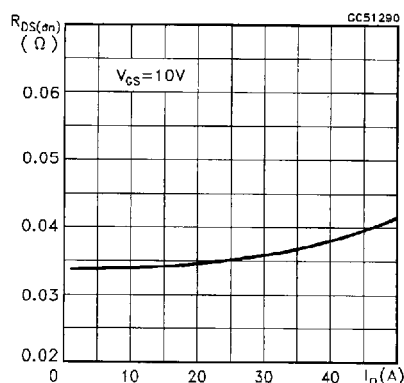
Transfer Characteristics



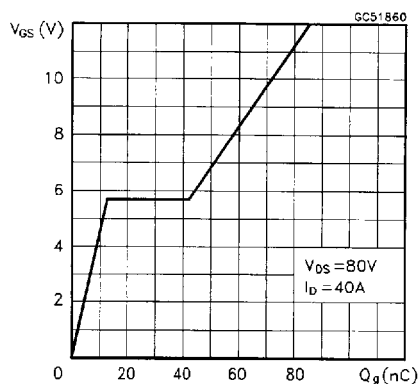
Transconductance



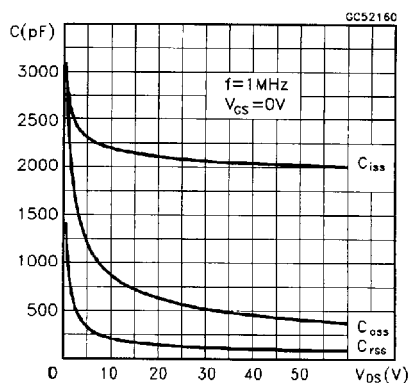
Static Drain-source On Resistance



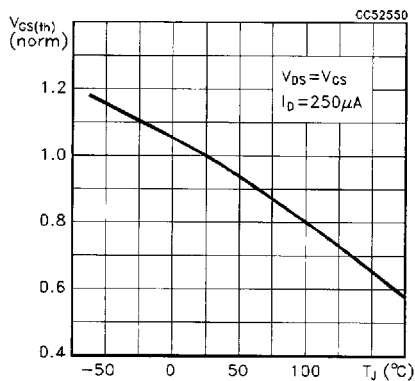
Gate Charge vs Gate-source Voltage



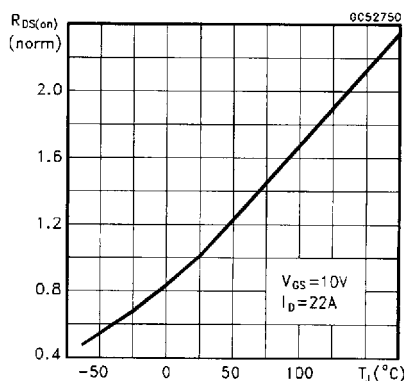
Capacitance Variations



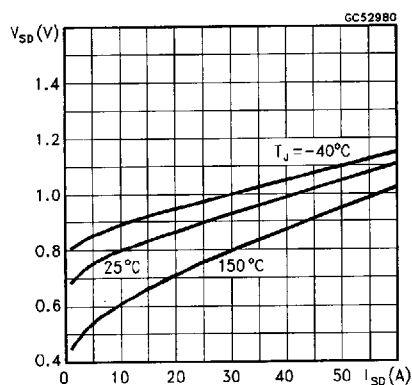
Normalized Gate Threshold Voltage vs Temperature



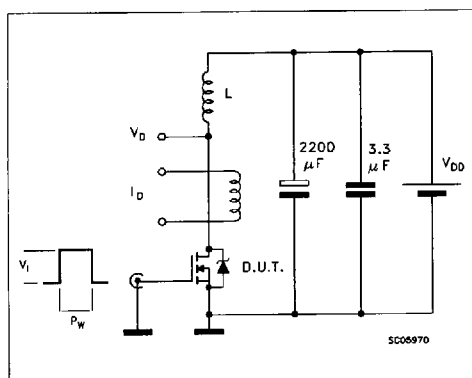
Normalized On Resistance vs Temperature



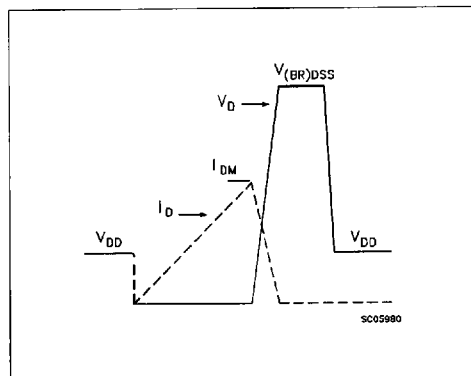
Source-drain Diode Forward Characteristics



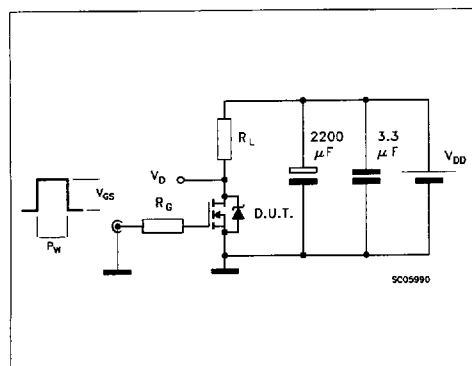
Unclamped Inductive Load Test Circuit



Unclamped Inductive Waveforms



Switching Time Test Circuit



Gate Charge Test Circuit

