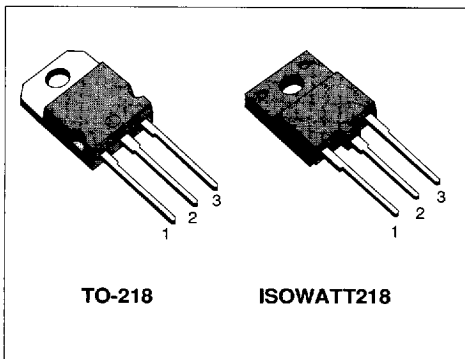


**N - CHANNEL ENHANCEMENT MODE  
POWER MOS TRANSISTORS**

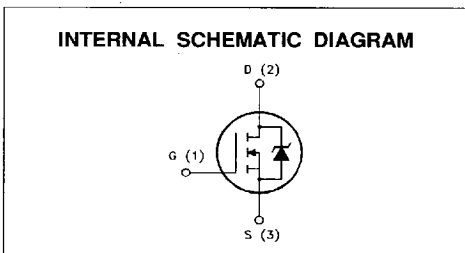
TYPE	V <sub>DSS</sub>	R <sub>DS(on)</sub>	I <sub>D</sub>
IRFP150	100 V	< 0.055 Ω	40 A
IRFP150FI	100 V	< 0.055 Ω	23 A

- TYPICAL R<sub>DS(on)</sub> = 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 <sub>DS</sub>	Drain-source Voltage (V <sub>GS</sub> = 0)	100		V	
V <sub>DGR</sub>	Drain- gate Voltage (R <sub>GS</sub> = 20 kΩ)	100		V	
V <sub>GS</sub>	Gate-source Voltage	± 20		V	
I <sub>D</sub>	Drain Current (cont.) at T <sub>c</sub> = 25 °C	40	23	A	
I <sub>D</sub>	Drain Current (cont.) at T <sub>c</sub> = 100 °C	28	14	A	
I <sub>DM</sub> (*)	Drain Current (pulsed)	160	160	A	
P <sub>tot</sub>	Total Dissipation at T <sub>c</sub> = 25 °C	180	60	W	
	Derating Factor	1.2	0.48	W/°C	
V <sub>ISO</sub>	Insulation Withstand Voltage (DC)	—		4000	V
T <sub>stg</sub>	Storage Temperature	-65 to 175	-65 to 150	°C	
T <sub>j</sub>	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	$^{\circ}C/W$
$R_{thj-amb}$	Thermal Resistance Junction-ambient	Max	30		$^{\circ}C/W$
$R_{thc-s}$	Thermal Resistance Case-sink	Typ	0.1		$^{\circ}C/W$
$T_i$	Maximum Lead Temperature For Soldering Purpose		300		$^{\circ}C$

## 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 $T_j = 25^{\circ}C$ , $I_D = I_{AR}$ , $V_{DD} = 25 V$ )	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 ( $T_c = 100^{\circ}C$ , pulse width limited by $T_j$ max, $\delta < 1\%$ )	28	A

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

OFF

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

ON (\*)

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

DYNAMIC

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

**ELECTRICAL CHARACTERISTICS** (continued)  
**SWITCHING RESISTIVE LOAD**

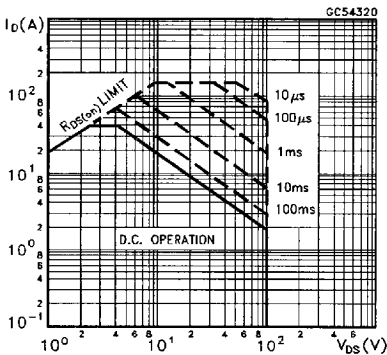
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Time	$V_{DD} = 24\text{ V}$ $I_D = 20\text{ A}$ $R_i = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ (see test circuit)		20	30	ns
$t_r$	Rise Time			130	190	ns
$t_{d(off)}$	Turn-off Delay Time			80	120	ns
$t_f$	Fall Time			80	120	ns
$Q_g$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

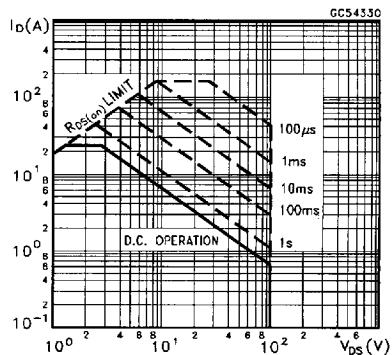
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{SD}$	Source-drain Current				40	A
$I_{SDM}(\bullet)$	Source-drain Current (pulsed)				160	A
$V_{SD}(\ast)$	Forward On Voltage	$I_{SD} = 40\text{ A}$ $V_{GS} = 0$			2	V
$t_{rr}$	Reverse Recovery Time	$I_{SD} = 40\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$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

(\*) Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %  
 (•) Pulse width limited by safe operating area

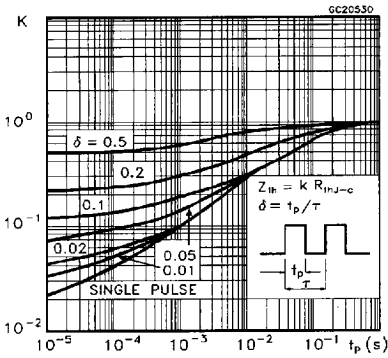
Safe Operating Area for TO-218



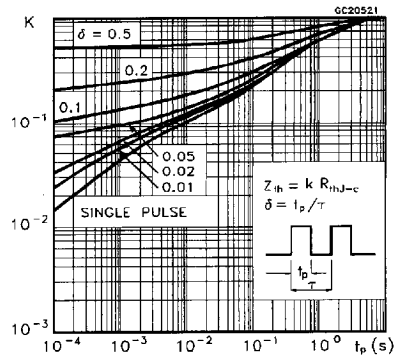
Safe Operating Area for ISOWATT218



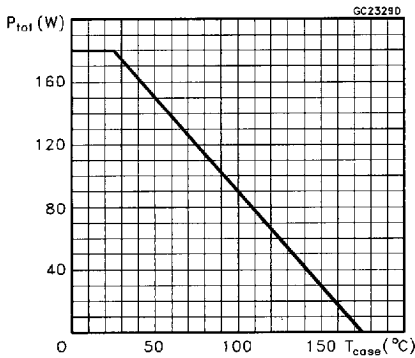
Thermal Impedance for TO-218



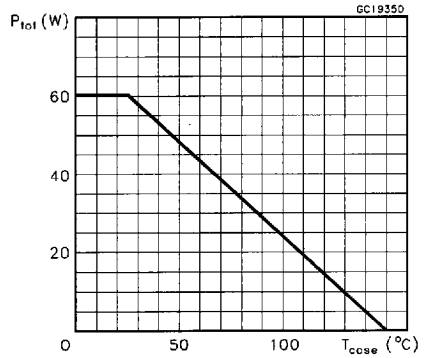
Thermal Impedance for ISOWATT218



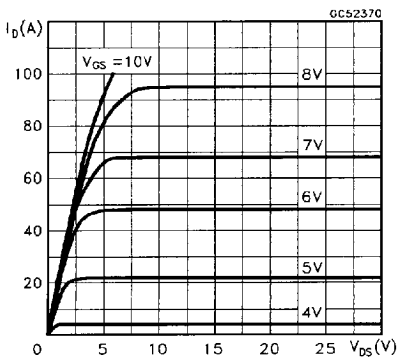
Derating Curve for TO-218



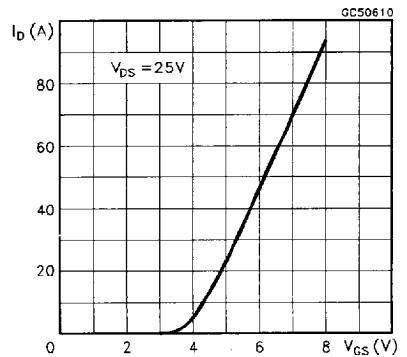
Derating Curve for ISOWATT218



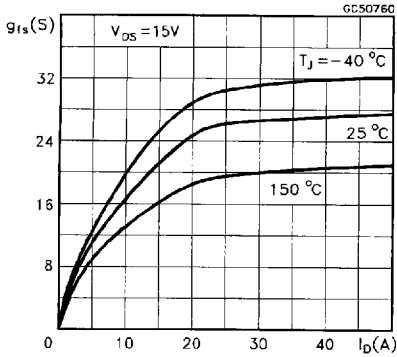
Output Characteristics



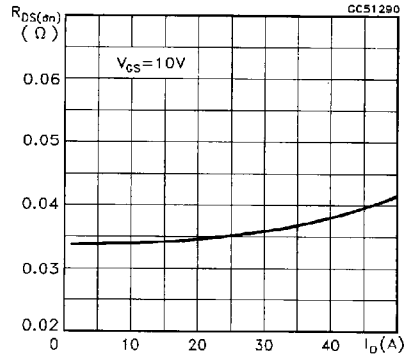
Transfer Characteristics



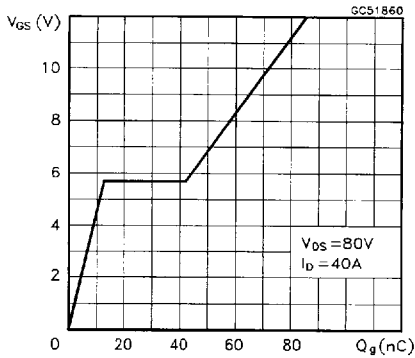
Transconductance



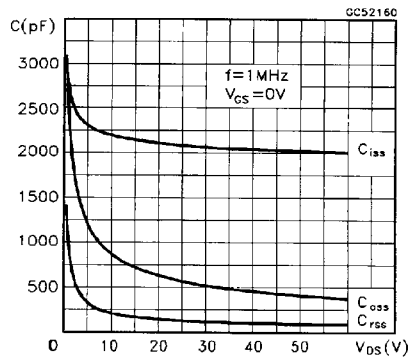
Static Drain-source On Resistance



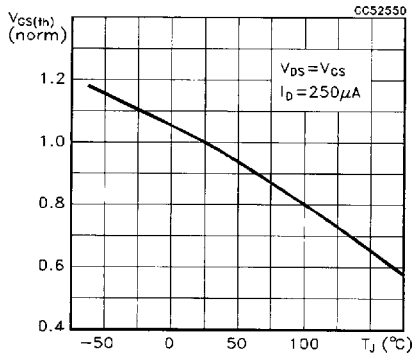
Gate Charge vs Gate-source Voltage



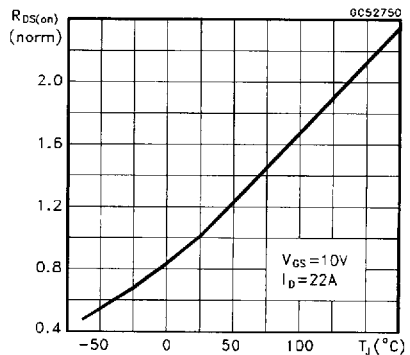
Capacitance Variations



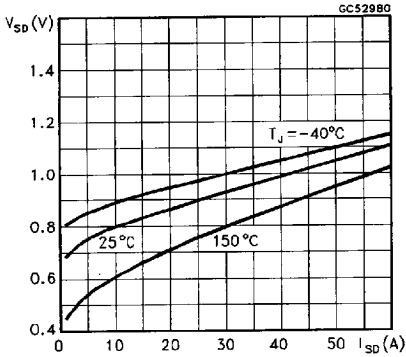
Normalized Gate Threshold Voltage vs Temperature



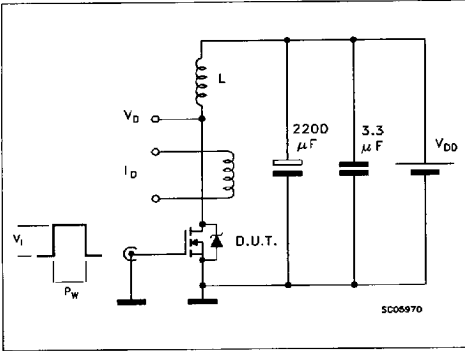
Normalized On Resistance vs Temperature



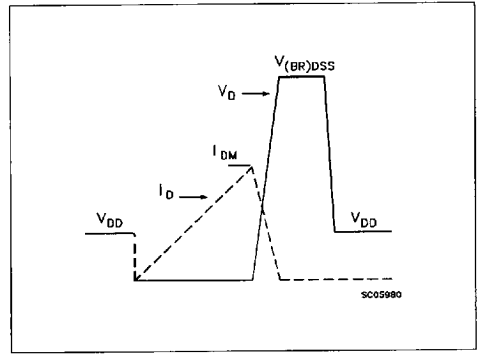
Source-drain Diode Forward Characteristics



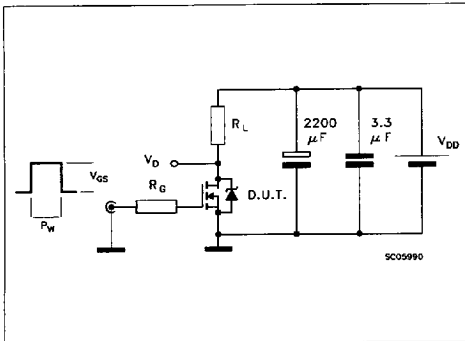
Unclamped Inductive Load Test Circuit



Unclamped Inductive Waveforms



Switching Time Test Circuit



Gate Charge Test Circuit

