

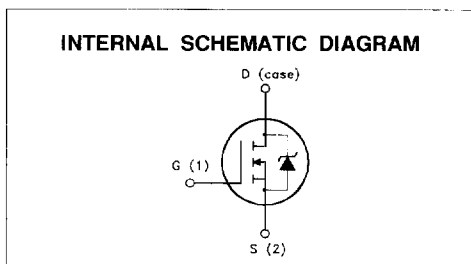
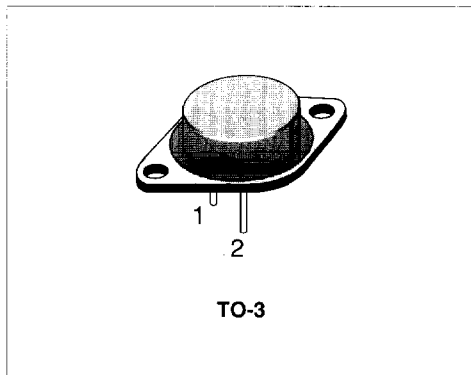
N - CHANNEL ENHANCEMENT MODE POWER MOS TRANSISTORS

TYPE	V _{DSS}	R _{DS(on)}	I _D
IRF150	100 V	0.055 Ω	40 A

- AVALANCHE RUGGEDNESS TECHNOLOGY
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100°C
- LOW GATE CHARGE
- HIGH CURRENT CAPABILITY

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
V _{DS}	Drain-source Voltage (V _{GS} = 0)	100	V
V _{DGR}	Drain- gate Voltage (R _{GS} = 20 kΩ)	100	V
V _{GS}	Gate-source Voltage	± 20	V
I _D	Drain Current (cont.) at T _c = 25 °C	40	A
I _D	Drain Current (cont.) at T _c = 100 °C	25	A
I _{DM} (*)	Drain Current (pulsed)	160	A
P _{tot}	Total Dissipation at T _c = 25 °C	150	W
	Derating Factor	1.2	W/°C
T _{slg}	Storage Temperature	-65 to 150	°C
T _j	Max. Operating Junction Temperature	150	°C

(*) Pulse width limited by safe operating area

THERMAL DATA

$R_{th(jc)}$	Thermal Resistance Junction-case	Max	0.83	$^{\circ}\text{C}/\text{W}$
$R_{th(ja)}$	Thermal Resistance Junction-ambient	Max	30	$^{\circ}\text{C}/\text{W}$
$R_{th(cs)}$	Thermal Resistance Case-sink	Typ	0.1	$^{\circ}\text{C}/\text{W}$
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_l , max. $\delta < 1\%$)	40	A
E_{AS}	Single Pulse Avalanche Energy (starting $T_l = 25^{\circ}\text{C}$, $I_D = I_{AR}$, $V_{DS} = 25\text{ V}$)	210	mJ
E_{AR}	Repetitive Avalanche Energy (pulse width limited by T_l , max. $\delta < 1\%$)	26	mJ
I_{AV}	Avalanche Current, Repetitive or Not-Repetitive ($T_c = 100^{\circ}\text{C}$, pulse width limited by T_l , max. $\delta < 1\%$)	24	A

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

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	$I_D = 250\ \mu\text{A}$ $V_{GS} = 0$	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_{DSS}	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	$V_{DS} = V_{DS}$ $I_D = 250\ \mu\text{A}$	2		4	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10\text{ V}$ $I_D = 20\text{ A}$			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 $I_D = 20\text{ A}$	9			S
C_{iss}	Input Capacitance	$V_{DS} = 25\text{ V}$ $f = 1\text{ MHz}$ $V_{GS} = 0$			3000	pF
C_{oss}	Output Capacitance				1500	pF
C_{riss}	Reverse Transfer Capacitance				500	pF

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING RESISTIVE LOAD

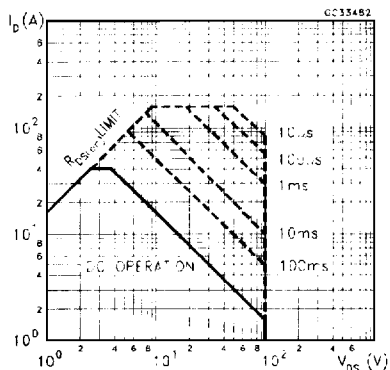
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Time	$V_{DD} = 24\text{ V}$ $I_D = 20\text{ A}$ $R_s = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ (see test circuit)			35	ns
t_r	Rise Time				100	ns
$t_{d(off)}$	Turn-off Delay Time				125	ns
t_f	Fall Time				100	ns
Q_g	Total Gate Charge	$I_D = 50\text{ A}$ $V_{GS} = 10\text{ V}$ $V_{DD} = \text{Max Rating} \times 0.8$ (see test circuit)		90		nC

SOURCE DRAIN DIODE

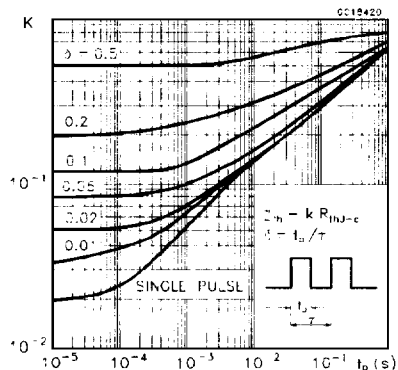
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				40	A
$I_{SDM}(\bullet)$	Source-drain Current (pulsed)				160	A
$V_{SD}(\ast)$	Forward On Voltage	$V_{GS} = 0$ $I_{SD} = 40\text{ A}$			2.5	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 40\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 30\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$		300		ns
Q_{rr}	Reverse Recovery Charge			2		μC

(*) Pulsed Pulse duration = 300 μs , duty cycle = 5 %
 (•) Pulse width limited by safe operating area

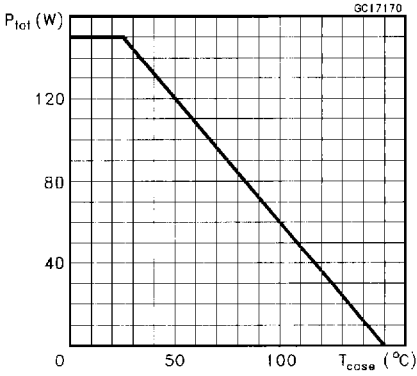
Safe Operating Area



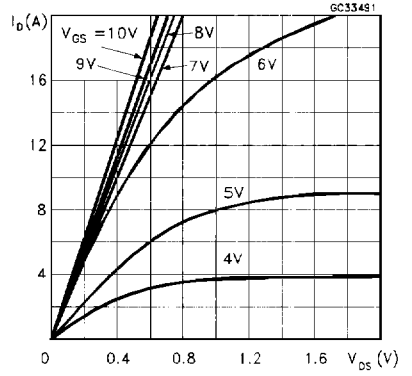
Thermal Impedance



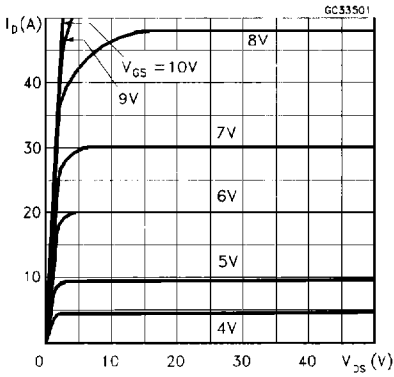
Derating Curve



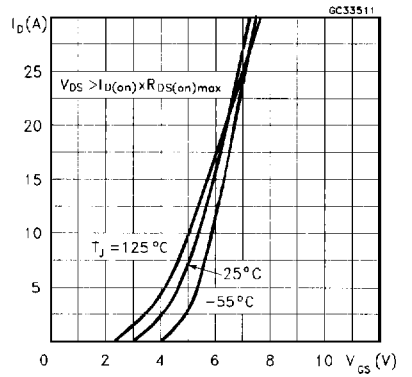
Output Characteristics



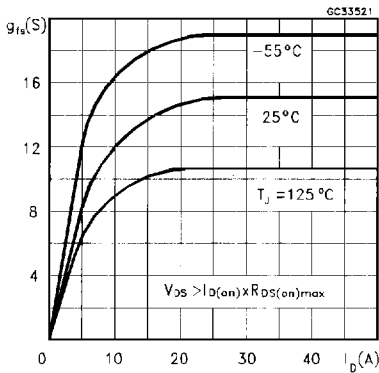
Output Characteristics



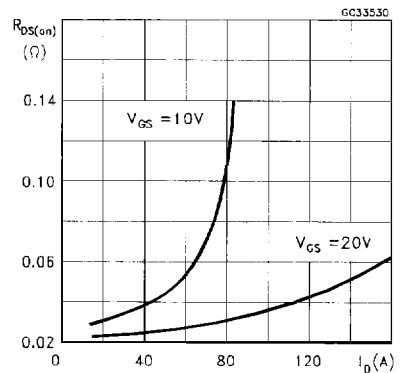
Transfer Characteristics



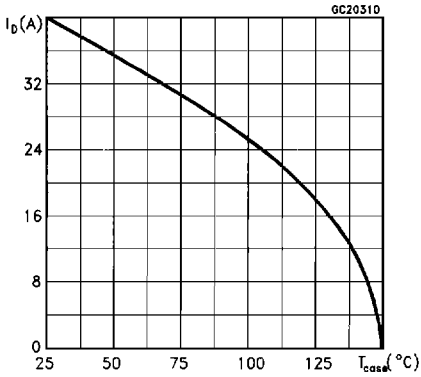
Transconductance



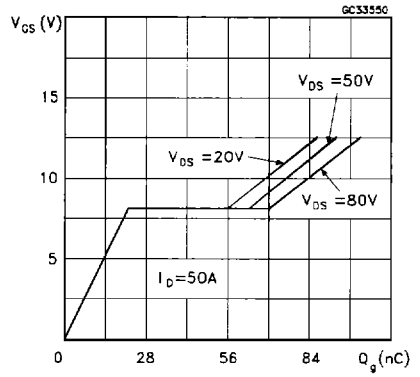
Static Drain-source On Resistance



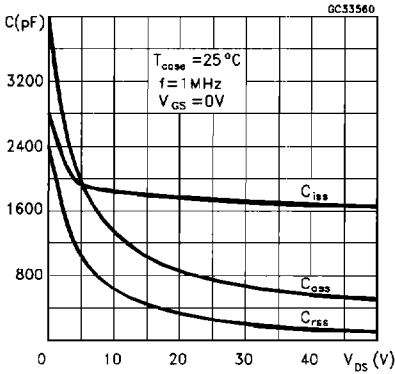
Maximum Drain Current vs Temperature



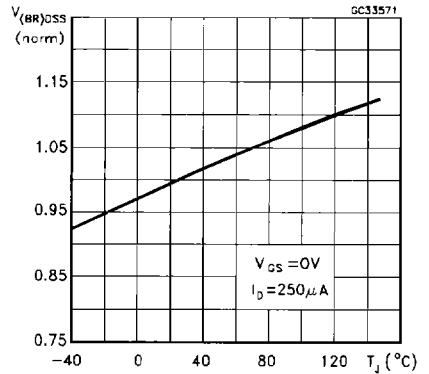
Gate Charge vs Gate-source Voltage



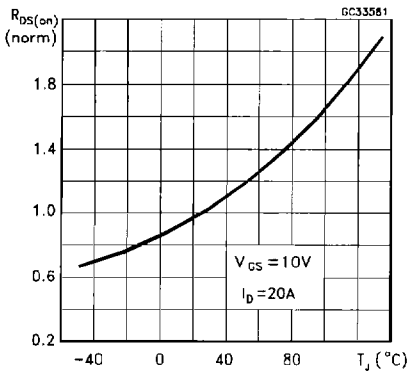
Capacitance Variations



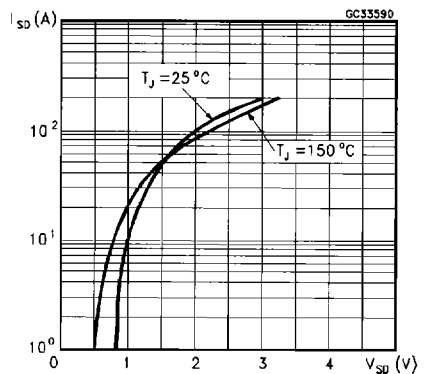
Normalized Breakdown Voltage vs Temperature



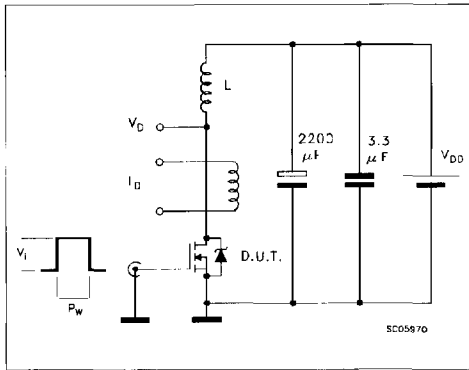
Normalized On Resistance vs Temperature



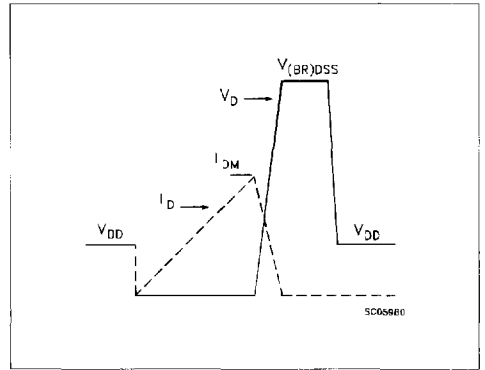
Source-drain Diode Forward Characteristics



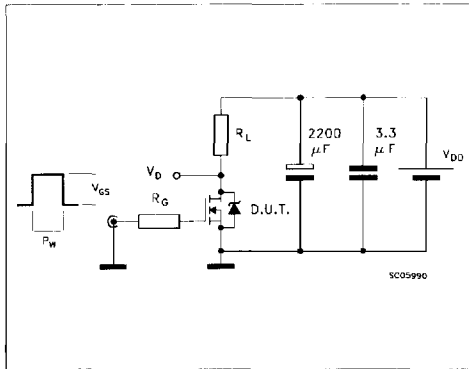
Unclamped Inductive Load Test Circuit



Unclamped Inductive Waveforms



Switching Time Test Circuit



Gate Charge Test Circuit

