

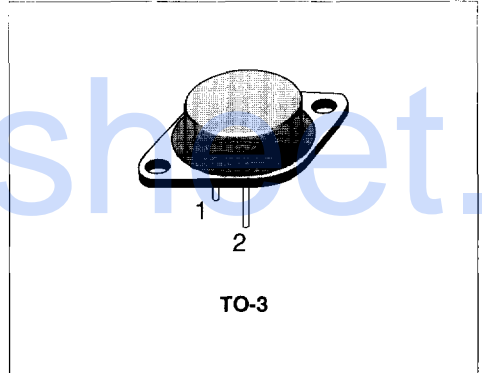
N - CHANNEL ENHANCEMENT MODE POWER MOS TRANSISTORS

TYPE	V _{DSS}	R _{DS(on)}	I _D
IRF240	200 V	0.18 Ω	18 A

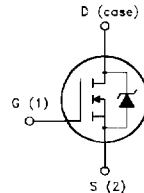
- AVALANCHE RUGGEDNESS TECHNOLOGY
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100°C

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



INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
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	18	A
I _D	Drain Current (cont.) at T _c = 100 °C	11	A
I _{DM} (*)	Drain Current (pulsed)	72	A
P _{tot}	Total Dissipation at T _c = 25 °C	125	W
	Derating Factor	1	W/°C
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

$R_{thj-case}$	Thermal Resistance Junction-case	Max	1	$^{\circ}C/W$
$R_{thj-amb}$	Thermal Resistance Junction-ambient	Max	30	$^{\circ}C/W$
R_{thc-s}	Thermal Resistance Case-sink	Typ	0.1	$^{\circ}C/W$
T_J	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, $\delta < 1\%$)	18	A
E_{AS}	Single Pulse Avalanche Energy (starting $T_J = 25^{\circ}C$, $I_D = I_{AR}$, $V_{DD} = 25V$)	580	mJ
E_{AR}	Repetitive Avalanche Energy (pulse width limited by T_J max, $\delta < 1\%$)	13	mJ
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive ($T_c = 100^{\circ}C$, pulse width limited by T_J max, $\delta < 1\%$)	11	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	$I_D = 250 \mu A$ $V_{GS} = 0$	200			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	μA μA
I_{GSS}	Gate-body Leakage Current ($V_{DS} = 0$)	$V_{GS} = \pm 20V$			± 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		4	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10V$ $I_D = 10A$			0.18	Ω
$I_{D(on)}$	On State Drain Current	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $V_{GS} = 10V$	18			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$g_{fs} (*)$	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $I_D = 10A$	6.7			S
C_{iss}	Input Capacitance	$V_{DS} = 25V$ $f = 1MHz$ $V_{GS} = 0$			2300	pF
C_{oss}	Output Capacitance				400	pF
C_{rss}	Reverse Transfer Capacitance				150	pF

ELECTRICAL CHARACTERISTICS (continued)
SWITCHING RESISTIVE LOAD

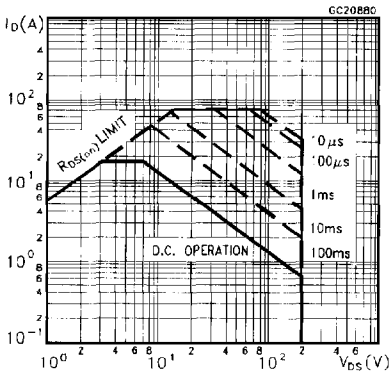
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Time	$V_{DD} = 100\text{ V}$ $I_D = 18\text{ A}$		50	65	ns
t_r	Rise Time	$R_G = 9.1\ \Omega$ $V_{GS} = 10\text{ V}$		90	120	ns
$t_{d(off)}$	Turn-off Delay Time	(see test circuit)		85	110	ns
t_f	Fall Time			60	80	ns
Q_g	Total Gate Charge	$I_D = 18\text{ A}$ $V_{GS} = 10\text{ V}$ $V_{DD} = \text{Max Rating} \times 0.8$ (see test circuit)		65	85	nC

SOURCE DRAIN DIODE

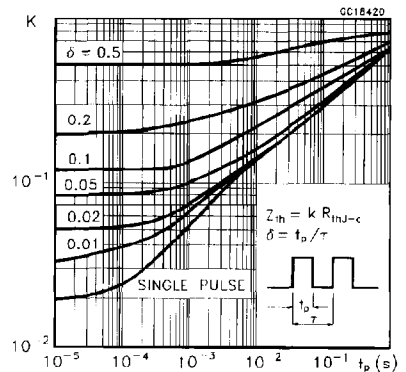
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				18	A
$I_{SDM}(\bullet)$	Source-drain Current (pulsed)				72	A
$V_{SD}(\ast)$	Forward On Voltage	$I_{SD} = 18\text{ A}$ $V_{GS} = 0$			1.6	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 18\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 100\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$		260		ns
Q_{rr}	Reverse Recovery Charge			2		μC

(\ast) Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %
 (\bullet) Pulse width limited by safe operating area

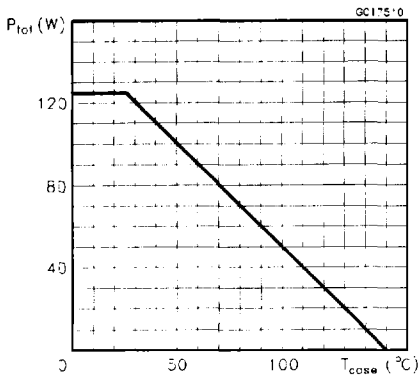
Safe Operating Area



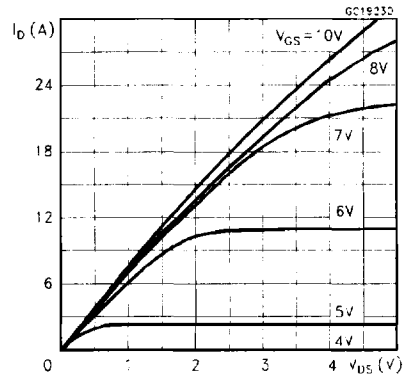
Thermal Impedance



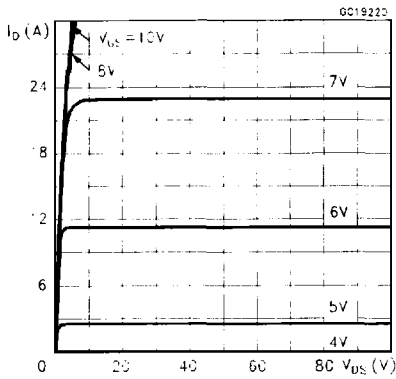
Derating Curve



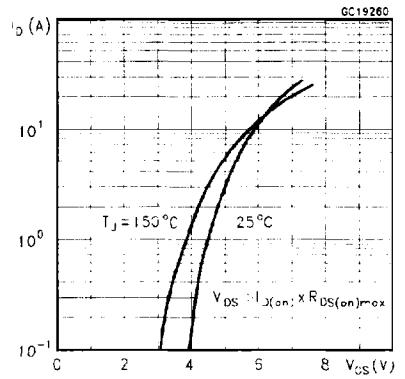
Output Characteristics



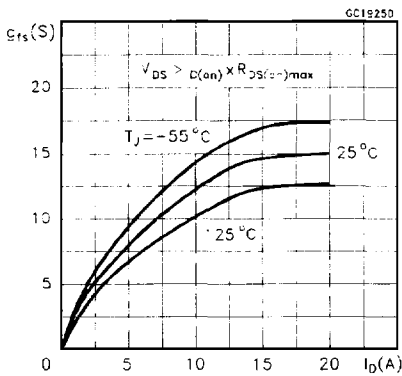
Output Characteristics



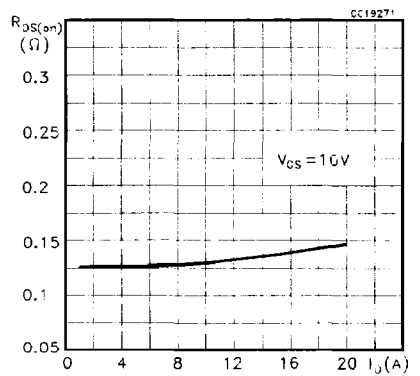
Transfer Characteristics



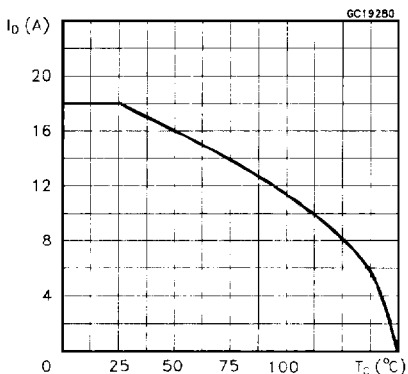
Transconductance



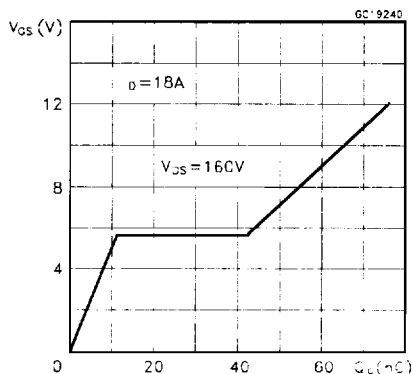
Static Drain-source On Resistance



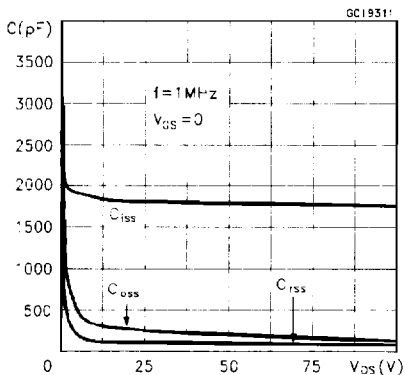
Maximum Drain Current vs Temperature



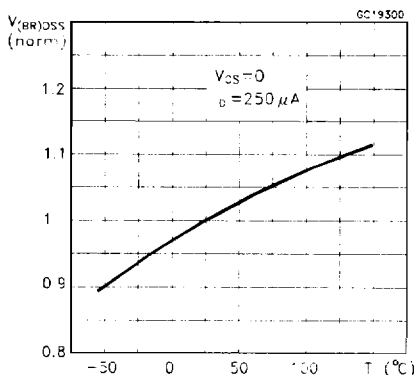
Gate Charge vs Gate-source Voltage



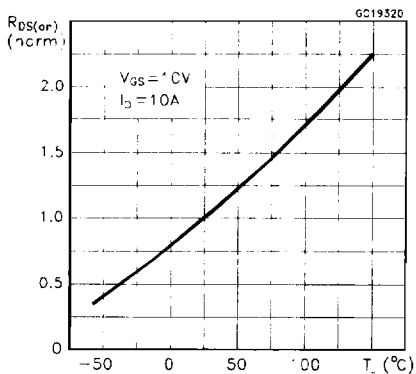
Capacitance Variations



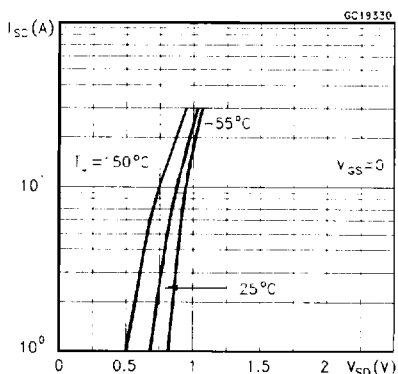
Normalized Breakdown Voltage vs Temperature



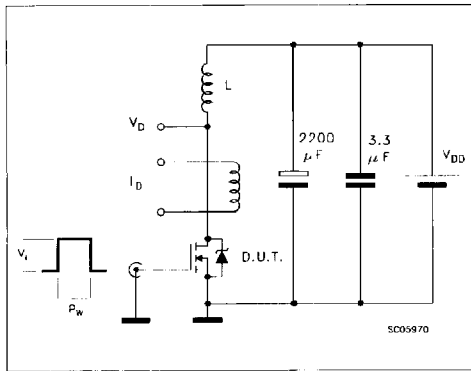
Normalized On Resistance vs Temperature



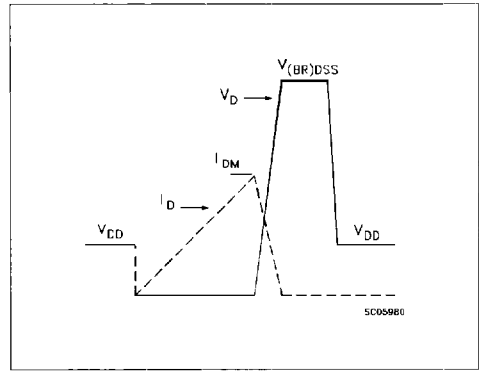
Source-drain Diode Forward Characteristics



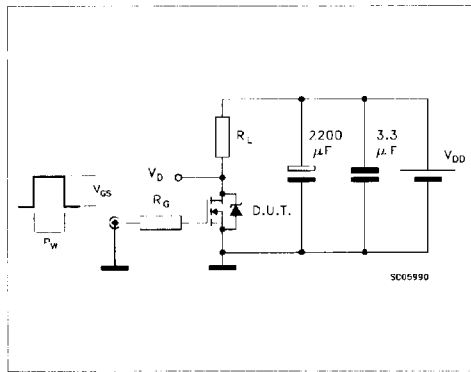
Unclamped Inductive Load Test Circuit



Unclamped Inductive Waveforms



Switching Time Test Circuit



Gate Charge Test Circuit

