SGS-THOMSON
MICROELECTRONICS

IRF350

N - CHANNEL ENHANCEMENT MODE POWER MOS TRANSISTOR

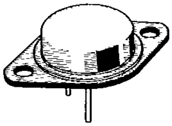
TYPE	V_{DSS}	$R_{DS(on)}$	I_D
IRF350	400 V	0.3 Ω	15 A

- HIGH VOLTAGE - FOR OFF-LINE SMPS
- HIGH CURRENT - FOR SMPS UP TO 350W
- ULTRA FAST SWITCHING - FOR OPERATION AT > 100KHz
- EASY DRIVE - REDUCES SIZE AND COST

INDUSTRIAL APPLICATIONS:

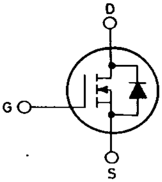
- SWITCHING MODE POWER SUPPLIES
- MOTOR CONTROLS

N - channel enhancement mode POWER MOS field effect transistor. Fast switching and easy drive make this POWER MOS transistor ideal for high voltage. Switching applications include electronic welders, switched mode power supplies and sonar equipment.



TO-3

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

V_{DS} *	Drain-source voltage ($V_{GS}=0$)	400	V
V_{DGR} *	Drain-gate voltage ($R_{GS}=20$ KΩ)	400	V
V_{GS}	Gate-source voltage	±20	V
I_D	Drain current (cont.) at $T_c=25°C$	15	A
I_D	Drain current (cont.) at $T_c=100°C$	9	A
I_{DM}(•)	Drain current (pulsed)	60	A
I_{DLM}	Drain inductive current, clamped (L = 100 μH)	60	A
P_{tot}	Total dissipation at T_c <25°C	150	W
	Derating factor	1.2	W/°C
T_{stg}	Storage temperature	−55 to 150	°C
T_j	Max. operating junction temperature	150	°C

* T_j = 25°C to 125°C
(•) Repetitive Rating: Pulse width limited by max junction temperature

June 1988

THERMAL DATA

$R_{thj-case}$	Thermal resistance junction-case	max	0.83	°C/W
R_{thc-s}	Thermal resistance case-sink	typ	0.1	°C/W
$R_{thj-amb}$	Thermal resistance junction-ambient	max	30	°C/W
T_l	Maximum lead temperature for soldering purpose		300	°C

ELECTRICAL CHARACTERISTICS ($T_j = 25°C$ unless otherwise specified)

Parameters	Test Conditions	Min.	Typ.	Max.	Unit
OFF					
$V_{(BR)DSS}$ Drain-source breakdown voltage	$I_D = 250\ \mu A$ $V_{GS} = 0$	400			V
I_{DSS} Zero gate voltage drain current ($V_{GS}=0$)	$V_{DS} =$ Max Rating $V_{DS} =$ Max Rating × 0.8 $T_j = 125°C$			250 1000	μA μA
I_{GSS} Gate-body leakage current ($V_{DS}=0$)	$V_{GS} = \pm 20$ V			±100	nA
ON **					
$V_{GS(th)}$ Gate threshold voltage	$V_{DS} = V_{GS}$ $I_D = 250\ \mu A$	2		4	V
$I_{D(on)}$ On-state drain current	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$, $V_{GS} = 10$ V	15			A
$R_{DS(on)}$ Static drain-source on resistance	$V_{GS} = 10$ V $I_D = 8$ A			0.3	Ω
DYNAMIC					
g_{fs}** Forward transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $I_D = 8$ A	8			mho
C_{iss} Input capacitance C_{oss} Output capacitance C_{rss} Reverse transfer capacitance	$V_{DS} = 25$ V $f = 1$ MHz $V_{GS} = 0$			3000 600 200	pF pF pF
SWITCHING					
$t_{d(on)}$ Turn-on time t_r Rise time $t_{d(off)}$ Turn-off delay time t_f Fall time	$V_{DD} = 180$ V $I_D = 8$ A $R_i = 4.7\ \Omega$ (see test circuit)			35 65 150 75	ns ns ns ns
Q_g Total Gate Charge	$V_{GS} = 10$ V $I_D = 18$ A $V_{DS} =$ Max Rating × 0.8 (see test circuit)			120	nC

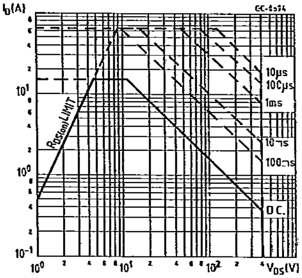
ELECTRICAL CHARACTERISTICS (Continued)

SOURCE DRAIN DIODE

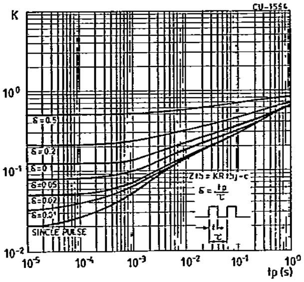
Parameters		Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} (•)	Source-drain current Source-drain current (pulsed)				15 60	A A
V_{SD}**	Forward on voltage	I_{SD} = 15 A V_{GS} = 0			1.6	V
t_{rr} Q_{rr}	Reverse recovery time Reverse recovered charge	T_j = 150°C I_{SD} = 15 A di/dt = 100 A/μs		1000 6.6		ns μC

** Pulsed: Pulse duration ⩽ 300 μs, duty cycle ⩽ 2%
(•) Repetitive Rating: Pulse width limited by max junction temperature

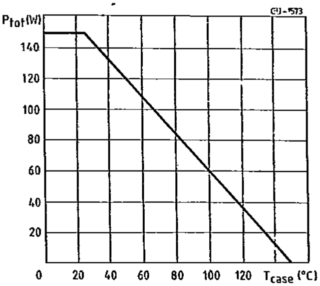
Safe operating areas



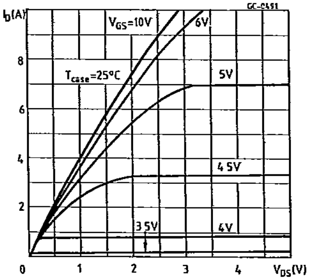
Thermal impedance



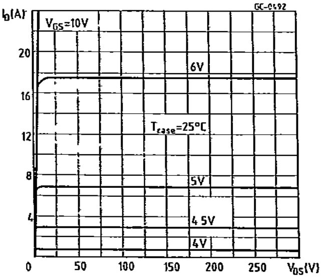
Derating curve



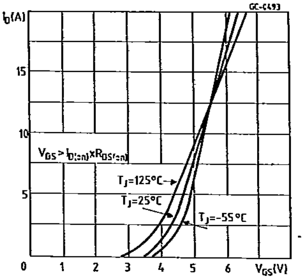
Output characteristics



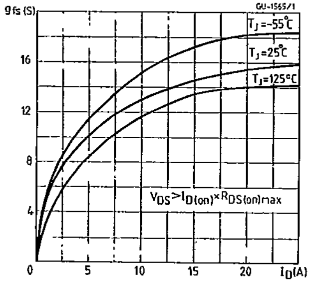
Output characteristics



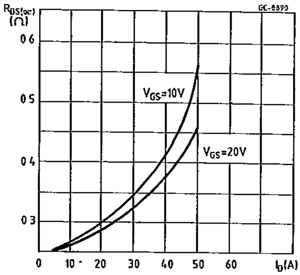
Transfer characteristics



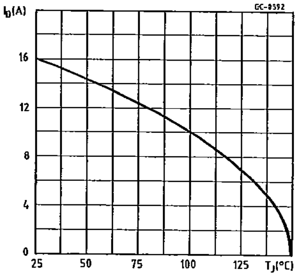
Transconductance



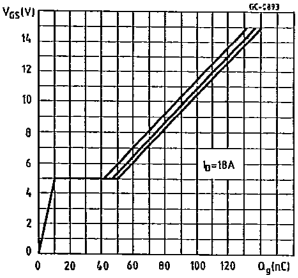
Static drain-source on resistance



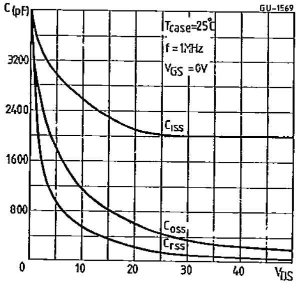
Maximum drain current vs temperature



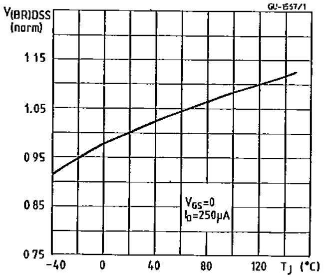
Gate charge vs gate-source voltage



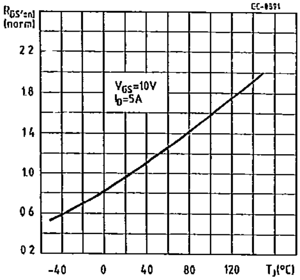
Capacitance variation



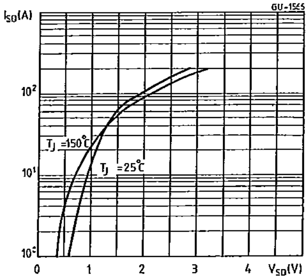
Normalized breakdown voltage vs temperature



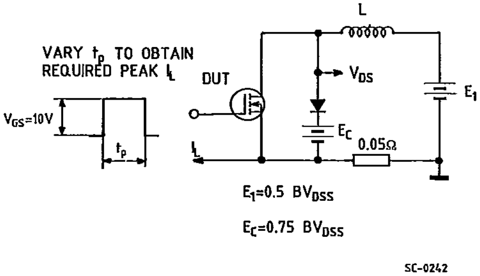
Normalized on resistance vs temperature



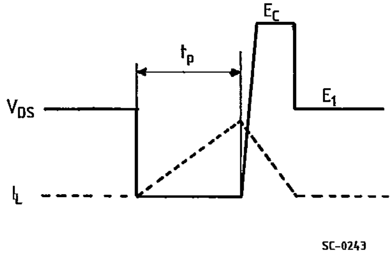
Source-drain diode forward characteristics



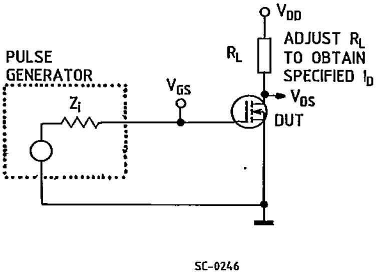
Clamped inductive test circuit



Clamped inductive waveforms



Switching times test circuit



Gate charge test circuit