

N - CHANNEL ENHANCEMENT MODE POWER MOS TRANSISTOR

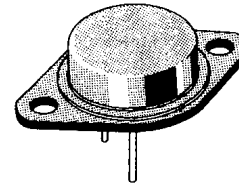
TYPE	V _{DSS}	R _{DS(on)}	I _D
IRF350	400 V	0.3 Ω	15 A

- 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:

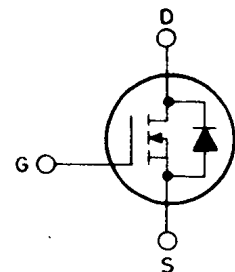
- SWITCHING MODE POWER SUPPLIES
- MOTOR CONTROLS

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 K Ω)	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 μ H)	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

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 ($T_j = 25^\circ\text{C}$ unless otherwise specified)

Parameters	Test Conditions	Min.	Typ.	Max.	Unit
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OFF

$V_{(BR) DSS}$	Drain-source breakdown voltage	$I_D = 250 \mu\text{A}$ $V_{GS} = 0$	400			V
I_{DSS}	Zero gate voltage drain current ($V_{GS} = 0$)	$V_{DS} = \text{Max Rating}$ $V_{DS} = \text{Max Rating} \times 0.8$ $T_j = 125^\circ\text{C}$			250 1000	μA μA
I_{GSS}	Gate-body leakage current ($V_{DS} = 0$)	$V_{GS} = \pm 20 \text{ V}$			± 100	nA

ON **

$V_{GS (th)}$	Gate threshold voltage	$V_{DS} = V_{GS}$ $I_D = 250 \mu\text{A}$	2		4	V
$I_{D (on)}$	On-state drain current	$V_{DS} > I_{D (on)} \times R_{DS (on) \text{ max}}$, $V_{GS} = 10 \text{ V}$	15			A
$R_{DS (on)}$	Static drain-source on resistance	$V_{GS} = 10 \text{ V}$ $I_D = 8 \text{ A}$			0.3	Ω

DYNAMIC

g_{fs}^{**}	Forward transconductance	$V_{DS} > I_{D (on)} \times R_{DS (on) \text{ max}}$ $I_D = 8 \text{ A}$	8			mho
C_{iss}	Input capacitance	$V_{DS} = 25 \text{ V}$ $f = 1 \text{ MHz}$ $V_{GS} = 0$			3000	pF
C_{oss}	Output capacitance				600	pF
C_{rss}	Reverse transfer capacitance				200	pF

SWITCHING

$t_{d (on)}$	Turn-on time	$V_{DD} = 180 \text{ V}$ $I_D = 8 \text{ A}$ $R_i = 4.7 \Omega$ (see test circuit)			35	ns
t_r	Rise time				65	ns
$t_{d (off)}$	Turn-off delay time				150	ns
t_f	Fall time				75	ns
Q_g	Total Gate Charge	$V_{GS} = 10 \text{ V}$ $I_D = 18 \text{ A}$ $V_{DS} = \text{Max Rating} \times 0.8$ (see test circuit)			120	nC

ELECTRICAL CHARACTERISTICS (Continued)

Parameters	Test Conditions	Min.	Typ.	Max.	Unit
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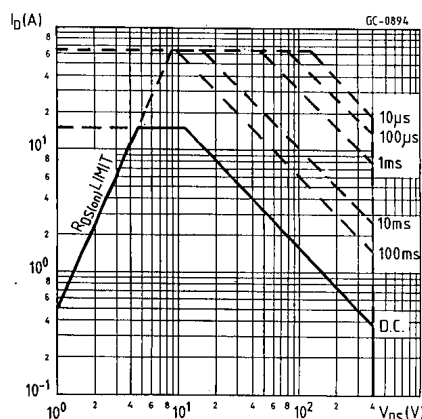
SOURCE DRAIN DIODE

I_{SD}	Source-drain current			15	A
$I_{SDM}^{(*)}$	Source-drain current (pulsed)			60	A
V_{SD}^{**}	Forward on voltage	$I_{SD} = 15\text{ A}$	$V_{GS} = 0$	1.6	V
t_{rr}	Reverse recovery time	$T_j = 150^\circ\text{C}$		1000	ns
Q_{rr}	Reverse recovered charge	$I_{SD} = 15\text{ A}$	$di/dt = 100\text{ A}/\mu\text{s}$	6.6	μC

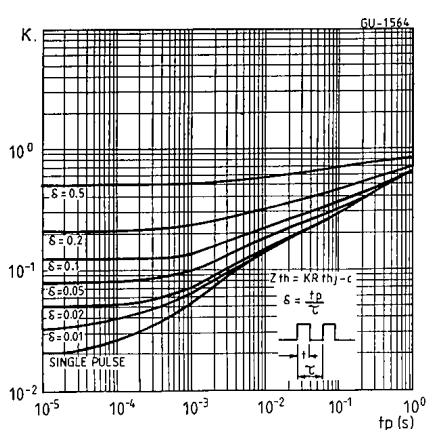
** Pulsed: Pulse duration $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

(*) Repetitive Rating: Pulse width limited by max junction temperature

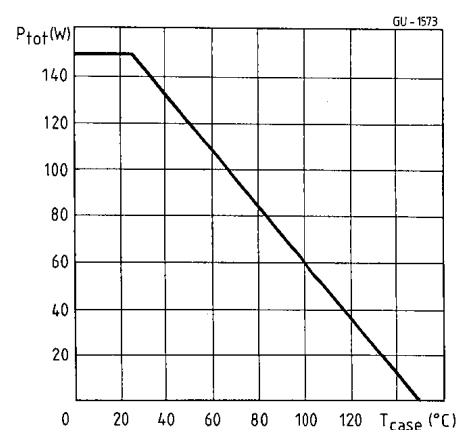
Safe operating areas



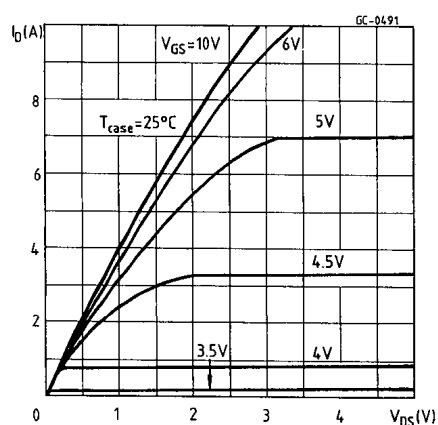
Thermal impedance



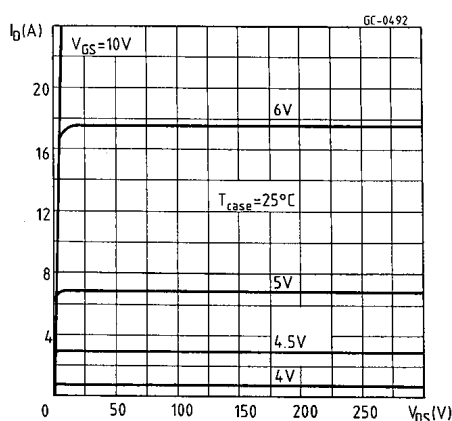
Derating curve



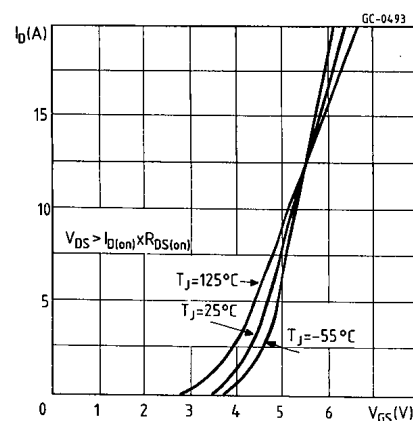
Output characteristics



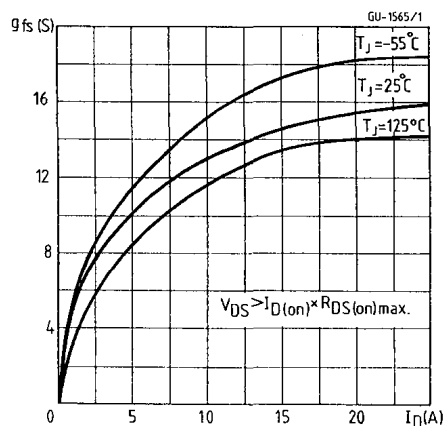
Output characteristics



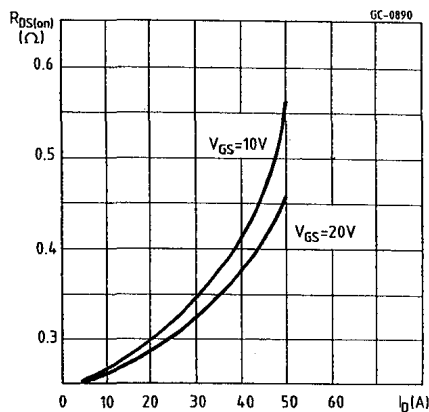
Transfer characteristics



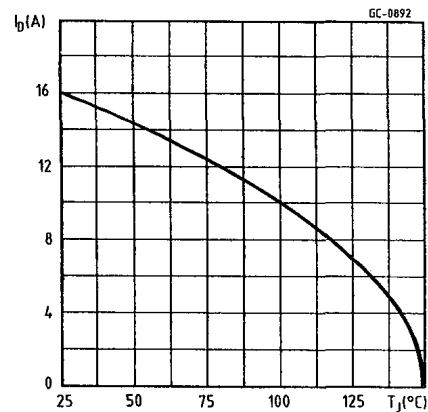
Transconductance



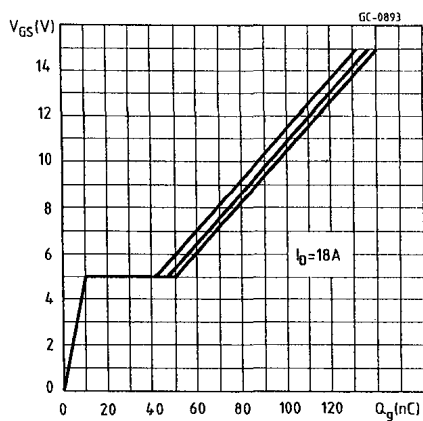
Static drain-source on resistance



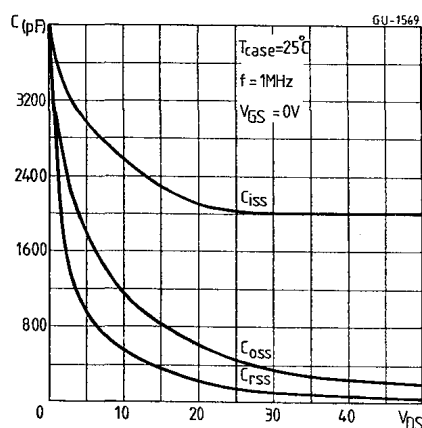
Maximum drain current vs temperature



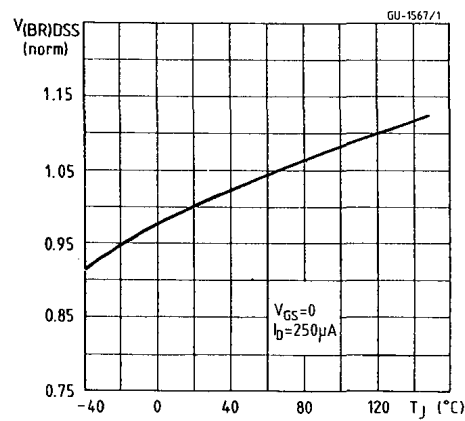
Gate charge vs gate-source voltage



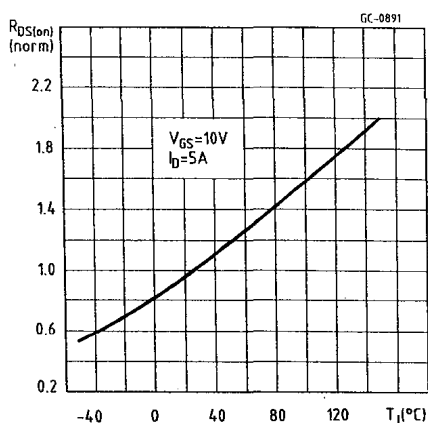
Capacitance variation



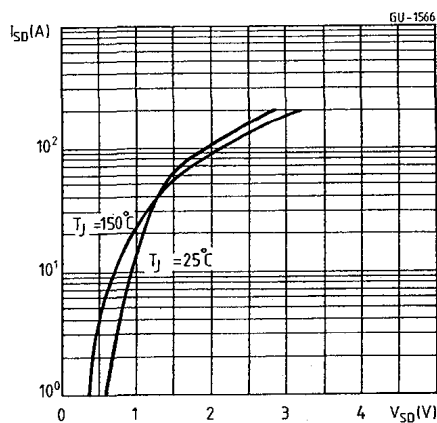
Normalized breakdown voltage vs temperature



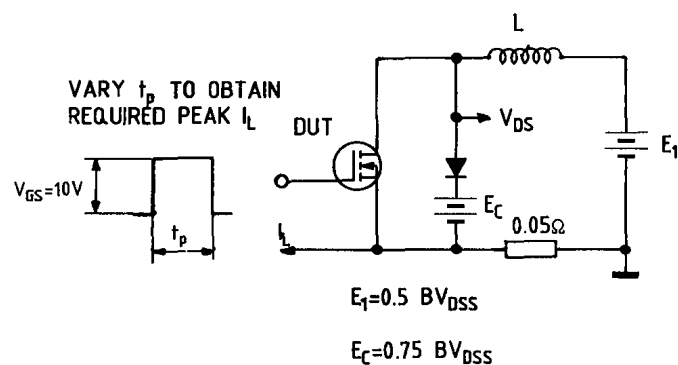
Normalized on resistance vs temperature



Source-drain diode forward characteristics

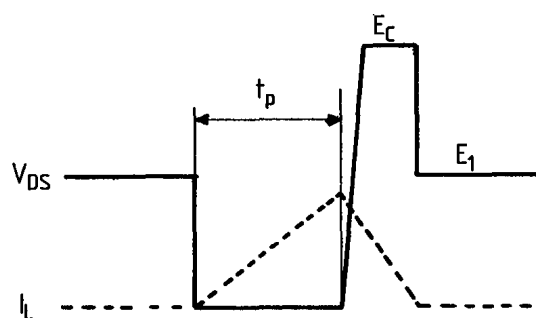


Clamped inductive test circuit



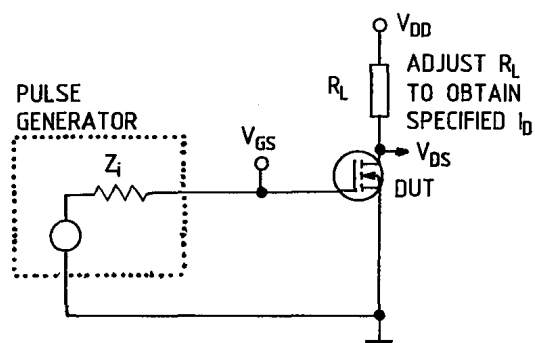
SC-0242

Clamped inductive waveforms



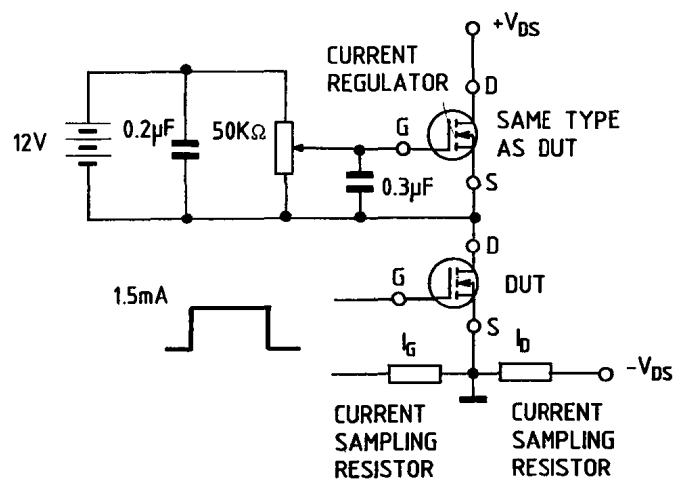
SC-0243

Switching times test circuit



SC-0246

Gate charge test circuit



SC-0244