



IRF 140 - 141
IRF 142 - 143

S G S-THOMSON

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

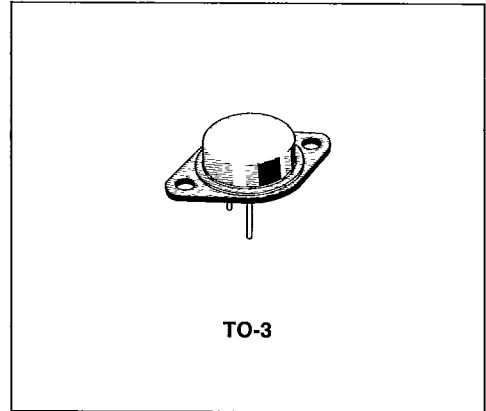
TYPE	V _{DSS}	R _{DS(on)}	I _D
IRF140	100 V	0.077 Ω	28 A
IRF141	80 V	0.077 Ω	28 A
IRF142	100 V	0.100 Ω	25 A
IRF143	80 V	0.100 Ω	25 A

- 80-100 VOLTS - FOR DC/DC CONVERTERS
- HIGH CURRENT
- ULTRA FAST SWITCHING
- EASY DRIVE- FOR REDUCED COST AND SIZE

INDUSTRIAL APPLICATIONS:

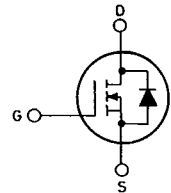
- UINTERRUPTIBLE POWER SUPPLIES
- MOTOR CONTROLS

N - channel enhancement mode POWER MOS field effect transistors. Easy drive and very fast switching times make these POWER MOS transistors ideal for high speed switching applications. Applications include DC/DC converters, UPS, battery chargers, secondary regulators, servo control, power audio amplifiers and robotics.



TO-3

**INTERNAL SCHEMATIC
DIAGRAM**



ABSOLUTE MAXIMUM RATINGS

		IRF				
		140	141	142	143	
V _{DS} *	Drain-source voltage (V _{GS} = 0)	100	80	100	80	V
V _{DGR} *	Drain-gate voltage (R _{GS} = 20 KΩ)	100	80	100	80	V
V _{GS}	Gate-source voltage	± 20				V
I _D	Drain current (cont.) at T _c = 25°C	28	28	25	25	A
I _D	Drain current (cont.) at T _c = 100°C	20	20	17	17	A
I _{DM} (*)	Drain current (pulsed)	110	110	100	100	A
I _{DLM}	Drain inductive current, clamped (L = 100 μH)	110	110	100	100	A
P _{tot}	Total dissipation at T _c < 25°C	125				W
	Derating factor	1				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	1	°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 ($T_{case} = 25^\circ\text{C}$ unless otherwise specified)

Parameters	Test Conditions	Min.	Typ.	Max.	Unit
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OFF

$V_{(BR)DSS}$	Drain-source breakdown voltage	$I_D = 250 \mu\text{A}$ for IRF140/IRF142 for IRF141/IRF143	$V_{GS} = 0$	100 80		V 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_{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	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ for IRF140/IRF141 for IRF142/IRF143	$V_{GS} = 10 \text{ V}$	28 25			A A
$R_{DS(on)}$	Static drain-source on resistance	$V_{GS} = 10 \text{ V}$ for IRF140/IRF141 for IRF142/IRF143	$I_D = 17 \text{ A}$			0.077 0.100	Ω Ω

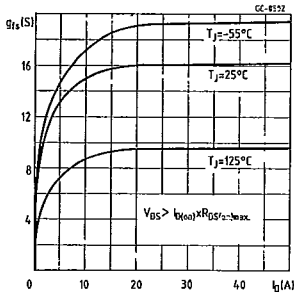
DYNAMIC

g_{fs}^{**}	Forward transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $I_D = 17 \text{ A}$		8.7			mho
C_{iss}	Input capacitance					1600	pF
C_{oss}	Output capacitance	$V_{DS} = 25 \text{ V}$	$f = 1 \text{ MHz}$			800	pF
C_{rss}	Reverse transfer capacitance	$V_{GS} = 0$				300	pF

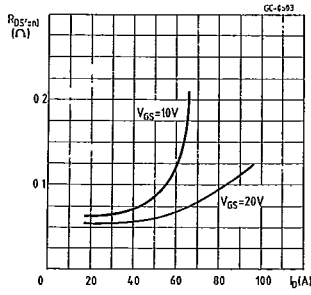
SWITCHING

$t_d(on)$	Turn-on time	$V_{DD} = 30 \text{ V}$	$I_D = 15 \text{ A}$			30	ns
t_r	Rise time	$R_l = 4.7 \Omega$				60	ns
$t_d(off)$	Turn-off delay time	(see test circuit)				80	ns
t_f	Fall time					30	ns
Q_g	Total gate charge	$V_{GS} = 10 \text{ V}$ $V_{DS} = \text{Max Rating} \times 0.8$ (see test circuit)	$I_D = 28 \text{ A}$			59	nC

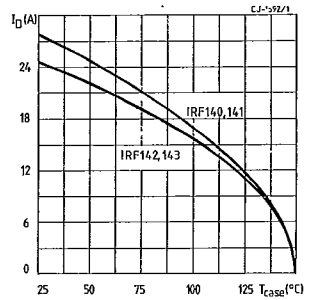
Transconductance



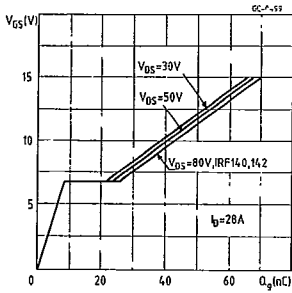
Static drain-source on resistance



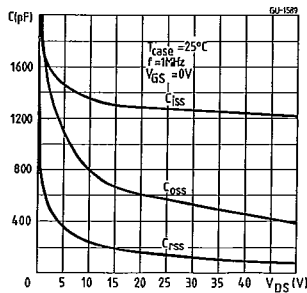
Maximum drain current vs temperature



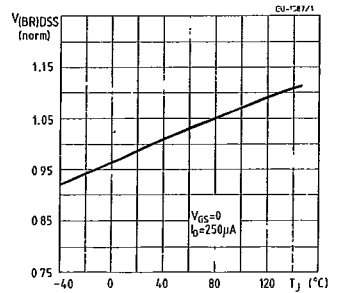
Gate charge vs gate-source voltage



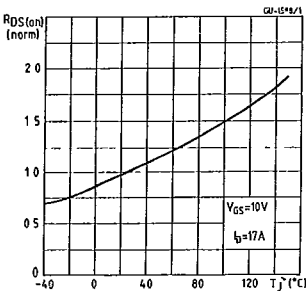
Capacitance variation



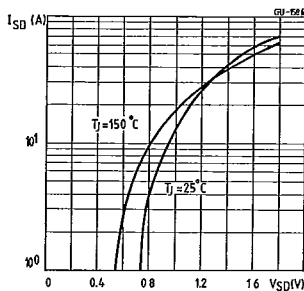
Normalized breakdown voltage vs temperature



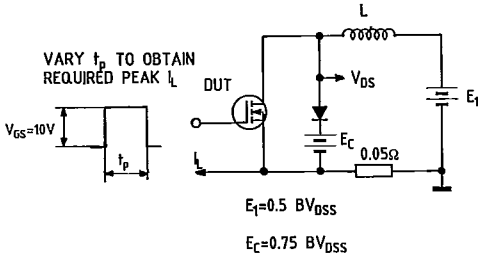
Normalized on resistance vs temperature



Source-drain diode forward characteristics

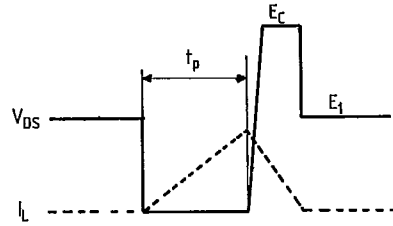


Clamped inductive test circuit



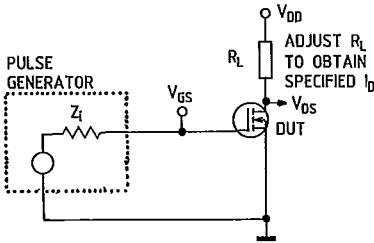
SC-0242

Clamped inductive waveforms



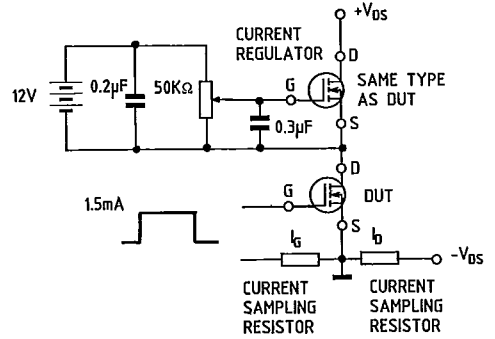
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Switching times test circuit



SC-0246

Gate charge test circuit



SC-0244