SGS-THOMSON MICROELECTRONICS

SGSP579

## N - CHANNEL ENHANCEMENT MODE
POWER MOS TRANSISTOR

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
SGSP579	500 V	0.7 Ω	9 A

- HIGH SPEED SWITCHING APPLICATIONS
- HIGH VOLTAGE - 9A FOR UP TO 350W SMPS
- ULTRA FAST SWITCHING - FOR OPERATION AT > 100KHz
- EASY DRIVE - REDUCED COST AND SIZE

INDUSTRIAL APPLICATIONS:
- SWITCHING MODE POWER SUPPLIES
- MOTOR CONTROLS

N - channel enhancement mode POWER MOS field effect transistor. Easy drive and very fast switching times make this POWER MOS transistor ideal for high speed switching applications. Typical applications include switching mode power supplies, uninterruptible power supplies and motor speed control.
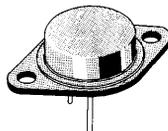
TO-3

INTERNAL SCHEMATIC DIAGRAM
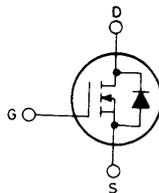
ABSOLUTE MAXIMUM RATINGS

V_{DS}	Drain-source voltage ($V_{GS} = 0$)	500	V
V_{DGR}	Drain-gate voltage ($R_{GS} = 20$ KΩ)	500	V
V_{GS}	Gate-source voltage	± 20	V
I_D	Drain current (cont.) at $T_c = 25°C$	9	A
I_D	Drain current (cont.) at $T_c = 100°C$	5.6	A
I_{DM} (*)	Drain current (pulsed)	36	A
I_{DLM} (*)	Drain inductive current, clamped	36	A
P_{tot}	Total dissipation at $T_c < 25°C$	150	W
	Derating factor	1.2	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	0.83	°C/W
T_L	Maximum lead temperature for soldering purpose		275	°C

ELECTRICAL CHARACTERISTICS ($T_{case} = 25°C$ unless otherwise specified)

Parameters	Test Conditions	Min.	Typ.	Max.	Unit

OFF

$V_{(BR) DSS}$	Drain-source breakdown voltage	$I_D = 250 \cdot \mu A$ $\qquad$ $V_{GS} = 0$	500			V
I_{DSS}	Zero gate voltage drain current ($V_{GS} = 0$)	$V_{DS} =$ Max Rating $V_{DS} =$ Max Rating x 0.8 $\quad T_c = 125°C$			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	$V_{DS} = V_{GS}$ $\qquad$ $I_D = 250 \ \mu A$	2		4	V
$R_{DS (on)}$	Static drain-source on resistance	$V_{GS} = 10$ V $\ \ I_D = 4.5$ A $V_{GS} = 10$ V $\ \ I_D = 4.5$ A $T_c = 100°C$			0.7 1.4	Ω Ω

DYNAMIC

g_{fs}	Forward transconductance	$V_{DS} = 25$ V $\qquad$ $I_D = 4.5$ A	5			mho
C_{iss} C_{oss} C_{rss}	Input capacitance Output capacitance Reverse transfer capacitance	$V_{DS} = 25$ V $\qquad$ f = 1 MHz $V_{GS} = 0$		1600	1900 280 170	pF pF pF

SWITCHING

$t_{d (on)}$ t_r $t_{d (off)}$ t_f	Turn-on time Rise time Turn-off delay time Fall time	$V_{DD} = 250$ V $\qquad$ $I_D = 4.5$ A $V_i = 10$ V $\qquad$ $R_i = 4.7 \ \Omega$ (see test circuit)		30 40 130 30	40 60 170 40	ns ns ns ns

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ELECTRICAL CHARACTERISTICS (Continued)

Parameters		Test Conditions		Min.	Typ.	Max.	Unit

SOURCE DRAIN DIODE

				Min.	Typ.	Max.	Unit
I_{SD}	Source-drain current					9	A
I_{SDM} (•)	Source-drain current (pulsed)					36	A
V_{SD}	Forward on voltage	$I_{SD} = 9\ A$	$V_{GS} = 0$			1.15	V
t_{rr}	Reverse recovery time	$I_{SD} = 9\ A$ di/dt = 100 A/μs	$V_{GS} = 0$		420		ns

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

Safe operating areas
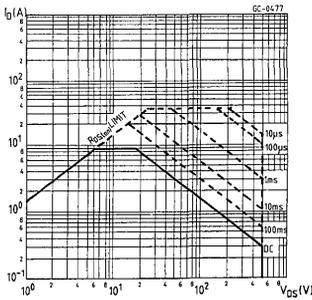
Thermal impedance
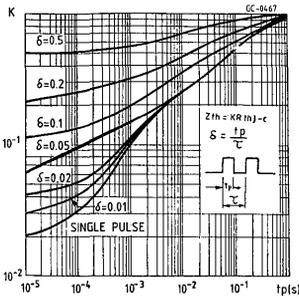
Derating curve
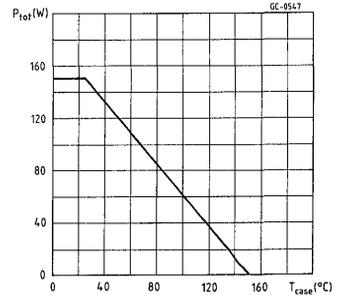
Output characteristics
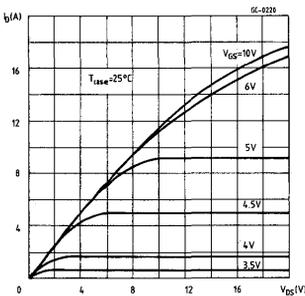
Output characteristics
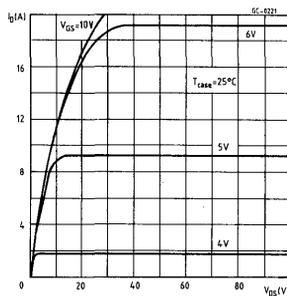
Transfer characteristics

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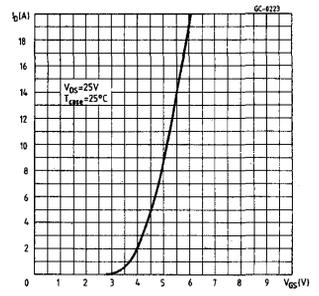
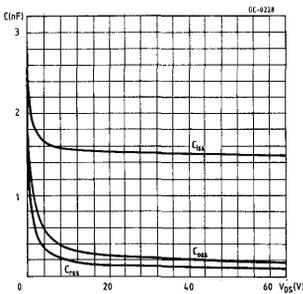### Transconductance
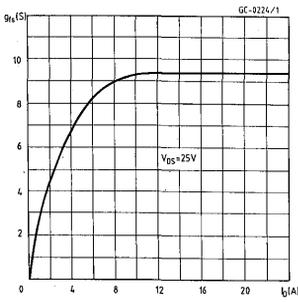
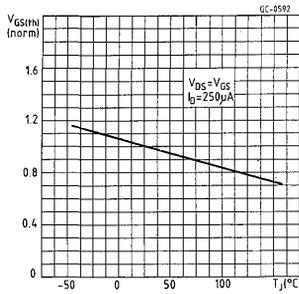### Static drain-source on resistance
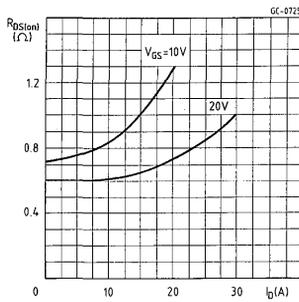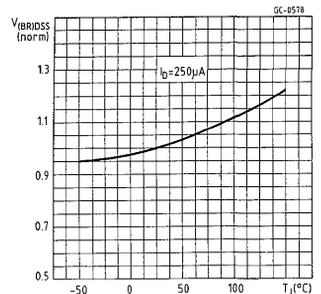

Gate charge vs gate-source voltage
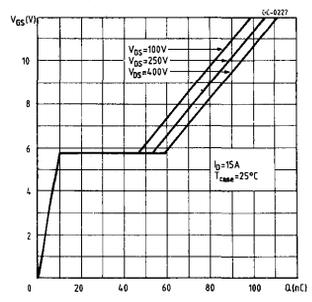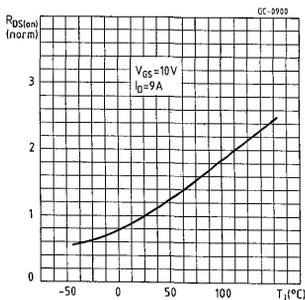

Capacitance variation

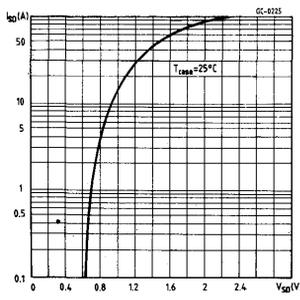### Normalized gate threshold voltage vs temperature

Normalized breakdown voltage vs temperature

Normalized on resistance vs temperature

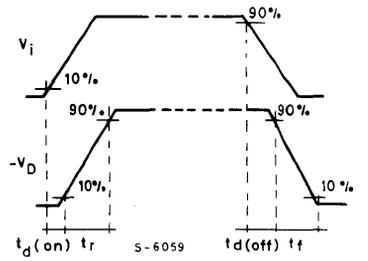### Source-drain diode forward characteristics

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Switching times test circuit for resistive load
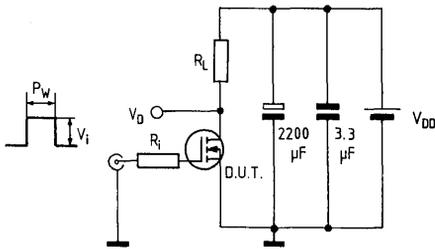
Pulse width $\leqslant 100 \ \mu s$
Duty cycle $\leqslant 2\%$

SC-0008/1
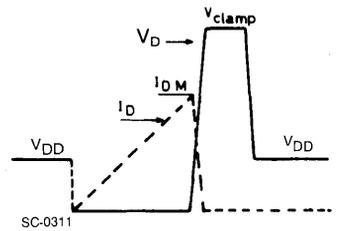
Switching time waveforms for resistive load

Clamped inductive load test circuit

SC-0310
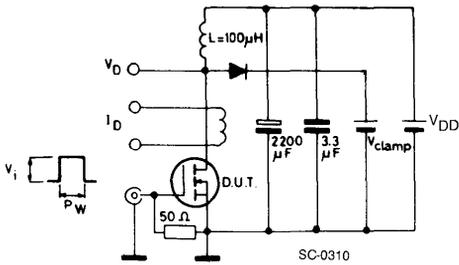
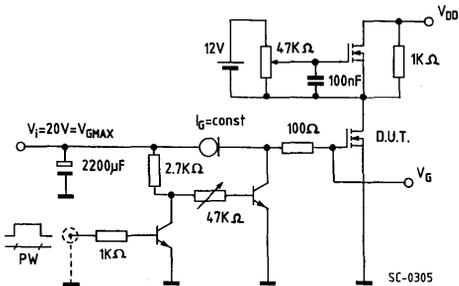$V_i = 12$ V - Pulse width: adjusted to obtain specified I_{DM}, $V_{clamp} = 0.75 \ V_{(BR) DSS}$.

Clamped inductive waveforms

SC-0311

Gate charge test circuit

SC-0305

PW adjusted to obtain required V_G

Body-drain diode t_{rr} measurement Jedec test circuit

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