SGS-THOMSON
MICROELECTRONICS

N - CHANNEL ENHANCEMENT MODE
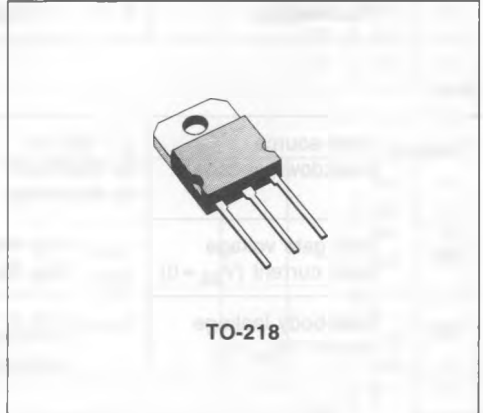# POWER MOS TRANSISTORS

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
SGSP461	100 V	0.15 Ω	20 A
SGSP462	80 V	0.1 Ω	25 A

- HIGH SPEED SWITCHING APPLICATIONS
- 80 - 100 VOLTS - FOR UPS APPLICATIONS
- RATED FOR UNCLAMPED INDUCTIVE SWITCHING (ENERGY TEST) ◆
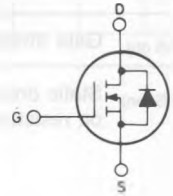- ULTRA FAST SWITCHING
- EASY DRIVE FOR REDUCED COST AND SIZE

INDUSTRIAL APPLICATIONS:
- UNINTERRUPTIBLE 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. Typical applications include UPS, battery chargers, printer hammer drivers, solenoid drivers and motor control.

TO-218

INTERNAL SCHEMATIC DIAGRAM

ABSOLUTE MAXIMUM RATINGS

		SGSP461	SGSP462	
V_{DS}	Drain-source voltage (V_{GS} = 0)	100	80	V
V_{DGR}	Drain-gate voltage (R_{GS} = 20 KΩ)	100	80	V
V_{GS}	Gate-source voltage	± 20		V
I_D	Drain current (cont.) at T_c = 25°C	20	25	A
I_D	Drain current (cont.) at T_c = 100°C	13	16	A
I_{DM} (*)	Drain current (pulsed)	80	100	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
◆ Introduced in 1988 week 44

THERMAL DATA

$R_{thj\text{-}case}$ Thermal resistance junction-case		max	1	°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

Parameters		Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)\,DSS}$	Drain-source breakdown voltage	$I_D = 250\ \mu A$ $\qquad V_{GS} = 0$ for **SGSP461** for **SGSP462**		100 80			V 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 (°)

Parameters		Test Conditions		Min.	Typ.	Max.	Unit
$V_{GS\,(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}$ $\qquad I_D = 250\ \mu A$		2		4	V
$R_{DS\,(on)}$	Static drain-source on resistance	$V_{GS} = 10\ V$ $I_D = 10\ A$ for **SGSP461** $I_D = 12.5\ A$ for **SGSP462** $V_{GS} = 10\ V \qquad T_c = 100°C$ $I_D = 10\ A$ for **SGSP461** $I_D = 12.5\ A$ for **SGSP462**				0.15 0.1 0.3 0.2	Ω Ω Ω Ω

ENERGY TEST

Parameters		Test Conditions		Min.	Typ.	Max.	Unit
I_{UIS}	Unclamped inductive switching current (single pulse)	$V_{DD} = 30\ V \qquad L = 100\ \mu H$ starting $T_j = 25°C$ for **SGSP461** for **SGSP462**		20 25			A A

DYNAMIC

Parameters		Test Conditions		Min.	Typ.	Max.	Unit
g_{fs}	Forward transconductance	$V_{DS} = 25\ V \qquad I_D = 12.5\ A$		4.5			mho
C_{iss} C_{oss} C_{rss}	Input capacitance Output capacitance Reverse transfer capacitance	$V_{DS} = 25\ V \qquad f = 1\ MHz$ $V_{GS} = 0$			950	1200 480 230	pF pF pF

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ELECTRICAL CHARACTERISTICS (Continued)

Parameters		Test Conditions	Min.	Typ.	Max.	Unit
SWITCHING						
$t_{d(on)}$	Turn-on time	$V_{DD} = 50$ V $\qquad$ $I_D = 12.5$ A		20	30	ns
t_r	Rise time	$V_i = 10$ V $\qquad$ $R_i = 4.7\ \Omega$		60	80	ns
$t_{d(off)}$	Turn-off delay time	(see test circuit)		65	85	ns
t_f	Fall time			25	35	ns
SOURCE DRAIN DIODE						
I_{SD}	Source-drain current	for **SGSP461**			20	A
		for **SGSP462**			25	A
I_{SDM} (*)	Source-drain current	for **SGSP461**			80	A
	(pulsed)	for **SGSP462**			100	A
V_{SD}	Forward on voltage	$V_{GS} = 0$				
		$I_{SD} = 20$ A for **SGSP461**			1.35	V
		$I_{SD} = 25$ A for **SGSP462**			1.35	V
t_{rr}	Reverse recovery time	$I_{SD} = 25$ A $\qquad$ $V_{GS} = 0$ $di/dt = 25$ A/μs		190		ns

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

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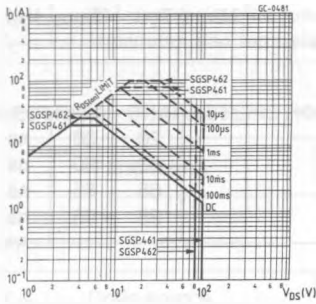
Thermal impedance
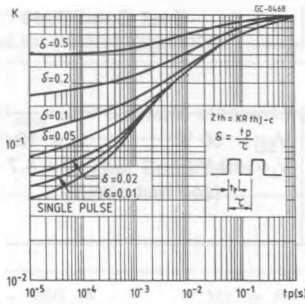
Derating curve
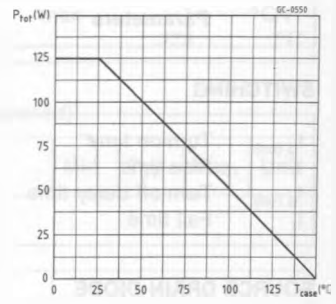
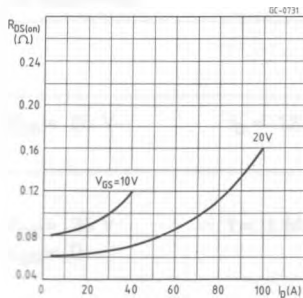### Output characteristics
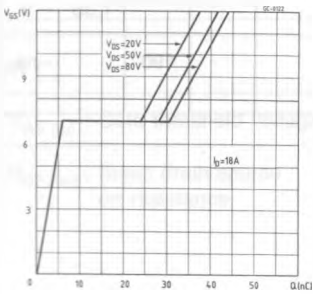
Output characteristics
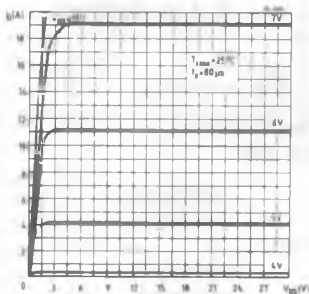
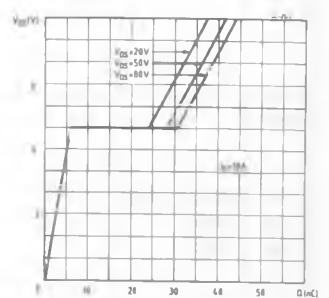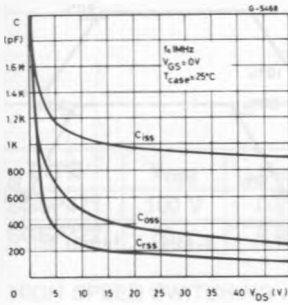### Transfer characteristics
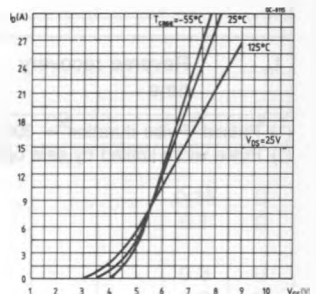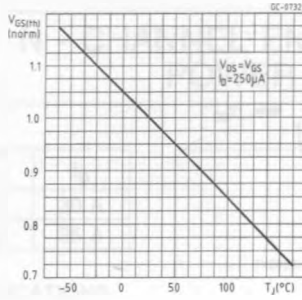

Transconductance
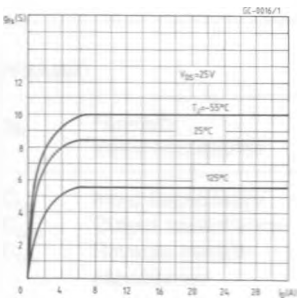
Static drain-source on resistance

Gate charge vs gate-source voltage
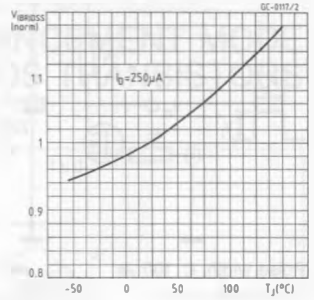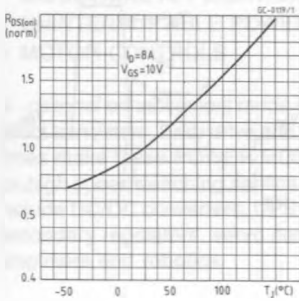
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Capacitance variation

Normalized gate threshold voltage vs temperature

Normalized breakdown voltage vs temperature

Normalized on resistance vs temperature

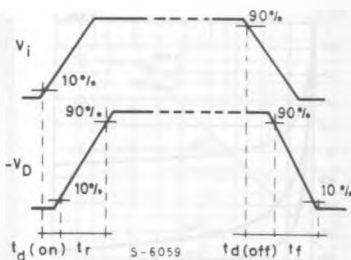## Source-drain diode forward characteristics
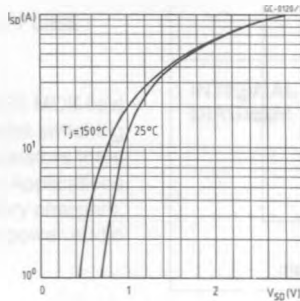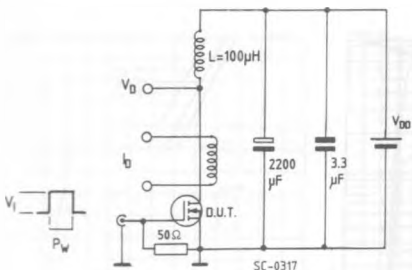
Switching times test circuit for resistive load
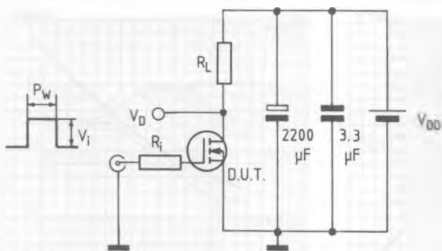
Pulse width $\leqslant 100\ \mu s$
Duty cycle $\leqslant 2\%$

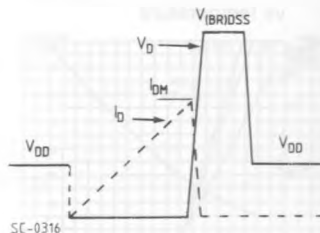SC-0008/1

Switching time waveforms for resistive load

S-6059

Unclamped inductive load test circuit

$V_i = 12\ V$ - Pulse width: adjusted to obtain
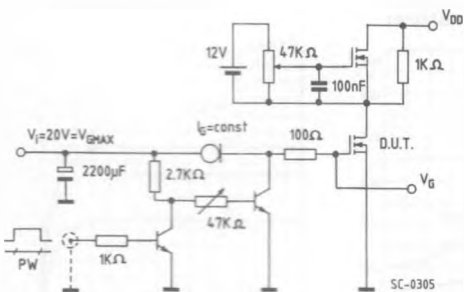specified I_{DM}
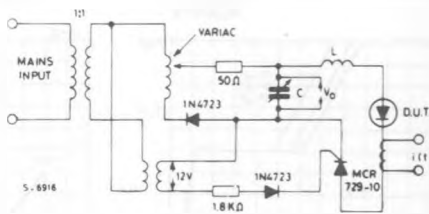
SC-0317

Unclamped inductive waveforms

SC-0316

Gate charge test circuit

PW adjusted to obtain required V_G

SC-0305

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

S-6916

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