

N - CHANNEL ENHANCEMENT MODE POWER MOS TRANSISTORS

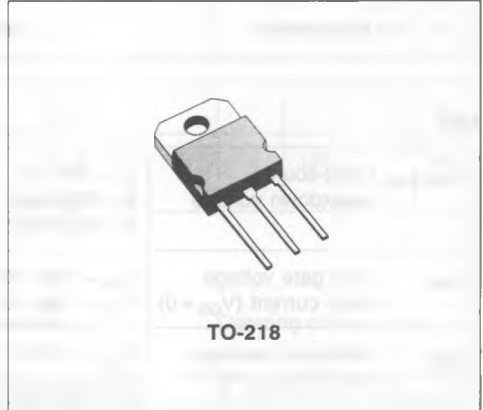
| TYPE | V _{DSS} | R _{DS(on)} | I _D |
|---------|------------------|---------------------|----------------|
| SGSP481 | 60 V | 0.06 Ω | 30 A |
| SGSP482 | 50 V | 0.06 Ω | 30 A |

- HIGH SPEED SWITCHING APPLICATIONS
- 60 VOLTS - DC/DC AND UPS APPLICATIONS
- ULTRA FAST SWITCHING
- EASY DRIVE FOR REDUCED COST AND SIZE

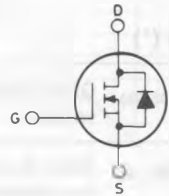
INDUSTRIAL APPLICATIONS:

- DC/DC CONVERTERS AND UPS
- 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 uses include UPS, battery chargers, printer mechanism drives and motor speed control.



INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

| | SGSP481 | SGSP482 | |
|----------------------|-----------------|---------|------|
| V _{DS} | 60 | 50 | V |
| V _{DGR} | 60 | 50 | V |
| V _{GS} | | ±20 | V |
| I _D | 30 | | A |
| I _D | 19 | | A |
| I _{DM} (*) | 120 | | A |
| I _{DLM} (*) | 120 | | A |
| P _{tot} | 125 | | W |
| | Derating factor | 1 | W/°C |
| T _{stg} | -65 to 150 | | °C |
| T _j | 150 | | °C |

(*) Pulse width limited by safe operating area

THERMAL DATA

| | | | | |
|------------------|--|-----|-----|------|
| $R_{thj - case}$ | Thermal resistance junction-case | max | 1 | °C/W |
| T_L | Maximum lead temperature for soldering purpose | | 275 | °C |

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}\text{C}$ unless otherwise specified)

| Parameters | Test Conditions | Min. | Typ. | Max. | Unit |
|------------|-----------------|------|------|------|------|
|------------|-----------------|------|------|------|------|

OFF

| | | | | | | |
|----------------|--|---|-----------------------------|----------|-------------|--------------------------------|
| $V_{(BR) DSS}$ | Drain-source breakdown voltage | $I_D = 250 \mu\text{A}$ for SGSP481 for SGSP482 | $V_{GS} = 0$ | 60 50 | | 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 |
| $R_{DS (on)}$ | Static drain-source on resistance | $V_{GS} = 10 \text{ V}$ $V_{GS} = 10 \text{ V}$ | $I_D = 15 \text{ A}$ $I_D = 15 \text{ A}$ | | | 0.06 0.12 | Ω Ω |

DYNAMIC

| | | | | | | | | |
|-----------|------------------------------|---|----------------------|---|------|------|-----|----|
| g_{fs} | Forward transconductance | $V_{DS} = 25 \text{ V}$ | $I_D = 15 \text{ A}$ | 5 | | | mho | |
| C_{iss} | Input capacitance | $V_{DS} = 25 \text{ V}$ $V_{GS} = 0$ | $f = 1 \text{ MHz}$ | | 1100 | 1400 | pF | |
| C_{oss} | Output capacitance | | | | | 800 | | pF |
| C_{rss} | Reverse transfer capacitance | | | | | 400 | | pF |

SWITCHING

| | | | | | | | |
|-------------|---------------------|---|--|--|----|-----|----|
| $t_d (on)$ | Turn-on time | $V_{DD} = 25 \text{ V}$ $V_i = 10 \text{ V}$ (see test circuit) | $I_D = 15 \text{ A}$ $R_f = 4.7 \Omega$ | | 25 | 35 | ns |
| t_r | Rise time | | | | 75 | 100 | ns |
| $t_d (off)$ | Turn-off delay time | | | | 50 | 65 | ns |
| t_f | Fall time | | | | 40 | 55 | ns |

ELECTRICAL CHARACTERISTICS (Continued)

| Parameters | Test Conditions | Min. | Typ. | Max. | Unit |
|------------|-----------------|------|------|------|------|
|------------|-----------------|------|------|------|------|

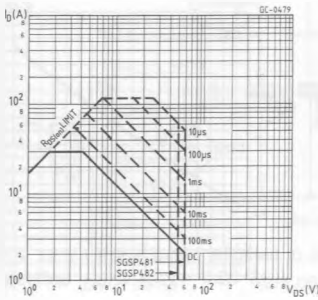
SOURCE DRAIN DIODE

| | | | | | |
|---------------|-------------------------------|--|--------------|-----|----|
| I_{SD} | Source-drain current | | | 30 | A |
| I_{SDM} (*) | Source-drain current (pulsed) | | | 120 | A |
| V_{SD} | Forward on voltage | $I_{SD} = 30\text{ A}$ | $V_{GS} = 0$ | 1.4 | V |
| t_{rr} | Reverse recovery time | $I_{SD} = 30\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ | $V_{GS} = 0$ | 125 | ns |

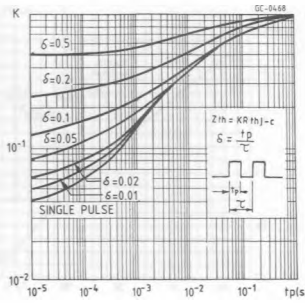
(*) Pulsed: Pulse duration = 300 μs , duty cycle 1.5%

(*) Pulse width limited by safe operating area

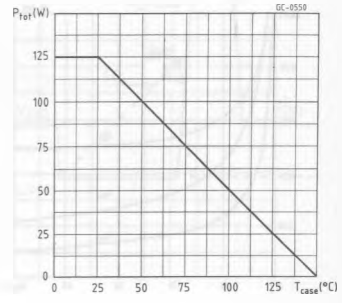
Safe operating areas



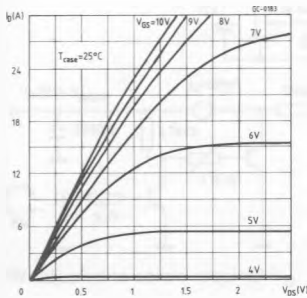
Thermal impedance



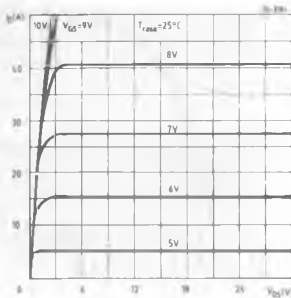
Derating curve



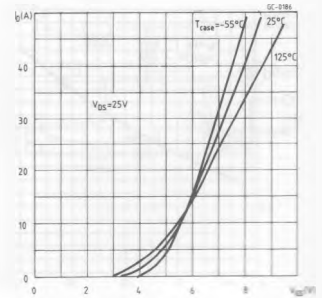
Output characteristics



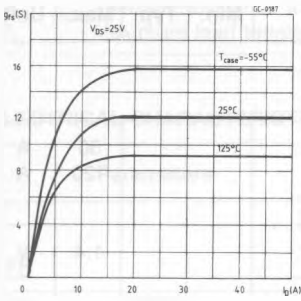
Output characteristics



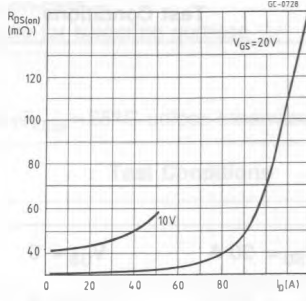
Transfer characteristics



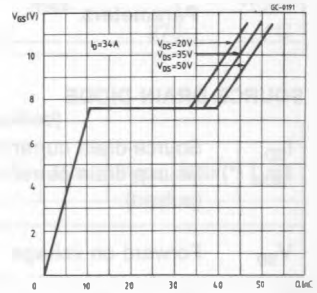
Transconductance



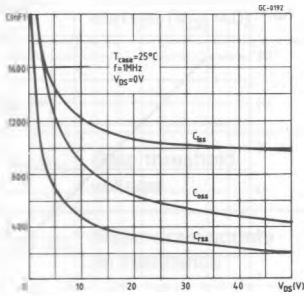
Static drain-source on resistance



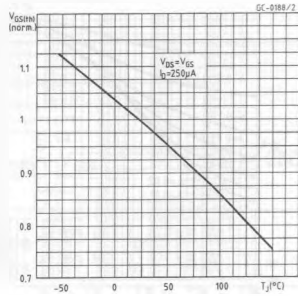
Gate charge vs gate-source voltage



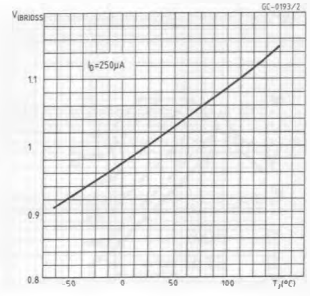
Capacitance variation



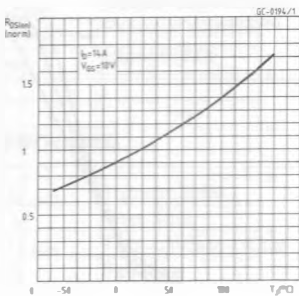
Normalized gate threshold voltage vs temperature



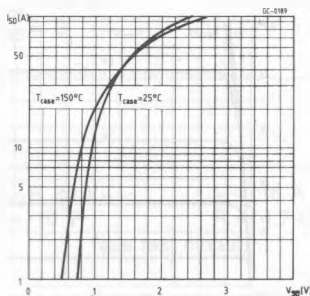
Normalized breakdown voltage vs temperature



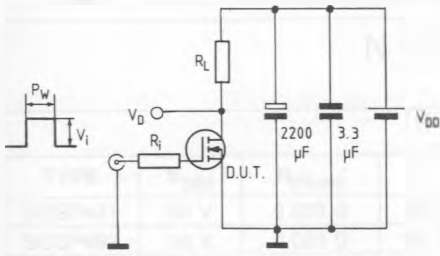
Normalized on resistance vs temperature



Source-drain diode forward characteristics



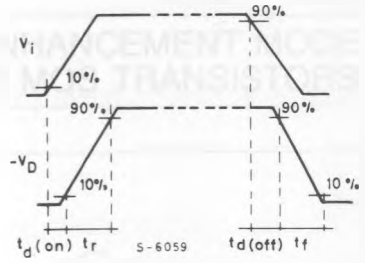
Switching times test circuit for resistive load



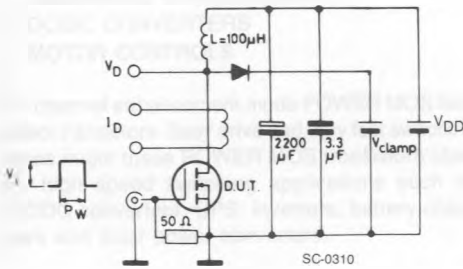
Pulse width $\leq 100 \mu\text{s}$
Duty cycle $\leq 2\%$

SC-0008/1

Switching time waveforms for resistive load



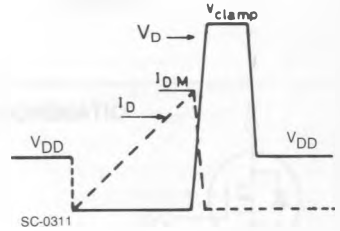
Clamped inductive load test circuit



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

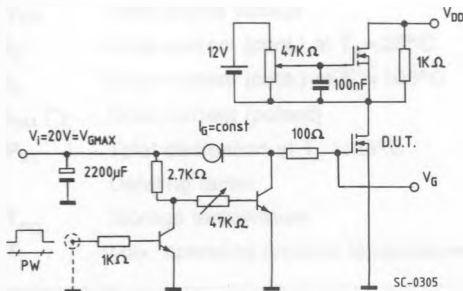
SC-0310

Clamped inductive waveforms



SC-0311

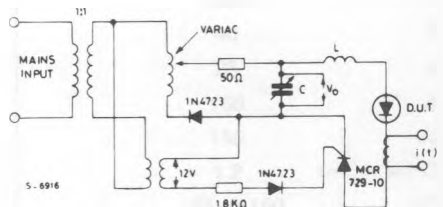
Gate charge test circuit



PW adjusted to obtain required V_G

SC-0305

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



S-6916