SGS-THOMSON MICROELECTRONICS

SGS35MA050D1

N - CHANNEL ENHANCEMENT MODE POWER MOS TRANSISTOR MODULE

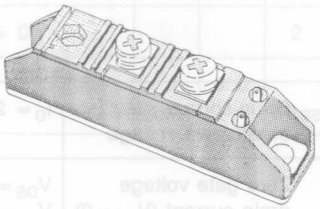
TYPE	V_{DSS}	$R_{DS(on)}$	I_D
SGS35MA050D1	500 V	0.16 Ω	35 A

- ISOLATED POWERMOS MODULE
- HIGH POWER
- FAST SWITCHING
- EASY DRIVE
- EASY TO PARALLEL

INDUSTRIAL APPLICATIONS:

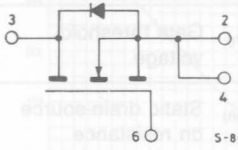
- SWITCHING MODE POWER SUPPLIES
- UNINTERRUPTIBLE POWER SUPPLIES

N - channel enhancement mode POWER MOS field effect transistor. Easy drive and fast switching of this TRANSPACK module make it ideal for high power, high speed switching applications. Typical applications include DC motor control (variable frequency control) switching mode power supplies, uninterruptible power supplies, DC/DC convertors and high frequency welding equipment. The large RBSOA and absence of second breakdown in POWER MOS make this TRANSPACK module very rugged. This, together with the isolated package with its optimised thermal performance, make this module extremely effective in high power applications.



TO-240

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	35	A
I_D	Drain current (cont.) at T_c = 100°C	22	A
I_{DM}	Drain current (pulsed)	140	A
P_{tot}	Total dissipation at T_c < 25°C	400	W
	Derating factor	3.2	W/°C
T_{stg}	Storage temperature	− 65 to 150	°C
T_j	Max. operating junction temperature	150	°C
V_{ISO}	Insulation withstand voltage (AC)	2500	V

THERMAL DATA

$R_{thj\text{ - }case}$	Thermal resistance junction-case	max	0.31	°C/W
$R_{thc\text{ - }h}$	Thermal resistance case-heatsink	max	0.20	°C/W

ELECTRICAL CHARACTERISTICS (T_j = 25°C unless otherwise specified)

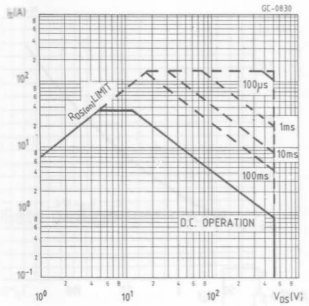
Parameters		Test Conditions		Min.	Typ.	Max.	Unit
OFF							
$V_{(BR)\ DSS}$	Drain-source breakdown voltage	I_D = 2 mA	V_{GS} = 0	500			V
I_{DSS}	Zero gate voltage drain current (V_{GS} = 0)	V_{DS} = Max Rating V_{DS} = Max Rating × 0.8	 T_j = 125°C			500 2	μA mA
I_{GSS}	Gate-body leakage current (V_{DS} = 0)	V_{GS} = ±20 V				±500	nA
ON*							
$V_{GS\ (th)}$	Gate threshold voltage	V_{DS} = V_{GS}	I_D = 2 mA	2		4	V
$R_{DS\ (on)}$	Static drain-source on resistance	V_{GS} = 10 V	I_D = 17.5 A			0.16	Ω
DYNAMIC							
g_{fs}	Forward transconductance	V_{DS} = 25 V	I_D = 17.5 A	15			mho
C_{iss} C_{oss} C_{rss}	Input capacitance Output capacitance Reverse transfer capacitance	V_{DS} = 25 V V_{GS} = 0	f = 1 MHz			12000 1500 1000	pF pF pF
SWITCHING							
$t_{d\ (on)}$ $(di/dt)_{on}$ $t_{d\ (off)}$ t_f	Turn-on time Turn-on current slope Turn-off delay time Fall time	V_{DD} = 250 V R_i = 50 Ω	I_D = 17.5 A V_i = 10 V		120 100 1.5 300		ns A/μs μs ns

ELECTRICAL CHARACTERISTICS (Continued)

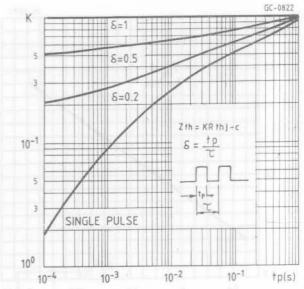
Parameters		Test Conditions		Min.	Typ.	Max.	Unit
SOURCE DRAIN DIODE							
I_{SD} I_{SDM}	Source-drain current Source-drain current (pulsed)					35 140	A A
V_{SD}	Forward on voltage	I_{SD} = 35 A	V_{GS} = 0			2	V
t_{rr}	Reverse recovery time	I_{SD} = 35 A	di/dt = 150A/μs		600		ns

* Pulsed: Pulse duration ≤ 300 μs, duty cycle ≤ 2%

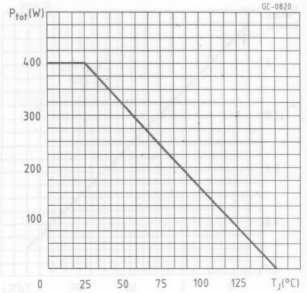
Safe operating areas



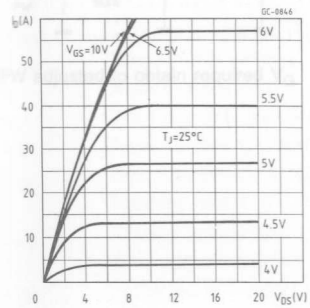
Thermal impedance



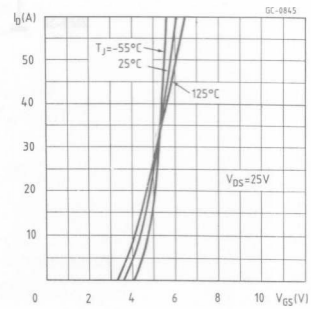
Derating curve



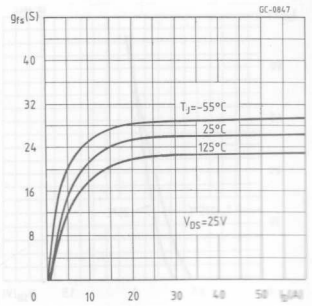
Output characteristics



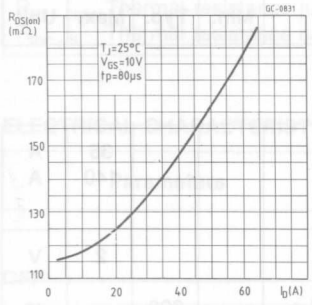
Transfer characteristics



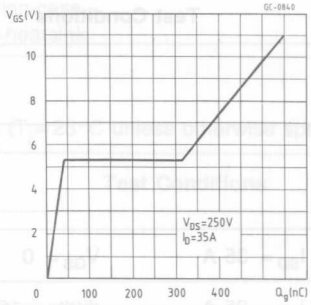
Transconductance



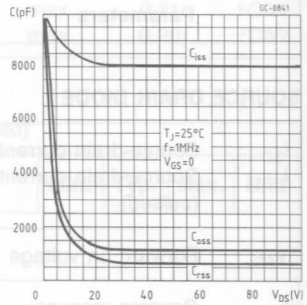
Static drain-source on resistance



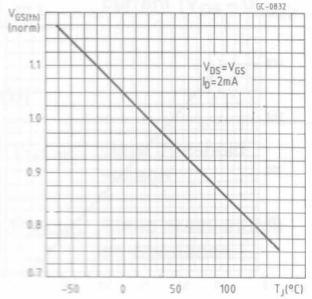
Gate charge vs gate-source voltage



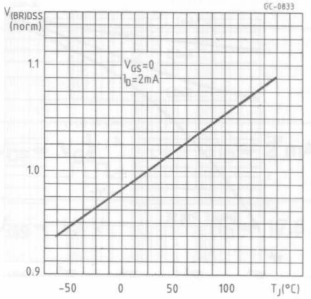
Capacitance variation



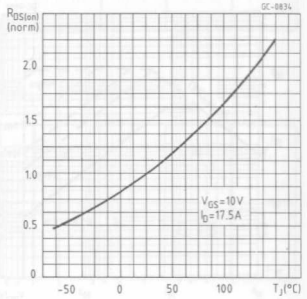
Normalized gate threshold voltage vs temperature



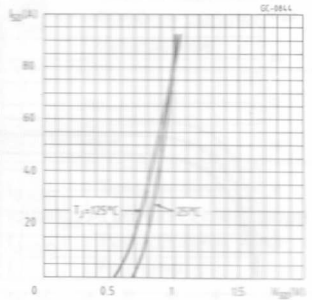
Normalized breakdown voltage vs temperature



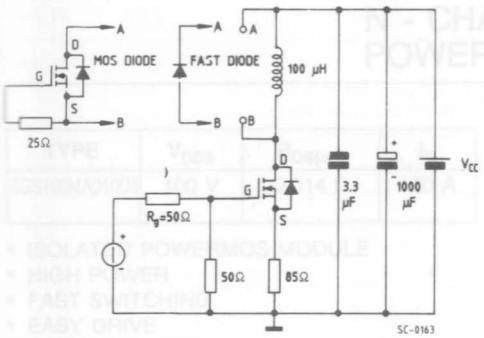
Normalized on resistance vs temperature



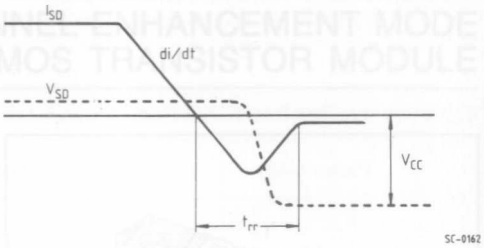
Source-drain diode forward characteristics



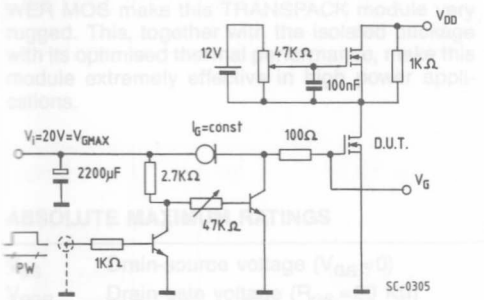
Test circuit for inductive load switching and diode reverse recovery times



Diode reverse recovery time waveform



Gate charge test circuit



PW adjusted to obtain required V_G