SGS-THOMSON MICROELECTRONICS

MTP6N60

N - CHANNEL ENHANCEMENT MODE POWER MOS TRANSISTOR

PRELIMINARY DATA

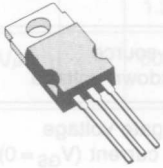
TYPE	V_{DSS}	$R_{DS(on)}$	I_D
MTP6N60	600 V	1.2 Ω	6 A

- HIGH VOLTAGE - 600 V FOR OFF-LINE APPLICATIONS
- ULTRA FAST SWITCHING TIMES FOR OPERATIONS AT > 100KHz
- EASY DRIVE FOR REDUCED COST AND SIZE

INDUSTRIAL APPLICATIONS:

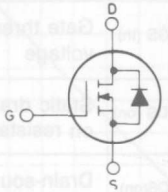
- SWITCHING POWER SUPPLY
- MOTOR CONTROLS

N - channel enhancement mode POWER MOS field effect transistor. Easy drive and very fast switching times make these POWER MOS ideal for very high speed switching applications. Typical uses include SMPS, uninterruptible power supplies and motor controls.



TO-220

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

V_{DS}	Drain-source voltage ($V_{GS} = 0$)	600	V
V_{DGR}	Drain-gate voltage (R_{GS} = 20 KΩ)	600	V
V_{GS}	Gate-source voltage	±20	V
I_D	Drain current (cont.) at $T_c = 25°C$	6	A
I_{DM}	Drain current (pulsed)	30	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

THERMAL DATA

$R_{thj\text{-}case}$	Thermal resistance junction-case	max	1	°C/W
$R_{thj\text{-}amb}$	Thermal resistance junction-ambient	max	62.5	°C/W

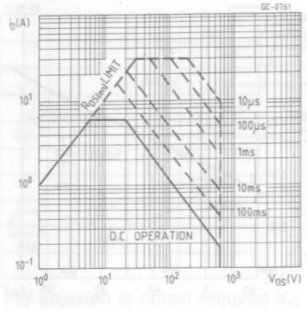
ELECTRICAL CHARACTERISTICS (T_{case} = 25°C unless otherwise specified)

Parameters		Test Conditions	Min.	Typ.	Max.	Unit
OFF						
$V_{(BR)\ DSS}$	Drain-source breakdown voltage	I_D = 250 μA V_{GS} = 0	600			V
I_{DSS}	Zero gate voltage drain current (V_{GS} = 0)	V_{DS} = Max Rating V_{DS} = Max Rating x 0.8 T_c = 125°C			200 1000	μA μA
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 = 1 mA V_{DS} = V_{GS} I_D = 1 mA T_c = 100°C	2 1.5		4.5 4	V V
$R_{DS\ (on)}$	Static drain-source on resistance	V_{GS} = 10 V I_D = 3 A			1.2	Ω
$V_{DS(on)}$	Drain-source on voltage	V_{GS} = 10 V I_D = 6 A V_{GS} = 10 V I_D = 3 A T_c = 100°C			8 7.2	V V
DYNAMIC						
g_{fs}	Forward transconductance	V_{DS} = 10 V I_D = 3 A	2			mho
C_{iss} C_{oss} C_{rss}	Input capacitance Output capacitance Reverse transfer capacitance	V_{DS} = 25 V f = 1 MHz V_{GS} = 0			1800 350 150	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} = 25 V I_D = 3 A R_i = 50 Ω V_i = 10 V			60 150 200 120	ns ns ns ns

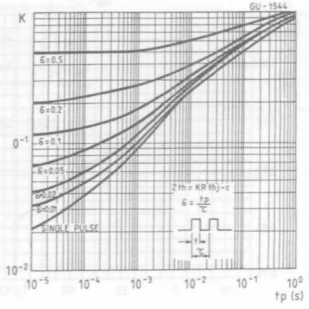
ELECTRICAL CHARACTERISTICS (Continued)

Parameters		Test Conditions		Min.	Typ.	Max.	Unit
SOURCE DRAIN DIODE							
I_{SD} I_{SDM}	Source-drain current Source-drain current (pulsed)					6 30	A A
V_{SD}	Forward on voltage	I_{SD} = 6 A	V_{GS} = 0		1.3		V
t_{rr}	Reverse recovery time	I_{SD} = 6 A	di/dt = 100A/μs		600		ns

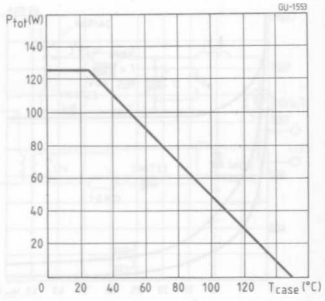
Safe operating areas



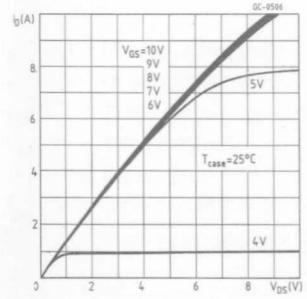
Thermal impedance



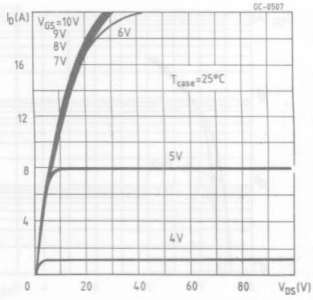
Derating curve



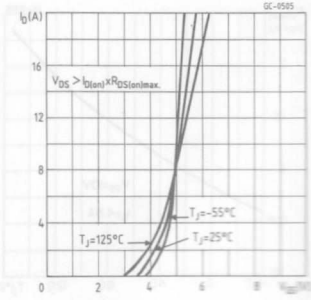
Output characteristics



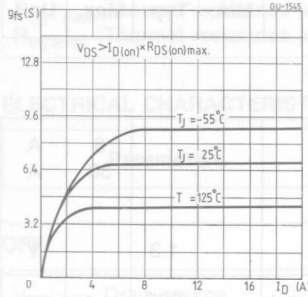
Output characteristics



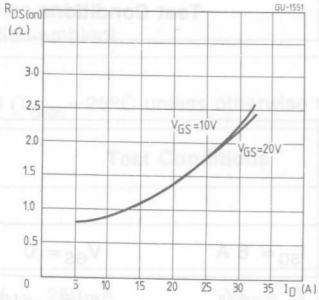
Transfer characteristics



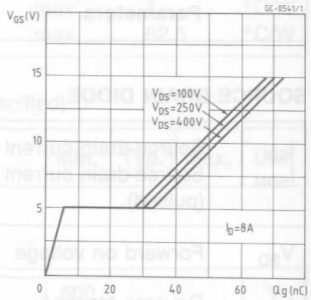
Transconductance



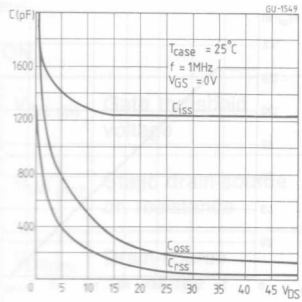
Static drain-source on resistance



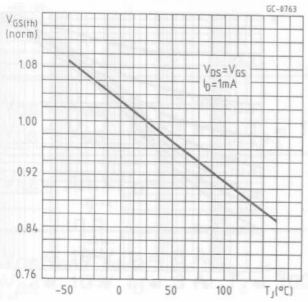
Gate charge vs gate-source voltage



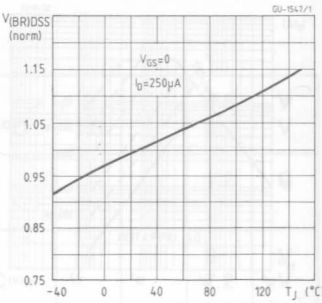
Capacitance variation



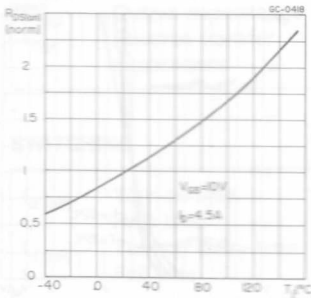
Normalized gate threshold voltage vs temperature



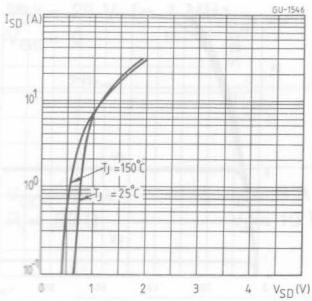
Normalized breakdown voltage vs temperature



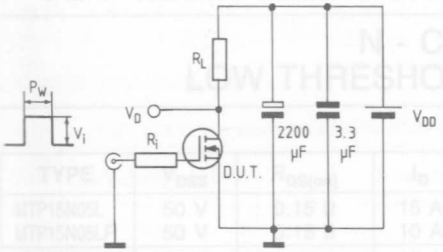
Normalized on resistance vs temperature



Source-drain diode forward characteristics

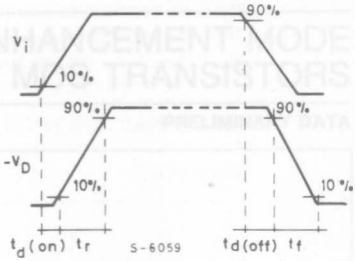


Switching times test circuit for resistive load

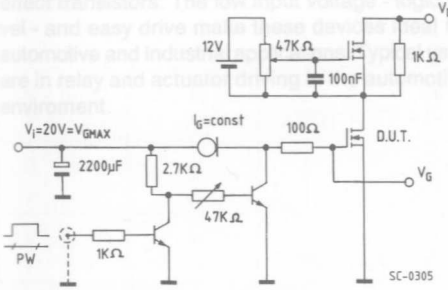


Pulse width ⩽ 100 µs
Duty cycle ⩽ 2%

Switching time waveforms for resistive load



Gate charge test circuit



PW adjusted to obtain required V_G

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