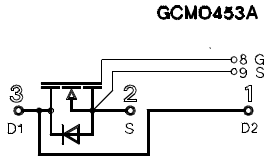
SEMIKRON

SEMITRANS® M
Power MOSFET Modules
450 A, 200 V, 4,3 mΩ

SKM 453 A 020

SEMITRANS M 3



Absolute Maximum Ratings			
Symbol	**Conditions** [1]	**Values**	**Units**
V_{DS}		200	V
V_{DGR}	R_{GS} = 20 kΩ	200	V
I_D	T_{case} = 25 °C	450 [2]	A
	T_{case} = 100 °C	330	A
I_{DM}	10 µs	1600	A
V_{GS}		± 20	V
P_D		2000	W
T_j, (T_{stg})		– 40 . . .+150 (125)	°C
V_{isol}	AC, 1 min	2 500	V
humidity	DIN 40 040	Class F	
climate	DIN IEC 68 T.1	40/125/56	
Inverse Diode			
I_F= – I_D		450	A
I_{FM}= – I_{DM}	10 µs	1600	A

Characteristics					
Symbol	**Conditions** [1]	**min.**	**typ.**	**max.**	**Units**
$V_{(BR)DSS}$	V_{GS} = 0, I_D = 0,5 mA	200	–	–	V
$V_{GS(th)}$	V_{GS} = V_{DS}, I_D = 1 mA	2,1	3,0	4,0	V
I_{DSS}	V_{DS} = 200 V, T_j = 25 °C	–	–	250	µA
	V_{GS} = 0, T_j = 125 °C	–	–	2500	µA
I_{GSS} [3]	V_{GS} = 20 V, V_{DS} = 0	–	–	100	nA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 300 A	–	3,8	4,3	mΩ
g_{fs}	V_{DS} = 25 V, I_D = 300 A	–	400	–	S
C_{CHC}	V_{GS} = 0	–	250	–	pF
C_{iss}	V_{DS} = 25 V	–	67	78	nF
C_{oss}	f = 1 MHz	–	13	15	nF
C_{rss}		–	5	7	nF
L_{DS}	Terminal 3-2 / 1-2	–	–	20/60	nH
$t_{d(on)}$	V_{DD} = 30 V	–	100	–	ns
t_r	I_D = 300 A	–	100	–	ns
$t_{d(off)}$	V_{GS} = ± 10 V	–	700	–	ns
t_f	R_G = 2 Ω	–	250	–	ns
Inverse Diode					
V_{SD}	I_F = 600 A, V_{GS} = 0	–	–	1,5	V
t_{rr}	T_j = 25 °C [3]	–	160	–	ns
	T_j = 150 °C [3]	–	–	–	ns
Q_{rr}	T_j = 25 °C [3]	–	25	–	µC
	T_j = 150 °C [3]	–	–	–	A
Thermal Characteristics					
R_{thjc}		–	–	0,06	°C/W
R_{thch}	M_1, surface 10 µm	–	–	0,038	°C/W

Mechanical Data					
M_1	to heatsink, SI Units (M6)	3	–	5	Nm
	to heatsink, US Units	27	–	44	lb.in.
M_2	for terminals, SI Units (M6)	2,5	–	5	Nm
	for terminals, US Units	22	–	44	lb.in.
a		–	–	5x9,81	m/s^2
w		–	–	325	g
Case	→ page B 5 – 18		D 71		

[1] T_{case} = 25 °C, unless otherwise specified.
[2] Limited by internal connections, I_D = 560 A at δ = 0,5, $t_p \leq 0,5$ s, T_c = 25 °C
[3] I_F = 560 A, V_R = 100 V, – di_F/dt = 100 A/µs

Features

- N Channel, enhancement mode
- Short internal connections avoid oscillations
- Isolated copper baseplate using Al_2O_3 ceramic Direct Copper Bonding Technology (DCB)
- All electrical connections on top for easy busbaring
- Large clearances (12 mm) and creepage distances (20 mm)

Typical Applications

- DC servo and robot drives
- DC choppers
- UPS equipment
- Plasma cutting
- Not suitable for linear amplification

This is an electrostatic discharge sensitive device (ESDS). Please observe the international standard IEC 747-1, Chapter IX.

Suitable mounting hardware:
Ident No. 33321100
(for 10 SEMITRANS 3)
Screws → page B 6 – 4

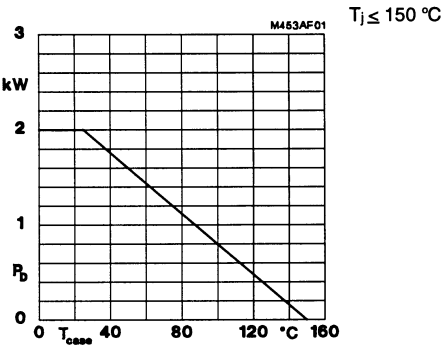


Fig. 1 Rated power dissipation vs. temperature

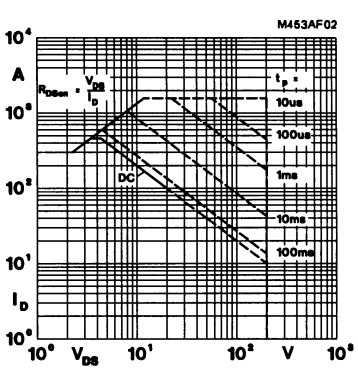


Fig. 2 Maximum safe operating area, single pulse

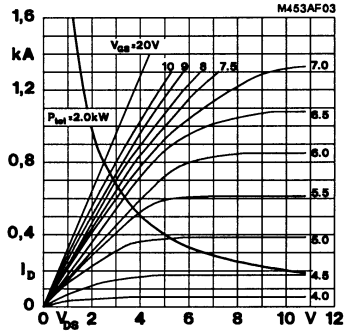


Fig. 3 Output characteristic, t_p = 80 µs, T_j = 25 °C

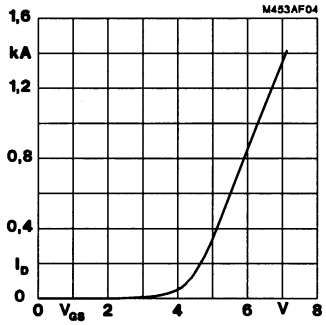


Fig. 4 Transfer characteristic, t_p = 80 µs, V_{DS} = 25 V

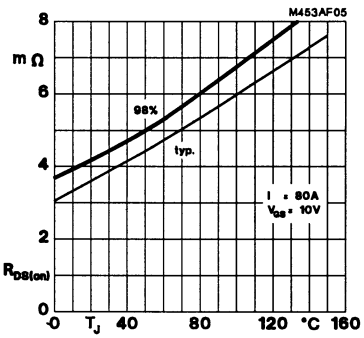


Fig. 5 On-resistance vs. temperature

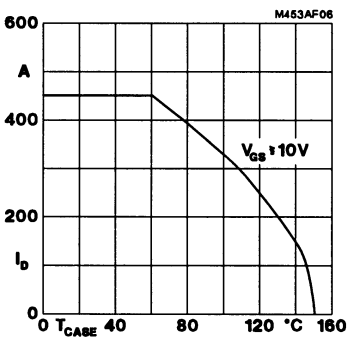


Fig. 6 Rated current vs. temperature

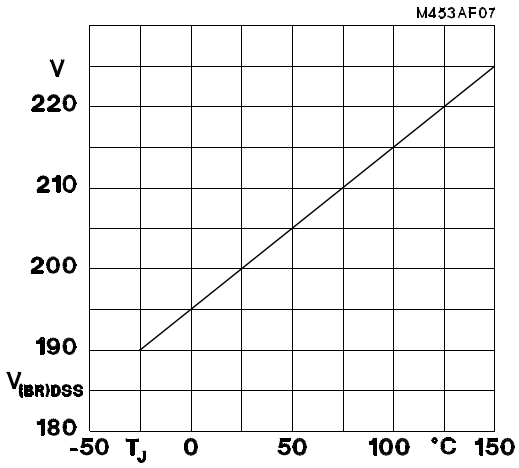


Fig. 7 Breakdown voltage vs. temperature

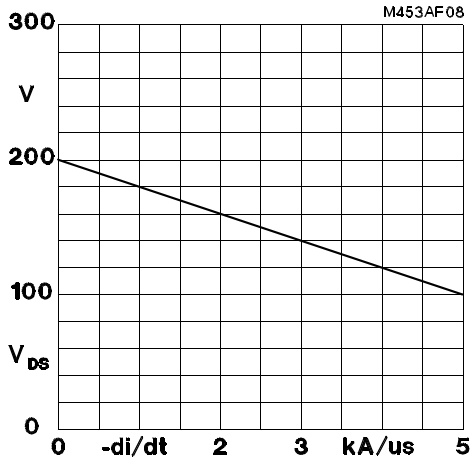


Fig. 8 Drain-source voltage derating (L_{DS})

V_{GS} = 0 V
f = 1 MHz

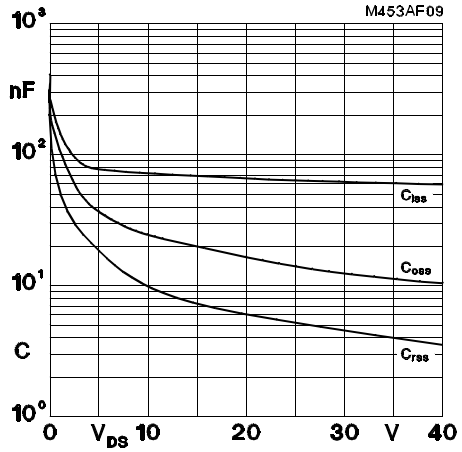


Fig. 9 Typ. capacitances vs. drain-source voltage

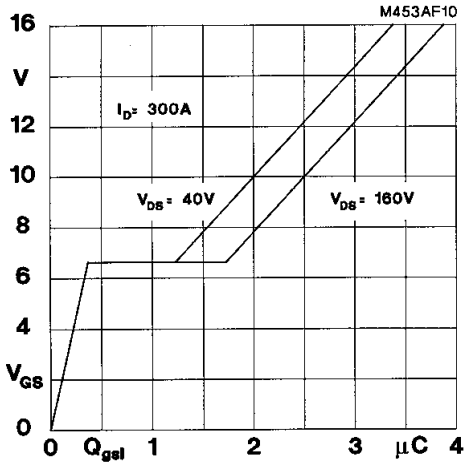


Fig. 10 Gate charge characteristic, I_{Dp} = 370 A

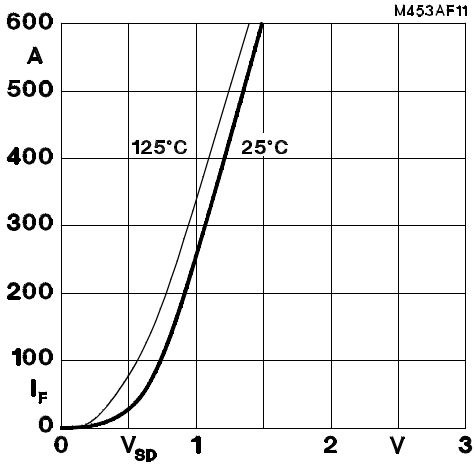


Fig. 11 Diode forward characteristic, t_p = 80 µs

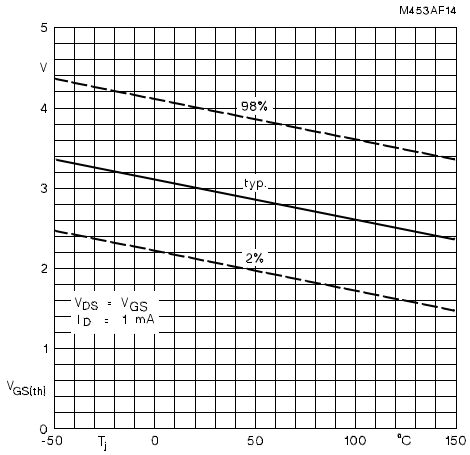
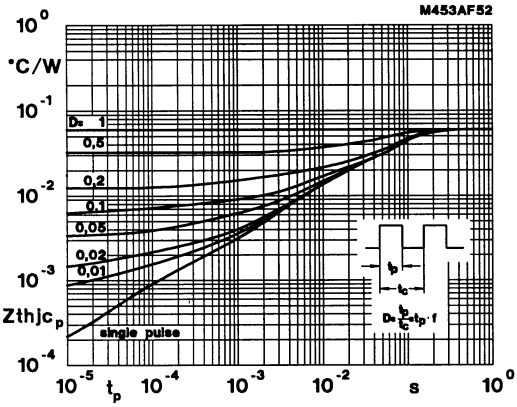


Fig. 14 Gate-source threshold voltage



Actual datasheets and other types in this case (under development) on request. Please contact SEMIKRON

Fig. 52 Thermal impedance under pulse conditions

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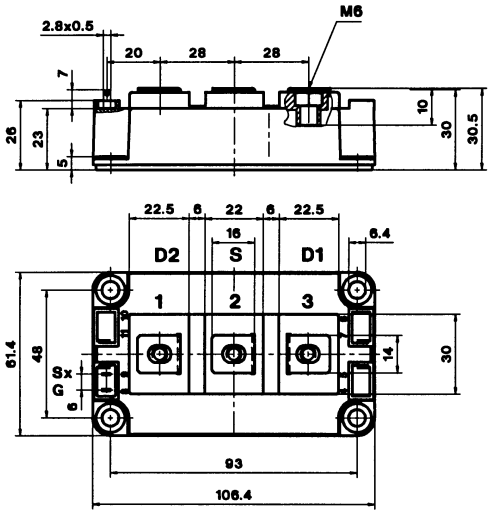
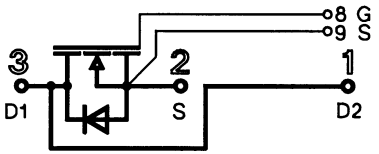
Case D 71

CASED71



3 = Main Drain terminal D 1 (low inductance)



Dimensions in mm

Terminal D 2 may or may not be used for current sensing ($V_{DS} = R_{DSon} \cdot I_D$)

