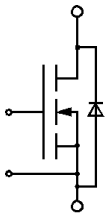
SEMIKRON

SEMITRANS® M
Power MOSFET Modules
180 A, 200 V, 11 mΩ

SKM 180 A 020

SEMITRANS M1



Absolute Maximum Ratings			
Symbol	**Conditions** [1]	**Values**	**Units**
V_{DS}		200	V
V_{DGR}	R_{GS} = 20 kΩ	200	V
I_D		180	A
	T_{case} = 100 °C	112	A
I_{DM}		540	A
V_{GS}		± 20	V
P_D		700	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		180	A
I_{FM}= – I_{DM}		540	A

Characteristics					
Symbol	**Conditions** [1]	**min.**	**typ.**	**max.**	**Units**
$V_{(BR)DSS}$	V_{GS} = 0, I_D = 0,25 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, V_{GS} = 0, T_j = 25 °C	–	50	250	µA
	V_{DS} = 200 V, V_{GS} = 0, T_j = 125 °C	–	300	1000	µA
I_{GSS}	V_{GS} = 20 V, V_{DS} = 0	–	10	100	nA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 110 A	–	9	11	mΩ
g_{fs}	V_{DS} = 25 V, I_D = 110 A	80	100	–	S
C_{CHC}		–	–	160	pF
C_{iss}	V_{GS} = 0	–	16	24	nF
C_{oss}	V_{DS} = 25 V	–	3	4,5	nF
C_{rss}	f = 1 MHz	–	1,5	2	nF
L_{DS}		–	–	20	nH
$t_{d(on)}$	V_{DD} = 100 V	–	100	–	ns
t_r	I_D = 80 A	–	200	–	ns
$t_{d(off)}$	V_{GS} = 10 V	–	900	–	ns
t_f	R_{GS} = 3,3 Ω	–	220	–	ns
Inverse Diode					
V_{SD}	I_F = 360 A, V_{GS} = 0	–	1,3	1,5	V
V_{TO}	T_j = 125 °C [2]	–	0,62	0,7	V
r_T	T_j = 125 °C [2]	–	1,9	2,1	mΩ
t_{rr}	T_j = 25 (125) °C [2]	–	0,5	–	µs
Q_{rr}	T_j = 25 (125) °C [2]	–	10(12)	–	µC
Thermal Characteristics					
R_{thjc}		–	–	0,18	°C/W
R_{thch}	M_1, surface 10 µm	–	–	0,05	°C/W

Mechanical Data					
M_1	to heatsink, SI Units	4	–	5	Nm
	to heatsink, US Units	35	–	44	lb.in.
M_2	for terminals, SI Units	2,5	–	3,5	Nm
	for terminals, US Units	22	–	24	lb.in.
a		–	–	5x9,81	m/s^2
w		–	–	130	g
Case	→ page B 5 – 14	D 15			

[1] T_{case} = 25 °C, unless otherwise specified.
[2] I_F = – I_D, V_R = 100 V, – di_F/dt = 100 A/µs

Features

- N Channel, enhancement mode
- Avalanche characteristic
- Short internal connections avoid oscillations
- Isolated copper baseplate
- All electrical connections on top for easy busbaring
- Large clearances (10 mm) and creepage distances (13 mm)
- UL recognized, file no. E 63 532

Typical Applications

- Switched mode power supplies
- 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.

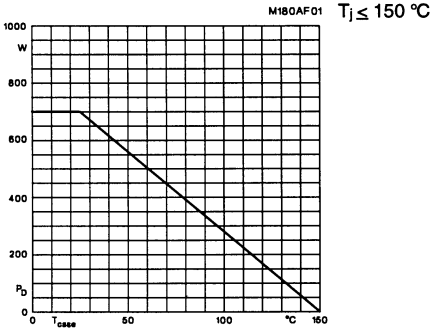


Fig. 1 Rated power dissipation vs. temperature

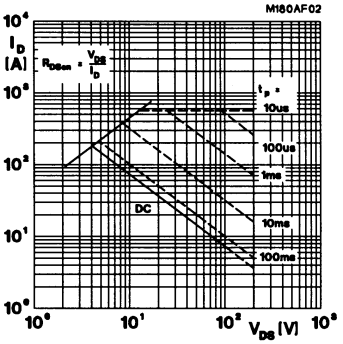


Fig. 2 Maximum safe operating area, single pulse

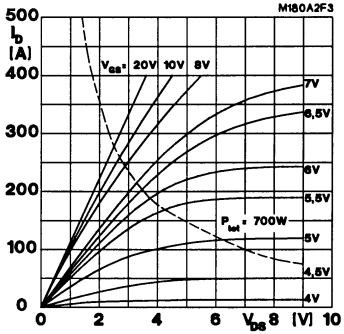


Fig. 3 Output characteristic, $t_p = 80$ µs, $T_j = 25$ °C

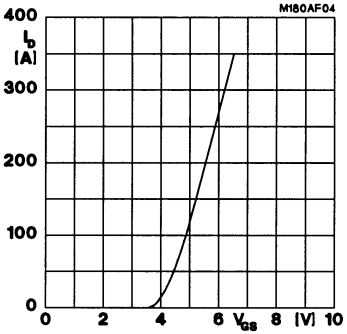


Fig. 4 Transfer characteristic, $t_p = 80$ µs, $V_{DS} = 25$ V

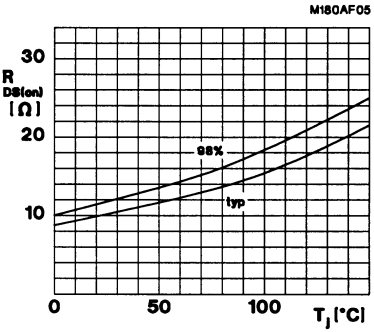


Fig. 5 On-resistance vs. temperature

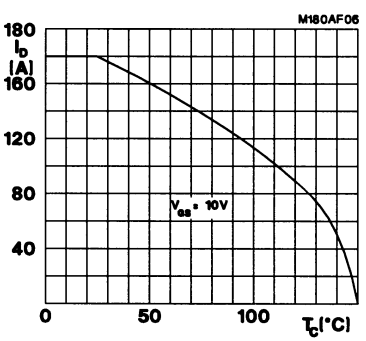


Fig. 6 Rated current vs. temperature

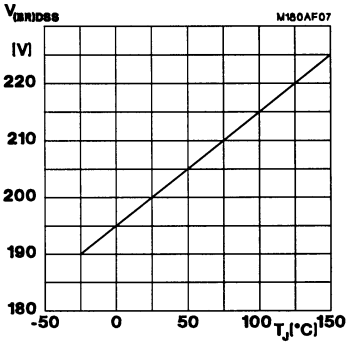


Fig. 7 Breakdown voltage vs. temperature

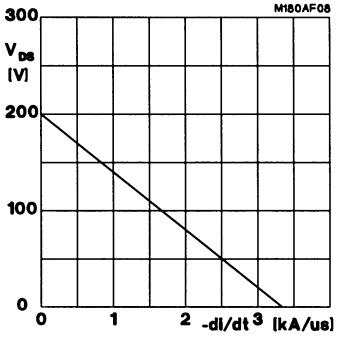


Fig. 8 Drain-source voltage derating (L_{DS})

V_{GS} = 0 V
f = 1 MHz

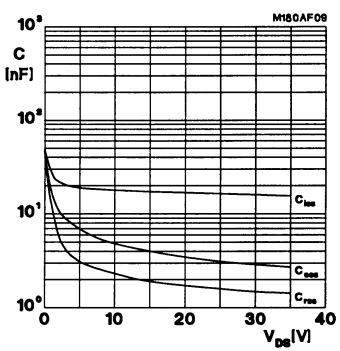


Fig. 9 Typ. capacitances vs. drain-source voltage

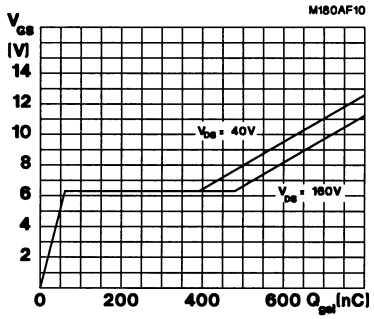


Fig. 10 Gate charge characteristic, I_{Dp} = 370 A

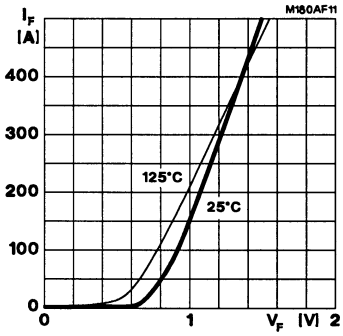


Fig. 11 Diode forward characteristic, t_p = 80 µs

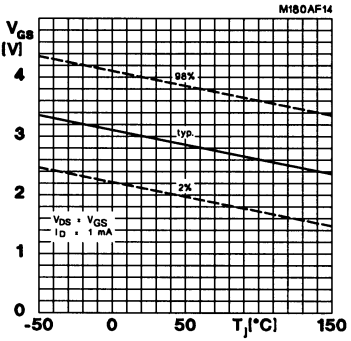


Fig. 14 Gate-source threshold voltage

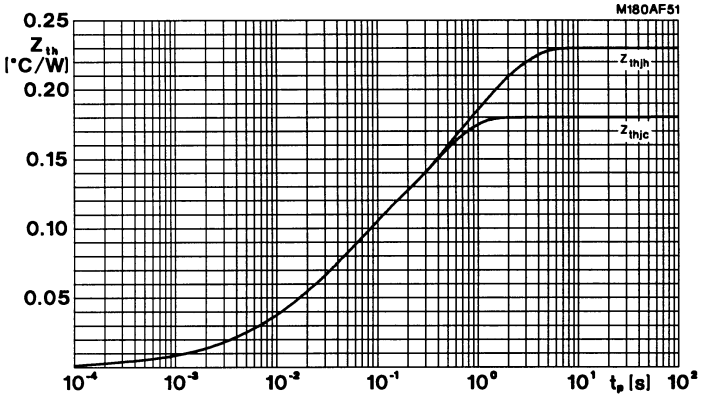


Fig. 51 Transient thermal impedance

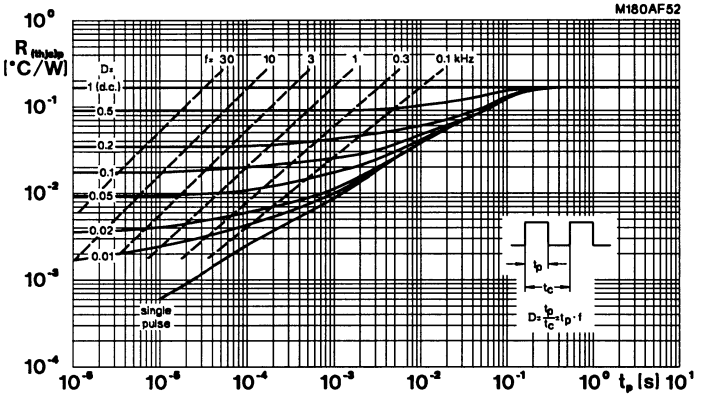


Fig. 52 Thermal impedance under pulse conditions

SEMITRANS M 1

Case D 15

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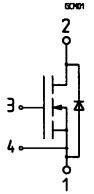

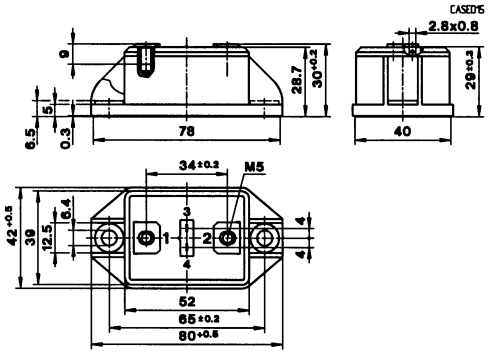

Dimensions in mm

