

Absolute Maximum Ratings		Values	Units
Symbol	Conditions ¹⁾		
V _{DS}	R _{GE} = 20 kΩ	800	V
V _{DGR}		800	V
I _D		36	A
I _{DM}		144	A
V _{GS}		± 20	V
P _D		700	W
T _j , (T _{stg})	AC, 1 min. humidity climate	−40 ... +150 (125)	°C
V _{isol}		2 500	V
humidity		Class F	
climate		40/125/56	
Inverse Diode			
I _F = −I _D		36	A
I _{FM} = −I _{DM}		144	A

Characteristics					
Symbol	Conditions ¹⁾	min.	typ.	max.	Units
V _{(BR)DSS}	V _{GS} = 0, I _D = 0,25 mA	800	—	—	V
V _{GS(th)}	V _{GS} = V _{DS} , I _D = 1 mA	2,1	3,0	4,0	V
I _{DSS}	V _{GS} = 0 } T _j = 25 °C V _{DS} = 800 V } T _j = 125 °C	—	50	100	μA
		—	300	1000	μA
I _{GSS}	V _{GS} = 20 V, V _{DS} = 0	—	10	100	nA
R _{DS(on)}	V _{GS} = 10 V, I _D = 23 A	—	170	210	mΩ
g _{fs}	V _{DS} = 10 V, I _D = 23 A	16	33	—	S
C _{CHC}	V _{GS} = 0 V _{DS} = 25 V f = 1 MHz	—	—	160	pF
C _{iss}		—	10	14	nF
C _{oss}		—	1,2	1,7	nF
C _{rss}		—	0,6	0,8	nF
L _{DS}		—	—	20	nH
t _{d(on)}	V _{DD} = 400 V I _D = 23 A V _{GS} = 10 V R _G = 4,7 Ω (SKM 181A3R: 3,3 Ω)	—	60	—	ns
t _r		—	30	—	ns
t _{d(off)}		—	350	—	ns
t _f		—	70	—	ns
Inverse Diode ⁸⁾					
V _{SD}	I _F = 72 A, V _{GS} = 0 V	—	0,9	1,2	V
t _{rr}	T _j = 25 °C ²⁾	—	1200	—	ns
	T _j = 150 °C ²⁾	—	—	—	ns
Q _{rr}	T _j = 25 °C ²⁾	—	42	—	μC
	T _j = 150 °C ²⁾	—	—	—	μC
Thermal characteristics					
R _{thjc}	M ₁ , surface 10 μm	—	—	0,18	°C/W
R _{thch}		—	—	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	→ B 5 – 25	D15			

¹⁾ $T_{case} = 25^{\circ}\text{C}$, unless otherwise specified

²⁾ $I_F = -I_D, V_R = 100 \text{ V}, -di_F/dt = 100 \text{ A}/\mu\text{s}$

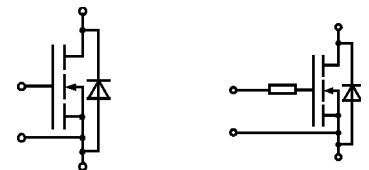
³⁾ SKM 181 A 3 (with standard recovery body drain diode) can replace old SKM 181 F (with fast recovery body drain diode) only in DC-choppers and resonant inverters which do not use the fast recovery feature i. e. $f_{sw} > f_{resonant}$, but not for $f_{sw} < f_r$ and not for PWM-inverters. In doubt please ask SEMIKRON.

SEMITRANS® M Power MOSFET Modules

SKM 181 A3 ³⁾
SKM 181 A3R *)



SEMITRANS M1



SKM 181 A3 **SKM 181 A3R *)**

Features

- N Channel, enhancement mode
- Short internal connections avoid oscillations
- DCB-ceramic isolated copper baseplate
- All electrical connections on top for easy busbaring
- Large clearance (10 mm) and creepage distances (13 mm)
- UL recognized, file no. E63 532

Typical Applications

- Switched mode power supplies
- DC servo and robot drives
- DC choppers
- Resonant and welding inverters
- AC motor drives
- Laser power supplies
- UPS equipment
- Plasma cutting
- Not suitable for linear amplification

*) SKM 181 A3R has built-in gate resistor chips ("R") $R_{ginternal} = 1,3\Omega$, preferred typed for paralleling and for lower switching frequencies

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

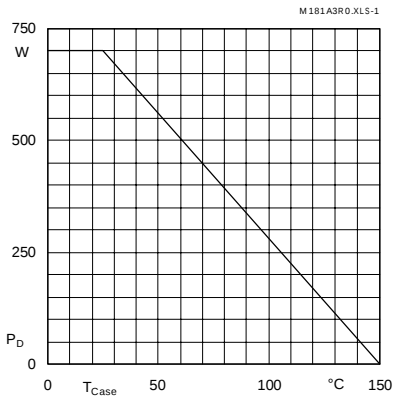


Fig. 1 Rated power dissipation vs. temperature

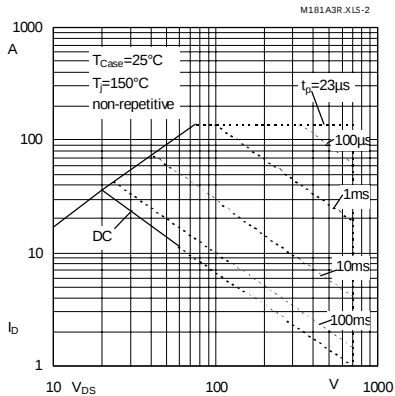


Fig. 2 Maximum safe operating area

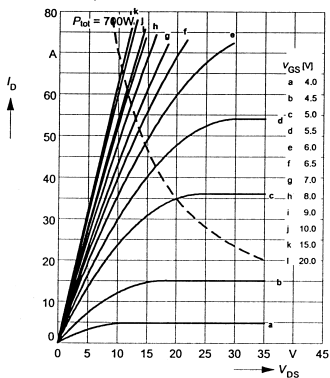


Fig. 3 Output characteristic

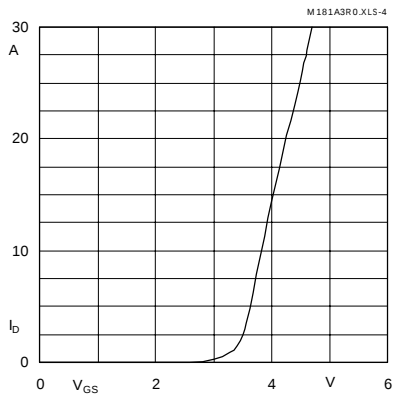


Fig. 4 Transfer characteristic

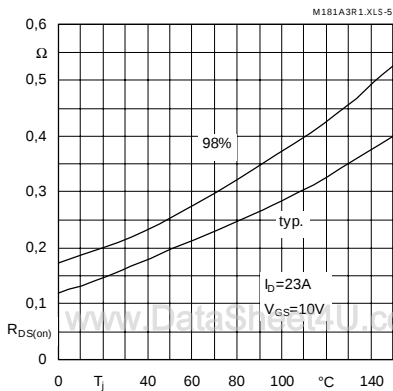


Fig. 5 On-resistance vs. temperature

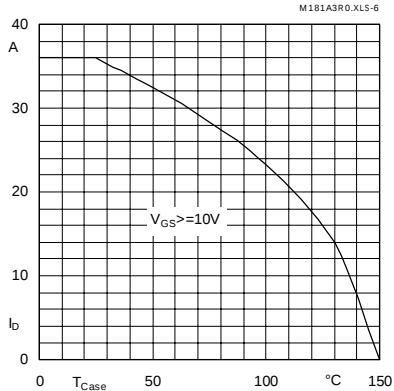


Fig. 6 Rated current vs. temperature

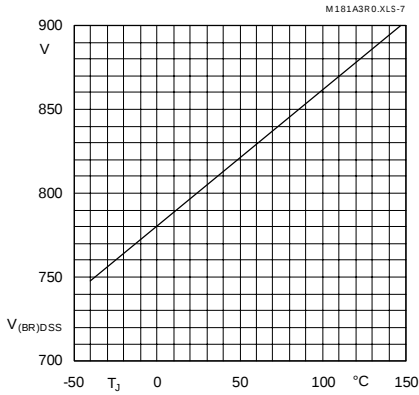


Fig. 7 Breakdown voltage vs. temperature

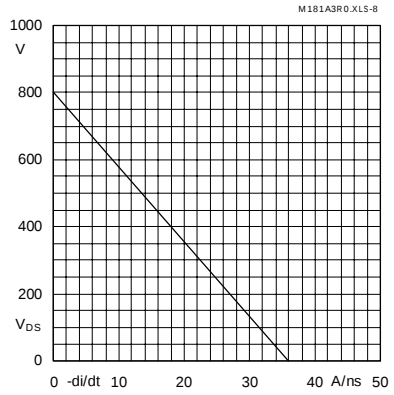


Fig. 8 Drain-source voltage derating

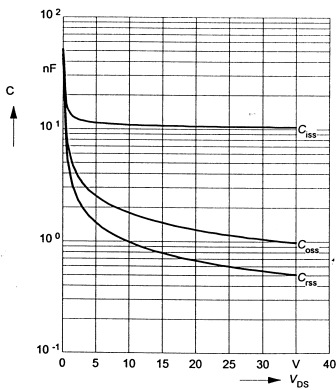


Fig. 9 Typ. capacitances vs. drain-source voltage

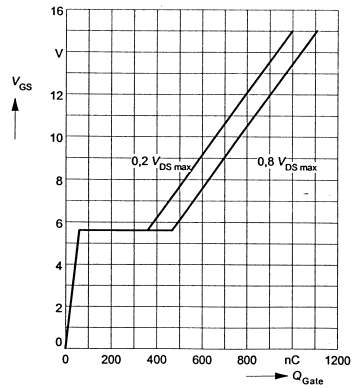


Fig. 10 Gate charge characteristic

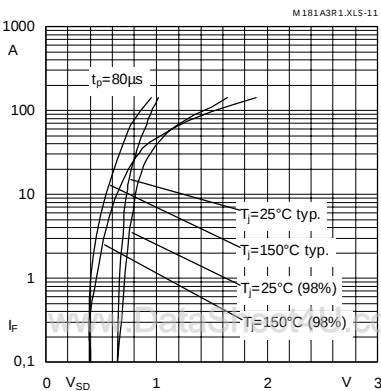


Fig. 11 Diode forward characteristic

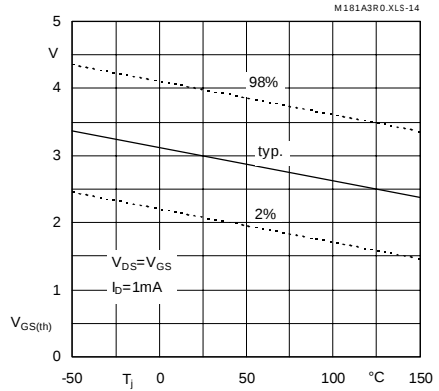


Fig. 14 Gate-source threshold voltage

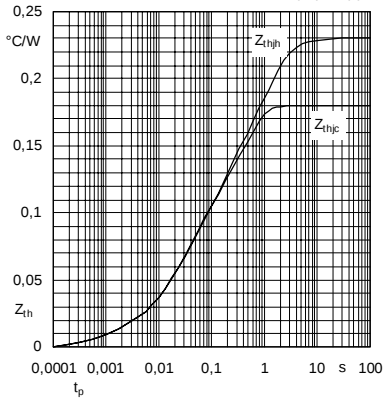


Fig. 51 Transient thermal impedance

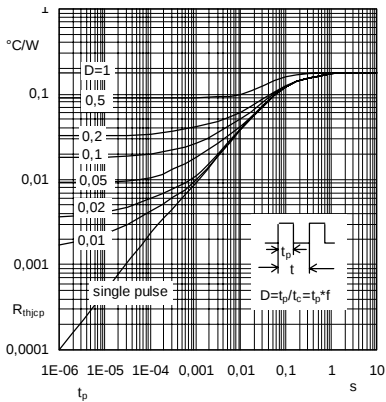
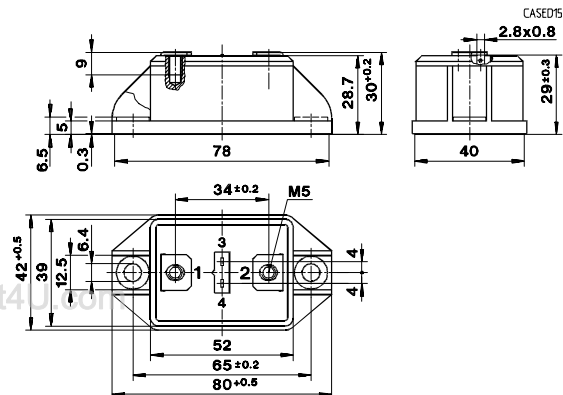
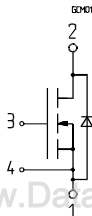


Fig. 52 Thermal impedance under pulse conditions

SEMITRANS M 1

Case D 15

SKM 181A3**SKM 181 A3R**

Dimensions in mm