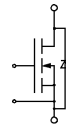


SEMITRANS® M Power MOSFET Modules SKM 181 F



SEMITRANS M1



Features

- N Channel, enhancement mode
- Fast inverse diode
- Short internal connections avoid oscillations
- Switching kW's in less than 1 μ s
- Isolated copper baseplate
- All electrical connections on top for easy busbaring
- Large clearances and creepage distances
- UL recognized, file no. E 63 532

Typical Applications

- Switched mode power supplies
- DC servo and robot drives
- DC choppers
- Resonant and welding inverters
- Induction heaters
- AC motor drives
- Laser power supplies
- 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.

Absolute Maximum Ratings			
Symbol	Conditions ¹⁾	Values	Units
V _{DS}	R _{GS} = 20 kΩ	800	V
V _{DGR}		800	V
I _D		34	A
I _{DM}		136	A
V _{GS}		± 20	V
P _D	AC, 1 min	700	W
T _J , T _{stg}		− 55 . . . +150	°C
V _{isol}		2 500	V
humidity		Class F	
climate		DIN IEC 68 T.1	55/150/56
Inverse Diode			
I _F = − I _D		34	A
I _{FM} = − I _{DM}		136	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, $\left. \begin{array}{l} T_J = 25\text{ }^{\circ}\text{C} \\ T_J = 125\text{ }^{\circ}\text{C} \end{array} \right\}$ V _{DS} = 800 V	—	20	250	μA
		—	300	1000	μA
		—	10	100	nA
I _{GSS}	V _{GS} = 20 V, V _{DS} = 0	—	10	100	nA
R _{DS(on)}	V _{GS} = 10 V, I _D = 21 A	—	250	320	mΩ
g _{fs}	V _{DS} = 25 V, I _D = 21 A	15	35	—	S
C _{CHC}	$\left. \begin{array}{l} V_{GS} = 0 \\ V_{DS} = 25\text{ V} \\ f = 1\text{ MHz} \end{array} \right\}$	—	—	160	pF
C _{iss}		—	22	30	nF
C _{oss}		—	1	1,5	nF
C _{rss}		—	0,48	0,8	nF
L _{DS}		—	—	20	nH
t _{d(on)}	$\left. \begin{array}{l} V_{DD} = 400\text{ V} \\ I_D = 21\text{ A} \\ V_{GS} = 10\text{ V} \\ R_{GS} = 3,3\text{ }\Omega \end{array} \right\}$	—	60	—	ns
t _r		—	30	—	ns
t _{d(off)}		—	350	—	ns
t _f		—	70	—	ns
Inverse Diode					
V _{SD}	I _F = 60 A, V _{GS} = 0	—	1,6	2	V
t _{rr}	T _J = 25 °C ²⁾	—	300	—	ns
	T _J = 150 °C ²⁾	—	—	—	ns
Q _{rr}	T _J = 25/150 °C ²⁾	—	—	2/16	μC
I _{RRM}	T _J = 25/150 °C ²⁾	—	—	16/40	A
Thermal Characteristics					
R _{thjc}	M ₁ , surface 10 μm	—	—	0,18	°C/W
R _{thch}		—	—	0,05	°C/W

Mechanical Data				
Symbol	Description			
M_1	to heatsink, SI Units	4	—	5
	to heatsink, US Units	35	—	44
M_2	for terminals, SI Units	2,5	—	3,5
	for terminals, US Units	22	—	24
a		—	—	5x9,81
w		—	—	150
Case	→ page B 5 – 2	D 15		

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

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

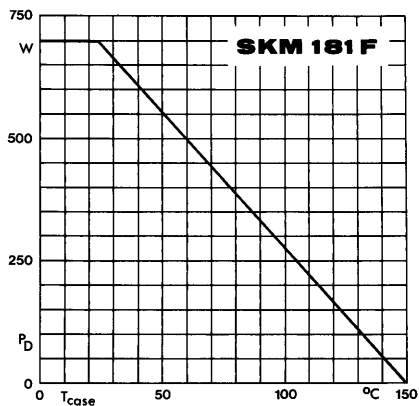


Fig. 1 Rated power dissipation vs. temperature

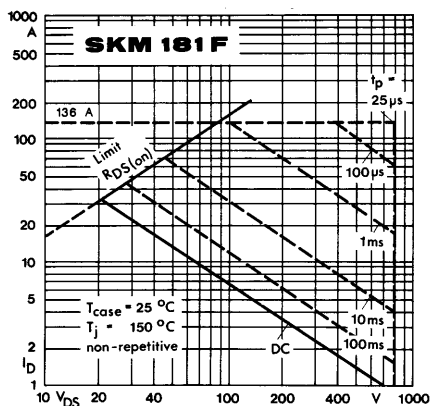


Fig. 2 Maximum safe operating area

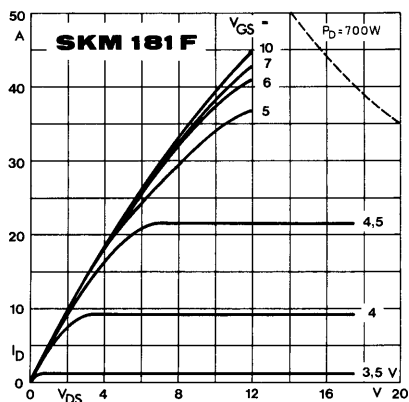


Fig. 3 Output characteristic

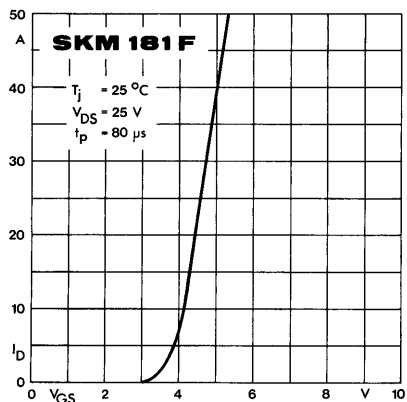


Fig. 4 Transfer characteristic

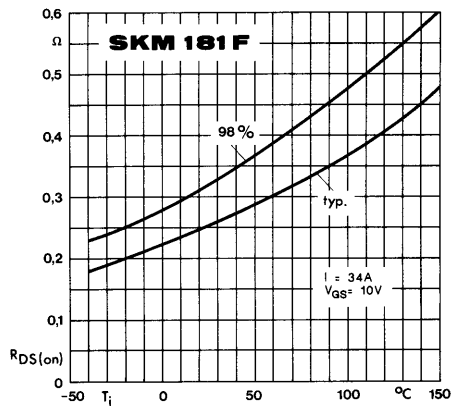


Fig. 5 On-resistance vs. temperature

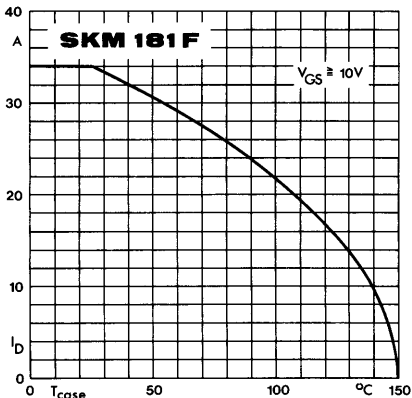


Fig. 6 Rated current vs. temperature

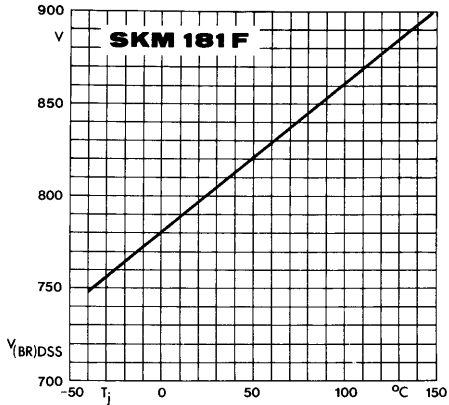


Fig. 7 Breakdown voltage vs. temperature

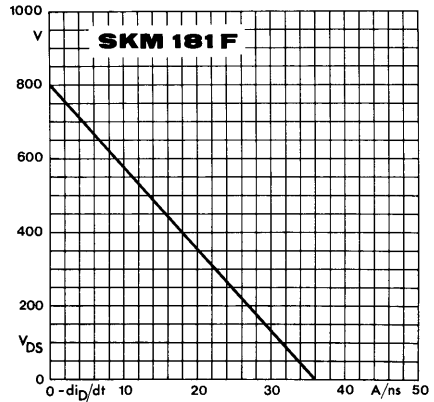


Fig. 8 Drain-source voltage derating

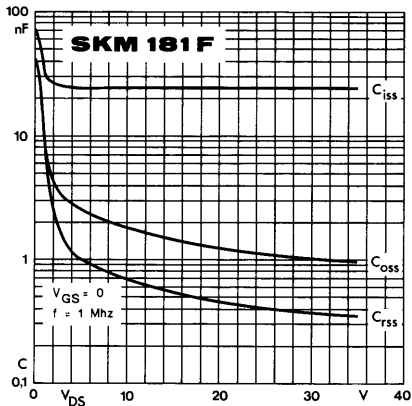


Fig. 9 Capacitances vs. drain-source voltage

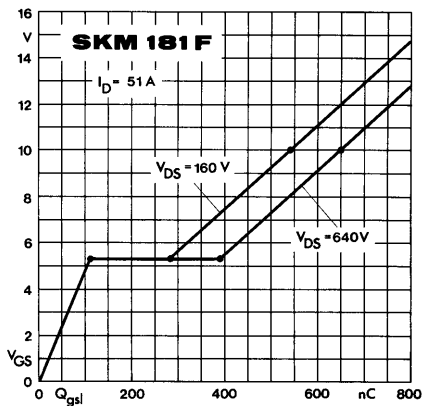


Fig. 10 Gate charge characteristic

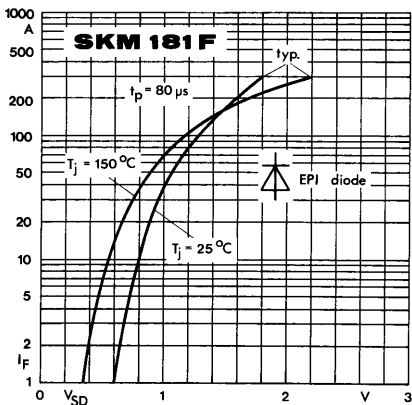


Fig. 11 Diode forward characteristic

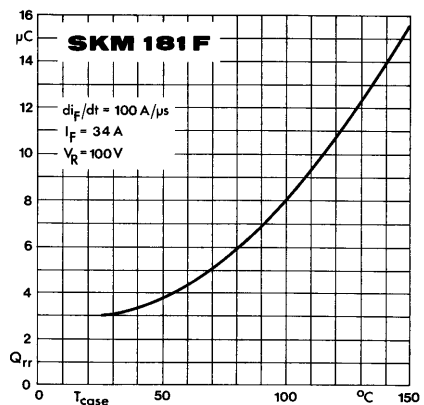


Fig. 12 Diode recovered charge

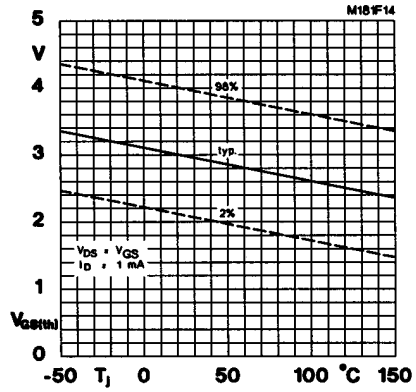


Fig. 14 Gate-source threshold voltage

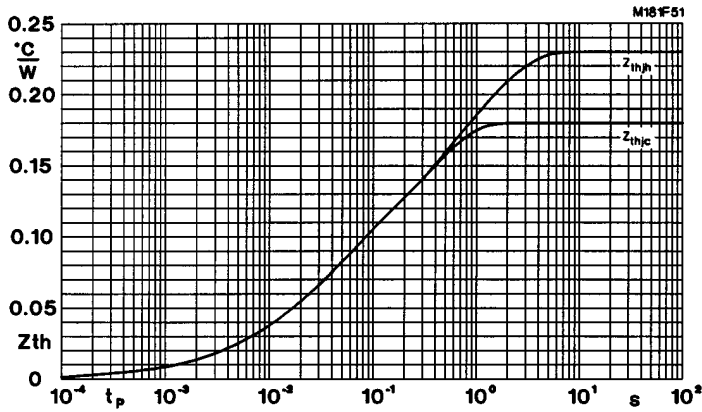


Fig. 51 Transient thermal impedance

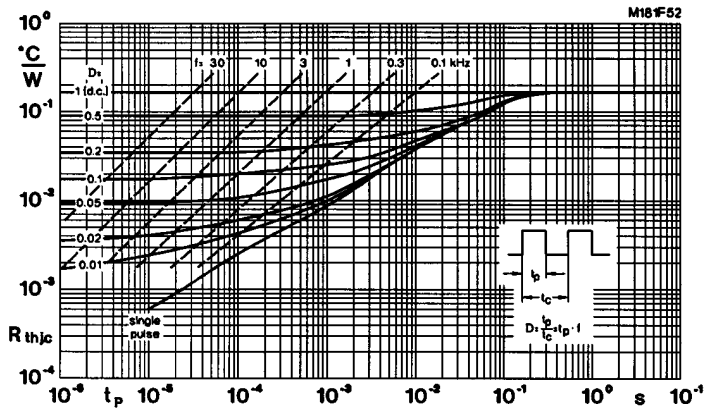


Fig. 52 Thermal impedance under pulse conditions