

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		Values	Units
Symbol	Conditions ¹⁾		
V _{DS}	R _{GS} = 20 k Ω	800	V
V _{DGR}		800	V
I _D		34	A
I _{DM}		136	A
V _{GS}		± 20	V
P _D		700	W
T _j , T _{stg}		-55...+150	$^{\circ}$ C
V _{isol}	AC, 1 min	2 500	V
humidity	DIN 40 040	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		min.	typ.	max.	Units
Symbol	Conditions ¹⁾				
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 $^{\circ}$ C V _{DS} = 800 V } T _j = 125 $^{\circ}$ C	-	20	250	μ A
		-	300	1000	μ A
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	m Ω
g _{fs}	V _{DS} = 25 V, I _D = 21 A	15	35	-	S

C _{CHC}	} V _{GS} = 0 V _{DS} = 25 V f = 1 MHz	-	-	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)}	} V _{DD} = 400 V I _D = 21 A	-	60	-	ns
t _r		-	30	-	ns
t _{d(off)}	} V _{GS} = 10 V R _{GS} = 3,3 Ω	-	350	-	ns
t _f		-	70	-	ns

Inverse Diode					
V _{SD}	} I _F = 60 A, V _{GS} = 0 T _j = 25 $^{\circ}$ C ²⁾ T _j = 150 $^{\circ}$ C ²⁾	-	1,6	2	V
t _{rr}		-	300	-	ns
Q _{rr}		-	-	-	-
I _{RRM}	T _j = 25/150 $^{\circ}$ C ²⁾	-	-	2/16	μ C
	T _j = 25/150 $^{\circ}$ C ²⁾	-	-	16/40	A

Thermal Characteristics					
R _{thjc}	M ₁ , surface 10 μ m	-	-	0,18	$^{\circ}$ C/W
R _{thch}		-	-	0,05	$^{\circ}$ C/W

Mechanical Data		4	-	5	Nm
M ₁	to heatsink, SI Units				
	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		-	-	150	g
Case	→ page B 5 - 2	D 15			

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

²⁾ I_F = -I_D, V_R = 100 V, -di_F/dt = 100 A/ μ s

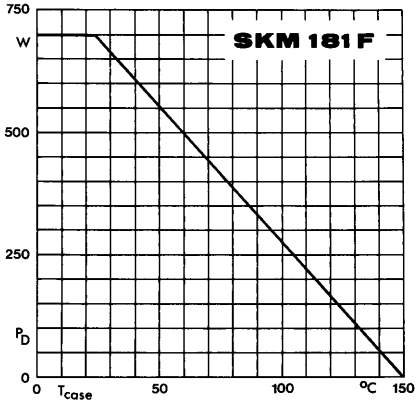


Fig. 1 Rated power dissipation vs. temperature

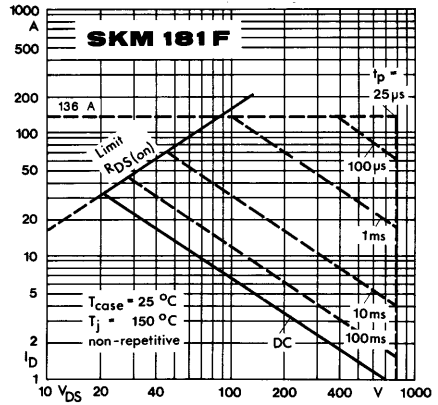


Fig. 2 Maximum safe operating area

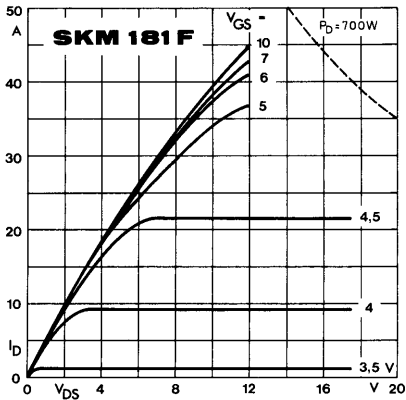


Fig. 3 Output characteristic

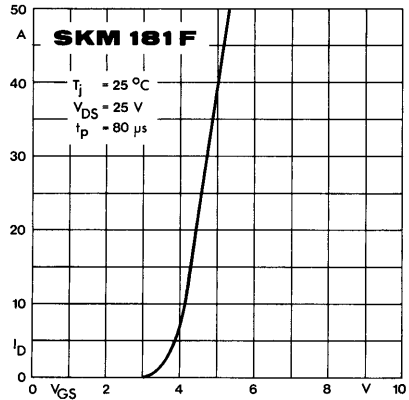


Fig. 4 Transfer characteristic

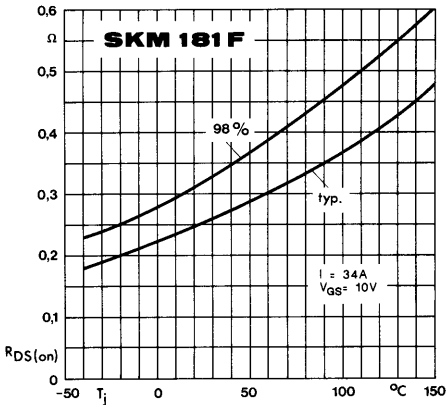


Fig. 5 On-resistance vs. temperature

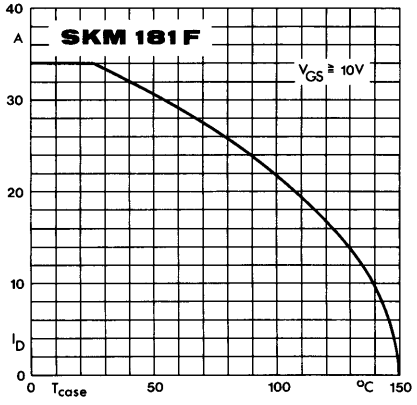


Fig. 6 Rated current vs. temperature

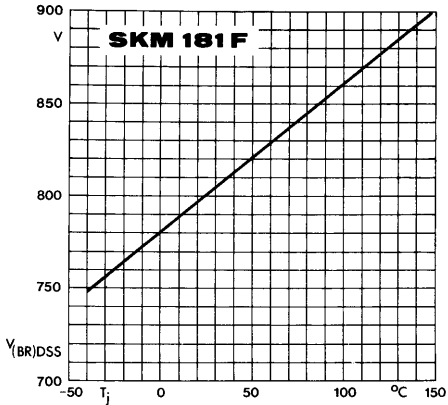


Fig. 7 Breakdown voltage vs. temperature

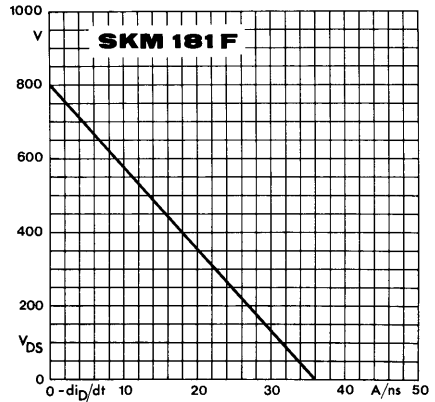


Fig. 8 Drain-source voltage derating

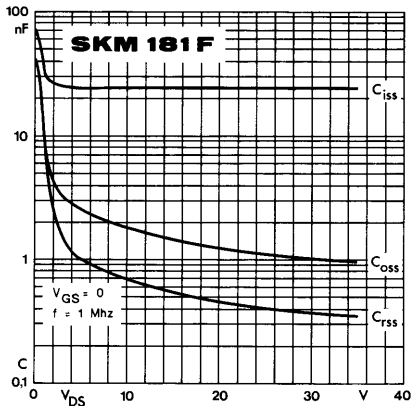


Fig. 9 Capacitances vs. drain-source voltage

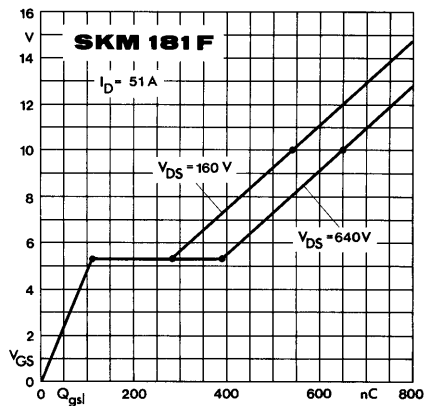


Fig. 10 Gate charge characteristic

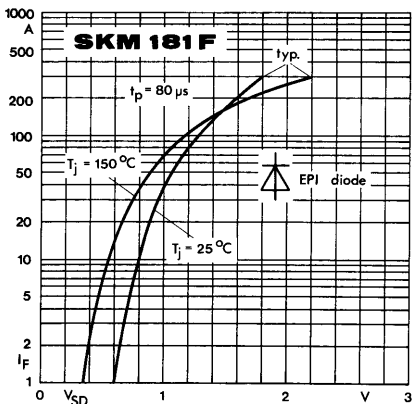


Fig. 11 Diode forward characteristic

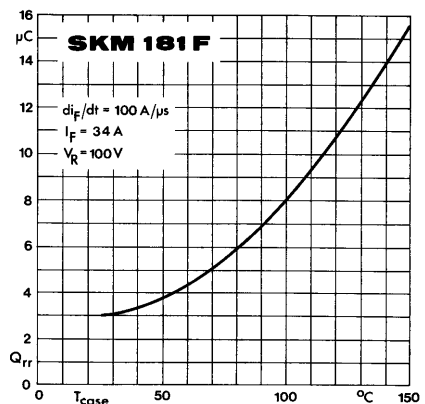


Fig. 12 Diode recovered charge

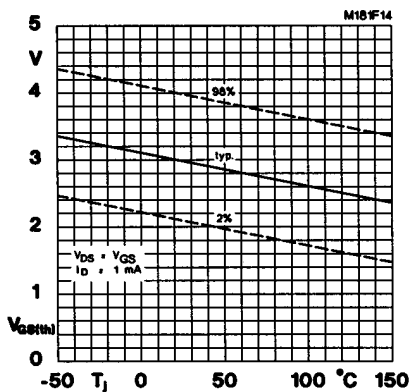


Fig. 14 Gate-source threshold voltage

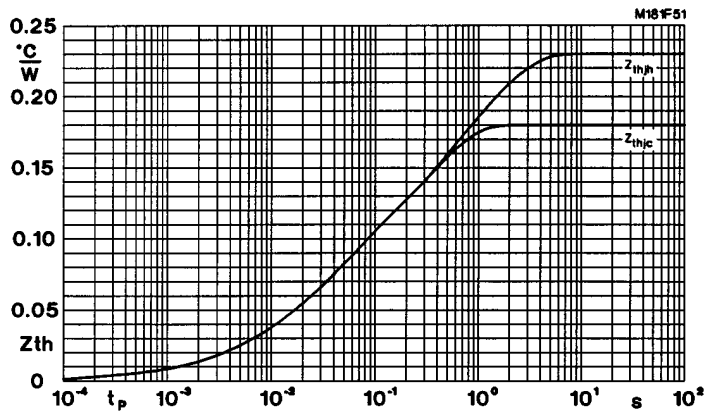


Fig. 51 Transient thermal impedance

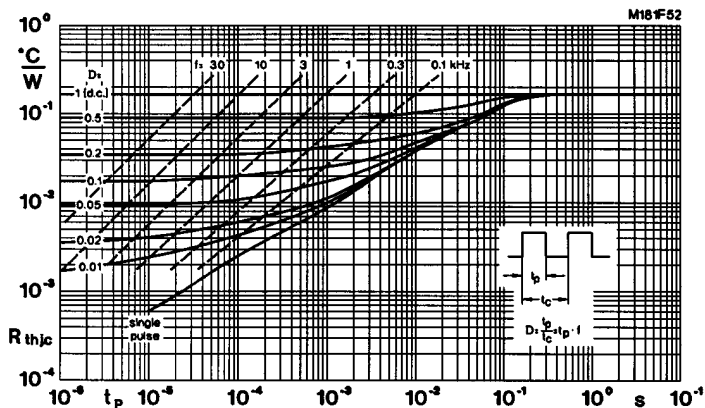


Fig. 52 Thermal impedance under pulse conditions