

SEMITRANS® M Power MOSFET Modules SKM 151 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	500	V		
V _{DGR}		500	V		
I _D		56	A		
I _{DM}		224	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		56	A		
I _{FM} = - I _{DM}		224	A		
Characteristics		min.	typ.	max.	Units
Symbol	Conditions ¹⁾				
V _{(BR)DSS}	V _{GS} = 0, I _D = 0,25 mA	500	-	-	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} = 500 V } T _J = 125 $^{\circ}$ C	-	50	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 = 36 A	-	90	110	m Ω
g _{fs}	V _{DS} = 25 V, I _D = 36 A	20	30	-	S
C _{CHC}	} V _{GS} = 0 } V _{DS} = 25 V } f = 1 MHz	-	-	160	pF
C _{iss}		-	22	30	nF
C _{oss}		-	1,6	2,4	nF
C _{rss}		-	0,6	1	nF
L _{DS}		-	-	20	nH
t _{d(on)}	} V _{DD} = 250 V } I _D = 36 A } V _{GS} = 10 V } R _{GS} = 3,3 Ω	-	60	-	ns
t _r		-	35	-	ns
t _{d(off)}		-	350	-	ns
t _f		-	70	-	ns
Inverse Diode					
V _{SD}	I _F = 110 A, V _{GS} = 0	-	1,3	1,6	V
t _{rr}	T _J = 25 $^{\circ}$ C ²⁾ T _J = 150 $^{\circ}$ C ²⁾	-	200	280	ns
		-	350	500	ns
Q _{rr}	T _J = 25/150 $^{\circ}$ C ²⁾	-	1,5/8,5	2,5/12	μ C
I _{RRM}	T _J = 25/150 $^{\circ}$ C ²⁾	-	12/28	-	A
Thermal Characteristics					
R _{thjc}		-	-	0,18	$^{\circ}$ C/W
R _{thch}	M1, surface 10 μ m	-	-	0,05	$^{\circ}$ C/W
Mechanical Data					
M1	to heatsink, SI Units	4	-	6	Nm
	to heatsink, US Units	35	-	53	lb.in.
M2	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

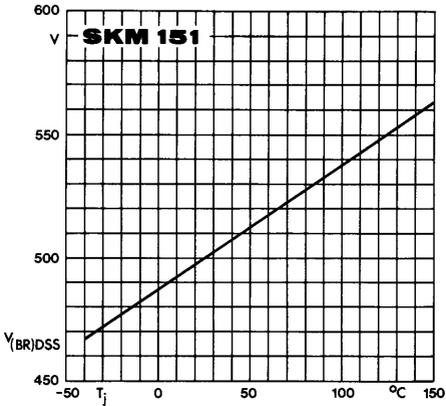


Fig. 7 Breakdown voltage vs. temperature

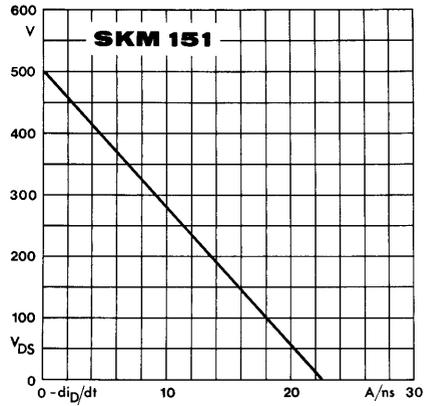


Fig. 8 Drain-source voltage derating

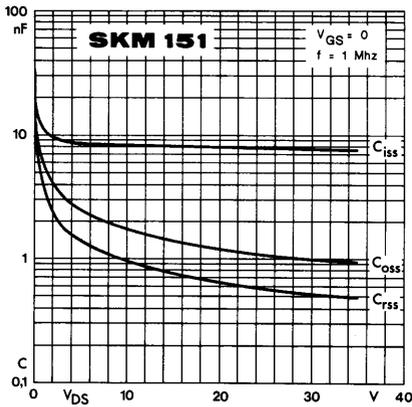


Fig. 9 Capacitances vs. drain-source voltage

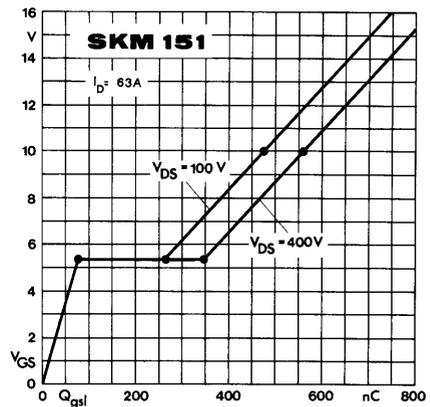


Fig. 10 Gate charge characteristic

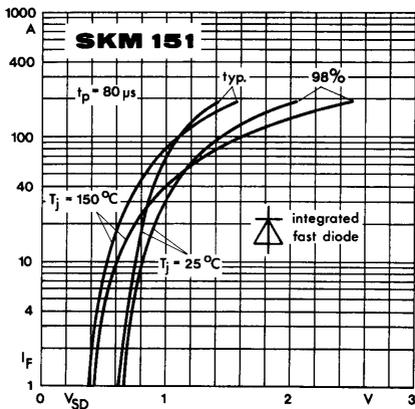


Fig. 11 Diode forward characteristic

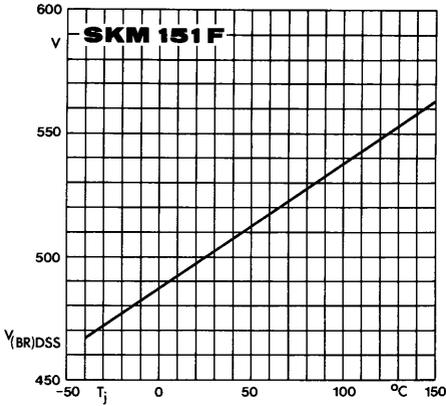


Fig. 7 Breakdown voltage vs. temperature

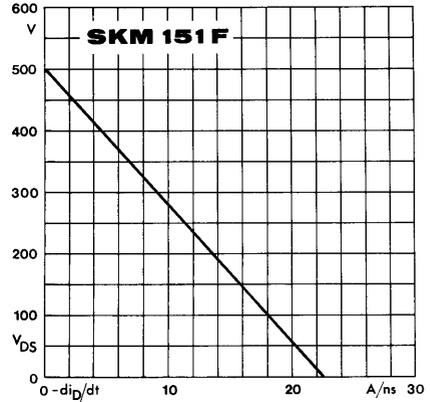


Fig. 8 Drain-source voltage derating

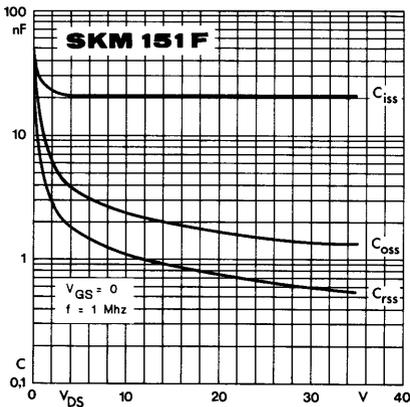


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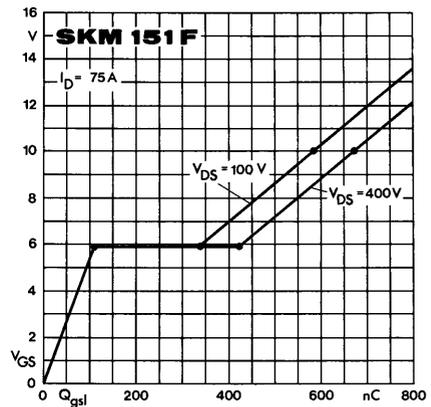


Fig. 10 Gate charge characteristic

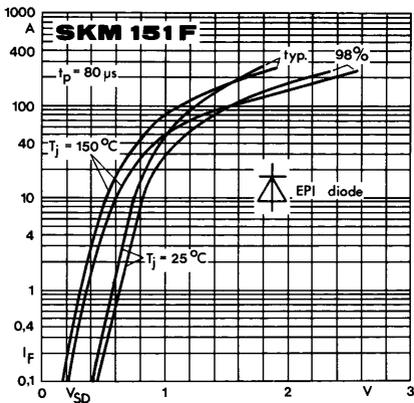


Fig. 11 Diode forward characteristic

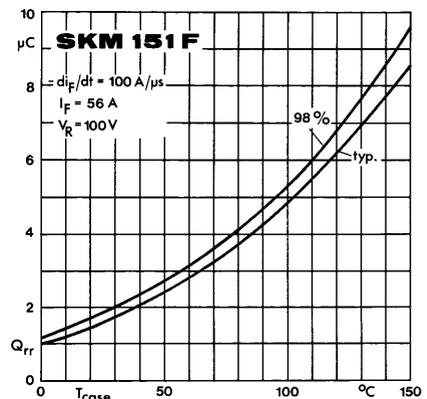


Fig. 12 Diode recovered charge

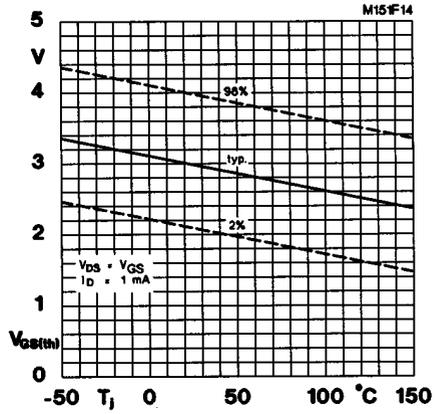


Fig. 14 Gate-source threshold voltage

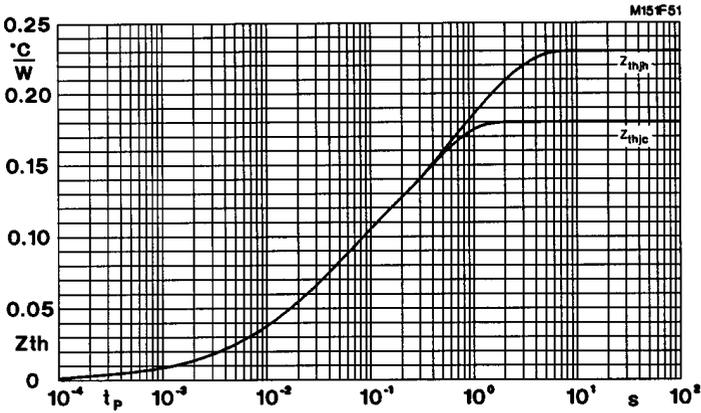


Fig. 51 Transient thermal impedance

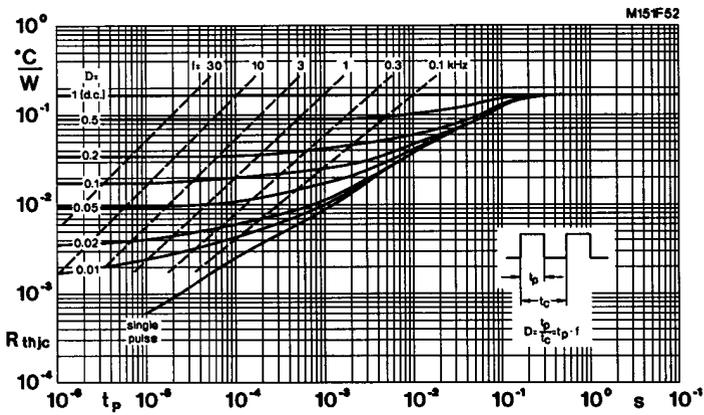


Fig. 52 Thermal impedance under pulse conditions