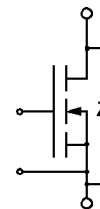


## SEMITRANS® M Power MOSFET Modules SKM 121 AR



### SEMITRANS M1



AR

### 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.**

Absolute Maximum Ratings		Values	Units		
Symbol	Conditions <sup>1)</sup>				
V <sub>DS</sub>		200	V		
V <sub>DGR</sub>	R <sub>GS</sub> = 20 kΩ	200	V		
I <sub>D</sub>		130	A		
I <sub>DM</sub>		390	A		
V <sub>GS</sub>		± 20	V		
P <sub>D</sub>		700	W		
T <sub>j</sub> , (T <sub>stg</sub> )		- 40 ... +150 (125)	°C		
V <sub>isol</sub>	AC, 1 min	2 500	V		
humidity	DIN 40 040	Class F			
climate	DIN IEC 68 T.1	40/125/56			
Inverse Diode					
I <sub>F</sub> = - I <sub>D</sub>		130	A		
I <sub>FM</sub> = - I <sub>DM</sub>		390	A		
Characteristics		min.	typ.	max.	Units
Symbol	Conditions <sup>1)</sup>				
V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0, I <sub>D</sub> = 0,25 mA	200	-	-	V
V <sub>GS(th)</sub>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 1 mA	2,1	3,0	4,0	V
I <sub>DSS</sub>	V <sub>GS</sub> = 0, $\left. \begin{array}{l} T_j = 25\text{ °C} \\ T_j = 125\text{ °C} \end{array} \right\}$ V <sub>DS</sub> = 200 V	-	50	250	μA
I <sub>GSS</sub> <sup>3)</sup>	V <sub>GS</sub> = 20 V, V <sub>DS</sub> = 0	-	10	100	nA
R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 80 A	-	18	20	mΩ
g <sub>fs</sub>	V <sub>DS</sub> = 25 V, I <sub>D</sub> = 80 A	60	75	-	S
C <sub>CHC</sub>		-	-	160	pF
C <sub>iss</sub>	} V <sub>GS</sub> = 0 V <sub>DS</sub> = 25 V f = 1 MHz	-	10	13	nF
C <sub>oss</sub>		-	3	4,5	nF
C <sub>rss</sub>		-	0,7	1	nF
L <sub>DS</sub>		-	-	20	nH
t <sub>d(on)</sub>	} V <sub>DD</sub> = 100 V I <sub>D</sub> = 80 A V <sub>GS</sub> = 10 V R <sub>GS</sub> = 3,3 Ω	-	60	-	ns
t <sub>r</sub>		-	60	-	ns
t <sub>d(off)</sub>		-	240	-	ns
t <sub>f</sub>		-	70	-	ns
Inverse Diode					
V <sub>SD</sub>	I <sub>F</sub> = 260 A, V <sub>GS</sub> = 0	-	1,05	1,4	V
t <sub>rr</sub>	T <sub>j</sub> = 25 °C <sup>2)</sup>	-	400	-	ns
	T <sub>j</sub> = 150 °C <sup>2)</sup>	-	-	-	ns
Q <sub>rr</sub>	T <sub>j</sub> = 25 °C <sup>2)</sup>	-	4,3	-	μC
	T <sub>j</sub> = 150 °C <sup>2)</sup>	-	-	-	
Thermal Characteristics					
R <sub>thjc</sub>		-	-	0,18	°C/W
R <sub>thch</sub>	M <sub>1</sub> , surface 10 μm	-	-	0,05	°C/W
Mechanical Data					
M <sub>1</sub>	to heatsink, SI Units	4	-	5	Nm
	to heatsink, US Units	35	-	44	lb.in.
M <sub>2</sub>	for terminals, SI Units	2,5	-	3,5	Nm
	for terminals, US Units	22	-	24	lb.in.
a		-	-	5x9,81	m/s <sup>2</sup>
w		-	-	130	g
Case	→ page B 5 - 2		D 15		

<sup>1)</sup> T<sub>case</sub> = 25 °C, unless otherwise specified.

<sup>2)</sup> I<sub>F</sub> = - I<sub>D</sub>, V<sub>R</sub> = 100 V, - di<sub>F</sub>/dt = 100 A/μs

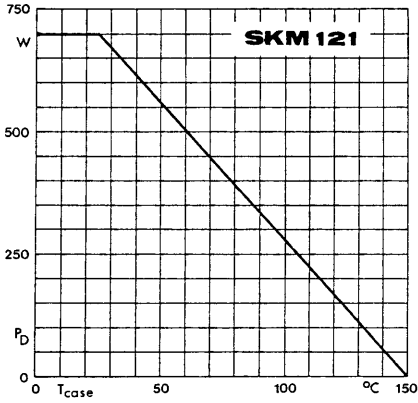


Fig. 1 Rated power dissipation vs. temperature

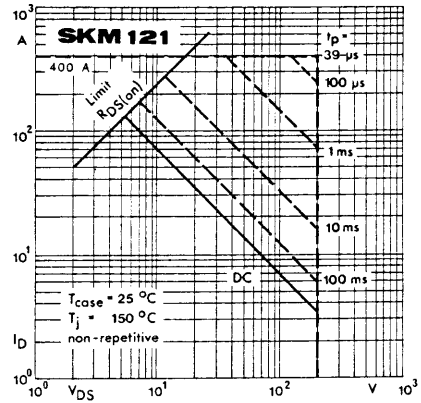


Fig. 2 Maximum safe operating area

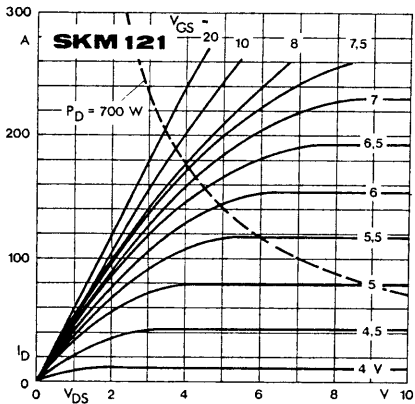


Fig. 3 Output characteristic

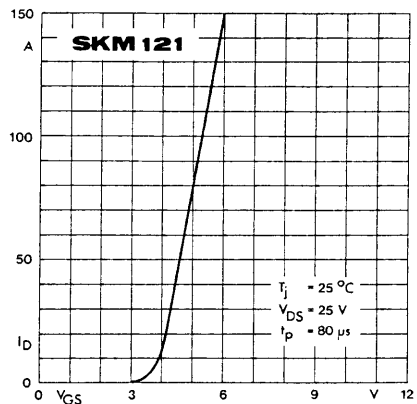


Fig. 4 Transfer characteristic

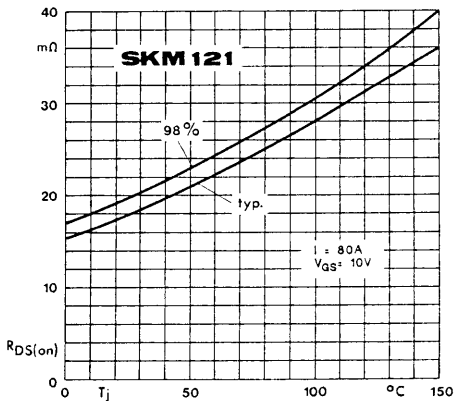


Fig. 5 On-resistance vs. temperature

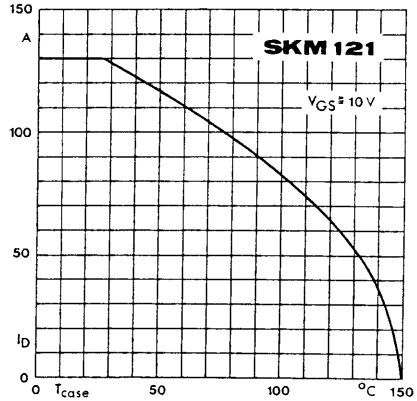


Fig. 6 Rated current vs. temperature

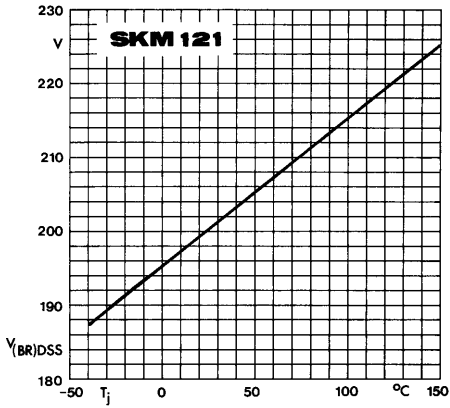


Fig. 7 Breakdown voltage vs. temperature

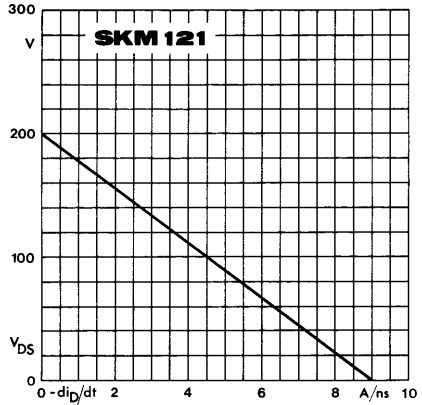


Fig. 8 Drain-source voltage derating

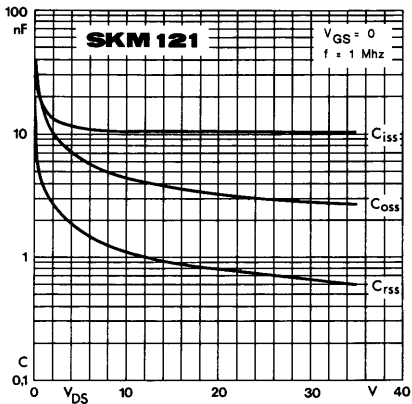


Fig. 9 Capacitances vs. drain-source voltage

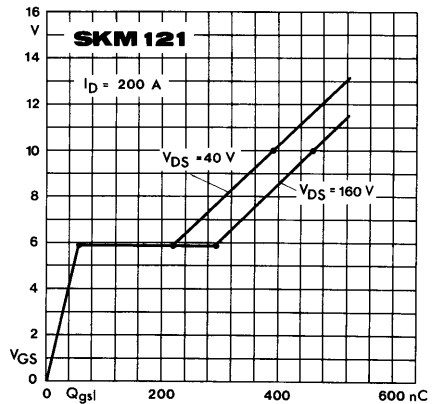


Fig. 10 Gate charge characteristic

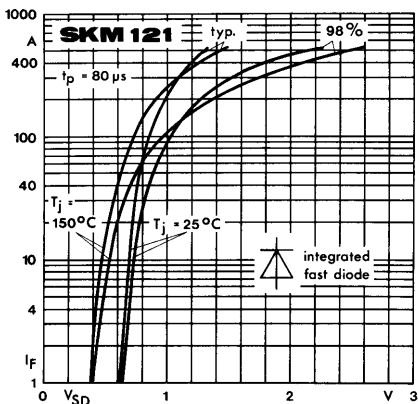


Fig. 11 Diode forward characteristic

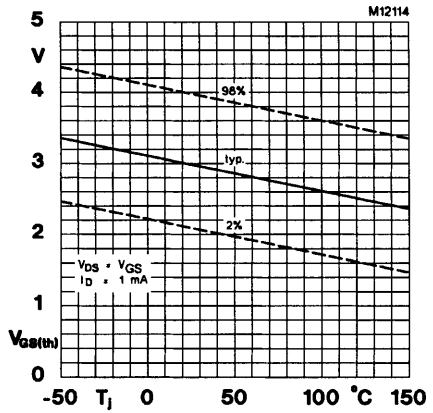


Fig. 14 Gate-source threshold voltage

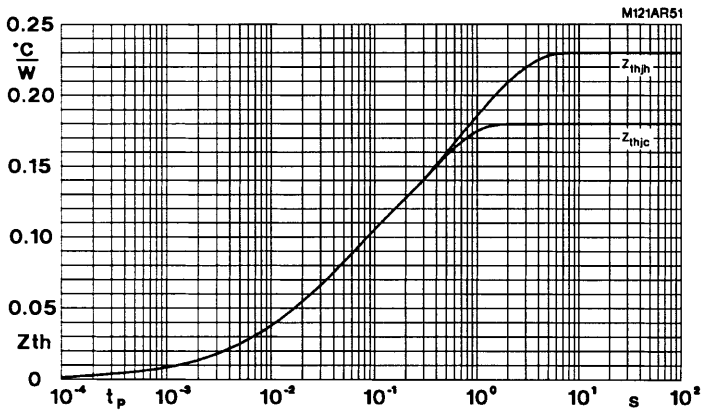


Fig. 51 Transient thermal impedance

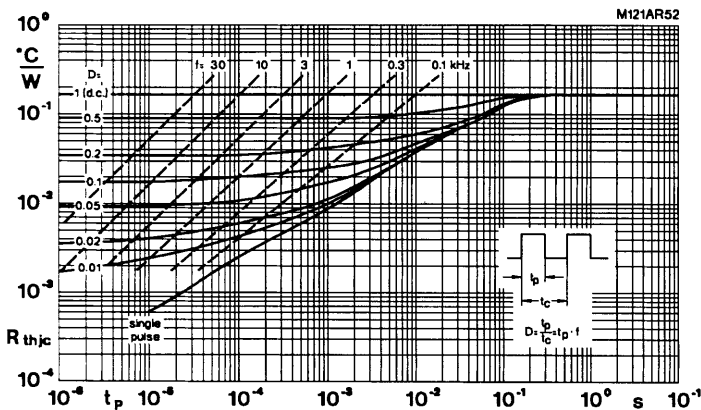


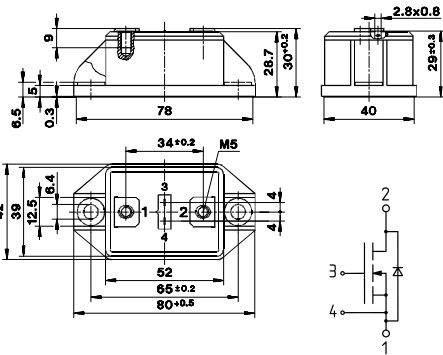
Fig. 52 Thermal impedance under pulse conditions

**SEMISTRANS® M1**

Case D 15  
 SKM 111 AR  
 SKM 121 AR  
 SKM 151 AR  
 SKM 180 A 020  
 SKM 181 A3 (R)

UL recognized  
 File No. E 63 532

CASED15



Dimensions in mm

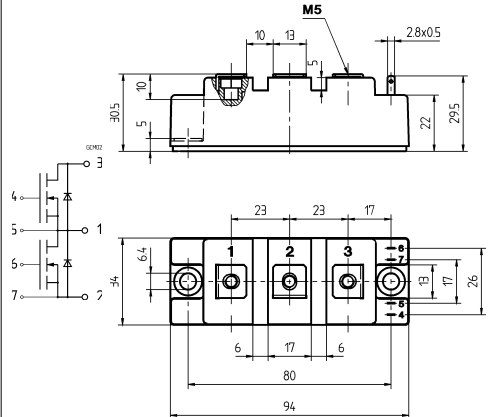
w = 130 g

**SEMISTRANS® M2**

Case D 70  
 SKM 120 B 020  
 SKM 204 A  
 SKM 214 A

UL recognized  
 File No. E 63 532

CASED70



Dimensions in mm

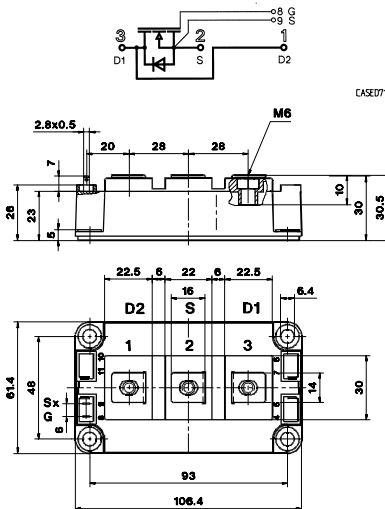
w = 160 g

**SEMISTRANS® M3**

(SINGLE)  
 Case D 71  
 SKM 453 A 020

UL recognized  
 File No. E 63 532

CASED71



→ B 5 – 18

Dimensions in mm

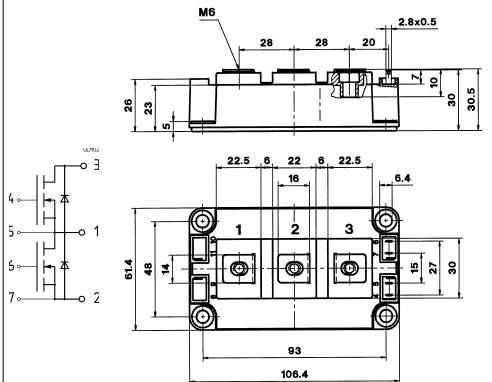
w = 325 g

**SEMISTRANS® 3**

(DUAL)  
 Case D 56  
 SKM 253 B 020  
 SKM 313 B 010

UL recognized  
 File No. E 63 532

CASED56



Dimensions in mm

w = 325 g