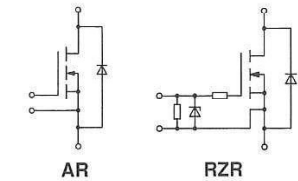
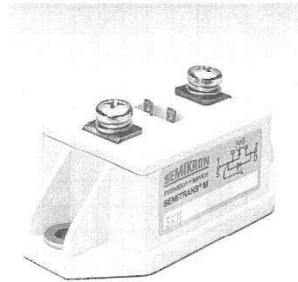


SEMITRANS® M Power MOSFET Modules

SKM 111 AR
SKM 111 RZR



Features

- N Channel, enhancement mode
- Avalanche characteristic
- Short connections and built-in gate resistors to suppress internal oscillations even in critical applications
- 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
- UPS equipment
- 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}	$R_{GS} = 20 \text{ k}\Omega$	100	V
V_{DGR}		100	V
I_D		200	A
I_{DM}		600	A
V_{GS}	AC, 1 min, 200 μ A	AR: ± 20 ; RZR: ± 15	V
P_D		700	W
T_j, T_{stg}		$-55 \dots +150$	$^{\circ}\text{C}$
V_{isol}		2 500	V
humidity	DIN 40 040	Class F	
climate	DIN IEC 68 T.1	55/150/56	
Inverse Diode			
$I_F = -I_D$		200	A
$I_{FM} = -I_{DM}$		600	A

Characteristics

Symbol	Conditions ¹⁾	min.	typ.	max.	Units
V(BR)DSS	V _{GS} = 0, I _D = 0,25 mA	100	—	—	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	—	50	250	μA
	V _{DS} = 100 V } T _J = 125 °C	—	300	1000	μA
I _{GSS} ³⁾	V _{GS} = 20 V, V _{DS} = 0	—	10	100	nA
R _{DS(on)}	V _{GS} = 10 V, I _D = 130 A	—	7	8,5	mΩ
g _{fs}	V _{DS} = 25 V, I _D = 130 A	60	75	—	S
C _{CHC}	} V _{GS} = 0 V _{DS} = 25 V f = 1 MHz	—	—	160	pF
C _{iss}		—	10	13	nF
C _{oss}		—	5	7,5	nF
C _{rss}		—	1,8	2,7	nF
L _{DS}		—	—	20	nH
t _{d(on)}	} V _{DD} = 50 V I _D = 130 A V _{GS} = 10 V R _{GS} = 3,3 Ω	—	60	—	ns
t _r		—	220	—	ns
t _{d(off)}		—	270	—	ns
t _f		—	200	—	ns
Inverse Diode					
V _{SD}	I _F = 400 A, V _{GS} = 0	—	1,25	1,6	V
t _{rr}	T _J = 25 °C ²⁾	—	400	—	ns
	T _J = 150 °C ²⁾	—	—	—	ns
Q _{rr}	T _J = 25 °C ²⁾	—	3,5	—	μC
	T _J = 150 °C ²⁾	—	—	—	

Thermal Characteristics

R_{thjc}	M1, surface 10 μ m	—	—	0,18	$^{\circ}\text{C/W}$
R_{thch}		—	—	0,05	$^{\circ}\text{C/W}$

Mechanical Data

M_1	to heatsink, SI Units	4	—	6	Nm
	to heatsink, US Units	35	—	53	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 6 – 69	AR: D 15; RZR: D 45			

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⁾ RZR: $V_{GS} = 12 \text{ V}; V_{DS} = 0; I_{GSS} = \text{typ. } 120 \mu\text{A}$

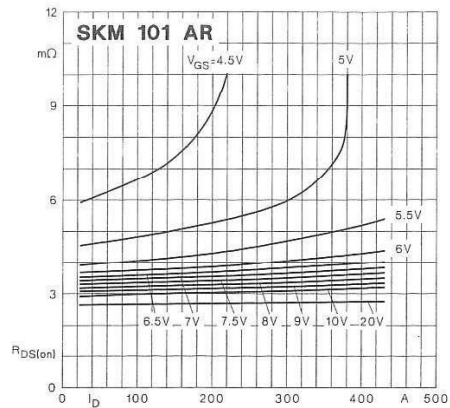


Fig. 13 On-resistance vs. drain current

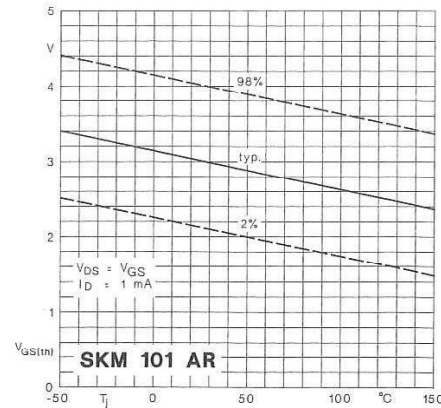


Fig. 14 Gate-source threshold voltage

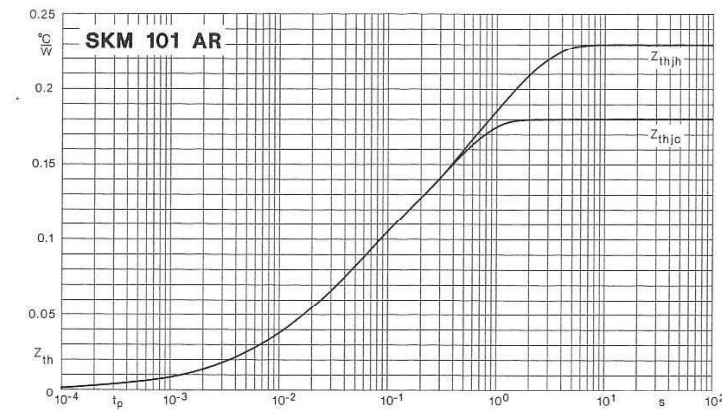


Fig. 51 Transient thermal impedance

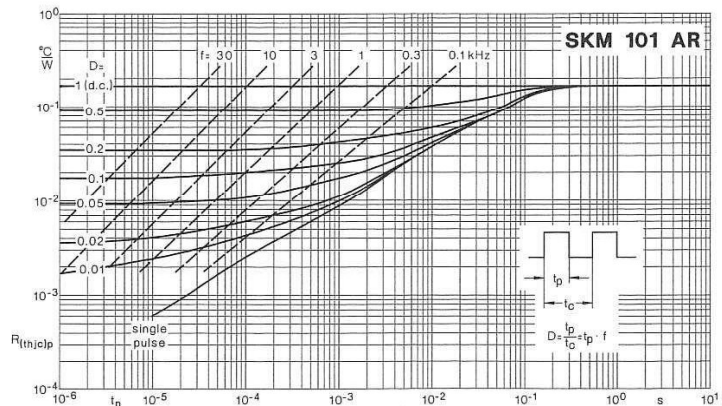


Fig. 52 Thermal impedance under pulse conditions

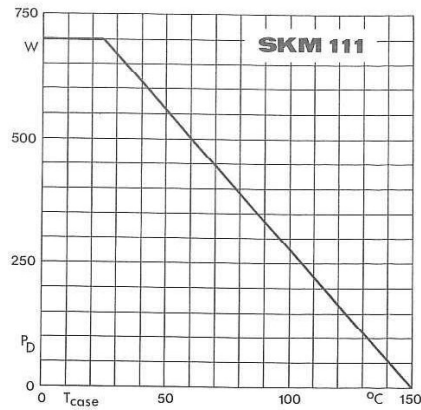


Fig. 1 Rated power dissipation vs. temperature

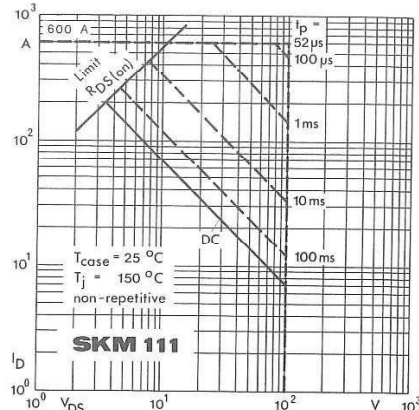


Fig. 2 Maximum safe operating area

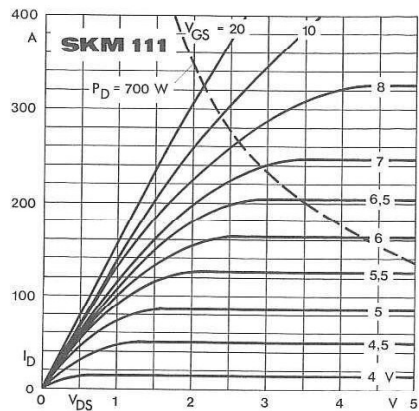


Fig. 3 Output characteristic

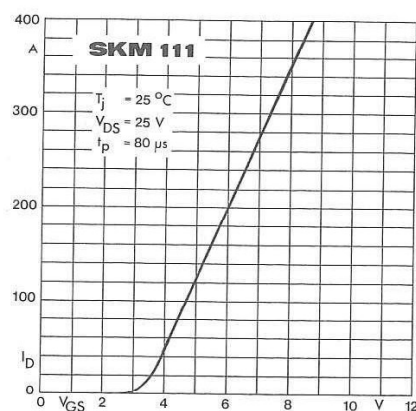


Fig. 4 Transfer characteristic

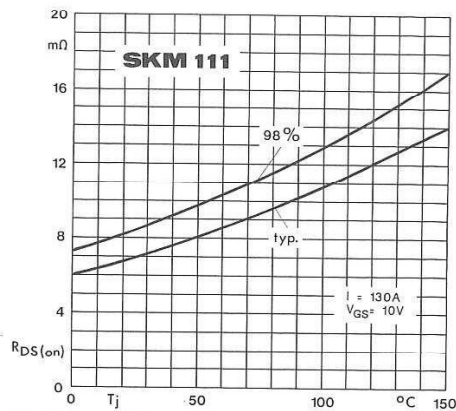


Fig. 5 On-resistance vs. temperature

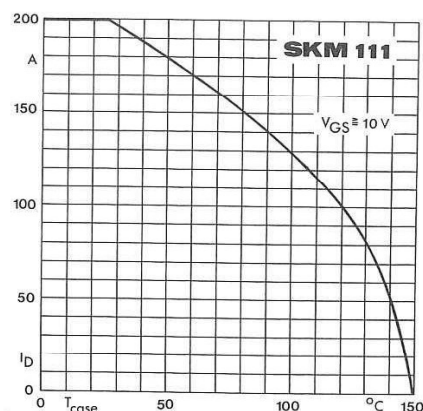


Fig. 6 Rated current vs. temperature

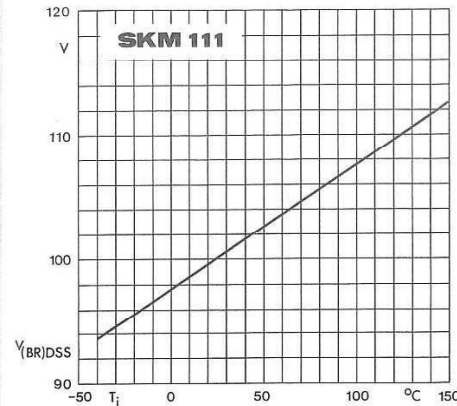


Fig. 7 Breakdown voltage vs. temperature

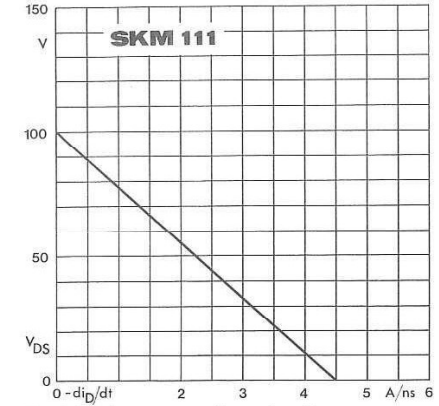


Fig. 8 Drain-source voltage derating

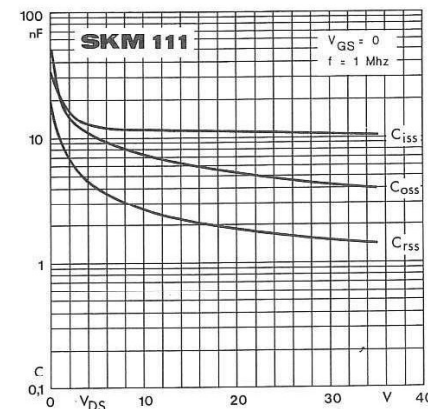


Fig. 9 Capacitances vs. drain-source voltage

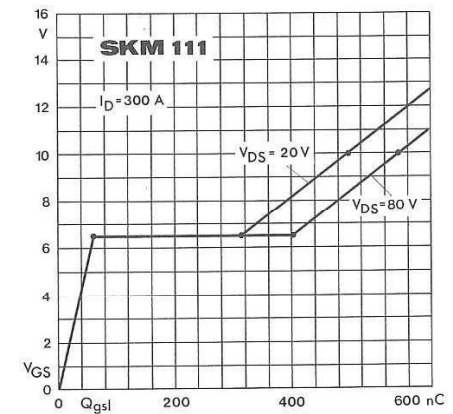


Fig. 10 Gate charge characteristic

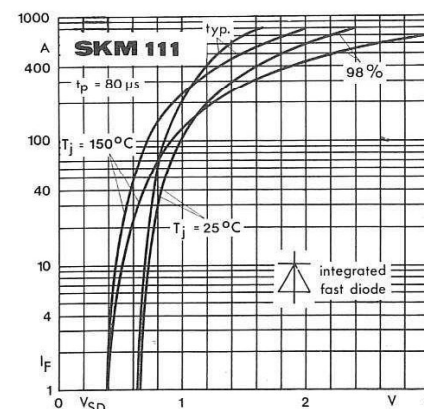


Fig. 11 Diode forward characteristic

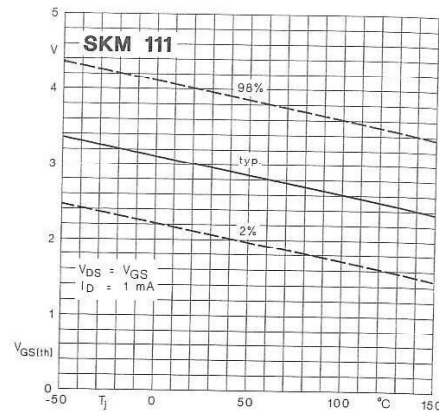


Fig. 14 Gate-source threshold voltage

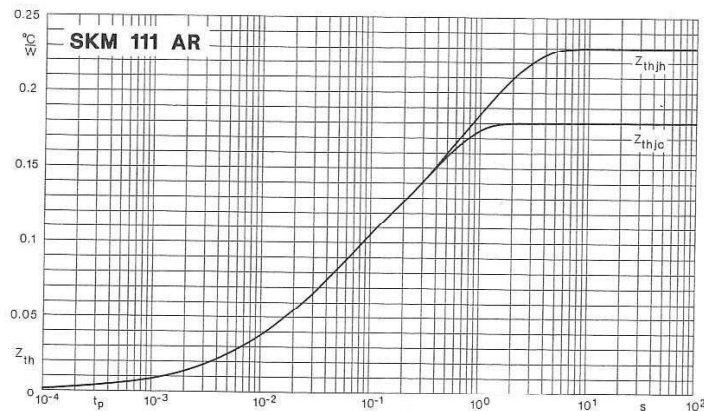


Fig. 51 Transient thermal impedance

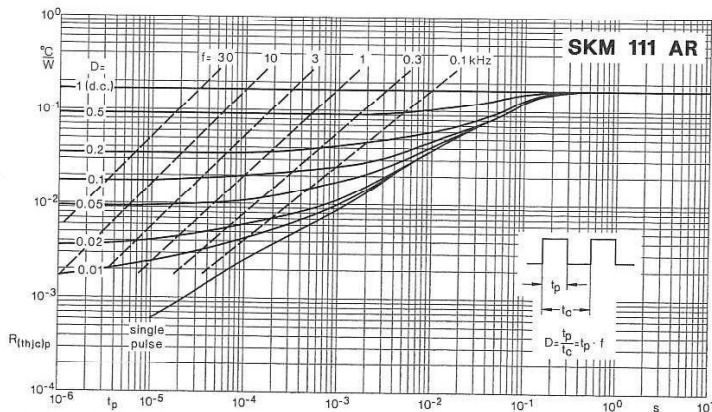


Fig. 52 Thermal impedance under pulse conditions

Absolute Maximum Ratings			
Symbol	Conditions ¹⁾	Values	Units
V _{DS}	R _G S = 20 kΩ	200	V
V _{DGR}		200	V
I _D		130	A
I _{DM}		390	A
V _{GS}		AR: ± 20; RZR: ⁺¹⁵ _{-0,3}	V
P _D	AC, 1 min, 200 μA DIN 40 040 DIN IEC 68 T.1	700	W
T _J , T _{stg}		- 55 ... +150	°C
V _{isol}		2 500	V
humidity		Class F	
climate		55/150/56	
Inverse Diode			
I _F = - I _D		130	A
I _{FM} = - I _{DM}		390	A

Characteristics		min.	typ.	max.	Units
Symbol	Conditions ¹⁾				
V _{(BR)DSS}	V _{GS} = 0, I _D = 0,25 mA	200	—	—	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	—	50	250	μA
	V _{DS} = 200 V, T _J = 125 °C	—	300	1000	μA
I _{GSS} ³⁾	V _{GS} = 20 V, V _{DS} = 0	—	10	100	nA
R _{DS(on)}	V _{GS} = 10 V, I _D = 80 A	—	18	20	mΩ
g _{fs}	V _{DS} = 25 V, I _D = 80 A	60	75	—	S

C _{CHC}	V _{GS} = 0 V _{DS} = 25 V f = 1 MHz	—	—	160	pF
C _{iss}		—	10	13	nF
C _{oss}		—	3	4,5	nF
C _{rss}		—	0,7	1	nF
L _{DS}		—	—	20	nH

t _{d(on)}	V _{DD} = 100 V I _D = 80 A	—	60	—	ns
t _r		—	60	—	ns
t _{d(off)}	V _{GS} = 10 V R _{GS} = 3,3 Ω	—	240	—	ns
t _f		—	70	—	ns

Inverse Diode					
V _{SD}	I _F = 260 A, V _{GS} = 0	—	1,05	1,4	V
t _{rr}	T _J = 25 °C ²⁾	—	400	—	ns
	T _J = 150 °C ²⁾	—	—	—	ns
Q _{rr}	T _J = 25 °C ²⁾	—	4,3	—	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	—	6	Nm
	to heatsink, US Units	35	—	53	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 6 – 69	AR: D 15; RZR: D 45			

¹⁾ T_{case} = 25 °C, unless otherwise specified.

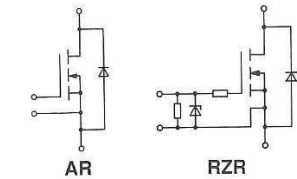
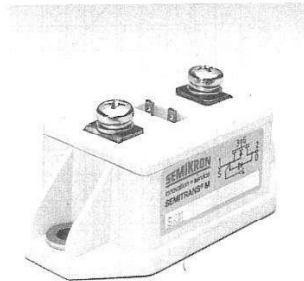
²⁾ I_F = - I_D, V_R = 100 V, - di_F/dt = 100 A/μs

³⁾ RZR: V_{GS} = 12 V; V_{DS} = 0; I_{GSS} = typ. 120 μA

SEMIKRON

SEMITRANS® M Power MOSFET Modules

SKM 121 AR
SKM 121 RZR



Features

- N Channel, enhancement mode
- Avalanche characteristic
- Short internal connections avoid oscillations
- Switching kW's in less than 1 μs
- 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
- 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.

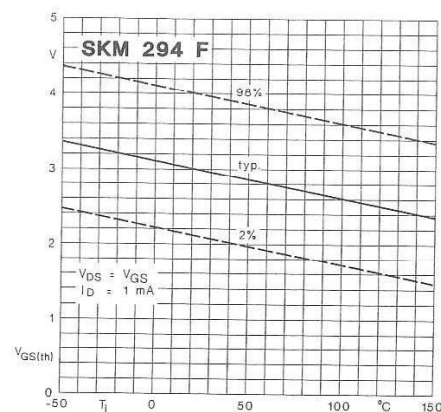


Fig. 14 Gate-source threshold voltage

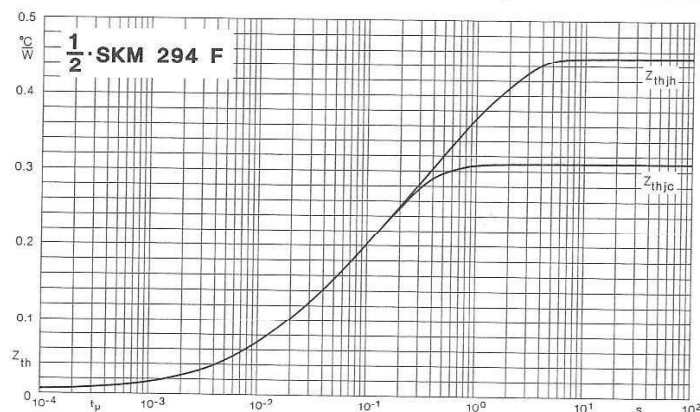


Fig. 51 Transient thermal impedance

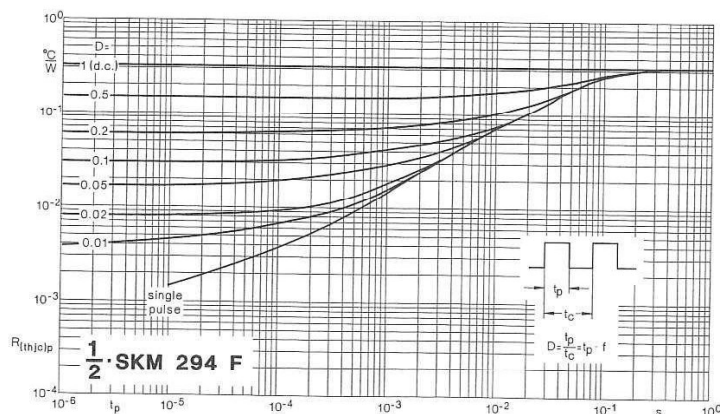
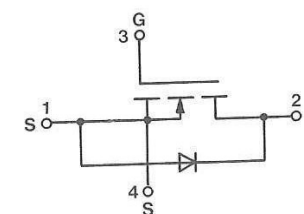
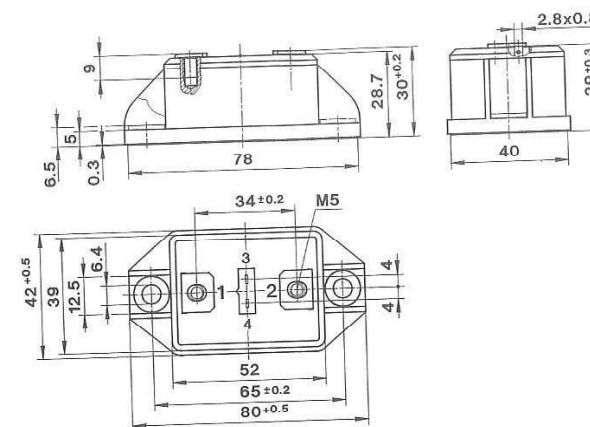


Fig. 52 Thermal impedance under pulse conditions

SKM 101 AR
SKM 111 AR
SKM 121 AR
SKM 141
SKM 151
SKM 151 F
SKM 181
SKM 181 F
SKM 191
SKM 191 F

Case D 15

UL recognized, file no. E 63 532



Dimensions in mm

SKM 101 RZR
SKM 111 RZR
SKM 121 RZR

Case D 45 (→ D 15)

