

Absolute Maximum Ratings		Values		Units
Symbol	Conditions ¹⁾	... 101 D	... 121 D	
V _{CES}		1000	1200	V
V _{CGR}	R _{GE} = 20 kΩ	1000	1200	V
I _C	T _{case} = 25/80 °C	22/15		A
I _{CM}	T _{case} = 25/80 °C	44/30		A
V _{GES}		± 20		V
P _{tot}	per IGBT, T _{case} = 25 °C	150		W
T _J , T _{slg}		- 55 ... +150		°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 _C		22		A
I _{FM} = - I _{CM}		44		A

Characteristics		min. typ. max.			Units
Symbol	Conditions ¹⁾	min.	typ.	max.	
V _{(BR)CES}	V _{GE} = 0, I _C = 0,5 mA	≥ V _{CES}	—	—	V
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 1 mA	4,5	5,5	6,5	V
I _{CES}	V _{GE} = 0 } T _J = 25 °C	—	—	0,5	mA
	V _{CE} = V _{CES} } T _J = 125 °C	—	—	2	
I _{GES}	V _{GE} = 20 V, V _{CE} = 0	—	—	100	nA
V _{CEsat}	V _{GE} = 15 V } T _J = 25 °C	—	3,5	4	V
	I _C = 22 A } T _J = 150 °C	—	4,9	5,5	
g _{fs}	V _{CE} = 20 V, I _C = 22 A	5,5	9	—	S

C _{CHC}	per IGBT	—	—	60	pF
C _{ies}	V _{GE} = 0	—	2	—	nF
C _{oes}	V _{CE} = 25 V	—	160	—	pF
C _{res}	f = 1 MHz	—	65	—	pF
L _{CE}		—	—	20	nH

t _{d(on)}	V _{CC} = 600 V	—	40 ³⁾	—	ns
t _r	V _{GE} = 15 V	—	100 ³⁾	—	ns
t _{d(off)}	I _C = 22 A	—	150 ^{3)/150} ⁴⁾	—	ns
t _f	R _{Gon} = R _{Goff} = 3,3 Ω	—	500 ^{3)/100} ⁴⁾	—	ns
W _{off12} ⁵⁾	T _J = 125 °C	—	1,3 ⁴⁾	—	mWs
W _{off23} ⁵⁾		—	0,7 ⁴⁾	—	mWs

Inverse Diode SKM 22 GD 101 D					
V _F = V _{EC}	I _F = 22 A, V _{GE} = 0; (T _J = 125 °C)	—	2,2 (1,8)	2,7	V
t _{rr}	T _J = 25 °C ²⁾	—	—	—	ns
	T _J = 125 °C ²⁾	—	100	—	ns
Q _{rr}	T _J = 25/125 °C ²⁾	—	1/4	—	μC
f _s	f _s = t _f / (t _{rr} - t _f)	—	1 ²⁾	—	

Inverse Diode SKM 22 GD 121 D					
V _F = V _{EC}	I _F = 22 A, V _{GE} = 0; (T _J = 125 °C)	—	2,7 (2,2)	3,2	V
t _{rr}	T _J = 25 °C ²⁾	—	—	—	ns
	T _J = 125 °C ²⁾	—	120	—	ns
Q _{rr}	T _J = 25/125 °C ²⁾	—	1,1/4,5	—	μC
f _s	f _s = t _f / (t _{rr} - t _f)	—	1 ²⁾	—	

Thermal Characteristics					
R _{thjc}	per IGBT	—	—	0,8	°C/W
R _{thjc}	per diode	—	—	1,3	°C/W
R _{thch}	per module	—	—	0,05	°C/W

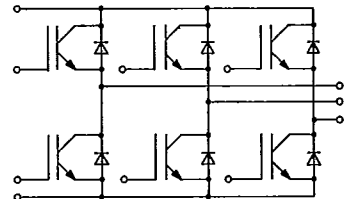
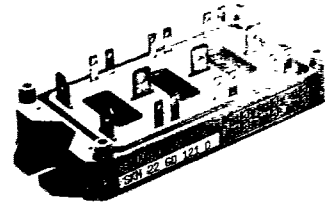
Cases and mechanical data see page B 6 – 78

¹⁾ T_{case} = 25 °C, unless otherwise specified²⁾ I_F = - I_C, V_R = 600 V, - di_F/dt = 800 A/μs, V_{GE} = 0³⁾ resistive load⁴⁾ inductive load⁵⁾ see fig. 21; R_{Goff} = 19 ΩSEMITRANS® M
IGBT Modules

SKM 22 GD 101 D

SKM 22 GD 121 D

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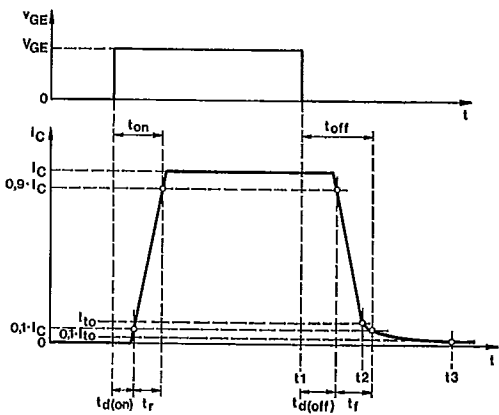


Features

- MOS input (voltage controlled)
- N channel
- Low saturation voltage
- Very low tail current
- Low temperature sensitivity
- Breakdown proof
- High short circuit capability
- No latch-up
- Fast inverse diodes
- Isolated copper baseplate
- Large clearances and creepage distances
- UL recognized, file no. E 63 532

Typical Applications

- DC servo and robot drives
- Self-commutated inverters
- AC motor speed control
- Uninterruptible power supplies
- General power switching applications
- Pulse frequencies above 15 kHz



$$W_{off 12} = \int_{t_1}^{t_2} I_C \cdot V_{CE} \cdot dt$$

$$W_{off 23} = \int_{t_2}^{t_3} I_C \cdot V_{CE} \cdot dt$$

Fig. 21 Switching times and turn-off energies

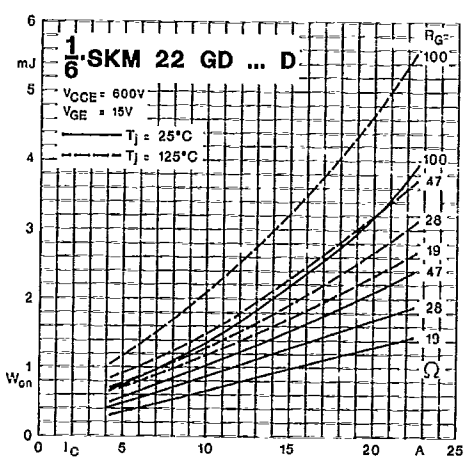
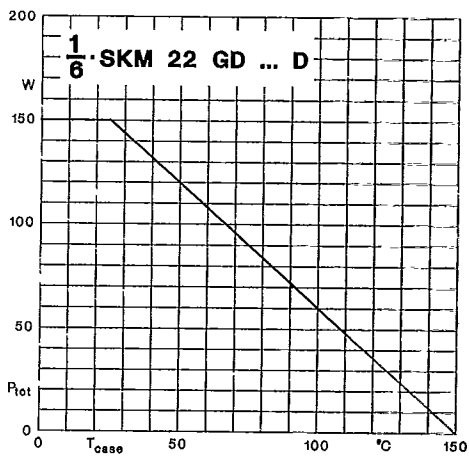


Fig. 23 Turn-on energy dissipation per pulse

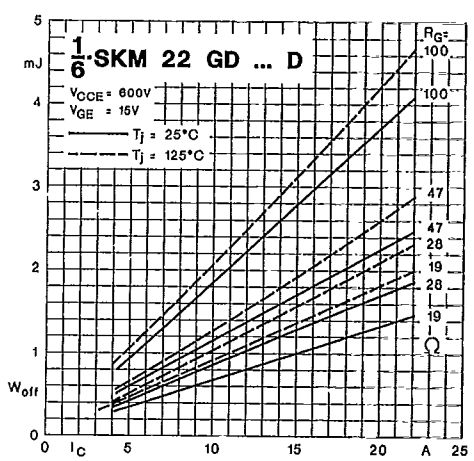


Fig. 24 Turn-off energy dissipation per pulse

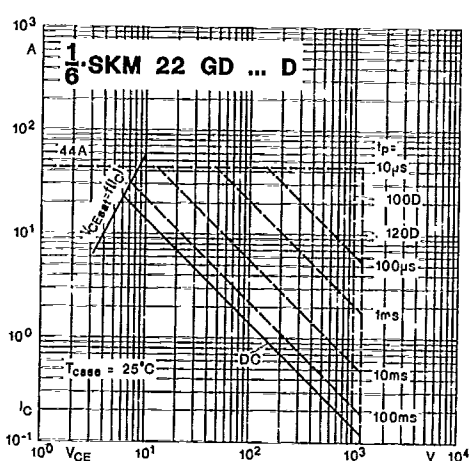


Fig. 25 Maximum safe operating area

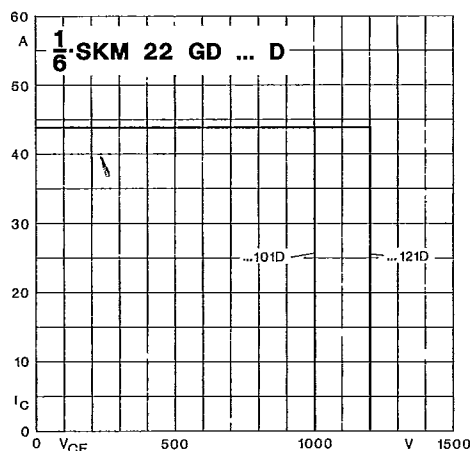


Fig. 26 Turn-off safe operating area

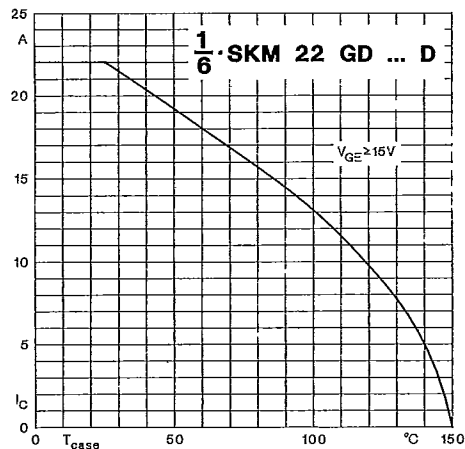


Fig. 28 Rated current vs. temperature

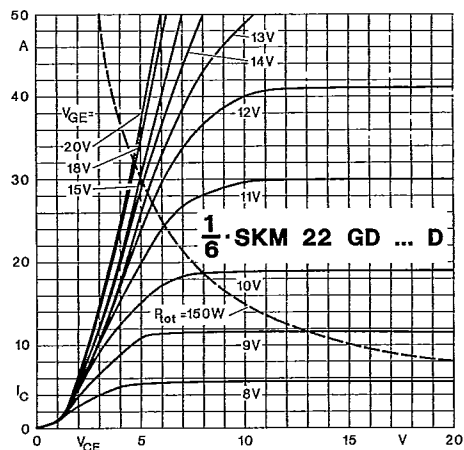


Fig. 30 Output characteristic

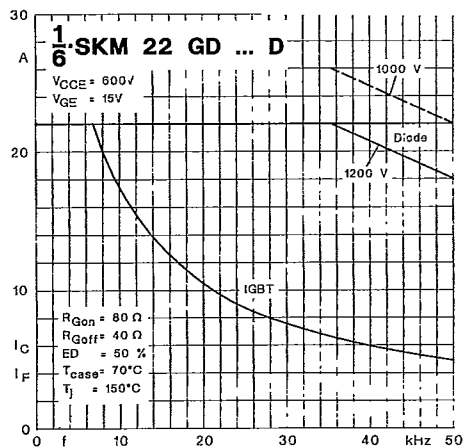


Fig. 27 Rated current vs. pulse frequency

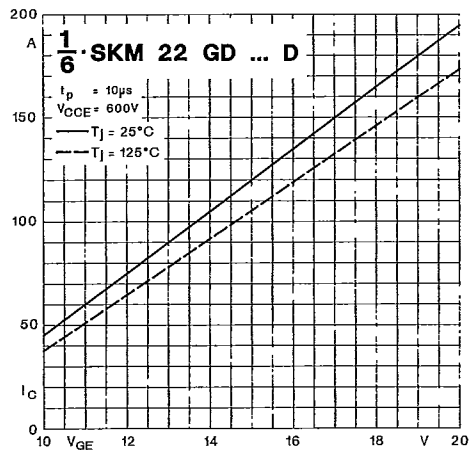


Fig. 29 Short-circuit current vs. turn-on gate voltage

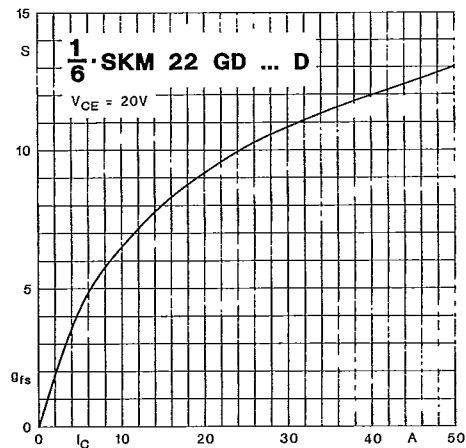


Fig. 31 Forward transconductance

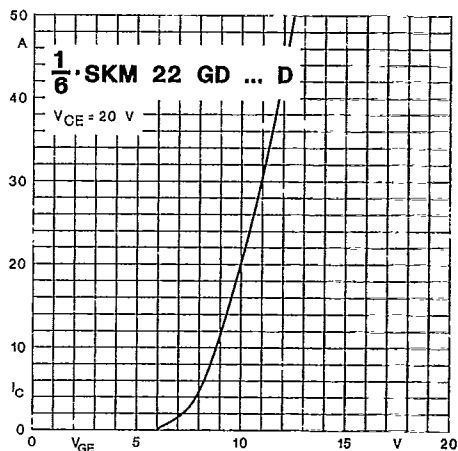


Fig. 32 Transfer characteristic

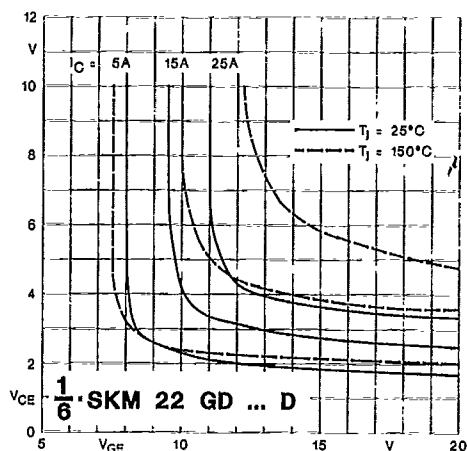


Fig. 33 Saturation characteristics

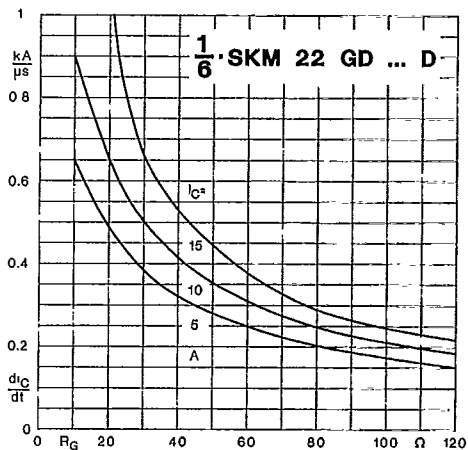


Fig. 34 Rate of rise of collector current

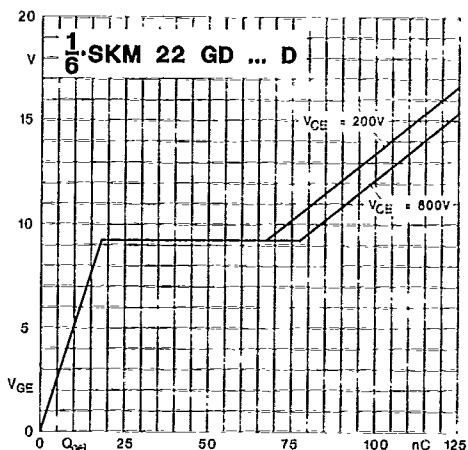


Fig. 35 Gate charge characteristic

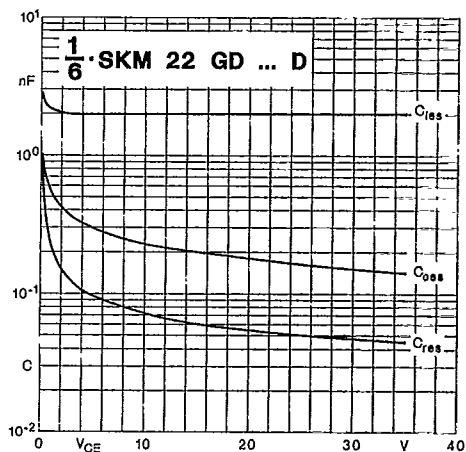


Fig. 36 Capacitances vs. collector-emitter voltage

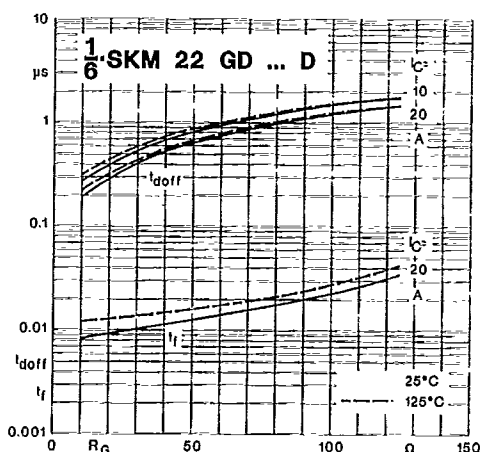


Fig. 37 Switching times vs. gate resistor

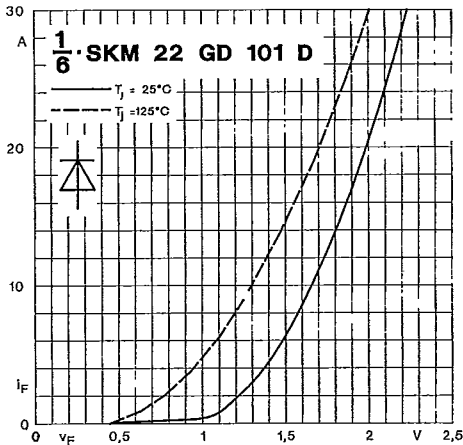


Fig. 38 a Diode forward characteristic

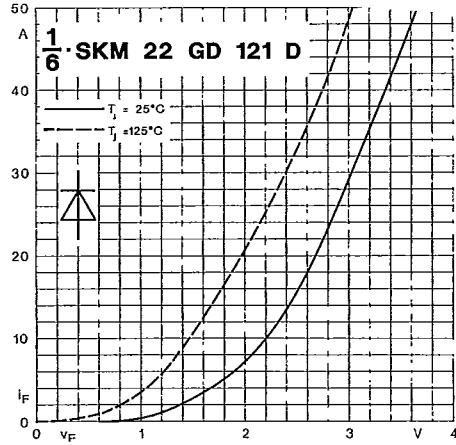


Fig. 38 b Diode forward characteristic

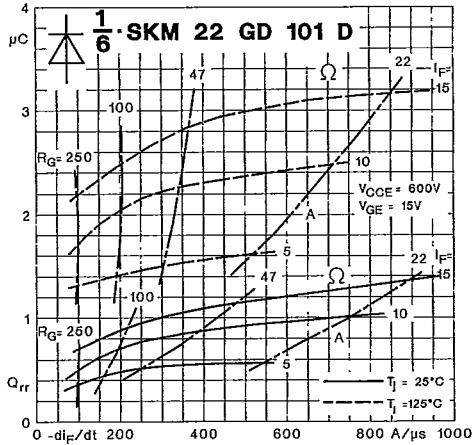


Fig. 39 a Diode recovered charge

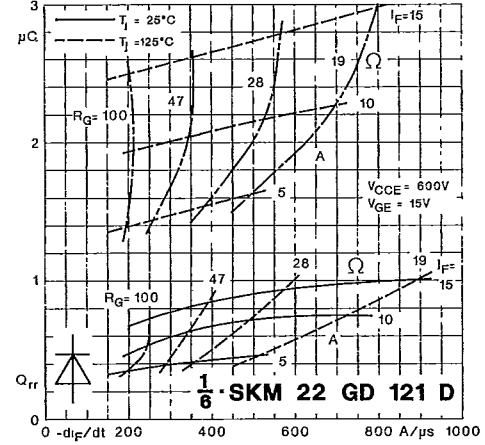


Fig. 39 b Diode recovered charge

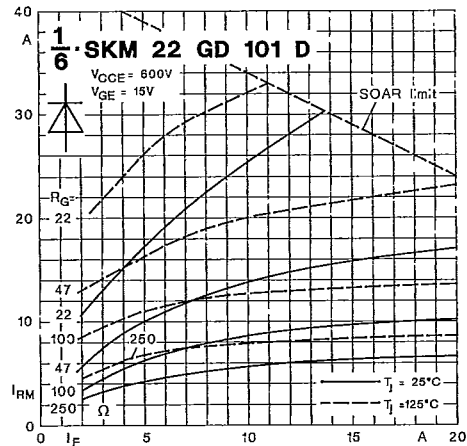


Fig. 40 a Diode peak reverse recovery current (I_F)

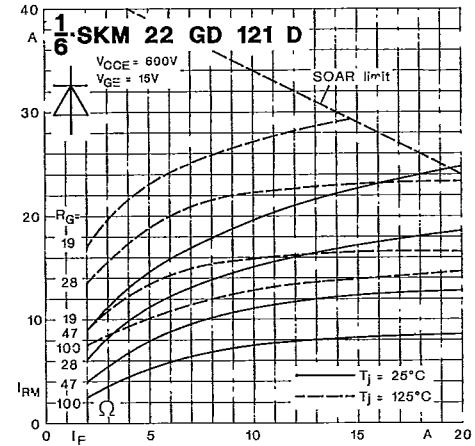


Fig. 40 b Diode peak reverse recovery current (I_F)

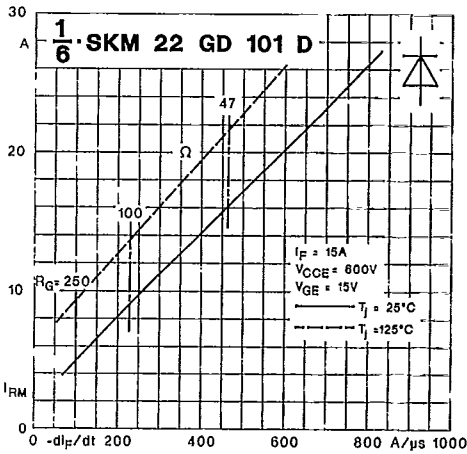
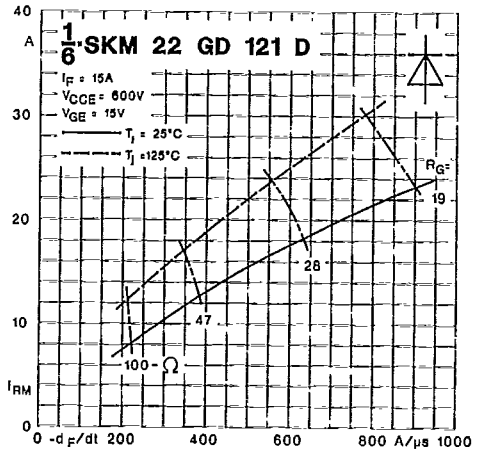
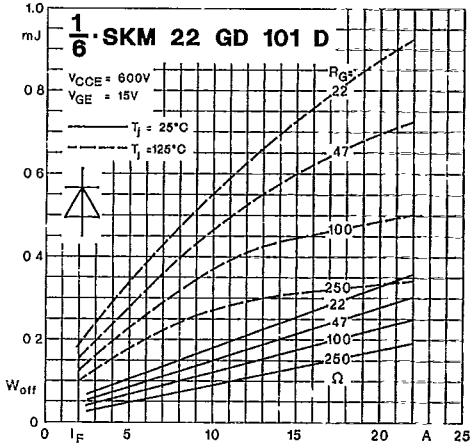

Fig. 41 a Diode peak reverse recovery current ($-di_F/dt$)

Fig. 41 b Diode peak reverse recovery current ($-di_F/dt$)


Fig. 42 a Diode turn-off energy dissipation per pulse

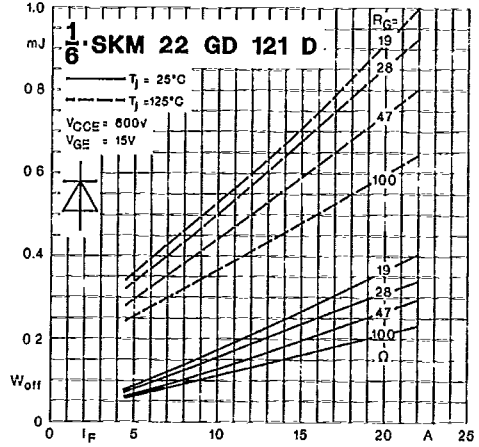
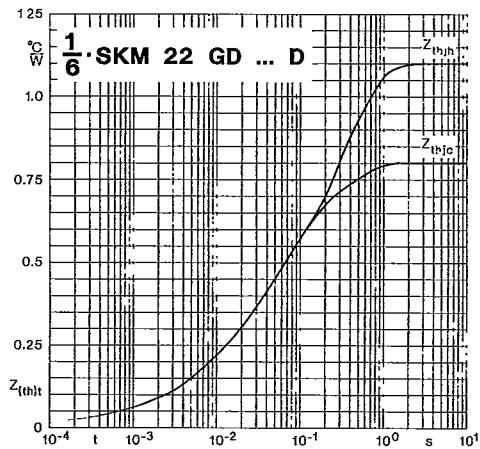


Fig. 42 b Diode turn-off energy dissipation per pulse



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Fig. 51 Transient thermal impedance

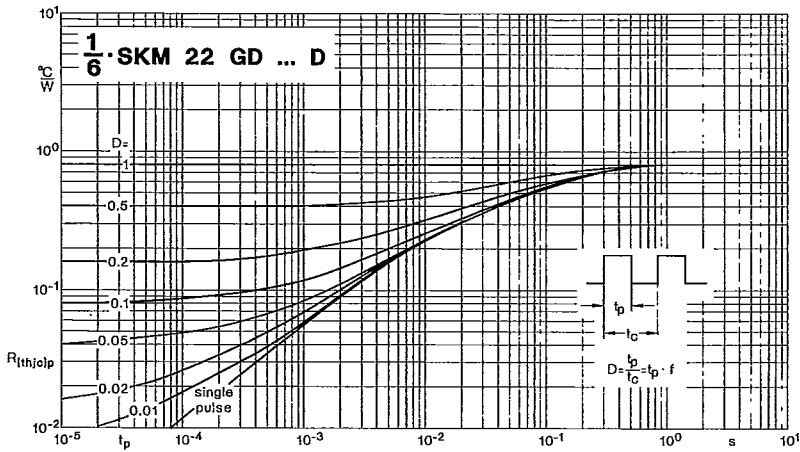


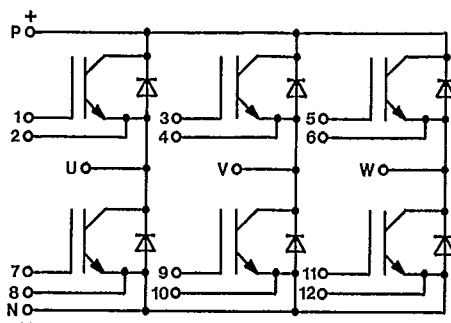
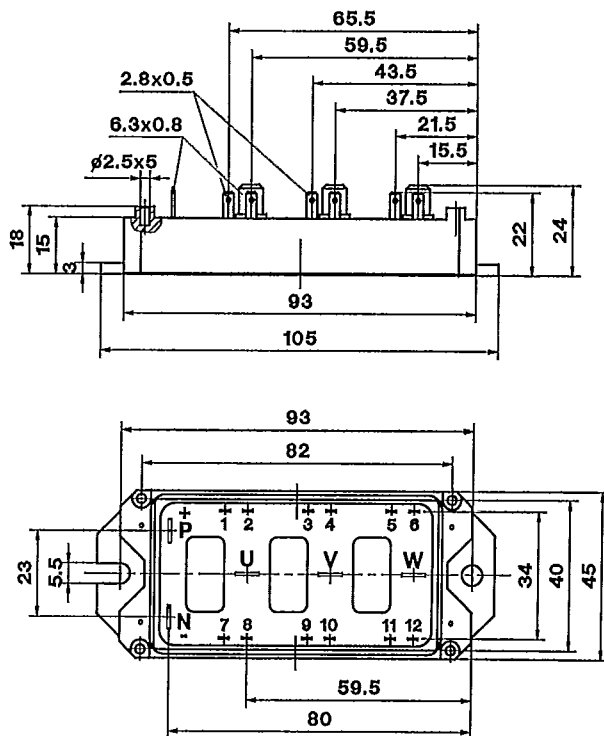
Fig. 52 Thermal impedance under pulse conditions

UL recognized, file no. E 63 532

SKM 22 GD 101 D

SKM 22 GD 121 D

Case D 28



Dimensions in mm

Mechanical Data		Values			Units
Symbol	Conditions	min.	typ.	max.	
M ₁	to heatsink, SI Units	4	—	6	Nm
	to heatsink, US Units	35	—	53	lb.in.
a		—	—	5x9,81	m/s ²
w		—	—	190	g

This is an electrostatic discharge sensitive device (ESDS). Please observe the international standard IEC 747-1, Chapter IX.