

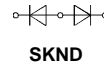
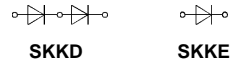
## SEMI<sup>®</sup>PACK® 1 Rectifier Diode Modules

**SKKD 46**     **SKKD 81**  
**SKND 46**<sup>1)</sup>    **SKKE 81**  
                         **SKND 81**<sup>1)</sup>



V <sub>RSM</sub>	V <sub>RRM</sub>	I <sub>FRMS</sub> (maximum values for continuous operation)		
		90 A	140 A	140 A
V	V	I <sub>FAV</sub> (sin. 180; T <sub>case</sub> = . . .)		
		57 A (71 °C)	90 A (80 °C)	90 A (80 °C)
500	400	<b>SKKD 46/04</b>	<b>SKKD 81/04</b>	<b>SKKE 81/04</b>
700	600	<b>SKKD 46/06</b>	<b>SKKD 81/06</b>	<b>SKKE 81/06</b>
900	800	<b>SKKD 46/08</b>	<b>SKKD 81/08</b>	<b>SKKE 81/08</b>
1300	1200	<b>SKKD 46/12</b>	<b>SKKD 81/12</b>	<b>SKKE 81/12</b>
1500	1400	<b>SKKD 46/14</b>	<b>SKKD 81/14</b>	<b>SKKE 81/14</b>
1700	1600	<b>SKKD 46/16</b>	<b>SKKD 81/16</b>	<b>SKKE 81/16</b>
1900	1800	<b>SKKD 46/18</b>	<b>SKKD 81/18</b>	<b>SKKE 81/18</b>
2100	2000	–	<b>SKKD 81/20</b>	<b>SKKE 81/20</b>
2300	2200	–	<b>SKKD 81/22</b>	<b>SKKE 81/22</b>

Symbol	Conditions	SKKD 46	SKKD 81 SKKE 81	Units
I <sub>FAV</sub> I <sub>D</sub> <sup>1)</sup>	sin. 180 (T <sub>case</sub> = . . .) B2/B6   T <sub>amb</sub> = 45 °C; P 3/120 P 3/180   T <sub>amb</sub> = 35 °C; P 3/180 F	45(86 °C) 50/60 54/66 95/120	80(87 °C) 63/70 70/85 135/175	A A A A
I <sub>FSM</sub>	T <sub>vj</sub> = 25 °C; 10 ms T <sub>vj</sub> = 125 °C; 10 ms	700 600	2 000 1 750	A A
i <sup>2</sup> t	T <sub>vj</sub> = 25 °C; 8,3 ... 10 ms T <sub>vj</sub> = 125 °C; 8,3 ... 10 ms	2 450 1 800	20 000 15 000	A <sup>2</sup> s A <sup>2</sup> s
I <sub>RD</sub>	T <sub>vj</sub> = 125 °C; V <sub>RD</sub> = V <sub>RRM</sub>	3	4,5	mA
V <sub>F</sub>	T <sub>vj</sub> = 25 °C (I <sub>F</sub> = . . .); max.	1,95 (250 A)	1,55 (300 A)	V
V <sub>(TO)</sub>	T <sub>vj</sub> = 125 °C	0,85	0,85	V
r <sub>T</sub>	T <sub>vj</sub> = 125 °C	5	1,8	mΩ
R <sub>thjc</sub> R <sub>thch</sub> T <sub>vj</sub> T <sub>stg</sub>	} per diode/per module <sup>2)</sup>	0,6/0,3 0,2/0,1	0,4/0,2 0,2/0,1	°C/W °C/W
T <sub>vj</sub>		– 40 ... +125		°C
T <sub>stg</sub>		– 40 ... +125		°C
V <sub>isol</sub>		a. c. 50 Hz; r.m.s.; 1 s/1 min to heatsink } SI (US) units M1 to terminals } M2 a w approx.	3600/3000	
M1	5 (44 lb. in.) ± 15 % <sup>3)</sup>		Nm	
M2	3 (26 lb. in.) ± 15 % <sup>3)</sup>		Nm	
a	5 · 9,81		m/s <sup>2</sup>	
w			120	g
Case	→ page B 1 – 93	SKKD 46: A 10 SKND 46: A 19	SKKD 81: A 10 SKKE 81: A 12 SKND 81: A 19	



### Features

- Heat transfer through aluminium oxide ceramic isolated metal baseplate
- Hard soldered joints for high reliability
- UL recognized, file no. E 63 532

### Typical Applications

- Non-controllable rectifiers for AC/AC converters
- Line rectifiers for transistorized AC motor controllers
- Field supply for DC motors
- SKKE: Free-wheeling diodes

<sup>1)</sup> SKND 46 and SKND 81 available on request

<sup>2)</sup> SKKD types only

<sup>3)</sup> See the assembly instructions

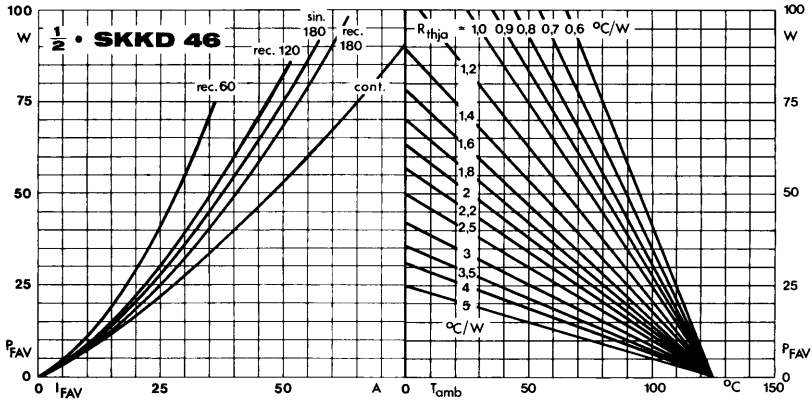


Fig. 11 a Power dissipation per diode vs. forward current and ambient temperature

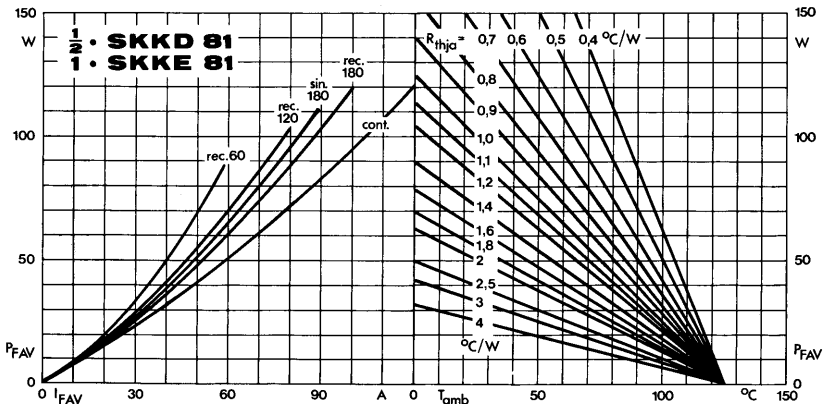


Fig. 11 b Power dissipation per diode vs. forward current and ambient temperature

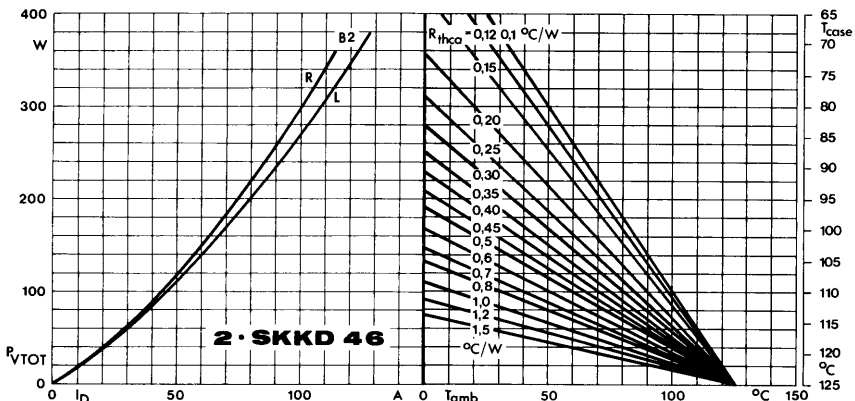


Fig. 12 a Power dissipation of two modules vs. direct current and case temperature

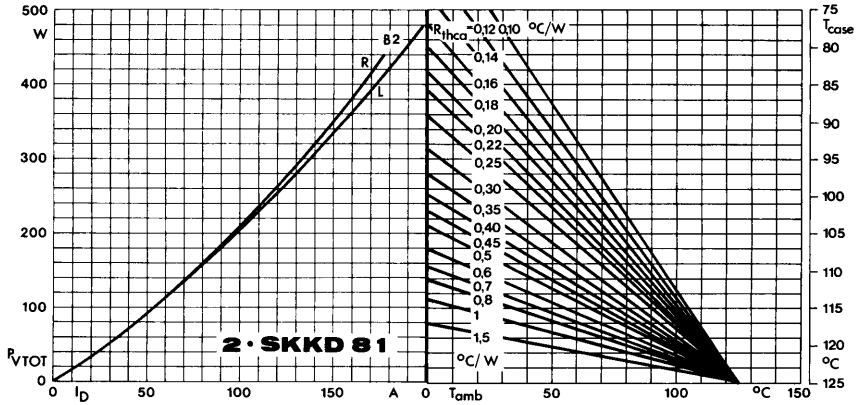


Fig. 12 b Power dissipation of two modules vs. direct current and case temperature

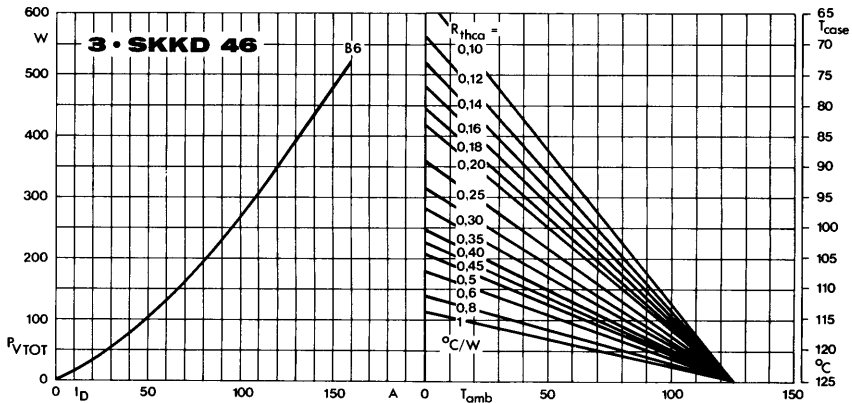


Fig. 13 a Power dissipation of three modules vs. direct current and case temperature

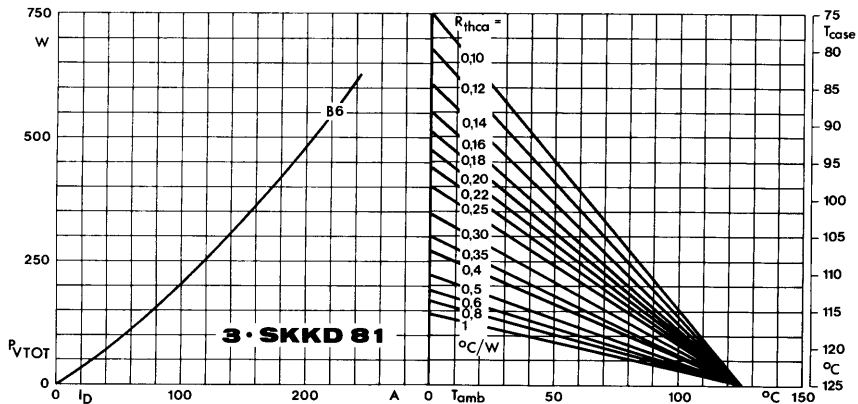


Fig. 13 b Power dissipation of three modules vs. direct current and case temperature

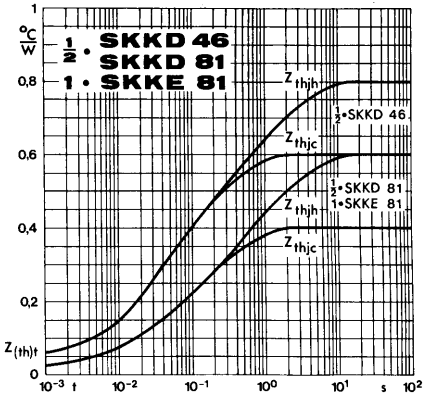


Fig. 14 Transient thermal impedance vs. time

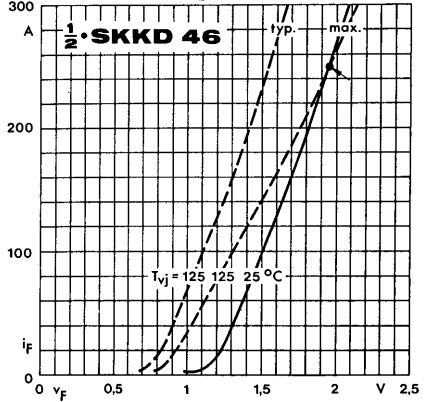


Fig. 15 a Forward characteristics

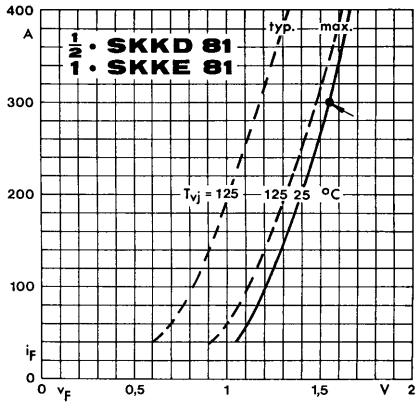


Fig. 15 b Forward characteristics

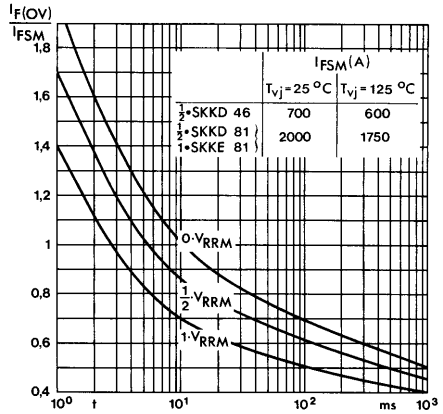


Fig. 16 Surge overload current vs. time

## Rectifier Diode Modules

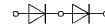
**SEMIPACK® 1**  
**SKKD 100**    **SKMD 100<sup>1)</sup>**

**SEMIPACK® 2**  
**SKKD 162**    **SKND 162<sup>1)</sup>**  
**SKKE 162**



V <sub>RSM</sub>	V <sub>RRM</sub>	I <sub>FRMS</sub> (maximum values for continuous operation)		
		175 A	250 A	250 A
V	V	I <sub>FAV</sub> (sin. 180; T <sub>case</sub> = ...)		
		100 A (85 °C)	160 A (95 °C)	160 A (95 °C)
500	400	<b>SKKD 100/04</b>	–	–
900	800	<b>SKKD 100/08</b>	<b>SKKD 162/08</b>	<b>SKKE 162/08</b>
1300	1200	<b>SKKD 100/12</b>	<b>SKKD 162/12</b>	<b>SKKE 162/12</b>
1500	1400	<b>SKKD 100/14</b>	<b>SKKD 162/14</b>	<b>SKKE 162/14</b>
1700	1600	<b>SKKD 100/16</b>	<b>SKKD 162/16</b>	<b>SKKE 162/16</b>
1900	1800	<b>SKKD 100/18</b>	<b>SKKD 162/18</b>	<b>SKKE 162/18</b>
2100	2000	–	<b>SKKD 162/20</b>	<b>SKKE 162/20</b>
2300	2200	–	<b>SKKD 162/22</b>	<b>SKKE 162/22</b>

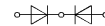
Symbol	Conditions	SKKD 100	SKKD 162 SKKE 162	Units	
I <sub>FAV</sub> I <sub>D</sub> <sup>1)</sup>	sin. 180; (T <sub>case</sub> = ...) B2/B6   T <sub>amb</sub> = 45 °C, P 3/180   T <sub>amb</sub> = 35 °C, P 3/180F   P16/200F	100 (85°C) 73/91 150/190 –	160 (95°C) 90/115 210/260 320/425	A A A A	
I <sub>FSM</sub>	T <sub>vj</sub> = 25 °C; 10 ms T <sub>vj</sub> = 125 °C; 10 ms	2500 2000	6000 5000	A A	
i <sup>2</sup> t	T <sub>vj</sub> = 25 °C; 8,3 ... 10 ms T <sub>vj</sub> = 125 °C; 8,3 ... 10 ms	31 250 20 000	180 000 125 000	A <sup>2</sup> s A <sup>2</sup> s	
I <sub>RD</sub>	T <sub>vj</sub> max.; V <sub>RD</sub> = V <sub>RRM</sub>	5	9	mA	
V <sub>F</sub>	T <sub>vj</sub> = 25 °C (I <sub>F</sub> = ...); max.	1,35 (300 A)	1,5 (500 A)	V	
V <sub>(TO)</sub>	T <sub>vj</sub> max	0,85	0,85	V	
r <sub>T</sub>	T <sub>vj</sub> max	1,3	1,2	mΩ	
R <sub>thjc</sub> R <sub>thch</sub> T <sub>vj</sub> T <sub>stg</sub>	} per diode/per module <sup>2)</sup>	0,35/0,175 0,2/0,1 – 40 ... +125 – 40 ... +125	0,18/0,09 0,10/0,05 – 40 ... +135 – 40 ... +135	°C/W °C/W °C °C	
V <sub>isol</sub>		a. c. 50 Hz; r.m.s.; 1 s/1 min	3600/3000		V~
M <sub>1</sub>		to heatsink	SI units US units	5 ± 15 % 44 ± 15 %	Nm lb.in.
M <sub>2</sub>		to terminals	SI units US units	3 ± 15 % <sup>3)</sup> 26 ± 15 % <sup>3)</sup>	5 ± 15 % <sup>3)</sup> 44 ± 15 % <sup>3)</sup> Nm lb.in.
a w	approx.	5 · 9,81 120	5 · 9,81 250	m/s <sup>2</sup> g	
Case	→ page B 1 – 93; 94	SKKD 100: A 10 (B 1 – 42: SKMD 100: A 33)	SKKD 162: A 23 SKKE 162: A 24 SKMD 162: A 57		



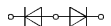
**SKKD**



**SKKE**



**SKMD**



**SKND**

### Features

- Heat transfer through aluminium oxide ceramic isolated metal baseplate
- Hard soldered joints for high reliability
- **SKKD** half bridge connection center-tap connections:  
**SKMD** common cathode  
**SKND** common anode
- UL recognized, file no. E 63 532

### Typical Applications

- Non-controllable rectifiers for AC/AC converters
- Line rectifiers for transistorized AC motor controllers
- Field supply for DC motors
- SKKE: Free-wheeling diodes

<sup>1)</sup> SKMD 100, SKND 162 available on request

<sup>2)</sup> SKKD types only

<sup>3)</sup> See the assembly instructions

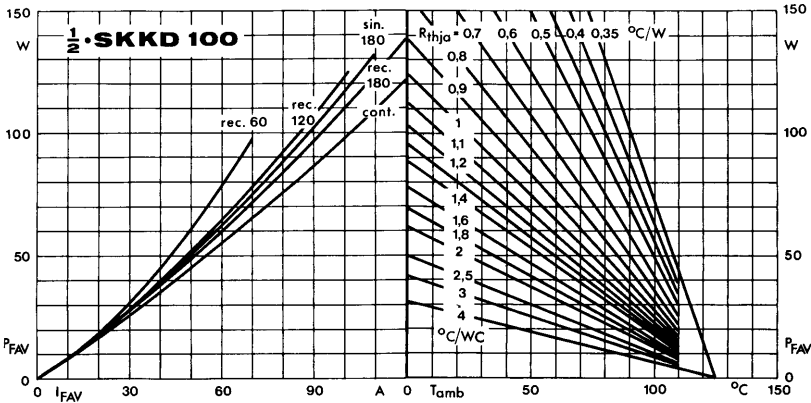


Fig. 11 a Power dissipation per diode vs. forward current and ambient temperature

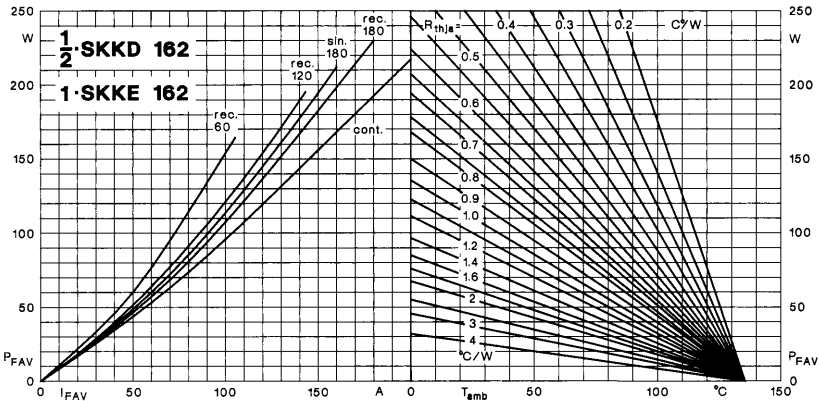


Fig. 11 b Power dissipation per diode vs. forward current and ambient temperature

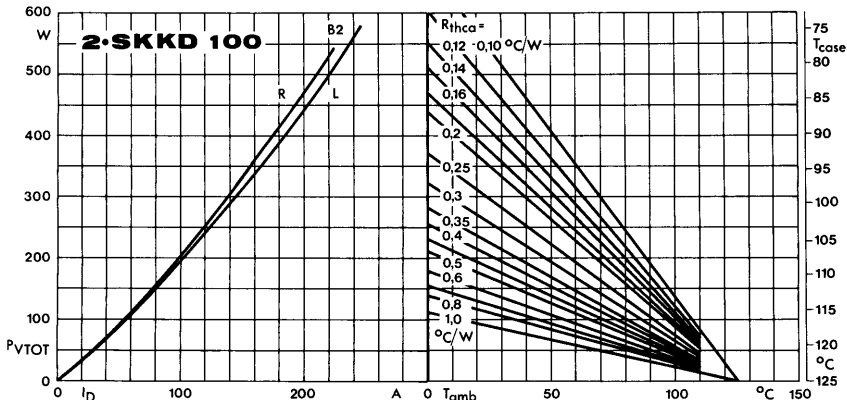


Fig. 12 a Power dissipation of two modules vs. direct current and case temperature

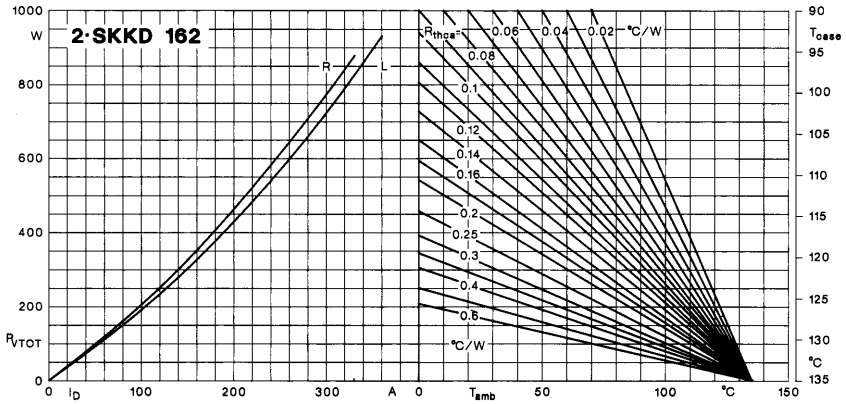


Fig. 12 b Power dissipation of two modules vs. direct current and case temperature

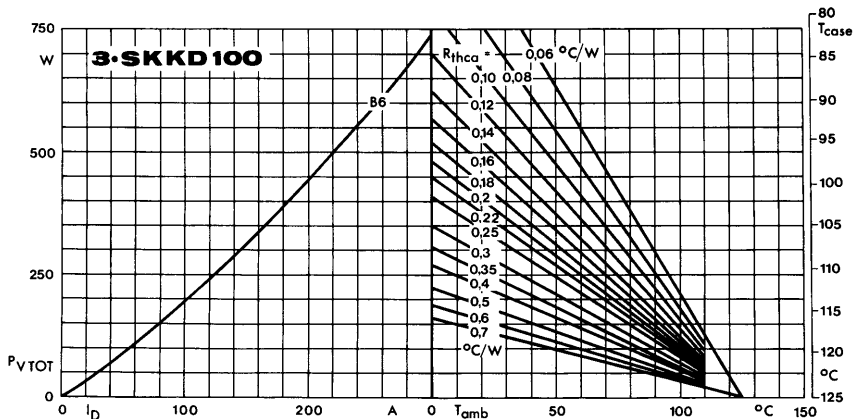


Fig. 13 a Power dissipation of three modules vs. direct current and case temperature

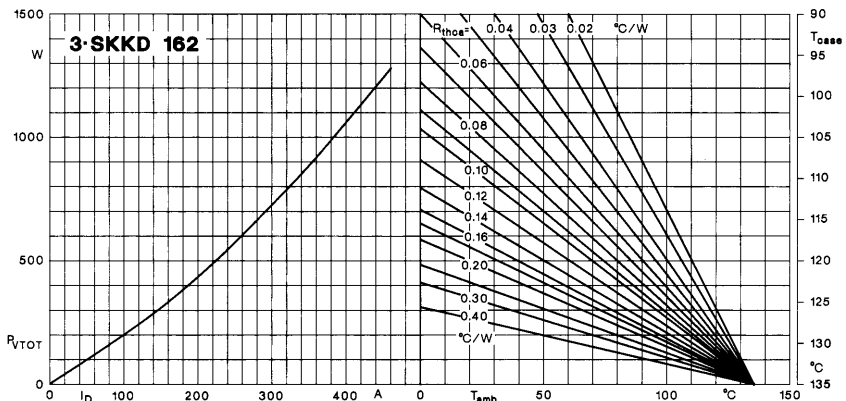


Fig. 13 b Power dissipation of three modules vs. direct current and case temperature

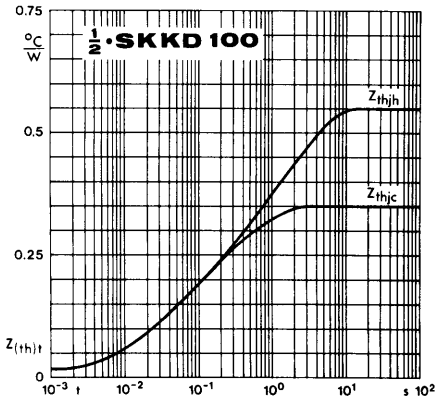


Fig. 14 a Transient thermal impedance vs. time

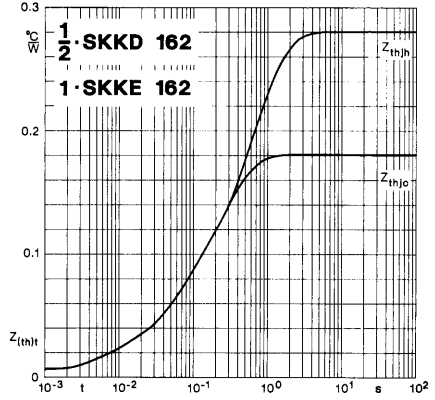


Fig. 14 b Transient thermal impedance vs. time

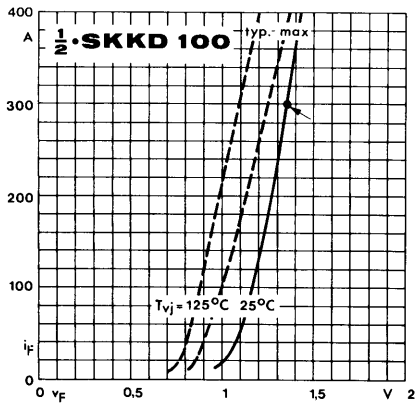


Fig. 15 a Forward characteristics

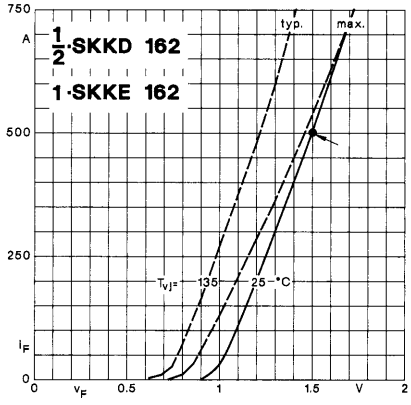


Fig. 15 b Forward characteristics

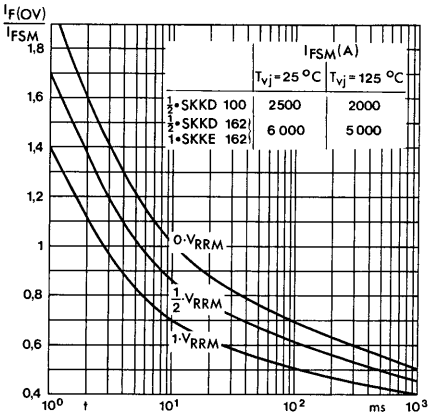
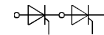


Fig. 16 Surge overload current vs. time

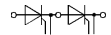


## SEMPACK® 1 Thyristor/ Diode Modules

**SKKT 19**  
**SKKT 20**  
**SKKT 20B**



**SKKT 19**



**SKKT 20**

### Features

- Heat transfer through aluminium oxide ceramic isolated metal baseplate
- Hard soldered joints for high reliability
- UL recognized, file no. E 63 532

### Typical Applications

- DC motor control (e. g. for machine tools)
- AC motor soft starters
- Temperature control (e. g. for ovens, chemical processes)
- Professional light dimming (studios, theaters)

$V_{RSM}$	$V_{RRM}$ $V_{DRM}$	$(dv/dt)_{cr}$	$I_{TRMS}$ (maximum value for continuous operation) 40 A		
			$I_{TAV}$ (sin. 180; $T_{case} = 60\text{ °C}$ ) 25 A		
V	V	V/ $\mu$ s			
700	600	500	<b>SKKT 19/06 D</b>	<b>SKKT 20/06 D</b>	–
900	800	500	<b>SKKT 19/08 D</b>	<b>SKKT 20/08 D</b>	<b>SKKT 20B08 D</b>
1300	1200	500	<b>SKKT 19/12 D</b>	–	–
1300	1200	1000	<b>SKKT 19/12 E</b>	<b>SKKT 20/12 E</b>	<b>SKKT 20B12 E</b>
1500	1400	1000	<b>SKKT 19/14 E</b>	<b>SKKT 20/14 E</b>	<b>SKKT 20B14 E</b>
1700	1600	1000	<b>SKKT 19/16 E</b>	<b>SKKT 20/16 E</b>	<b>SKKT 20B16 E</b>

Symbol	Conditions	SKKT 19	SKKT 20 SKKT 20B
$I_{TAV}$	sin. 180; $T_{case} = 60\text{ °C}$ $T_{case} = 85\text{ °C}$		25 A 18 A
$I_D$	B2/B6 $T_{amb} = 45\text{ °C}$ ; P 3/180 $T_{amb} = 35\text{ °C}$ ; P 3/180 F		31 A/38 A 46 A/60 A
$I_{RMS}$	W1/W3 $T_{amb} = 45\text{ °C}$ ; P 3/180		42 A/3 x 30 A
$I_{TSM}$	$T_{vj} = 25\text{ °C}$ ; 10 ms $T_{vj} = 125\text{ °C}$ ; 10 ms		320 A 280 A
$i^2t$	$T_{vj} = 25\text{ °C}$ ; 8,3 ... 10 ms $T_{vj} = 125\text{ °C}$ ; 8,3 ... 10 ms		510 A <sup>2</sup> s 390 A <sup>2</sup> s
$t_{gd}$	$T_{vj} = 25\text{ °C}$ ; $I_G = 1\text{ A}$ ; $di_G/dt = 1\text{ A}/\mu$ s		1 $\mu$ s
$t_{gr}$	$V_D = 0,67 \cdot V_{DRM}$		1 $\mu$ s
$(di/dt)_{cr}$	$T_{vj} = 125\text{ °C}$		150 A/ $\mu$ s
$t_q$	$T_{vj} = 125\text{ °C}$		typ. 80 $\mu$ s
$I_H$	$T_{vj} = 25\text{ °C}$ ; typ./max.		100/200 mA
$I_L$	$T_{vj} = 25\text{ °C}$ ; $R_G = 33\ \Omega$ ; typ./max.		250/400 mA
$V_T$	$T_{vj} = 25\text{ °C}$ ; $I_T = 75\text{ A}$		max. 2,3 V
$V_{T(TO)}$	$T_{vj} = 125\text{ °C}$		1,0 V
$r_T$	$T_{vj} = 125\text{ °C}$		16 m $\Omega$
$I_{D1}$ ; $I_{RD}$	$T_{vj} = 125\text{ °C}$ ; $V_{DD} = V_{DRM}$ ; $V_{RD} = V_{RRM}$		max. 10 mA
$V_{GT}$	$T_{vj} = 25\text{ °C}$ ; d. c.		3 V
$I_{GT}$	$T_{vj} = 25\text{ °C}$ ; d. c.		150 mA
$V_{GD}$	$T_{vj} = 125\text{ °C}$ ; d. c.		0,25 V
$I_{GD}$	$T_{vj} = 125\text{ °C}$ ; d. c.		5 mA
$R_{thjc}$	cont. sin. 180 rec. 120	} per thyristor/per module	1,2 °C/W / 0,6 °C/W 1,3 °C/W / 0,65 °C/W 1,35 °C/W / 0,68 °C/W
$R_{thch}$			0,2 °C/W / 0,1 °C/W
$T_{vj}$			– 40 ... +125 °C
$T_{stg}$			– 40 ... +125 °C
$V_{isol}$	a. c. 50 Hz; r.m.s.; 1 s/1 min	} SI units / US units	3600 V–/ 3000 V–
$M_1$	to heatsink		5 Nm/44 lb. in. $\pm$ 15 % <sup>1)</sup>
$M_2$	to terminals		3 Nm/26 lb. in. $\pm$ 15 %
a			5 · 9,81 m/s <sup>2</sup>
w	approx.		120 g
Case	→ page B 1 – 93		SKKT 19: A 5 SKKT 20: A 46 SKKT 20B: A 48

<sup>1)</sup> See the assembly instructions

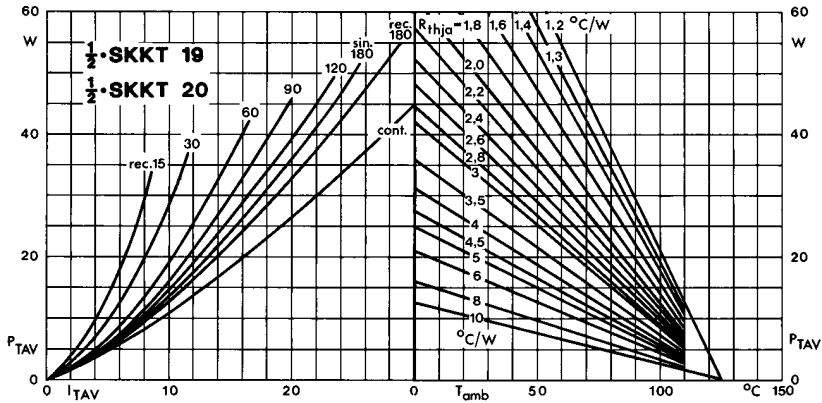


Fig. 1 Power dissipation per thyristor vs. on-state current and ambient temperature

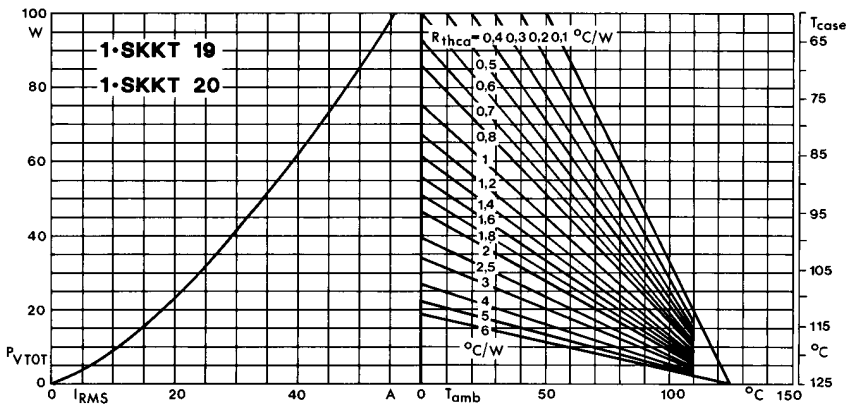


Fig. 2 Power dissipation per module vs. rms current and case temperature

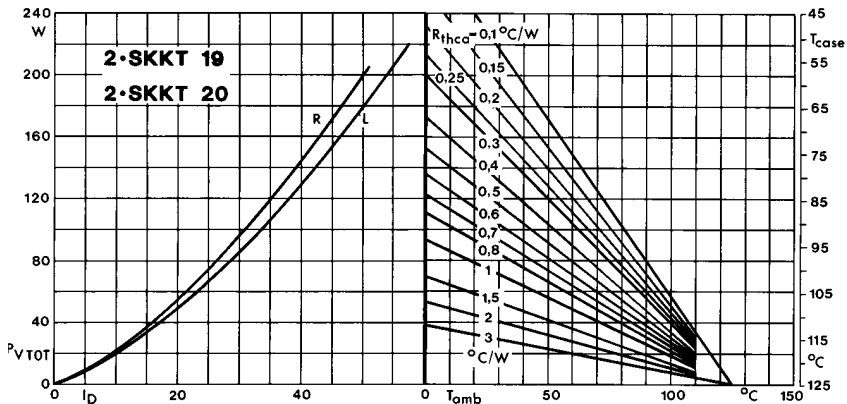


Fig. 3 Power dissipation of two modules vs. direct current and case temperature

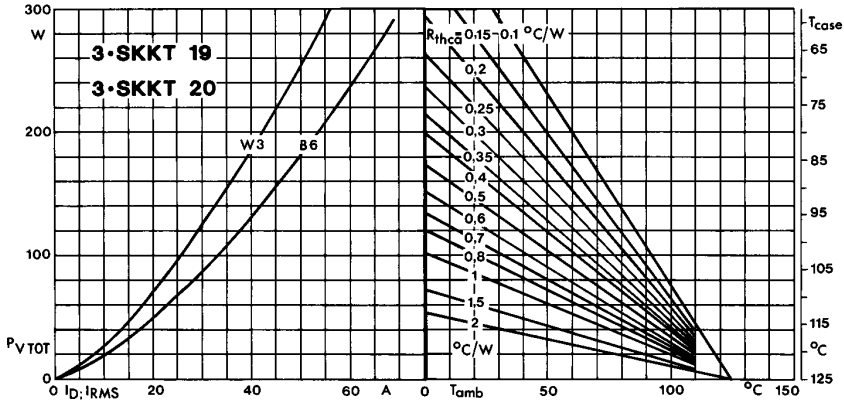


Fig. 4 Power dissipation of three modules vs. direct and rms current and case temperature

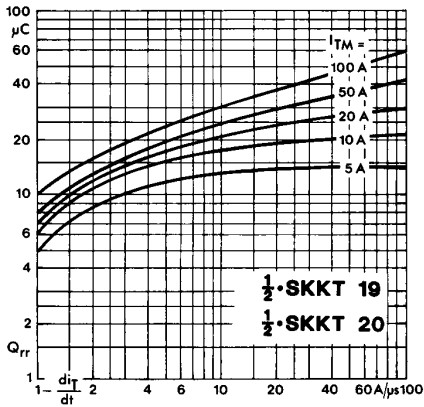


Fig. 5 Recovered charge vs. current decrease

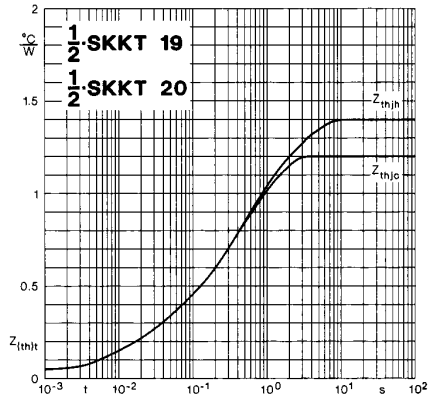


Fig. 6 Transient thermal impedance vs. time

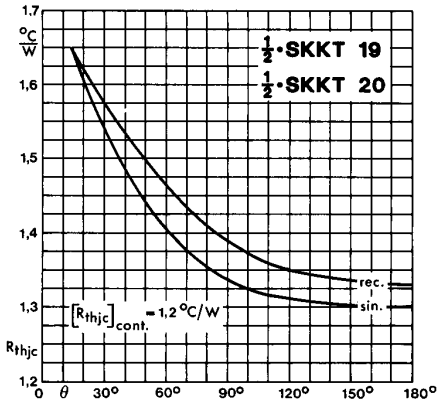


Fig. 7 Thermal resistance vs. conduction angle

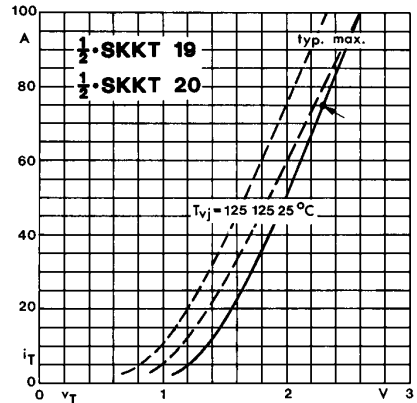


Fig. 8 On-state characteristics

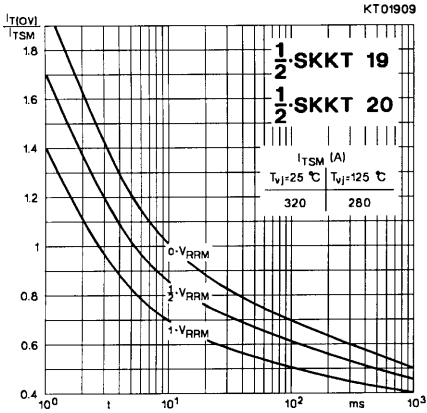


Fig. 9 Surge overload current vs. time

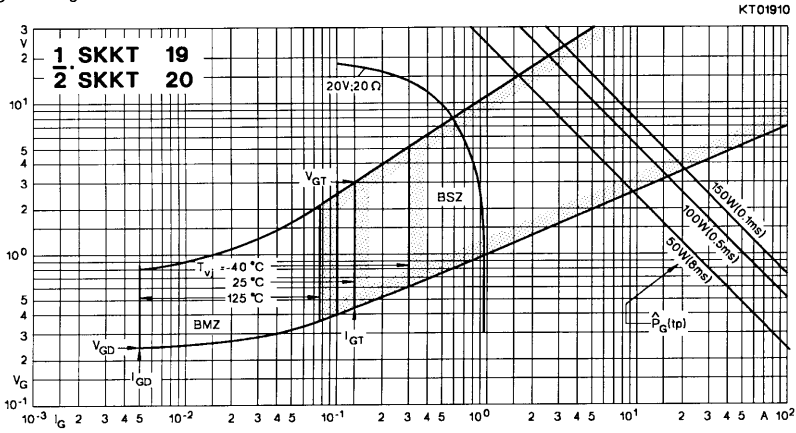


Fig. 10 Gate trigger characteristics

## SEMPACK® 1 Thyristor/ Diode Modules

**SKKT 26**      **SKKH 26**  
**SKKT 27**      **SKKH 27**  
**SKKT 27B**



**SKKT 26**      **SKKH 26**



**SKKT 27**      **SKKH 27**

### Features

- Heat transfer through aluminium oxide ceramic isolated metal baseplate
- Hard soldered joints for high reliability
- UL recognized, file no. E 63 532

### Typical Applications

- DC motor control (e. g. for machine tools)
- AC motor soft starters
- Temperature control (e. g. for ovens, chemical processes)
- Professional light dimming (studios, theaters)

1) Also available in SKKT 27 B configuration (case A 48)

2) See the assembly instructions

V <sub>RSM</sub>	V <sub>RRM</sub>	(dv/dt) <sub>cr</sub>	I <sub>T</sub> RMS (maximum value for continuous operation)			
			50 A			
V	V	V/μs	I <sub>T</sub> AV (sin. 180; T <sub>case</sub> = 68 °C)			
			32 A			
500	400	500	-	-	SKKH 26/04 D	-
700	600	500	SKKT 26/06 D	-	SKKH 26/06 D	SKKH 27/06 D
900	800	500	SKKT 26/08 D	SKKT 27/08 D <sup>1)</sup>	SKKH 26/08 D	SKKH 27/08 D
1300	1200	1000	SKKT 26/12 E	SKKT 27/12 E <sup>1)</sup>	SKKH 26/12 E	SKKH 27/12 E
1500	1400	1000	SKKT 26/14 E	SKKT 27/14 E <sup>1)</sup>	SKKH 26/14 E	SKKH 27/14 E
1700	1600	1000	SKKT 26/16 E	SKKT 27/16 E <sup>1)</sup>	SKKH 26/16 E	SKKH 27/16 E

Symbol	Conditions	SKKT 26 SKKH 26	SKKT 27 SKKT 27B SKKH 27
I <sub>T</sub> AV	sin. 180; T <sub>case</sub> = 68 °C T <sub>case</sub> = 85 °C		32 A 25 A
I <sub>D</sub>	B2/B6 T <sub>amb</sub> = 45 °C; P 3/180 T <sub>amb</sub> = 35 °C; P 3/180 F		38 A/50 A 60 A/77 A
I <sub>RMS</sub>	W1/W3 T <sub>amb</sub> = 45 °C; P 3/180		52 A/3 x 37 A
I <sub>TSM</sub>	T <sub>vj</sub> = 25 °C; 10 ms T <sub>vj</sub> = 125 °C; 10 ms;		550 A 480 A
i <sup>2</sup> t	T <sub>vj</sub> = 25 °C; 8,3 ... 10 ms T <sub>vj</sub> = 125 °C; 8,3 ... 10 ms		1 500 A <sup>2</sup> s 1 150 A <sup>2</sup> s
t <sub>gd</sub>	T <sub>vj</sub> = 25 °C; I <sub>G</sub> = 1 A; di <sub>G</sub> /dt = 1 A/μs		1 μs
t <sub>gr</sub>	V <sub>D</sub> = 0,67 · V <sub>DRM</sub>		1 μs
(di/dt) <sub>cr</sub>	T <sub>vj</sub> = 125 °C		150 A/μs
t <sub>q</sub>	T <sub>vj</sub> = 125 °C		typ. 80 μs
I <sub>H</sub>	T <sub>vj</sub> = 25 °C; typ./max.		100/200 mA
I <sub>L</sub>	T <sub>vj</sub> = 25 °C; R <sub>G</sub> = 33 Ω; typ./max.		250/400 mA
V <sub>T</sub>	T <sub>vj</sub> = 25 °C; I <sub>T</sub> = 75 A		max. 1,8 V
V <sub>T(TO)</sub>	T <sub>vj</sub> = 125 °C		0,9 V
r <sub>T</sub>	T <sub>vj</sub> = 125 °C		12 mΩ
I <sub>DD</sub> ; I <sub>RD</sub>	T <sub>vj</sub> = 125 °C; V <sub>DD</sub> = V <sub>DRM</sub> ; V <sub>RD</sub> = V <sub>RRM</sub>		max. 10 mA
V <sub>GT</sub>	T <sub>vj</sub> = 25 °C; d. c.		3 V
I <sub>GT</sub>	T <sub>vj</sub> = 25 °C; d. c.		150 mA
V <sub>GD</sub>	T <sub>vj</sub> = 125 °C; d. c.		0,25 V
I <sub>GD</sub>	T <sub>vj</sub> = 125 °C; d. c.		5 mA
R <sub>thjc</sub>	cont. } sin. 180 } per thyristor/per module rec.120 }		0,9 °C/W / 0,45 °C/W 0,95 °C/W / 0,48 °C/W 1,0 °C/W / 0,5 °C/W 0,2 °C/W / 0,1 °C/W - 40 ... + 125 °C - 40 ... + 125 °C
R <sub>thch</sub>			
T <sub>vj</sub>			
T <sub>stg</sub>			
V <sub>isol</sub>	a. c. 50 Hz; r.m.s.; 1 s/1 min		3600 V~ / 3000 V~
M <sub>1</sub>	to heatsink } to terminals } SI units / US units		5 Nm/44 lb. in. ± 15 % <sup>2)</sup> 3 Nm/26 lb. in. ± 15 %
M <sub>2</sub>			
a			5 · 9,81 m/s <sup>2</sup>
w	approx.		120 g
Case	→ page B 1 – 93	SKKT 26: A 5 SKKH 26: A 6	SKKT 27: A 46 SKKT 27B: A 48 SKKH 27: A 47

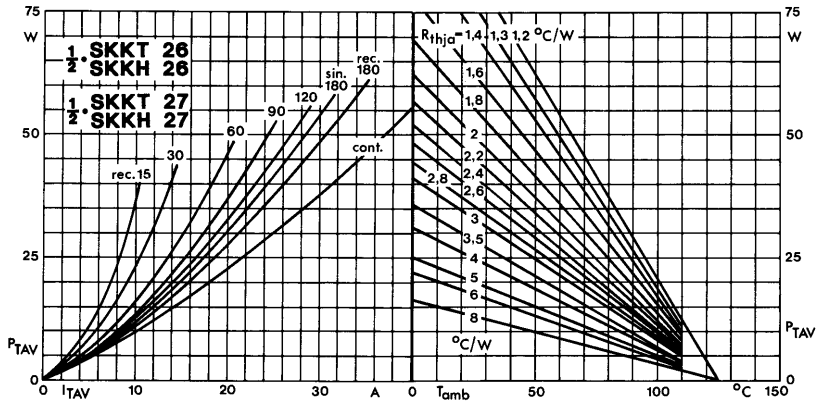


Fig. 1 Power dissipation per thyristor vs. on-state current and ambient temperature

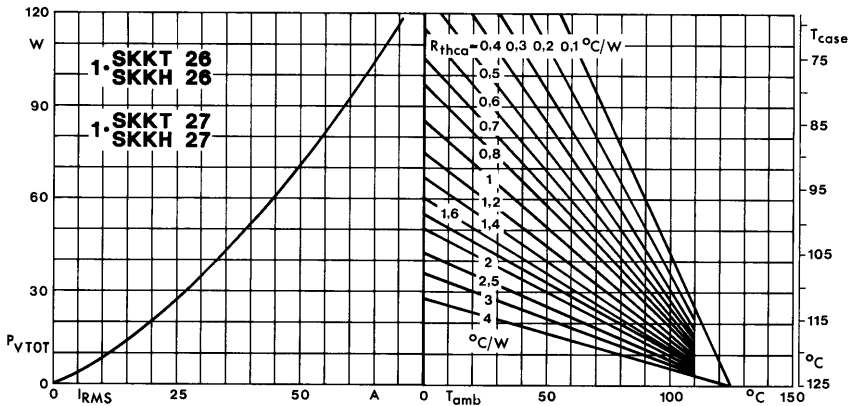


Fig. 2 Power dissipation per module vs. rms current and case temperature

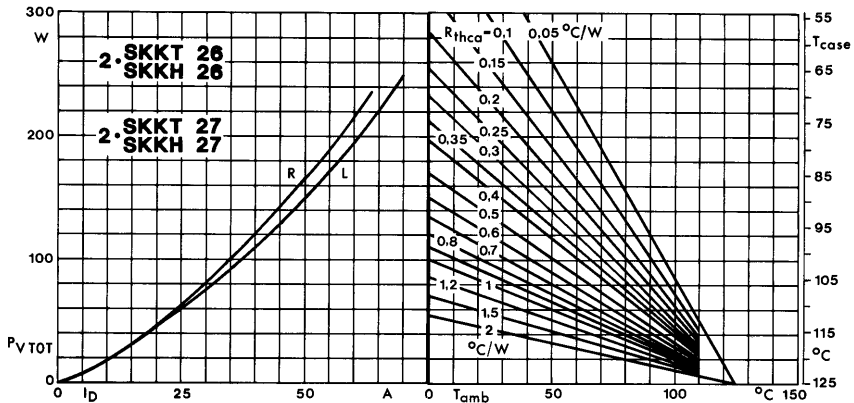


Fig. 3 Power dissipation of two modules vs. direct current and case temperature

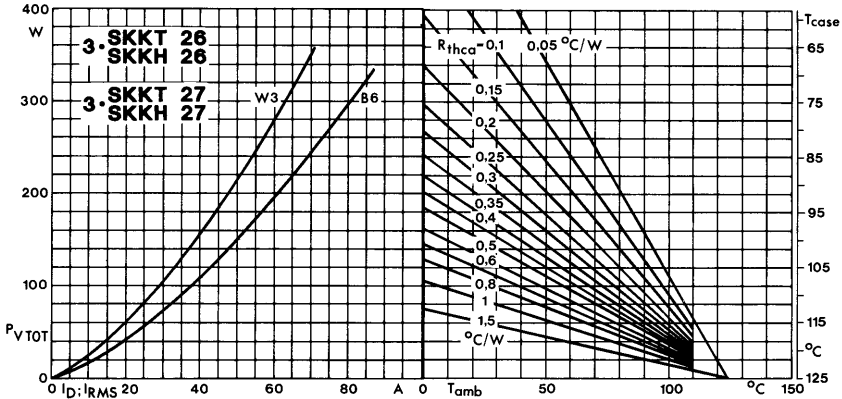


Fig. 4 Power dissipation of three modules vs. direct and rms current and case temperature

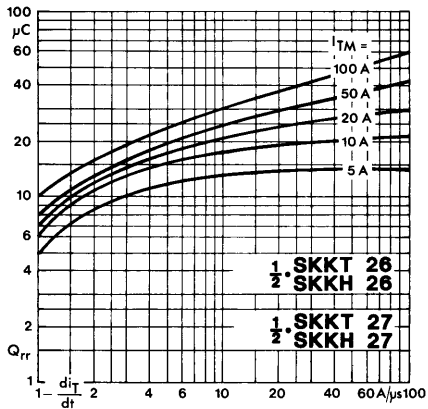


Fig. 5 Recovered charge vs. current decrease

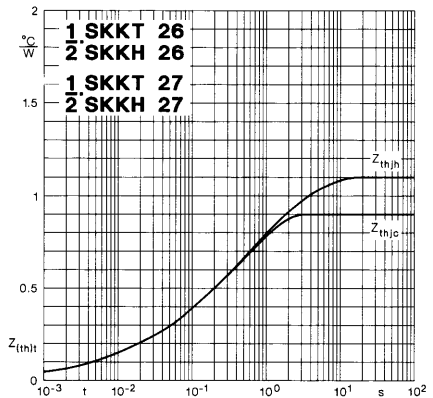


Fig. 6 Transient thermal impedance vs. time

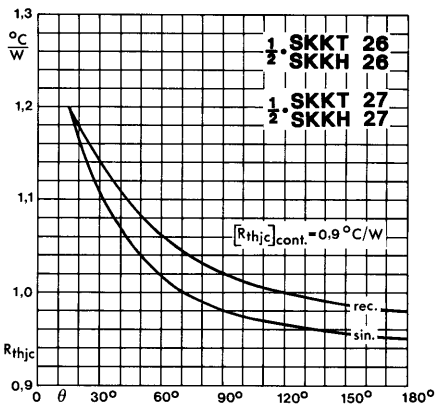


Fig. 7 Thermal resistance vs. conduction angle

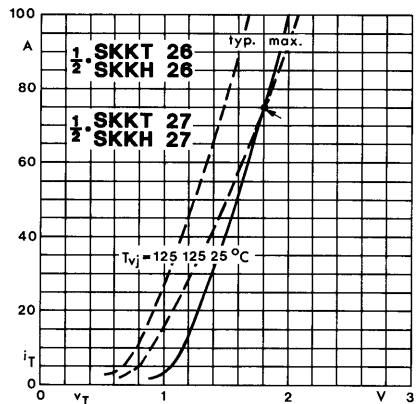


Fig. 8 On-state characteristics

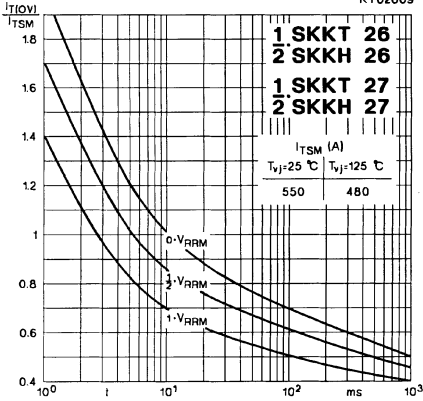


Fig. 9 Surge overload current vs. time

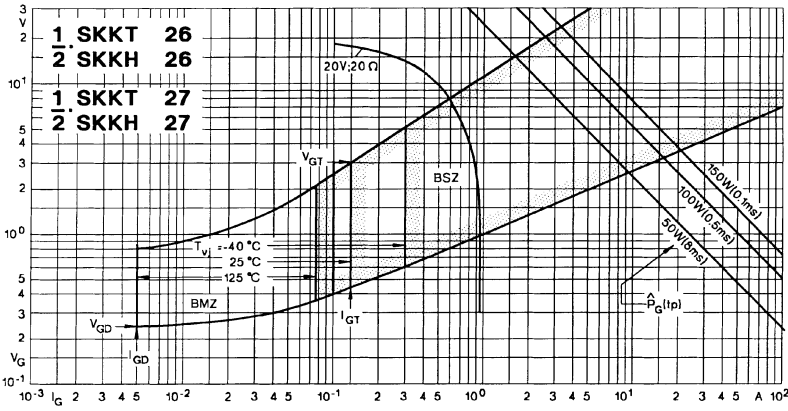
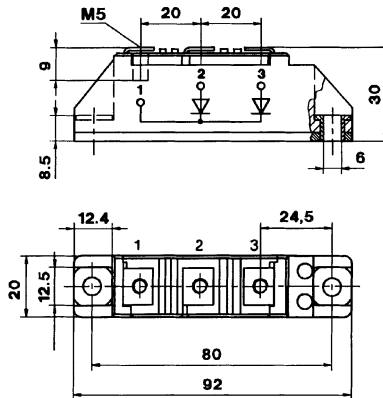


Fig. 10 Gate trigger characteristics

**SKMD 100**  
Case A 33  
SEMIPACK® 1

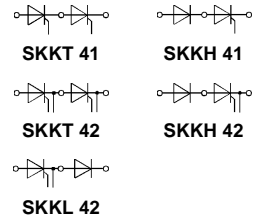


Dimensions in mm



## SEMPACK® 1 Thyristor/ Diode Modules

**SKKT 41**      **SKKH 41**  
**SKKT 42**      **SKKH 42**  
**SKKT 42B**      **SKKL 42<sup>2)</sup>**



### Features

- Heat transfer through aluminium oxide ceramic isolated metal baseplate
- Hard soldered joints for high reliability
- UL recognized, file no. E 63 532

### Typical Applications

- DC motor control (e. g. for machine tools)
- AC motor soft starters
- Temperature control (e. g. for ovens, chemical processes)
- Professional light dimming (studios, theaters)

- 1) Also available in SKKT 42 B configuration (case A 48).  
2) SKKL 42 available on request  
3) /20 E, /22 E max. 30 mA  
4) See the assembly instructions

V <sub>RRM</sub>	V <sub>DRM</sub>	(dv/dt) <sub>cr</sub>	I <sub>TRMS</sub> (maximum value for continuous operation)			
			75 A			
V	V	V/μs	I <sub>TAV</sub> (sin. 180; T <sub>case</sub> = 68 °C)			
			48 A			
500	400	500	–	–	SKKH 41/04 D	–
700	600	500	SKKT 41/06 D	SKKT 42/06 D	SKKH 41/06 D	SKKH 42/06 D
900	800	500	SKKT 41/08 D	SKKT 42/08 D <sup>1)</sup>	SKKH 41/08 D	SKKH 42/08 D
1300	1200	500	SKKT 41/12 D	–	SKKH 41/12 D	–
1300	1200	1000	SKKT 41/12 E	SKKT 42/12 E <sup>1)</sup>	SKKH 41/12 E	SKKH 42/12 E
1500	1400	1000	SKKT 41/14 E	SKKT 42/14 E <sup>1)</sup>	SKKH 41/14 E	SKKH 42/14 E
1700	1600	1000	SKKT 41/16 E	SKKT 42/16 E <sup>1)</sup>	SKKH 41/16 E	SKKH 42/16 E
1900	1800	1000	SKKT 41/18 E	SKKT 42/18 E <sup>1)</sup>	SKKH 41/18 E	SKKH 42/18 E
2100	2000	1000	SKKT 41/20 E	SKKT 42/20 E <sup>1)</sup>	–	–
2300	2200	1000	SKKT 41/22 E	SKKT 42/22 E <sup>1)</sup>	–	–

Symbol	Conditions	SKKT 41 SKKH 41	SKKT 42 SKKH 42B SKKL 42
I <sub>TAV</sub>	sin. 180; T <sub>case</sub> = 74 °C T <sub>case</sub> = 85 °C	48 A 40 A	
I <sub>D</sub>	B2/B6 T <sub>amb</sub> = 45 °C; P 3/180 T <sub>amb</sub> = 35 °C; P 3/180 F	50 A/60 A 85 A/110 A	
I <sub>RMS</sub>	W1/W3 T <sub>amb</sub> = 35 °C; P 3/180 F	110 A/3 x 85 A	
I <sub>TSM</sub>	T <sub>vj</sub> = 25 °C; 10 ms T <sub>vj</sub> = 125 °C; 10 ms	1 000 A 850 A	
i <sup>2</sup> t	T <sub>vj</sub> = 25 °C; 8,3 ... 10 ms T <sub>vj</sub> = 125 °C; 8,3 ... 10 ms	5 000 A <sup>2</sup> s 3 600 A <sup>2</sup> s	
t <sub>gd</sub> t <sub>gr</sub>	T <sub>vj</sub> = 25 °C; I <sub>G</sub> = 1 A; di <sub>G</sub> /dt = 1 A/μs V <sub>D</sub> = 0,67 · V <sub>DRM</sub>	1 μs 2 μs	
(di/dt) <sub>cr</sub>	T <sub>vj</sub> = 125 °C	150 A/μs	
t <sub>q</sub>	T <sub>vj</sub> = 125 °C	typ. 80 μs	
I <sub>H</sub>	T <sub>vj</sub> = 25 °C;	typ. 150 mA; max. 250 mA	
I <sub>L</sub>	T <sub>vj</sub> = 25 °C; R <sub>G</sub> = 33 Ω	typ. 300 mA; max. 600 mA	
V <sub>T</sub>	T <sub>vj</sub> = 25 °C; I <sub>T</sub> = 200 A	max. 1,95 V	
V <sub>T(TO)</sub>	T <sub>vj</sub> = 125 °C	1 V	
r <sub>T</sub>	T <sub>vj</sub> = 125 °C	4,5 mΩ	
I <sub>DD</sub> ; I <sub>RD</sub>	T <sub>vj</sub> = 125 °C; V <sub>DD</sub> = V <sub>DRM</sub> ; V <sub>RD</sub> = V <sub>RRM</sub>	max. 15 mA <sup>3)</sup>	
V <sub>GT</sub>	T <sub>vj</sub> = 25 °C; d. c.	3 V	
I <sub>GT</sub>	T <sub>vj</sub> = 25 °C; d. c.	150 mA	
V <sub>GD</sub>	T <sub>vj</sub> = 125 °C; d. c.	0,25 V	
I <sub>GD</sub>	T <sub>vj</sub> = 125 °C; d. c.	6 mA	
R <sub>thjc</sub> R <sub>thch</sub> T <sub>vj</sub> ; T <sub>stg</sub>	cont. sin. 180 rec.120 } per thyristor/per module	0,65 °C/W / 0,33 °C/W 0,69 °C/W / 0,35 °C/W 0,73 °C/W / 0,37 °C/W 0,2 °C/W / 0,1 °C/W – 40 ... +125 °C	
V <sub>isol</sub> M <sub>1</sub> M <sub>2</sub> a w	a. c. 50 Hz; r.m.s.; 1 s/1 min to heatsink } SI units / US units to terminals } approx.	3600 V ~ / 3000 V ~ 5 Nm/44 lb. in. ± 15 % <sup>4)</sup> 3 Nm/26 lb. in. ± 15 % 5 · 9,81 m/s <sup>2</sup> 120 g	
Case	→ page B 1 – 93	SKKT 41: A 5 SKKH 41: A 6 SKKH 42: A 47	SKKL 42: A 59 SKKT 42: A 46 SKKT 42B: A 48

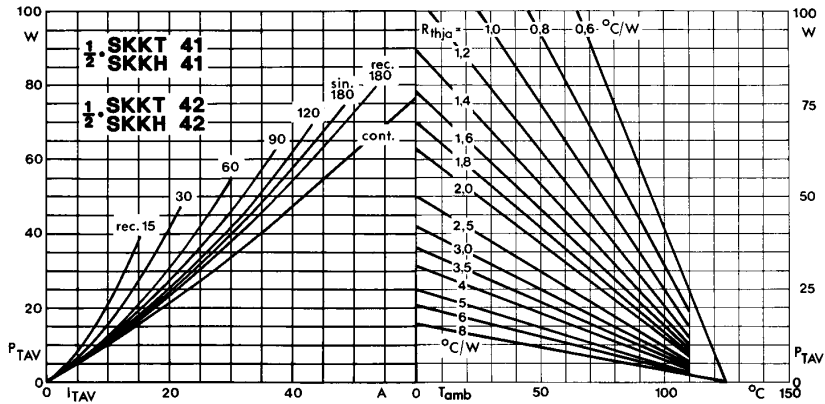


Fig. 1 Power dissipation per thyristor vs. on-state current and ambient temperature

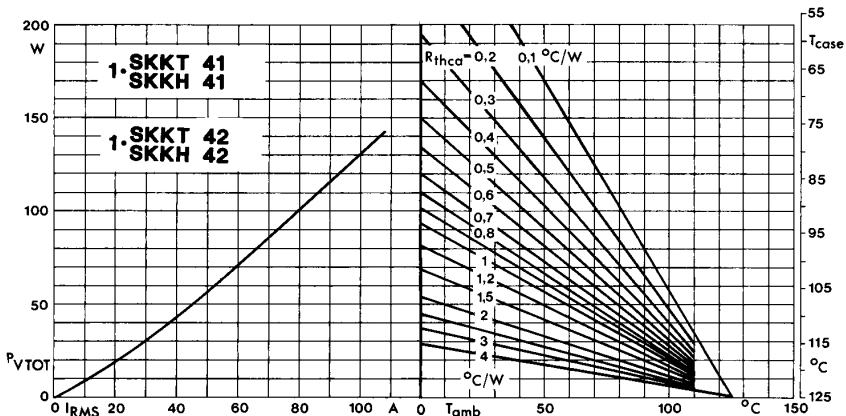


Fig. 2 Power dissipation per module vs. rms current and case temperature

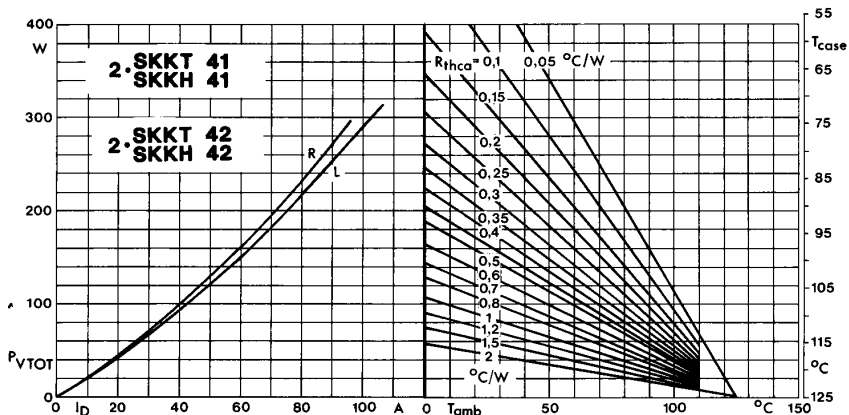


Fig. 3 Power dissipation of two modules vs. direct current and case temperature

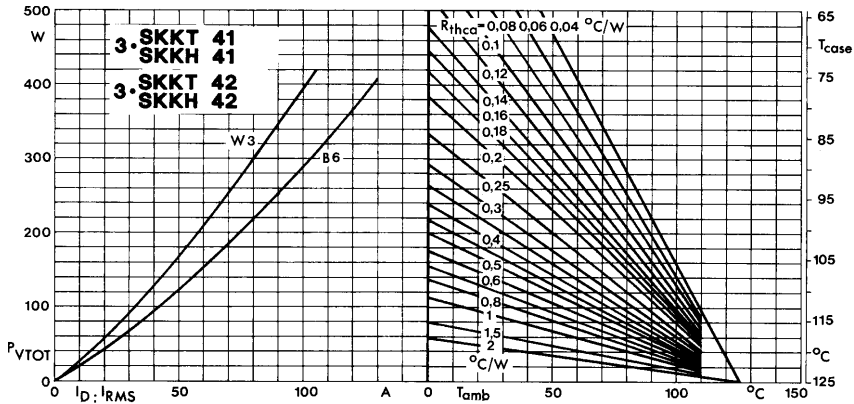


Fig. 4 Power dissipation of three modules vs. direct and rms current and case temperature

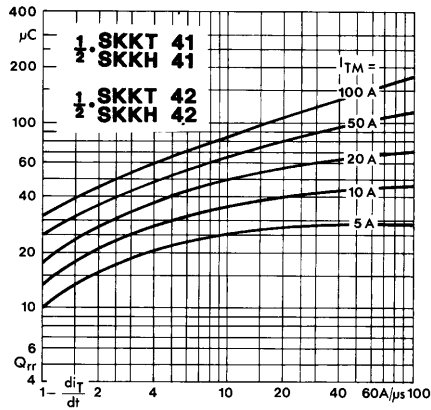


Fig. 5 Recovered charge vs. current decrease

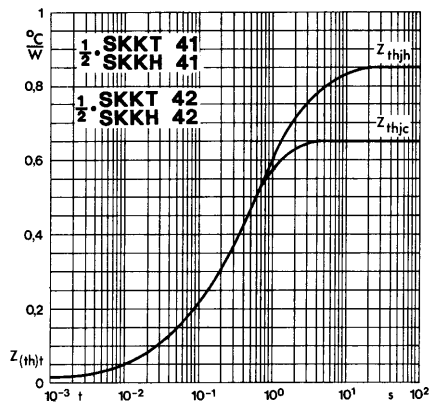


Fig. 6 Transient thermal impedance vs. time

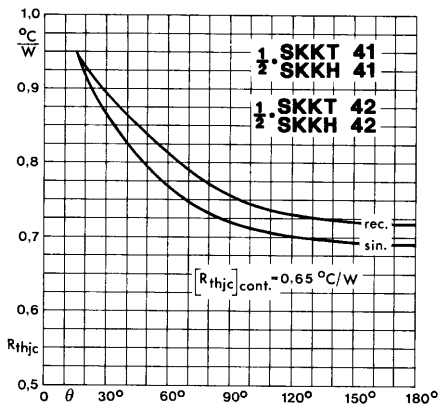


Fig. 7 Thermal resistance vs. conduction angle

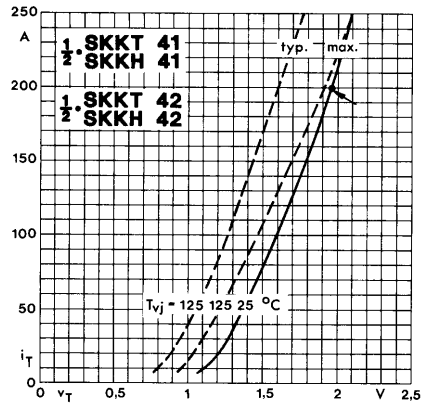


Fig. 8 On-state characteristics

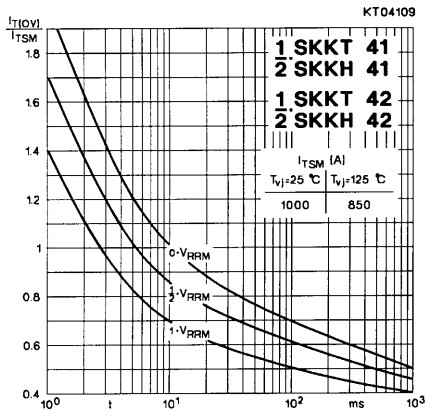


Fig. 9 Surge overload current vs. time

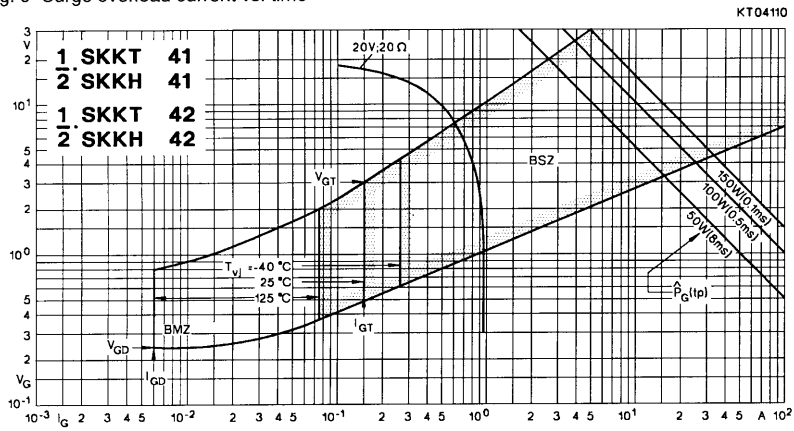


Fig. 10 Gate trigger characteristics

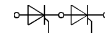
## SEMPACK® 1 Thyristor/ Diode Modules

**SKKT 56**      **SKKH 56**  
**SKKT 57**      **SKKH 57**  
**SKKT 57B**

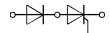


V <sub>RSM</sub>	V <sub>RRM</sub>	(dv/dt) <sub>cr</sub>	I <sub>TRMS</sub> (maximum value for continuous operation)			
			95 A			
V	V	V/μs	I <sub>TAV</sub> (sin. 180; T <sub>case</sub> = 74 °C)			
			60 A			
500	400	500	–	–	SKKH 56/04 D	–
700	600	500	SKKT 56/06 D	SKKT 57/06 D	SKKH 56/06 D	SKKH 57/06 D
900	800	500	SKKT 56/08 D	SKKT 57/08 D <sup>1)</sup>	SKKH 56/08 D	SKKH 57/08 D
1300	1200	500	SKKT 56/12 D	–	SKKH 56/12 D	–
1300	1200	1000	SKKT 56/12 E	SKKT 57/12 E <sup>1)</sup>	–	SKKH 57/12 E
1500	1400	1000	SKKT 56/14 E	SKKT 57/14 E <sup>1)</sup>	SKKH 56/14 E	SKKH 57/14 E
1700	1600	1000	SKKT 56/16 E	SKKT 57/16 E <sup>1)</sup>	SKKH 56/16 E	SKKH 57/16 E
1900	1800	1000	SKKT 56/18 E	SKKT 57/18 E <sup>1)</sup>	SKKH 56/18 E	SKKH 57/18 E
2100	2000	1000	SKKT 56/20 E	SKKT 57/20 E <sup>1)</sup>	–	SKKH 57/20 E
2300	2200	1000	SKKT 56/22 E	SKKT 57/22 E <sup>1)</sup>	–	SKKH 57/22 E

Symbol	Conditions	SKKT 56 SKKH 56	SKKT 57 SKKT 57B SKKH 57
I <sub>TAV</sub>	sin. 180; T <sub>case</sub> = 74 °C T <sub>case</sub> = 80 °C	60 A 55 A	60 A 55 A
I <sub>D</sub>	B2/B6 T <sub>amb</sub> = 45 °C; P 3/180 T <sub>amb</sub> = 35 °C; P 3/180 F	57 A/68 A 100 A/130 A	57 A/68 A 100 A/130 A
I <sub>RMS</sub>	W1/W3 T <sub>amb</sub> = 35 °C; P 3/180 F	130 A/3 x 100 A	130 A/3 x 100 A
I <sub>TSM</sub>	T <sub>vj</sub> = 25 °C; 10 ms T <sub>vj</sub> = 125 °C; 10 ms	1 500 A 1 250 A	1 500 A 1 250 A
i <sup>2</sup> t	T <sub>vj</sub> = 25 °C; 8,3 ... 10 ms T <sub>vj</sub> = 125 °C; 8,3 ... 10 ms	11 000 A <sup>2</sup> s 8 000 A <sup>2</sup> s	11 000 A <sup>2</sup> s 8 000 A <sup>2</sup> s
t <sub>gd</sub> t <sub>gr</sub>	T <sub>vj</sub> = 25 °C; I <sub>G</sub> = 1 A; di <sub>G</sub> /dt = 1 A/μs V <sub>D</sub> = 0,67 · V <sub>DRM</sub>	1 μs 2 μs	1 μs 2 μs
(di/dt) <sub>cr</sub>	T <sub>vj</sub> = 125 °C	150 A/μs	150 A/μs
t <sub>q</sub>	T <sub>vj</sub> = 125 °C	typ. 80 μs	typ. 80 μs
I <sub>H</sub>	T <sub>vj</sub> = 25 °C;	typ. 150 mA; max. 250 mA	typ. 150 mA; max. 250 mA
I <sub>L</sub>	T <sub>vj</sub> = 25 °C; R <sub>G</sub> = 33 Ω	typ. 300 mA; max. 600 mA	typ. 300 mA; max. 600 mA
V <sub>T</sub>	T <sub>vj</sub> = 25 °C; I <sub>T</sub> = 200 A	max. 1,65 V	max. 1,65 V
V <sub>T(TO)</sub>	T <sub>vj</sub> = 125 °C	0,9 V	0,9 V
r <sub>T</sub>	T <sub>vj</sub> = 125 °C	3,5 mΩ	3,5 mΩ
I <sub>DD</sub> ; I <sub>RD</sub>	T <sub>vj</sub> = 125 °C; V <sub>DD</sub> = V <sub>DRM</sub> ; V <sub>RD</sub> = V <sub>RRM</sub>	max. 15 mA <sup>3)</sup>	max. 15 mA <sup>3)</sup>
V <sub>GT</sub>	T <sub>vj</sub> = 25 °C; d. c.	3 V	3 V
I <sub>GT</sub>	T <sub>vj</sub> = 25 °C; d. c.	150 mA	150 mA
V <sub>GD</sub>	T <sub>vj</sub> = 125 °C; d. c.	0,25 V	0,25 V
I <sub>GD</sub>	T <sub>vj</sub> = 125 °C; d. c.	6 mA	6 mA
R <sub>thjc</sub> R <sub>thch</sub> T <sub>vj</sub> , T <sub>stg</sub>	cont. } sin. 180 } per thyristor/per module rec. 120 }	0,57 °C/W / 0,29 °C/W 0,60 °C/W / 0,30 °C/W 0,64 °C/W / 0,32 °C/W 0,2 °C/W / 0,1 °C/W – 40 ... +125 °C	0,57 °C/W / 0,29 °C/W 0,60 °C/W / 0,30 °C/W 0,64 °C/W / 0,32 °C/W 0,2 °C/W / 0,1 °C/W – 40 ... +125 °C
V <sub>isol</sub> M <sub>1</sub> M <sub>2</sub> a w	a. c. 50 Hz; r.m.s.; 1 s/1 min to heatsink } SI units / US units to terminals }	3600 V ~ / 3000 V ~ 5 Nm/44 lb. in. ± 15 % <sup>2)</sup> 3 Nm/26 lb. in. ± 15 % 5 · 9,81 m/s <sup>2</sup> 120 g	3600 V ~ / 3000 V ~ 5 Nm/44 lb. in. ± 15 % <sup>2)</sup> 3 Nm/26 lb. in. ± 15 % 5 · 9,81 m/s <sup>2</sup> 120 g
Case	→ page B 1 – 93	SKKT 56: A 5 SKKH 56: A 6	SKKT 57: A 46 SKKT 57B: A 48 SKKH 57: A 47



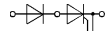
**SKKT 56**



**SKKH 56**



**SKKT 57**



**SKKH 57**

### Features

- Heat transfer through aluminium oxide ceramic isolated metal baseplate
- Hard soldered joints for high reliability
- UL recognized, file no. E 63 532

### Typical Applications

- DC motor control (e. g. for machine tools)
- AC motor soft starters
- Temperature control (e. g. for ovens, chemical processes)
- Professional light dimming (studios, theaters)

1) Also available in SKKT 57 B configuration (case A 48)

2) See the assembly instructions

3) /20 E, /22 E max. 30 mA

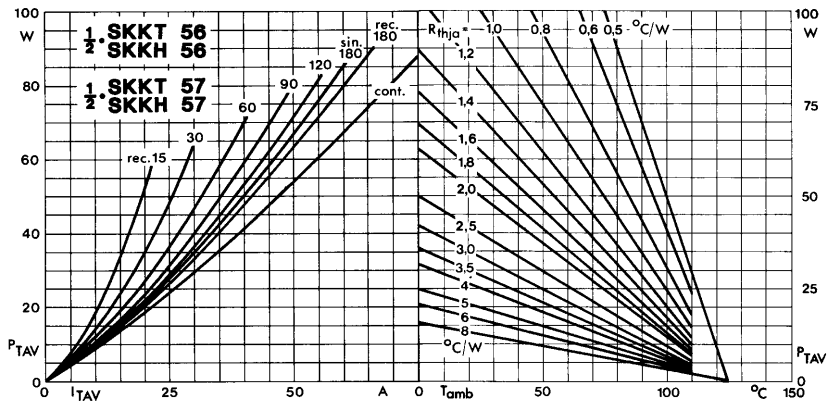


Fig. 1 Power dissipation per thyristor vs. on-state current and ambient temperature

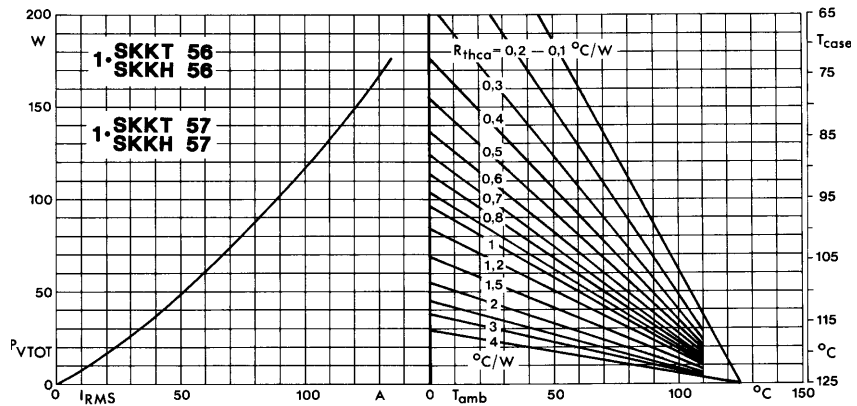


Fig. 2 Power dissipation per module vs. rms current and case temperature

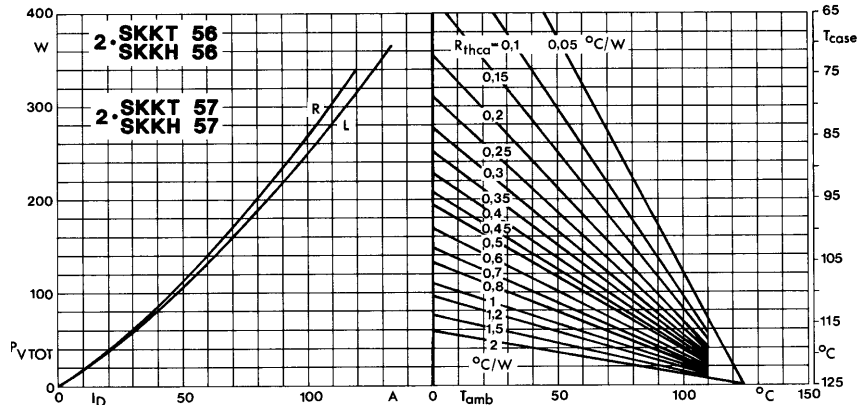


Fig. 3 Power dissipation of two modules vs. direct current and case temperature

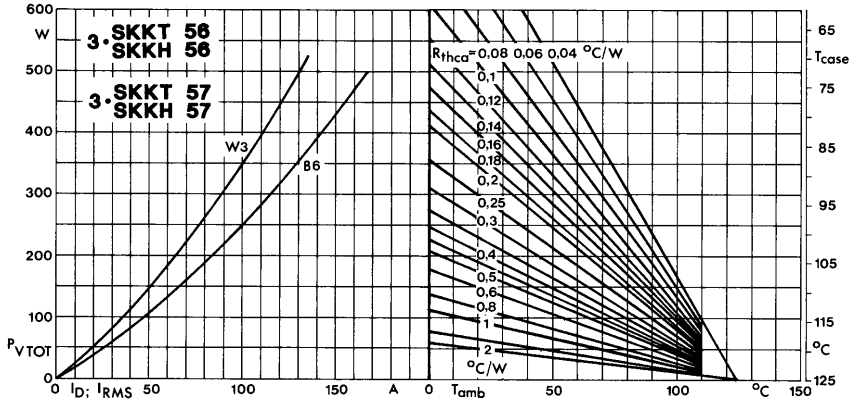


Fig. 4 Power dissipation of three modules vs. direct and rms current and case temperature

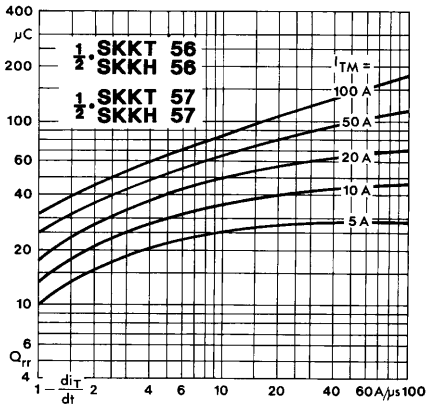


Fig. 5 Recovered charge vs. current decrease

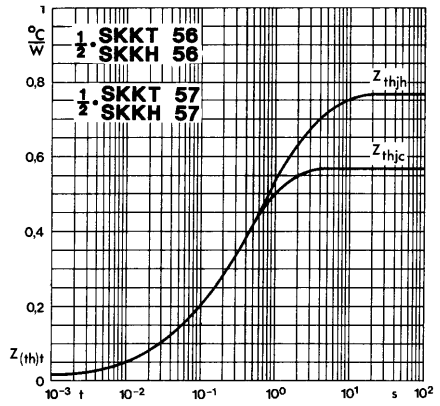


Fig. 6 Transient thermal impedance vs. time

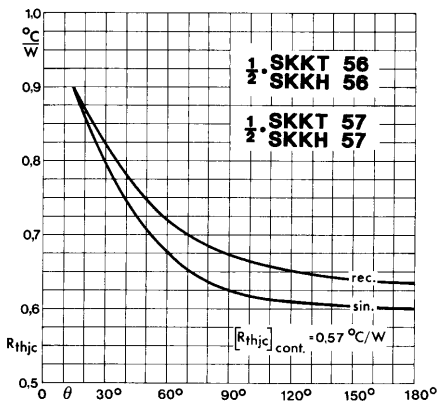


Fig. 7 Thermal resistance vs. conduction angle

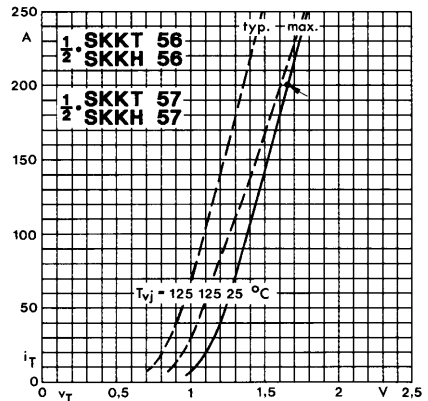


Fig. 8 On-state characteristics

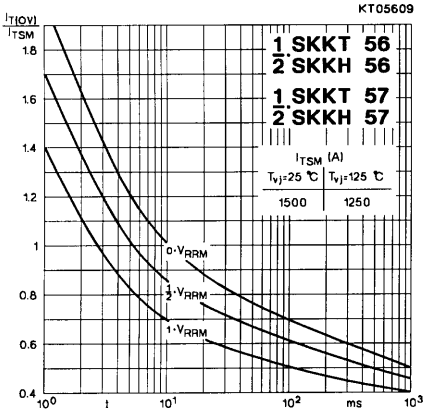


Fig. 9 Surge overload current vs. time

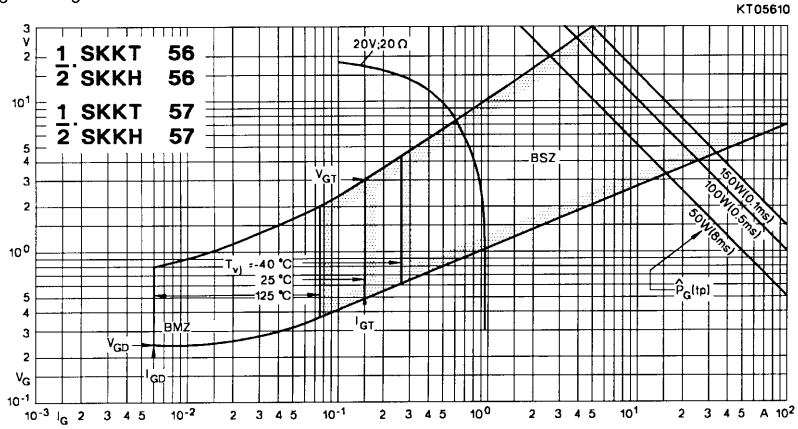


Fig. 10 Gate trigger characteristics



## SEMPACK® 1 Thyristor/ Diode Modules

**SKKT 91**      **SKKH 91**  
**SKKT 92**      **SKKH 92**  
**SKKT 92B**      **SKMT 91<sup>2)</sup>**  
**SKKL 92<sup>2)</sup>**



V <sub>VRSM</sub>	V <sub>VDRM</sub>	(dv/dt) <sub>cr</sub>	I <sub>TRMS</sub> (maximum value for continuous operation)			
			150 A			
V	V	V/μs	I <sub>TAV</sub> (sin. 180; T <sub>case</sub> = 85 °C)			
			95 A			
500	400	500	–	–	SKKH 91/04 D	–
700	600	500	SKKT 91/06 D	SKKT 92/06 D	SKKH 91/06 D	SKKH 92/06 D
900	800	500	SKKT 91/08 D	SKKT 92/08 D <sup>1)</sup>	SKKH 91/08 D	SKKH 92/08 D
1300	1200	500	SKKT 91/12 D	–	SKKH 91/12 D	–
1300	1200	1000	SKKT 91/12 E	SKKT 92/12 E <sup>1)</sup>	–	SKKH 92/12 E
1500	1400	1000	SKKT 91/14 E	SKKT 92/14 E <sup>1)</sup>	SKKH 91/14 E	SKKH 92/14 E
1700	1600	1000	SKKT 91/16 E	SKKT 92/16 E <sup>1)</sup>	SKKH 91/16 E	SKKH 92/16 E
1900	1800	1000	SKKT 91/18 E	SKKT 92/18 E <sup>1)</sup>	SKKH 91/18 E	SKKH 92/18 E

Symbol	Conditions	SKKT 91 SKKH 91	SKKT 92 SKKT 92B SKKH 92
I <sub>TAV</sub>	sin. 180; T <sub>case</sub> = 85 °C	95 A	
I <sub>D</sub>	B2/B6 T <sub>amb</sub> = 45 °C; P 3/180 T <sub>amb</sub> = 35 °C; P 3/180 F	70 A/85 A 140 A/175 A	
I <sub>RMS</sub>	W1/W3 T <sub>amb</sub> = 35 °C; P 3/180 F	190 A/3 x 135 A	
I <sub>TSM</sub>	T <sub>vj</sub> = 25 °C; 10 ms T <sub>vj</sub> = 125 °C; 10 ms	2 000 A 1 750 A	
i <sup>2</sup> t	T <sub>vj</sub> = 25 °C; 8,3 ... 10 ms T <sub>vj</sub> = 125 °C; 8,3 ... 10 ms	20 000 A <sup>2</sup> s 15 000 A <sup>2</sup> s	
t <sub>gd</sub>	T <sub>vj</sub> = 25 °C; I <sub>G</sub> = 1 A; di <sub>G</sub> /dt = 1 A/μs	1 μs	
t <sub>gr</sub>	V <sub>D</sub> = 0,67 · V <sub>DRM</sub>	2 μs	
(di/dt) <sub>cr</sub>	T <sub>vj</sub> = 125 °C	150 A/μs	
t <sub>q</sub>	T <sub>vj</sub> = 125 °C	typ. 100 μs	
I <sub>H</sub>	T <sub>vj</sub> = 25 °C;	max. 250 mA	
I <sub>L</sub>	T <sub>vj</sub> = 25 °C; R <sub>G</sub> = 33 Ω	max. 600 mA	
V <sub>T</sub>	T <sub>vj</sub> = 25 °C; I <sub>T</sub> = 300 A	max. 1,65 V	
V <sub>T(TO)</sub>	T <sub>vj</sub> = 125 °C	0,9 V	
r <sub>T</sub>	T <sub>vj</sub> = 125 °C	2 mΩ	
I <sub>DD</sub> ; I <sub>RD</sub>	T <sub>vj</sub> = 125 °C; V <sub>DD</sub> = V <sub>DRM</sub> ; V <sub>RD</sub> = V <sub>RRM</sub>	max. 20 mA	
V <sub>GT</sub>	T <sub>vj</sub> = 25 °C; d. c.	3 V	
I <sub>GT</sub>	T <sub>vj</sub> = 25 °C; d. c.	150 mA	
V <sub>GD</sub>	T <sub>vj</sub> = 125 °C; d. c.	0,25 V	
I <sub>GD</sub>	T <sub>vj</sub> = 125 °C; d. c.	6 mA	
R <sub>thjc</sub>	cont. } sin. 180 } rec.120 } per thyristor/per module	0,28 °C/W / 0,14 °C/W 0,30 °C/W / 0,15 °C/W 0,32 °C/W / 0,16 °C/W 0,2 °C/W / 0,1 °C/W	
R <sub>thch</sub>		– 40 ... +125 °C	
T <sub>vj</sub>		– 40 ... +125 °C	
T <sub>stg</sub>			
V <sub>isol</sub>	a. c. 50 Hz; r.m.s.; 1 s/1 min	3600 V~ / 3000 V~	
M <sub>1</sub>	to heatsink } SI units/ to terminals } US units	5 Nm/44 lb. in. ± 15 % <sup>3)</sup> 3 Nm/26 lb.in. ± 15 %	
a		5 · 9,81 m/s <sup>2</sup>	
w	approx.	120 g	
Case	→ page B 1 – 93	SKKT 91: A 5 SKKH 91: A 6 SKMT 91: A 65	SKKL 92: A 59 SKKT 92: A 46 SKKT 92B: A 48



**SKKT 91**

**SKKH 91**



**SKKT 92**

**SKKH 92**



**SKMT 91**

**SKKL 92**

### Features

- Heat transfer through aluminium oxide ceramic isolated metal baseplate
- Hard soldered joints for high reliability
- UL recognized, file no. E 63 532

### Typical Applications

- DC motor control (e. g. for machine tools)
- AC motor soft starters
- Temperature control (e. g. for ovens, chemical processes)
- Professional light dimming (studios, theaters)

- 1) Also available in SKKT 92 B configuration (case A 48)
- 2) SKKL 92, SKMT 91 available on request
- 3) See the assembly instructions

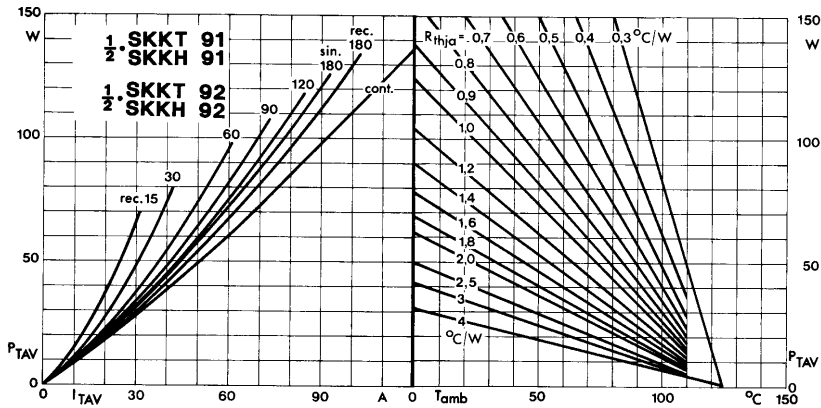


Fig. 1 Power dissipation per thyristor vs. on-state current and ambient temperature

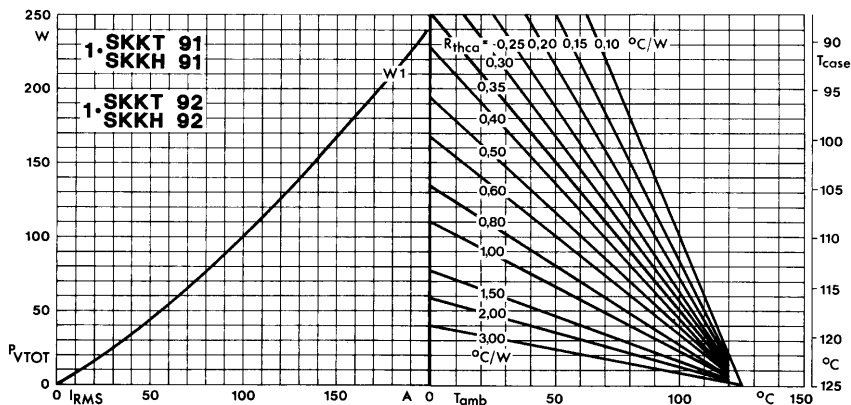


Fig. 2 Power dissipation per module vs. rms current and case temperature

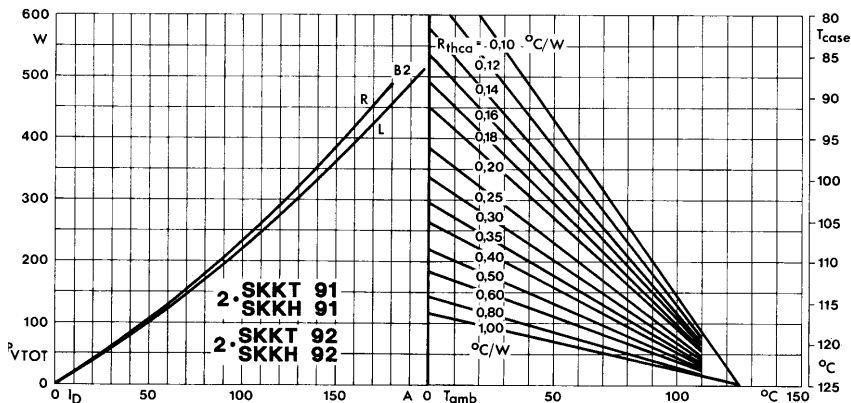


Fig. 3 Power dissipation of two modules vs. direct current and case temperature

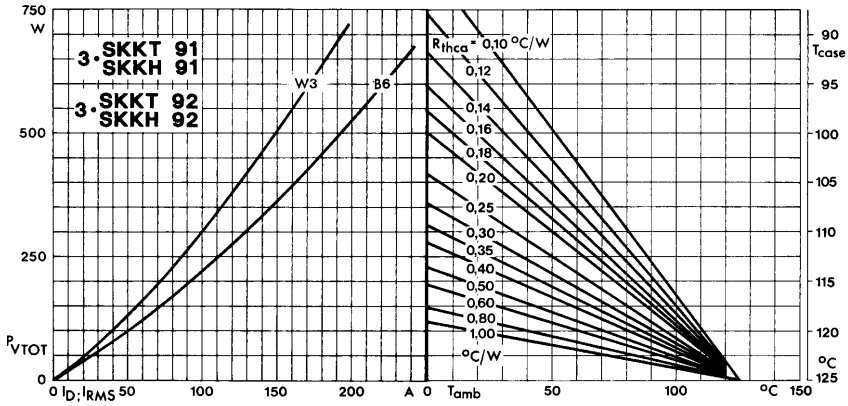


Fig. 4 Power dissipation of three modules vs. direct and rms current and case temperature

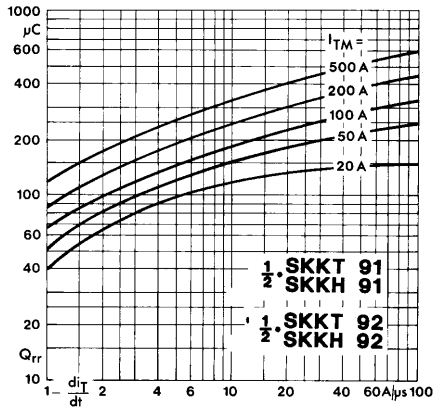


Fig. 5 Recovered charge vs. current decrease

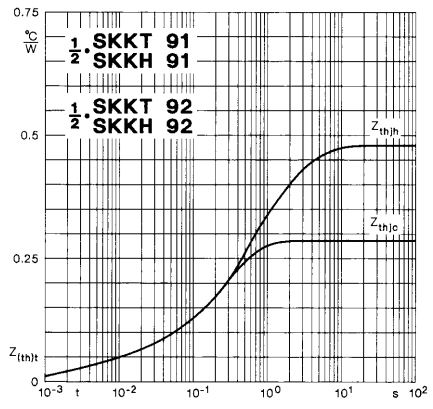


Fig. 6 Transient thermal impedance vs. time

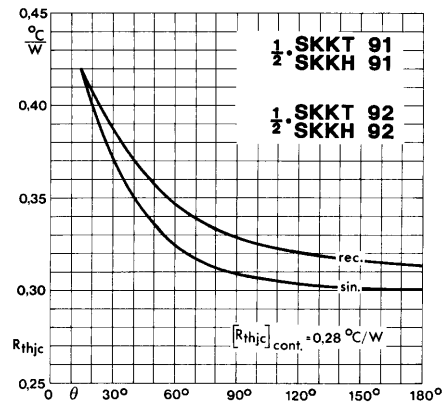


Fig. 7 Thermal resistance vs. conduction angle

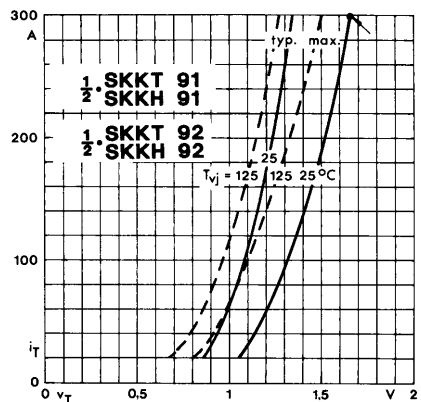


Fig. 8 On-state characteristics

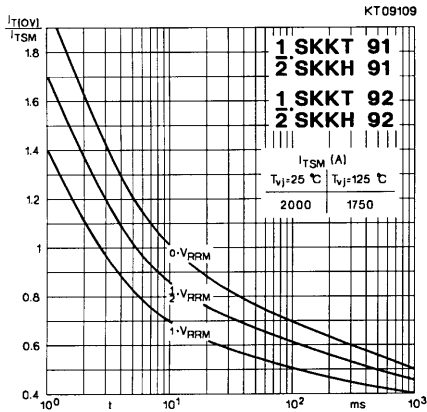


Fig. 9 Surge overload current vs. time

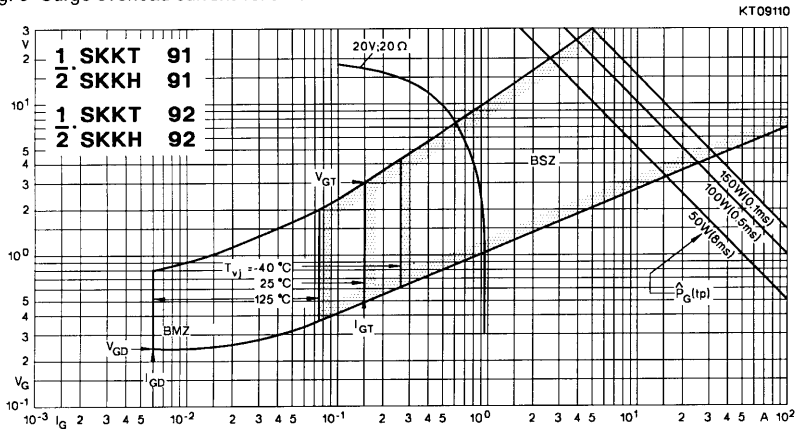


Fig. 10 Gate trigger characteristics