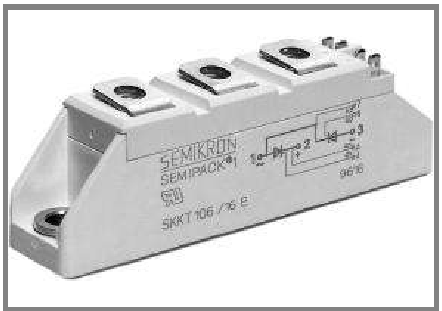
SKKT 92, SKKH 92, SKKT 92B



SEMIPACK® 1

Thyristor / Diode Modules

SKKT 92

SKKT 92B

SKKH 92

Features

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

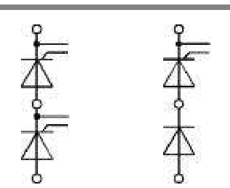
Typical Applications

- 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) See the assembly instructions

V_{RSM} V	V_{RRM}, V_{DRM} V	I_{TRMS} = 150 A (maximum value for continuous operation) I_{TAV} = 95 A (sin. 180; T_c = 85 °C)		
900	800	SKKT 92/08E	SKKT 92B08E	SKKH 92/08E
1300	1200	SKKT 92/12E	SKKT 92B12E	SKKH 92/12E
1500	1400	SKKT 92/14E	SKKT 92B14E	SKKH 92/14E
1700	1600	SKKT 92/16E	SKKT 92B16E	SKKH 92/16E
1900	1800	SKKT 92/18E	SKKT 92B18E	SKKH 92/18E

Symbol	Conditions	Values	Units
I_{TAV}	sin. 180; T_c = 85 (100) °C;	95 (68)	A
I_D	P3/180; T_a = 45 °C; B2 / B6	70 / 85	A
	P3/180F; T_a = 35 °C; B2 / B6	140 /175	A
I_{RMS}	P3/180F; T_a = 35 °C; W1 / W3	190 / 3 * 135	A
I_{TSM}	T_{vj} = 25 °C; 10 ms	2000	A
	T_{vj} = 125 °C; 10 ms	1750	A
i²t	T_{vj} = 25 °C; 8,3 ... 10 ms	20000	A²s
	T_{vj} = 125 °C; 8,3 ... 10 ms	15000	A²s
V_T	T_{vj} = 25 °C; I_T = 300 A	max. 1,65	V
$V_{T(TO)}$	T_{vj} = 125 °C	max. 0,9	V
r_T	T_{vj} = 125 °C	max. 2	mΩ
I_{DD}; I_{RD}	T_{vj} = 125 °C; V_{RD} = V_{RRM}; V_{DD} = V_{DRM}	max. 20	mA
t_{gd}	T_{vj} = 25 °C; I_G = 1 A; di_G/dt = 1 A/µs	1	µs
t_{gr}	V_D = 0,67 * V_{DRM}	2	µs
$(di/dt)_{cr}$	T_{vj} = 125 °C	max. 150	A/µs
$(dv/dt)_{cr}$	T_{vj} = 125 °C	max. 1000	V/µs
t_q	T_{vj} = 125 °C ,	100	µs
I_H	T_{vj} = 25 °C; typ. / max.	150 / 250	mA
I_L	T_{vj} = 25 °C; R_G = 33 Ω; typ. / max.	300 / 600	mA
V_{GT}	T_{vj} = 25 °C; d.c.	min. 3	V
I_{GT}	T_{vj} = 25 °C; d.c.	min. 150	mA
V_{GD}	T_{vj} = 125 °C; d.c.	max. 0,25	V
I_{GD}	T_{vj} = 125 °C; d.c.	max. 6	mA
$R_{th(j-c)}$	cont.; per thyristor / per module	0,28 / 0,14	K/W
$R_{th(j-c)}$	sin. 180; per thyristor / per module	0,3 / 0,15	K/W
$R_{th(j-c)}$	rec. 120; per thyristor / per module	0,32 / 0,16	K/W
$R_{th(c-s)}$	per thyristor / per module	0,2 / 0,1	K/W
T_{vj}		- 40 ... + 125	°C
T_{stg}		- 40 ... + 125	°C
V_{isol}	a. c. 50 Hz; r.m.s.; 1 s / 1 min.	3600 / 3000	V~
M_s	to heatsink	5 ± 15 %[1]	Nm
M_t	to terminals	3 ± 15 %	Nm
a		5 * 9,81	m/s²
m	approx.	95	g
Case	SKKT	A 46	
	SKKT ...B	A 48	
	SKKH	A 47	



SKKT **SKKH**

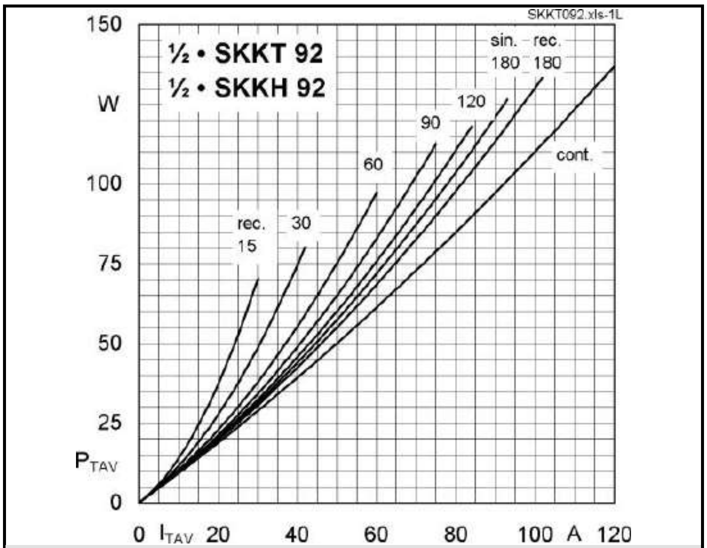


Fig. 1L Power dissipation per thyristor vs. on-state current

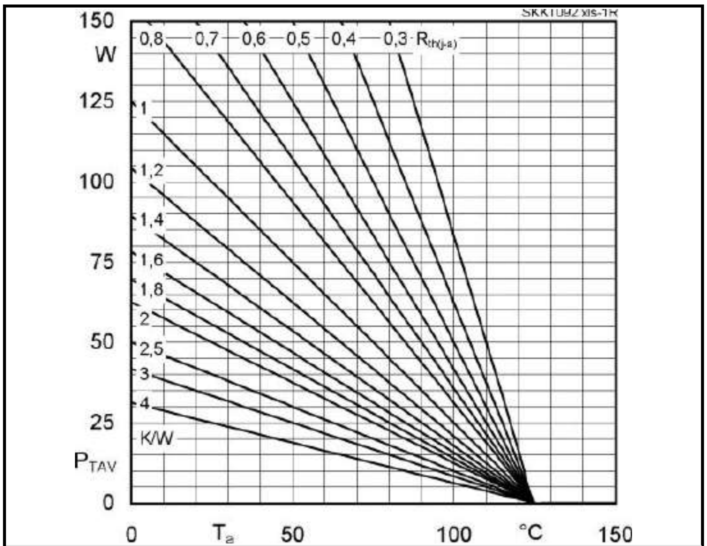


Fig. 1R Power dissipation per thyristor vs. ambient temp.

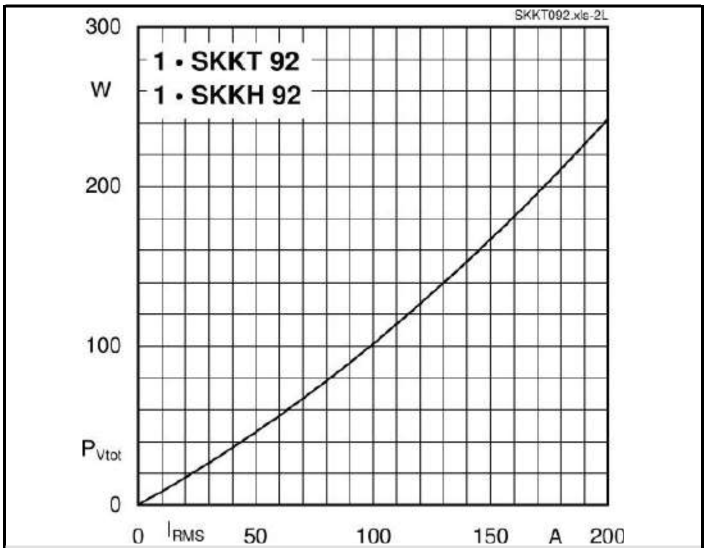


Fig. 2L Power dissipation per module vs. rms current

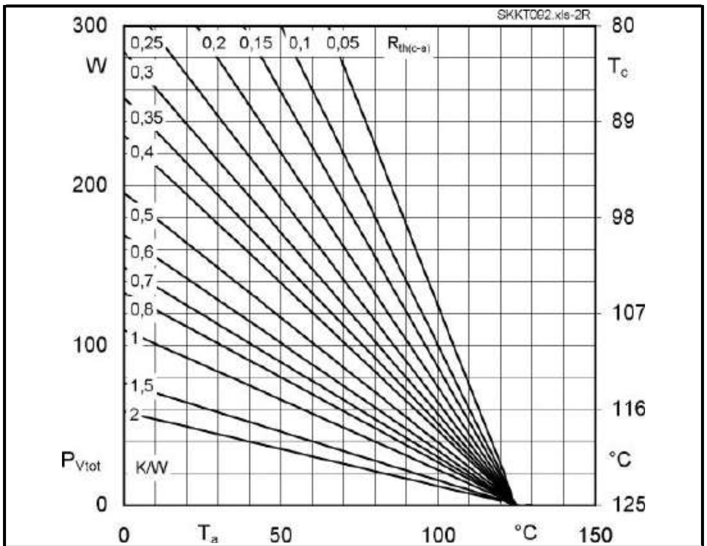


Fig. 2R Power dissipation per module vs. case temp.

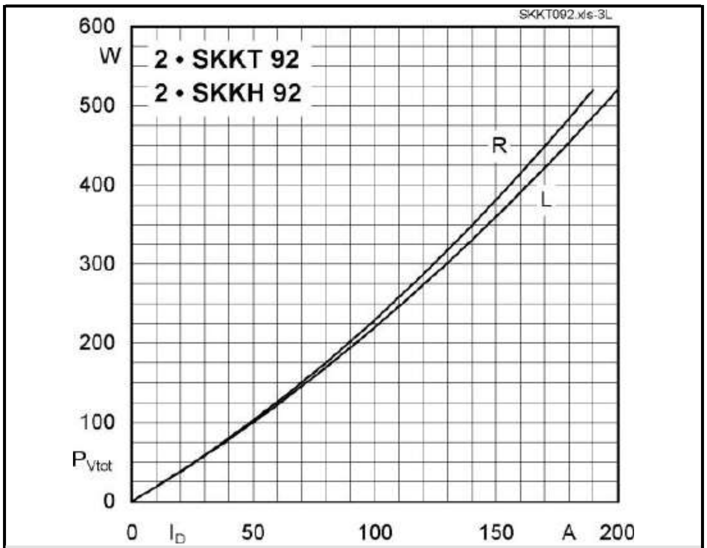


Fig. 3L Power dissipation of two modules vs. direct current

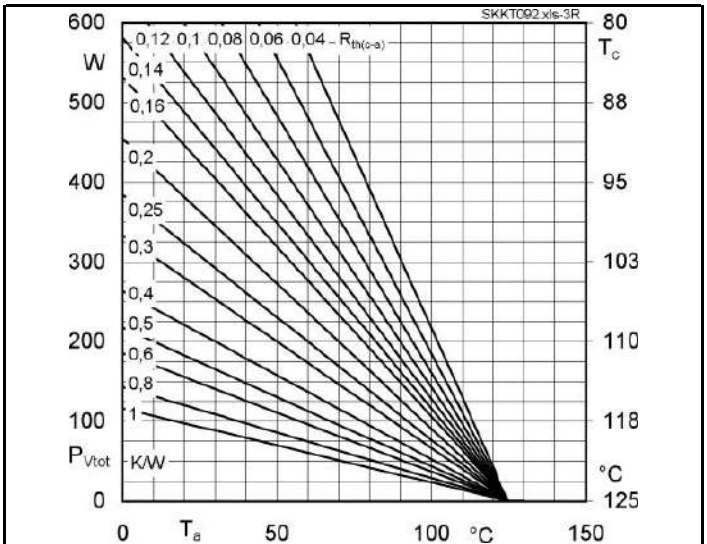


Fig. 3R Power dissipation of two modules vs. case temp.

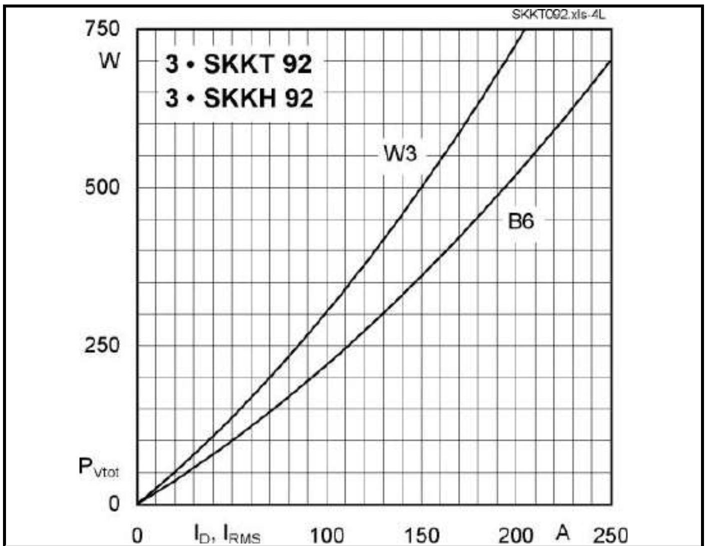


Fig. 4L Power dissipation of three modules vs. direct and rms current

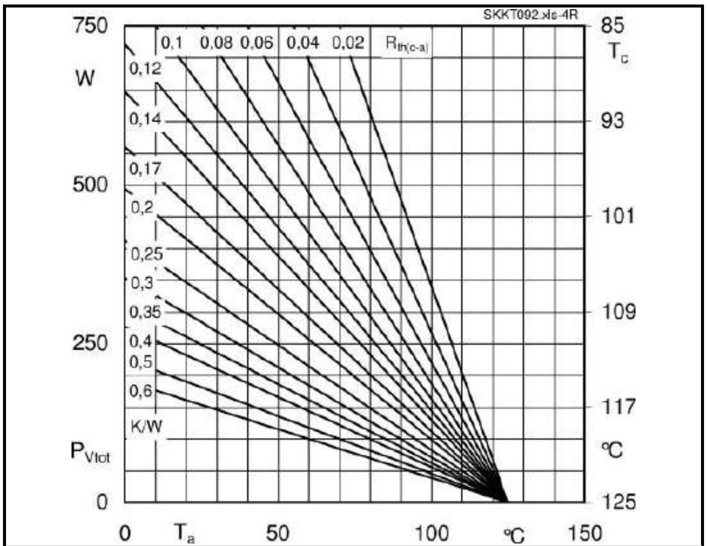


Fig. 4R Power dissipation of three modules vs. case temp.

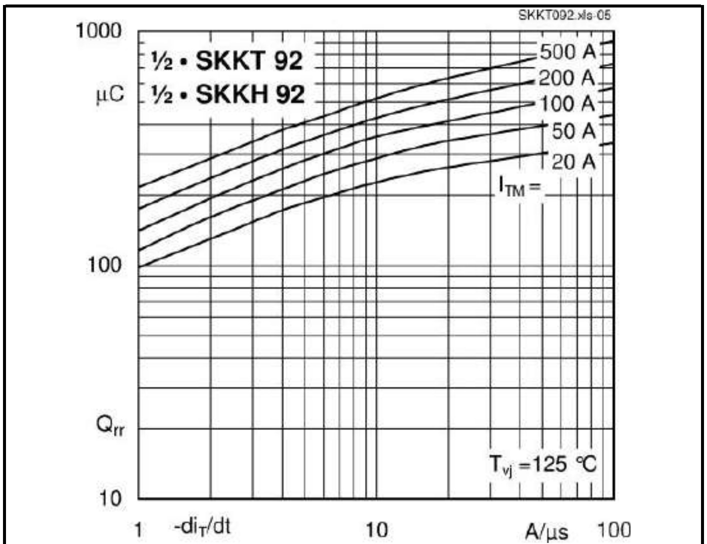


Fig. 5 Recovered charge vs. current decrease

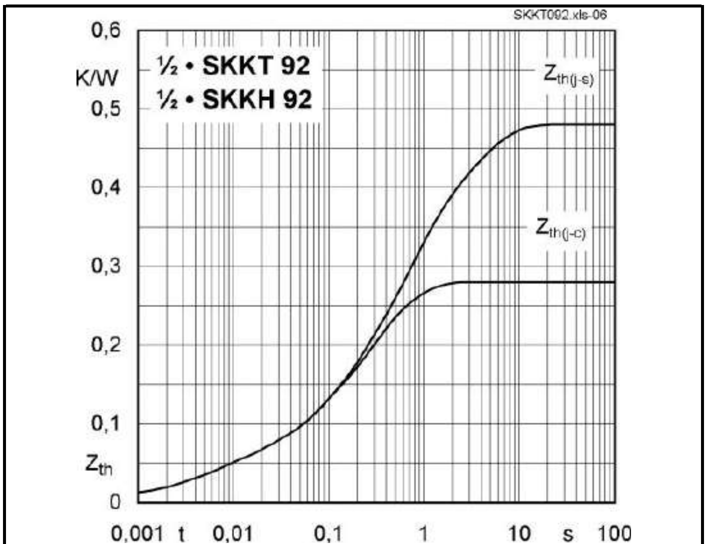


Fig. 6 Transient thermal impedance vs. time

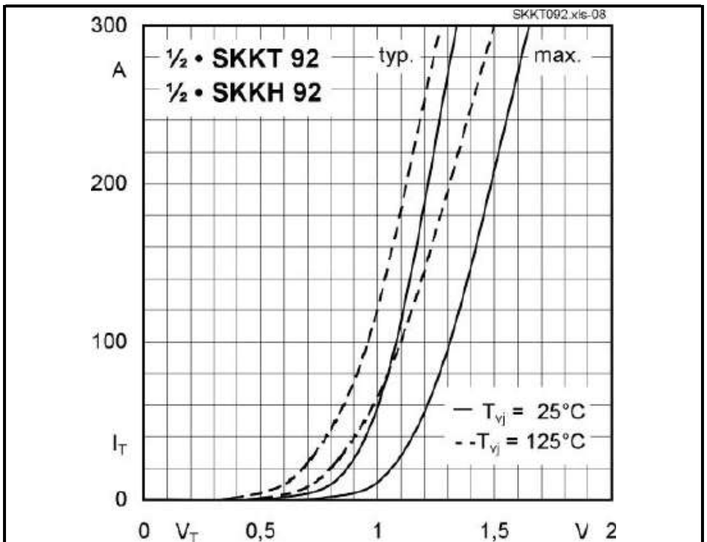


Fig. 7 On-state characteristics

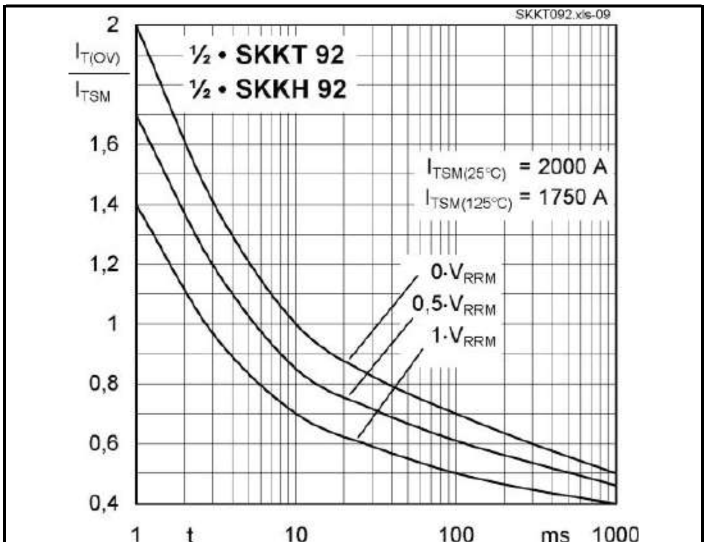


Fig. 8 Surge overload current vs. time

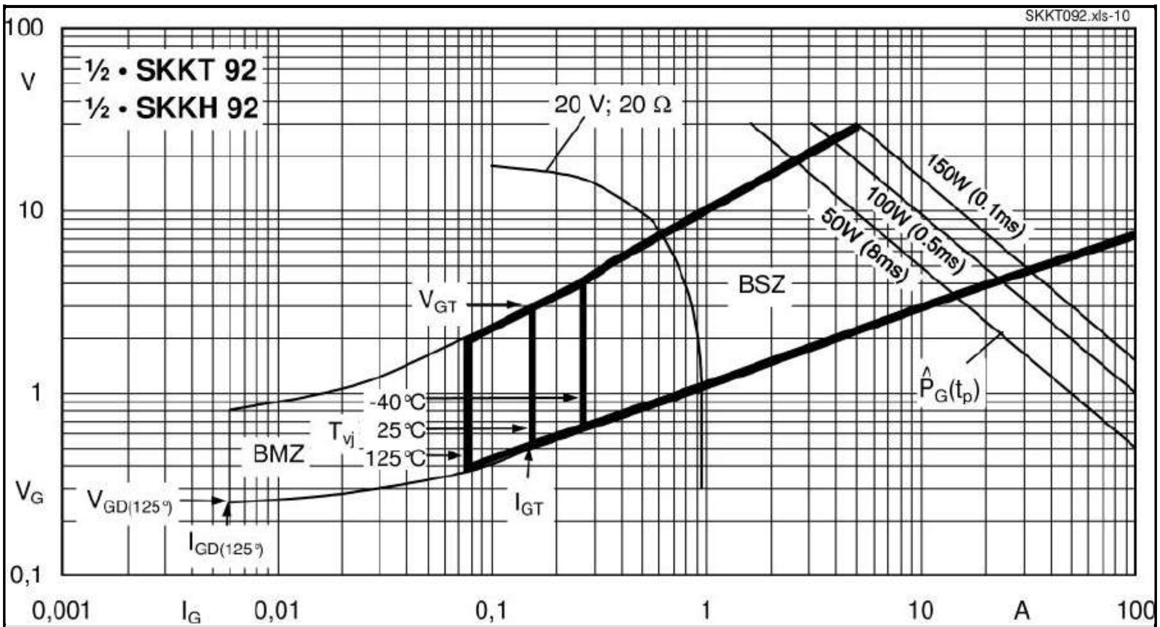
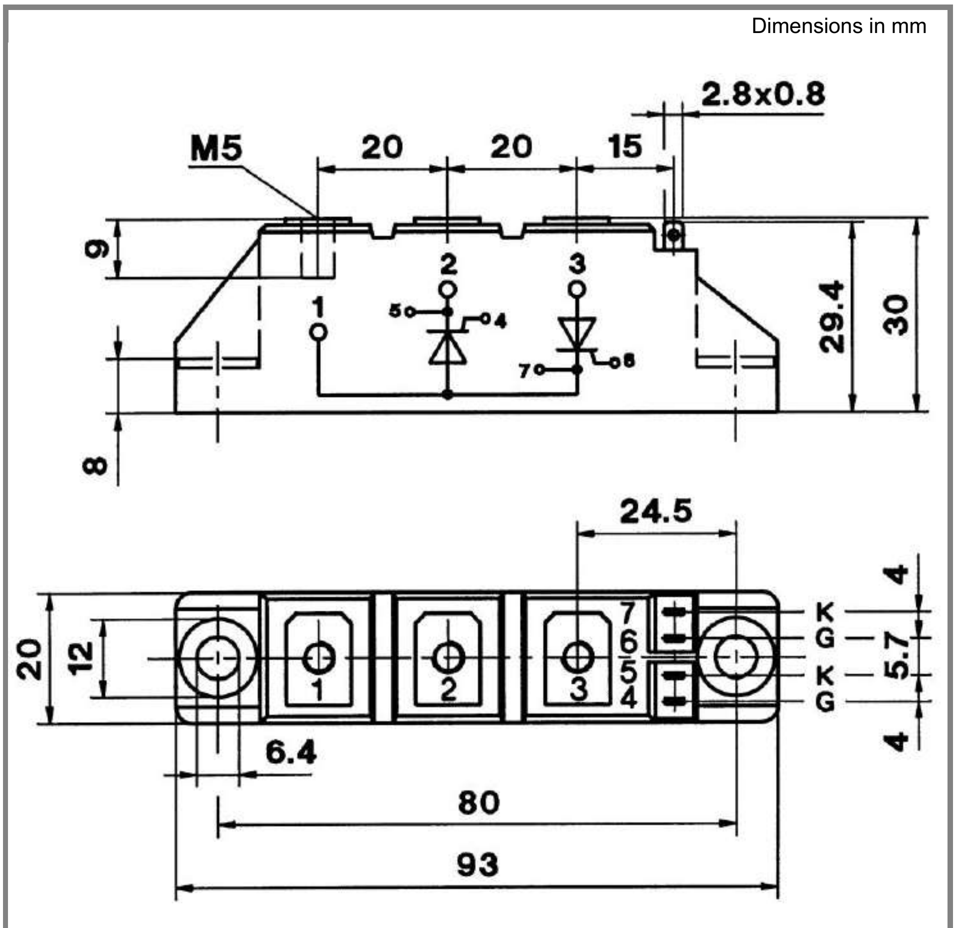
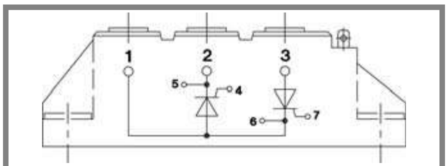
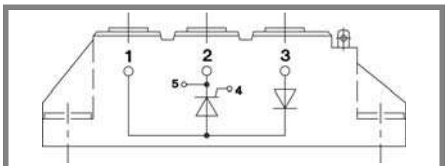


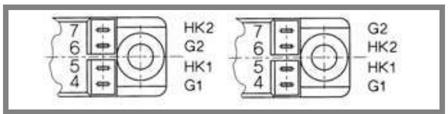
Fig. 9 Gate trigger characteristics



Case A 5 (SKKT)


Case A 48 SKKT ...B


Case A 47 SKKH



SKKT SKKT ...B

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.

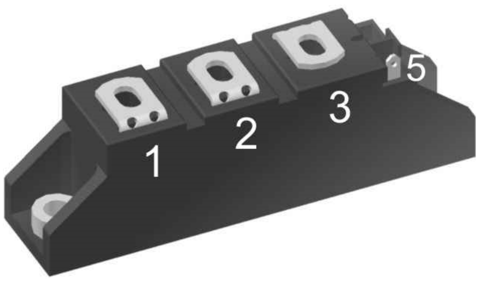
Thyristor \ Diode Module

V_{RRM} = 2x 1600 V
I_{TAV} = 27 A
V_T = 1.27 V

Phase leg

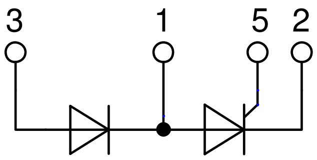
Part number

MCD26-16io8B



Backside: isolated

E72873



Features / Advantages:

- Thyristor for line frequency
- Planar passivated chip
- Long-term stability
- Direct Copper Bonded Al2O3-ceramic

Applications:

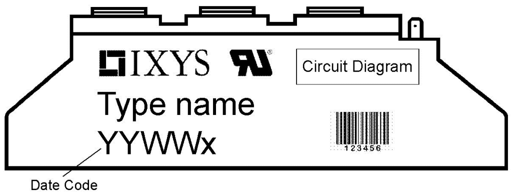
- Line rectifying 50/60 Hz
- Softstart AC motor control
- DC Motor control
- Power converter
- AC power control
- Lighting and temperature control

Package: TO-240AA

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

Rectifier				Ratings			
Symbol	**Definition**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
$V_{RSM/DSM}$	*max. non-repetitive reverse/forward blocking voltage*		T_{VJ} = 25°C			1700	V
$V_{RRM/DRM}$	*max. repetitive reverse/forward blocking voltage*		T_{VJ} = 25°C			1600	V
$I_{R/D}$	*reverse current, drain current*	$V_{R/D}$ = 1600 V	T_{VJ} = 25°C			100	µA
		$V_{R/D}$ = 1600 V	T_{VJ} = 125°C			3	mA
V_T	*forward voltage drop*	I_T = 40 A	T_{VJ} = 25°C			1.27	V
		I_T = 80 A				1.64	V
		I_T = 40 A	T_{VJ} = 125°C			1.27	V
		I_T = 80 A				1.65	V
I_{TAV}	*average forward current*	T_C = 85°C	T_{VJ} = 125°C			27	A
$I_{T(RMS)}$	*RMS forward current*	180° sine				42	A
V_{T0}	*threshold voltage*	*for power loss calculation only*	T_{VJ} = 125°C			0.85	V
r_T	*slope resistance*					11	mΩ
R_{thJC}	*thermal resistance junction to case*					0.88	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.20		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			115	W
I_{TSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			520	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			560	A
		t = 10 ms; (50 Hz), sine	T_{VJ} = 125°C			440	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			475	A
I^2t	*value for fusing*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			1.35	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			1.31	kA²s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 125°C			970	A²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			940	A²s
C_J	*junction capacitance*	V_R = 400 V f = 1 MHz	T_{VJ} = 25°C		22		pF
P_{GM}	*max. gate power dissipation*	t_P = 30 µs	T_C = 125°C			10	W
		t_P = 300 µs				5	W
P_{GAV}	*average gate power dissipation*					0.5	W
$(di/dt)_{cr}$	*critical rate of rise of current*	T_{VJ} = 125°C; f = 50 Hz	repetitive, I_T = 45 A			150	A/µs
		t_P = 200 µs; di_G/dt = 0.45 A/µs;					
		I_G = 0.45 A; V = ⅔ V_{DRM}	non-repet., I_T = 27 A			500	A/µs
$(dv/dt)_{cr}$	*critical rate of rise of voltage*	V = ⅔ V_{DRM}	T_{VJ} = 125°C			1000	V/µs
		R_{GK} = ∞; method 1 (linear voltage rise)					
V_{GT}	*gate trigger voltage*	V_D = 6 V	T_{VJ} = 25°C			1.5	V
			T_{VJ} = -40°C			1.6	V
I_{GT}	*gate trigger current*	V_D = 6 V	T_{VJ} = 25°C			100	mA
			T_{VJ} = -40°C			200	mA
V_{GD}	*gate non-trigger voltage*	V_D = ⅔ V_{DRM}	T_{VJ} = 125°C			0.2	V
I_{GD}	*gate non-trigger current*					10	mA
I_L	*latching current*	t_p = 10 µs	T_{VJ} = 25°C			450	mA
		I_G = 0.45 A; di_G/dt = 0.45 A/µs					
I_H	*holding current*	V_D = 6 V R_{GK} = ∞	T_{VJ} = 25°C			200	mA
t_{gd}	*gate controlled delay time*	V_D = ½ V_{DRM}	T_{VJ} = 25°C			2	µs
		I_G = 0.45 A; di_G/dt = 0.45 A/µs					
t_q	*turn-off time*	V_R = 100 V; I_T = 20 A; V = ⅔ V_{DRM}	T_{VJ} = 100 °C		150		µs
		di/dt = 10 A/µs dv/dt = 20 V/µs t_p = 200 µs					

Package TO-240AA				Ratings			
Symbol	**Definition**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
I_{RMS}	*RMS current*	per terminal				200	A
T_{VJ}	*virtual junction temperature*			-40		125	°C
T_{op}	*operation temperature*			-40		100	°C
T_{stg}	*storage temperature*			-40		125	°C
Weight					81		g
M_D	*mounting torque*			2.5		4	Nm
M_T	*terminal torque*			2.5		4	Nm
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*	*terminal to terminal*	13.0	9.7			mm
$d_{Spb/Apb}$		*terminal to backside*	16.0	16.0			mm
V_{ISOL}	*isolation voltage*	t = 1 second; 50/60 Hz, RMS; I_{ISOL} ≤ 1 mA		3600			V
		t = 1 minute; 50/60 Hz, RMS; I_{ISOL} ≤ 1 mA		3000			V

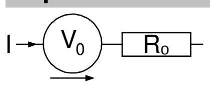


Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCD26-16io8B	MCD26-16io8B	Box	36	453277

Similar Part	Package	Voltage class
MCMA35PD1600TB	TO-240AA-1B	1600
MCMA50PD1600TB	TO-240AA-1B	1600

Equivalent Circuits for Simulation

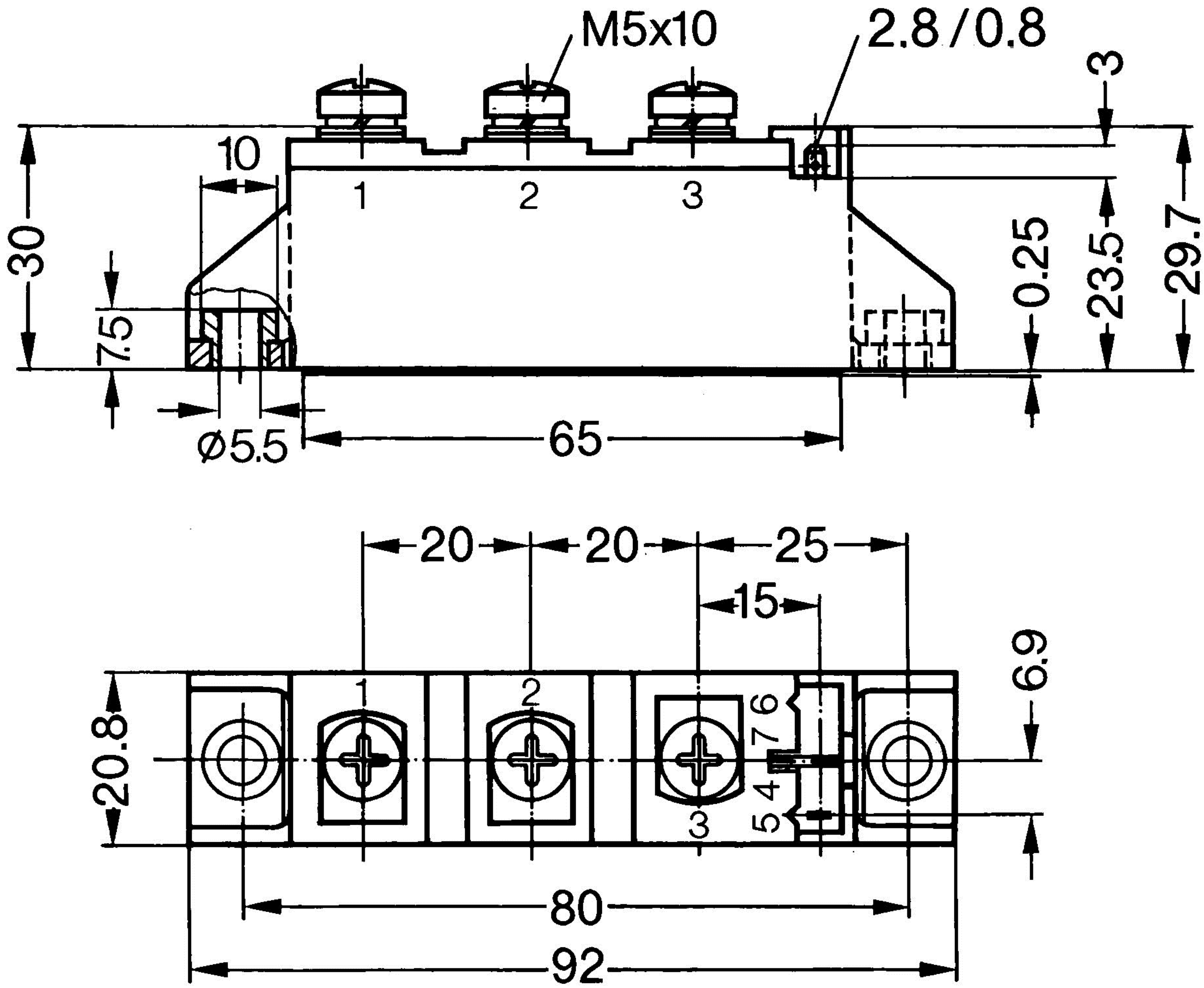
** on die level* T_{VJ} = 125 °C

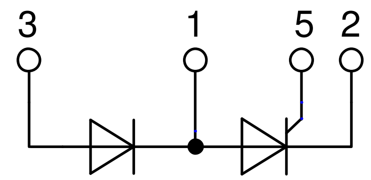


Thyristor

$V_{0\,max}$	*threshold voltage*	0.85	V
$R_{0\,max}$	*slope resistance **	9.8	mΩ

Outlines TO-240AA





Thyristor

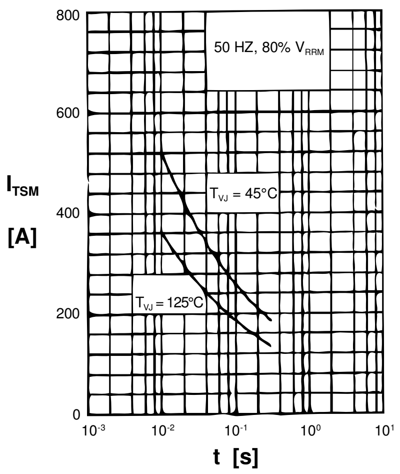


Fig. 1 Surge overload current
I_{TSM}: Crest value, t: duration

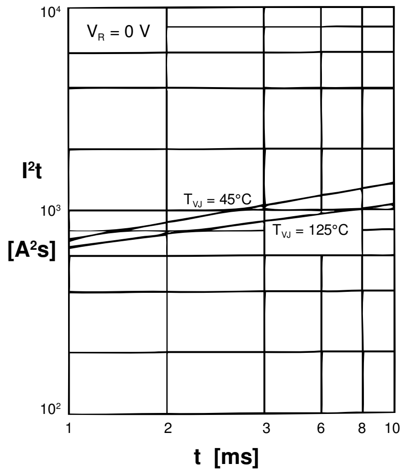


Fig. 2 I^2t versus time (1-10 ms)

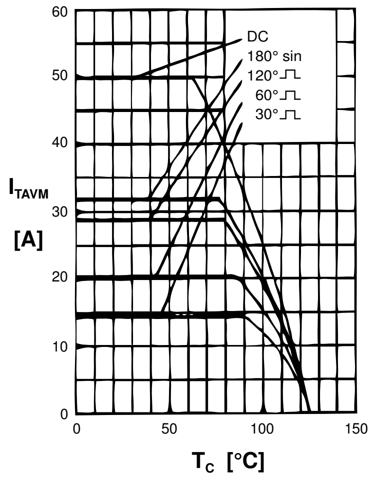


Fig. 3 Max. forward current at case temperature

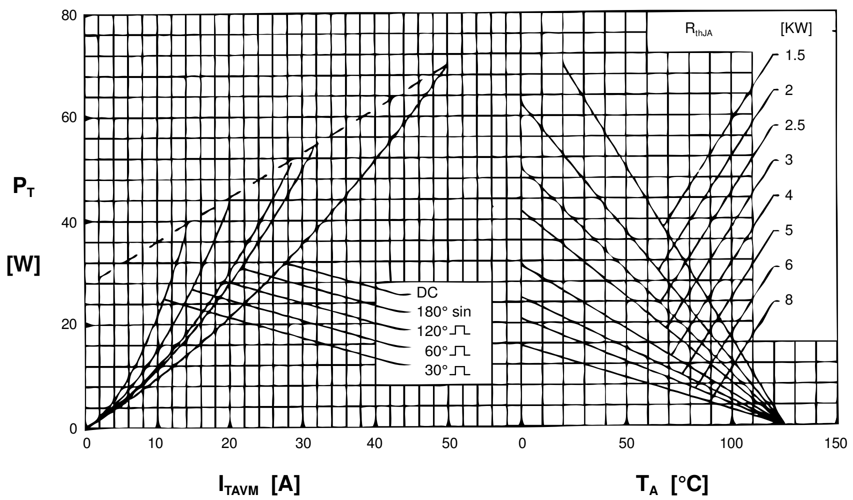


Fig. 4 Power dissipation versus onstate current & ambient temp. (per thyristor)

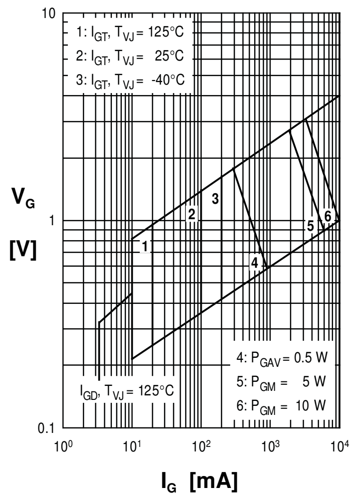


Fig. 5 Gate trigger charact.

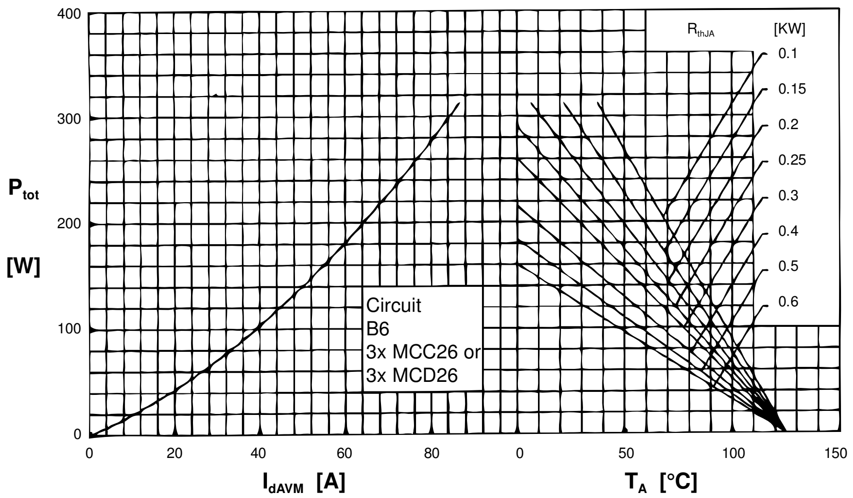


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

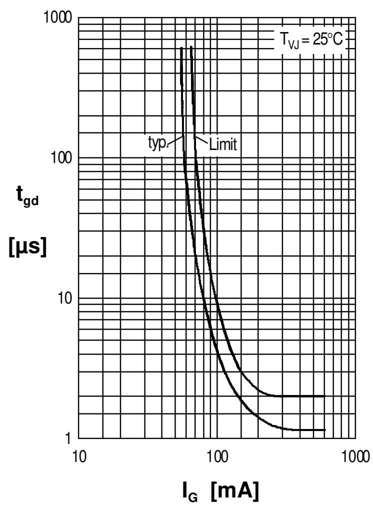


Fig. 7 Gate trigger delay time

Rectifier

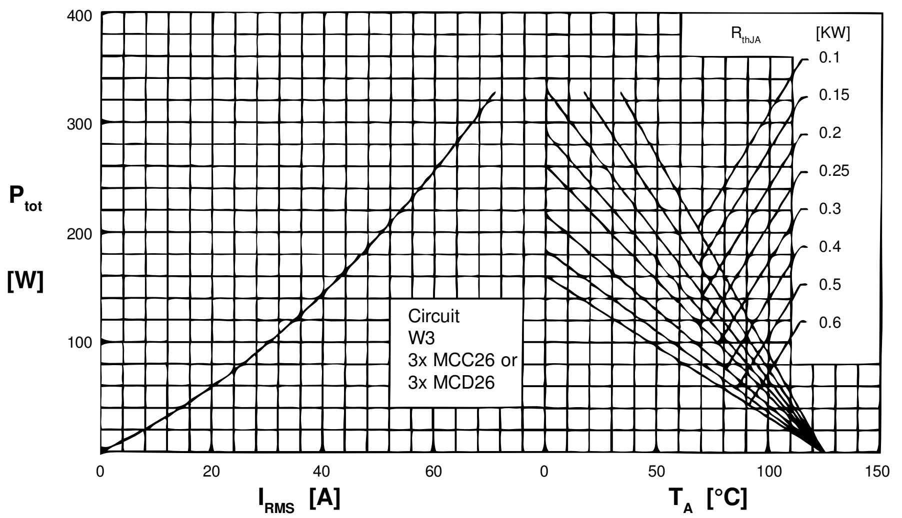


Fig. 8 Three phase AC-controller: Power dissipation vs. RMS output current and ambient temperature

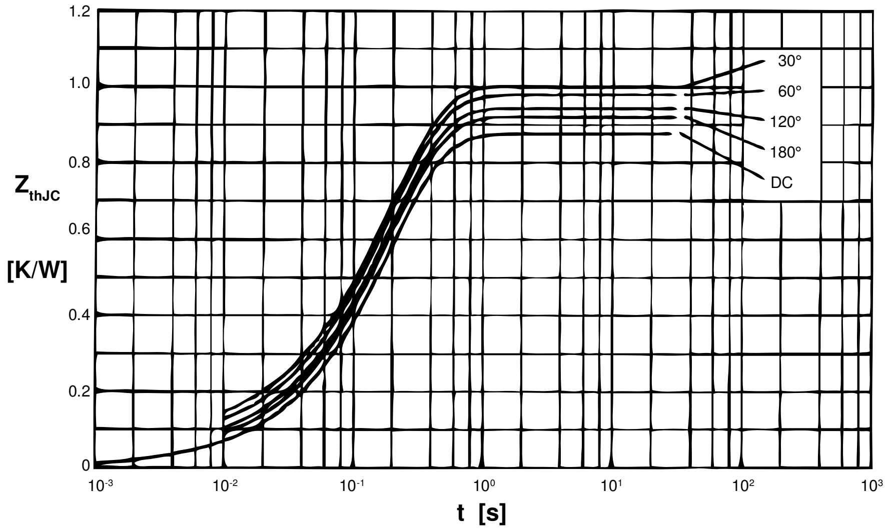


Fig. 9 Transient thermal impedance junction to case (per thyristor)

R_{thJC} for various conduction angles d:

d	R_{thJC} [K/W]
DC	0.88
180°	0.92
120°	0.95
60°	0.98
30°	1.01

Constants for Z_{thJC} calculation:

i	R_{thi} [K/W]	t_i [s]
1	0.019	0.0031
2	0.029	0.0216
3	0.832	0.1910

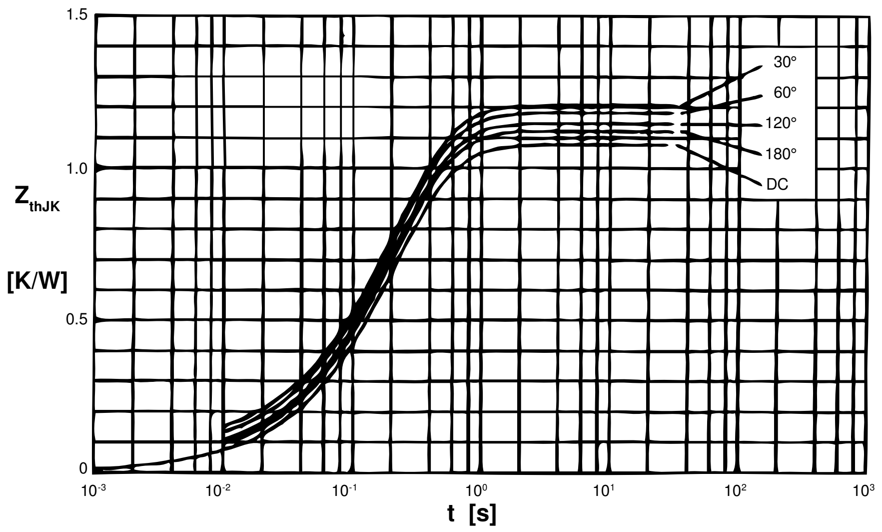


Fig. 10 Transient thermal impedance junction to heatsink (per thyristor)

R_{thJK} for various conduction angles d:

d	R_{thJK} [K/W]
DC	1.08
180°	1.12
120°	1.15
60°	1.18
30°	1.21

Constants for Z_{thJK} calculation:

i	R_{thi} [K/W]	t_i [s]
1	0.019	0.0031
2	0.029	0.0216
3	0.832	0.1910
4	0.200	0.4500

back zurück

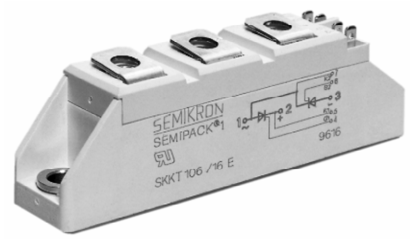
SEMIKRON

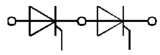
V_{RSM}	V_{RRM} V_{DRM}	(dv/dt)$_{cr}$	I_{TRMS} (maximum value for continuous operation) 75 A			
			I_{TAV} (sin. 180; T_{case} = 68 °C) 48 A			
V	V	V/µs				
500	400	500	–	–	SKKH 41/04 D	–
700	600	500	SKKT 41/06 D	SKKT 42/06 D	SKKH 41/06 D	SKKH 42/06 D
900	800	500	SKKT 41/08 D	SKKT 42/08 D[1)]	SKKH 41/08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

Symbol	Conditions	SKKT 41 SKKH 41	SKKT 42 SKKT 42B SKKH 42	Units
I_{TAV}	sin. 180; T_{case} = 74 °C	48		A
	T_{case} = 85 °C	40		A
I_D	B2/B6 | T_{amb} = 45 °C; P 3/180	50 / 60		A
	T_{amb} = 35 °C; P 3/180 F	85 / 110		A
I_{RMS}	W1/W3 | T_{amb} = 35 °C; P 3/180 F	110 / 3 x 85		A
I_{TSM}	T_{vj} = 25 °C; 10 ms	1 000		A
	T_{vj} = 125 °C; 10 ms	850		A
i^2t	T_{vj} = 25 °C; 8,3 ... 10 ms	5 000		A^2s
	T_{vj} = 125 °C; 8,3 ... 10 ms	3 600		A^2s
t_{gd}	T_{vj} = 25 °C; I_G = 1 A; di_G/dt = 1 A/µs	1		µs
t_{gr}	V_D = 0,67 · V_{DRM}	2		µs
$(di/dt)_{cr}$	T_{vj} = 125 °C	150		A/µs
t_q	T_{vj} = 125 °C	typ. 80		µs
I_H	T_{vj} = 25 °C; typ./max.	150 / 250		mA
I_L	T_{vj} = 25 °C; R_G = 33 Ω; typ./max.	300 / 600		mA
V_T	T_{vj} = 25 °C; I_T = 200 A	max. 1,95		V
$V_{T(TO)}$	T_{vj} = 125 °C	1		V
r_T	T_{vj} = 125 °C	4,5		mΩ
I_{DD}; I_{RD}	T_{vj} = 125 °C; V_{RD} = V_{RRM}; V_{DD} = V_{DRM}	max. 15 [3)]		mA
V_{GT}	T_{vj} = 25 °C; d.c.	3		V
I_{GT}	T_{vj} = 25 °C; d.c.	150		mA
V_{GD}	T_{vj} = 125 °C; d.c.	0,25		V
I_{GD}	T_{vj} = 125 °C; d.c.	6		mA
R_{thjc}	cont. } per thyristor / per module	0,65 / 0,33		°C/W
	sin. 180 } per thyristor / per module	0,69 / 0,35		°C/W
	rec. 120 } per thyristor / per module	0,73 / 0,37		°C/W
R_{thch}		0,2 / 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	3600 / 3000		V~
M_1	to heatsink } SI (US) units	5 (44 lb. in.) ± 15 %[4)]		Nm
M_2	to terminals } SI (US) units	3 (26 lb. in.) ± 15 %		Nm
a		5 · 9,81		m/s^2
w	approx.	95		g
Case	→ page B 1 – 95	SKKT 41: A 5; SKKH 41: A 6; SKKH 42: A 47	SKKL 42: A 59; SKKT 42: A 46; SKKT 42B: A 48	

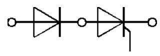
SEMIPACK® 1
Thyristor / Diode Modules

SKKT 41 **SKKH 41**
SKKT 42 **SKKH 42**
SKKT 42B **SKKL 42** [2)]

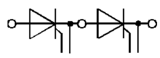




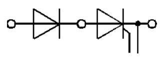
SKKT 41



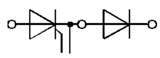
SKKH 41



SKKT 42
SKKT 42B



SKKH 42



SKKL 42

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

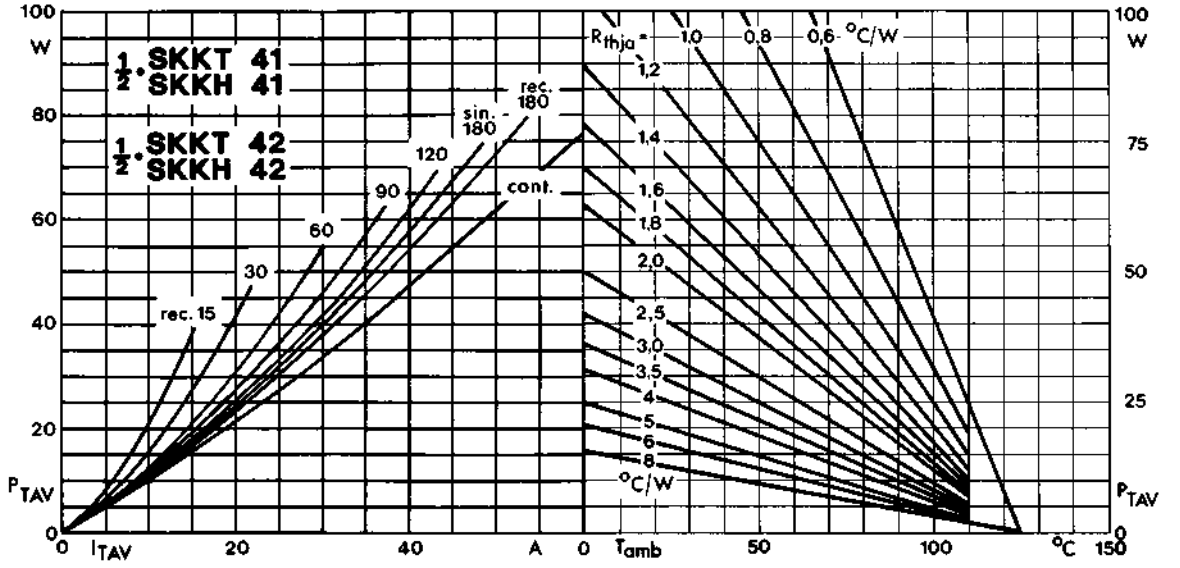


Fig. 1 Power dissipation per thyristor vs. on-state current and ambient temperature

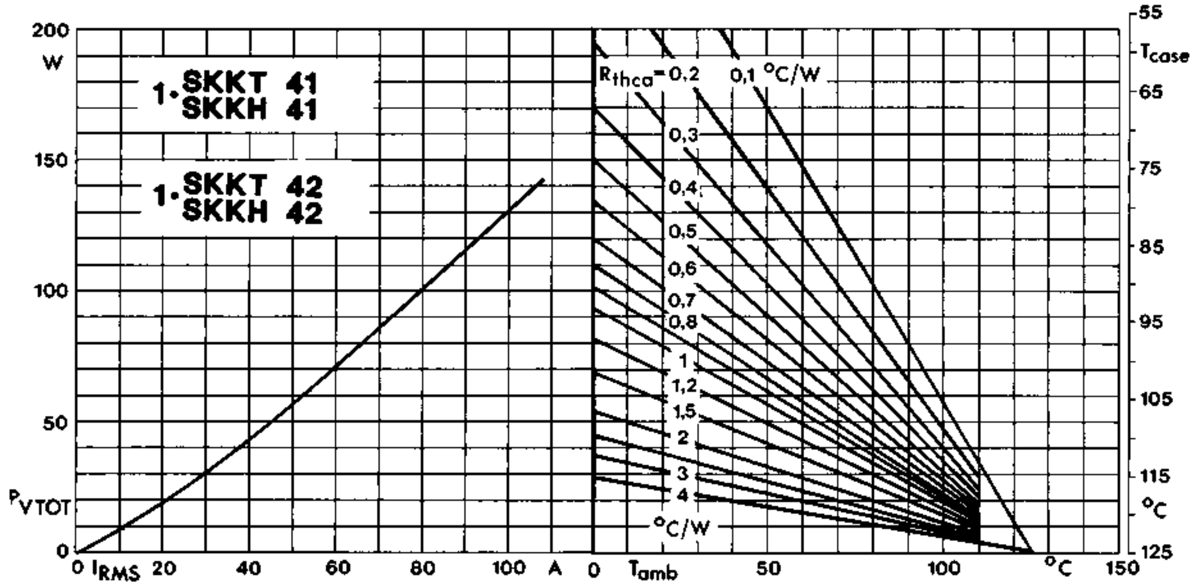


Fig. 2 Power dissipation per module vs. rms current and case temperature

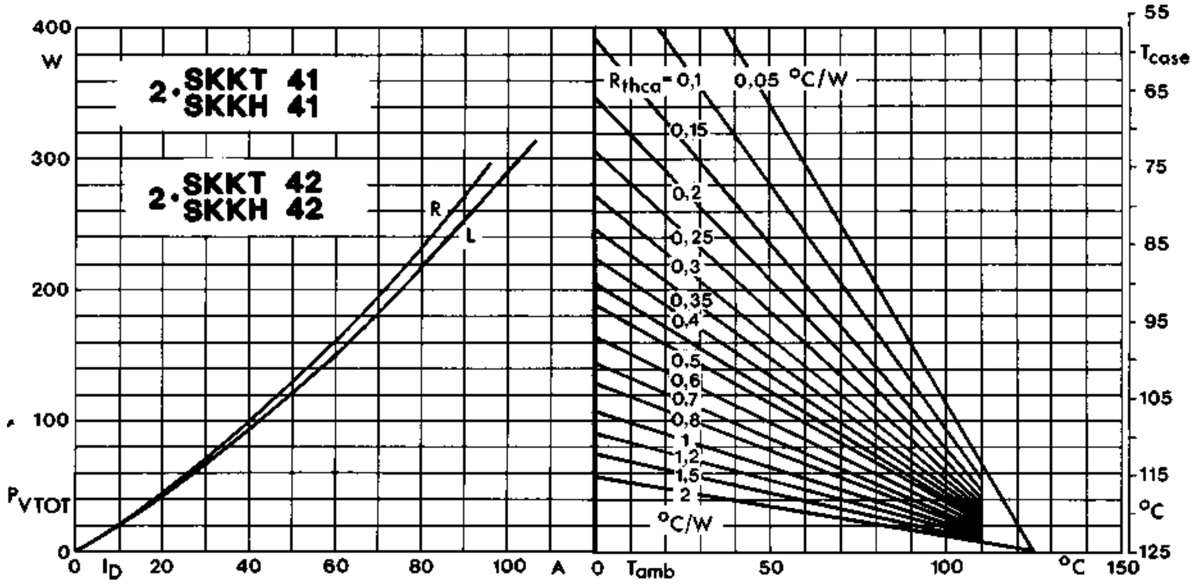


Fig. 3 Power dissipation of two modules vs. direct current and case temperature

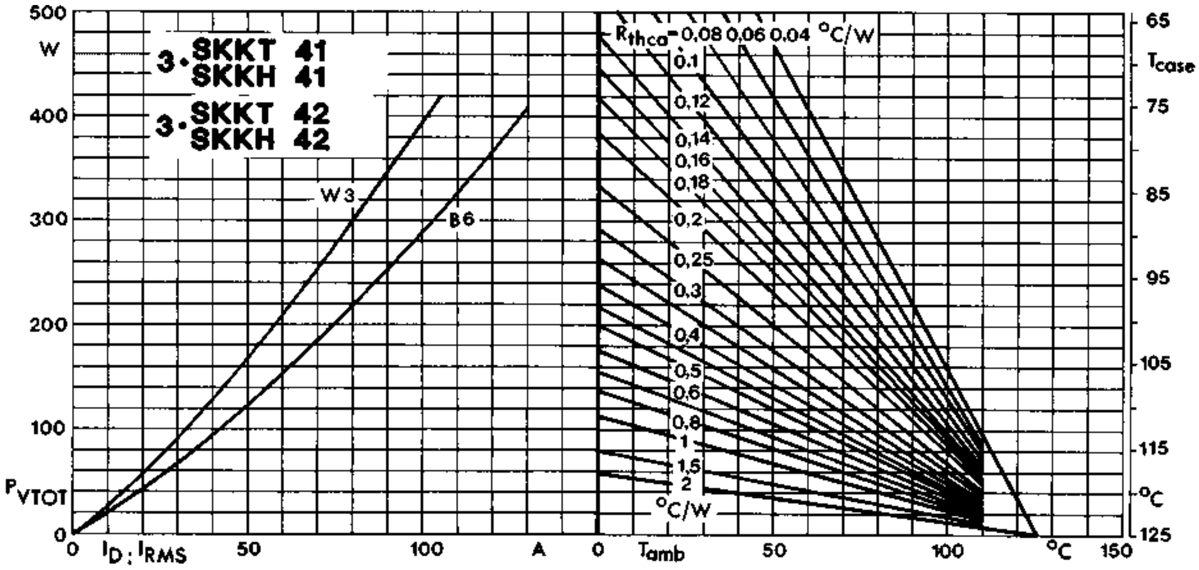


Fig. 4 Power dissipation of three modules vs. direct and rms current and case temperature

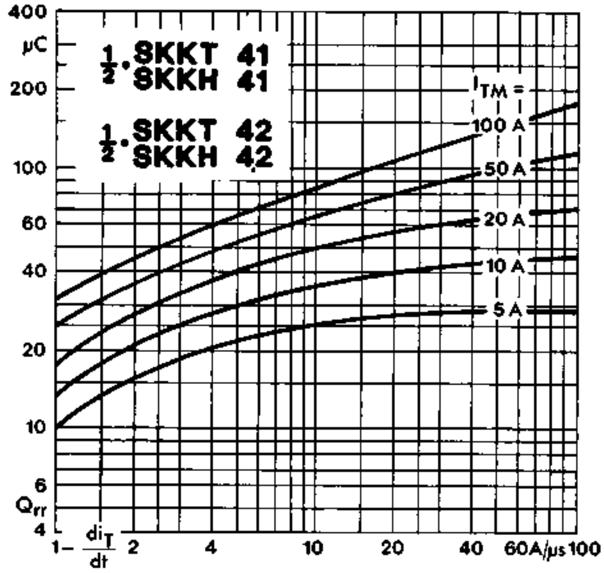


Fig. 5 Recovered charge vs. current decrease

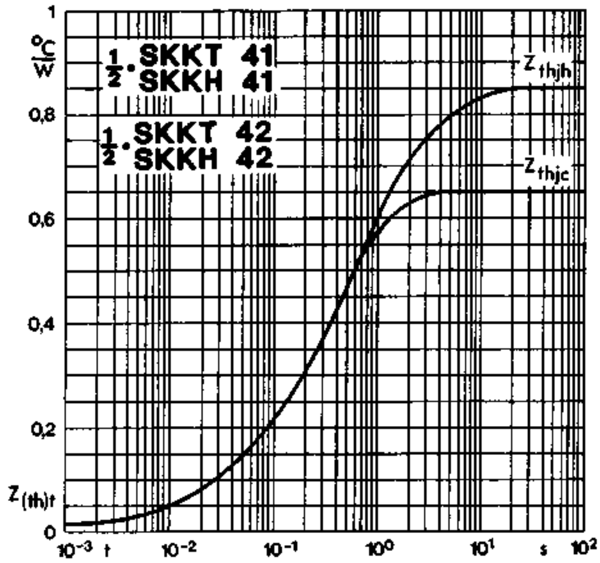


Fig. 6 Transient thermal impedance vs. time

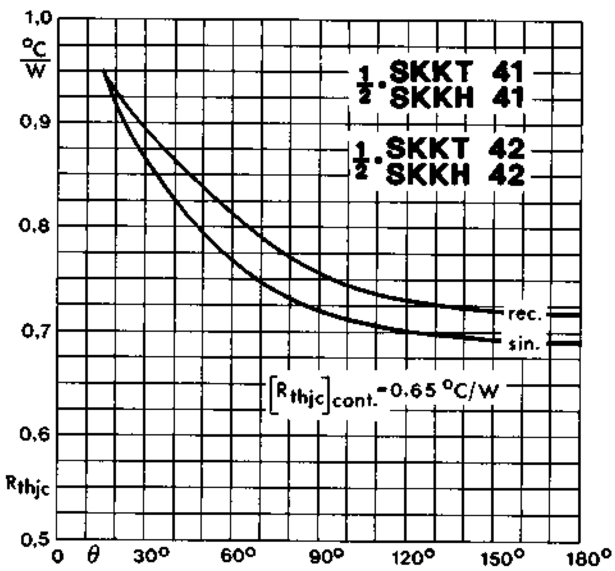


Fig. 7 Thermal resistance vs. conduction angle

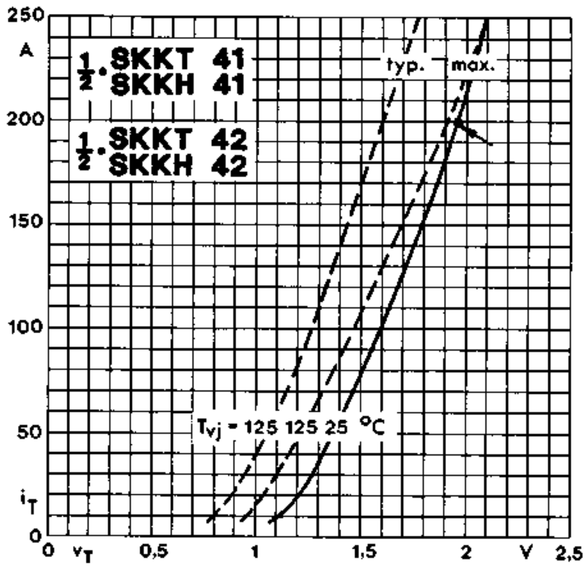


Fig. 8 On-state characteristics

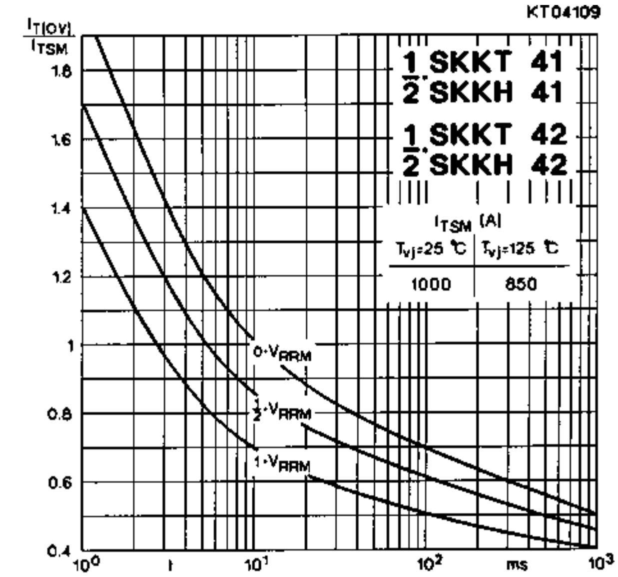


Fig. 9 Surge overload current vs. time

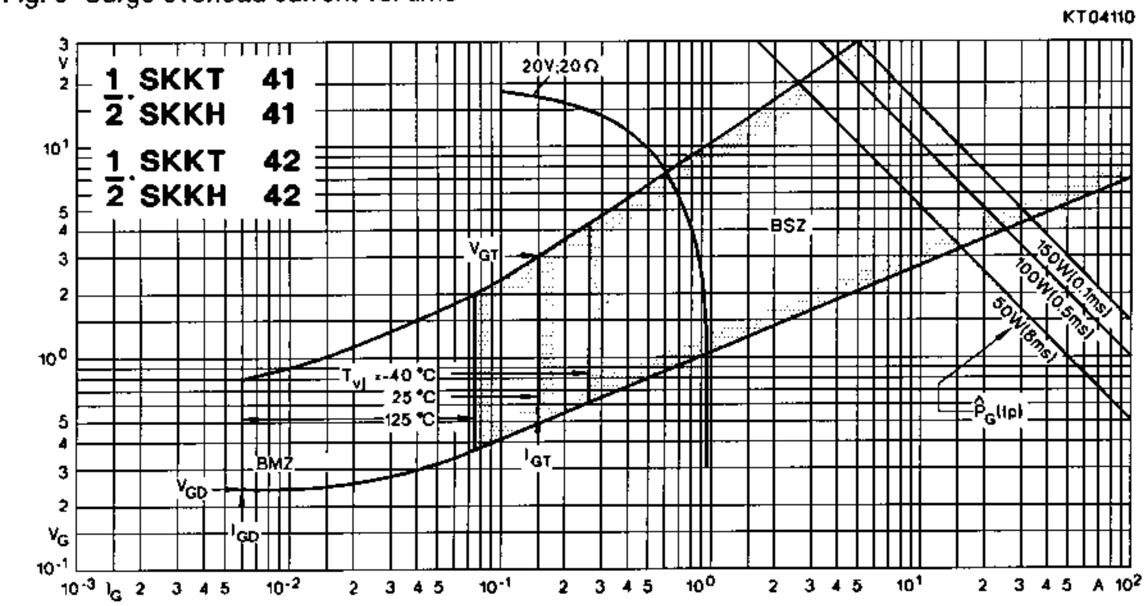


Fig. 10 Gate trigger characteristics

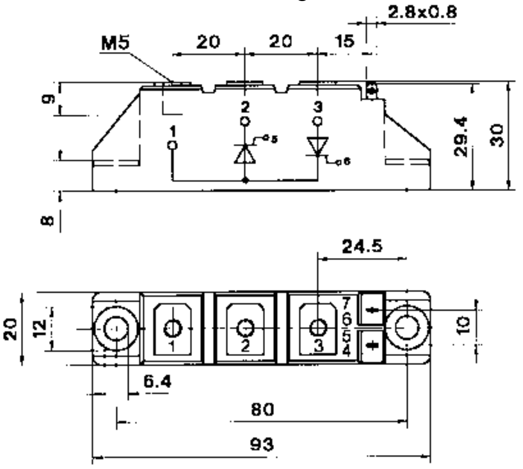
SKKT 19 . . . 105

Case A 5

IEC 192-2: A 77 A
JEDEC: TO-240 AA

SEMIPACK® 1

UL recognized, file no. E 63 532



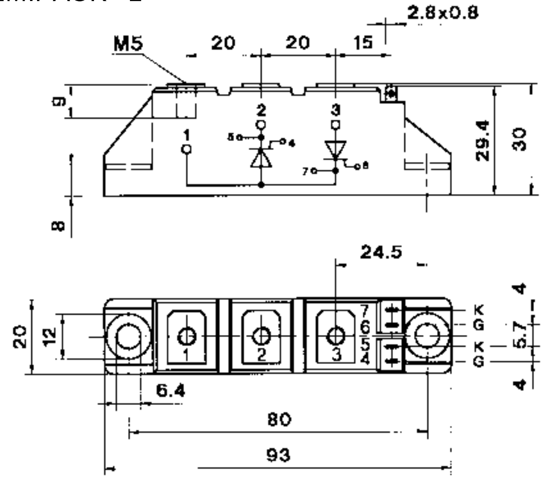
Dimensions in mm

SKKT 20/ . . . 106/

Case A 46

IEC 192-2: A 77 A
JEDEC: TO-240 AA

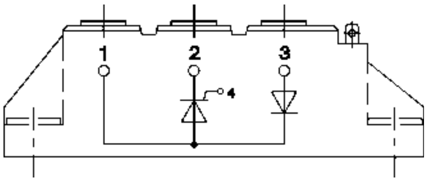
SEMIPACK® 1



Dimensions in mm

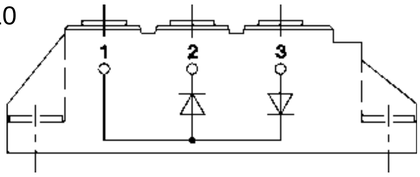
SKKH 26 . . . 105

Case A 6



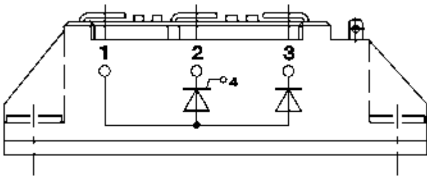
SKKD 26 . . . 100

Case A 10



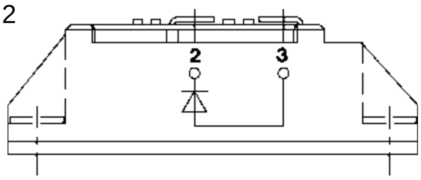
SKNH 56 . . . 91

Case A 7



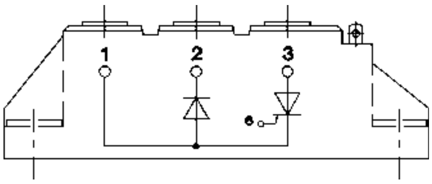
SKKE 81

Case A 12



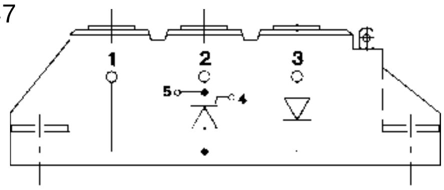
SKKL 56 . . . 105

Case A 9



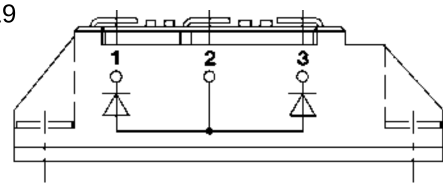
SKKH 27 . . . 106

Case A 47



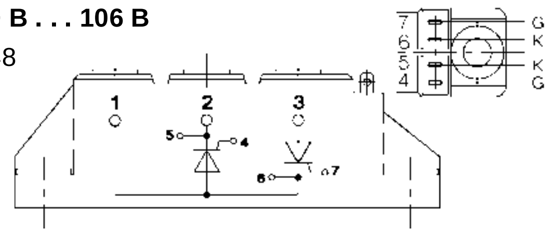
SKND 46 . . . 81

Case A 19



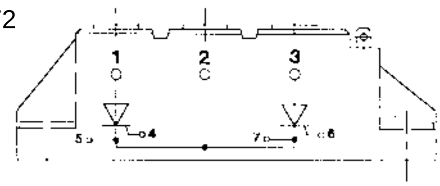
SKKT 20 B . . . 106 B

Case A 48



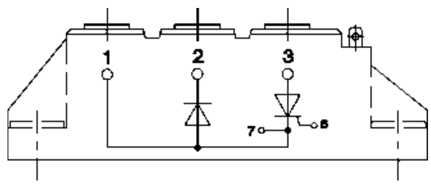
SKMT 92

Case A 72



SKKL 42 . . . 106

Case A 59



Mini SKiip

SEMITOP

SEMITRANS

SEMIX

SKIM

Full SiC

Hybrid SiC

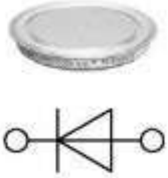
SKiiP

SEMIPACK

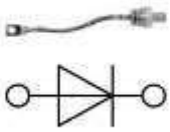
SEMITOP

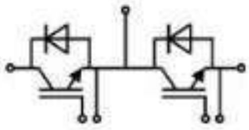
SEMIX

SEMISTART



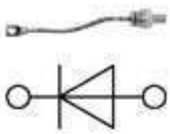
Power Bridge Rectifiers





SEMISTACK Classics

SEMIPONT



SEMITEACH

SEMIX

PT 22b3 RoHS

Pulse Transformer

Part Number: 97492890
Manufacturer: SEMIKRON
datasheet

Product Details >>

Current delivery time approx. 10 weeks

Axial fan 230V 119x38m 150m3/h

Fan

V 230 V

Part Number: 30031061
Manufacturer: SEMIKRON
datasheet

Thermal paste P12

Thermal paste

Part Number: 31867700
Manufacturer: SEMIKRON
datasheet