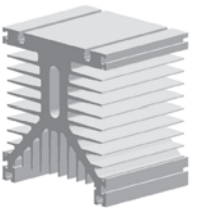
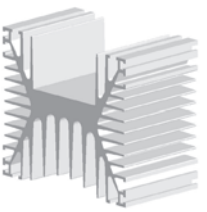
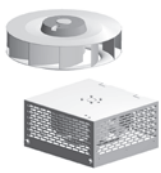
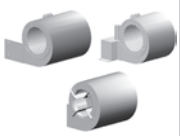
Accessories - Heatsinks

Type	Suitable for	R_{thsa} natural cooling K/W	R_{thsa} forced air or water cooling K/W	w kg	w kg/m	Picture
Forced-air cooled						
P 1	Studs or modules	0.7	0.4	-	11.3	
P 3	Isolated base modules	0.45	0.14	-	17.6	
Natural cooled						
P 4 [5]	Stud device	0.27	-	-	20.6	

footnotes

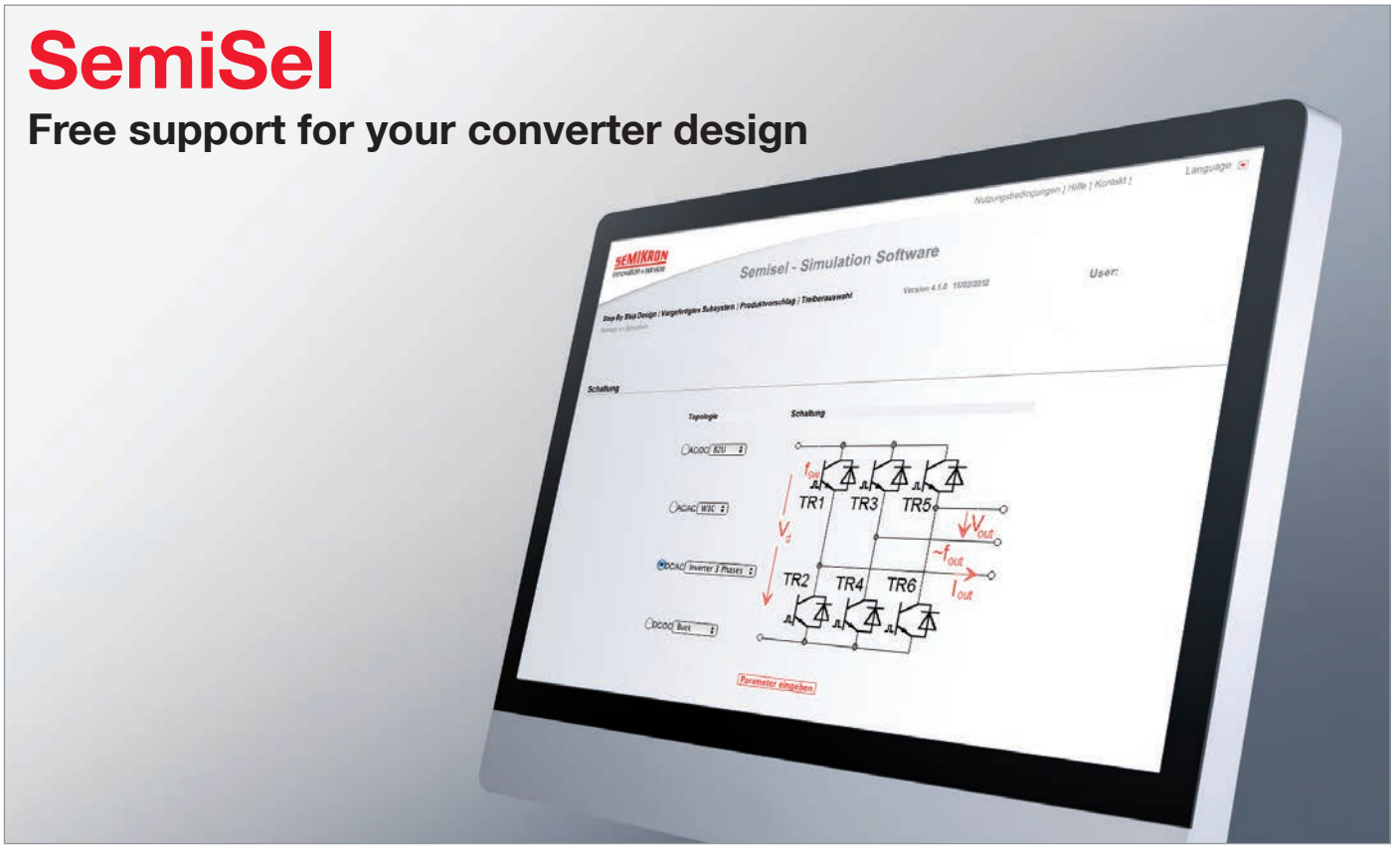
[5] Non standard item, available on request only, typical minimum batch quantities of 60 pieces will apply

Accessories - Fans

Type	V_{in} V	f Hz	V_{air} / t m³/h	P_{max} V	T_{Amax} °C	w kg	Noise dB	Picture
Axial Fans								
SKF 3-230-01	230	50	159 / 190	15 / 14	70	0.55	37 / 41	
Centrifugal Fans								
SKF 17A-230-11	230	50	850 / 930	110 / 120	70	2	74	
SKF N4-230-01	230	50	1500 / 1700	210 / 280	80 / 70	3.1	76 / 78	
Radial Fans								
SKF 16A-230-11	230	50	615 / 575	135 / 154	50 / 40	3.6	55 / 57	
SKF 16O-230-02	230	50	1150	260	40	4.2	-	
SKF 16B-230-01	230	50	640	167	70	3.75	58	

SemiSel

Free support for your converter design



Applications

SemiSel is the SEMIKRON online calculation and simulation tool for losses, temperatures and optimal choice of power electronic components (www.semikron.com). Due to the ever-present cost pressure, the optimal choice of power conductor components is a must-have. The days when a module was purchased solely on the basis of its nominal current are over. Today, increased product diversity in the field of power semiconductors calls for comparisons beyond the information contained in data sheets. Only a comparison under application-oriented conditions, such as voltage level, switching frequency or cooling conditions, can demonstrate differences in the performance of the devices available. Miniaturisation combined with higher power densities makes it essential to have the right thermal design for heat dissipation.

Benefits

The risk arising from variations in both component and electrical circuit parameters should be considered in proper circuit design. These facts are only a few of the many points that need to be considered when developing a power electronics system. And this is where efficient support is provided by SemiSel to enable developers to make the right decision. Many manufacturers of power semiconductors offer tools for device selection, yet, SemiSel is still the most comprehensive free tool of its kind that can be used to investigate different power electronic circuits under different operating conditions. This programme has been available online since 2001, and it has been continually improved and expanded since its introduction. It provides a good compromise of user-friendliness, applications and speed. The calculation functions range from product proposal for nominal operating conditions to drivers and heat sink specifications and product selections for specific overload conditions and complex calculations, such as complete load cycles that take into account temperature cycling problems.

semisel.semikron.com

Abbreviations

Acronym	English
E_{off}	Energy dissipation during turn-off
E_{on}	Energy dissipation during turn-on
E_{rr}	Energy dissipation during reverse recovery (diode)
f	Operating frequency
f_{max}	Maximum frequency
I_C	Continuous collector current
I_{Cnom}	Nominal collector current
I_D	Direct output current (of a rectifier connection)
I_D	Continuous drain current (MOSFET)
I_F	Forward current (actual value)
I_{FAV}	Mean forward current
I_{FSM}	Surge forward current
I_{GT}	Minimum guaranteed gate trigger current
$I_{outPEAK}$	Output peak current (driver)
$I_{overload}$	Overload current for a specified time
i_T	On-State current (instantaneous value)
I_{TAV}	Mean on-state current
I_{TSM}	Surge on-state curren
Qout/pulse	Output charge per pulse (Driver)
Q_{rr}	Reverse recovery charge
$R_{DS(on)}$	Drain-source on-resistance (MOSFET)
r_T	On-state slope resistance, forward slope resistance (Thyristor)
$R_{th(c-s)}$	thermal resistance case to heat sink
$R_{th(j-a)}$	Thermal resistance junction to ambient
$R_{th(j-c)}$	Thermal resistance junction to case
$R_{th(j-s)}$	Thermal resistance junction to sink
$R_{th(s-a)}$	Thermal resistance heat sink to ambient
T_c	Case temperature
T_j	Junction temperature
t_q	Circuit commutated turn-off time (thyristor)
T_s	Heatsink temperature
V_{air}/t	Air flow
V_{CE}	Collector-emitter voltage
V_{CEsat}	Collector-emitter saturation voltage
V_{DRM}	Repetitive peak off-state voltage
V_{DS}	Drain-source voltage
V_F	Forward voltage
$V_{G(off)}$	Turn-off gate voltage level (driver)
$V_{G(on)}$	Turn-on gate voltage level (driver)
V_{GT}	Gate trigger voltage
V_{in}	Input voltage
$V_{isol(IO)}$	Isolation test voltage (r.m.s. /1 min.) input-output (driver)
V_{RRM}	Repetitive peak reverse voltage
V_T	On-state voltage (Thyristor)
w	Weight

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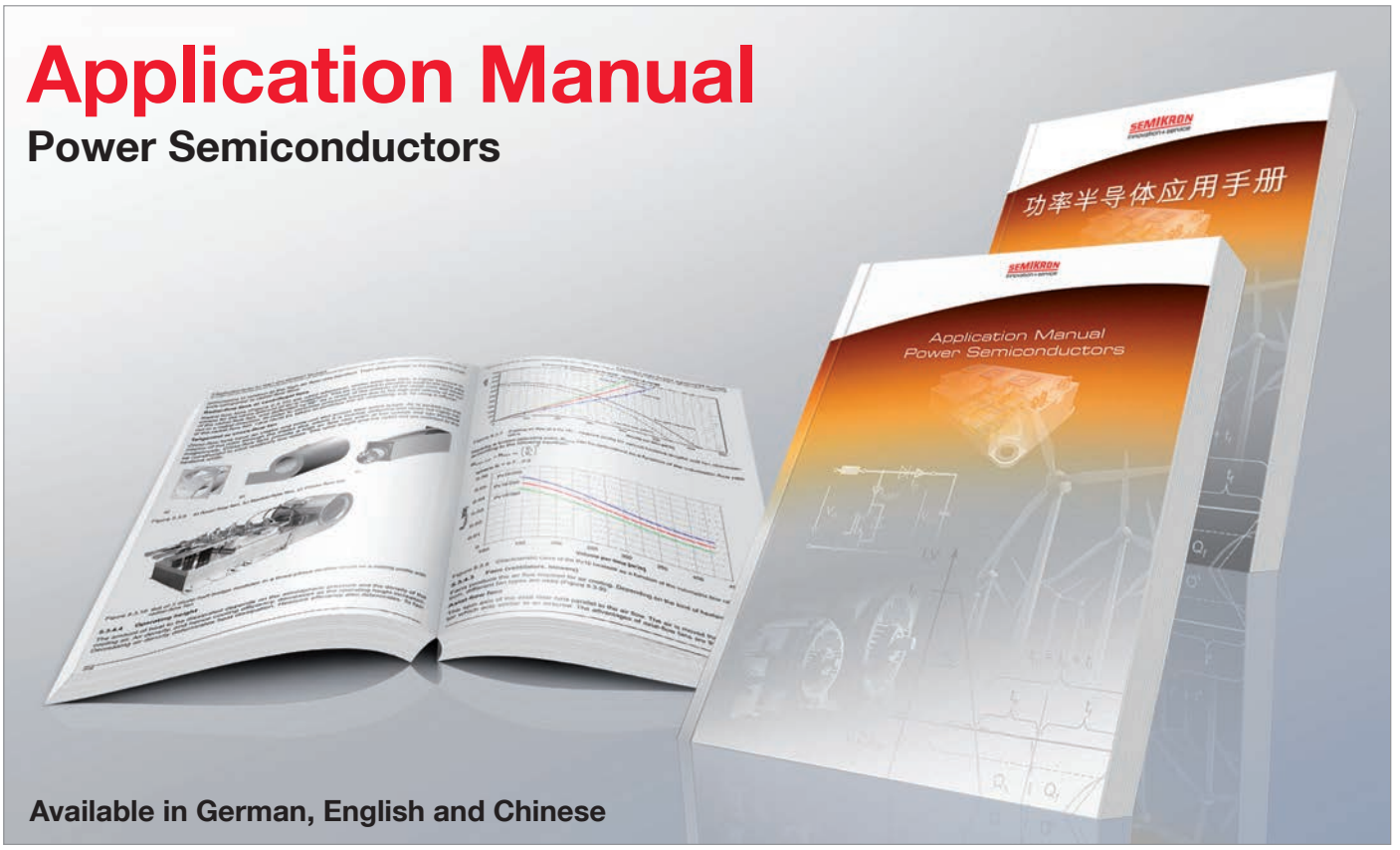

465 pages of acquired knowledge

IGBT´s and MOSFET´s integrated in power modules are the key components of power electronic circuits today and are continuously finding their way into new fields of application. This goes hand in hand with the ever increasing call for line rectifier diodes and thyristors as a cost-effective way of connecting the circuits to the power grid. The aim of the application manual is to provide users with support in selecting and using such devices. The manual contains basic background knowledge on semiconductors in order to enable a better understanding of application possibilities and limits. More in-depth explanations are given on packaging and assembly technologies, because of the major influence they have on module properties and limitations in field applications. Statements on reliability data, life cycle analyses and key test processes round off the chapter. The Application Manual also explains the structure of datasheets and provides notes to help users better understand datasheet parameters.

The Application Manual contains detailed application-related information on electrical configuration under important operating conditions, driver and protection elements for semiconductors; thermal dimensioning and cooling, tips on parallel and series connection, assembly tips for optimized power layouts with regard to parasitic elements and the requirements arising from specific ambient conditions.

This book is written for users and provides help with component selection and design-in work. It couples a vast wealth of experience with detailed practical knowledge, the result being a vast pool of information which up till now has been spread across various individual articles or in the minds of experts only.

Can be ordered at www.sindopower.com

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