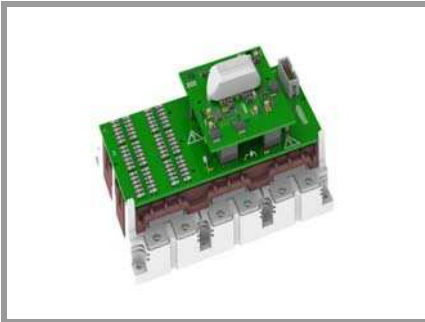


Board 93 GB SKYPER 42 R



SKYPER®

IGBT Driver Core

Board 93 GB SKYPER 42 R

Preliminary Data

Features

- Two output channels
- Gold nickel finish
- Failure management

Typical Applications*

- Adaptor board for SKYPER 42 IGBT drivers in bridge circuits for industrial applications
- PCB with gold plating
- DC bus up to 1200V

Footnotes

Isolation test voltage with external high voltage diode

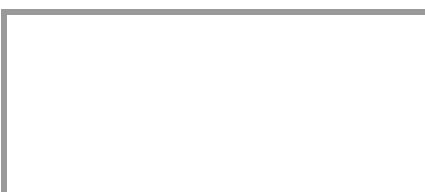
The isolation test is not performed as a series test at SEMIKRON

The driver power can be expanded to 50µC with external boost capacitors

Isolation coordination in compliance with EN50178 PD2

Operating temperature is real ambient temperature around the driver core

Degree of protection: IP00



Adaptor board

Absolute Maximum Ratings			
Symbol	Conditions	Values	Unit
V_s	Supply voltage primary	16	V
$I_{outPEAK}$	Output peak current	30	A
$I_{outAVmax}$	Output average current	150	mA
f_{max}	Max. switching frequency	100	kHz
V_{CE}	Collector emitter voltage sense across the IGBT	1700	V
V_{isolIO}	Isolation test voltage input - output (AC, rms, 2s)	4000	V
V_{isolPD}	Partial discharge extinction voltage, rms, $Q_{PD} \leq 10pC$	1500	V
V_{isol12}	Isolation test voltage output 1 - output 2 (AC, rms, 2s)	1500	V
$R_{Gon\ min}$	Minimum rating for external R_{Gon}	0.8	Ω
$R_{Goff\ min}$	Minimum rating for external R_{Goff}	0.8	Ω
T_{op}	Operating temperature	-40 ... 85	$^{\circ}C$
T_{stg}	Storage temperature	-40 ... 85	$^{\circ}C$

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
V_s	Supply voltage primary side	14.4	15	15.6	V
V_i	Input signal voltage on / off		15 / 0		V
V_{IT+}	Input treshold voltage HIGH			12.3	V
V_{IT-}	Input threshold voltage (LOW)	4.6			V
$V_{G(on)}$	Turn on output voltage		15		V
$V_{G(off)}$	Turn off output voltage		-8		V
$t_{d(on)IO}$	Input-output turn-on propagation time		1.1		μs
$t_{d(off)IO}$	Input-output turn-on propagation time		1.1		μs

This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX

* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our staff.

Adaptor Board 93 SKYPER® 42 R

Technical Explanations

Revision 04

This Technical Explanation is valid for the following parts:

part number	type	date code (YYWW)
L5059601	Board 93 GB SKYPER® 42 R	≥ 1241

Related documents:

title
Technical Explanations SKYPER® 42 R

Prepared by: Johannes Krapp

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Please note:

All values in this technical explanation are typical values. Typical values are the average values expected in large quantities and are provided for information purposes only. These values can and do vary in different applications. All operating parameters should be validated by user's technical experts for each application.

Application and Handling Instructions

- Please provide for static discharge protection during handling. As long as the hybrid driver is not completely assembled, the input terminals have to be short-circuited. Persons working with devices have to wear a grounded bracelet. Any synthetic floor coverings must not be statically chargeable. Even during transportation the input terminals have to be short-circuited using, for example, conductive rubber. Worktables have to be grounded. The same safety requirements apply to MOSFET- and IGBT-modules.
- Any parasitic inductances within the DC-link have to be minimised. Over-voltages may be absorbed by C- or RCD-snubber networks between main terminals for PLUS and MINUS of the power module.
- When first operating a newly developed circuit, SEMIKRON recommends to apply low collector voltage and load current in the beginning and to increase these values gradually, observing the turn-off behaviour of the free-wheeling diode and the turn-off voltage spikes generated across the IGBT. An oscillographic control will be necessary. Additionally, the case temperature of the module has to be monitored. When the circuit works correctly under rated operation conditions, short-circuit testing may be done, starting again with low collector voltage.
- It is important to feed any errors back to the control circuit and to switch off the device immediately in failure events. Repeated turn-on of the IGBT into a short circuit with a high frequency may destroy the device.
- The inputs of the hybrid driver are sensitive to over-voltage. Voltages higher than $V_S + 0,3V$ or below $-0,3V$ may destroy these inputs. Therefore, control signal over-voltages exceeding the above values have to be avoided.
- The connecting leads between hybrid driver and the power module should be as short as possible (max. 20cm), the driver leads should be twisted.

Further application support

Latest information is available at <http://www.semikron.com>. For design support please read the SEMIKRON Application Manual Power Modules available at <http://www.semikron.com>.

General Description

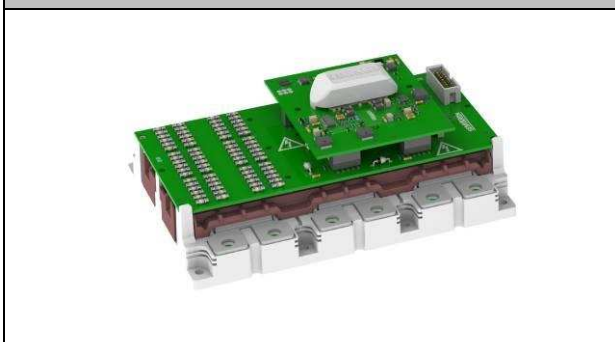
The Board 93 GB SKYPER® 42 is an adaptor board for the IGBT module SKiM® 93 (spring contact). The board is paralleling three channels so the SKiM module can be used in half bridge configuration. The board can be customized allowing adaptation and optimization to the used IGBT module.

The switching characteristic of the IGBT can be influenced through user settings, e.g. changing turn-on and turn-off speed by variation of R_{Gon} and R_{Goff} . Furthermore, it is possible to adjust the monitoring level and blanking time for the DSCP (see Technical Explanations SKYPER® 42 R).

Please note:

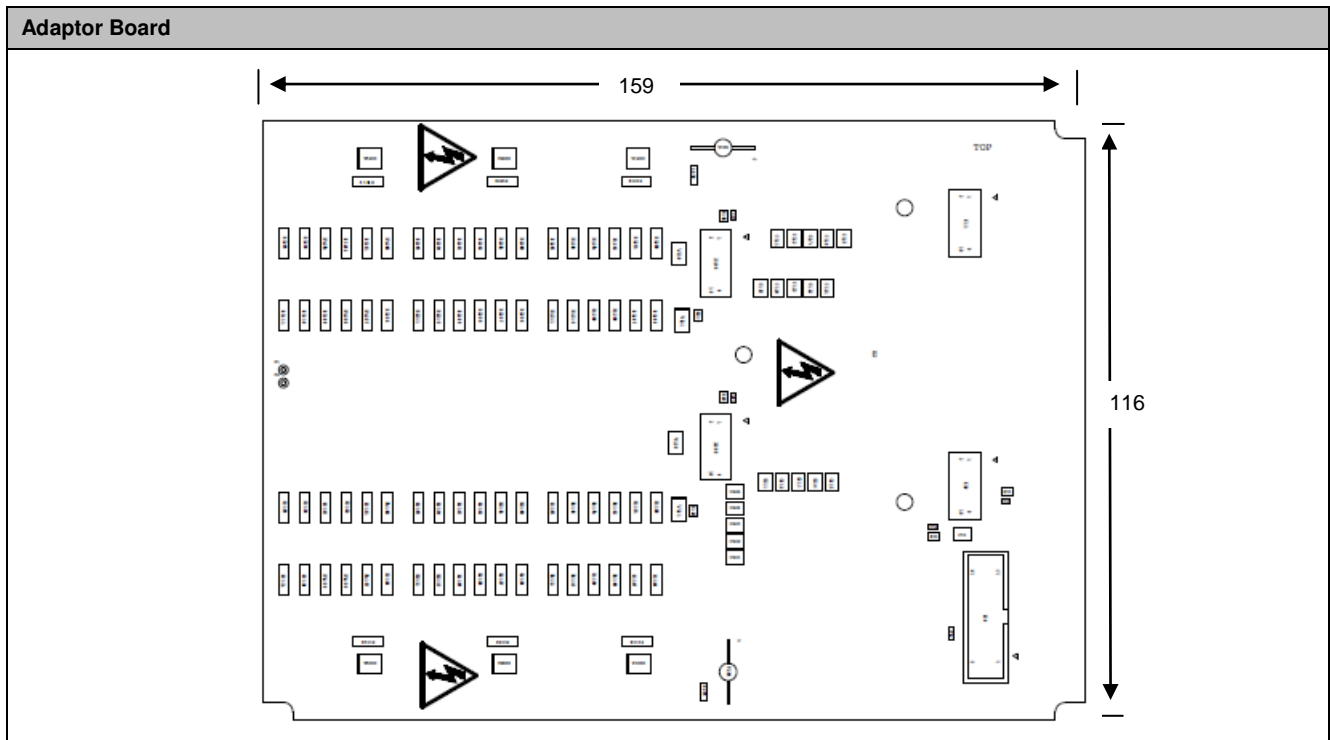
This technical explanation is based on the Technical Explanations for SKYPER® 42 R. Please read the Technical Explanations SKYPER® 42 R before using the Adaptor Board.

Board 93 GB SKYPER® 42 R



Board 93 GB SKYPER[®] 42 R - Technical Explanations

Dimensions



PIN Array

Connector X30 (male), RM2,54, 14p	
	<p>Product information of suitable female connectors and distributor contact information is available at e.g. http://www.harting.com (part number 09 18 520 6 813).</p>

PIN	Signal	Function	Specification
X30:01	IF_PWR_GND	GND for power supply and GND for digital signals	
X30:02	IF_HB_BOT	Switching signal input (BOTTOM switch)	Digital 15 V; 10 kOhm impedance; LOW = BOT switch off; HIGH = BOT switch on
X30:03	IF_nERROR_OUT	ERROR output	LOW = NO ERROR; open collector output; max. 30V / 15mA (external pull up resistor necessary)
X30:04	IF_HB_TOP	Switching signal input (TOP switch)	Digital 15 V; 10 kOhm impedance; LOW = TOP switch off; HIGH = TOP switch on
X30:05	IF_PWR_GND	GND for power supply and GND for digital signals	
X30:06	reserved		
X30:07	reserved		
X30:08	IF_PWR_15P	Drive power supply	Stabilised +15V ±4%
X30:09	IF_PWR_15P	Drive power supply	Stabilised +15V ±4%
X30:10-14	IF_PWR_GND	GND for power supply and GND for digital signals	

Setting Dynamic Short Circuit Protection

R _{CE} & C _{CE}		
Designation	Shape	Setting
R101	0805 (SMD)	R _{CE} Factory setting: not equipped TOP
C101	0603 (SMD)	C _{CE} Factory setting: not equipped TOP
R202	0805 (SMD)	R _{CE} Factory setting: not equipped BOT
C201	0603 (SMD)	C _{CE} Factory setting: not equipped BOT

The V_{ce} formula for the V_{ce} monitoring is described in the technical explanation of SKYPER 42 R.

Collector Series Resistance

R _{VCE}		
Designation	Shape	Setting
R105	MiniMELF (SMD)	R _{VCE} * Factory setting: not equipped TOP
R205	MiniMELF (SMD)	R _{VCE} * Factory setting: not equipped BOT

* 1200V IGBT operation: 0Ω
1700V IGBT operation: 1kΩ / 0,4W

Adaptation Gate Resistors

R_{Gon} & R_{Goff}			
Designation	Shape	Setting	
R1200 – R1205 (parallel connected)	MELF	R_{Gon} Factory setting: not equipped	TOP 1
R1206 – R1211 (parallel connected)	MELF	R_{Goff} Factory setting: not equipped	TOP 1
R1100 – R1105 (parallel connected)	MELF	R_{Gon} Factory setting: not equipped	BOT 1
R1106 – R1111 (parallel connected)	MELF	R_{Goff} Factory setting: not equipped	BOT 1
R2200 – R2205 (parallel connected)	MELF	R_{Gon} Factory setting: not equipped	TOP 2
R2206 – R2211 (parallel connected)	MELF	R_{Goff} Factory setting: not equipped	TOP 2
R2100 – R2105 (parallel connected)	MELF	R_{Gon} Factory setting: not equipped	BOT 2
R2106 – R2111 (parallel connected)	MELF	R_{Goff} Factory setting: not equipped	BOT 2
R3200 – R3205 (parallel connected)	MELF	R_{Gon} Factory setting: not equipped	TOP 3
R3206 – R3211 (parallel connected)	MELF	R_{Goff} Factory setting: not equipped	TOP 3
R3100 – R3105 (parallel connected)	MELF	R_{Gon} Factory setting: not equipped	BOT 3
R3106 – R3111 (parallel connected)	MELF	R_{Goff} Factory setting: not equipped	BOT 3

Please consider that not all gate resistors have to be populated. The number and value of the gate resistors have to be calculated according to each application. For details please refer to application note AN 7003 - Gate Resistor. As starting point for evaluation the recommended values of the IGBT data sheet can be taken.

Boost Capacitors

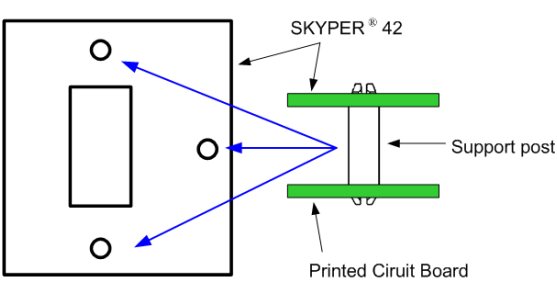
C _{boost15P} & C _{boost8N}			
Designation	Pattern Name	Setting	
C111, C112, C113, C114, C115	1210	C _{boost15P} Factory setting: C111, C112: 10µF/25V*	TOP
C121, C122, C123, C124, C125	1210	C _{boost8N} Factory setting: C124, C125: 10µF/25V *	TOP
C211, C212, C213, C214, C215	1210	C _{boost15P} Factory setting: C211, C212: 10µF/25V*	BOT
C221, C222, C223, C224, C225	1210	C _{boost8N} Factory setting: C224, C225: 10µF/25V *	BOT

* output charge pulse: 4µF=1µC. Factory setting: 5µC per channel

Environmental conditions

Please refer to the technical explanation of SKYPER 42 R for the environmental conditions.

Mounting Notes

Driver Core Mounting	
<ol style="list-style-type: none"> Soldering of components (e.g. R_{Gon}, R_{Goff}, etc.) on adaptor board. Insert driver core into the box connector on adaptor board. The connecting leads between board and power module should be as short as possible (max. 20cm), the leads should be twisted. 	
	<p>The connection between driver core and adaptor board should be mechanical reinforced by using support posts. The posts have to be spaced between driver core and adaptor board.</p> <p>Product information of suitable support posts and distributor contact information is available at e.g. http://www.richco-inc.com.</p> <p>Please refer to the technical explanation of the SKIM93 module for further mounting instructions.</p>

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