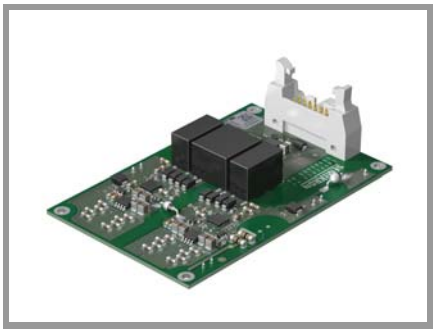
SKYPER 12 press-fit 300A



SKYPER®

Plug & Play Driver Board for SEMiX223GB12E4p and SEMiX303GB12E4p

Order Number
L5066601 – Driver
27895002 – Module 223GB
27895007 – Module 303GB

SKYPER 12 press-fit 300A

Features*

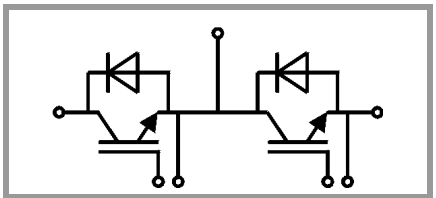
- Dynamic short circuit detection with SoftOff
- Undervoltage lockout on primary side and secondary side
- Internal power supply
- ROHS, UL recognized

Typical Applications

- Solar inverters
- Power supplies
- Motor drives

Remarks

- All data refer to T_{op} = +25°C and $V_S = V_{S(typ)}$ unless otherwise specified
- Environmental conditions please see technical explanation



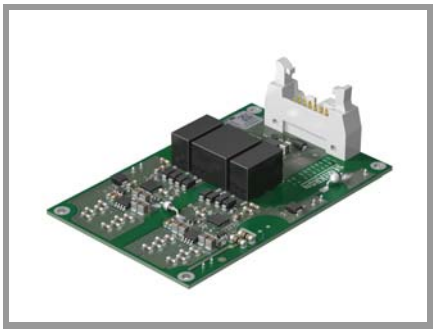
Two channel driver

Absolute Maximum Ratings

Symbol	Conditions	Values	Unit
V_s	Supply voltage primary side	15.7	V
V_{IH}	Input signal voltage (HIGH)	Vs + 0.4	V
V_{IL}	Input signal voltage (LOW)	GND - 0.4	V
f_{max}	Maximum switching frequency[1)]	30	kHz
V_{CE}	Collector emitter voltage[2)]	1200	V
V_{DC}	DC-Link voltage[3)]	800	V
dv/dt	Rate of rise and fall of voltage secondary to primary side	50	kV/µs
V_{isol}	Insulation test voltage[4)]	4000	V
T_{op}	Operating temperature	-40 ... 85	°C
T_{stg}	Storage temperature	-40 ... 85	°C

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
V_s	Supply voltage primary side	14.4	15	15.6	V
$V_{UVLO(prim)}$	Undervoltage lockout primary side	12.2		13.9	V
$V_{UVLO(secP)}$	Undervoltage lockout secondary side, positive voltage	9.4			V
$V_{UVLO(secN)}$	Undervoltage lockout secondary side, negative voltage	-5.8		-4.1	V
$I_{S(idle)}$	Supply current primary side (no load)		120		mA
$I_{S(max)}$	Supply current primary side (full load)			450	mA
V_I	Input signal voltage on/off		Vs/0		V
$R_{IN(sw)}$	Input resistance (switching signals)		33		kΩ
$C_{IN(sw)}$	Input capacitance (switching signals)		1		nF
$V_{G(on)}$	Turn-on output voltage		15		V
$V_{G(off)}$	Turn-off output voltage		-11.3		V
$t_{d(on)}$	Turn-on propagation delay time		1		µs
$t_{d(off)}$	Turn-off propagation delay time		1		µs
$R_{IN(err)}$	Input resistance (error input)		150		kΩ
$C_{IN(err)}$	Input capacitance (error input)		10		nF
$t_{d(err)}$	Error propagation delay time[5)]		0.6		µs
$t_{d(err,ext)}$	External error propagation delay time[6)]		0.6		µs
t_{IDT}	Interlock dead time[7)]		2		µs
t_{jitter}	Signal transfer time deviation[8)]		± 12.5		ns
t_{SPS}	Short pulse suppression		0.395		µs
t_{POR}	Power-on reset time		0.15		s
t_{reset}	Error reset time[9)]	0.03			ms
$V_{CE(ref)}$	Reference voltage for V_{CE}-monitoring[10)]		8.2		V
$t_{bl(VCE)}$	Blanking time V_{CE}-monitoring[11)]		5.4		µs
R_{OTLO}	Over temperature lockout[12)]		243		Ω
$R_{G(on)}$	Populated gate resistor for turn-on		1.31		Ω
$R_{G(off)}$	Populated gate resistor for turn-off		0.33		Ω
$l_{clear(PS)}$	Shortest distance in air, primary side to secondary side	12.2			mm
$l_{clear(SS)}$	Shortest distance in air, secondary sides	6.1			mm
$l_{clear(TS)}$	Shortest distance in air, temperature sensor pads to secondary side	3.1			mm
$l_{clear(TP)}$	Shortest distance in air, temperature sensor pads to primary side	12.2			mm



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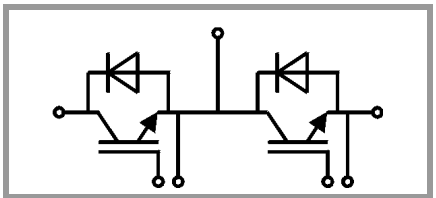

Two channel driver

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
$l_{creep(PS)}$	Shortest distance along the surface, primary side to secondary side (CTI≥175)	12.2			mm
$l_{creep(SS)}$	Shortest distance along the surface, secondary sides (CTI≥175)	6.1			mm
$l_{creep(TS)}$	Shortest distance along the surface, temperature sensor pads to secondary side (CTI≥175)	6.1			mm
$l_{creep(TP)}$	Shortest distance along the surface, temperature sensor pads to primary side (CTI≥175)	12.2			mm
V_{PDPS}	Partial discharge extinction voltage, primary side to secondary side[13)]	2107			V
V_{PDTP}	Partial discharge extinction voltage, temperature sensor pads to primary side[13)]	2107			V
w	Weight		45		g
MTBF	Mean Time Between Failure[14)]		7.5		10^6h

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Footnotes

Footnote	Description
1)	The rated maximum switching frequency is valid for an operating temperature up to 75°C. For operating temperatures above 75°C the limits are specified according to the graph 'Maximum Switching Frequency'.
2)	Voltage class of semiconductor.
3)	The DC-Link voltage is limited due to the specified safe operation area boundaries.
4)	Test Conditions: ACrms, 2s, input to output
5)	Time between the driver detects an error at the secondary side until the primary side reports an error at the interface.
6)	Time between the driver receives an external error signal at the primary side until the driver turns off its outputs at the secondary side.
7)	The interlock dead time prevents the two outputs from being activated simultaneously. The dead time generation starts with each turn-off command at the driver's primary side.
8)	The jitter is defined as the maximum deviation of the switching signal propagation delay time at constant environmental conditions.
9)	Minimum time of the driver in error state.
10)	The driver detects a desaturation event, when one of its outputs is in on-state and the applied voltage at the corresponding V_{CE}-monitoring input exceeds the reference voltage for V_{CE}-monitoring.
11)	Time elapsed when the driver starts the power semiconductor's turn-on process after the V_{CE}-monitoring input has fallen below the reference voltage for V_{CE}-monitoring.
12)	The driver sets both outputs to $V_{G(off)}$, if the ohmic resistance of the applied temperature sensor is less than R_{OTLO}. For proper function of the temperature lockout a NTC temperature sensor has to be used. The temperature sensor of the SEMIKRON's SEMiX 3 press-fit modules has an ohmic resistance of R_{OTLO} at 130°C, typically.
13)	The partial discharge extinction voltage in this data sheet is defined as peak voltage.
14)	Conditions: T_{op} = 40°C; full load

Signal Connector

PIN	Signal	Function	Specifications
X10:01	reserved		To be connected to ground
X10:02	BOT_IN	Switching signal input (BOT)	15V logic; 33kΩ/1nF (pull-down) LOW = BOT switch off HIGH = BOT switch on
X10:03	nERR_OUT	Error output	Open collector output; max. 18V/15mA (external pull-up resistor needed) LOW = Error HIGH = No error
X10:04	TOP_IN	Switching signal input (TOP)	15V logic; 33kΩ/1nF (pull-down) LOW = TOP switch off HIGH = TOP switch on
X10:05	nERR_IN	Error input	15V logic inverted; 150kΩ/10nF (pull-up) LOW = External error HIGH = No external error
X10:06	reserved		To be connected to ground
X10:07	reserved		To be connected to ground
X10:08	PWR_VS	Driver power supply	Stabilized +15V ±4%
X10:09	PWR_VS	Driver power supply	Stabilized +15V ±4%
X10:10	PWR_GND	Ground potential for power supply and digital inputs	To be connected to ground
X10:11	PWR_GND	Ground potential for power supply and digital inputs	To be connected to ground
X10:12	reserved		To be connected to ground
X10:13	reserved		To be connected to ground
X10:14	reserved		To be connected to ground

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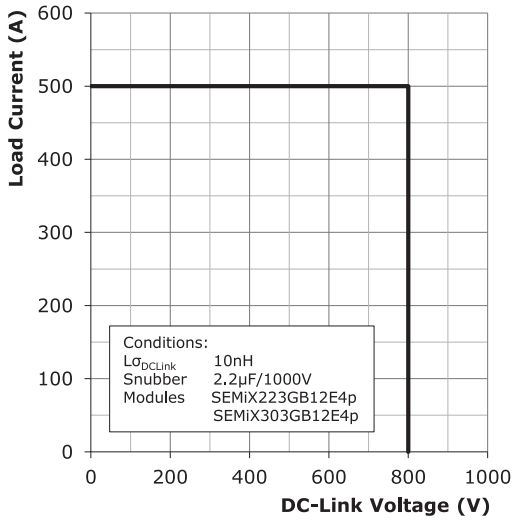

Fig. 1: Safe Operating Area

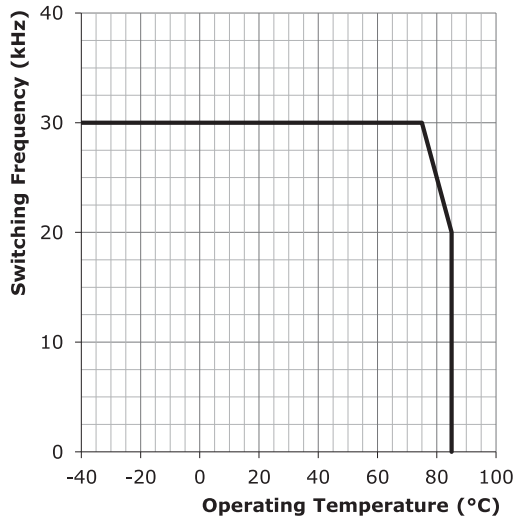

Fig. 2: Maximum Switching Frequency

This is an electrostatic discharge sensitive device (ESDS) due to international standard IEC 61340.

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