



Inselkammerstraße 10 H D-82008 Unterhaching C Tel: +49 (0)89 614 503 10 T Fax:+49 (0)89 614 503 20 F E-Mail: power@hy-line.de E www.hy-line.de v

Hochstraße 355 CH-8200 Schaffhausen Tel: +41 (0)52 647 42 00 Fax:+41 (0)52 647 42 01 E-Mail: power@hy-line.ch www.hy-line.ch



1SC0450V/1SC0450E High-Voltage 4.5 kV and 6.5 kV Single-Channel Gate Driver with Integrated DC/DC Converter.

### PRODUCT DESCRIPTION

Robust and cost effective single-channel gate drive solution for 4.5 kV and 6.5 kV IGBT modules. The 1SC0450x2A0-xx features versatile fiber-optic links or electrical input. Thanks to its high output power capability, one single driver 1SC0450x2A0-xx can drive up to four parallel connected 4500 V or 6500 V IGBT modules and consequently provides easy inverter design covering higher power ratings. Multi-level topologies involving 3300 V or 4500 V IGBTs with higher isolation requirements can also be easily supported by 1SC0450x2A0-xx.

The driver's secondary side is electrically isolated from the primary side. The 1SC0450x2A0-45 meets the requirements of 4500 V IGBT applications while the 1SC0450x2A0-65 covers the requirements of 6500 V IGBT applications.

An output current of 50 A and 6 W drive power is available, making the 1SC0450x2A0-xx an ideal driver platform for universal use in medium and high-power applications. The driver provides a gate voltage swing of 15 V /-10 V. The turn-on voltage is regulated to maintain a stable 15 V regardless of the output power level. Its outstanding EMC allows safe and reliable operation even in hard industrial applications.

#### APPLICATIONS

- Traction
- HVDC
- STATCOM
- Medium-voltage converters/drives
- Wind-power converters

### **KEY BENEFITS**

Compact and reliable 4.5 kV and 6.5 kV gate drive unit enables cost effective multi-level designs and supports series connection of IGBTs. Supports voltage source inverter (VSI, VVVF) and current source inverter (CSI). Flexible and innovative design with gate driver core functionalities.

### **KEY FEATURES**

- Single-channel driver core for up to 4.5 kV and 6.5 kV IGBTs
- ±50 A gate current, +15 V/-10 V
- 6 W @ 85 degC
- High reliability (reduced component count)
- Parallel connection of IGBT modules
- Design flexibility
- Advanced Active Clamping and
- Dynamic Advanced Active Clamping
- Short-circuit protection, under-voltage lockout
- Short delay time <100 ns
- Power Supply Short-circuit protection
- Gate boosting functionallity
- Isolation according to IEC 60664-1
- UL compliant
- Lead free
- -40...+85 degC

# **KEY DATA OVERVIEW**

Parameter	Min	Typical	Max	Unit
Nominal supply voltage		15		V
Supply current @ fin=0 Hz		130		mA
Supply current, full load			880	mA
Output power per channel			8	W
Gate voltage		+15 V/-10 V		V
Peak output current (gate current)	-50		50	А
Switching frequency $f_{IN}$ <sup>1)</sup>			10	kHz
Duty Cycle	0		100	%
Turn-on delay		135		ns
Turn-off delay		105		ns
Creepage distance primary-secondary	45			mm
Clearance distance primary-secondary	25			mm
Dielectric test voltage		10300		VAC
Partial discharge extinction voltage	5400/7800			Vpeak
dv/dt immunity, input to output			35	KV/us
Operating temperature	-40		85	degC

<sup>1)</sup> Maximum switching frequency depends on the IGBT gate charge. See data sheet for actual value of specific driver.

# BASIC SCHEMATIC OF THE 1SC0450V

The 1SC0450V2A0-xx combines a complete singlechannel driver core with all components required for driving, such as an isolated DC/DC converter, short-circuit protection, Advanced Active Clamping as well as supply voltage monitoring. Enhanced features such as gate boosting or power supply short-circuit protection are also implemented and provide further driving benefits.

# BASIC SCHEMATIC OF THE 1SC0450E





# ORDERING INFORMATION 1SC0450 SCALE<sup>™</sup>-2 GATE DRIVER CORE

	Type Designation	Description	Temp degC	Lead free	Pin length
1SC0450V	1SC0450V2A0-45	HBFR-1522ETZ	-4085	yes	5.84 mm
	1SC0450V2A0-65	HBFR-2522ETZ		yes	5.84 mm
	1SC0450E2A0-45	no HBFR		yes	5.84 mm
	1SC0450E2A0-65	no HBFR	-4085	yes	5.84 mm