

1SP0340 SCALE™-2 Plug-and-Play IGBT Driver



1SP0340
Most Compact Plug-and-Play Driver for 4.5 kV
IGBT Modules in the Low Voltage (6 kV) Package.

PRODUCT DESCRIPTION

The 1SP0340 SCALE™-2 single-channel Plug-and-Play driver is specifically designed for the reliable and safe driving of 130 x 140 mm and 190 x 140 mm IGBT modules with 6000 V isolation voltage and 4.5 kV blocking voltage. It is optimized for high-reliability applications in the rail industry.

The driver concept relies on a master/slave principle that enables parallel-connected IGBT modules to be operated safely. The master (1SP0340V) can be used as a stand-alone driver without slave to drive a single IGBT module, or with up to three slaves (1SP0340D) to drive up to four parallel-connected IGBT modules.

The master is equipped with a fiber-optic interface and global fault management. In master/slave configurations, the slaves are connected to the master via a bus cable which distributes the common command signal and the secondary-side supply voltages from the DC/DC converter.

The SCALE™-2 chipset reduces the component count by 80 % when compared to conventional solutions, thus significantly increasing reliability and reducing costs.

1SP0340 drivers are equipped with Dynamic Advanced Active Clamping (DAAC), short-circuit protection, regulated turn-on gate driving voltage and supply-voltage-monitoring.

APPLICATIONS

- Traction inverters
- HVDC Light
- Wind-power converters
- Medium and high voltage drives
- Pulse power applications

KEY BENEFIT

Proven high performance of this most compact gate driver solution for 4.5 kV IGBT's with 6 kV isolation.

KEY FEATURES

- Single-channel IGBT gate driver
- Compact Plug-and-Play solution
- Fibre-optic interfaces
- +15 V (regulated)/-10 V gate driving
- Direct paralleling of IGBTs
- 2-level and multilevel topologies
- Dynamic IGBT short-circuit protection
- Dynamic Advanced Active Clamping (DAAC)
- Supply under-voltage lockout
- Gate monitoring
- Active Miller clamping
- Creepage and clearances acc. to IEC60077-1
- UL compliant
- Superior EMC
- Easy mounting directly onto the IGBT

FIBER-OPTIC INTERFACE OPTIONS

Fiber-optic links are used to electrically isolate the command and status-feedback signals. Two versions are available:
1SP0340V equipped with Versatile links

POWER SUPPLY AND ELECTRICAL ISOLATION

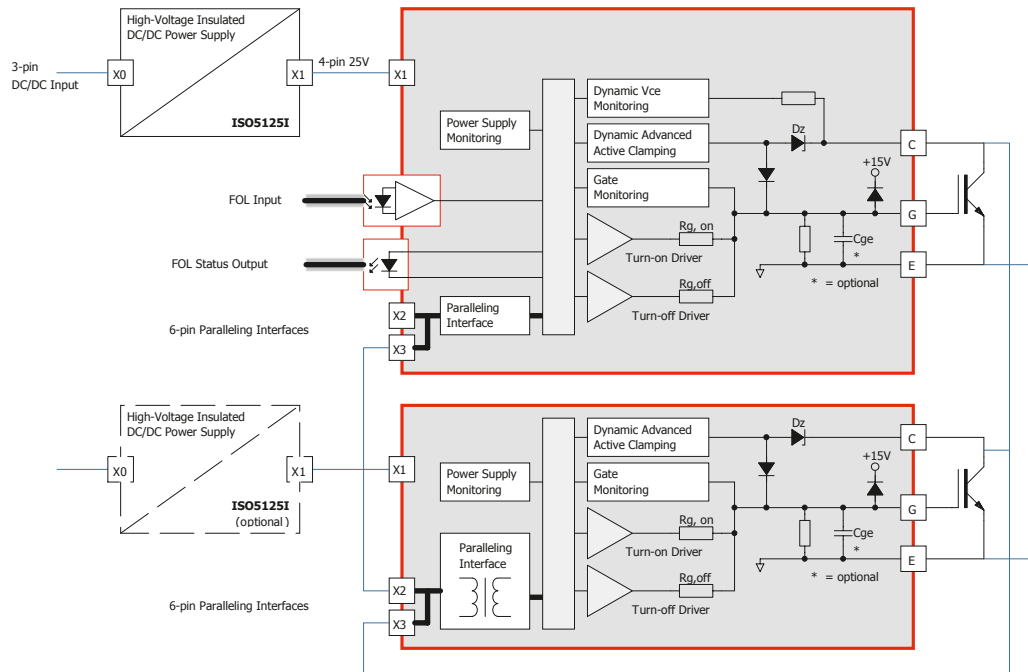
The 1SP0340 driver is modular, so the driver card and power supply (DC/DC converter) are two separate units. This means that any driver that has been developed to match a specific IGBT module can be used for any required isolation specification. Only the separate power supply (ISO5125I) must be selected to match the specific application. A further benefit is that drivers for 4.5 kV IGBTs can be implemented in 2-level, 3-level and multi-level inverter topologies. For parallel-connected drivers, only one power supply is needed per switch.

KEY DATA OVERVIEW

Parameter	Min	Typical	Max	Unit
Nominal supply voltage f_{IN}		25		V
Supply current 1SP0340V2M0 @ $f_{IN}=0$ Hz		180		mA
Output power (1SP0340V2M0)		2.8		W
Gate voltage		± 15		V
Peak output current (gate current)	-35		35	A
Switching frequency $f_{IN}^{1)}$	0		30	kHz
Duty cycle	0		100	%
Turn-on delay		170		ns
Turn-off delay		160		ns
Operating temperature	-40		85	degC

¹⁾ Maximum switching frequency depends on the IGBT gate charge. See data sheet for the value of a specific driver.

BASIC SCHEMATIC OF THE 1SP0340



ORDERING INFORMATION 1SP0340 SCALE™-2 IGBT PLUG-AND-PLAY DRIVER

	V-Type (Master)	D-Type (Slave) ²⁾
Type designation plus	1SP0340V2M0-xx	1SP0340D2S0-xx
xx: Voltage basic type ¹⁾ or xx: Specific module type	4500 V=45 e.g. FZ1200R45HL3	
Modul package	IHV 130/140; 190/140	
DC/DC-Converter	ISO5125I-xx (xx: 4500 V=45 / 6500 V=65 / 10000 V=100 / 12000 V=120)	
Input signal interface	Versatile FOL Input/Output	n.a.
On-board connector	HFBR-2522ETZ/1522ETZ	n.a.
Bus interface	X2/X3	
On-board connector	MBCON-6-1-0 (on 1SP0340)	
Connecting cable	MBC61-xxx-0 (xxx=030,050,070,110) ³⁾	
Power Supply	X0/X1	
User-board connector	Right angle MBCON-3-1-0; vertical MBCON-3-2-0	
Connecting cable driver/ISO	MBC41-xxx-0 (xxx=035,045,070,110) ³⁾	
Connecting cable ISO/User-board	MBC31-100-0	

¹⁾ Gate resistors have to be soldered by customer
²⁾ Only for parallel operation, needs master for control
³⁾ Cable length in cm