power integrations™

SCALE™ IGBT and MOSFET Gate Driver Product Overview 2016/2017

ac-dc converters

led drivers

igbt drivers

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power integrations™

Powering your world

Continuous investment in applications expertise, IC packaging and microelectronics R&D has enabled the enlargement of our portfolio of gate drivers. We now offer gate driver solutions for IGBTs and MOSFETs from 5.5 kW up to MW and in blocking voltages from 600 V up 6.5 kV.

We are strongly focused on innovation – such as SiC-MOSFET gate drivers and products that enable users to benefit from new IGBT package technologies.

One of the highlights in the 2016/2017 catalogue is our newly-launched SCALE-iDriver™ gate driver IC family. This revolutionary and unique solution has been made possible only through the collaboration of our global development team, and we believe it will enable designers to create the power electronic products of the future - now.

To speed up development and to ensure reliability, we have created a new series of fully qualified reference designs for our SCALE-iDriver™, SCALE™-2 and SCALE™-2+ gate drivers which are presented in the catalogue you are now reading. Included are solutions for 600 V, 1200 V and 1700 V applications, IGBT module paralleling, 3-level architectures to high voltage and for HVDC systems.

Check out the catalogue to see if we have a solution for your application. If you cannot find an exact match for your needs, please contact our regional sales office who will be pleased to discuss your requirements.

Best Regards

Michael Hornkamp

Senior Director Marketing, High Power

Delivering Excellence in Gate Driver Design

Power Integrations, Inc. is a technology and market leader in mid and high power gate drivers. Using highly integrated technology, the company's gate drivers employ 85 % fewer components than other commonly-available solutions. Power Integrations has nearly 30 years' history of supporting demanding industries such as traction, power generation, power transmission and industrial automation with products that combine outstanding reliability, best-in-class performance and competitive pricing.

INNOVATIVE SCALE™-2 AND SCALE™-2+ TECHNOLOGY

Power Integrations' SCALE™-2 IGBT and MOSFET Gate Drivers use an ASIC chip set specifically designed to reduce count, save space and increase product reliability and functionality. A recent technology development, SCALE™-2+, enables Soft Shut Down (SSD) to be implemented in the event of a short circuit without requiring additional components (SSD function exclusive in 2SC0106T and 2SC0108T). This is particularly beneficial in applications with low stray-inductance where Advanced Active Clamping (AAC) may not be required.

GATE DRIVER CORES

Power Integrations' Gate Driver Cores incorporate driver functions including galvanic isolation, protection functions, DC/DC converter etc. on board, presenting designers with a complete yet extremely flexible system solution.

IGBT driver cores are available with blocking voltage capabilities from 600 V to 6500 V and output power from 1 W to 20 W per channel. They are also suitable for driving wide bandgap devices based on emerging materials such as gallium nitride (GaN) and Silicon Carbide (SiC) at frequencies at up to 500 kHz. Gate driver cores are supported by reference designs for fast design-ins.

PLUG AND PLAY IGBT GATE DRIVERS

Plug and play products are complete, ready-to-use IGBT GATE drivers that have been tightly matched to a specific IGBT module. Drivers are available to cover a large selection of high power and high voltage IGBT modules with reverse blocking voltage from 600 V to 6500 V. All plug and play drivers are equipped with DC/DC converters, short circuit protection, active clamping, supply monitoring, soft start and more.

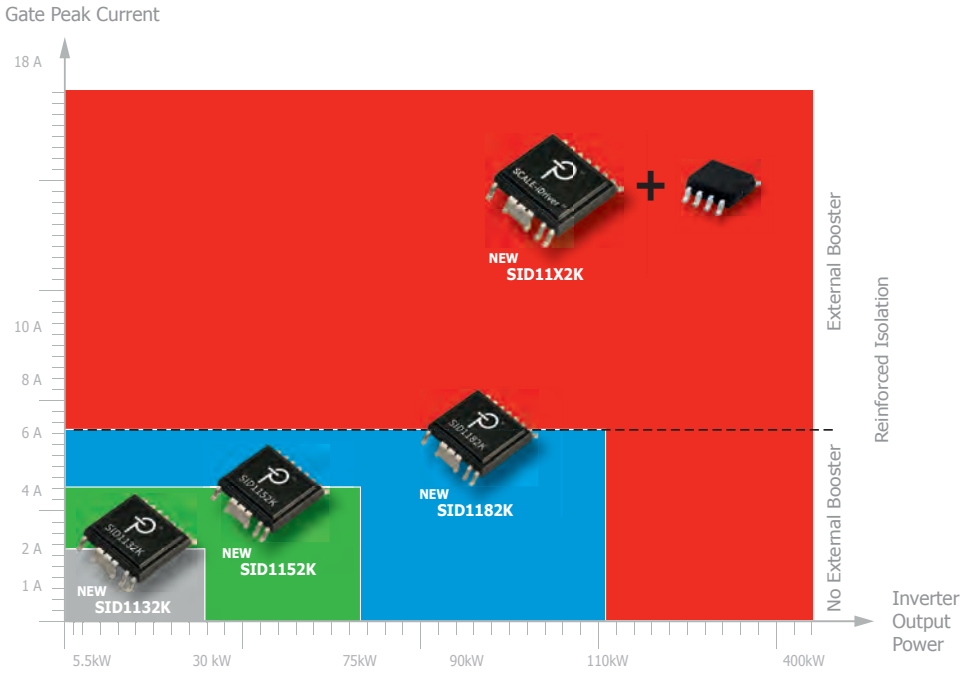
SCALE-iDriver™ GATE DRIVER

The SCALE-iDriver™ family of galvanic-isolated single channel gate driver ICs ranges in output current from 2 A up to 6 A – industry's highest - at 125 °C without needing an external booster amplifier. SCALE-iDriver™ devices are optimized for driving IGBT and MOSFETs and enable inverters to be built up to 110kW using only a few external components.

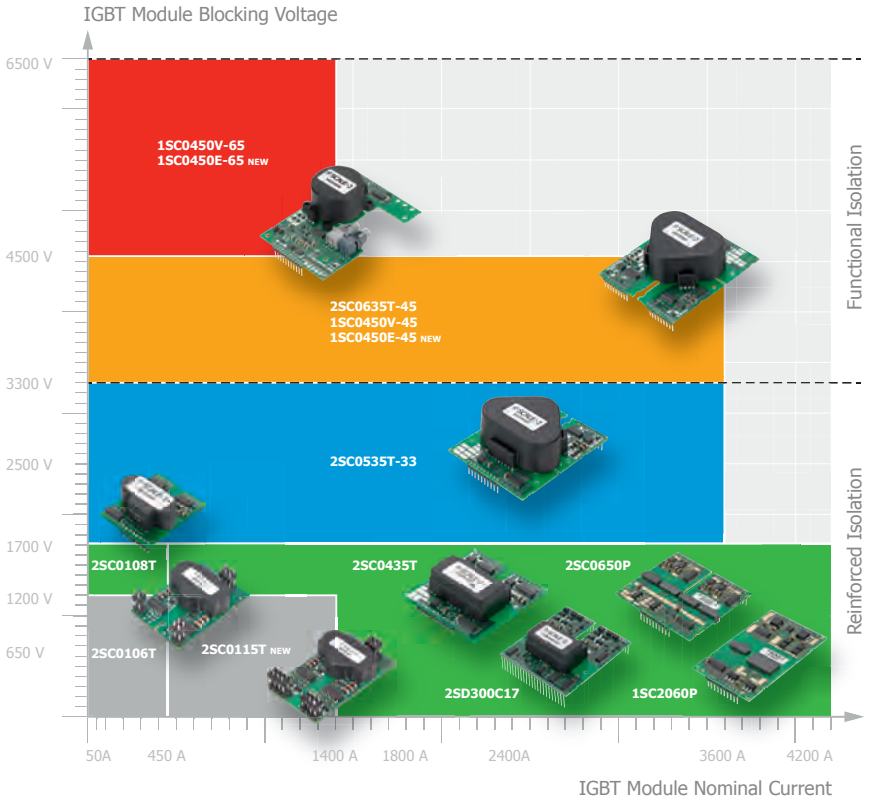
DESIGN SUPPORT AND CUSTOMISATION

Power Integrations develops reference designs and semi custom gate drive designs based on the company's driver cores and produces full custom drivers using the company's SCALE™-2 platform for large projects.

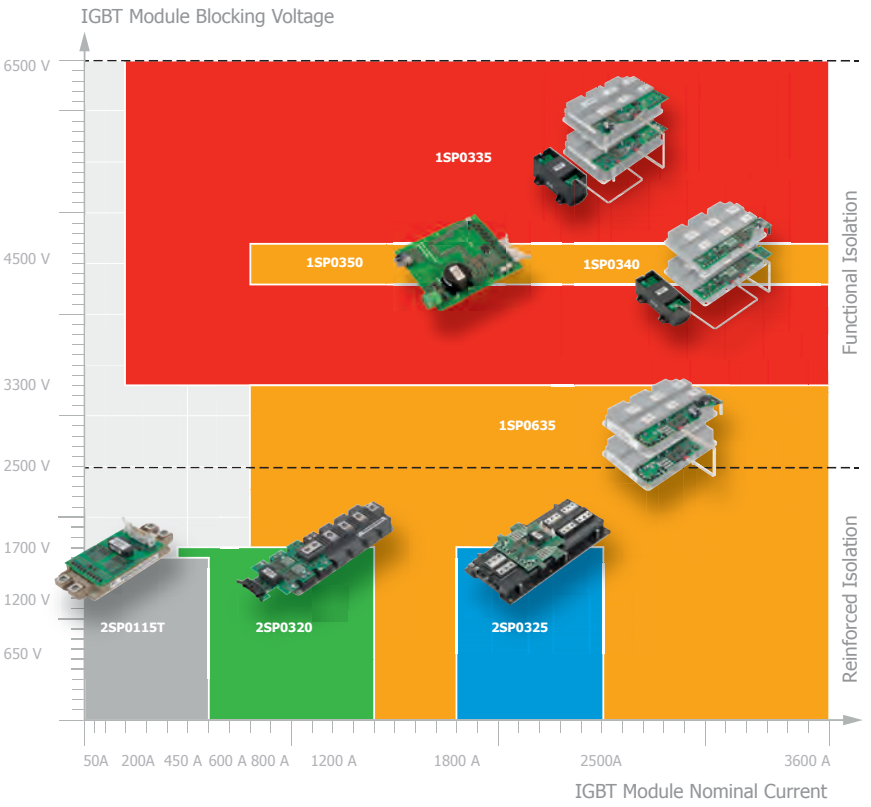
SCALE-iDriver™ GATE DRIVER IC PORTFOLIO



SCALE™-2 AND SCALE™-2+ GATE DRIVER CORES PORTFOLIO

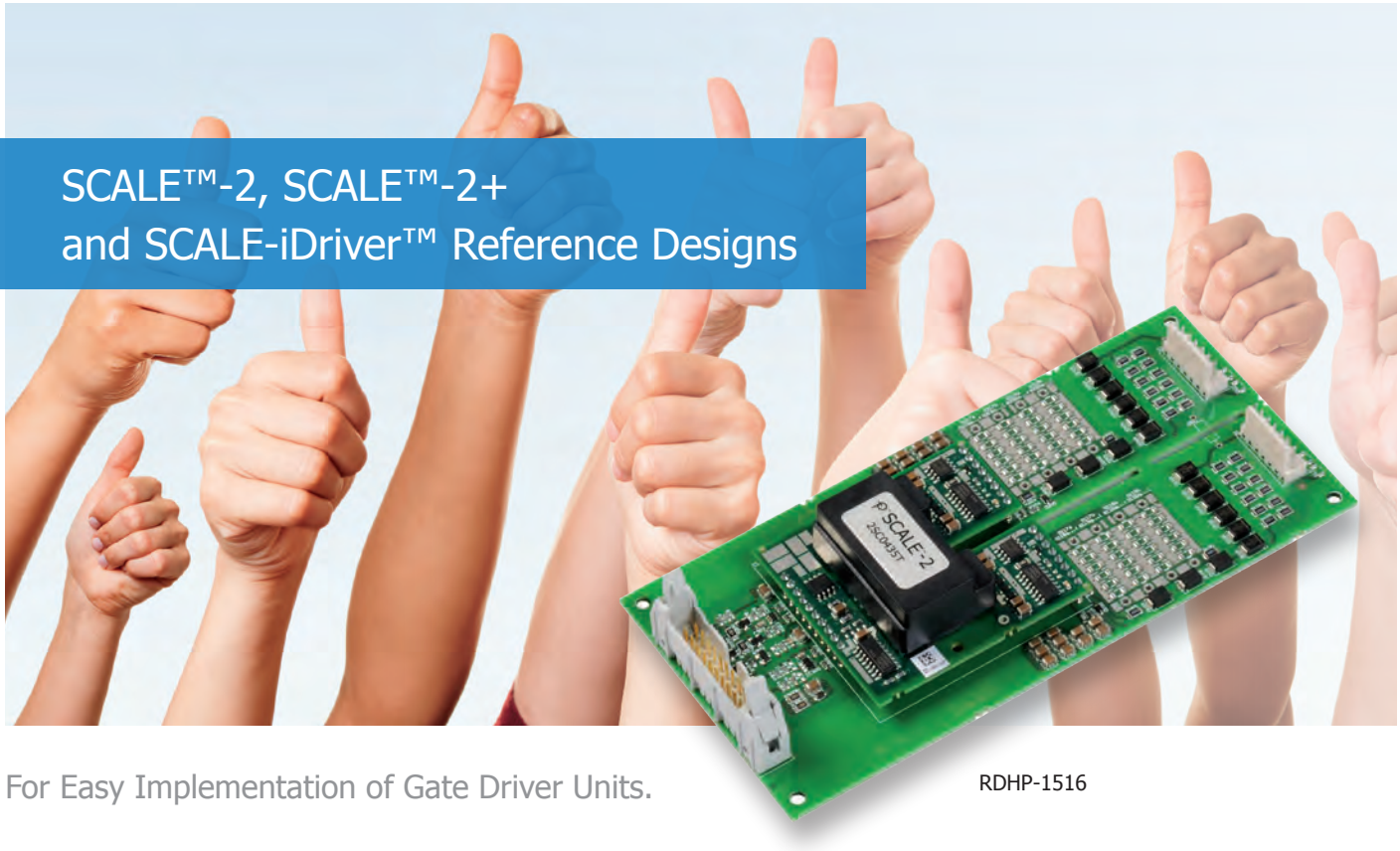


SCALE™-2 PLUG AND PLAY GATE DRIVER PORTFOLIO



CONTENTS

SCALE™-2, SCALE™-2+ and SCALE-iDriver™ Reference Designs



For Easy Implementation of Gate Driver Units.

RDHP-1516

CUSTOMERS' ADVANTAGE

To simplify the design-in process for development engineers using SCALE™-2 and SCALE™-2+ gate driver cores, Power Integrations offers a variety of reference designs optimized for particular applications and/or power module packages. Each reference design comes with a complete set of documentation, CAD and test data, significantly shortening development time. Our website is continually updated with new designs covering applications such as Solar Power, Wind Power, UPS, GPD and many more. Topologies supported include standard 2 level systems in single and parallel configuration as well as 3 level designs.

On request, dedicated reference designs for IGBT and SiC MOSFET power modules are available, specifically to suit your applications and requirements.

REFERENCE DESIGN OVERVIEW

Most of SCALE™-2 and SCALE™-2+ reference designs are available on our website, and we are continually adding new ones to support your needs. Please contact us for your custom requirements. All reference designs are under international standards for creepage and clearance distances IEC 60664-1.

KEY BENEFITS

Provides reference designs for generic and specific applications.

KEY FEATURES

- Ready-to-use designs
- Schematics, Gerber files and bill-of-materials available
- Test data included
- 3D STEP files available
- Designed in accordance with IEC standards
- Based on standard SCALE™-2 and SCALE™-2+ gate driver cores

RDHP-1526, 2-Channel and 15A Peak Output Current Gate Driver IC with SCALE-iDriver™ SID1182K

This two channel application related reference design board embrace a circuit design suitable for driving IGBT module or discrete IGBT/ MOSFET with blocking voltage up to 1200V. The external booster stage amplifies the 6A output current of SCALE-iDriver™ IC to 15A peak output current. The reference design offers a variation of safety function including Active Clamping and Advanced Soft Shut Down. A compact reinforced isolated DC/DC converter provide unipolar secondary side supply voltage.

The main features of the design are:

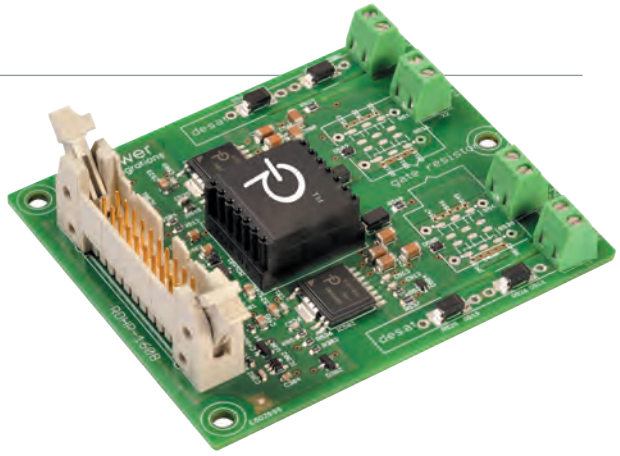
- Suitable for power module up to V_{CES}=1200V
- Integrated booster stage for high gate peak output current 15A
- Embedded isolated DC/DC power supply with 1.2W per channel
- Electrical 5V logic level interface
- Short-circuit detection with collector sense and resistors chain
- Advanced Soft Shut down function (ASSD)
- Undervoltage lock out primary and secondary side
- Basic Active Clamping (BAC)
- 5V supply voltage
- 2-layer PCB design

The design is proposed for the following application conditions:

- Maximum DC-link voltage of up to 800V under switching conditions
- Typical stray inductance (including the stray inductance of the IGBT power modules) of the commutation loop is 30nH

Gate Driver	Channels	Interface	Power Module Package	Voltage Class
SID1182K	2	Electrical	Various	Up to 1200V

RDHP-1608, 2-Channel and 6A Peak Output Current Gate Driver IC with SCALE-iDriver™ SID1182K



This two channel application related reference design board embrace a circuit design suitable for driving IGBT module or discrete IGBT with blocking voltage up to 1200V. The SCALE-iDriver™ IC provide peak output current of 6A. The reference design offers a variation of safety function including short circuit measurement and Advanced Soft Shut Down (ASSD). An compact reinforced isolated DC/DC converter provide unipolar secondary side supply voltage.

The main features of the design are:

- Very compact Gate Driver design with minimum amount of external components
- Suitable for IGBT module and discrete IGBT/MOSFET up to V_{CES}=1200V
- Gate driver IC gate peak output current 6A
- Embedded two channel reinforced isolated DC/DC power supply with 1.2W per channel
- Electrical 5V logic level interface
- Short-circuit detection with collector sense and resistors chain
- Advanced Soft Shut down function (ASSD)
- Undervoltage lock out primary and secondary side
- 5V supply voltage
- 2-layer PCB design

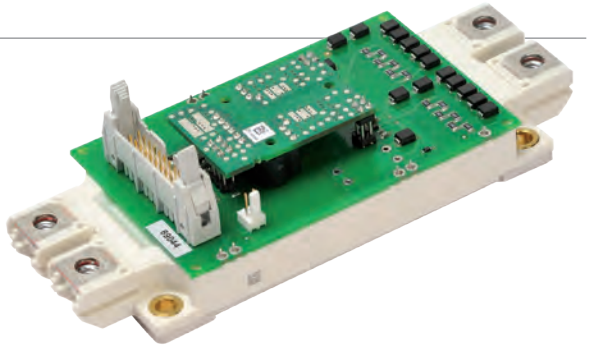
The design is proposed for the following application conditions:

- Maximum DC-link voltage of up to 800V under switching conditions
- Typical stray inductance (including the stray inductance of the IGBT power modules) of the commutation loop is 30nH

Gate Driver	Channels	Interface	Power Module Package	Voltage Class
SID1182K	2	Electrical	Various	Up to 1200V

RDHP-1412 – 17mm Dual IGBT Module with Gate Driver Core 2SC0106T

This reference design provides a circuit design suitable for driving a 17 mm dual IGBT power module 650 V and 1200 V.



The main features of the design are:

- Suitable for 17 mm dual IGBT module e.g FF600R12ME4
- Basic Active Clamping (optional)
- Short circuit detection with SSD (Soft Shut Down)
- Electrical PWM inputs and status outputs
- 15 V supply voltage
- Single PCB solution with soldered-in gate driver core 2SC0106T

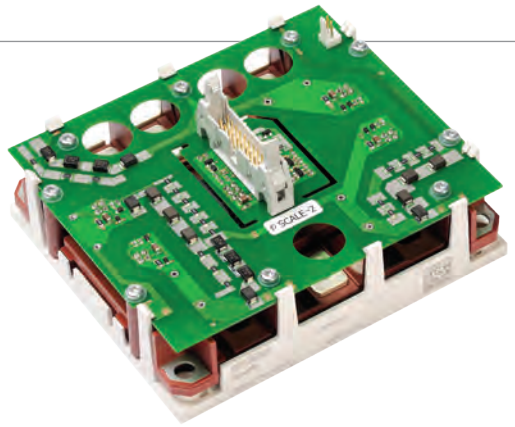
The design is proposed for the following application conditions:

- Maximum DC-link voltage of 800 V under switching conditions
- Typical stray inductance of the commutation loop of 30 nH

Gate Driver	Channels	Interface	Power Module Package	Voltage Class
2SC0106T	2	Electrical	17 mm	1200 V

RDHP-1419 – SKiM401TMLI12E4B 3L NPC2 with 2 Gate Driver Core 2SC0106T

This reference design provides a circuit design suitable for driving a SKiM401TMLI12E4B IGBT power module.



The main features of the design are:

- Suitable for SKiM401TMLI12E4B IGBT module
- Basic Active Clamping
- Short circuit detection with Soft Shut Down (SSD)
- Electrical command inputs and status outputs (0 V/15 V)
- 15 V supply voltage
- Minimum pulse suppression (≈ 200 ns)
- Single PCB solution with soldered-in gate driver core 2SC0106T

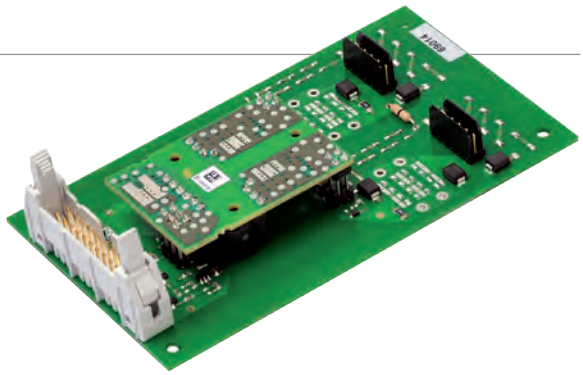
The design is proposed for the following application conditions:

- Maximum DC-link voltage (DC+ to DC-) of 800 V under switching conditions
- Maximum DC-link voltage of 430 V between DC+ to N or N to DC- under switching conditions
- Typical stray inductance of the commutation loop for IGBTs T1 and T4 of approx. 100 nH and for IGBTs T2 and T3 of approx. 70 nH

Gate Driver	Channels	Interface	Power Module Package	Voltage Class
2SC0106T	4	Electrical	Semikron	1200 V

RDHP-1423 – Driving 1200 V IGBT Power Modules for 2SC0106T

This reference design provides all-in-one solution for driving dual IGBT power modules.

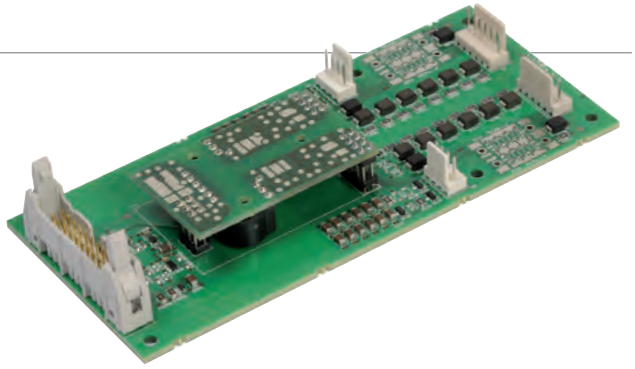


The main features of the design are:

- Suitable for all standard IGBT modules with a maximum blocking voltage of 1200V
- Basic Active Clamping (optional)
- Short circuit detection with SSD (Soft Shut Down)
- Electrical PWM inputs and status outputs
- 0 V/15 V PWM input logic
- 0 V/15 V status output logic
- Optional minimum pulse suppression
- 15 V supply voltage
- Single PCB solution with soldered-in gate driver core 2SC0106T

Gate Driver	Channels	Interface	Power Module Package	Voltage Class
2SC0106T	2	Electrical	Any	1200 V

RDHP-1521 – Reference Design for Gate Driver Core 2SC0115T



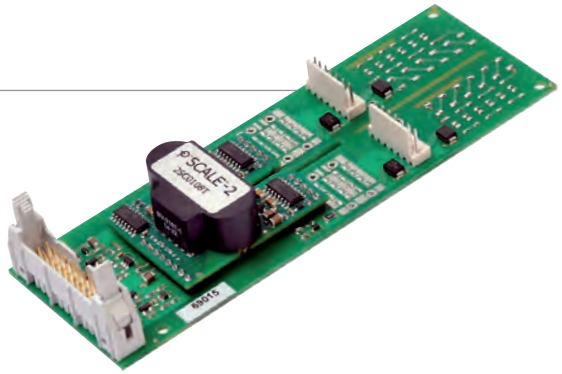
This reference design provides a circuit design suitable for a generic base board for driving various IGBT power modules.

The main features of the design are:

- Suitable for IGBT power modules in various housings such as 17mm dual, 17mm six-pack, 62mm, PrimePACK™, etc. with a maximum blocking voltage of 1200V
- Advanced Active Clamping (AAC)
- Short circuit detection
- Electrical command inputs and status outputs
- Optional secondary side fault inputs
- Optional secondary side status feedback output outputs
- 0 V/15 V command input logic
- 0 V/15 V status output logic
- Minimum pulse suppression (optional)
- Adjustable blocking time
- 15 V supply voltage
- Single PCB solution with soldered-in gate driver core

Gate Driver	Channels	Interface	Power Module Package	Voltage Class
2SC0115T	2	Electrical	Generic	1200 V

RDHP-1415 – Driving up to 1700 V IGBT Power Modules with 2SC0108T



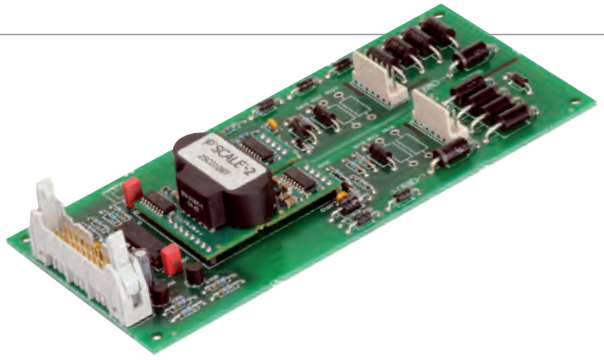
This reference design provides a circuit design for a generic base board for driving various IGBT power modules up to a maximum blocking voltage of 1700 V reinforced isolation.

The main features of the design are:

- Suitable for all standard IGBT modules with a maximum blocking voltage of 1700 V
- Basic Active Clamping (optional)
- Short-circuit detection with SSD (Soft Shut Down)
- Electrical command inputs and status outputs
- 0 V/15 V command input logic
- 0 V/15 V status output logic
- Minimum pulse suppression (optional)
- Adjustable blocking time
- 15 V supply voltage
- Single PCB solution with soldered-in gate driver core 2SC0108T

Gate Driver	Channels	Interface	Power Module Package	Voltage Class
2SC0108T	2	Electrical	Generic	600 V - 1700 V

RDHP-1531 – THT Reference Design for Gate Driver Core 2SC0108T



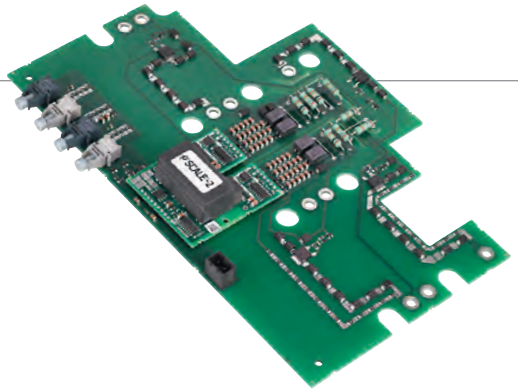
This reference design provides a circuit design suitable for a generic base board for driving various IGBT power modules.

The main features of the design are:

- Suitable for all standard IGBT modules with a maximum blocking voltage of 1700V
- Basic Active Clamping (optional)
- Short-circuit detection with Soft Shut Down (SSD)
- Electrical command inputs and status outputs
- 0 V/15 V command input logic
- 0 V/15 V status output logic
- Optional minimum pulse suppression
- Adjustable blocking time
- 15 V supply voltage
- Single PCB solution with soldered-in gate driver core 2SC0108T

Gate Driver	Channels	Interface	Power Module Package	Voltage Class
2SC0108T	2	Electrical	Generic	1700 V

RDHP-1409 – Paralleling of 2x FF1400R12IP4 with 1x Gate Driver Core 2SC0435T



This reference design provides a circuit design suitable for driving two PrimePACK™ 3 IGBT power modules in parallel.

The main features of the design are:

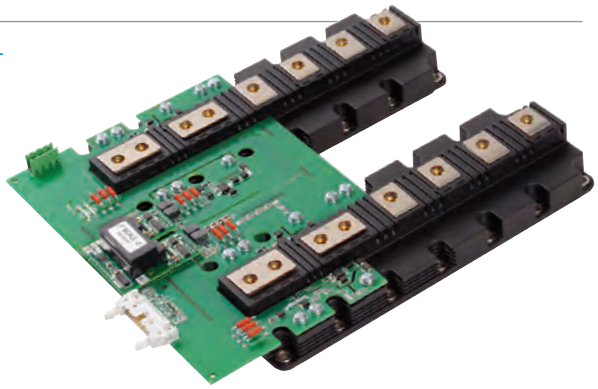
- Advanced Power Paralleling (APP)
- Dynamic Advanced Active Clamping (DAAC)
- Short circuit detection
- Optical command inputs and status outputs
- 15 V supply voltage
- Single PCB solution with soldered-in gate driver core 2SC0435T

The design is proposed for the following application conditions:

- Maximum DC-link voltage of up to 850 V under switching conditions
- Maximum DC-link voltage of up to 1000 V under non-switching conditions (limited to a duration of 60s)
- Typical stray inductance of the commutation loop of 60nH

Gate Driver	Channels	Interface	Power Module Package	Voltage Class
2SC0435T	2	Optical	PrimePACK™3	1200 V

RDHP-1513 – Paralleling of IGBT5 2x FF1800R17IP5 with 1x Gate Driver Core 2SC0435T



This reference design provides a circuit design suitable for driving two PrimePACK™ 3+ IGBT power modules with IGBT5 in parallel.

The main features of the design are:

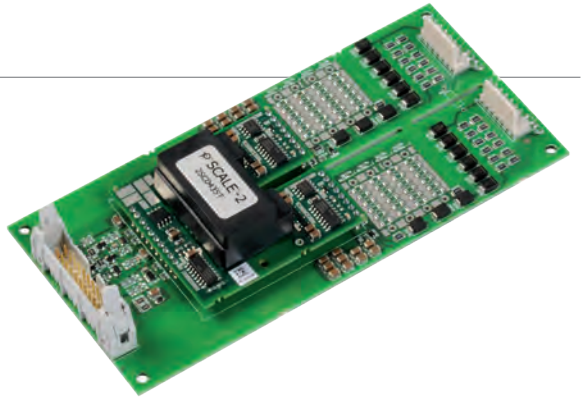
- Advanced Power Paralleling (APP)
- Dynamic Advanced Active Clamping (DAAC)
- Short circuit detection
- Electrical command inputs and status outputs
- 0 V/15 V command input logic
- 0 V/15 V status output logic
- Minimum pulse suppression (optional)
- 15 V supply voltage
- Single PCB solution with soldered-in gate driver core

The design is proposed for the following application conditions:

- Maximum DC-link voltage of up to 1200 V under switching conditions
- Maximum DC-link voltage of up to 1600 V under non-switching conditions (limited to a duration of 60s)
- Typical stray inductance of the commutation loop of 50nH

Gate Driver	Channels	Interface	Power Module Package	Voltage Class
2SC0435T	2	Electrical	PrimePACK™3+	1700 V

RDHP-1516 – Driving up to 1700 V IGBT Power Modules with 2SC0435T



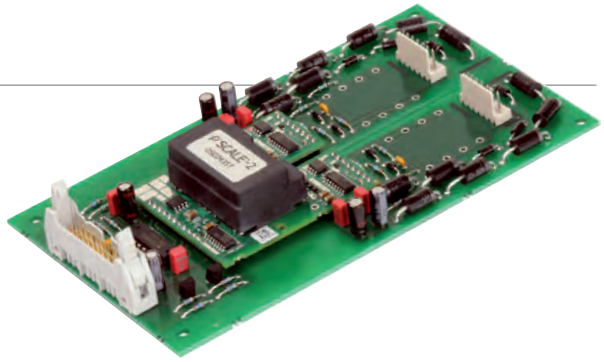
This reference design provides a circuit design for all-in-one base board for driving various IGBT power modules up to a maximum blocking voltage of 1700V.

The main features of the design are:

- Suitable for all standard IGBT modules with a maximum blocking voltage of 1700V
- Basic Active Clamping (optional)
- Short-circuit detection with SSD (Soft Shut Down)
- Electrical command inputs and status outputs
- 0 V/15 V command input logic
- 0 V/15 V status output logic
- Minimum pulse suppression (optional)
- Adjustable blocking time
- 15 V supply voltage
- Single PCB solution with soldered-in gate driver core 2SC0108T

Gate Driver	Channels	Interface	Power Module Package	Voltage Class
2SC0435T	2	Electrical	Any	600 V - 1700 V

RDHP-1532 – THT Reference Design for Gate Driver Core 2SC0435T



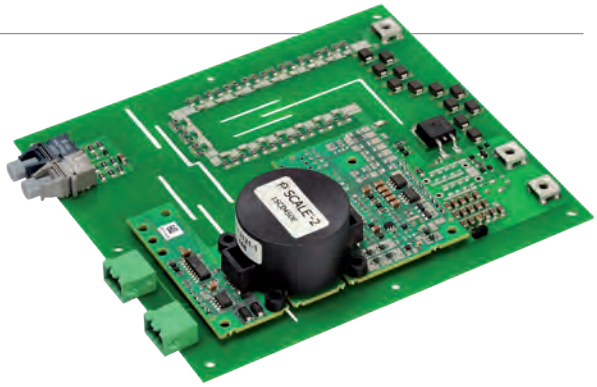
This reference design provides a circuit design suitable for a generic base board for driving various IGBT power modules.

The main features of the design are:

- Suitable for all standard IGBT modules with a maximum blocking voltage of 1700V
- Advanced Active Clamping (AAC)
- Short-circuit detection
- Electrical command inputs and status outputs
- 0 V/15 V command input logic
- 0 V/15 V status output logic
- Minimum pulse suppression (optional)
- Adjustable blocking time
- 15 V supply voltage
- Single PCB solution with soldered-in gate driver core 2SC0108T

Gate Driver	Channels	Interface	Power Module Package	Voltage Class
2SC0435T	2	Electrical	Generic	1700 V

RDHP-1413 – Reference Design for Press-Pack IGBTs up to 4500 V with Gate Driver Core 1SC0450E



This reference design provides a circuit design suitable for driving a single press-pack IGBT module in high-voltage series connection topologies. Driving press-pack IGBT modules connected in parallel is also possible, by removing a single jumper.

The main features of the design are:

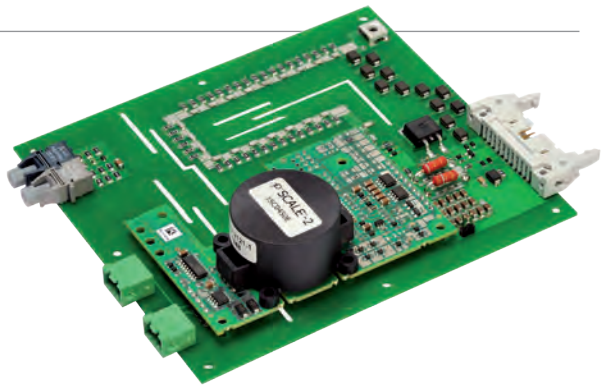
- Suitable for press-pack IGBT modules of various suppliers
- Optical interface
- Short circuit detection
- Dynamic Advanced Active Clamping
- 15 V supply voltage
- Single PCB solution with soldered-in gate driver core 1SC0450E
- Jumper to configure series or single/ parallel topologies

The design is proposed for the following application conditions:

- Maximum V_{CE} voltage of 3400 V under switching conditions
- Maximum V_{CE} voltage of 4000 V under non-switching conditions (t≤60s)
- Typical stray inductance of the commutation loop of 200 nH

Gate Driver	Channels	Interface	Power Module Package	Voltage Class
1SC0450E	1	Optical	Press-Pack	4500 V

RDHP-1422 – ABB StakPak 5SNA2000K451300 with Gate Driver Core 1SC0450E



This reference design provides a circuit design suitable for driving a single StakPak IGBT module in high-voltage series connection topologies. Driving StakPak IGBT modules connected in parallel is also possible, by removing a single jumper.

The main features of the design are:

- Suitable for ABB StakPak IGBT modules
- Optical interface
- Short circuit detection
- Dynamic Advanced Active Clamping
- 15 V supply voltage
- Single PCB solution with soldered-in gate driver core 1SC0450E
- Jumper to configure series or single/ parallel topologies

The design is proposed for the following application conditions:

- Maximum V_{CE} voltage of 3400 V under switching conditions
- Maximum V_{CE} voltage of 4000 V under non-switching conditions (t≤60s)
- Typical stray inductance of the commutation loop is 200 nH

Gate Driver	Channels	Interface	Power Module Package	Voltage Class
1SC0450E	1	Optical	StakPak	4500 V

power integrations™

SCALE-iDriver™ Gate Driver
SID1132K, SID1152K, SID1182K

SCALE-iDriver™ Gate Driver -- galvanically-isolated single channel gate driver IC has output currents from 2A to 6A; drives inverters of up to 110kW using only a few external components

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E358471

PRODUCT DESCRIPTION

The SCALE-iDriver™ family of galvanic-isolated single channel gate driver ICs ranges in output current from 2 A up to 6 A – industry's highest - at 125 °C without needing an external booster amplifier. SCALE-iDriver™ ICs are optimized for driving IGBTs and MOSFETs and benefit from Power Integrations' FluxLink™ magneto-inductive bi-directional communications technology with a 9.5mm creepage distance to be maintained between primary and secondary side – all within a low 2.67mm profile package. This new gate driver design also means that bulky optocouplers are not needed, further increasing reliability and product life.

SCALE-iDriver™ devices are optimized for driving IGBTs and MOSFETs and enable inverters to be built up to 110kW using only a few external components. Devices exhibit rail-to-rail output, fast gate switching speed, unipolar supply voltage for bi-direction output voltage, reinforced isolation and safety features like desaturation monitoring with Advanced Soft Shut Down (ASSD), primary and secondary under-voltage lock-out (UVLO) and gate current stabilization. The pairing of Power Integrations' SCALE™ gate driver technology – which integrates all key functions into an ASIC with resulting reliability, size and design simplicity benefits – with FluxLink technology revolutionizes gate driver design. Bi-directional communication results in fast, efficient, accurate switching and minimizes signal jitter. The wide isolation gap delivers exceptional robustness, and low profile packaging technology reduces size and system cost.

APPLICATIONS

- Industrial drives (GPD, AC drives and servo drives)
- Power supplies (UPS, all other power supplies e.g. large flat panel, industrial filter, lighting)
- Photo voltaic inverter (small power PV, large power commercial PV)
- Industrial application (welding, health care, plasma, inductive heating)
- EV charger supply and charger station

KEY BENEFITS

- Highest output peak current to 6 A
- 9.5 mm creepage and clearance
- Low profile 2.67 mm packaging
- Desaturation monitoring, selectable resistor chain or diode chain
- Low component count
- Advanced Soft Shut Down (ASSD), no external components needed

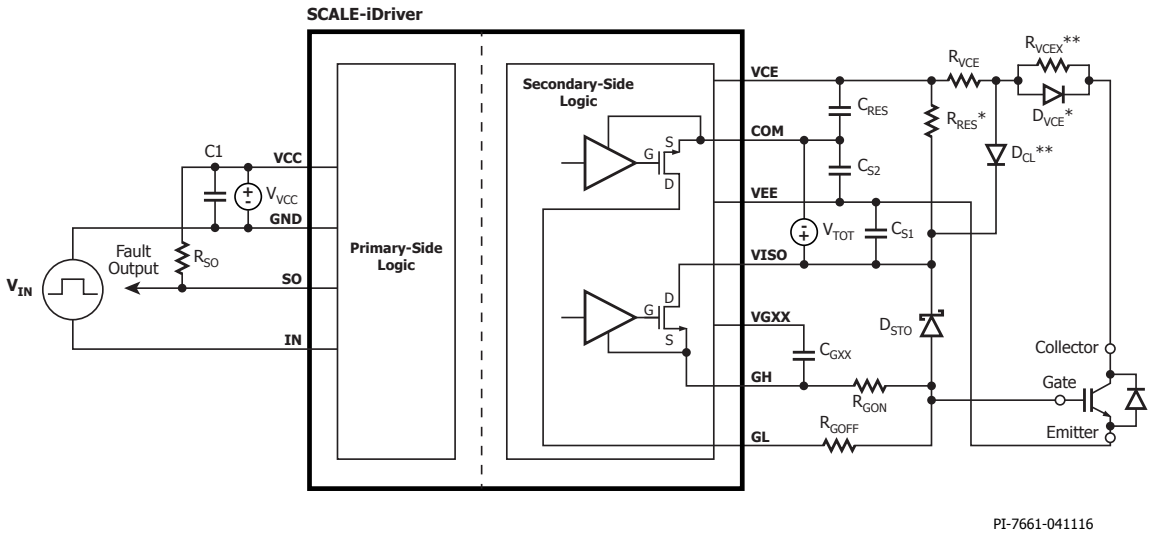
KEY FEATURES

- Family of isolated IGBT drivers with three output currents: SID1182K (6A), SID1152K (4A), SID1132K (2A) at 125°C junction temperature, suitable for power semiconductors 600 V / 650 V / 1200 V IGBT and MOSFET switches.
- -40 °C to +125 °C operating ambient temperature
- Customer friendly, simple 2-layer PCB design
- Meets IEC 60664-1 and IEC 61800-5-1 on creepage and clearance with new "9.5mm" package
- FluxLink™ with bidirectional signal transfer
- Up to 250kHz switching frequency
- Desaturation monitoring selectable with resistor chain or diode chain
- Active gate voltage clamping via chip internal voltage regulation

KEY DATA OVERVIEW

Parameter	Min	Typical	Max	Unit
Primary-side supply voltage (V_{VCC})	4.75	5	5.25	V
Secondary-side total Supply voltage (V_{TOT})	22	25	25	V
Gate Sourcinp peak current (I_{GH})			5.2	A
Gate Sinking peak current (I_{GL})			6.1	A
Operating switching frequency (f_S)	0	20	250	kHz
Propagation delay jitter			+/-5	
Turn-on propagation delay time ($t_{D(ON)}$)		265		ns
Turn-off propagation delay time ($t_{D(OFF)}$)		260		ns
Minimum turn-on and off PWM pulses extention ($t_{GE(MIN)}$)		390		ns
Creepage distance primary-secondary (L2)	9.5			mm
Clearance distance primary-secondary (L1)	9.5			mm
Tracking resistance (comparative tracking index - CTI)		600		
Max. package dissipated power (T_S)			1.79	W
100% production withstanding isolation voltage test (V_{ISO})	6			kVRMS
100% production partial discharge test ($V_{PD(m)}$)	2650			Vpeak

APPLICATION CIRCUIT OF SID11X2K

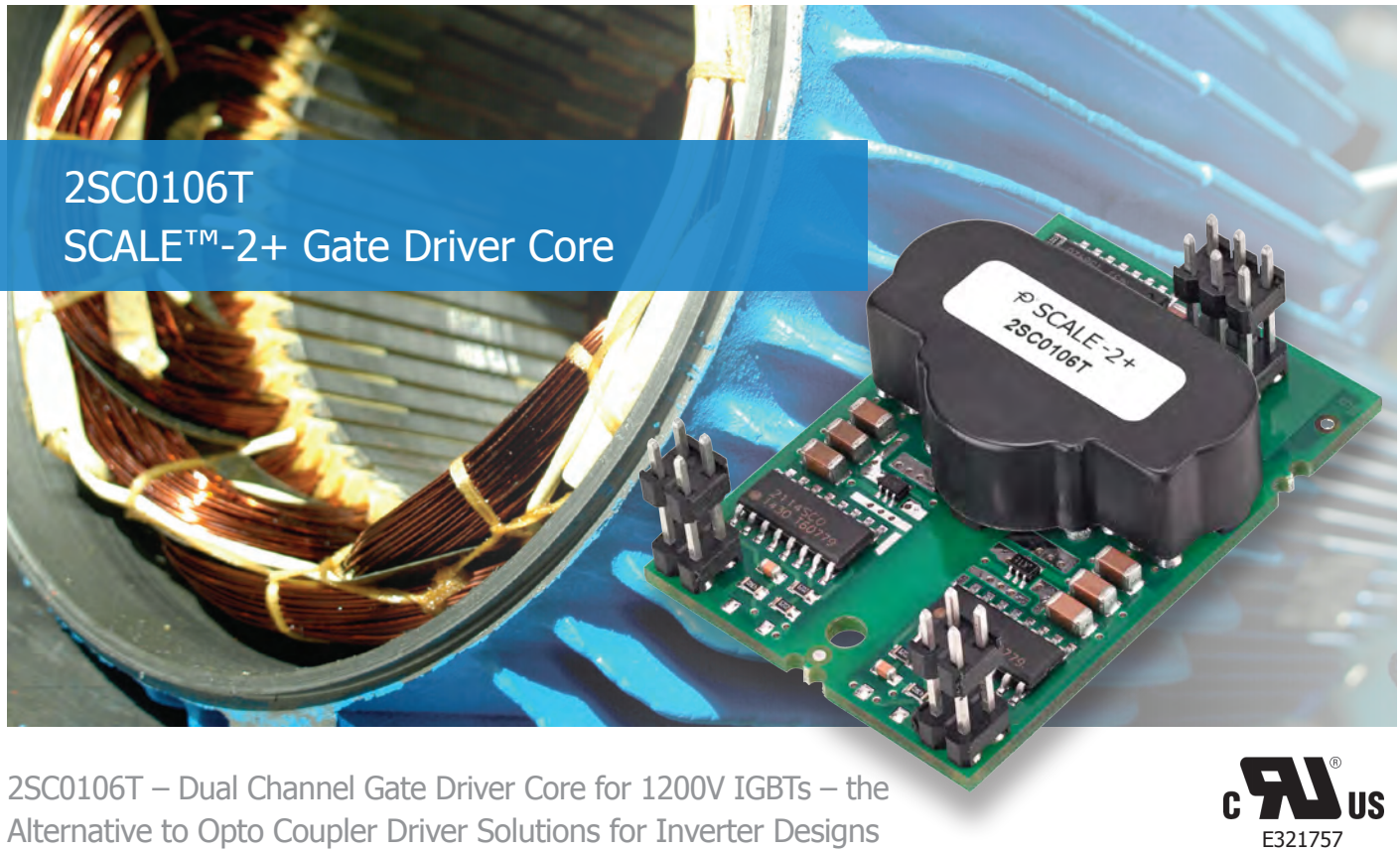


ORDERING INFORMATION SCALE-iDriver™ GATE DRIVER CORE

Type Designation	Product rated current	IGBT collector current ratings	Ordering code
SID1132K	2A	up to 100A	SID1132K (delivered in tubes – 50pcs) SID1132K-TL (delivered in Tape & Rail -2500pcs)
SID1152K	4A	up to 200A	SID1152K (delivered in tubes – 50pcs) SID1152K-TL (delivered in Tape & Rail -2500pcs)
SID1182K	6A	up to 450A	SID1182K (delivered in tubes – 50pcs) SID1182K-TL (delivered in Tape & Rail -2500pcs)

power integrations™

2SC0106T
SCALE™-2+ Gate Driver Core



2SC0106T – Dual Channel Gate Driver Core for 1200V IGBTs – the Alternative to Opto Coupler Driver Solutions for Inverter Designs Requiring Reinforced Isolation in the 37 - 110 kW Power Range.

c UL us
E321757
E346491

PRODUCT DESCRIPTION

SCALE™-2+ technology enables additional Soft Shut Down (SSD) to be implemented in the event of a IGBT/MOSFET short circuit without requiring additional components. This is particularly beneficial in applications with low commutation stray-inductance where Advanced Active Clamping (AAC) may not be necessary.

The 2SC0106T dual channel gate driver core is suitable for inverter designs in the 37 - 110 kW power range. It drives 600 V to 1200 V IGBTs with collector currents up to 450 A and switches at frequencies up to 50 kHz. The 2SC0106T complies with all standards for safety and reinforced isolations.

The new cost-effective SCALE™-2+ dual channel driver core 2SC0106T combines unrivalled compactness with broad applicability. The driver was designed for universal applications requiring high reliability. The 2SC0106T drives all standard IGBT modules up to 450 A/1200 V or 600 A/650 V. It delivers all the necessary functionality required for an advanced dual channel IGBT gate driver including an isolated DC/DC converter, soft start, short circuit protection, Soft Shut Down (SSD) and supply voltage monitoring.

Each of the two channels is electrically isolated from the primary side and the other channel.

The 2SC0106T is the most compact driver core available for industrial applications, with a footprint of only 45.5 x 31 mm and a height of 13 mm, so even very space-restricted designs can be efficiently accommodated. Compared with conventional drivers, the use of the highly integrated SCALE™-2+ chipset results in the component count being cut by around 85 %. This leads to increased reliability and minimized cost.

APPLICATIONS

- Industrial motor drives
- Premium drives
- Uninterruptible power supplies (UPS)
- Solar inverters
- Electro/hybrid drive vehicles
- Switched mode power supplies (SMPS)
- Medical (MRT, CT, X-ray)
- Welding

KEY BENEFITS

Soft Shut Down is implemented in the event of a short circuit without requiring extra components. This gate driver is a space and cost-saving alternative to opto coupler driver solutions, with reinforced isolation for DC/DC and signals.

KEY FEATURES

- Dual channel driver core for up to 1200V
- ±6 A gate current, +15 V/-8 V
- 1 W @ 85 °C per channel
- On board regulated power supply
- High reliability (reduced component count)
- Direct paralleling capability
- Short circuit protection, under voltage lockout
- Delay time <100 ns, up to 50 kHz, Jitter ± 3 ns
- Isolation coordination according to IEC 60664-1
- -40 – +85 °C (105 °C with derating)
- Lead-free
- Soft Shut Down (SSD)

PRODUCT DESCRIPTION

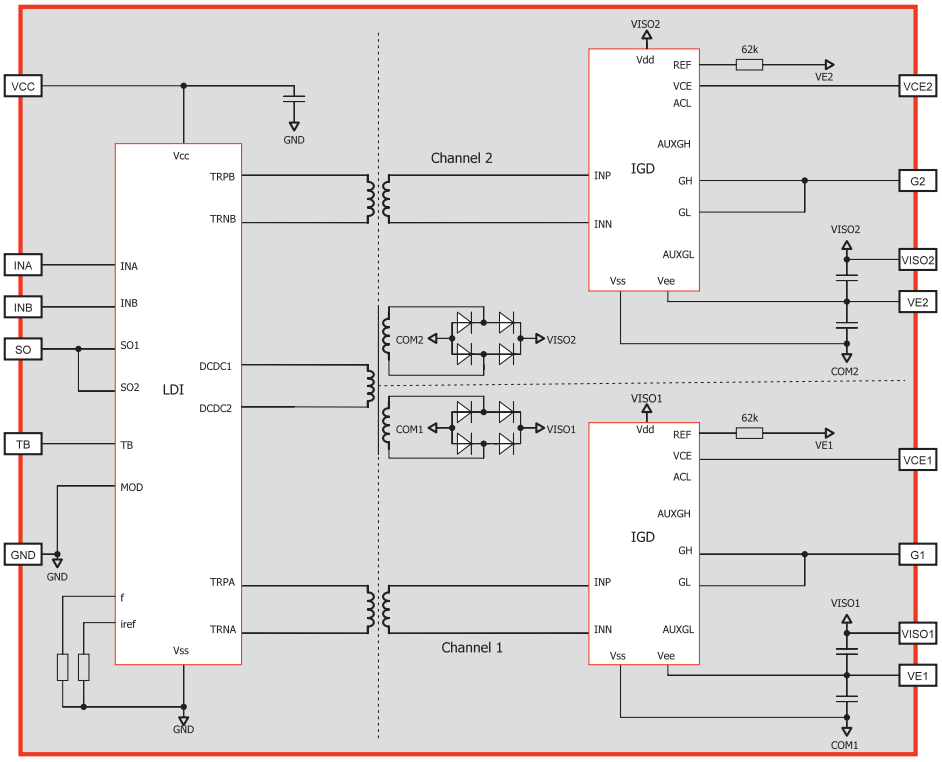
An output current of ±6 A and 1 W driver power at 85 °C is available per channel, making the 2SC0106T an ideal driver platform for universal usage in small and medium power applications. The driver provides a gate voltage swing of +15 V/–8 V. The turn on voltage is regulated to maintain a stable 15 V regardless of the output power level.
Outstanding EMC performance enables safe and reliable operation even in harsh industrial environments.

KEY DATA OVERVIEW

Parameter	Min	Typical	Max	Unit
Nominal supply voltage		15		V
Supply current @ f_{IN}=0 Hz		40		mA
Supply current, full load		300		mA
Output power per channel		1		W
Gate voltage		+15/-8		V
Peak output current (gate current)	-6		+6	A
Switching frequency f_{IN} [1]	0		50	kHz
Duty cycle	0		100	%
Creepage distance primary-secondary	9			mm
Creepage secondary-secondary	5.5			mm
Clearance distance primary-secondary	9			mm
Clearance distance secondary-secondary	5.5			mm
Dielectric test voltage	4000			V_{AC}
Partial discharge extinction voltage	1800			V_{peak}
dv/dt immunity, input to output			50	kV/us
Operating temperature	-40		+105	°C

[1] Maximum switching frequency depends on the IGBT gate charge. See data sheet for actual value of specific driver.

BLOCK DIAGRAM OF THE 2SC0106T



The 2SC0106T is a cost-effective driver core equipped with Power Integrations' latest SCALE™-2+ chipset. The chipset consists of two ASICs that provide the main functions required to implement intelligent gate drivers. Devices include all functionality necessary for an advanced dual channel gate driver: isolated DC/DC converter, short circuit protection, Soft Shut Down (SSD) and supply voltage monitoring.

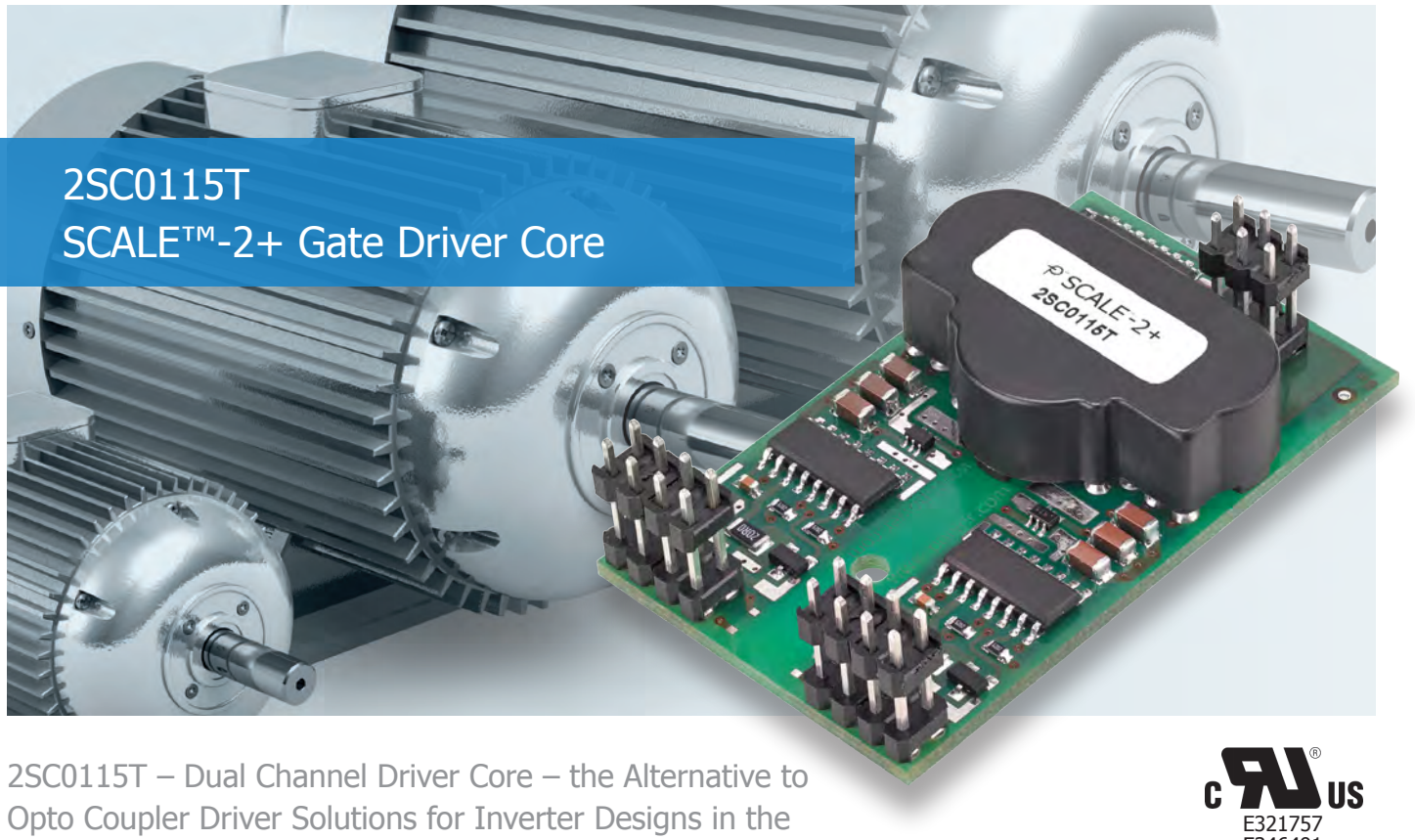
ORDERING INFORMATION 2SC0106T DUAL CHANNEL SCALE™-2+ GATE DRIVER CORE

	Type Designation	Temp °C	SSD*
2SC0106T	2SC0106T2A1-12	-40 – +85	yes

*) Soft Shut Down

power integrations™

2SC0115T
SCALE™-2+ Gate Driver Core



2SC0115T – Dual Channel Driver Core – the Alternative to Opto Coupler Driver Solutions for Inverter Designs in the 90 - 500 kW Power Range.

c UL us
E321757
E346491

PRODUCT DESCRIPTION

Dual channel gate driver core is dedicated to inverter designs in the power range of 90-500 kW. It drives 600-1200 V IGBTs with collector currents up to 2400 A and switches at frequencies up to 50 kHz.

The new cost-effective SCALE™-2+ dual driver core 2SC0115T combines unrivalled compactness with broad applicability. The driver was designed for universal applications requiring high reliability. The 2SC0115T drives all standard IGBT modules up to 2400 A/1200 V. The driver core targets applications such as general purpose drives, UPS, solar converters and medical applications. The driver supports switching up to 50 kHz. It comprises all functionality for an advanced dual channel IGBT gate driver including an reinforced isolated DC/DC converter, short circuit protection, Advanced Active Clamping (AAC) and supply voltage monitoring.

The 2SC0115T is the most compact driver core available for industrial applications, with a footprint of only 53.2 mm x 31 mm and an insertion height of 13 mm. It allows even the most restricted insertion spaces to be efficiently used.

Compared with conventional drivers, the highly integrated SCALE™-2 chipset allows about 85 % of components to be dispensed with. This advantage is impressively reflected in increased reliability at simultaneously minimized cost.

APPLICATIONS

- Industrial motor drives
- Premium drives
- Uninterruptible power supplies (UPS)
- Solar converters
- Electro/hybrid drive vehicles
- Switched mode power supplies (SMPS)
- Medical (MRT, CT, X-ray)
- Welding

KEY BENEFITS

Flexible use with Advanced Active Clamping (AAC) and reinforced isolation. Optimized for 1200V IGBT Modules.

KEY FEATURES

- Dual channel driver core for up to 1200 V
- Driver core for modules up to V_{ces} <= 1200 V
- ±15A peak output gate current
- +15 V/-6 V gate output voltage
- 1 W @ 85 °C output power per channel or 1.4 W @ = 55 °C
- On board power supply
- High reliability (reduced component count)
- Isolation technology according to international standard
- Short circuit protection, under voltage lockout
- Delay time <100 ns, up to 50 kHz
- Reinforced isolation acc. to VDE/EN and IEC
- Safe Torque Off (STO) prepared
- Advanced Active Clamping (AAC)
- Able to drive SiC-MOSFETs

PRODUCT DESCRIPTION

The 2SC0115T combines a complete two channel driver core with all components required for driving, such as an isolated DC/DC converter, short circuit protection as well as supply voltage monitoring. Each of the two output channels is electrically isolated from the primary side and the other secondary channel.

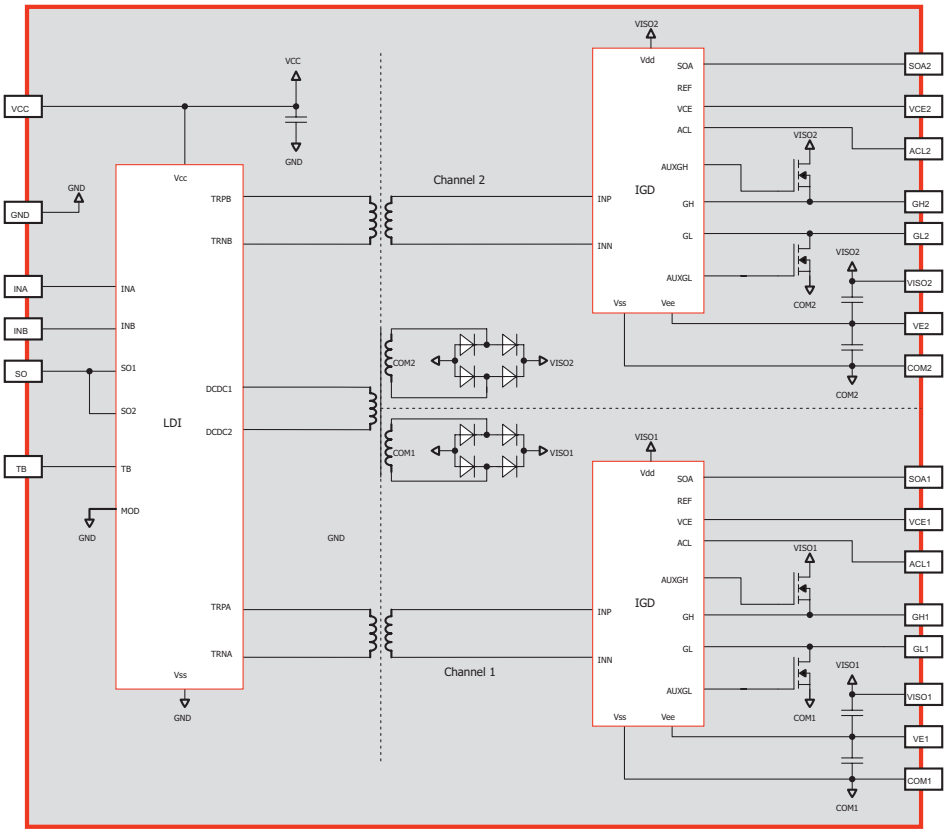
An output current of ±15 A and 1.4 W drive power is available per channel, making the 2SC0115T an ideal driver platform for universal usage in small and medium power applications. The driver provides a gate voltage swing for IGBT switching of +15 V/–6 V. The turn on voltage is regulated to maintain a stable 15 V regardless of the output power level. For SiC-MOSFET application, the 2SC0115T provides adjustable gate source voltages. Its outstanding EMC allows safe and reliable operation even in hard industrial applications.

KEY DATA OVERVIEW

Parameter	Min	Typical	Max	Unit
Nominal supply voltage		15		V
Supply current @ f_{IN}=0 Hz		40		mA
Output power per channel		1	1.4	W
Gate voltage		+15/-6		V
Peak output current (gate current)	-15		+15	A
Switching frequency f_{IN} [1)]	0		50	kHz
Duty cycle	0		100	%
Creepage distance primary-secondary	9			mm
Creepage secondary-secondary	5.5			mm
Clearance distance primary-secondary	9			mm
Clearance distance secondary-secondary	5.5			mm
Dielectric test voltage	4000			V_{AC}
Partial discharge extinction voltage	1800			V_{peak}
dv/dt immunity, input to output		50		kV/us
Operating temperature	-40		+105	°C

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

BLOCK DIAGRAM OF THE 2SC0115T



The 2SC0115T is a cost-effective driver core equipped with Power Integrations' latest SCALE™-2+ chipset. The SCALE™-2 chipset consists of two application specific integrated circuits (ASICs) that cover the main range of functions needed to design intelligent gate drivers. It comprises all functionality for an advanced dual channel IGBT gate driver including an isolated DC/DC converter, short circuit protection, Advanced Active Clamping (AAC) and supply voltage monitoring.

ORDERING INFORMATION 2SC0115T DUAL CHANNEL SCALE™-2 GATE DRIVER CORE

	Type Designation	Description	Pin length
2SC0115T	2SC0115T2A0-12	-40 – +105 °C, lead free, AAC	3.00 mm

2SC0108T
SCALE™-2+ Gate Driver Core

2SC0108T – Dual Channel Ultra Compact Universal SCALE™-2+ Gate Driver Core for up to 1700 V IGBTs.

c UL us
E321757
E346491

PRODUCT DESCRIPTION

The SCALE™-2+ dual driver core 2SC0108T combines unrivalled compactness with broad applicability and low cost. The driver was designed for universal applications requiring high reliability. The 2SC0108T drives all standard IGBT modules up to 600 A/1200 V or 450 A/1700 V. It allows easy inverter design covering higher power ratings. Multi level topologies are also supported.

The 2SC0108T is the most compact driver core available for industrial applications, with a footprint of only 45 mm x 34.3 mm and an insertion height of 16 mm. It allows even the most restricted insertion spaces to be efficiently used. Compared with conventional drivers, the highly integrated SCALE™-2+ chipset allows about 85 % of components to be dispensed with. This advantage is impressively reflected in increased reliability at simultaneously minimized cost.

The 2SC0108T combines a complete two channel driver core with all components required for driving, such as an isolated DC/DC converter, short circuit protection with Soft Shut Down (SSD) as well as supply voltage monitoring.

Each of the two output channels is electrically isolated from the primary side and the other secondary channel.

An output current of ±8 A and 1 W drive power at 85 °C ambient temperature is available per channel, making the 2SC0108T an ideal driver platform for universal use in small and medium power applications as well as medium voltage drives. The driver provides a gate voltage swing of +15 V/–8 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 tough industrial applications.

APPLICATIONS

- General purpose drives
- Uninterruptible power supplies (UPS)
- Solar and wind power converters
- Auxiliary converters for traction
- Electric/hybrid drive vehicles
- Switched mode power supplies (SMPS)
- Medical (MRT, CT, X-ray)
- Laser technology
- Medium voltage drives

KEY BENEFITS

Unrivalled compactness with broad applicability and high reliability - 85 % less components compared to conventional drivers.
Soft Shut Down is implemented in the event of a short circuit without requiring extra components.

KEY FEATURES

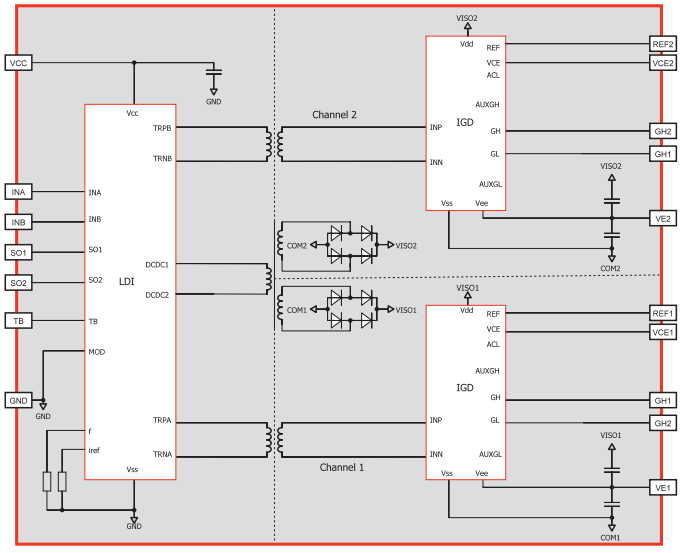
- Ultra-compact dual channel driver
- Blocking voltages up to 1700 V
- Switching frequency up to 50 kHz
- Very short delay time of <100 ns
- Small jitter of ±2 ns
- Gate current ±8 A
- +15 V/-8 V gate driving
- Regulated gate emitter voltage
- Interface for 3.3 V – 15 V logic level
- Direct and half bridge modes
- 2 level and multi level topologies
- IGBT short circuit protection with Soft Shut Down (SSD)
- Isolated DC/DC converter
- 2 x 1 W output power
- Supply under voltage lockout
- Reinforced isolation according to IEC 60664-1
- UL recognized: under UL 508C NMMS2/8 and under UL 60950-1 NWGQ2/8
- Footprint: 45 mm x 34.3 mm

KEY DATA OVERVIEW

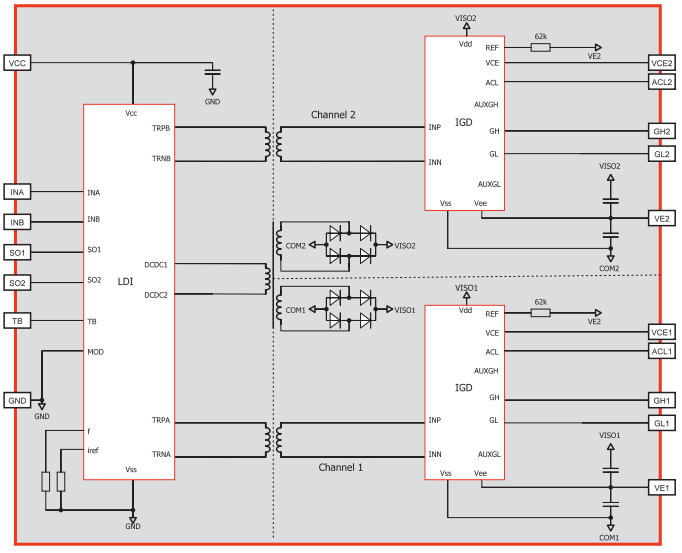
Parameter	Min	Typical	Max	Unit
Nominal supply voltage		15		V
Supply current @ f_{IN}=0 Hz		31		mA
Supply current, full load		240		mA
Output power per channel		1		W
Gate voltage		+15/-8		V
Peak output current (gate current)	-8		+8	A
Switching frequency f_{IN} [1)]	0		50	kHz
Duty cycle	0		100	%
Turn on delay		90		ns
Turn off delay		75		ns
Output rise time		17		ns
Output fall time		15		ns
Creepage distance primary-secondary	12.9			mm
Creepage secondary-secondary	8.5			mm
Clearance distance primary-secondary	12.9			mm
Clearance distance secondary-secondary	6.5			mm
Dielectric test voltage	5000			V_{AC}
Partial discharge extinction voltage	1768			V_{peak}
dv/dt immunity, input to output			75	kV/us

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

BLOCK DIAGRAM OF THE 2SC0108T



BLOCK DIAGRAM OF THE 2SC0108T2D0-XX



ORDERING INFORMATION 2SC0108T DUAL CHANNEL SCALE™-2+ GATE DRIVER CORE

	Type Designation	Increased EMI capability	Temp °C	SSD*	Lead free	Pin length
2SC0108T	2SC0108T2D0-12 / 2SC0108T2D0-07	yes	-40 – +85	no	no	2.54 mm
	2SC0108T2H0-17	yes	-40 – +85	yes	yes	2.54 mm
	2SC0108T2F1-17	yes	-40 – +85	yes	yes	5.84 mm
	2SC0108T2G0-17	yes	-40 – +85	yes	yes	3.10 mm

*) Soft Shut Down

power integrations™

2SC0435T
SCALE™-2+ Gate Driver Core

2SC0435T – Dual Channel, 1700 V SCALE™-2+ Gate Driver Core.

c UL us
E321757
E346491

PRODUCT DESCRIPTION

The SCALE™-2+ gate driver core 2SC0435T combines unrivalled compactness with broad applicability. It is made for universal applications requiring high reliability and performance. The 2SC0435T drives all common high power IGBT modules up to 1700 V. It allows easy inverter design covering higher power ratings. Multi-level topologies are also supported.

The 2SC0435T is the most compact driver core in its power range, featuring a footprint of only 57.2 mm x 51.6 mm and an insertion height of 20 mm. It allows even the most restricted spaces to be efficiently used. Compared with conventional drivers, the highly integrated SCALE™-2+ chipset allows about 85 % of components to be dispensed with. This advantage is significantly increased reliability and minimized cost.

The 2SC0435T combines a complete two channel driver core with all components required for driving, such as short circuit protection, Advanced Active Clamping, an isolated DC/DC converter as well as supply voltage monitoring.

Each of the two output channels is electrically isolated from the primary side and the other secondary channel 2SC0435T is able to drive IGBT MOSFETs and SiC- MOSFET.

APPLICATIONS

- Wind power and photovoltaic
- Industrial drives
- Medium voltage drive
- Traction applications
- Electric/hybrid commercial vehicles
- Uninterruptible power supplies (UPS)
- Driving large parallel connected IGBTs
- High gate current driving applications
- Medical (MRT, CT, X-ray)
- Industrial power supplies

KEY BENEFITS

The 2SC0435T drives all common high power IGBT modules, MOSFETs and SiC MOSFETs up to 1700V. It offers broad applicability thanks to its compactness and cost effectiveness, especially for paralleling IGBTs.

KEY FEATURES

- High power dual channel driver
- Blocking voltages up to 1700V
- Switching frequency up to 100 kHz
- Very short delay time of <100 ns
- Small jitter of ±3 ns
- Gate current ±35 A @ 85 °C
- Regulated gate emitter voltage
- Interface for 3.3 V – 15 V logic level
- Direct and half bridge modes
- 2 level and multi level topologies
- IGBT short circuit protection
- Advanced Active Clamping
- Isolated DC/DC converter
- 2 x 4 W output power at 85 °C
- Supply under voltage lockout
- Reinforced isolation according to IEC 60664-1
- UL recognized: under UL 508C NMMS2/8 and under UL 60950-1 NWGQ2/8
- Footprint: 57.2 mm x 51.6 mm

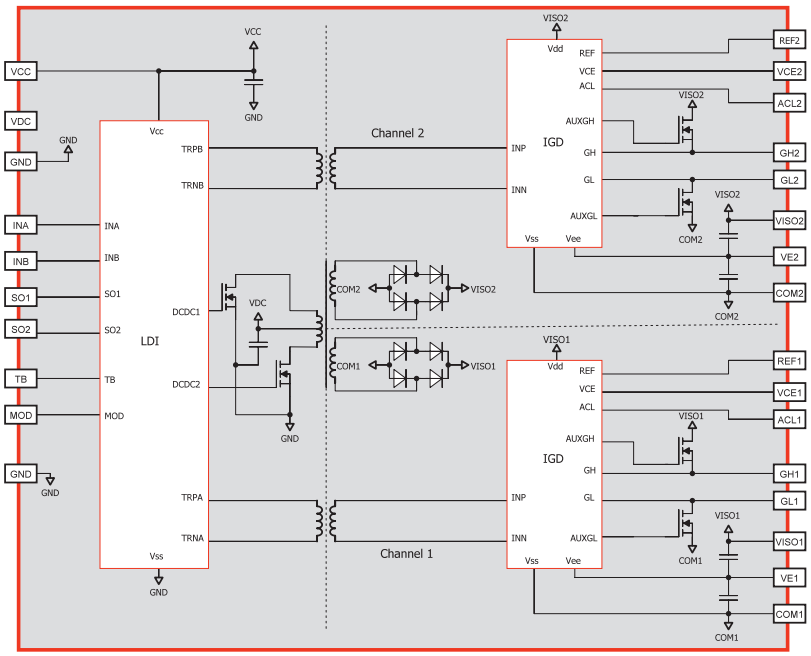
KEY DATA OVERVIEW

Parameter	Min	Typical	Max	Unit
Nominal supply voltage		15		V
Supply current @ f_{IN}=0 Hz		58		mA
Supply current, full load		700		mA
Output power per channel		4		W
Gate voltage		+15/-10		V
Peak output current (gate current)	-35		+35	A
Switching frequency f_{IN} [1)]	0		100	kHz
Duty cycle	0		100	%
Turn on delay		85		ns
Turn off delay		70		ns
Output rise time		20		ns
Output fall time		20		ns
Creepage distance primary-secondary	15.7			mm
Creepage secondary-secondary	12			mm
Clearance distance primary-secondary	15.7			mm
Clearance distance secondary-secondary	7.3			mm
Dielectric test voltage	5000			V_{AC}
Partial discharge extinction voltage	1768			V_{peak}
dv/dt immunity, input to output		50		kV/us
Operating temperature	-40		+85	°C

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

BLOCK DIAGRAM OF THE 2SC0435T

The 2SC0435T targets medium power, dual channel IGBT and MOSFET and SiC MOSFET applications. The driver supports switching up to 100 kHz at best efficiency. The 2SC0435T comprises a complete dual channel IGBT driver core, fully equipped with an isolated DC/DC converter, short circuit protection, Advanced Active Clamping, regulated gate voltage and supply voltage monitoring. The 2SC0435T is a driver core equipped with the SCALE™-2+ chipset, a set of application specific integrated circuits (ASICs) that covers the main range of functions needed to design intelligent gate drivers.



DRIVING PARALLEL CONNECTED IGBTS

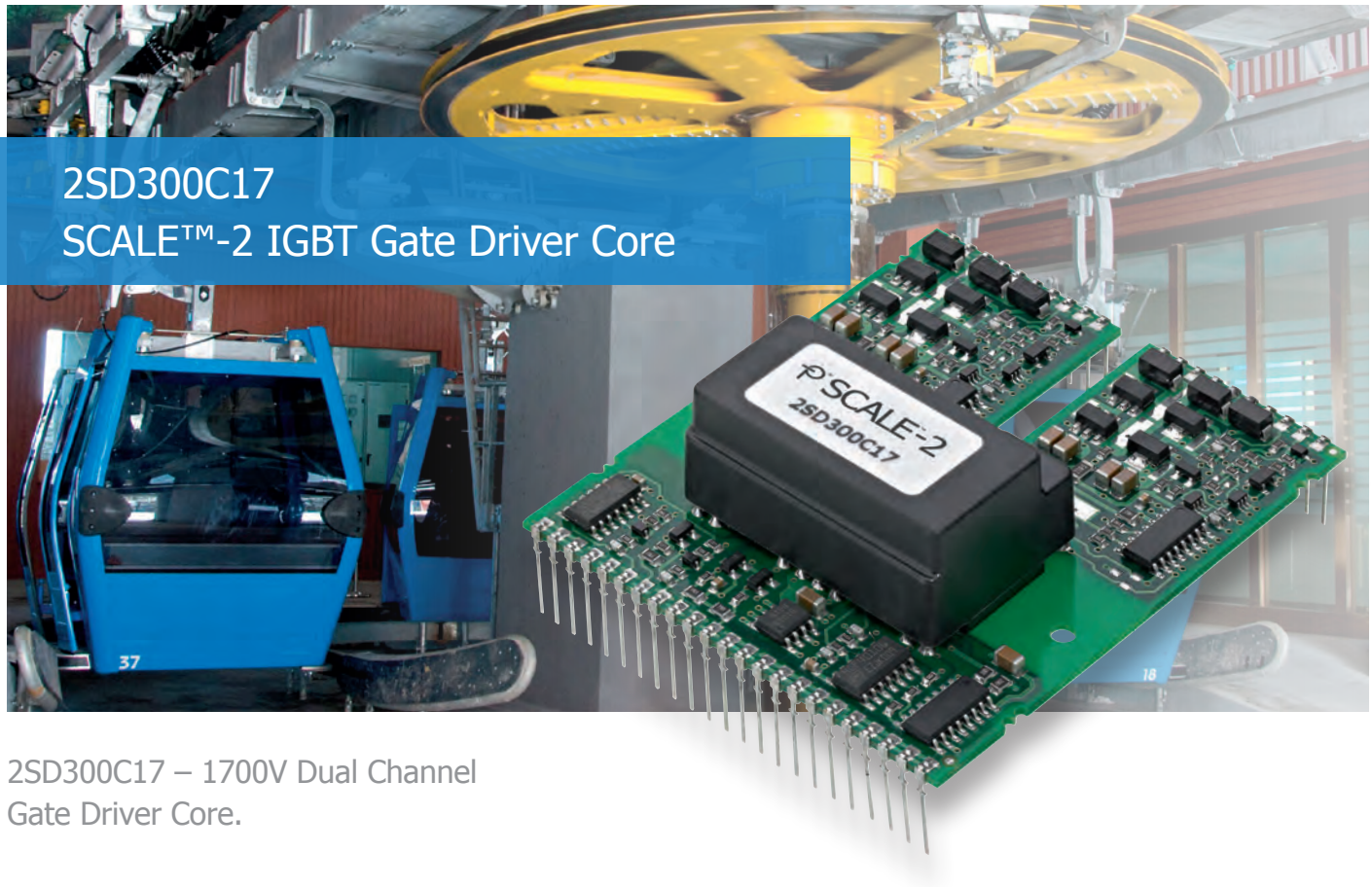
The driver core allows parallel connection of any level of IGBTs. With the innovation of Advanced Power Paralleling (AAP), the 2SC0435T allows to driving multiple IGBT modules with gate signal synchronisation. More details are available in the reference designs.

The IP licenses are available on the homepage.
https://www.power.com/company/intellectual-property-licensing/

ORDERING INFORMATION 2SC0435T DUAL CHANNEL SCALE™-2+ GATE DRIVER CORE

	Type Designation	Increased EMI capability	Lead free	Pin length
2SC0435T	2SC0435T2F1-17	yes	yes	5.84 mm
	2SC0435T2G1-17	yes	yes	3.10 mm
	2SC0435T2H0-17	yes	yes	2.54 mm

2SD300C17
SCALE™-2 IGBT Gate Driver Core



2SD300C17 – 1700V Dual Channel Gate Driver Core.

PRODUCT DESCRIPTION

The use of Power Integrations highly integrated SCALE™-2 chipset on the 2SD300C17 uses 63% fewer components than other market available solutions.

This results in a significant improvement in reliability (both calculated MTBF and measured) and reduced costs. The 2SD300C17 combines a complete two channel driver core with all components required for driving, such as an isolated DC/DC converter, short circuit protection, Soft Shut Down function under short circuit condition, short pulse suppression as well as supply voltage monitoring. Each of the two output channels is electrically isolated from the primary side and the other secondary channel.

The driver provides a gate voltage swing of ±15 V. An output current of 30 A at 85 °C and 4 W drive power is available per channel.

Excellent EMC performance with a dv/dt strength of more than 50 V/ns allows safe and reliable operation even in demanding industrial applications.

APPLICATIONS

- Traction
- Solar
- Wind power converters
- Medium voltage converters/drives
- Motor drives
- IGBTs up to 1700 V

KEY BENEFITS

Pin compatible product with drastically reduced component count.

KEY FEATURES

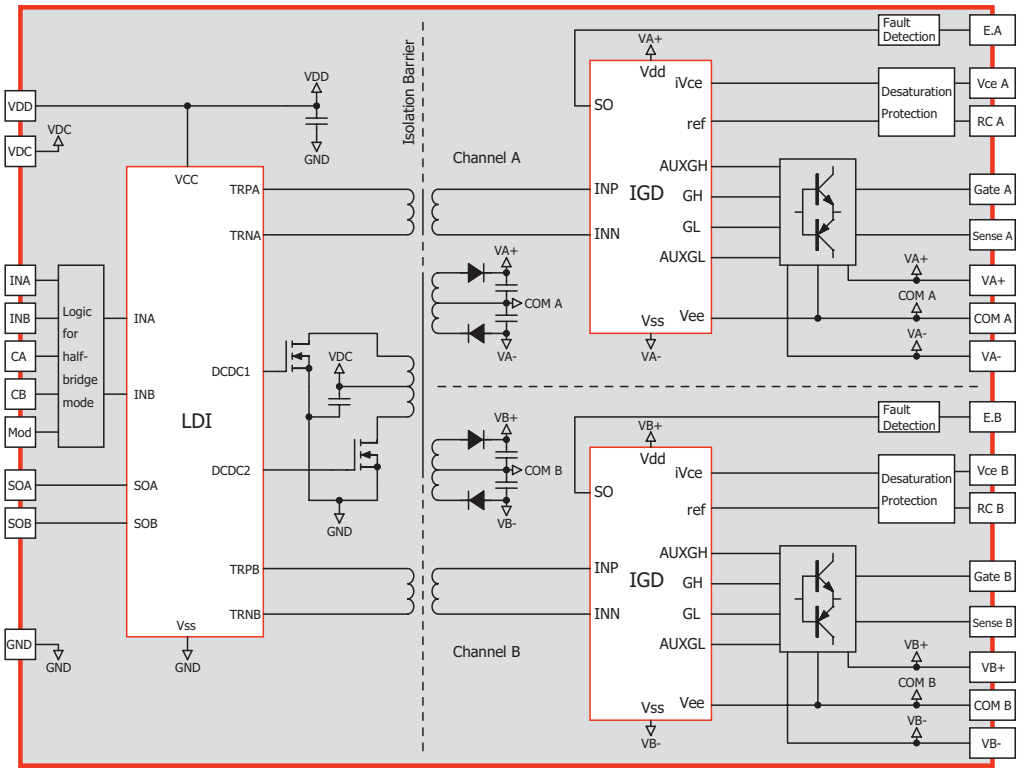
- Dual channel driver core
- Second source solution
- Blocking voltages up to 1700 V
- Switching frequency up to 60 kHz
- Short pulse suppression 400 ns
- Delay time <700 ns
- Gate current ±30 A
- Gate voltage ±15 V
- 15 V logic interface
- Direct and half bridge modes
- IGBT short circuit protection
- Soft Shut Down
- Isolated DC/DC converter
- 2 x 4 W output power
- Supply under voltage lockout
- Reinforced isolation according to IEC 60664-1

KEY DATA OVERVIEW

Parameter	Min	Typical	Max	Unit
Nominal supply voltage		15		V
Supply current @ f_{IN}=0 Hz		65		mA
Supply current @ f_{IN}=60 Hz		21		mA
Output power		4		W
Gate voltage		+15/-15		V
Peak output current (gate current)	-30		+30	A
Switching frequency f_{IN} [1)]			60	kHz
Duty cycle	0		100	%
Turn on delay		630		ns
Turn off delay		490		ns
Operating temperature	-40		+85	°C

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

BLOCK DIAGRAM OF THE 2SD300C17



ORDERING INFORMATION 2SD300C17 SCALE™-2 GATE DRIVER CORE

	Type Designation	Description	Lead free
2SD300C17	2SD300C17A1	Standard version	no
	2SD300C17A2	Standard version	yes

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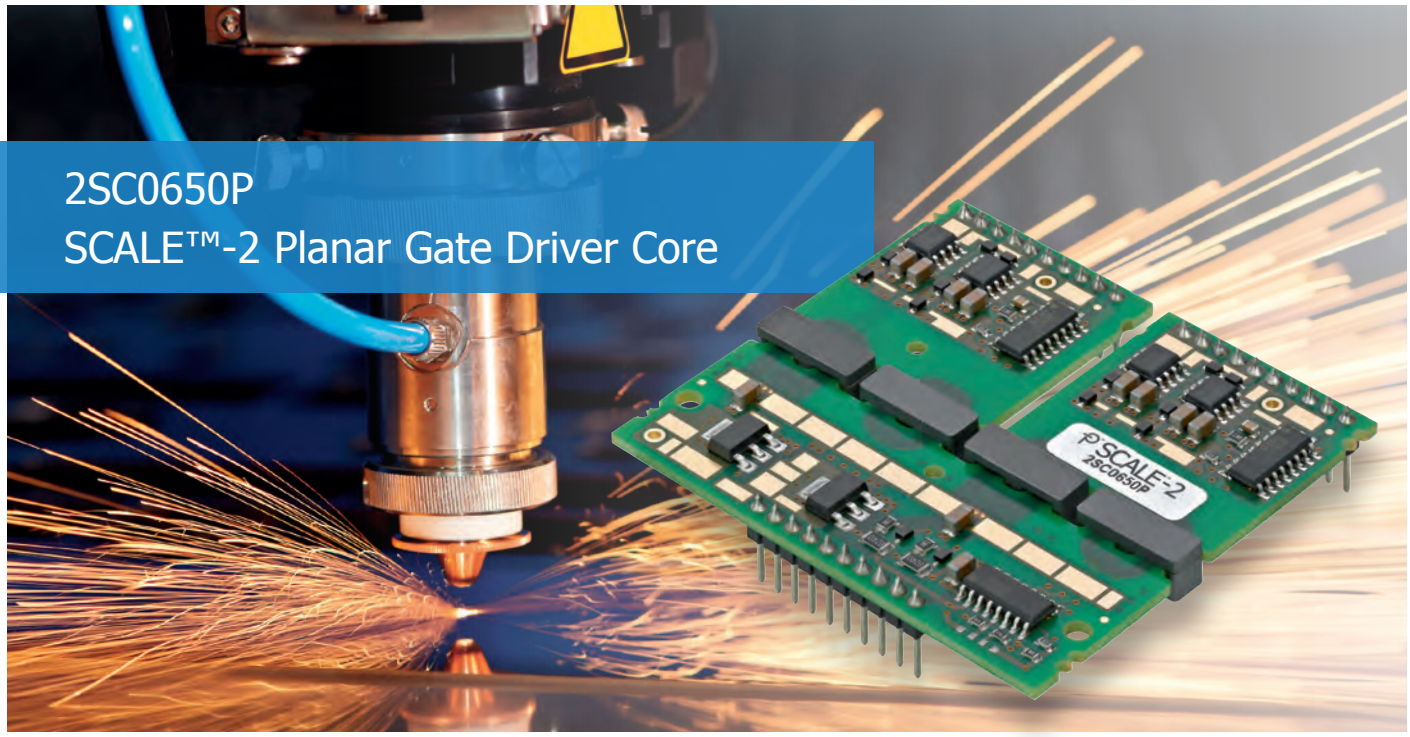


2SC0650P
SCALE™-2 Planar Gate Driver Core

2SC0650P – Dual Channel IGBT, MOSFET and SiC-MOSFET Gate Driver Core with Planar Transformers. Highest Power Density for High Power and High Frequency. 50 A Gate Current and 2 x 6 W Output Power at 85 °C Ambient Temperature.

PRODUCT DESCRIPTION

The 2SC0650P driver core combines high power density with broad applicability. The driver is designed for both high power and high frequency applications requiring maximum reliability. It is suitable for IGBTs with reverse voltages up to 1700 V and also SiC MOSFETs.

The highly integrated SCALE™-2 chipset reduces the component count by up to 85 % compared to conventional solutions, thus significantly increasing reliability and reducing costs. SCALE™-2 technology enables the driver core to operate at switching frequencies of up to 150 kHz – at best-in-class efficiency.

The 2SC0650P has a profile of only 6.5 mm and a footprint of 57 x 62 mm. It combines a complete two channel 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 and regulated gate voltage. Each of the two output channels is electrically isolated from the primary side and the other secondary channel with fulfilling international standards for basic and reinforced isolation. 2SC0650P is CAF (Conductive Anodic Filaments) approved.

APPLICATIONS

- High gate current driving applications
- High frequency applications
- Switched mode power supplies (SMPS)
- Wind power converters
- Induction heating
- Industrial drives
- Traction applications
- Electro/hybrid commercial vehicles
- SiC-MOSFET application

KEY BENEFITS

Ultra-flat due to planar transformers and highest power density. Low transformer stray inductance and low couple capacities.

KEY FEATURES

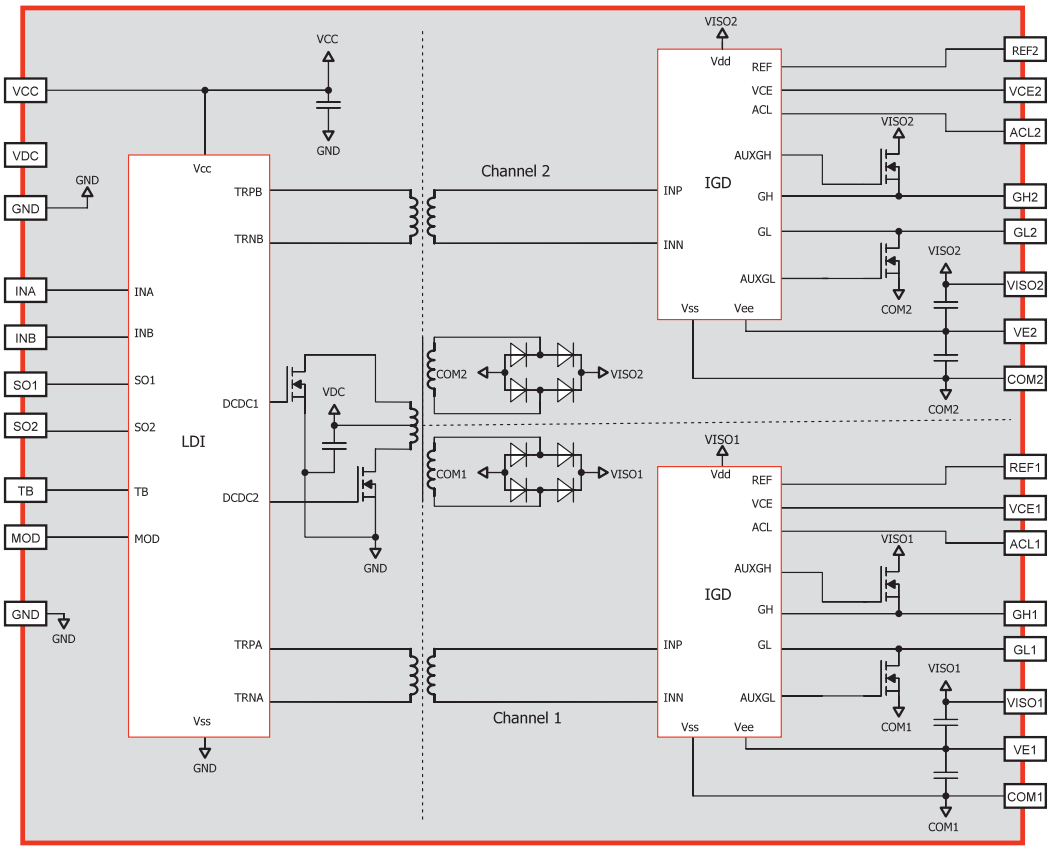
- Ultra-low-profile solution
- Planar transformer isolation
- IGBT blocking voltages up to 1700 V
- Switching frequency up to 150 kHz
- Very short delay time of ≤80 ns
- Extremely small jitter of ≤±2 ns
- High gate current ±50 A
- Compatible to all logic families
- IGBT short circuit protection
- Advanced Active Clamping
- 2 x 6 W output power
- Supply under voltage lockout
- Reinforced isolation according to IEC 60664-1
- UL compliant

KEY DATA OVERVIEW

Parameter	Min	Typical	Max	Unit
Nominal supply voltage		15		V
Supply current @ f_{IN}=0 Hz		61		mA
Supply current, full load			1335	mA
Output power per channel			6.5	W
Gate voltage		+15/-10		V
Peak output current (gate current)	-50		+50	A
Switching frequency f_{IN} [1)]			150	kHz
Duty cycle	0		100	%
Turn on delay		80		ns
Turn off delay		75		ns
Creepage distance primary-secondary		15		mm
Clearance distance primary-secondary		15		mm
Dielectric test voltage	5000		5100	V_{AC}
Partial discharge extinction voltage	1768			V_{peak}
dv/dt immunity, input to output			100	kV/us
Operating temperature	-40		+85	°C

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

BLOCK DIAGRAM OF THE 2SC0650P



ORDERING INFORMATION 2SC0650P DUAL CHANNEL SCALE™-2 GATE DRIVER PLANAR CORE

	Type Designation	Description	Temp °C	Lead free	Pin length
2SC0650P	2SC0650P2A0-17	Switching frequency up to 150 kHz	-40 – +85	no	2.54 mm
	2SC0650P2C0-17	Switching frequency up to 150 kHz	-40 – +85	no	5.84 mm

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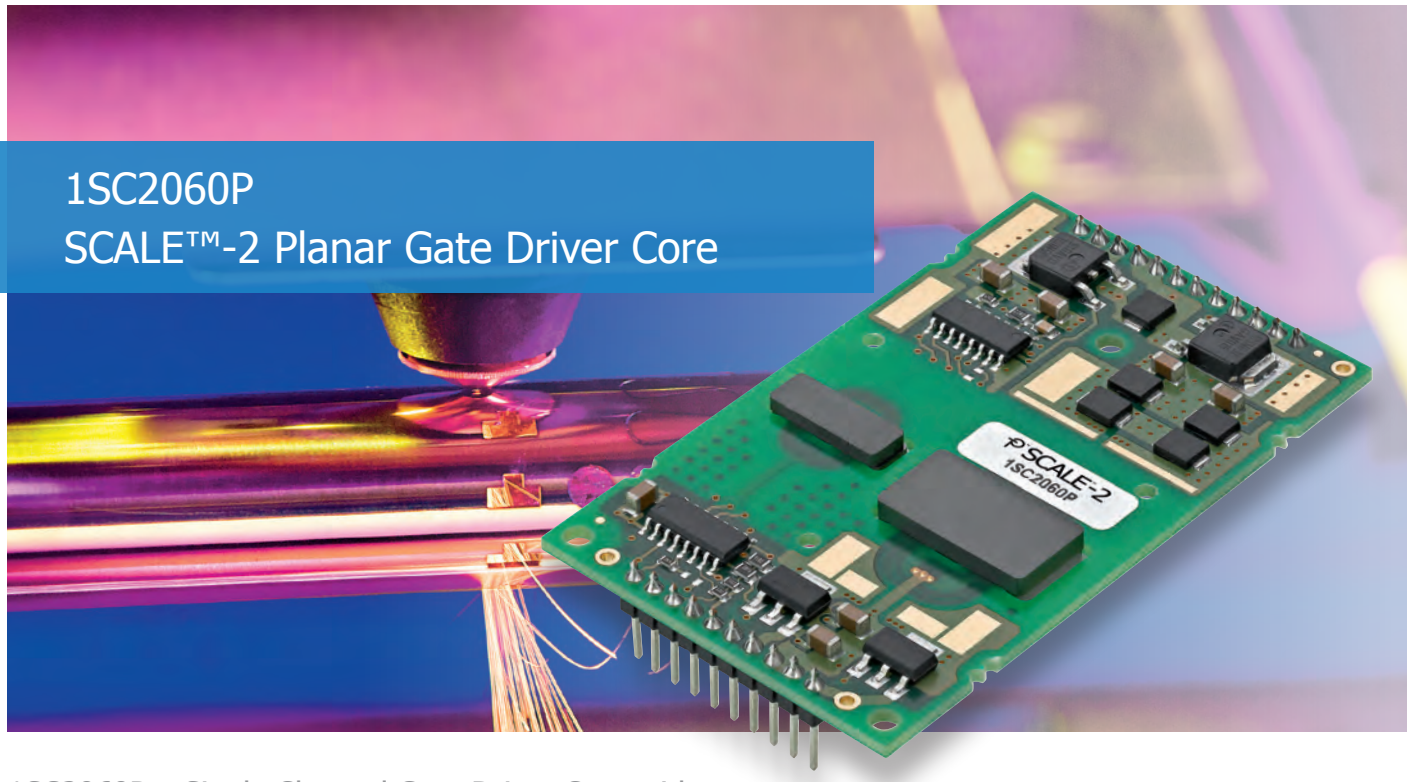


1SC2060P
SCALE™-2 Planar Gate Driver Core

1SC2060P – Single Channel Gate Driver Core with ±60 A Gate Current for Driving IGBT Modules and SiC-MOSFET 20 W Output Power for High Frequency Applications up to 500 kHz.

PRODUCT DESCRIPTION

The 1SC2060P is designed for high power and high frequency applications using high power IGBTs and SiC MOSFETs. The gate driver supports switching at up to 500 kHz with best-in-class efficiency. The 1SC2060P effectively comprises a complete single channel IGBT driver core, fully-equipped with an isolated DC/DC converter, short circuit protection, Advanced Active Clamping, and supply voltage monitoring and regulated gate voltage.

With its compact outline of 44 mm x 74 mm and a total height of just 7 mm, the 1SC2060P delivers high power density in an attractive form factor. The highly integrated SCALE™-2 chipset reduces components by around 85 %. This leads to increased reliability and minimized costs.

Primary to secondary side isolation fulfills international standards for reinforced isolation. 1SC2060P is CAF (Conductive Anodic Filaments) approved.

APPLICATIONS

- High frequency applications
- High gate current driving applications
- Switched mode power supplies (SMPS)
- Driving parallel connected large IGBTs
- Wind power converters
- Traction propulsion converters
- Industrial drives
- Induction heating
- SiC-MOSFET application

KEY BENEFITS

Use of planar transformer technology leads to low transformer stray inductance, ultra-flat design and high power density.

KEY FEATURES

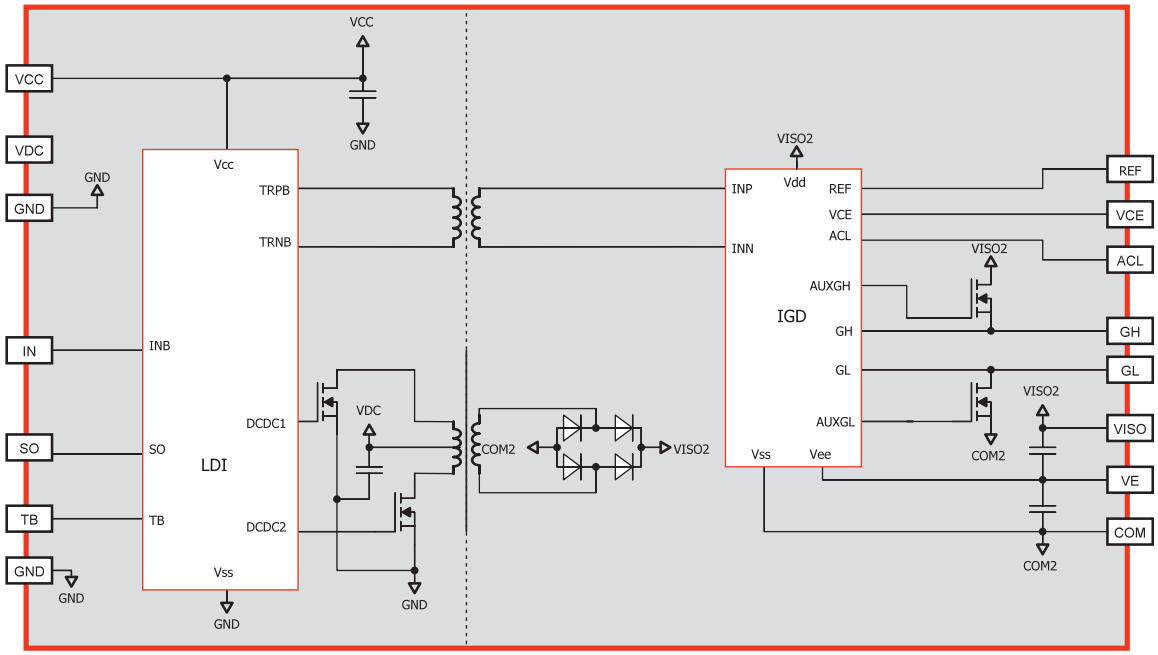
- Ultra low profile solution
- Planar transformer isolation
- Switching frequency up to 500 kHz
- IGBT blocking voltages up to 1700 V
- Very short delay time of <80 ns
- Extremely small jitter of <±1 ns
- High gate current ±60 A
- Compatible to all logic families
- IGBT short circuit protection
- Advanced Active Clamping
- Isolated DC/DC converter
- 20 W output power
- Supply under voltage lockout
- Reinforced isolation according to IEC 60664-1
- UL compliant

KEY DATA OVERVIEW

Parameter	Min	Typical	Max	Unit
Nominal supply voltage		15		V
Supply current @ f_{IN}=0 Hz		48		mA
Supply current, full load			2131	mA
Output power per channel			23	W
Gate voltage		+15/-10		V
Peak output current (gate current)	-60		+60	A
Switching frequency f_{IN} [1)]			500	kHz
Duty cycle	0		100	%
Turn on delay		75		ns
Turn off delay		70		ns
Creepage distance primary-secondary	15			mm
Clearance distance primary-secondary	15			mm
Dielectric test voltage	5000	5050	5100	V_{AC}
Partial discharge extinction voltage	1768			V_{peak}
dv/dt immunity, input to output			100	kV/us
Operating temperature	-40		+85	°C

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

BLOCK DIAGRAM OF THE 1SC2060P



ORDERING INFORMATION 1SC2060P SINGLE CHANNEL SCALE™-2 GATE DRIVER PLANAR CORE

	Type Designation	Description	Temp °C	Lead free	Pin length
1SC02060P	1SC02060P2A0-17	Switching frequency up to 500 kHz	-40 – +85	no	5.84 mm

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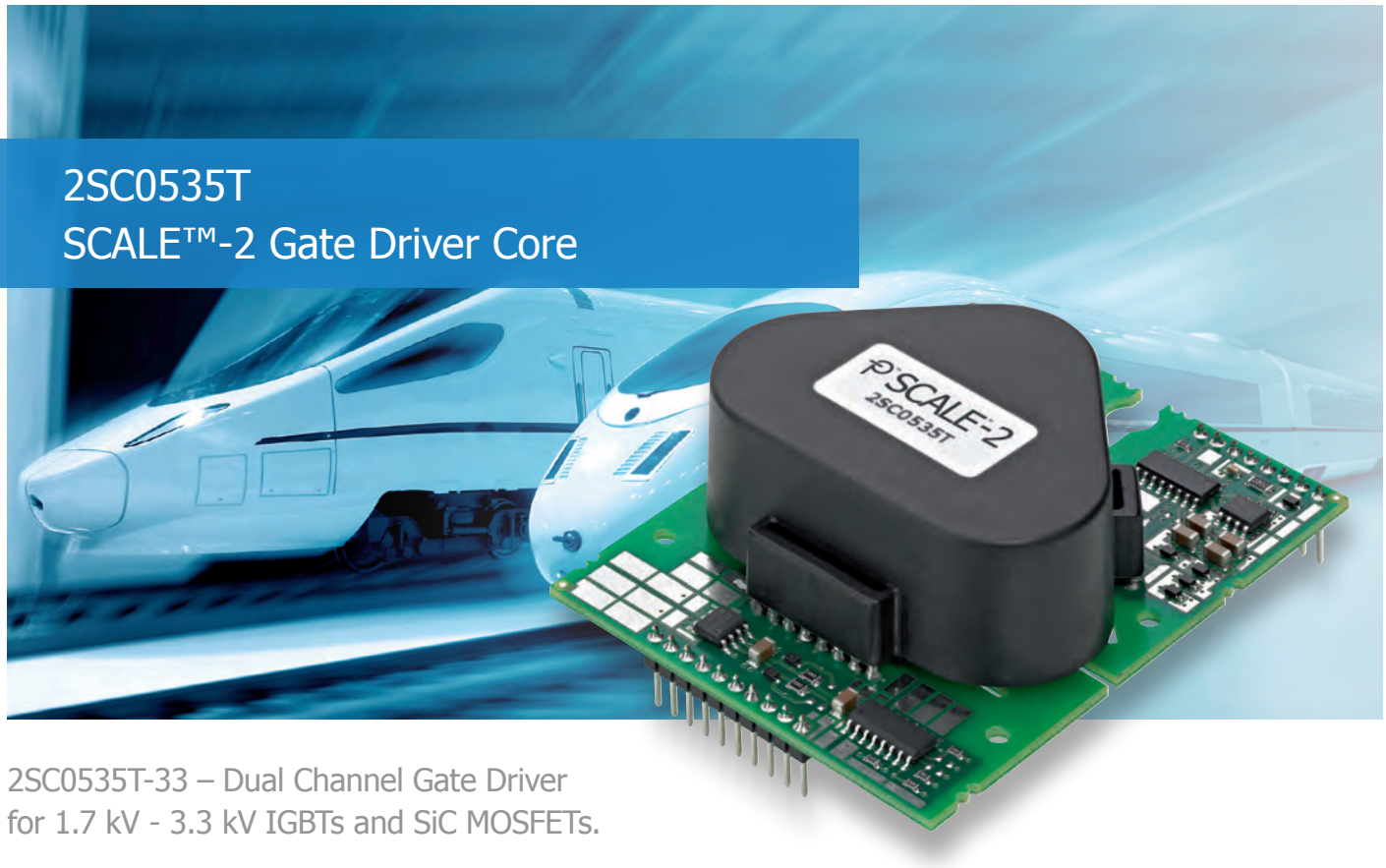
2SC0535T
SCALE™-2 Gate Driver Core



2SC0535T-33 – Dual Channel Gate Driver
for 1.7 kV - 3.3 kV IGBTs and SiC MOSFETs.

PRODUCT DESCRIPTION

The driver is designed for industrial and traction applications requiring high reliability. The 2SC0535T drives all standard high voltage IGBT modules up to 3300 V. Its embedded paralleling capability allows easy inverter design covering higher power ratings. Multi-level topologies with 1700 V IGBTs with higher requirements on the isolation can also be easily supported same as SiC applications by 2SC0535T. The SCALE™-2 driver core 2SC0535T combines unrivalled compactness with broad applicability and cost-effectiveness.

The 2SC0535T is the most compact driver core in its voltage and power range, featuring a footprint of only 76.5 mm x 59.2 mm and an insertion height of max. 26 mm. It allows even the most restricted insertion spaces to be efficiently used. Compared with conventional drivers, the highly integrated SCALE™- 2 chipset allows about 85 % of components to be dispensed with. This advantage is impressively reflected in increased reliability at simultaneously minimized cost.

The 2SC0535T combines a complete dual channel driver core with all necessary safety features, such as short circuit protection, Advanced Active Clamping, an isolated DC/DC converter as well as supply voltage monitoring.

Each of the two output channels is electrically isolated from the primary side and the other secondary channel.

An output current of ±35 A and 5 W at 85 °C drive power is available per channel, making the 2SC0535T an ideal driver platform for both high power modules and parallel circuits. In dedicated IGBT mode, the driver provides a gate voltage swing of +15 V/–10 V. The turn on voltage is regulated to maintain stable 15 V regardless of the output power level. Moreover, its temperature range has been increased to -40 – +85 °C to cover applications requiring lower temperature capability.

APPLICATIONS

- Traction
- Railroad power supplies
- Light rail vehicles
- HVDC
- Flexible AC transmission systems (FACTS)
- Medium voltage converters
- Wind power converters
- Industrial drives

KEY BENEFITS

The 2SC0535T is the most compact driver core in its voltage and power range - a compact dual channel solution for various 1.7 - 3.3 kV applications.

KEY FEATURES

- IGBT blocking voltages up to 3300 V
- 2 level and multi level topologies
- Applicable for SiC-MOSFET
- Switching frequency up to 100 kHz
- Very short delay time of <100 ns
- Small jitter of ±2 ns
- Gate current ±35 A
- +15 V (regulated)/-10 V gate driving
- Interface for 3.3 V – 15 V logic level
- Direct and half bridge modes
- IGBT short circuit protection
- Supply under voltage lockout
- Isolated DC/DC converter
- 2 x 5 W output power
- Operating temperature -55 – +85 °C
- Reinforced isolation according to IEC 60664-1
- UL compliant

KEY DATA OVERVIEW

Parameter	Min	Typical	Max	Unit
Nominal supply voltage		15		V
Supply current @ f_{IN}=0 Hz		87		mA
Supply current, full load		900		mA
Output power per channel		5		W
Gate voltage		+15/-10		V
Peak output current (gate current)	-35		+35	A
Switching frequency f_{IN} [1]	0		100	kHz
Duty cycle	0		100	%
Turn on delay		70		ns
Turn off delay		70		ns
Output rise time		20		ns
Output fall time		20		ns
Creepage distance primary-secondary	44			mm
Creepage secondary-secondary	22			mm
Clearance distance primary-secondary	25			mm
Clearance distance secondary-secondary	14			mm
Dielectric test voltage	9100			V_{AC}
Partial discharge extinction voltage	4125			V_{peak}
dv/dt immunity, input to output		50		kV/us
Operating temperature	-55		+85	°C

[1] Maximum switching frequency depends on the IGBT gate charge. See data sheet for actual value of specific driver.

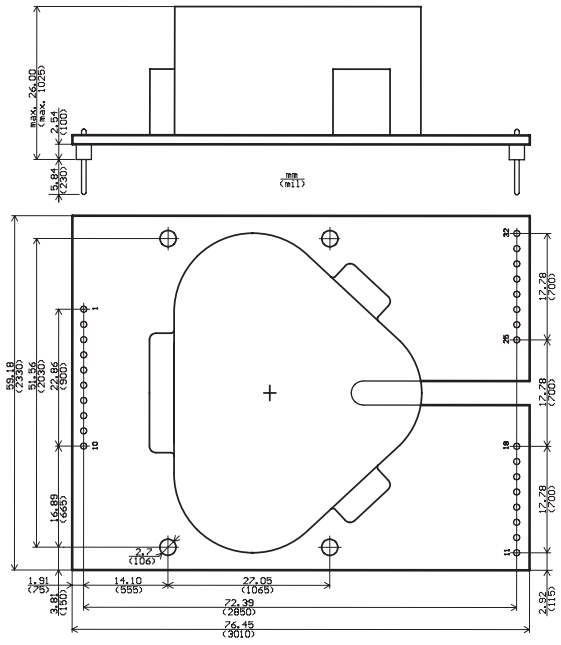
MECHANICAL DIMENSIONS 2SC0535T

The primary and secondary side pin grid is 2.54 mm (100 mil) with a pin cross section of 0.64 mm x 0.64 mm. Total outline dimensions of the board are 59.2 mm x 76.5 mm. The total height of the driver is max. 26 mm measured from the bottom of the pin bodies to the top of the populated PCB.

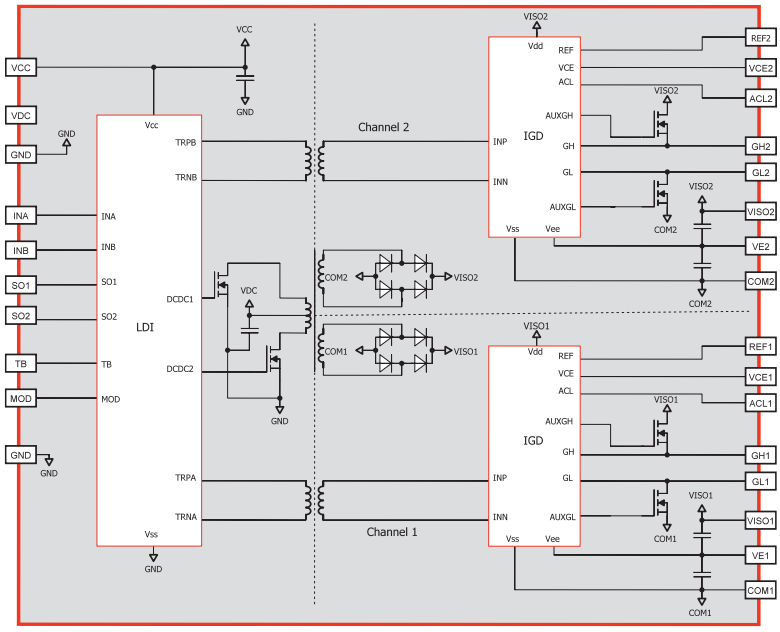
DRIVING PARALLEL CONNECTED IGBTS

The driver allows direct parallel connection of any number of IGBT modules with individual drivers or single gate driver. This new pioneering concept for simple and reliable parallel connection makes it practical for the first time to set up converter series with discrete modules as well as parallel connected IGBTs.

MECHANICAL DRAWING OF 2SC0535T



BLOCK DIAGRAM OF THE 2SC0535T



ORDERING INFORMATION 2SC0535T DUAL CHANNEL SCALE™-2 GATE DRIVER CORE

	Type Designation	Description	Temp °C	Lead free	Pin length
2SC0535T	2SC0535T2A1-33	Standard version	-55 – +85	yes	5.84 mm
2SC0535T	2SC0535T2G0-33	Standard version	-55 – +85	yes	3.10 mm

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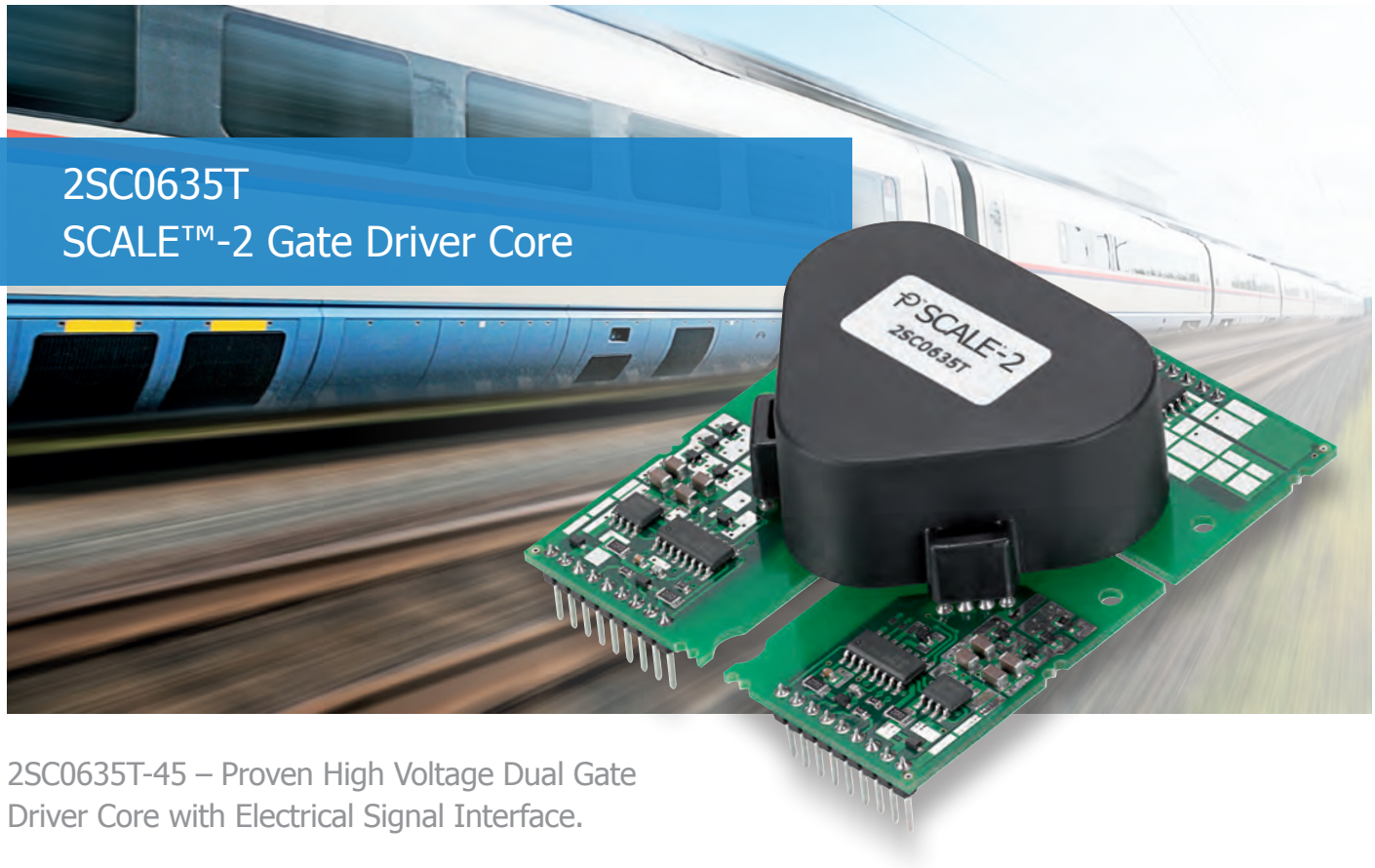
2SC0635T
SCALE™-2 Gate Driver Core



2SC0635T-45 – Proven High Voltage Dual Gate Driver Core with Electrical Signal Interface.

PRODUCT DESCRIPTION

The 2SC0635T dual channel SCALE™-2 driver core combines unrivalled compactness with broad applicability and cost efficiency. It is designed for industrial and traction applications requiring high reliability. The 2SC0635T drives all standard high voltage IGBT modules up to 4500 V.

The driver is designed for universal applications requiring high reliability. It allows easy inverter design covering higher power ratings. Multi-level topologies involving 3.3 kV and 4.5 kV IGBTs with higher isolation requirements can also be easily supported by 2SC0635T2A0-45.

The 2SC0635T is the most compact driver core in its voltage and power range, featuring a footprint of only 75.5 x 66.8 mm and an insertion height of maximum 26 mm. It allows even the most restricted insertion spaces to be efficiently used.

An output current of ±35 A and 6 W drive power is available per channel at 85 °C, making the 2SC0635T2A0-45 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

4.5 kV driver core with on board power supply and no fiber optics achieves lower system costs.

KEY FEATURES

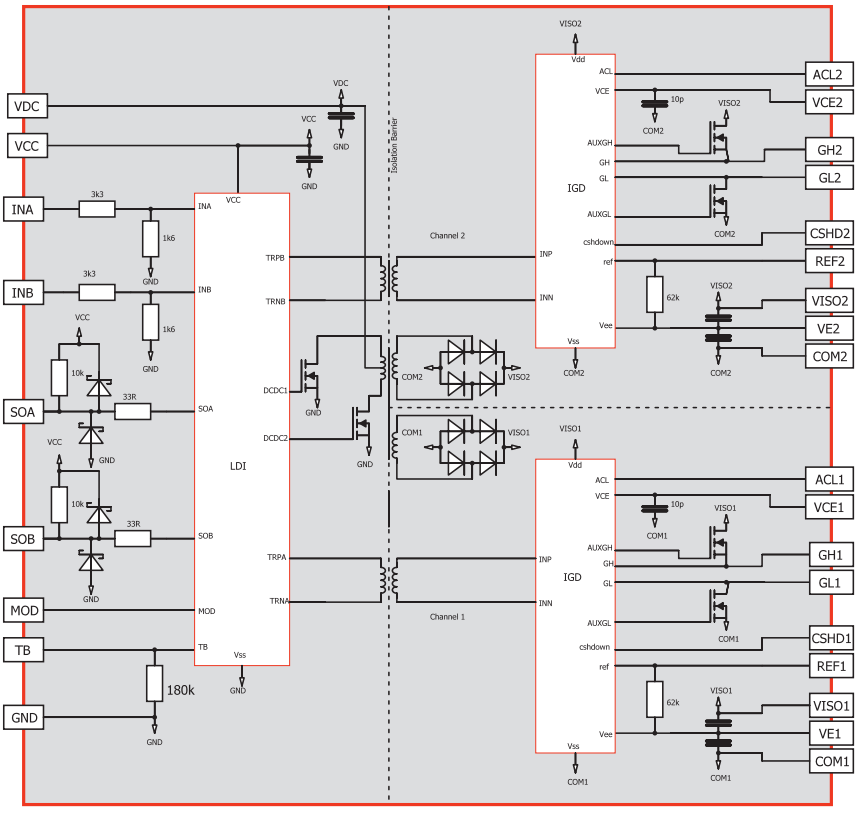
- Dual channel driver core for up to 4500 V
- ±35 A gate current, +15 V/-10 V
- 6 W @ 85 °C per channel
- High reliability (reduced component count)
- Design flexibility
- 1700 V/3300 V 3 level converters
- Direct paralleling capability
- Advanced Active Clamping
- Short circuit protection, under voltage lockout
- Adjustable short circuit turn off delay (3 level converters)
- Delay time <100 ns, up to 100 kHz
- Isolation coordination according to IEC Standards
- UL compliant

KEY DATA OVERVIEW

Parameter	Min	Typical	Max	Unit
Nominal supply voltage		15		V
Supply current @ f_{IN}=0 Hz		95		mA
Supply current, full load			1484	mA
Output power per channel			9	W
Gate voltage		+15/-10		V
Peak output current (gate current)	-35		+35	A
Switching frequency f_{IN} [1)]			100	kHz
Duty cycle	0		100	%
Turn on delay		95		ns
Turn off delay		80		ns
Creepage distance primary-secondary	34			mm
Clearance distance primary-secondary	25			mm
Dielectric test voltage		10300		V_{AC}
Partial discharge extinction voltage	5400			V_{peak}
dv/dt immunity, input to output			50	kV/us
Operating temperature	-40		+85	°C

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

BLOCK DIAGRAM OF THE 2SC0635T



The 2SC0635T2A0-45 combines a complete two channel 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. Each of the two output channels is electrically isolated from the primary side and from the other secondary channel.

ORDERING INFORMATION 2SC0635T SCALE™-2 GATE DRIVER CORE

	Type Designation	Description	Temp °C	Lead free	Pin length
2SC0635T	2SC0635T2A0-45	For 4.5 kV IGBT modules, electrical interface	-40 – +85	yes	5.84 mm

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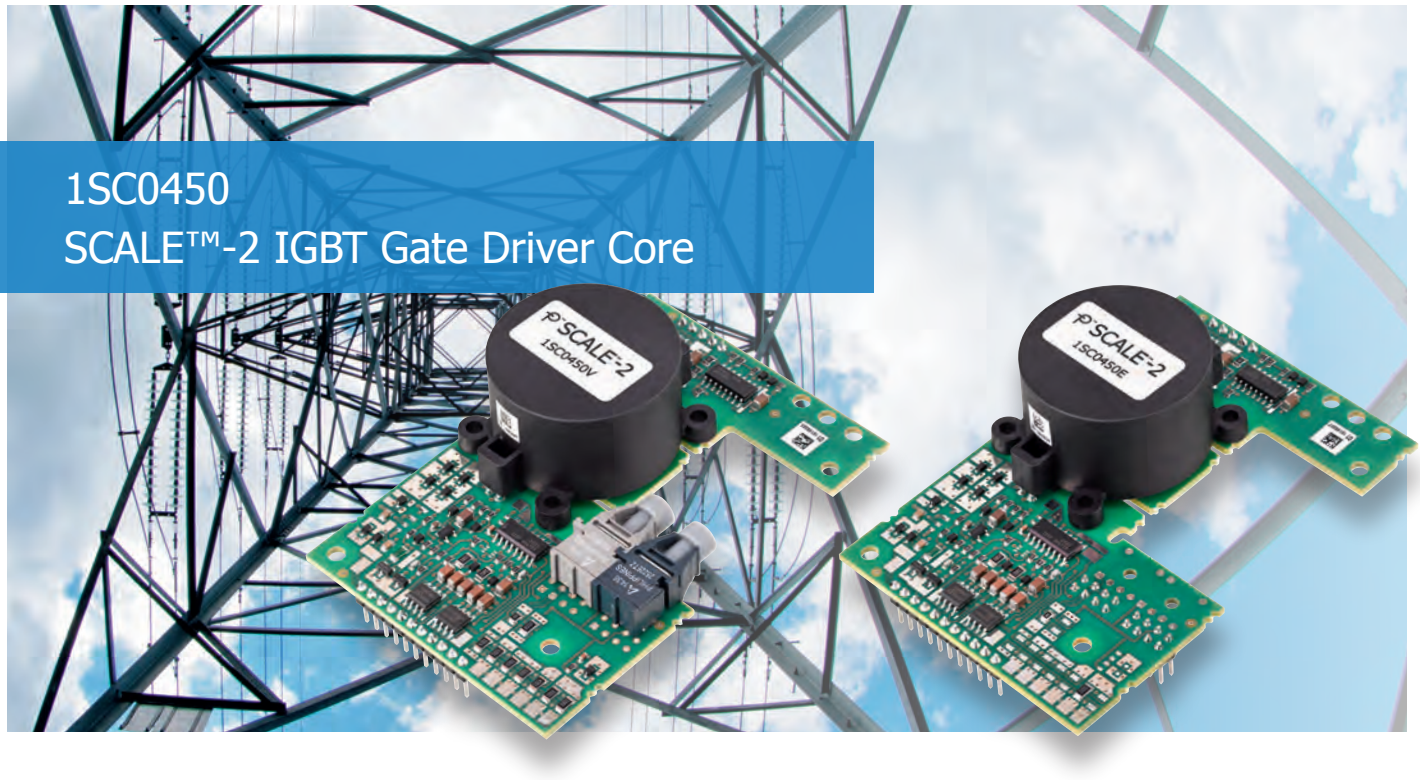


1SC0450V/1SC0450E – High Voltage 4.5 kV and 6.5 kV Single Channel Gate Driver with Integrated DC/DC Converter.

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 °C
- 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
- Isolation according to IEC 60664-1
- UL compliant
- Lead free
- -40 – +85 °C

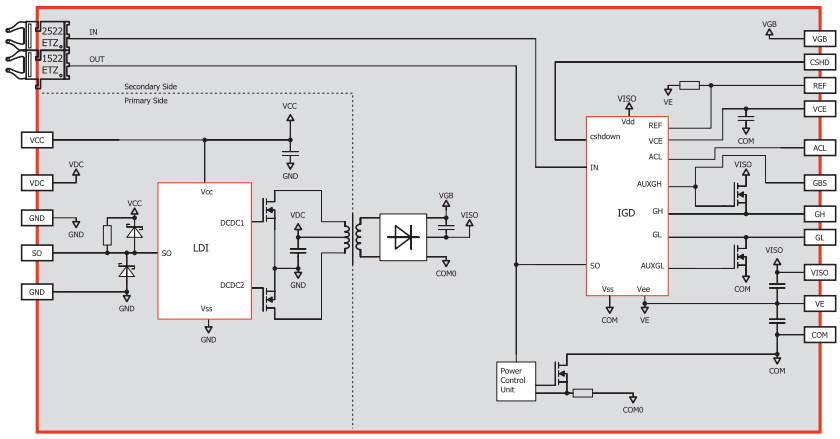
KEY DATA OVERVIEW

Parameter	Min	Typical	Max	Unit
Nominal supply voltage		15		V
Supply current @ f_{IN}=0 Hz		130		mA
Supply current, full load			880	mA
Output power per channel			8	W
Gate voltage		+15/-10		V
Peak output current (gate current)	-50		+50	A
Switching frequency f_{IN} [1)]			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		V_{AC}
Partial discharge extinction voltage	5400/7800			V_{peak}
dv/dt immunity, input to output			35	kV/us
Operating temperature	-40		+85	°C

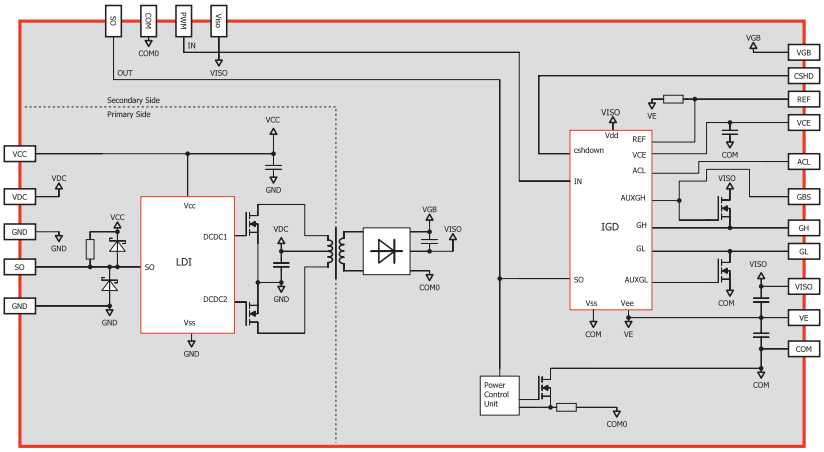
[1)] Maximum switching frequency depends on the IGBT gate charge. See data sheet for actual value of specific driver

BLOCK DIAGRAM OF THE 1SC0450V

The 1SC0450V2A0-xx combines a complete single channel 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.



BLOCK DIAGRAM OF THE 1SC0450E



ORDERING INFORMATION 1SC0450 SCALE™-2 GATE DRIVER CORE

	Type Designation	Description	Temp °C	Lead free	Pin length
1SC0450	1SC0450V2A0-45	Fiber-optic interface	-40 – +85	yes	5.84 mm
	1SC0450V2A0-65	Fiber-optic interface	-40 – +85	yes	5.84 mm
	1SC0450E2A0-45	Non-isolated electrical interface	-40 – +85	yes	5.84 mm
	1SC0450E2A0-65	Non-isolated electrical interface	-40 – +85	yes	5.84 mm

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2SP0115T
SCALE™-2 Plug and Play Gate Driver

2SP0115T – Dual Channel Gate Driver with
Electrical Interface for 17 mm-Dual IGBT Modules.

PRODUCT DESCRIPTION

The 2SP0115T is a dual channel gate driver with an electrical interface. The gate driver is based on Power Integrations' SCALE™-2 chipset, a highly integrated technology for the reliable driving and safe operation of IGBTs.

Perfectly matched driver versions are available for all 17 mm dual IGBT modules such as Infineon, Mitsubishi, Fuji. The plug and play capability of the driver allows immediate operation after mounting. The user does not need to invest effort in designing or adjusting it to a specific application. 2SP0115T is the ultimate low cost ultra compact driver platform for EconoDUAL™ IGBT modules. As a member of the Power Integrations' plug and play driver family, it satisfies the requirements for optimized electrical performance and noise immunity.

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

Thanks to SCALE™-2 technology, the 2SP0115T family comprises complete and extremely compact two channel IGBT drivers equipped with DC/DC converters, short circuit protection, Advanced Active Clamping and supply voltage monitoring.

Users only need to solder them onto the corresponding IGBT module Press Fit version available by request.

Version for 650 V, 1200 V and 1700 V are available.

The DIC20 electrical interface is very simple and easy to use.

APPLICATIONS

- Wind power converters
- Industrial drives
- Railways auxiliary systems
- Induction heating
- Elevators
- UPS and SMPS
- Medical (MRT, CT, X-ray)
- Laser technology

KEY BENEFIT

Compact driver solution for 17 mm dual IGBT modules with an electrical interface.

KEY FEATURES

- Very short delay time of <100 ns
- Small jitter of ±4 ns
- +15 V (regulated)/-8 V gate driving
- Separate gate current paths (on/off)
- Suitable for IGBTs up to 1700 V
- Interface for 3.3 V – 15 V logic level
- Direct and half bridge modes
- 2 level and multi level topologies
- IGBT short circuit protection
- Advanced Active Clamping
- Isolated DC/DC converter
- 2 x 1 W output power
- Supply under voltage lockout
- UL compliant
- Superior EMC
- Reliable, long service life

ELECTRICAL INTERFACE DIC20

The 2SP0115T driver series is equipped with DIC20 electrical interface, fully compatible to PrimePACK™ driver series 2SP0320T. The DIC20 electrical interface is very simple and easy to use.
The driver has the following terminals:
- Power supply and GND terminals
- 2x drive signal inputs
- 2x status outputs (failure returns)
- 1x mode selection (half bridge mode/direct mode)
- 1x input to set the blocking time

All inputs are ESD protected and all digital inputs have Schmitt trigger characteristics.

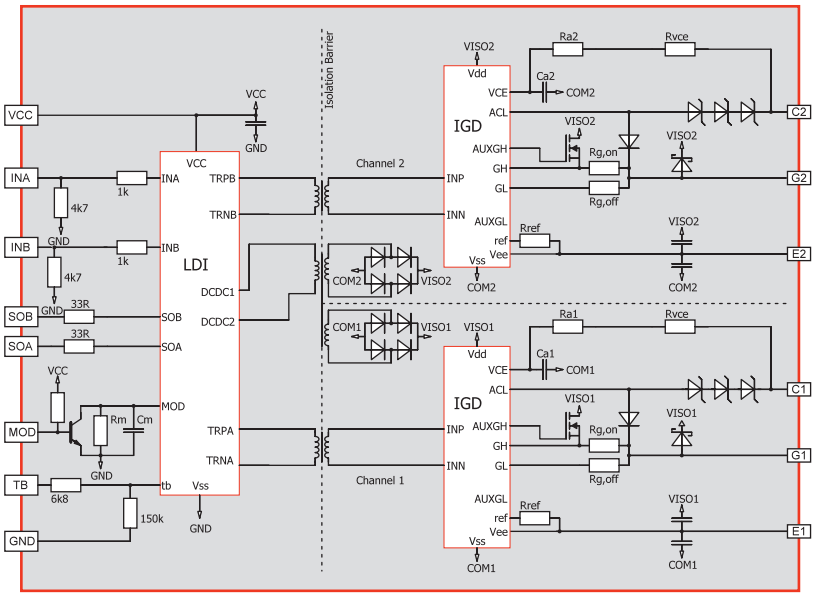
KEY DATA OVERVIEW

Parameter	Min	Typical	Max	Unit
Nominal supply voltage		15		V
Supply current @ f_{IN}=0 Hz		33		mA
Supply current, full load			220	mA
Output power per channel		1		W
Gate voltage		+15/-8		V
Peak output current (gate current)	-8		+15	A
Switching frequency f_{IN} [1]	0		50	kHz
Duty cycle	0		100	%
Turn on delay		75		ns
Turn off delay		65		ns
Creepage distance primary-secondary	12.6			mm
Creepage distance secondary-secondary	6.6			mm
Clearance distance primary-secondary	12.3			mm
Clearance distance secondary-secondary	6.6			mm
Dielectric test voltage (600 V/1200 V versions)	3800			V_{AC}
Dielectric test voltage (1700 V versions)	5000			V_{AC}
Partial discharge extinction voltage (600/1200 V versions)	1200			V_{peak}
Partial discharge extinction voltage (1700 V versions)	1700			V_{peak}
dv/dt immunity, input to output		50		kV/us
Operating temperature 2SP0115T2Ax-xx	-20		+85	°C
Operating temperature 2SP0115T2Bx-xx	-40		+85	°C

[1] Maximum switching frequency depends on the IGBT gate charge. See data sheet for actual value of specific driver.

BLOCK DIAGRAM OF THE 2SP0115T

The driver contains all necessary components for optimal and safe driving of the relevant IGBT module: smallest gate resistors in order to minimize switching losses, gate clamping, active clamping diodes (overvoltage protection at turn off), V_{ce} monitoring (short circuit protection) as well as the input electrical connector X1. Moreover, it includes components for setting the turn off trip level, the response time and the dead time between both channels in half bridge mode. Its plug and play capability means that it is ready to operate immediately after mounting. The user needs to invest no effort in designing or adjusting the driver for a specific application.



ORDERING INFORMATION 2SP0115T DUAL CHANNEL SCALE™-2 PLUG AND PLAY DRIVER

	Type Designation	Description
2SP0115T	2SP0115T2A0	Standard version (-20 – +85 °C)
	2SP0115T2B0	Extended operating temperature (-40 – +85 °C)
	2SP0115T2A0-xx or 2SP0115T2B0-xx	xx: voltage basic type (for any module type)[1] xx = 06 (600 V) / xx = 12 (1200 V) / xx = 17 (1700 V)
		xx: specific module type (Infineon, Fuji, Mitsubishi, Starpower, Powerex) such as 2MBI300VN-120-50
	2SP0115T2C0-xx	xx: voltage basic type xx = 06 (600 V) / xx = 12 (1200 V) / xx = 17 (1700 V) 15 V logic level, extended operating temperature (-40 – +85 °C)

[1] Gate resistors have to be soldered by customer

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2SP0320
SCALE™-2 Plug and Play IGBT Gate Driver

2SP0320 Series – Dual Channel Gate Driver for PrimePACK™ and Equivalent IGBT Modules with Electrical or Fiber Optic Interfaces.

PRODUCT DESCRIPTION

The 2SP0320 is the ultimate gate driver platform for PrimePACK™ and equivalent IGBT modules of various manufacturers. As a member of the Power Integrations plug and play driver family, it satisfies the requirements for optimized electrical performance and noise immunity.

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

Thanks to SCALE™-2 technology, the 2SP0320 family comprises complete and extremely compact two channel IGBT drivers equipped with DC/DC converters, short circuit protection, Advanced Active Clamping and supply voltage monitoring.

The embedded paralleling capability allows easy inverter design covering higher power ratings. Specifically adapted drivers are available for all module types. All drivers are available with electrical or fiber optical interfaces.

PrimePACK™ is a registered trademark of Infineon Technology AG

The driver contains all necessary components for optimal and safe driving of the relevant IGBT module: smallest gate resistors in order to minimize switching losses, gate clamping, active-clamping diodes (overvoltage protection at turn off), V_{ce} monitoring (short circuit protection) as well as the electrical connector input X1. Moreover, it includes components for setting the turn off trip level, the response time and the dead time between both channels in half bridge mode. Its plug and play capability means that it is ready to operate immediately after mounting. Users don't need to invest more efforts in designing or adjusting the driver to a specific application.

APPLICATIONS

- Wind power converters
- Traction inverters
- Industrial drives
- Induction heating
- Elevators
- UPS and SMPS
- Medical (MRT, CT, X-ray)
- Laser technology

KEY BENEFITS

Ultimate driver platform for PrimePACK™ and equivalent IGBTs with an electrical or fiber optic interface. Component count reduced by 80 % thanks to the SCALE™-2 chipset.

KEY FEATURES

- Compact plug and play solution up to 1.7 kV
- Very short delay time of <120 ns
- Small jitter of +/-2 ns
- Interface for 3.3 V – 15 V logic level
- Electrical or fiber optic interfaces
- Small jitter of +/-2 ns (electrical interface)
- +15 V/-10 V gate driving
- Easy mounting directly onto the IGBT
- Supports 2 level and 3 level converter topologies
- IGBT short circuit protection
- Advanced Active Clamping
- Isolated DC/DC converter
- Supply under voltage lockout
- Reinforced isolation to IEC-60664-1
- UL compliant

INTERFACE OPTIONS

The 2SP0320 driver series is available with one electrical and two fiber optical interfaces.

Electrical Interface:
2SP0320T
The DIC20 electrical interface is very simple and easy to use. The driver has the following terminals:
- Power supply and GND terminals
- 2x drive signal inputs
- 2x status outputs (failure returns)
- 1x mode selection
  (half bridge mode/direct mode)
- 1x input to set the blocking time

All inputs are ESD protected and all digital inputs have Schmitt trigger characteristics.

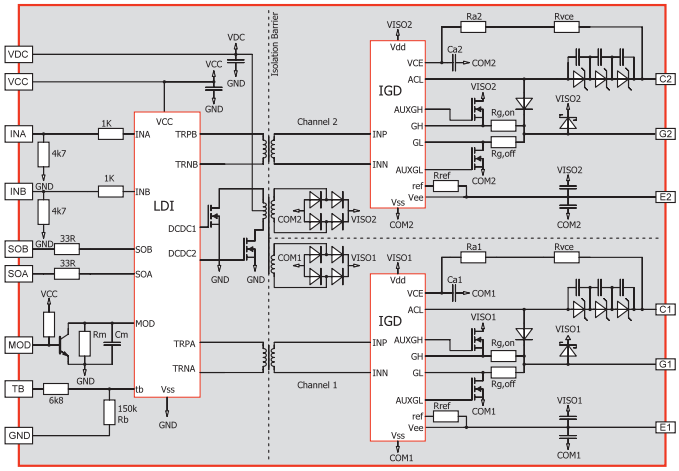
Fiber Optic Interfaces:
2SP0320V and 2SP0320S
Fiber optic links are used for the electrical insulation of the command and status feedback signals. Two versions of the fiber optic interfaces are available:
- 2SP0320V versatile fiber optic
- 2SP0320S ST fiber optic

KEY DATA OVERVIEW

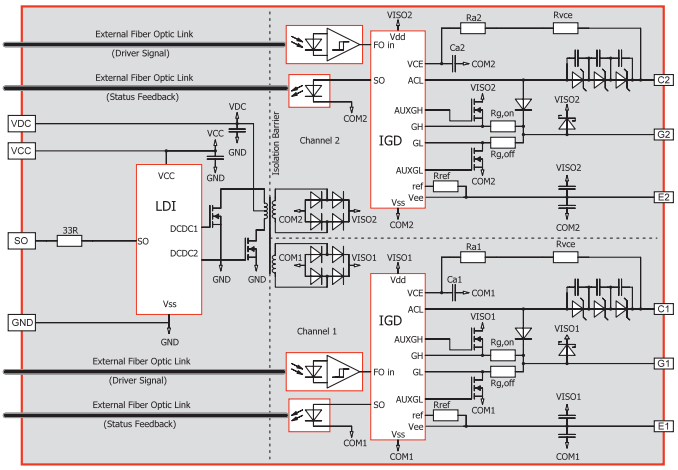
Parameter	Min	Typical	Max	Unit
Nominal supply voltage		15		V
Supply current 2SP0320T2xx @ f_{IN}=0 Hz		56		mA
Supply current 2SP0320V2xx and 2SP0320S2xx @ f_{IN}=0 Hz		164		mA
Supply current, full load 2SP0320T2xx		600		mA
Supply current, full load 2SP0320V2xx and 2SP0320S2xx		690		mA
Output power per channel		3		W
Gate voltage		+15/-10		V
Peak output current (gate current)	-20		+20	A
Switching frequency f_{IN} [1]	0		30	kHz
Duty cycle	0		100	%
Turn on delay, 2SP0320T2xx		90		ns
Turn off delay, 2SP0320T2xx		90		ns
Turn on delay, 2SP0320V2xx and 2SP0320S2xx		120		ns
Turn off delay, 2SP0320V2xx and 2SP0320S2xx		100		ns
Creepage distance primary-secondary	20			mm
Creepage distance secondary-secondary	17			mm
Dielectric test voltage	5000			V_{AC}
Partial discharge extinction voltage	1768			V_{peak}
dv/dt immunity, input to output			50	kV/us
Operating temperature	-40		+85	°C

[1] Maximum switching frequency depends on the IGBT gate charge. See data sheet for actual values of specific drivers.

BLOCK DIAGRAM OF THE 2SP0320T



BLOCK DIAGRAM OF THE 2SP0320V



ORDERING INFORMATION 2SP0320 SERIES

	2SP0320T	2SP0320V
Type designation	2SP0320T2A0-xx 2SP0320T2C0-12 2SP0320T2C0-17	2SP0320V2A0-xx
xx: Voltage basic type[1] or xx: Specific module type	xx = 12 (1200 V) / xx = 17 (1700 V) xx = e.g. 2MBI900VXA-120E-50	
Input signal interface	Electrical interface 2SP0320T2A0: 3.3-15 V logic level 2SP0320T2C0: 15 V logic level	Versatile FOL Input/Output
On board connector	DIC20[2]	HFBR 2522ETZ/1522ETZ

[1] Gate resistors have to be soldered by customer
[2] Electrical connector on the driver: 71922-120LF from FCI, recommended cable connector: 71600-020LF from FCI. Recommended twisted pair flat cable: 1700/20 or 2100/20 from 3M™

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2SP0325
SCALE™-2 Plug and Play IGBT Gate Driver

2SP0325 – Perfect Driving of the New Mega Power Dual (nMPD) from Mitsubishi.

PRODUCT DESCRIPTION

Controlling the ever faster switching IGBT module innovations is our passion. The SCALE™-2-based 2SP0325 dual IGBT driver for Mitsubishi's high current and high performance 1200 V and 1700 V modules demonstrates the features of this most advanced ASIC technology for gate drivers available on the market. It enables extremely fast analog control loops, which, in combination with Dynamic Advanced Active Clamping (DAAC), can switch the module faster and allows higher DC voltages than any other gate drive solution. With its excellent EMI ruggedness, the driver can sit directly on top of the module with no need for additional shielding measures. A really compact and clean design. The user can naturally choose between an electrical and fiber optic interface depending on his requirements. Combining Mitsubishi's new MPD with Power Integrations' 2SP0325 leads to a system design with the highest power density in the 1MW inverter class.

APPLICATIONS

- Wind power converters
- Solar inverters
- UPS systems
- Industrial drives

KEY BENEFIT

Clean and simple gate drive solution for fast switching high-performance modules.

KEY FEATURES

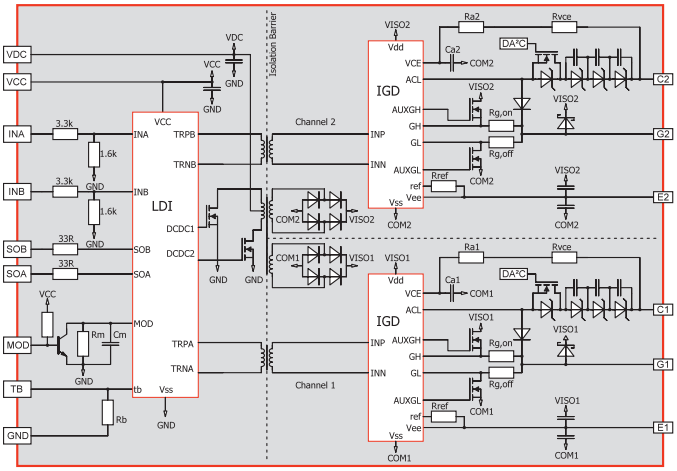
- High power dual channel Plug and Play IGBT gate driver
- Schmitt trigger input
- Electrical 15 V logic level or fiber optic interfaces
- +15 V (regulated)/-10 V gate driving
- Supports 3 level converter topologies
- IGBT short circuit protection
- Isolated DC/DC converter
- Supply under voltage lockout
- Creepage and clearance acc. to IEC 60664-1
- UL compliant
- Dynamic Advanced Active Clamping (DAAC)

KEY DATA OVERVIEW

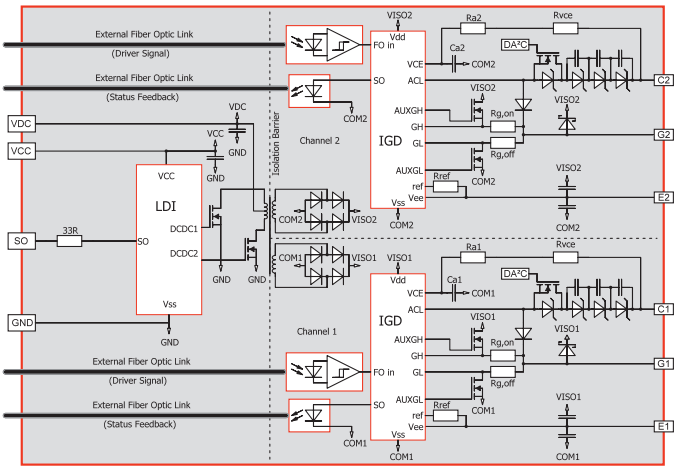
Parameter	Min	Typical	Max	Unit
Nominal supply voltage		15		V
Supply current @ f_{IN}=0 Hz		55		mA
Supply current, full load			573	mA
Output power per channel			2	W
Gate voltage		+15/-10		V
Peak output current (gate current)	-25		+25	A
Switching frequency f_{IN} [1)]			5	kHz
Duty cycle	0		100	%
Turn on delay		80		ns
Turn off delay		65		ns
Creepage distance primary-secondary	12.5			mm
Clearance distance primary-secondary	12.5			mm
Dielectric test voltage		5050		V_{AC}
Partial discharge extinction voltage	1768			V_{peak}
dv/dt immunity, input to output			50	kV/us
Operating temperature	-40		+85	°C

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

BLOCK DIAGRAM OF THE 2SP0325T



BLOCK DIAGRAM OF THE 2SP0325V



The driver contains all necessary components for optimal and safe driving of the relevant IGBT module: smallest gate resistors in order to minimize switching losses, gate clamping, active clamping diodes (overvoltage protection at turn off), V_{ce} monitoring (short circuit protection) as well as the input electrical connector X1. Moreover, it includes components for setting the turn off trip level, the response time and the dead time between both channels in half bridge mode. Its plug and play capability means that it is ready to operate immediately after mounting. The user needs to invest no effort in designing or adjusting the driver to a specific application.

ORDERING INFORMATION SCALE™-2 DUAL CHANNEL IGBT GATE DRIVER FOR MITSUBISHI'S NEW MEGA POWER DUAL IGBT MODULES

	Type Designation	Description	Lead free
2SP0325T	2SP0325T2A0	Electrical interface	yes
2SP0325V	2SP0325V2A0	Fiber-optic interface with built in DC/DC Power Supply	yes

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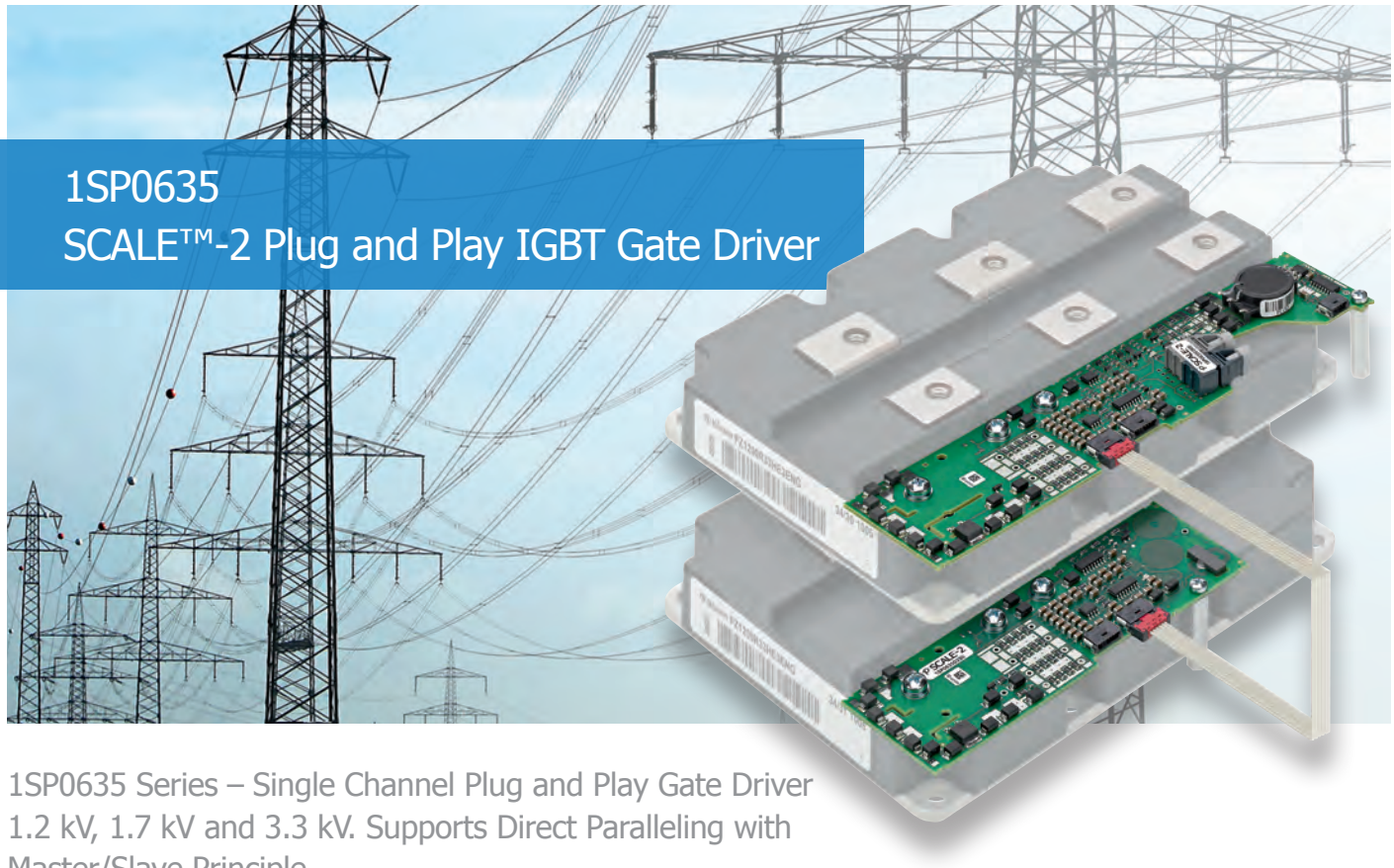


1SP0635
SCALE™-2 Plug and Play IGBT Gate Driver

1SP0635 Series – Single Channel Plug and Play Gate Driver 1.2 kV, 1.7 kV and 3.3 kV. Supports Direct Paralleling with Master/Slave Principle.

PRODUCT DESCRIPTION

The 1SP0635 SCALE™-2 Plug and Play Gate drivers are specifically designed for the reliable and safe driving of 130 x 140 mm and 190 x 140 mm high voltage and high power IGBT modules from the 1200 V to the 3300 V voltage classes.
They are optimally suited to high reliability applications in railway technology and industry. The driver concept relies on a master/slave principle that allows the safe operation of parallel connected IGBT modules. The master (1SP0635V) can be used as a standalone driver without a slave to drive a single IGBT module or with up to three 1SP0635D slaves to drive up to four parallel connected IGBT modules.
The master is equipped with a fiber optic interface and fault management. In master-slave configurations, the slaves are connected to the master by a bus cable which distributes the common command signal and the secondary side supply voltages of the DC/DC converter.

The 1SP0635 Gate drivers are based on Power Integrations SCALE™-2 chipset. Thanks to SCALE™-2 technology, the 1SP0635 family comprises highly integrated, high performance, complete and extremely compact single channel IGBT drivers.

The SCALE™-2 chipset reduces the component count by 85 % compared to conventional solutions, thus significantly increasing reliability and reducing costs.

The drivers are equipped with Dynamic Advanced Active Clamping (DAAC), short circuit protection, built in DC/DC converters, regulated turn on gate driving voltage, Gate-Emitter monitoring and supply voltage monitoring.
Perfectly matched driver versions are available for all mechanically compatible IGBT modules. The plug and play capability of the driver allows immediate operation after mounting. The user needs to invest no effort in designing or adjusting it to a specific application.

APPLICATIONS

- Traction
- Railroad power supplies
- Light rail vehicles
- HVDC
- Flexible AC transmission systems
- Medium voltage converters
- Industrial drives
- Wind power converters

KEY BENEFIT

Reliable and safe operation of parallel connected high voltage and high power IGBT modules.

KEY FEATURES

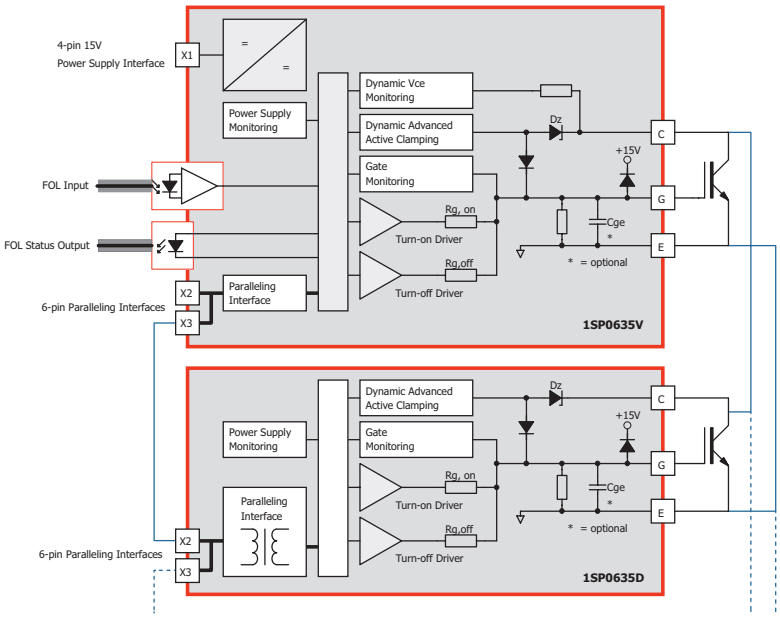
- Single channel driver
- Compact Plug and Play solution
- Fiber optic interfaces
- +15 V/-10 V gate driving
- Regulated gate voltage
- Direct paralleling of IGBTs
- 2 level and multi level topologies
- Embedded paralleling capability
- Dynamic IGBT short circuit protection
- Dynamic Advanced Active Clamping (DAAC)
- Built in isolated DC/DC converter
- Supply under voltage lockout
- Creepage and clearances acc. IEC 60077-1
- UL compliant
- Easy mounting directly onto the IGBT
- Extremely reliable, long service life

KEY DATA OVERVIEW

Parameter	Min	Typical	Max	Unit
Nominal supply voltage		15		V
Supply current 1SP0635x2Mx @ f_{IN}=0 Hz		120		mA
Per additional 1SP0635D2Sx @ f_{IN}=0 Hz		35		mA
Supply current, full load 1SP0635x2Mx		325		mA
Output power (1SP0635V2Mx or 1SP0635SMx)		3		W
Output power (1SP0635D2Sx)		2.6		W
Gate voltage		+15/-10		V
Peak output current (gate current)	-35		+35	A
Switching frequency f_{IN} [1)]	0		30	kHz
Duty cycle	0		100	%
Turn on delay		190		ns
Turn off delay		185		ns
Creepage distance primary-secondary	21			mm
Clearance distance primary-secondary	21			mm
Dielectric test voltage (3.3 kV versions)	6000			V_{AC}
Partial discharge extinction voltage (3.3 kV versions)	3630			V_{peak}
Operating temperature	-40		+85	°C

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

BLOCK DIAGRAM OF THE 1SP0635 DRIVER SERIES



MASTER-SLAVE SYSTEM 1SP0635 SERIES

The master (1SP0635V or 1SP0635S) can be used as perfect standalone driver without a slave to drive IGBT modules without parallel connection or with one to three 1SP0635D slaves to drive up to four parallel connected IGBT modules.
Paralleling is achieved by simply connecting the master and slaves via the provided paralleling interfaces X2 and X3, which are identical.

ORDERING INFORMATION 1SP0635 DRIVER SERIES

	V-Type (Master)	S-Type (Master)	D-Type (Slave)[2)]
Type designation plus	1SP0635V2M1-xx	1SP0635S2M1-xx	1SP0635D2S1-xx
xx: Voltage basic type[1)]	xx = 12 (1200 V) xx = 17 (1700 V) xx = 33 (3300 V)		
or xx: Specific module type	e.g. 5SNA1200E330100		
Module package	IHM 130/190		
Input signal interface	Versatile FOL Input/Output	ST FOL Input/Output	n.a.
On board connector	HFBR-1522ETZ/2522ETZ	HFBR1412Z/2412Z	n.a.
Bus interface	X2/X3		
On board connector	MBCON-6-1-0		
Connecting cable	MBC61-xxx-0 (xxx=030,050,070,110)[3)]		
Power supply	X1		n.a.
User board connector	Right angle MBCON-4-1-0; vertical MBCON-4-2-0		n.a.
Connecting cable	MBC41-xxx-0 (xxx=035,045,070)[3)]		n.a.

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

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

1SP0340 – Most Compact Plug and Play Gate 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 standalone 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 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
- 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
- Fiber optic interfaces
- +15 V (regulated)/-10 V gate driving
- Direct paralleling of IGBTs
- 2 level and multi level topologies
- IGBT short circuit protection
- Dynamic Advanced Active Clamping (DAAC)
- Supply under voltage lockout
- Gate monitoring
- Active Miller clamping
- Creepage and clearances acc. to IEC 60077-1
- UL compliant
- Easy mounting directly onto the IGBT
- External DC/DC converter ISO5125I necessary

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

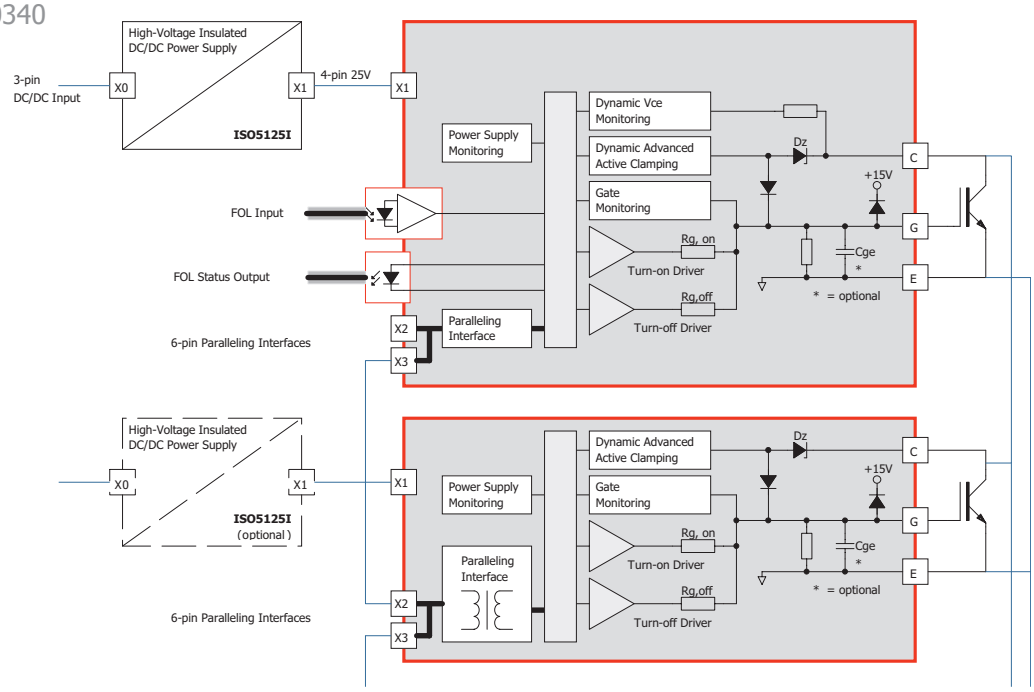
The 1SP0340 driver is modular, so the driver card and power supply (DC/DC converter) are two separate units. This means that any driver that has been developed to match a specific IGBT module can be used for any required isolation specification. Only the separate power supply (ISO51) must be selected 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		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	°C

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

BLOCK DIAGRAM 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)]	4500 V=45	
or xx: Specific module type	e.g. FZ1200R45HL3	
Module 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

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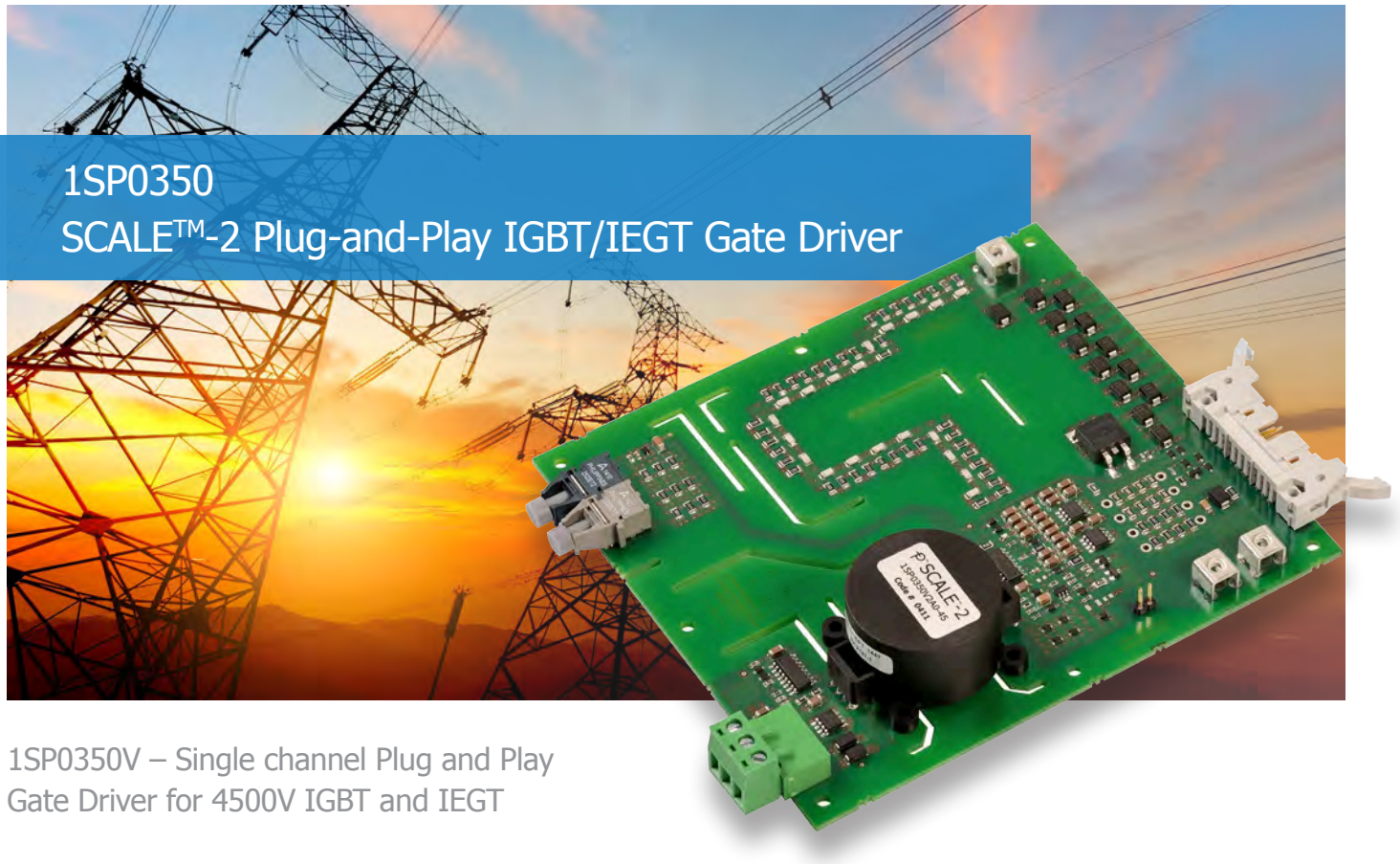


1SP0350
SCALE™-2 Plug-and-Play IGBT/IEGT Gate Driver

1SP0350V – Single channel Plug and Play Gate Driver for 4500V IGBT and IEGT

PRODUCT DESCRIPTION

The 1SP0350V SCALE™-2 single channel Plug and Play gate driver is specifically designed for the reliable and safe driving of 4500V press-pack IEGT and IGBT as well as IGBT modules.
It is optimally suited to high reliability applications in HVDC and railway technology.
The 1SP0350 gate driver is based on Power Integrations SCALE™-2 chipset. Thanks to SCALE™-2 technology, the 1SP0350 is an autonomous, highly integrated, high performance, complete and extremely compact single channel gate driver.
The SCALE™-2 chipset reduces the component count by 85 % compared to conventional solutions, thus significantly increasing reliability and reducing costs.
The driver is equipped with Dynamic Advanced Active Clamping (DAAC), short circuit protection, a built in DC/DC converter, regulated turn on gate driving voltage, DC/DC overload monitoring and supply voltage monitoring.
Its autonomous connect ability makes the driver compatible to a broad range of press-pack IEGT, press-pack IGBT and IGBT modules. The plug and play capability of the driver allows immediate operation after connection.

APPLICATIONS

- HVDC
- Traction
- Statcom
- Medium Voltage Drive

KEY BENEFIT

Autonomous Plug and Play Gate driver with integrated high voltage DC/DC converter for operating 4500V IGBT Presspack, IEGT Presspack and IGBT Modules.

KEY FEATURES

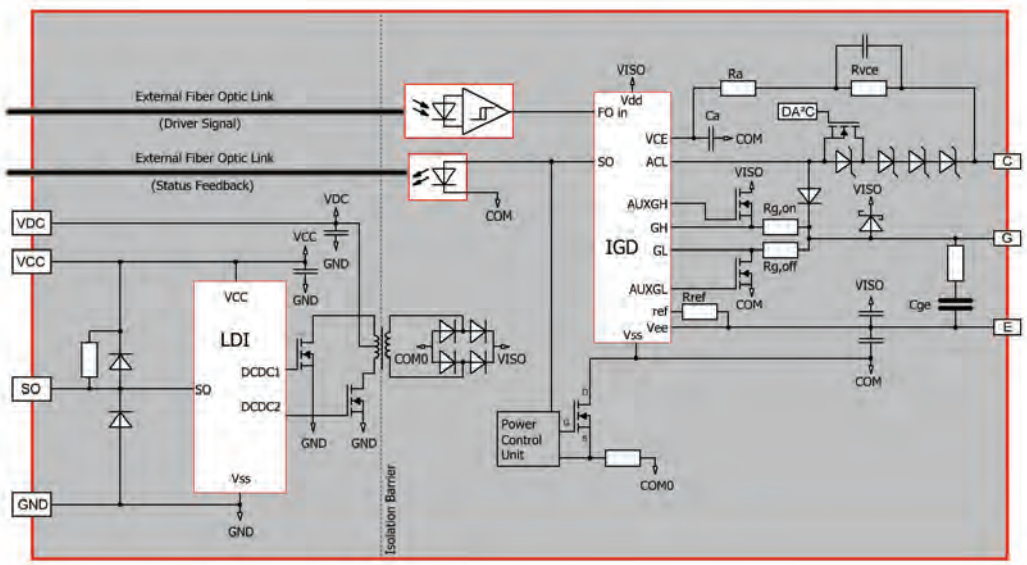
- Single Channel Gate driver
- Compact Autonomous Plug and Play solution
- Fiber optic interface
- +15/-10V gate driving
- Regulated gate voltage
- IGBT/IEGT short circuit protection
- Dynamic Advanced Active Clamping (DAAC)
- Build in isolated and regulated DC/DC converter
- Creepage and Clearances according to IEC Standards
- DC/DC overload monitoring

KEY DATA OVERVIEW

Parameter	Min	Typical	Max	Unit
Nominal supply voltage		15		V
Supply current @ f_{IN}=0 Hz		nn		mA
Per additional @ f_{IN}=0 Hz		nn		mA
Supply current, full load		nn		mA
Output power		3		W
Gate voltage		+15/-10		V
Peak output current (gate current)	-50		+50	A
Switching frequency f_{IN} [1)]	0		nn	kHz
Duty cycle	0		100	%
Turn on delay		nn		ns
Turn off delay		nn		ns
Creepage distance primary-secondary	nn			mm
Clearance distance primary-secondary	nn			mm
Dielectric test voltage (3.3 kV versions)	nn			V_{AC}
Partial discharge extinction voltage (3.3 kV versions)	nn			V_{peak}
Operating temperature	-40		+85	°C

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

BLOCK DIAGRAM OF THE 1SP0350 DRIVER SERIES



ORDERING INFORMATION 1SP0350 DRIVER SERIES

	Type Designation	Description	Availability
1SP0350	1SP0350V2A0	-40 – +85°C, DAAC, lead free	Sampling

1SP0335
SCALE™-2 Plug and Play IGBT Gate Driver

DC/DC converter ISO5125I connected to 1SP0335D (slave) with 1SP0335V (master) each screwed onto a 6.5 kV IGBT module.

1SP0335 Series – Single Channel Driver 6.5 kV/4.5 kV with Separate Power Supply Unit for High Voltage IGBT Modules (10.2 kV Isolation).

PRODUCT DESCRIPTION

The 1SP0335 SCALE™-2 Plug and Play Gate drivers are specifically designed for the reliable and safe driving of 130 x 140 mm and 190 x 140 mm IGBT modules with 10.2 kV isolation voltage and blocking voltages from 3.3 kV to 6.5 kV. They are optimally suited to high-reliability applications in railway technology and industry.
The driver concept relies on a master/slave principle that allows the safe operation of parallel connected IGBT modules. The master (1SP0335V or 1SP0335S) can be used as a stand-alone driver without a slave to drive a single IGBT module or with up to three 1SP0335D slaves, to drive up to four parallel connected IGBT modules. The master is equipped with a fiber optic interface and fault management. In master/slave configurations, the slaves are connected to the master by a bus cable which distributes the common command signal and the secondary side supply voltages for the DC/DC converter.

The 1SP0335 drivers are based on Power Integrations SCALE™-2 chipset. Thanks to SCALE™-2 technology, the new 1SP0335 family comprises highly integrated, high performance, complete and extremely compact single channel IGBT drivers.

The SCALE™-2 chipset reduces the component count by 85 % compared to conventional solutions, thus significantly increasing reliability and reducing costs.
The drivers are equipped with Dynamic Advanced Active Clamping (DAAC), short circuit protection, regulated turn on gate driving voltage and supply voltage monitoring.
Perfectly matched driver versions are available for all mechanically compatible IGBT modules. The plug and play capability of the driver allows immediate operation after mounting. The user needs to invest no effort in designing or adjusting it to a specific application.

APPLICATIONS

- Traction
- Railroad power supplies
- Light rail vehicles
- HVDC
- Flexible AC transmission systems
- Medium voltage converters
- Industrial drives
- Wind power converters

KEY BENEFIT

Reliable and safe operation of parallel connected high voltage and high power IGBT modules.

KEY FEATURES

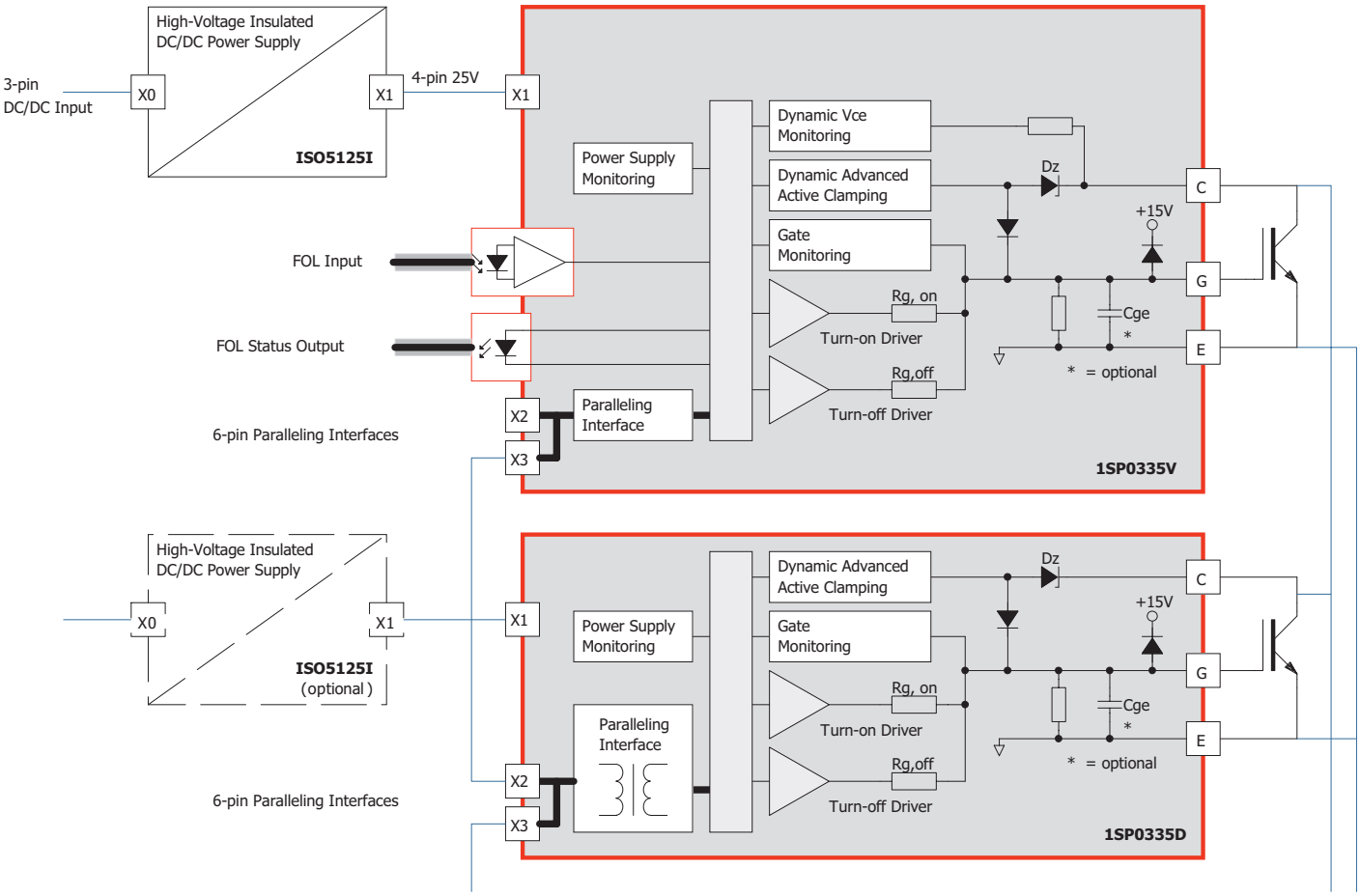
- Single channel driver
- Compact Plug and Play solution
- Fiber optic interfaces
- +15 V (regulated)/-10 V gate driving
- Direct paralleling of IGBTs
- 2 level and multi level topologies
- Dynamic IGBT short circuit protection
- Dynamic Advanced Active Clamping (DAAC)
- Supply under voltage lockout
- Creepage and clearances acc. IEC 60077-1
- UL compliant
- Easy mounting directly onto the IGBT
- Extremely reliable, long service life
- External DC/DC converter ISO5125I necessary

KEY DATA OVERVIEW

Parameter	Min	Typical	Max	Unit
Nominal supply voltage		25		V
Supply current 1SP0335x2Mx @ f_{IN}=0 Hz		45		mA
per additional 1SP0335D2Sx @ f_{IN}=0 Hz		20		mA
Output power (1SP0335V2Mx)		3.5		W
Output power (1SP0335D2Sx)		3.3		W
Gate voltage		+15/-10		V
Peak output current (gate current)	-35		+35	A
Switching frequency f_{IN} [2]	0		30	kHz
Duty cycle	0		100	%
Turn on delay		190		ns
Turn off delay		185		ns
Operating temperature	-40		+85	°C

[1] 25 V is the nominal output voltage of the ISO5125I power supply. The power supply works with nominal 15 V input voltage.
[2] Maximum switching frequency depends on the IGBT gate charge. See data sheet for the value of a specific driver.

BLOCK DIAGRAM OF THE 1SP0335 DRIVER SERIES



MASTER-SLAVE SYSTEM 1SP0335 SERIES

The master (1SP0335V or 1SP0335S) can be used as perfect stand alone driver without a slave to drive IGBT modules without parallel connection or with up to three 1SP0335D slaves, to drive up to four parallel connected IGBT modules. Paralleling is achieved by simply connecting the master and slaves via the provided paralleling interfaces X2 and X3, which are identical.

In contrast to the other SCALE™-2 plug and play drivers, the drivers of the 1SP0335 family are modular in the sense that the driver card and power supply (DC/DC converter) are two separate units. Thanks to this modular concept, any driver unit that was developed to match a specific IGBT module can be used for any required insulation specifications. Only the separate power supply unit ISO5125I must be chosen to a specific application.

ELECTRICAL INSULATION AND POWER SUPPLY WITH ISO5125I

The ISO5125I is a single channel insulated DC/DC converter suitable as a power supply for IGBT drivers up to 6.5 kV. It complements the 1SP0335 and 1SP0340 high voltage. Its output power of 5 W enables switching frequencies up to 5 kHz for 6.5 kV/750 A IGBTs.

On the basis of this concept, the drivers for IGBTs in the voltage range from 3.3 kV to 6.5 kV can be implemented in 2 level, 3 level and multi level inverter topologies.

The driver unit is mounted directly onto the IGBT module by means of three screws. The power supply unit ISO5125I is designed as a separate module attached close to the IGBT. For parallel connected drivers, only one power supply is needed per switch.

ORDERING INFORMATION 1SP0335 DRIVER SERIES

	V-Type (Master)	S-Type (Master)	D-Type (Slave)[2]
Type designation plus	1SP0335V2M1-xx	1SP0335S2M1-xx	1SP0335D2S1-xx
xx: Voltage basic type[1]	3300 V=33 / 4500 V=45 / 6500 V=65		
or xx: Specific module type	e.g. 5SNA1200G330100		
Module 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	ST FOL Input/Output	n.a.
On board connector	HFBR-2522ETZ/1522ETZ	HFBR-2412Z/1412Z	n.a.
Bus interface	X2/X3		
On board connector	MBCON-6-1-0 (on 1SP0335)		
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

SiC-MOSFET Gate Driver Solutions

Driving SiC-MOSFET with standard low cost gate drivers

RDHP1417

GATE DRIVER SOLUTIONS:

2SC0115T-12	2SC0435T-17
2SC0535T-33	2SC0635T-45
2SC0650P-17	2SC2060P-17

Recommended Reference designs: RDHP1417
Please send support requests to: IGBT-driver.support@power.com

BENEFITS

- Variable gate voltage by V_{ee} circuit 0 - 25 V, 0 - 10 V = 28 V
- Short-circuit response time <=2µs
- High output current capability
- High isolation capability
- Advance active clamping with dv/dt feedback
- High switching frequency up to 500 kHz
- SiC MOSFET breakdown voltage up to 4.5kV
- High MTBF/low FIT-rate
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- Paralleling of MOSFET Module
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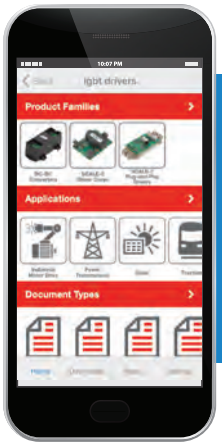

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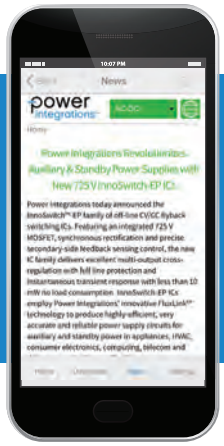

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Application Notes

For better understanding and easier design with SCALE™ gate drivers, Power Integrations offers detailed application notes with test data, PCB layout reference, topology application suggestion and more useful information.

- Typical application failures
- EMI requirements
- Clearance and creepage distances for PCB
- External implementation guidance

KEY APPLICATION NOTES:

AN-1101: APPLICATION WITH SCALE-2 AND SCALE-2+ GATE DRIVER CORES

This application note highlights important design rules and helps to speed up the development time by showing detailed examples about how to design successfully IGBT drivers for industrial and traction applications. Considered SCALE™ driver cores are: 2SC0108T, 2SC0435T, 2SC0650P and 1SC2060P.

AN-1001: IGBT AND MOSFET DRIVERS CORRECTLY CALCULATED

This application note describes the calculation of the gate drive performance figures required for a given application. The values as derived from this application note serve as a base for selecting the most appropriate driver.

AN-1301: DO'S AND DON'TS WITH SCALE™-2 GATE DRIVERS

This application note highlights important points that must be considered when using SCALE™-2 driver cores as well as plug-and-play drivers. It complements Application Note AN-1101.

More Application Notes available for download here:
igbt-driver.power.com/design-support/application-notes/

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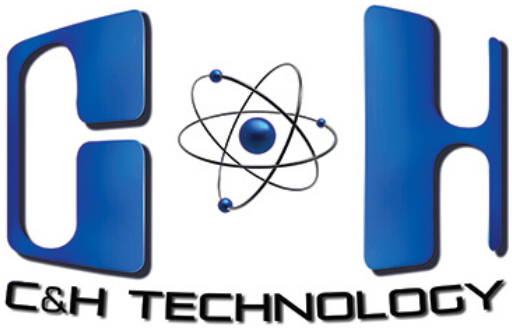

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