



SCALE-2® IGBT Gate Driver Core

2SC0435T - Dual Channel
Low-Cost High-Power SCALE-2® Driver Core

Ihr Vertriebspartner:

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POWER COMPONENTS

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PRODUCT DESCRIPTION

The new high-power low-cost SCALE-2 dual-driver core 2SC0435T combines unrivalled compactness with broad applicability. It has been designed for universal applications requiring high reliability and performance. The 2SC0435T drives all common high-power IGBT modules up to 1700V. Its embedded paralleling capability 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 57.2mm x 51.6mm and an insertion height of 20mm. 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 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.

APPLICATIONS


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

KEY BENEFIT

The 2SC0435T drives all common high-power IGBT modules up to 1700V. It offers broad applicability thanks to its compactness and cost effectiveness, especially for solar/wind applications.

KEY FEATURES

- High-power dual-channel driver
- Blocking voltages up to 1700V
- Switching frequency up to 100kHz
- Very short delay time of <100ns
- Small jitter of ±3ns
- Gate current ±35A
- Regulated gate-emitter voltage
- Interface for 3.3V...15V logic level
- Direct and half-bridge modes
- Embedded paralleling capability
- 2-level and multilevel topologies
- IGBT short-circuit protection
- Advanced active clamping
- Isolated DC/DC converter
- 2 x 4W output power
- Supply under-voltage lockout
- Safe isolation to EN50178
- UL recognized: under UL 508C NMMS2/8 and under UL 60950-1 NWGQ2/8
- Superior EMC
- Reliable, long service life
- Footprint: 57.2mm x 51.6mm

 engineered
in Switzerland

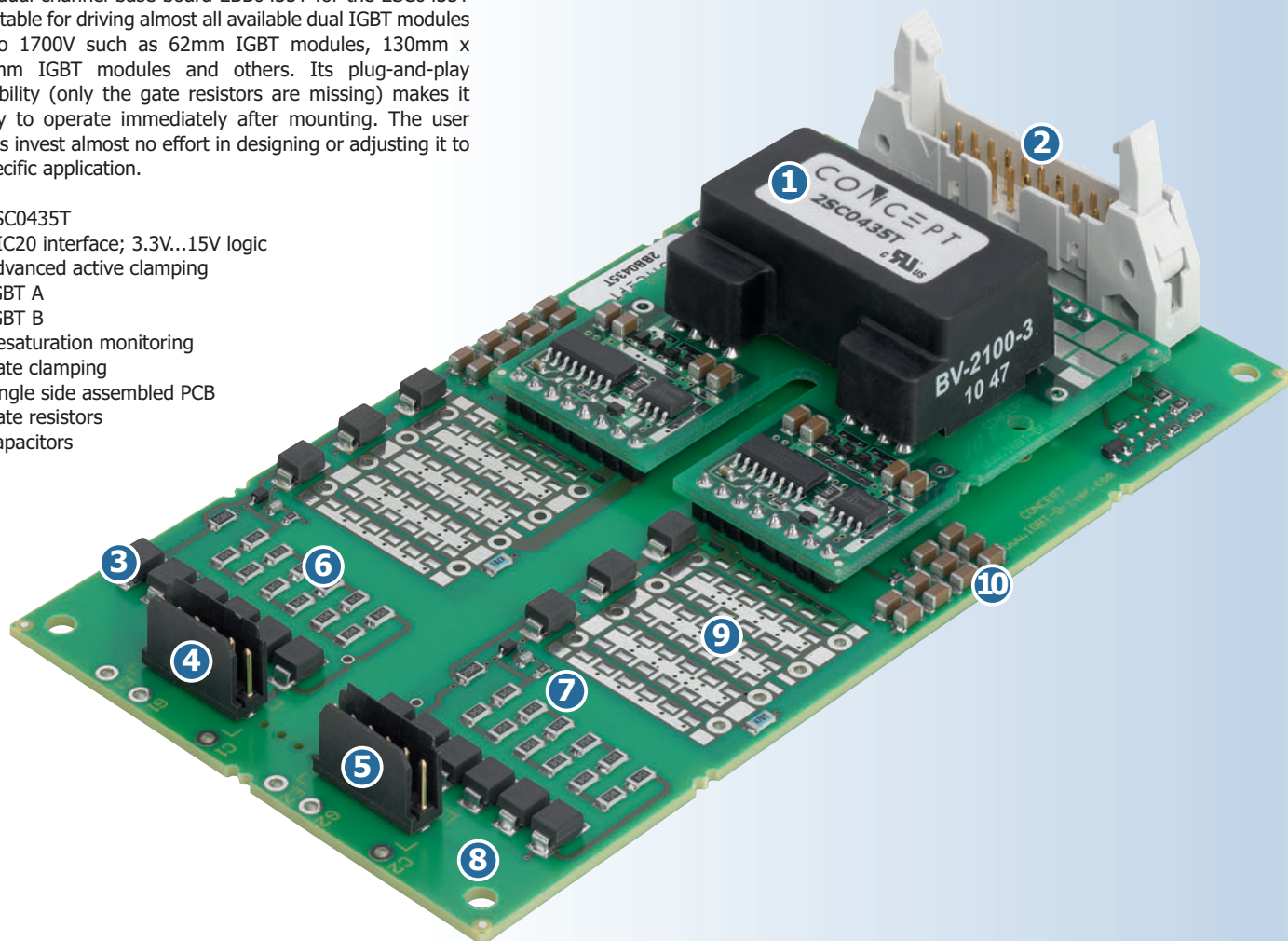
KEY DATA OVERVIEW

Parameter	Min	Typical	Max	Unit
Nominal supply voltage		15		V
Supply current @ $f_{IN}=0\text{Hz}$		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}	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 distance 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		75		kV/us
Operating temperature	-40		+85	°C

DRIVER CORE 2SC0435T ON THE BASE BOARD 2BB0435T

The dual-channel base board 2BB0435T for the 2SC0435T is suitable for driving almost all available dual IGBT modules up to 1700V such as 62mm IGBT modules, 130mm x 140mm IGBT modules and others. Its plug-and-play capability (only the gate resistors are missing) makes it ready to operate immediately after mounting. The user needs invest almost no effort in designing or adjusting it to a specific application.

- ① 2SC0435T
- ② DIC20 interface; 3.3V...15V logic
- ③ Advanced active clamping
- ④ IGBT A
- ⑤ IGBT B
- ⑥ Desaturation monitoring
- ⑦ Gate clamping
- ⑧ Single side assembled PCB
- ⑨ Gate resistors
- ⑩ Capacitors

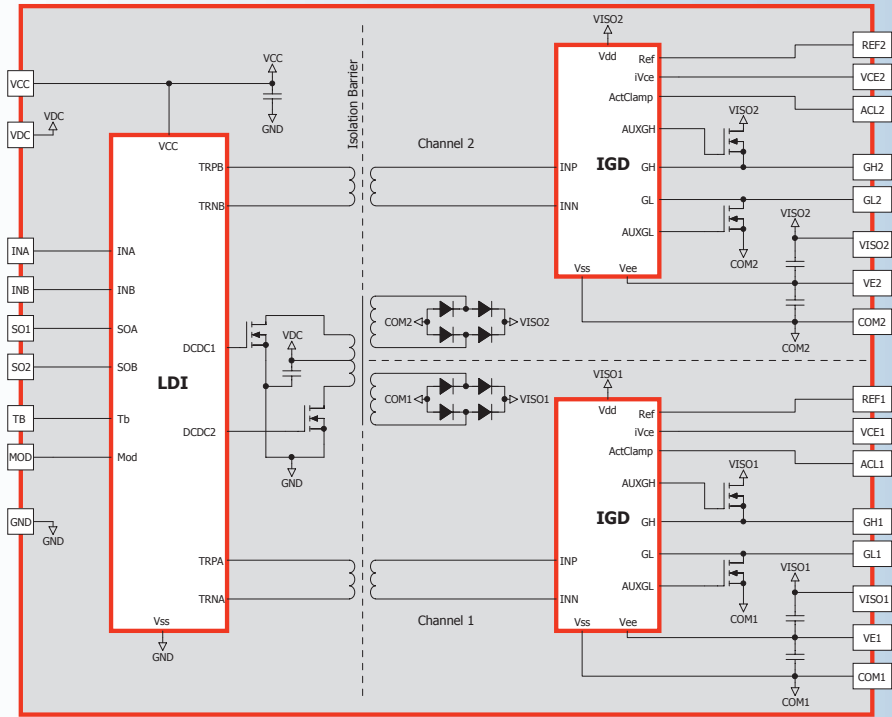


BASIC SCHEMATIC OF THE 2SC0435T

The 2SC0435T targets medium-power, dual-channel IGBT and MOSFET applications. The driver supports switching up to 100kHz at best-in-class 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 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

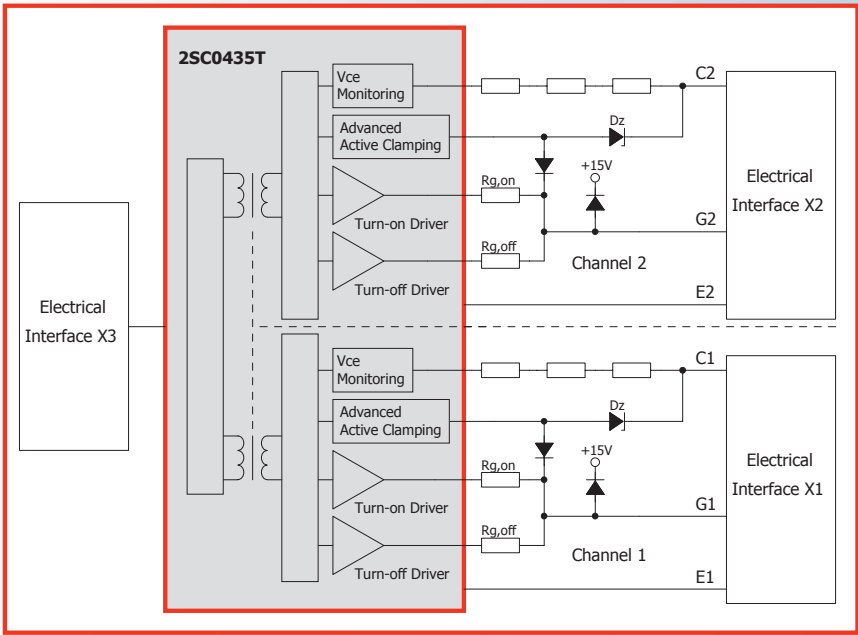
The driver allows direct parallel connection of any number of IGBT modules with individual drivers. This new pioneering concept for simple and reliable parallel connection makes it practical for the first time to set up converter series with discrete modules as well as parallel-connected IGBTs without any additional development effort.



BASIC SCHEMATIC OF THE 2SC0435T ON THE BASE BOARD 2BB0435T

The base board contains all necessary components for optimal and safe driving of IGBT modules or MOSFETs: gate clamping, active-clamping diodes (overvoltage protection at turn-off), Vce monitoring (short-circuit protection) as well as the input electrical connector X3 and both output electrical connectors X1 and X2 to connect the power switch. 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 invest almost no effort in designing or adjusting the base board to a specific application. Only the gate resistors are not assembled in order to provide full flexibility for the user.

Schematics and Gerber Files can be downloaded from the internet which allows the customer to integrate the Base Board Design into his own design and to use the Driver Core safely. This guarantees easy design in.



ORDERING INFORMATION 2SC0435T DUAL-CHANNEL SCALE-2 DRIVER CORE

	Type Designation	Description
2SC0435T	2SC0435T2A0-17	Short connector pin (-40°C...85°C / 1700V / pin length 2.54mm)
	2SC0435T2C0-17	Long connector pin (-40°C...85°C / 1700V / pin length 5.84mm)
	2SC0435T2D0-17	RoHS, short connector pin (-40°C...85°C / 1700V / pin length 2.54mm)
	2SC0435T2E0-17	RoHS, long connector pin (-40°C...85°C / 1700V / pin length 5.84mm)
Base Board Type	2BB0435T2A0-06	Related IGBTs 600V IGBT modules
	2BB0435T2A0-12	1200V IGBT modules
	2BB0435T2A0-17	1700V IGBT modules
	2EB0435T2A0	For an easy start of operation and low voltage verification.



PLUG-AND-PLAY IGBT GATE DRIVERS

Driver Family	Blocking Voltage	Signal Interface	SCALE	Topology Features	
	[V]		Generation	Multilevel	Paralleling
EconoDUAL™ - Danfoss, Fuji, Infineon, Mitsubishi, Powerex, Starpower					
2SP0115T	600/1200/1700	Electrical	2	✓	✓
PrimePACK™ - Danfoss, Fuji, Infineon, Starpower					
2SP0320T	1200/1700	Electrical	2	✓	✓
2SP0320V	1200/1700	Fiber Optic	2	✓	-
New Mega Power Dual - Mitsubishi					
2SP0325T	1200/1700	Electrical and Fiber Optic	2	✓	✓
2SP0325V	1200/1700	Electrical and Fiber Optic	2	✓	✓
IHM 130mm - ABB, Dynex, Fuji, Hitachi, Infineon, Mitsubishi, Powerex					
2SB315A	1200/1700	Electrical	1	-	-
2SB315B	1200/1700	Fiber Optic	1	-	-
1SD536F2	1200/1700/2500/3300	Fiber Optic	1	✓	-
1SD418F2	1700/2500/3300	Fiber Optic	1	✓	-
1SP0635	1200/1700/2500/3300	Fiber Optic	2	✓	✓
IHV 130mm - ABB, Dynex, Fuji, Hitachi, Infineon, Mitsubishi, Powerex					
1SD312F2+ISO3116I	4500	Fiber Optic	1	✓	-
1SD210F2+ISO3116I	4500/6500	Fiber Optic	1	✓	-
1SP0335+ISO5125I	3300/4500/6500	Fiber Optic	2	✓	✓
1SP0340+ISO5125I	4500	Fiber Optic	2	✓	✓

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IGBT GATE DRIVER CORES

Type	Output Power	Gate Current	Blocking Voltage	Frequency Max.	SCALE	Topology Features	
	[W/ Channel]	[A/ Channel]	[V]	[kHz]	Generation	Multilevel	Paralleling
Single Channel Driver Cores							
1SD1548AI	15	48	1700	150	1	-	-
1SC2060P	20	60	1700	500	2	✓	✓
IGD515EI	5	15	1700/3300	100	-	✓	-
1SC0450V	4	50	4500/6500	tbd	2	✓	✓
Dual Channel Driver Cores							
2SC0106T	1	6	1200	20	2	✓	✓
2SC0108T	1	8	650/1200/1700	50	2	✓	✓
2SD106AI	1	6	1200/1700	100	1	-	-
2SD315AI	3	15	1700/2500/3300	100	1	-	-
2SD300C17	4	30	1700	60	2	-	-
2SC0435T	4	35	1700	100	2	✓	✓
2SC0535T	5	35	3300	100	2	✓	✓
2SC0635T	6	35	4500	100	2	✓	✓
2SC0650P	6	50	1700	150	2	✓	✓
IHD 260/660	1/3	6	1700	100	1	-	-
Six Channel Driver Core							
6SD106EI	1	6	1200/1700	100	1	-	-



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