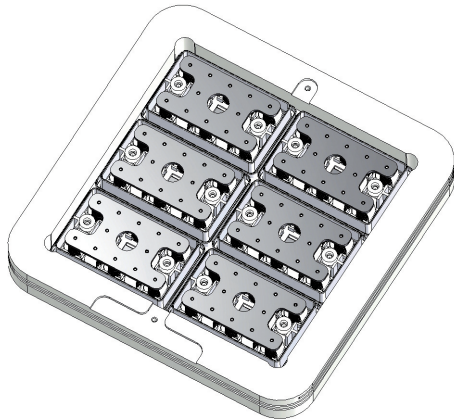


## IGBT StakPak IGBT и Диодные модули ABB

Биполярные транзисторы с изолированным затвором (IGBT) - самый молодой член в семействе высоковольтных ключей. Управление потоком тока через прибор обычно берет на себя источник напряжения на 15 В с большим сопротивлением. Таким образом, управляя высокими токами, используется очень малая мощность управления.

Power and productivity  
for a better world™

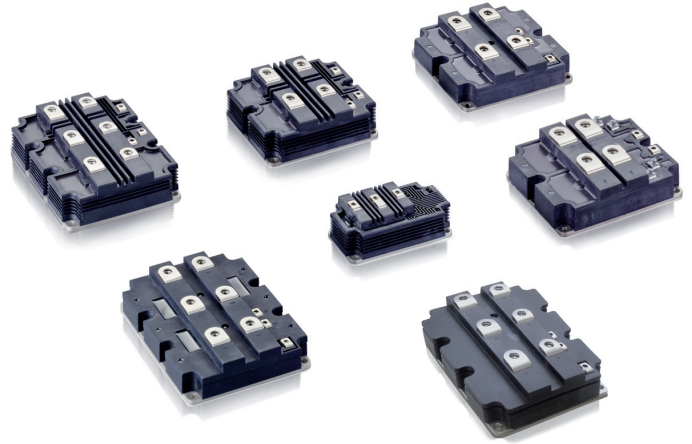


Part number	Voltage $V_{CES}$ (V)	Current $I_C$ (A)	IGBT / Diode ratio	Footprint (mm)	Number of Submodules
<b>2.5 kV</b>					
5SNR 10H2501	2500	1000	2:1	150.3 x 236.3	3
5SNR 13H2501	2500	1300	2:1	150.3 x 236.3	4
5SNR 20H2501	2500	2000	2:1	150.3 x 236.3	6
<b>4.5 kV</b>					
5SNA 1300K450300	4500	1300	1:1	235.1 x 273.3	4
5SNA 2000K450300	4500	2000	1:1	235.1 x 273.3	6
5SNA 2000K451300	4500	2000	2:1	235.1 x 273.3	4

Table 1

# HiPak IGBT Modules

ABB Semiconductors' HiPak modules are a family of highpower IGBTs in industry standard housings using the popular 190 x 140 mm, 130 x 140 mm and 140 x 70 mm footprints. HiPak modules are the perfect match for demanding highpower applications such as traction, renewable energy (wind, solar), industrial drives and T & D.



ABB's HiPak modules are available in three standard isolation voltages (4, 6 and 10.2 kV<sub>RMS</sub>) and a variety of circuit configurations. These modules exclusively use Aluminium Silicon Carbide (AlSiC) base-plate material for good thermal cycling capability and Aluminium Nitride (AlN) isolation with low thermal resistance. This material combination offers an excellent thermal cycling performance thanks to its matched thermal expansion coefficients (CTE). All HiPak modules feature ABB's advanced *Soft Punch Through* (SPT and SPT<sup>+</sup>) chip technology, which combines low-losses with soft-switching performance and record-breaking Safe Operating Area (SOA).

In keeping with ABB's reputation for offering high power semiconductors of exceptionally high reliability, the HiPak SPT chips have been optimized for reliable operation under

harsh conditions. This has been achieved through smooth switching characteristics – essential in the high-inductance environments of power electronic systems – and through rugged operation (high SOA) as this translates into operational safety margins for the equipment.

Furthermore, the SPT<sup>+</sup> chipsets (IGBT and Diode) at 1700 V and 3300 V blocking voltages have been improved to operate at higher junction temperatures up to 150°C in the HiPak modules .

Table 1 on the next page shows the current HiPak product portfolio. Modules designated "HV" have isolation voltages of up to 10.2 kV<sub>RMS</sub>. Standard types have isolation voltages of up to 6 kV<sub>RMS</sub>, depending on V<sub>CEs</sub> rating.

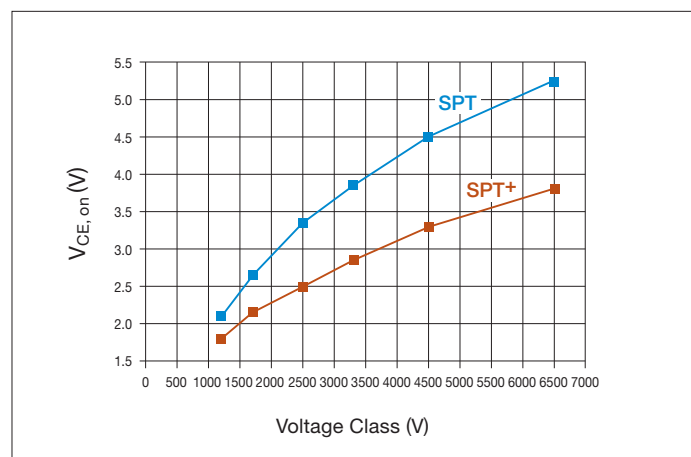
## HiPak Product Portfolio

Part number	Voltage $V_{CES}$ (V)	Current $I_C$ (A)	Configuration	Footprint	Package
<b>1.7 kV</b>					
5SND 0800M170100	1700	2 x 800	Dual IGBT	130 x 140	HiPak1
5SNE 0800M170100	1700	800	Chopper	130 x 140	HiPak1
5SNA 1600N170100	1700	1600	Single IGBT	130 x 140	HiPak1
5SNA 1800E170100	1700	1800	Single IGBT	190 x 140	HiPak2
5SNA 2400E170100	1700	2400	Single IGBT	190 x 140	HiPak2
5SNA 2400E170305*	1700	2400	Single IGBT	190 x 140	HiPak2
5SNA 2000J170300*	1700	2000	Single IGBT	190 x 140	HiPak1 HV
5SLA 2000J170300*	1700	2000	Single Diode	190 x 140	HiPak1 HV
5SNA 3600E170300*	1700	3600	Single IGBT	190 x 140	HiPak2
5SLA 3600E170300*	1700	3600	Single Diode	190 x 140	HiPak2
<b>2.5 kV</b>					
5SNA 1500E250300*#	2500	1200	Single IGBT	190 x 140	HiPak2
<b>3.3 kV</b>					
5SNG 0250P330300	3300	2 x 250	Half Bridge	140 x 70	HiPak0 HV
5SNA 0800N330100	3300	800	Single IGBT	130 x 140	HiPak1
5SNE 0800E330100	3300	800	Chopper	190 x 140	HiPak2
5SNA 1000N330300*	3300	1000	Single IGBT	130 x 140	HiPak1
5SLD 1000N330300*	3300	2 x 1000	Dual Diode	130 x 140	HiPak1
5SLD 1200J330100	3300	1200	Dual Diode	130 x 140	HiPak1 HV
5SNA 1200E330100	3300	1200	Single IGBT	190 x 140	HiPak2
5SNA 1200G330100	3300	1200	Single IGBT	190 x 140	HiPak2 HV
5SNA 1500E330305*	3300	1500	Single IGBT	190 x 140	HiPak2
<b>4.5 kV</b>					
5SNG 0150P450300	4500	2 x 150	Half Bridge	140 x 70	HiPak0 HV
5SLD 0650J450300	4500	2 x 650	Dual Diode	130 x 140	HiPak1 HV
5SNA 0650J450300	4500	650	Single IGBT	130 x 140	HiPak1 HV
5SNA 0800J450300	4500	800	Single IGBT	130 x 140	HiPak1 HV
5SLD 1200J450350	4500	2 x 1200	Dual Diode	130 x 140	HiPak1 HV
5SNA 1200G450300	4500	1200	Single IGBT	190 x 140	HiPak2 HV
5SNA 1200G450350 <sup>+</sup>	4500	1200	Single IGBT	190 x 140	HiPak2 HV
<b>6.5 kV</b>					
5SLD 0600J650100	6500	2 x 600	Dual Diode	130 x 140	HiPak1 HV
5SNA 0400J650100	6500	400	Single IGBT	130 x 140	HiPak1 HV
5SNA 0500J650300	6500	500	Single IGBT	130 x 140	HiPak1 HV
5SNA 0600G650100	6500	600	Single IGBT	190 x 140	HiPak2 HV
5SNA 0750G650300	6500	750	Single IGBT	190 x 140	HiPak2 HV

Table 1 \*  $T_{VJ}$  (operational) up to 150°C + 10.2 kV<sub>RMS</sub> Isolation # Contact factory

## SPT Technology

SPT is a well-established planar IGBT technology covering the range of 1200 V to 6500 V. It is characterized by smooth switching waveforms and exceptional robustness which is of particular importance at higher voltages and currents where stray inductances are not easily minimized.

SPT<sup>+</sup> Technology

SPT<sup>+</sup> retains all the features of the SPT technology but reduces  $V_{CE,SAT}$  by up to 30% according to the curve of Fig. 1 – an achievement previously believed to be possible only with Trench technology.

Fig. 1  $V_{CE(sat)}$  for different IGBT Cell Technologies on SPT Silicon at 125°C. (Current Density of SPT range, same  $E_{off}$ )