MiniSKiiP® IPM

Compact 3-phase inverter design through high power density

Applications

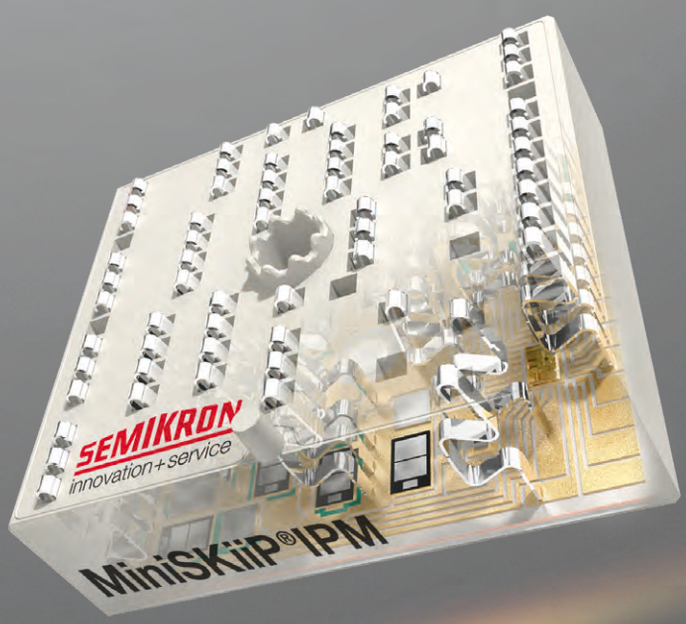
MiniSKiiP IPM is SEMIKRON's new intelligent power module family for medium power applications. Each IPM incorporates a latch-up free HVIC SOI gate driver with advanced level shifter concept. The gate driver has a 3.3 V/ 5 V/ 15 V compatible input signal interface and provides short-circuit current detection using external shunt resistor, integrated under-voltage lockout for all channels and interlock logic with dead time setting for cross conduction protection. A built-in temperature sensor with NTC characteristic enables monitoring of the intelligent power module temperature continuously by the external µC.

Benefits

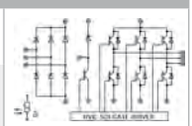
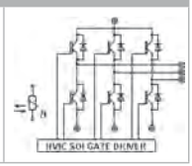
The IPM combines a base plate free package with the established pressure contact technology for quick and easy solder-free assembly. All power, control and auxiliary contacts are connected directly to the printed circuit board via springs resulting in more reliable electrical connections under stronger vibration and shock conditions. The simple one-step mounting of module, printed circuit board and heat sink with one standard screw reduces assembly steps and costs.

Product range

MiniSKiiP IPM is suitable for industrial and consumer drives up to 15 kW as well as process control and solar applications. Using state-of the-art Trench-Field-Stop IGBTs, the IPMs are available in 600 V as CIB and 1200 V as 6-pack. The modules are RoHS-compliant.

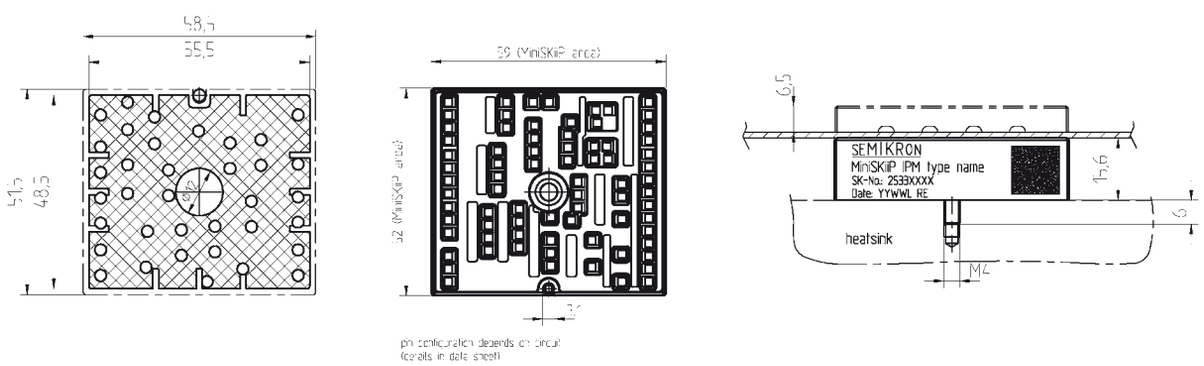


Modules - IPM - MiniSKiiP

Type	IGBT						Diode				Rectifier		Case	Circuit
	I_C @T_S= 25°C	I_{Cnom}	$V_{CE(sat)}$ @T_j= 25°C typ.	E_{on}	E_{off}	$R_{th(j-s)}$	I_F @T_S= 25°C	V_F @T_j= 25°C typ.	E_{rr}	$R_{th(j-s)}$	I_{FSM} @T_S= 25°C	$R_{th(j-s)}$		
	A	A	V	mJ	mJ	K/W	A	V	mJ	K/W	A	K/W		
600 V - IGBT 3 (Trench)														
SKiiP 25NABI066V3 1)	42	30	1.45	1.3	1	1.4	42	1.50	0.6	1.8	370	1.7	IPM 2	
SKiiP 26NABI066V3 1)	59	50	1.45	3	2	1.1	54	1.50	1	1.6	370	1.7	IPM 2	
1200 V - IGBT 4 (Trench)														
SKiiP 25ACI12T4V2 1)	61	50	1.85	7.2	5.6	0.84	57	2.25	3	0.99	-	-	IPM 2	

Cases

MiniSKiiP IPM 2



Dimensions in mm

SKiiP® 4th generation

Sintered chips – for high operating temperatures

Applications

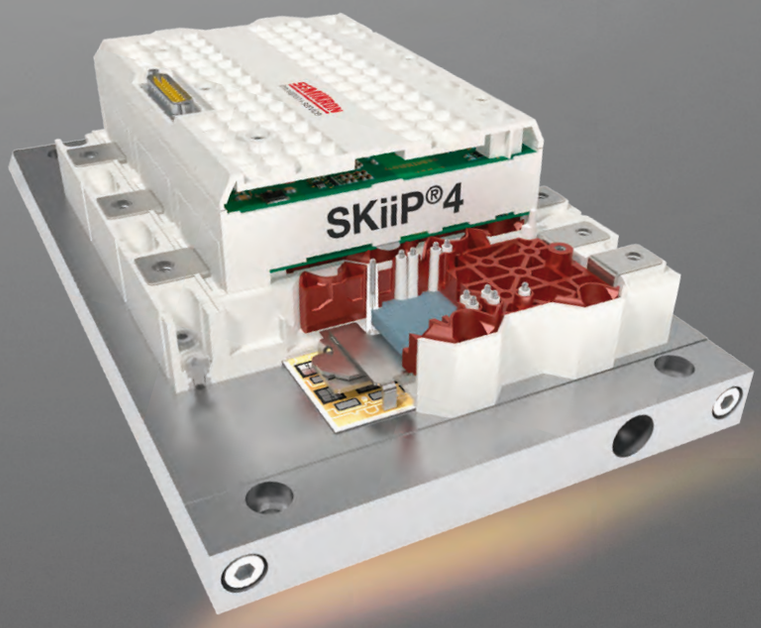
The success story of the SKiiP family has progressed hand in hand with the advancement of the wind power market. The 4th-generation SKiiP modules are a further improvement of the powerful SKiiP series. The mainstay of SKiiP4 modules is the wind power sector, with approximately 57 GW of the 122 GW of wind power installed worldwide (at the end of 2009) featuring SEMIKRON solutions, in many cases SKiiP technology. Besides wind power applications, SKiiP modules can also be found in elevators, solar power and railway applications - in fact in any area where powerful, safe and reliable IGBT IPMs are a must.

Product range

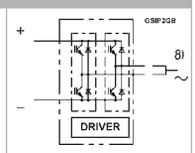
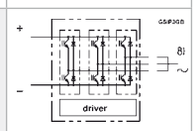
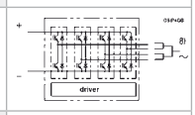
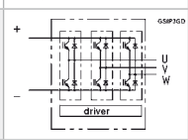
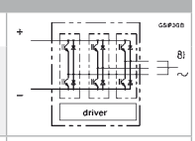
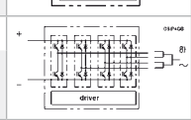
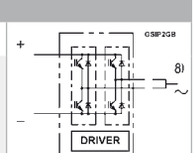
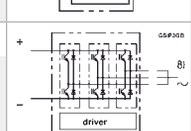
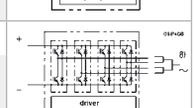
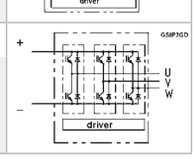
SKiiP4 is available for 1200 V and 1700 V. In both of these voltage classes, SKiiP4 modules come in the topologies 3GB 1800 A, 4GB 2400 A and - new to the SKiiP family - 6GB 3600 A.

Benefits

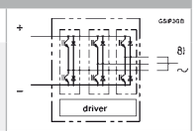
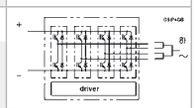
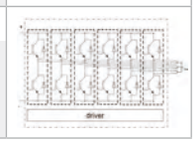
SKiiP4 is the most powerful IPM on the market. SKiiP4 modules enable the production of converter units with outputs of up to 2.1 MW. The power semiconductors used in SKiiP4 modules can be operated at a junction temperature of up to 175°C. To make sure these components can be reliably used at these temperatures, the power circuitry is 100% solder-free. Instead, sinter technology is used to create a sintered silver layer in place of the solder layer that can limit the service life of power modules. Reliability during active and passive thermal cycling is greatly improved. A further benefit is the better load cycling capability as compared with solder-based modules. The integrated gate driver in the SKiiP4 sets new standards on the reliability and functionality fronts. The digital driver guarantees safe isolation between the primary and secondary side for both switching signals and all measurement parameters, such as temperature and DC link voltage. This means the user no longer has to introduce complex and costly circuit components to provide safe isolation. For the first time, the SKiiP driver features a CANOpen diagnosis channel for the integration of additional functions.



Modules - IPM - SKiiP 3 / 4

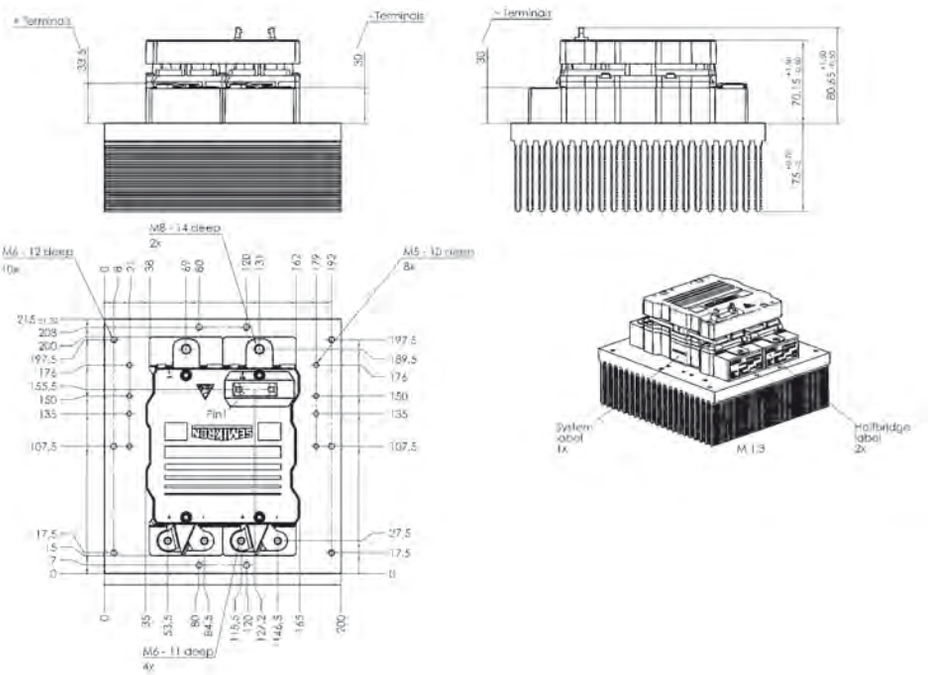
Type	IGBT				Diode			Case		Circuit
	I_C @T_S= 25°C	I_{Cnom}	$V_{CE(sat)}$ @T_j= 25°C typ.	$E_{on} + E_{off}$	I_F @T_S= 25°C	V_F @T_j= 25°C typ.	E_{rr}	Case	Options	
	A	A	V	mJ	A	V	mJ			
1200 V - IGBT 3 (Trench) - SKiiP 3										
SKiiP 1213 GB123-2DL V3	1200	1200	1.7	390	930	1.50	56	S23	F,W,L	
SKiiP 1813 GB123-3DL V3	1800	1800	1.7	585	1410	1.50	84	S33	U,F,W,L	
SKiiP 2413 GB123-4DL V3	2400	2400	1.7	780	1860	1.50	112	S43	U,F,W,L	
SKiiP 613 GD123-3DUL V3	600	600	1.7	195	470	1.50	28	S33	L,W	
1200 V - IGBT 4 (Trench) - SKiiP 4										
SKiiP 1814 GB12E4-3DL	2345	1800	1.95	870	1791	2.27	153	S34	-	
SKiiP 1814 GB12E4-3DW	2100	1800	1.95	870	1515	2.27	153	S34	-	
SKiiP 2414 GB12E4-4DL	3109	2400	1.95	1160	2431	2.27	204	S44	-	
SKiiP 2414 GB12E4-4DW	3109	2400	1.95	1160	2431	2.27	204	S44	-	
SKiiP 3614 GB12E4-6DL	4664	3600	1.95	1740	3418	2.27	306	S64	-	
SKiiP 3614 GB12E4-6DW	4664	3600	1.95	1740	3418	2.27	306	S64	-	
1700 V - IGBT 3 (Trench) - SKiiP 3										
SKiiP 1013 GB172-2DL V3	1000	1000	1.9	575	830	2.00	86	S23	F,L,W	
SKiiP 1203 GB172-2DW V3	1200	1200	1.9	575	900	2.00	86	S23	F,L,W	
SKiiP 1513 GB172-3DL V3	1500	1500	1.9	863	900	2.00	128	S33	U,F,L,W	
SKiiP 1803 GB172-3DW V3	1800	1800	1.9	863	1400	2.00	128	S33	F,L,W	
SKiiP 2013 GB172-4DL V3	2000	2000	1.9	1150	1650	2.00	171	S43	U,F,L,W	
SKiiP 2403 GB172-4DW V3	2400	2400	1.9	1150	1800	2.00	171	S43	U,F,L,W	
SKiiP 513 GD172-3DUL V3	500	500	1.9	288	400	1.90	43	S33	L,W	
SKiiP 603 GD172-3DUW V3	570	600	1.9	288	450	1.90	43	S33	L,W	

Modules - IPM - SKiiP 3 / 4

Type	IGBT				Diode			Case		Circuit
	I_C @T_S= 25°C	I_{Cnom}	$V_{CE(sat)}$ @T_j= 25°C typ.	$E_{on} + E_{off}$	I_F @T_S= 25°C	V_F @T_j= 25°C typ.	E_{rr}	Case	Options	
	A	A	V	mJ	A	V	mJ			
1700 V - IGBT 4 (Trench) - SKiiP 4										
SKiiP 1814 GB17E4-3DL	2547	1800	2.06	1995	1806	1.96	489	S34	-	
SKiiP 1814 GB17E4-3DW	2547	1800	2.06	1995	1806	1.96	489	S34	-	
SKiiP 2414 GB17E4-4DL	3385	2400	2.06	2660	2294	1.96	652	S44	-	
SKiiP 2414 GB17E4-4DW	3385	2400	2.06	2660	2294	1.96	652	S44	-	
SKiiP 3614 GB17E4-6DL	5078	3600	2.06	3990	3444	1.96	978	S64	-	
SKiiP 3614 GB17E4-6DW	5078	3600	2.06	3990	3444	1.96	978	S64	-	

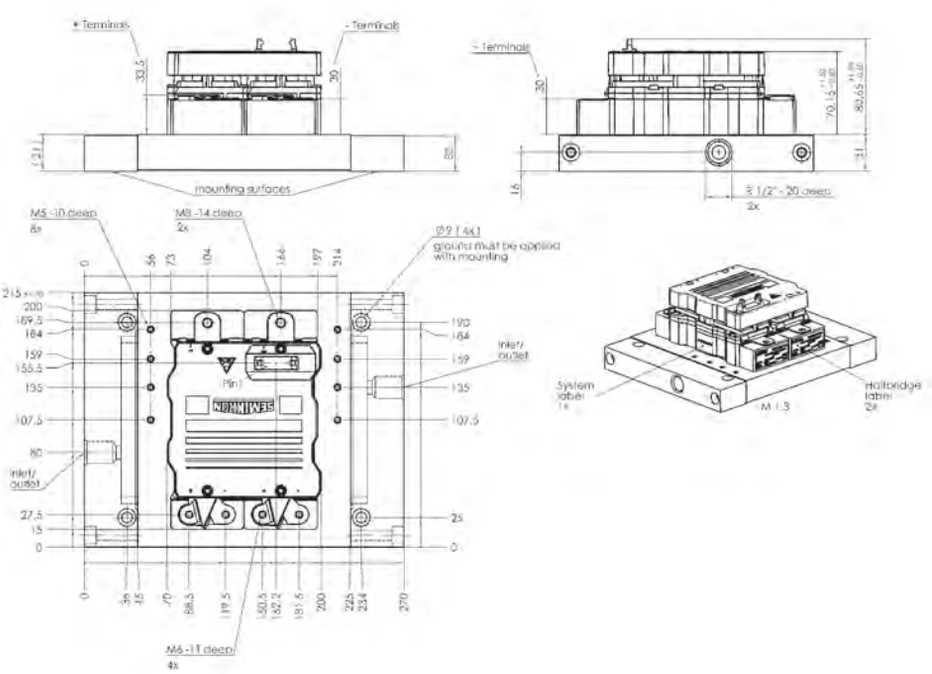
Cases SKiiP 3

Case S 23 mounted on P3016 heat sink



weight without heat sink:	**1,7 kg**
P3016:	**5,4 kg**

Case S 23 mounted on liquid cooled heat sink NWK 40

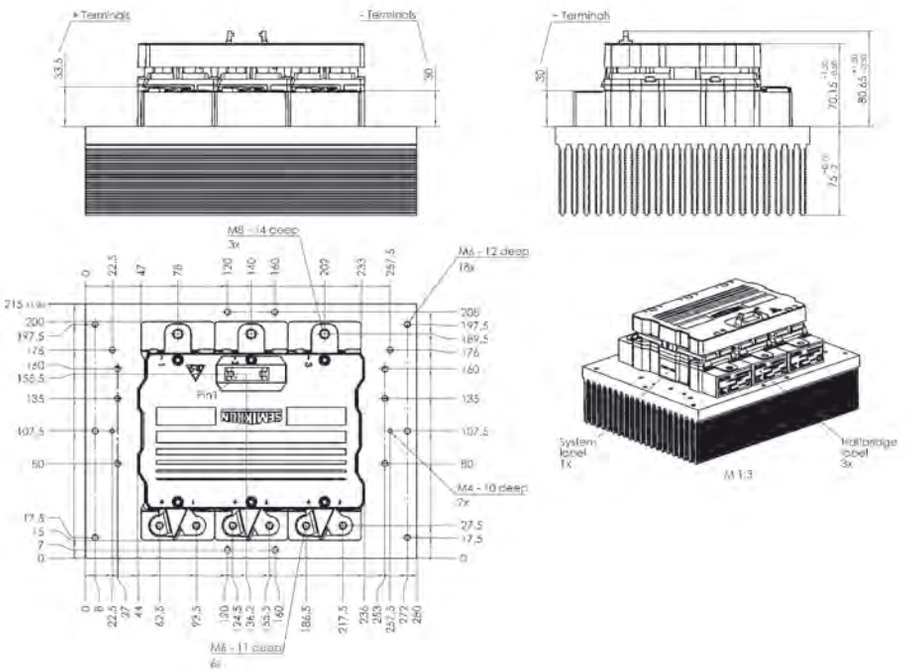


NWK 40:	**6,5 kg**

Dimensions in mm

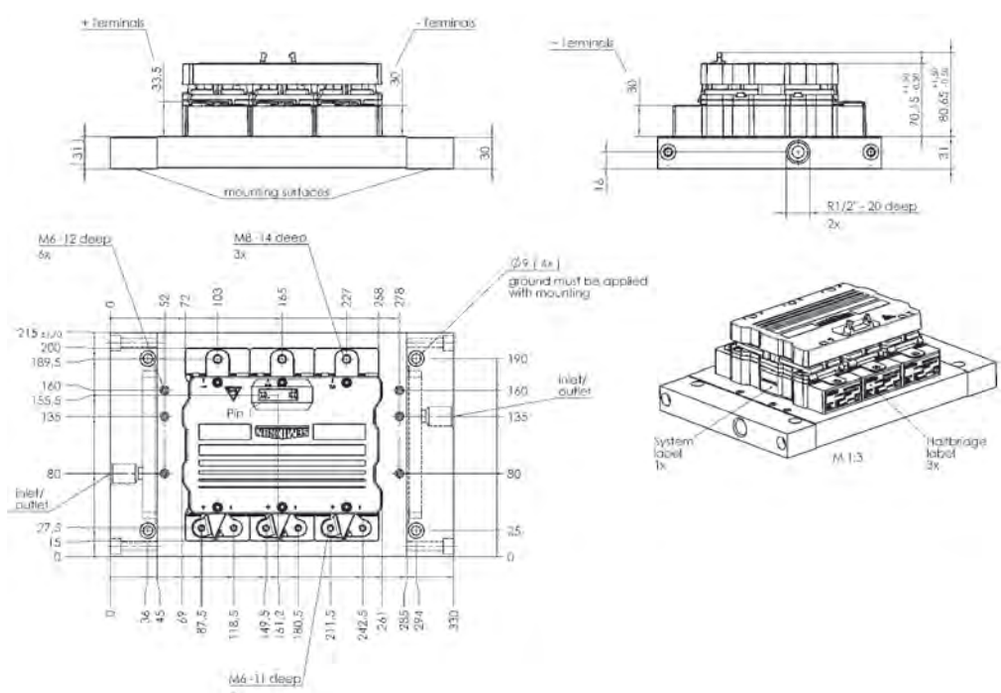
Cases SKiiP 3

Case S 33 mounted on P3016 heat sink



weight without heat sink:	**2,4 kg**
P3016:	**7,5 kg**

Case S 33 mounted on liquid cooled heat sink NWK 40

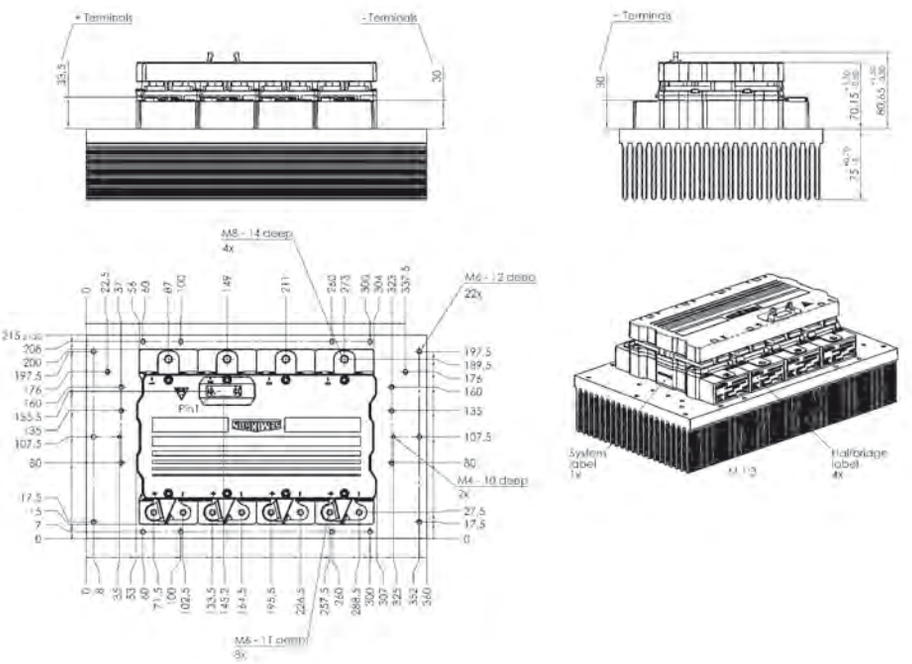


NWK 40:	**8,3 kg**

Dimensions in mm

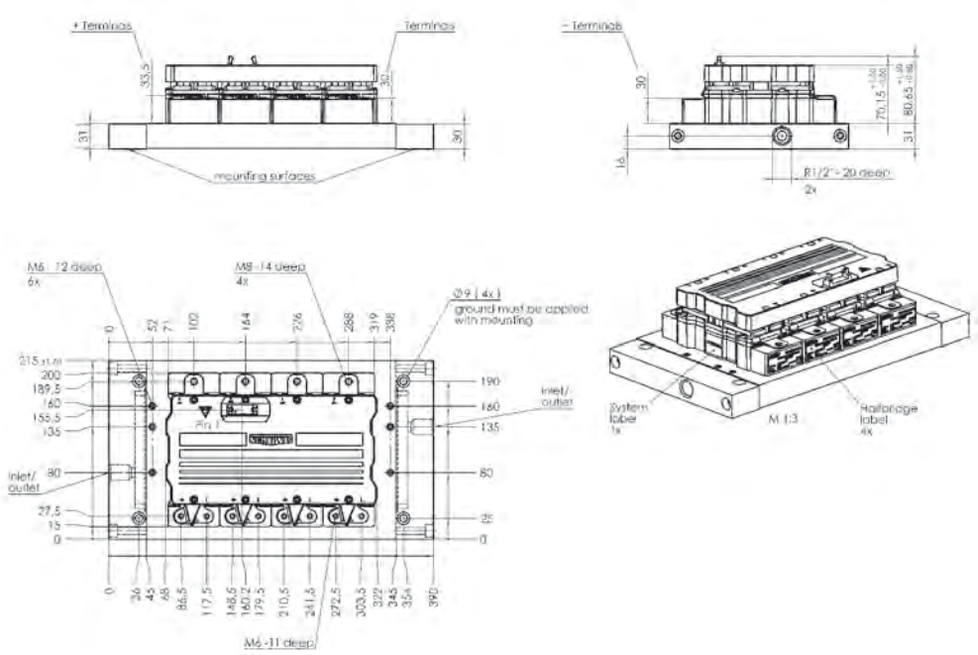
Cases SKiiP 3

Case S 43 mounted on P3016 heat sink



weight without heat sink:	**3,1 kg**
P3016:	**9,7 kg**

Case S 43 mounted on liquid cooled heat sink NWK 40

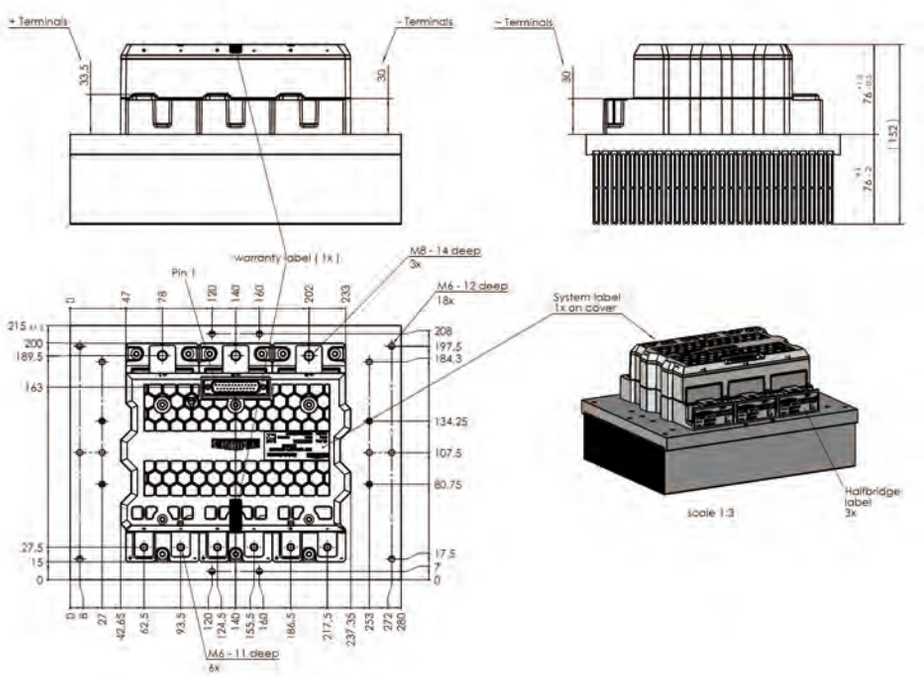


NWK 40:	**10,2 kg**

Dimensions in mm

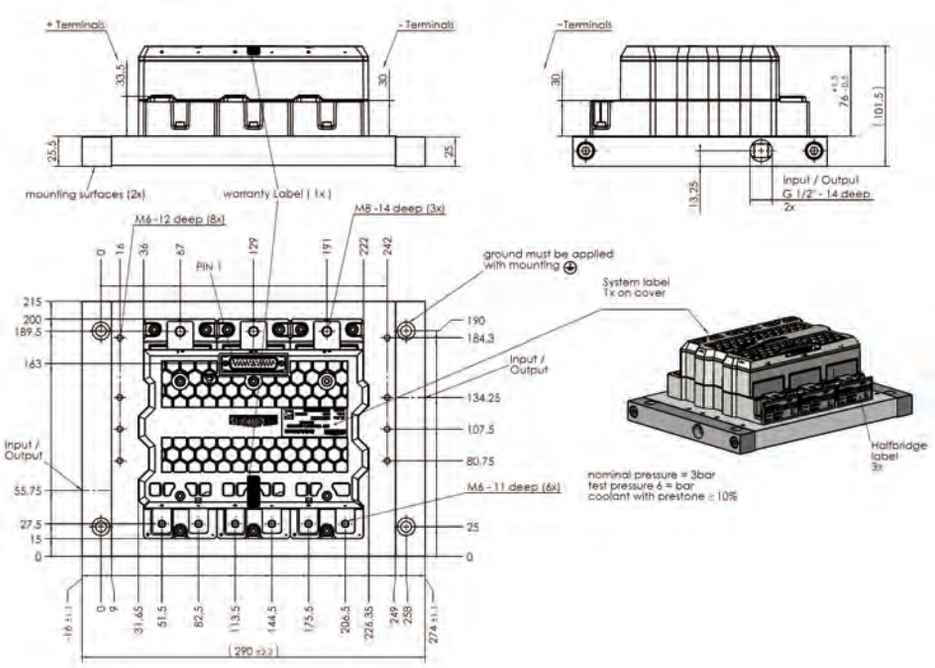
Cases SKiiP 4

Case S 34 mounted on P3016 heat sink



weight without heat sink:	**3,0 kg**
P3016:	**5,4 kg**

Case S 34 mounted on liquid cooled heat sink NHC

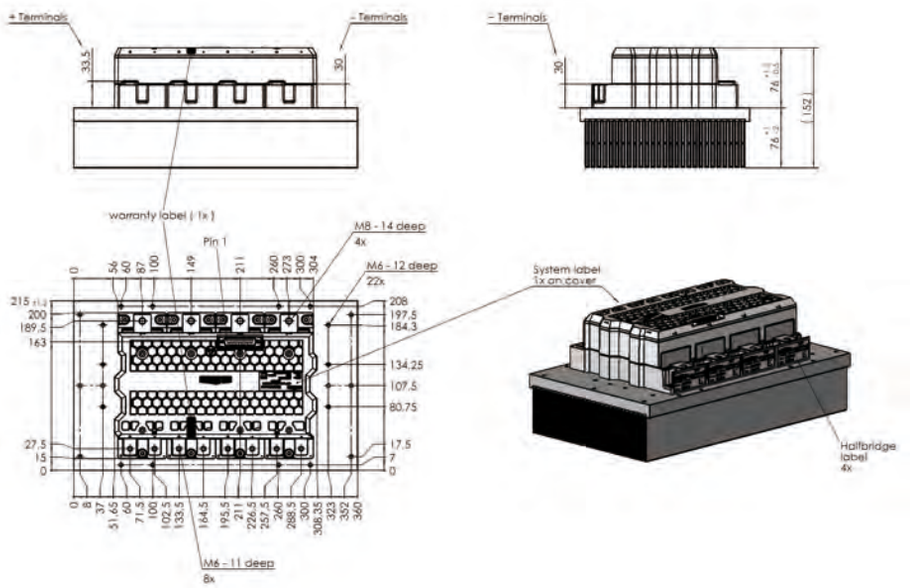


NHC:	**2,9 kg**

Dimensions in mm

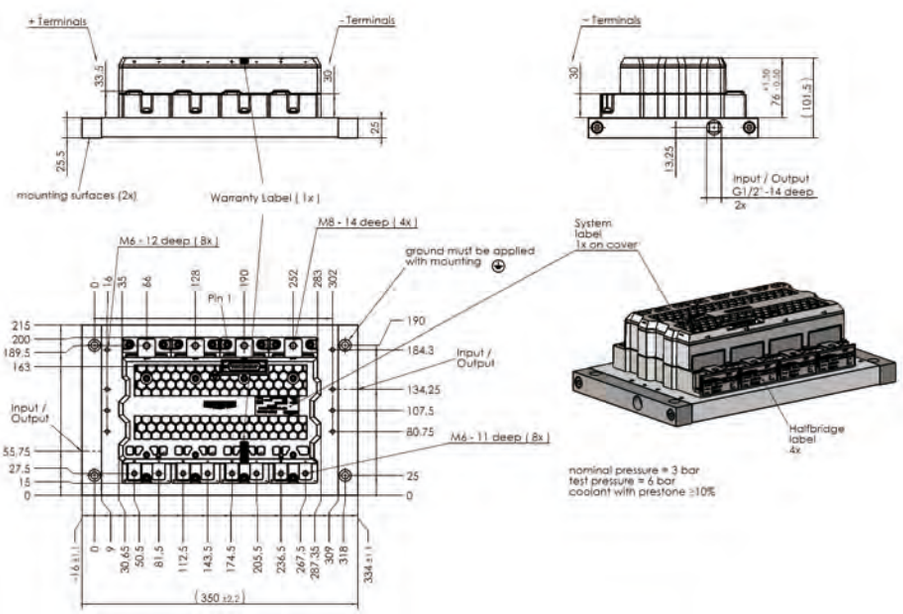
Cases SKiiP 4

Case S 44 mounted on P3016 heat sink



weight without heat sink:	**3,8 kg**
P3016:	**7,5 kg**

Case S 44 mounted on liquid cooled heat sink NHC

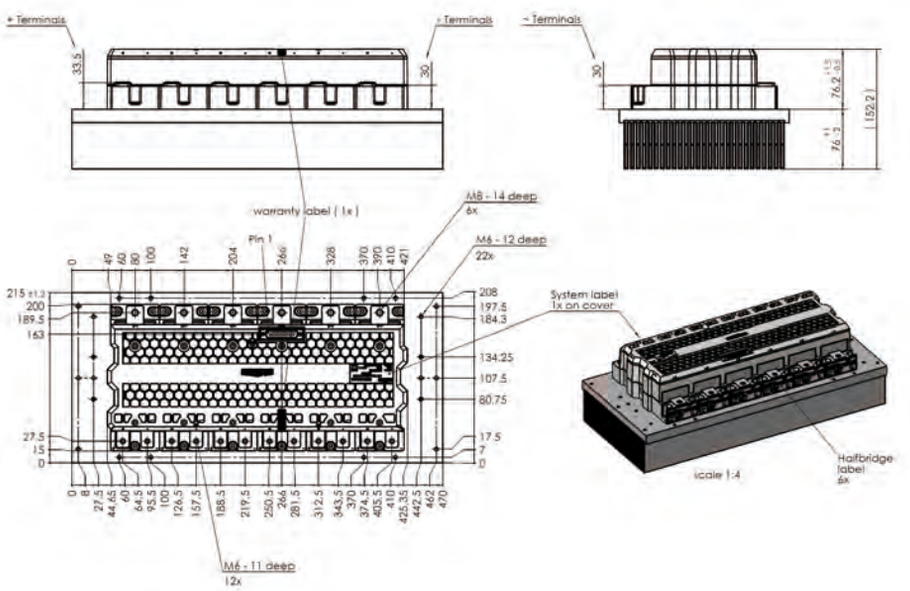


NHC:	**3,5 kg**

Dimensions in mm

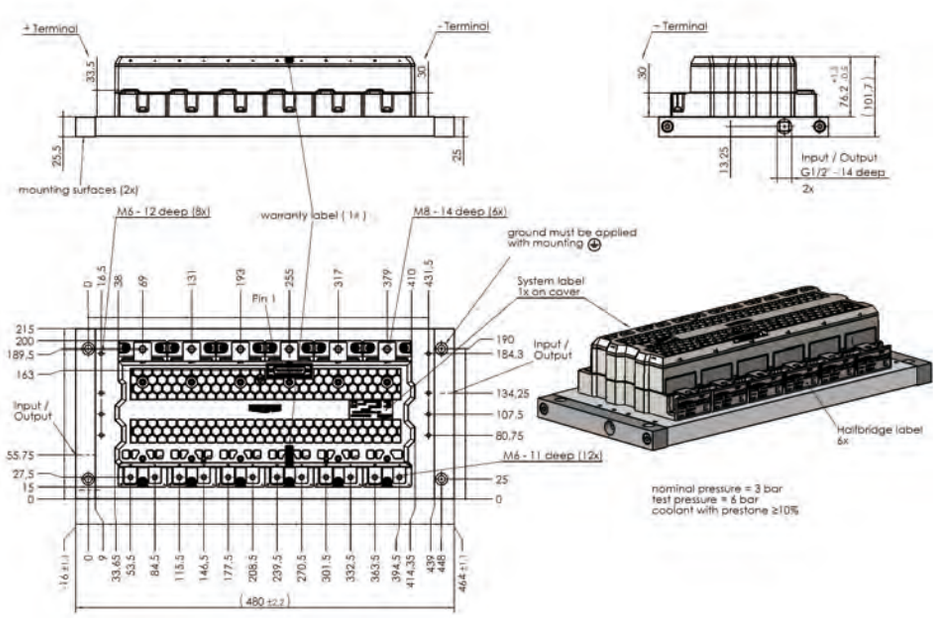
Cases SKiiP 4

Case S 64 mounted on P3016 heat sink



weight without heat sink:	**5,4 kg**
P3016:	**11,7 kg**

Case S 64 mounted on liquid cooled heat sink NHC



NHC:	**5,2 kg**

Dimensions in mm