

Absolute Maximum Ratings		Values	Units
Symbol	Conditions ¹⁾		
V _{CES}		1700	V
V _{CGR}	R _{GE} = 20 kΩ	1700	V
I _C	T _{case} = 25/60 °C	170 / 145	A
I _{CM}	T _{case} = 25/60 °C; t _p = 1 ms	340 / 290	A
V _{GES}		± 20	V
P _{tot}	per IGBT, T _{case} = 25 °C	960	W
T _J , (T _{stg})		−40 ... + 150 (125)	°C
V _{isol}	AC, 1 min.	3 400	V
humidity	IEC-EN 60721-3-3		
climate	DIN IEC 68 T.1	40/125/56	
Inverse Diode and FWD of type „GAL“ ⁽⁶⁾⁸⁾			
I _F = −I _C	T _{case} = 25/80 °C	145 / 100	A
I _{FM} = −I _{CM}	T _{case} = 25/80 °C; t _p = 1 ms	340 / 290	A
I _{FSM}	t _p = 10 ms; sin.; T _J = 150 °C	720	A
I _t ²	t _p = 10 ms; T _J = 150 °C	2600	A ² s

Characteristics		min.	typ.	max.	Units
Symbol	Conditions ¹⁾				
V _{(BR)CES}	V _{GE} = 0, I _C = 5 mA	≥ V _{CES}	—	—	V
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 5 mA	4,5	5,5	6,5	V
I _{CES}	V _{GE} = 0 } T _J = 25 °C	—	0,1	0,3	mA
	V _{CE} = V _{CES} } T _J = 125 °C	—	12	—	mA
I _{GES}	V _{GE} = 20 V, V _{CE} = 0	—	—	0,3	μA
V _{CESat}	I _C = 100 A } V _{GE} = 15 V;	—	2,7(3,2)	3,3(3,7)	V
V _{CESat}	I _C = 150 A } T _J = 25 (125) °C }	—	3,2(3,8)	3,8(4,2)	V
g _{fs}	V _{CE} = 20 V, I _C = 100 A	36	—	—	S
C _{CHC}	per IGBT	—	—	350	pF
C _{ies}	V _{GE} = 0	—	7	8,5	nF
C _{oes}	V _{CE} = 25 V	—	1100	1500	pF
C _{res}	f = 1 MHz	—	400	600	pF
L _{CE}		—	—	25	nH
t _{d(on)}	V _{CC} = 1200 V	—	100	—	ns
t _r	V _{GE} = −15 V / +15 V ³⁾	—	100	—	ns
t _{d(off)}	I _C = 100 A, ind. load	—	900	—	ns
t _f	R _{Gon} = R _{Goff} = 15 Ω	—	30	—	ns
E _{on} ⁵⁾	T _J = 125 °C	—	66	—	mWs
E _{off} ⁵⁾	L _S = 60 nH	—	40	—	mWs
Inverse Diode and FWD of type „GAL“ ⁽⁶⁾⁸⁾					
V _F = V _{EC}	I _F = 100 A } V _{GE} = 0 V;	—	2,2(1,9)	2,7(2,4)	V
V _F = V _{EC}	I _F = 150 A } T _J = 25 (125) °C }	—	2,4(2,2)	—	V
V _{TO}	T _J = 125 °C	—	1,3	1,5	V
r _t	T _J = 125 °C	—	7	9	mΩ
I _{RRM}	I _F = 100 A; T _J = 125 °C ²⁾	—	70	—	A
Q _{rr}	I _F = 100 A; T _J = 125 °C ²⁾	—	27	—	μC
Thermal characteristics					
R _{thjc}	per IGBT	—	—	0,13	°C/W
R _{thjc}	per diode	—	—	0,30	°C/W
R _{thch}	per module	—	—	0,05	°C/W

Fig. 11: $V_{CE(T0)}(T_J) = 1,6 + 0,001 \cdot (T_J - 25) [V]$
 $r_{CE}(T_J) = 0,0165 + 0,000045 \cdot (T_J - 25) [\Omega]$

¹⁾ T_{case} = 25 °C, unless otherwise specified

²⁾ I_F = −I_C, V_R = 1200 V,
−di_F/dt = 1000 A/μs, V_{GE} = 0 V

³⁾ Use V_{GEoff} = −5... −15 V

⁵⁾ See fig. 2 + 3; R_{Goff} = 15 Ω

⁶⁾ The free-wheeling diode of the GAL type has the data of the inverse diode.

⁸⁾ CAL = Controlled Axial Lifetime Technology

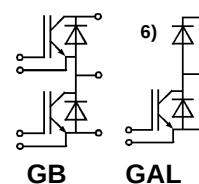
SEMITRANS® M Low Loss IGBT Modules

SKM 145 GB 174 DN SKM 145 GAL 174 DN

Preliminary Data



SEMITRANS 2N (low inductance)



Features

- MOS input (voltage controlled)
- N channel, homogeneous Silicon structure (NPT- Non punch-through IGBT)
- Low loss high density chip
- Low tail current
- High short circuit capability, self limiting
- Latch-up free
- Fast & soft inverse CAL diodes ⁸⁾
- Isolated copper baseplate using DCB Direct Copper Bonding Technology without hard mould
- Large clearance (10 mm) and creepage distances (20 mm)

Typical Applications:

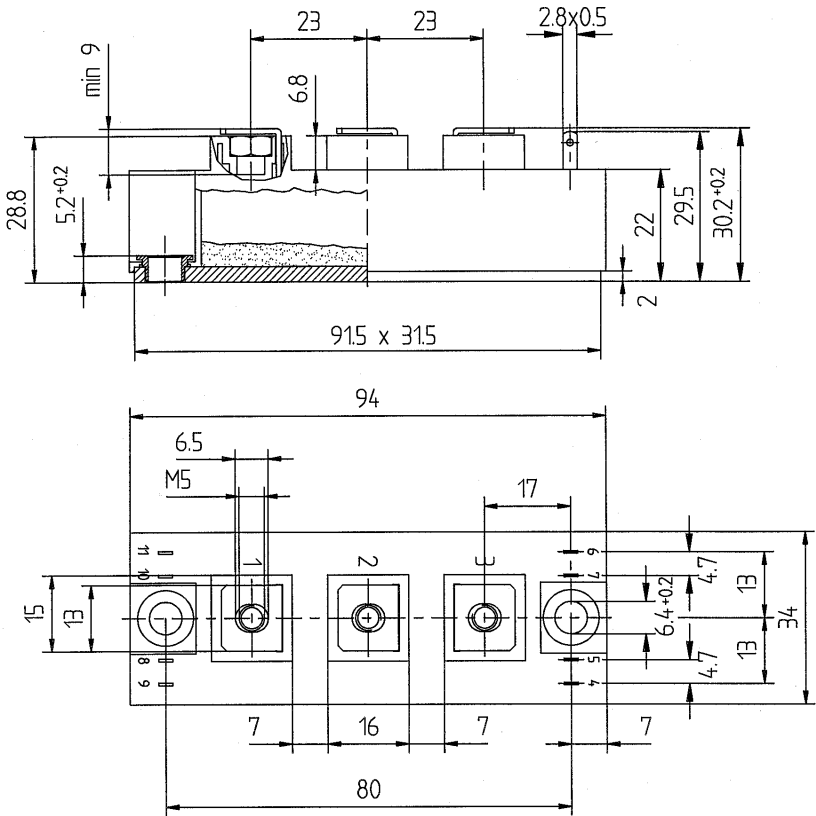
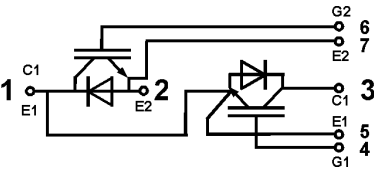
- AC inverter drives on mains
- 575 - 750 V AC
- DC bus voltage 750 V ... 1200 V DC
- Public transport (auxiliary syst.)
- Switching (not for linear use)

Cases and mech. data → page 2

SEMITRANS 2N (low inductance)

Case D 93
UL Recognized
File no. E 63 532

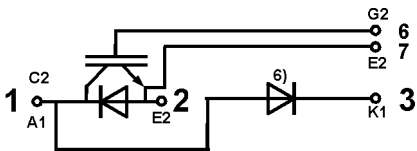
SKM 145 GB 174 DN



Dimensions in mm

SKM 145 GAL 174 DN

Case D 94 (→ D 93)



Case outline and circuit diagrams

Mechanical Data			Values			Units
Symbol	Conditions		min.	typ.	max.	
M ₁	to heatsink, SI Units	(M6)	3	—	5	Nm
	to heatsink, US Units		27	—	44	lb.in.
M ₂	for terminals, SI Units	(M5)	2,5	—	5	Nm
	for terminals, US Units		22	—	44	lb.in.
a			—	—	5x9,81	m/s ²
w			—	—	160	g

This is an electrostatic discharge sensitive device (ESDS). Please observe the international standard IEC 747-1, Chapter IX.

Eight devices are supplied in one SEMIBOX A without mounting hardware, which can be ordered separately under Ident No. 33321100 (for 10 SEMITRANS 2)

Larger packing units of 20 pieces are used if suitable

Accessories → SEMIKRON Book '99 page B 6 – 4

SEMIBOX → SEMIKRON Book '99 page C - 1.