



SEMITRANS® 10

IGBT R8 Modules

SKM1400GAR17R8

Features*

- Symmetrical current sharing
- Low-inductive module design
- High mechanical robustness
- UL recognized, file no. E63532

Typical Applications

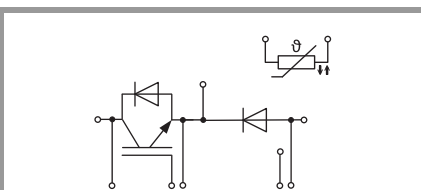
- Brake chopper
- Wind turbines

Remarks

Recommended $T_{jop} = -40 \dots +150^{\circ}\text{C}$

Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT				
V _{CES}	T _j = 25 °C		1700	V
I _C	T _j = 175 °C	T _c = 25 °C	2337	A
		T _c = 100 °C	1527	A
I _{Cnom}			1400	A
I _{CRM}			2800	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 1200 V V _{GE} ≤ 15 V V _{CES} ≤ 1700 V	T _j = 150 °C	10	µs
T _j			-40 ... 175	°C
Inverse diode				
V _{RRM}	T _j = 25 °C		1700	V
I _F	T _j = 175 °C	T _c = 25 °C	1874	A
		T _c = 100 °C	1168	A
I _{FRM}			2800	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 25 °C		9024	A
T _j			-40 ... 175	°C
Freewheeling diode				
V _{RRM}	T _j = 25 °C		1700	V
I _F	T _j = 175 °C	T _c = 25 °C	1874	A
		T _c = 100 °C	1168	A
I _{FRM}			2800	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 25 °C		9024	A
T _j			-40 ... 175	°C
Module				
T _{stg}			-40 ... 150	°C
V _{isol}	AC sinus 50 Hz, t = 1 min		4000	V

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT						
V _{CE(sat)}	I _C = 1400 A	T _j = 25 °C		1.63	1.95	V
	V _{GE} = 15 V chiplevel	T _j = 150 °C		1.96	2.27	V
V _{CE0}	chiplevel	T _j = 25 °C		1.06	1.12	V
		T _j = 150 °C		0.95	1.05	V
r _{CE}	V _{GE} = 15 V chiplevel	T _j = 25 °C		0.41	0.59	mΩ
		T _j = 150 °C		0.72	0.87	mΩ
V _{GE(th)}	V _{CE} = 10 V, I _C = 52.8 mA		5	5.8	6.5	V
I _{CES}	V _{GE} = 0 V, V _{CE} = 1700 V, T _j = 25 °C				6.0	mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		139.2		nF
C _{oes}		f = 1 MHz		4.80		nF
C _{res}		f = 1 MHz		0.43		nF
Q _G	V _{GE} = - 15 V...+ 15 V			8640		nC
R _{Gint}	T _j = 25 °C			1.3		Ω



GAR



SEMITRANS® 10

IGBT R8 Modules

SKM1400GAR17R8

Features*

- Symmetrical current sharing
- Low-inductive module design
- High mechanical robustness
- UL recognized, file no. E63532

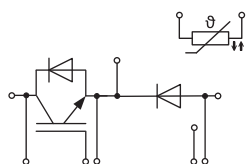
Typical Applications

- Brake chopper
- Windturbines

Remarks

Recommended $T_{jop} = -40 \dots +150^\circ\text{C}$

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT						
t _{d(on)}	V _{CC} = 900 V	T _j = 150 °C		528		ns
t _r	I _C = 1400 A	T _j = 150 °C		127		ns
E _{on}	V _{GE} = +15/-15 V	T _j = 150 °C		632		mJ
t _{d(off)}	R _{G on} = 0.67 Ω	T _j = 150 °C		636		ns
t _f	R _{G off} = 0.5 Ω	T _j = 150 °C		161		ns
E _{off}	di/dt _{on} = 10.7 kA/ μs di/dt _{off} = 7.5 kA/μs dv/dt = 4300 V/μs L _s = 36 nH	T _j = 150 °C		496		mJ
R _{th(j-c)}	per IGBT				0.02	K/W
R _{th(c-s)}	per IGBT (λ _{grease} =0.81 W/(m²K))			0.01		K/W
Inverse diode						
V _F = V _{EC}	I _F = 1400 A	T _j = 25 °C		1.84	2.19	V
	V _{GE} = 0 V	T _j = 150 °C		1.89	2.25	V
	chiplevel					
V _{F0}		T _j = 25 °C		1.32	1.56	V
	chiplevel	T _j = 150 °C		1.08	1.22	V
r _F		T _j = 25 °C		0.37	0.45	mΩ
	chiplevel	T _j = 150 °C		0.58	0.74	mΩ
I _{RRM}	I _F = 1400 A	T _j = 150 °C		1015		A
Q _{rr}	V _{GE} = -15 V	T _j = 150 °C		516		μC
	di/dt _{off} = 10.1 kA/ μs					
E _{rr}	V _R = 900 V	T _j = 150 °C		269		mJ
R _{th(j-c)}	per diode				0.032	K/W
R _{th(c-s)}	per diode (λ _{grease} =0.81 W/(m²K))			0.013		K/W
Freewheeling diode						
V _F = V _{EC}	I _F = 1400 A	T _j = 25 °C		1.84	2.19	V
	V _{GE} = 0 V	T _j = 150 °C		1.89	2.25	V
	level = chiplevel					
V _{F0}		T _j = 25 °C		1.32	1.56	V
	chiplevel	T _j = 150 °C		1.08	1.22	V
r _F		T _j = 25 °C		0.37	0.45	mΩ
	chiplevel	T _j = 150 °C		0.58	0.74	mΩ
I _{RRM}	I _F = 1400 A	T _j = 150 °C		1015		A
Q _{rr}	di/dt _{off} = 10.1 kA/ μs	T _j = 150 °C		516		μC
E _{rr}	V _{GE} = -15 V	T _j = 150 °C		269		mJ
	V _R = 900 V					
R _{th(j-c)}	per diode				0.032	K/W
R _{th(c-s)}	per diode (λ _{grease} =0.81 W/(m²K))			0.013		K/W
Module						
L _{CE}				10		nH
R _{CC'+EE'}	measured per switch, T _C = 25 °C			0.2		mΩ
R _{th(c-s)1}	calculated without thermal coupling (λ _{grease} =0.81 W/(m²K))			0.0028		K/W
R _{th(c-s)2}	including thermal coupling, T _s underneath module (λ _{grease} =0.81 W/(m²K))			0.005		K/W
M _s	to heat sink M5		4		6	Nm
M _t		to terminals M8	8		10	Nm
		to terminals M4	1.8		2.1	Nm
w					1250	g



GAR

SKM1400GAR17R8



SEMITRANS® 10

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Temperature Sensor					
R ₁₀₀	T _c =100°C (R ₂₅ =5 kΩ)		493 ± 5%		Ω
B _{100/125}	R _(T) =R ₁₀₀ exp[B _{100/125} (1/T-1/T ₁₀₀)]; T[K];		3550 ±2%		K

IGBT R8 Modules

SKM1400GAR17R8

Features*

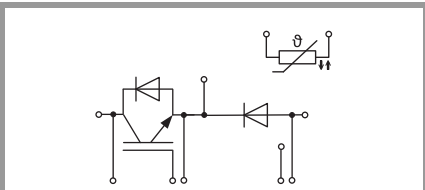
- Symmetrical current sharing
- Low-inductive module design
- High mechanical robustness
- UL recognized, file no. E63532

Typical Applications

- Brake chopper
- Windturbines

Remarks

Recommended T_{jop} = -40 ... +150°C



GAR

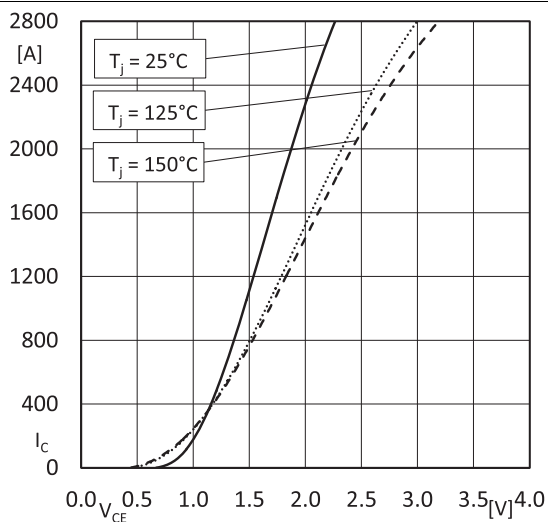


Fig. 1: Output characteristics IGBT (typical); $I_C = f(V_{CE})$; $V_{GE} = 15V$; (chiplevel)

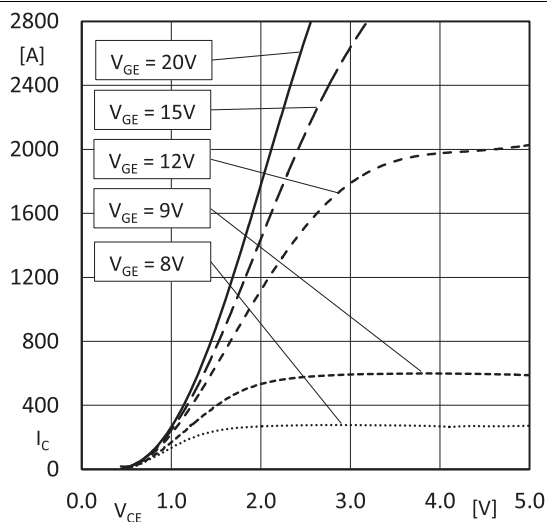


Fig. 2: Output characteristics IGBT (typical); $I_C = f(V_{CE})$; $T_j = 150^\circ C$; (chiplevel)

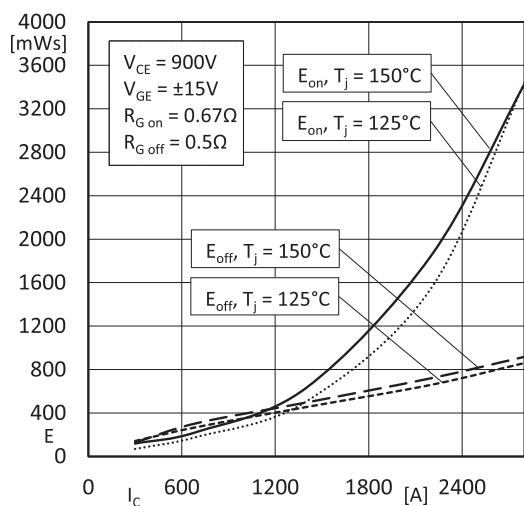


Fig. 3: Switching losses IGBT (typical); $E = f(I_C)$

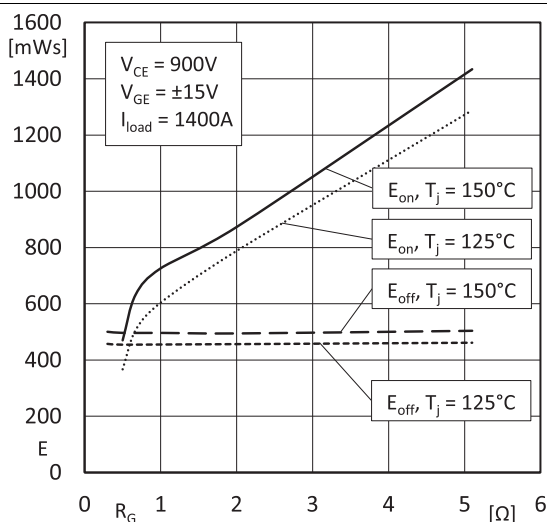


Fig. 4: Switching losses IGBT (typical); $E = f(R_G)$

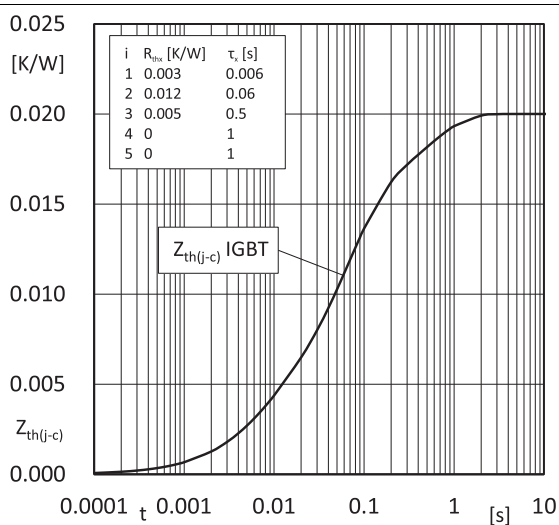


Fig. 5: Transient thermal impedance IGBT

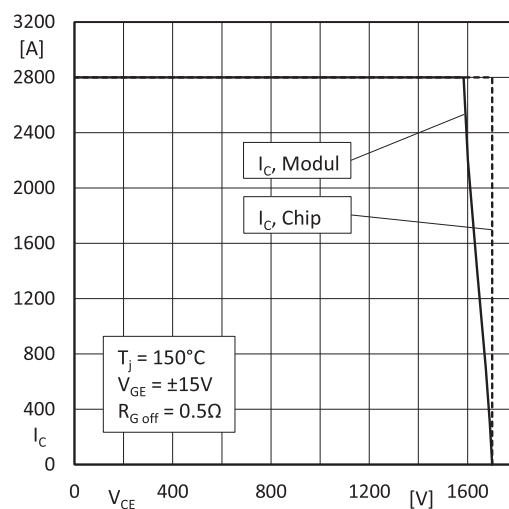
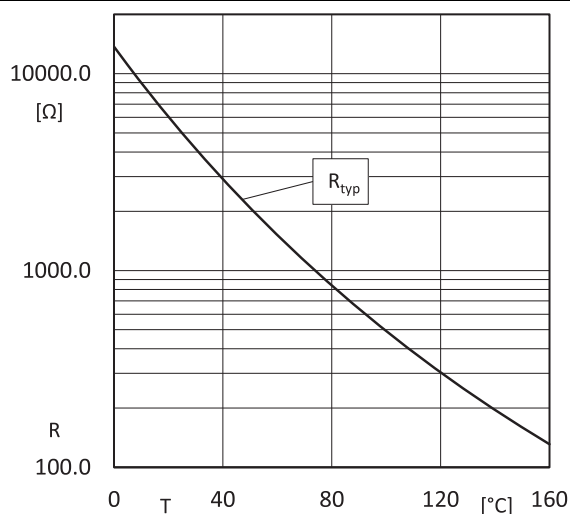
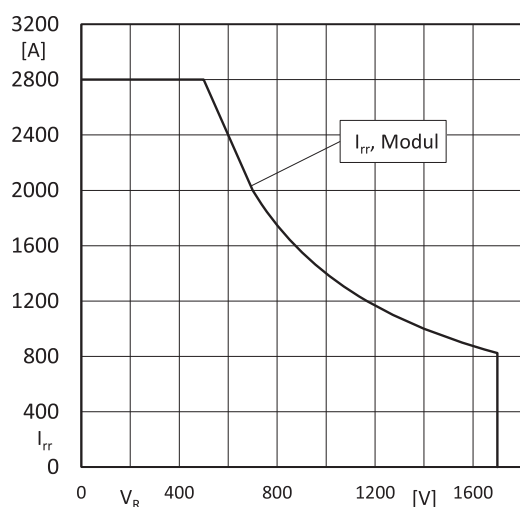
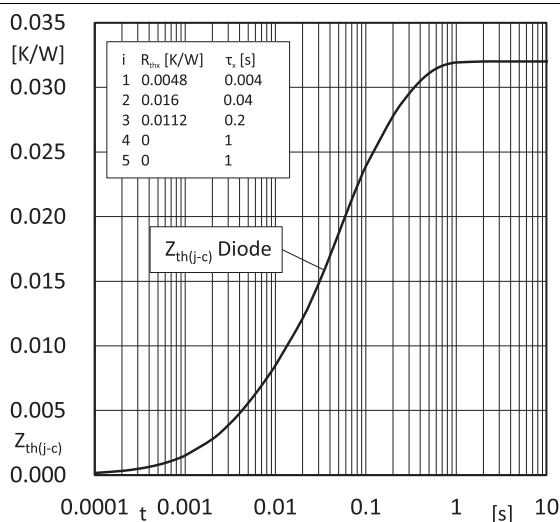
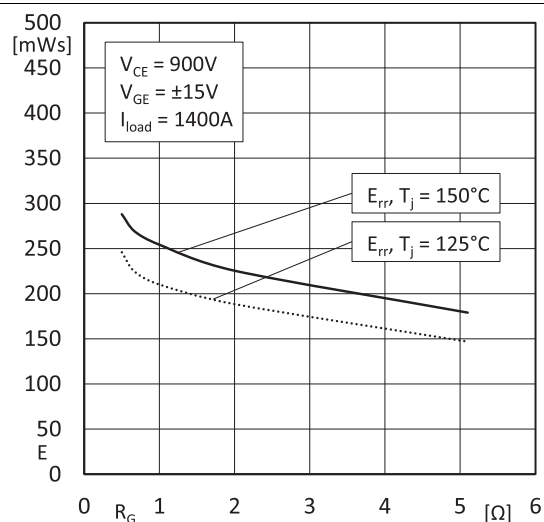
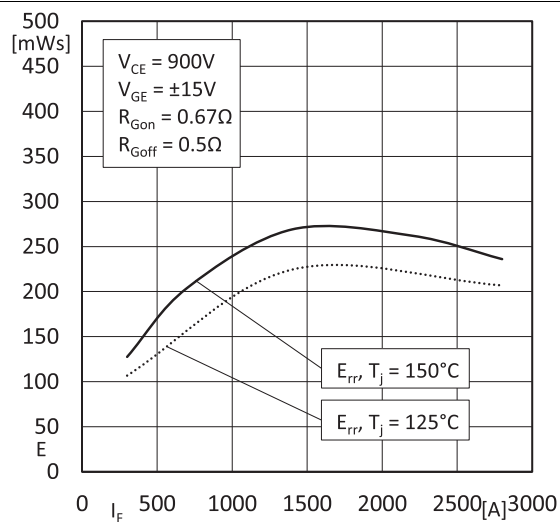
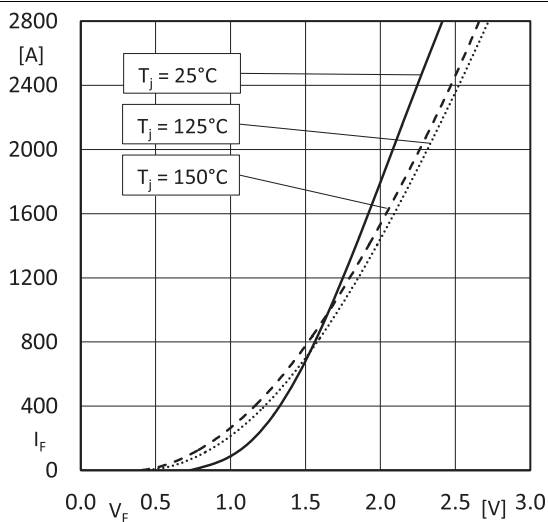


Fig. 6: RBSOA IGBT



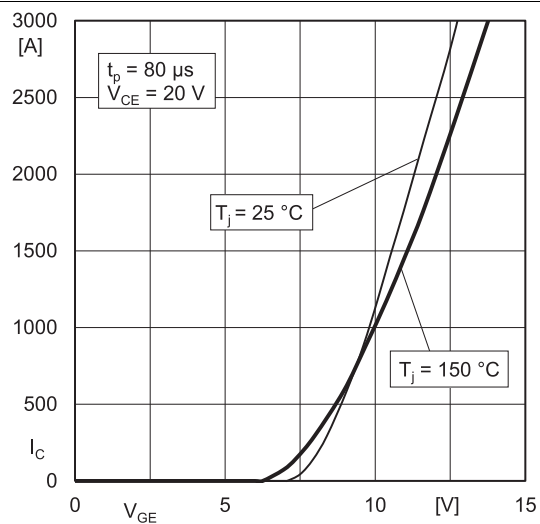


Fig. 13: Typ. transfer characteristic

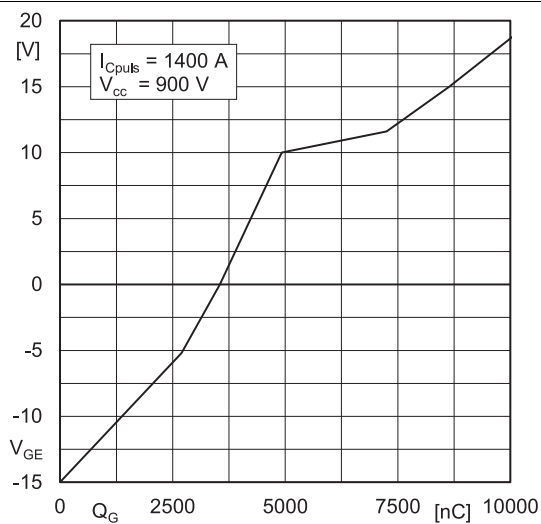
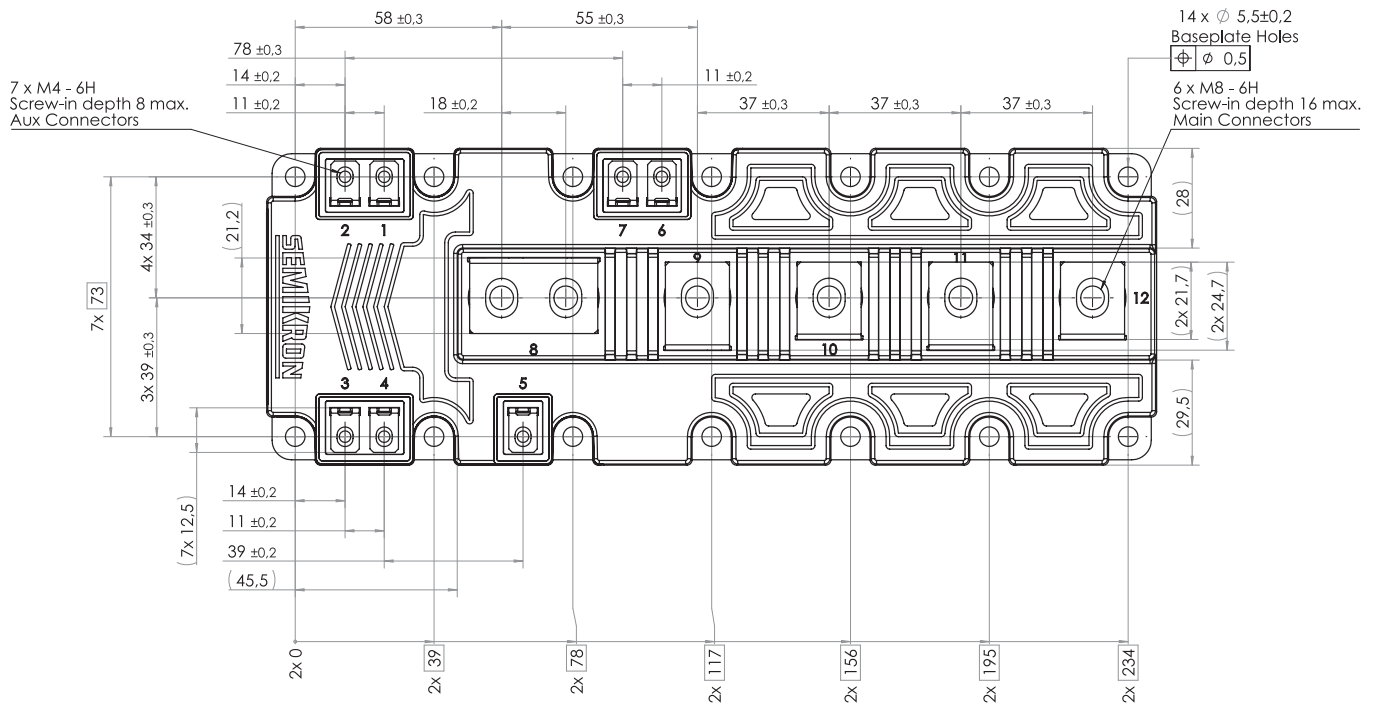
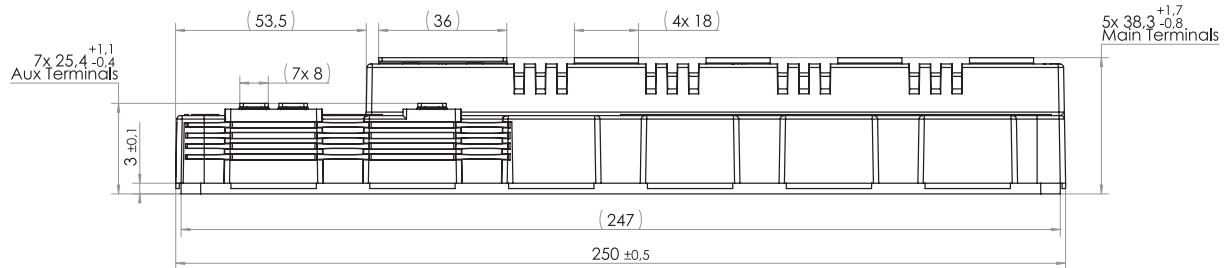
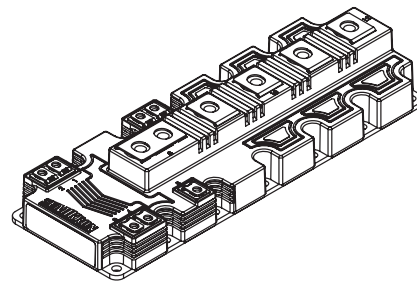
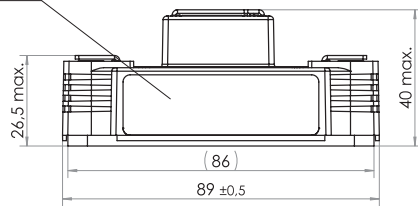


Fig. 14: Typ. gate charge characteristic

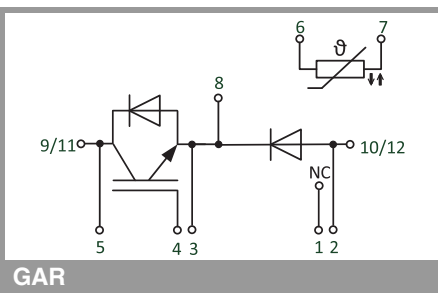
SKM1400GAR17R8

Module label



- Dimensions in mm
- General tolerances $\pm 0.5\text{mm}$

SEMITRANS 10



This is an electrostatic discharge sensitive device (ESDS) due to international standard IEC 61340.

***IMPORTANT INFORMATION AND WARNINGS**

The specifications of SEMIKRON products may not be considered as guarantee or assurance of product characteristics ("Beschaffenheitsgarantie"). The specifications of SEMIKRON products describe only the usual characteristics of products to be expected in typical applications, which may still vary depending on the specific application. Therefore, products must be tested for the respective application in advance. Application adjustments may be necessary. The user of SEMIKRON products is responsible for the safety of their applications embedding SEMIKRON products and must take adequate safety measures to prevent the applications from causing a physical injury, fire or other problem if any of SEMIKRON products become faulty. The user is responsible to make sure that the application design is compliant with all applicable laws, regulations, norms and standards. Except as otherwise explicitly approved by SEMIKRON in a written document signed by authorized representatives of SEMIKRON, SEMIKRON products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury. No representation or warranty is given and no liability is assumed with respect to the accuracy, completeness and/or use of any information herein, including without limitation, warranties of non-infringement of intellectual property rights of any third party. SEMIKRON does not assume any liability arising out of the applications or use of any product; neither does it convey any license under its patent rights, copyrights, trade secrets or other intellectual property rights, nor the rights of others. SEMIKRON makes no representation or warranty of non-infringement or alleged non-infringement of intellectual property rights of any third party which may arise from applications. Due to technical requirements our products may contain dangerous substances. For information on the types in question please contact the nearest SEMIKRON sales office. This document supersedes and replaces all information previously supplied and may be superseded by updates. SEMIKRON reserves the right to make changes.