



SEMITRANS® 10

IGBT R8 Modules

SKM1000GB17R8H1

Features*

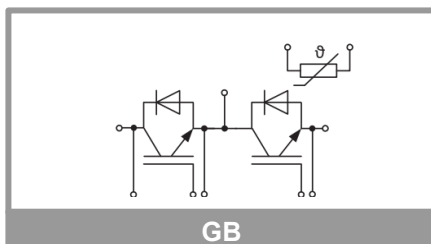
- Symmetrical current sharing
- Low-inductive module design
- High mechanical robustness
- UL recognized, file no. E63532

Typical Applications

- Motor Drives
- UPS Systems
- Solar Inverters

Remarks

- Max. case temperature limited to $T_c = T_s = 125\text{ °C}$
- Recommended $T_{j,op} = -40 \dots +150\text{ °C}$
- $I_{DC} \leq 1000\text{ A}$ for $T_{Terminal} = 100\text{ °C}$



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	1574	A
		T _c = 100 °C	1027	A
I _{Cnom}			1000	A
I _{CRM}			2000	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 1000 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	1449	A
		T _c = 100 °C	905	A
I _{FRM}			2000	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 25 °C		6240	A
T _j			-40 ... 175	°C
Module				
I _{t(RMS)}			1000	A
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 = 1000 A V _{GE} = 15 V chipelevel	T _j = 25 °C		1.66	1.99	V
		T _j = 150 °C		2.01	2.33	V
V _{CE0}	chipelevel	T _j = 25 °C		1.06	1.12	V
		T _j = 150 °C		0.95	1.05	V
r _{CE}	V _{GE} = 15 V chipelevel	T _j = 25 °C		0.60	0.87	mΩ
		T _j = 150 °C		1.06	1.28	mΩ
V _{GE(th)}	V _{CE} = 10 V, I _C = 36 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		90.0		nF
C _{oes}		f = 1 MHz		3.00		nF
C _{res}		f = 1 MHz		0.24		nF
Q _G	V _{GE} = - 15 V / + 15 V			5640		nC
R _{Gint}	T _j = 25 °C			2.5		Ω
t _{d(on)}	V _{CC} = 900 V	T _j = 150 °C		735		ns
t _r	I _C = 1000 A	T _j = 150 °C		160		ns
E _{on}	V _{GE} = +15 V/-15 V	T _j = 150 °C		535		mJ
t _{d(off)}	R _{Gon} = 2 Ω	T _j = 150 °C		750		ns
t _f	R _{Goff} = 2 Ω	T _j = 150 °C		155		ns
E _{off}	di/dt _{on} = 5.7 kA/μs di/dt _{off} = 5.4 kA/μs dv/dt = 4100 V/μs L _S = 25 nH	T _j = 150 °C		345		mJ
R _{th(j-c)}	per IGBT				0.03	K/W
R _{th(c-s)}	per IGBT, (λ _{grease} = 0.81 W/(m*K))			0.016		K/W
R _{th(c-s)}	per IGBT, pre-applied phase change material			0.012		K/W

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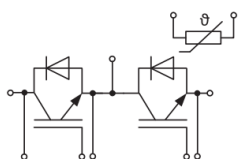
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- $I_{DC} \leq 1000\text{ A}$ for $T_{Terminal} = 100\text{ °C}$

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Inverse diode					
$V_F = V_{EC}$	$I_F = 1000\text{ A}$ $V_{GE} = 0\text{ V}$ chipelevel	$T_j = 25\text{ °C}$	1.78	2.12	V
		$T_j = 150\text{ °C}$	1.81	2.14	V
V_{F0}	chipelevel	$T_j = 25\text{ °C}$	1.32	1.56	V
		$T_j = 150\text{ °C}$	1.08	1.22	V
r_F	chipelevel	$T_j = 25\text{ °C}$	0.46	0.56	mΩ
		$T_j = 150\text{ °C}$	0.73	0.92	mΩ
I_{RRM}	$I_F = 1000\text{ A}$	$T_j = 150\text{ °C}$	750		A
Q_{rr}	$di/dt_{off} = 5.9\text{ kA/μs}$ $V_{GE} = -15\text{ V}$	$T_j = 150\text{ °C}$	330		μC
E_{rr}	$V_{CC} = 900\text{ V}$	$T_j = 150\text{ °C}$	170		mJ
$R_{th(j-c)}$	per diode			0.042	K/W
$R_{th(c-s)}$	per diode, ($\lambda_{grease} = 0.81\text{ W/(m}^2\text{K)}$)		0.017		K/W
$R_{th(c-s)}$	per diode, pre-applied phase change material		0.013		K/W
Module					
L_{CE}			10		nH
R_{CC+EE}	measured per switch, $T_c = 25\text{ °C}$		0.20		mΩ
$R_{th(c-s)1}$	calculated without thermal coupling ($\lambda_{grease}=0.81\text{ W/(m}^2\text{K)}$)		0.004		K/W
$R_{th(c-s)2}$	including thermal coupling, T_s underneath module ($\lambda_{grease}=0.81\text{ W/(m}^2\text{K)}$)		0.006		K/W
$R_{th(c-s)2}$	including thermal coupling, T_s underneath module, pre-applied phase change material		0.005		K/W
M_s	to heat sink M5	4		6	Nm
M_t	to terminal M8	8		10	Nm
	to terminal M4	1.8		2.1	Nm
w				1250	g
Temperature Sensor					
R_{100}	$T_c=100\text{ °C}$ ($R_{25}=5\text{ kΩ}$)		493 ± 5%		Ω
$B_{100/125}$	$R(T)=R_{100}\exp[B_{100/125}(1/T-1/T_{100})]$; $T[K]$;		3550 ±2%		K



GB

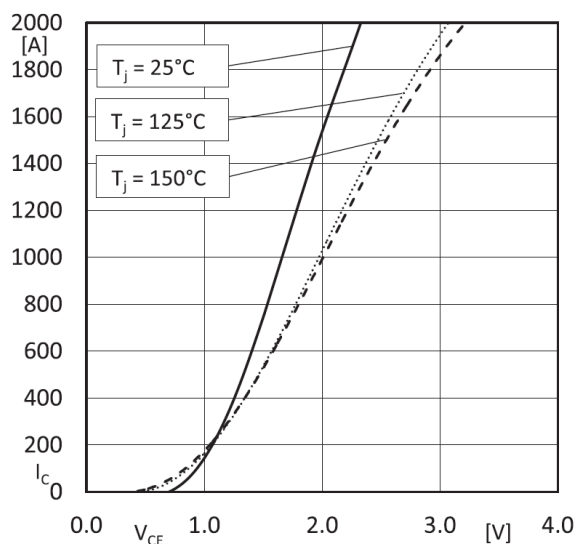


Fig. 1: Output characteristics IGBT (typical); $I_C = f(V_{CE})$; $V_{GE} = 15V$; (chipl level)

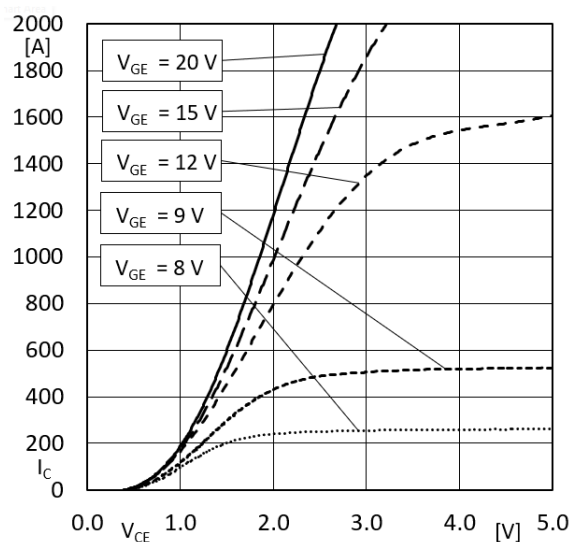


Fig. 2: Output characteristics IGBT (typical); $I_C = f(V_{CE})$; $T_j = 150^\circ C$; (chipl level)

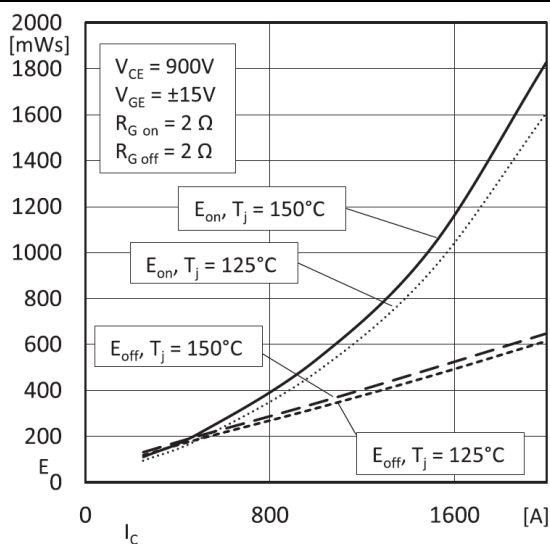


Fig. 3: Switching losses IGBT (typical); $E = f(I_C)$

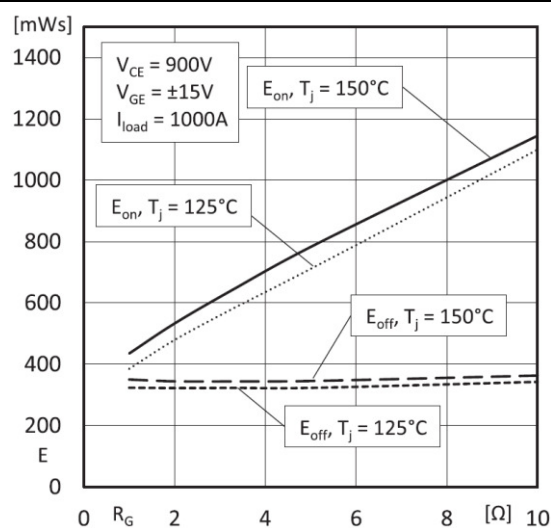


Fig. 4: Switching losses IGBT (typical); $E = f(R_G)$

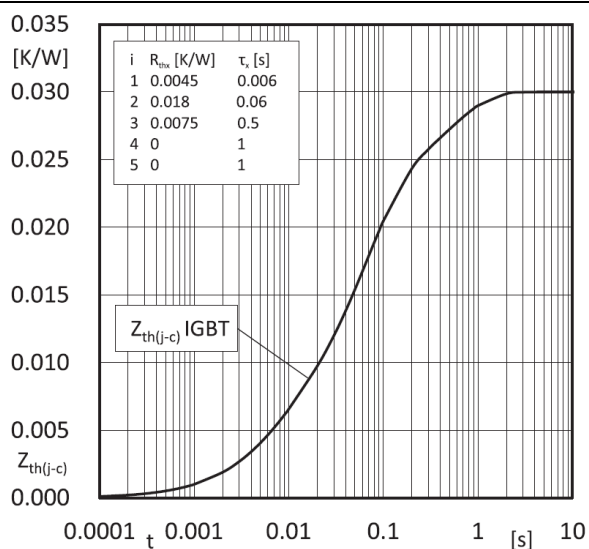


Fig. 5: Transient thermal impedance IGBT

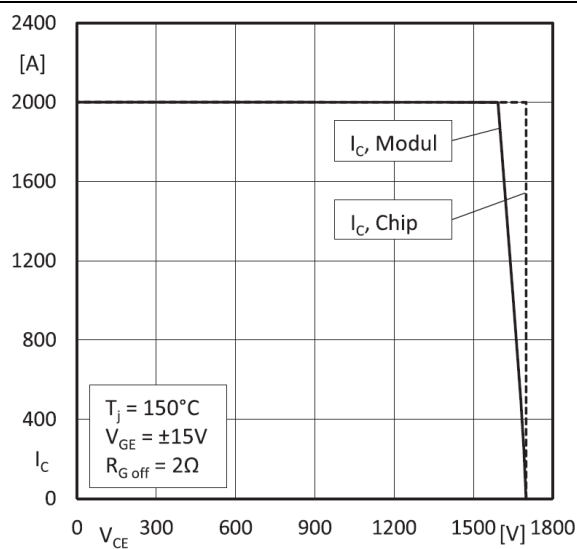
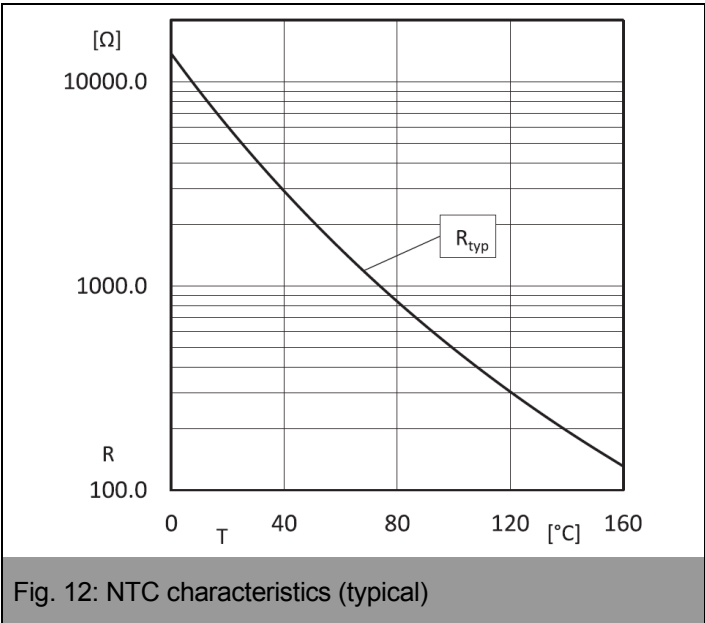
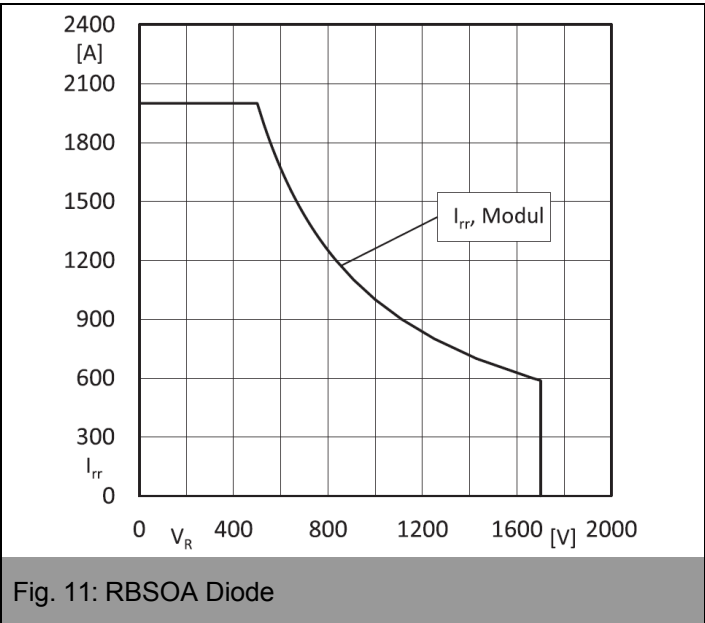
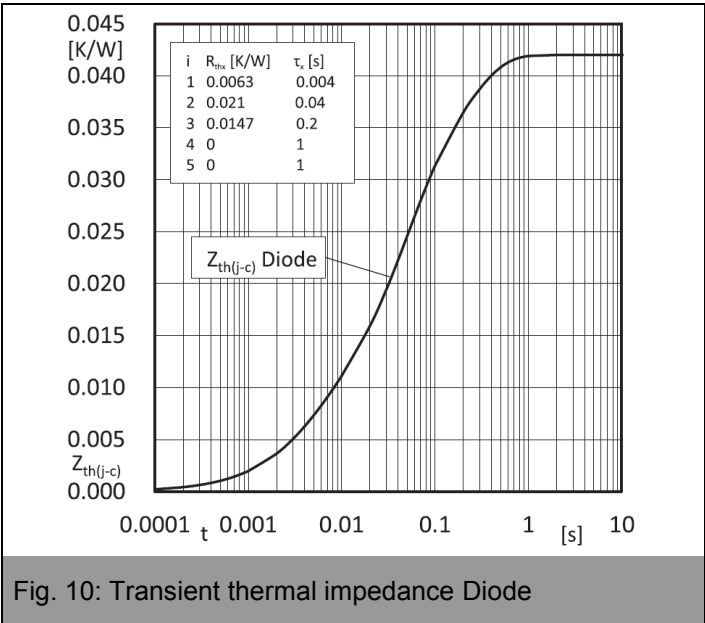
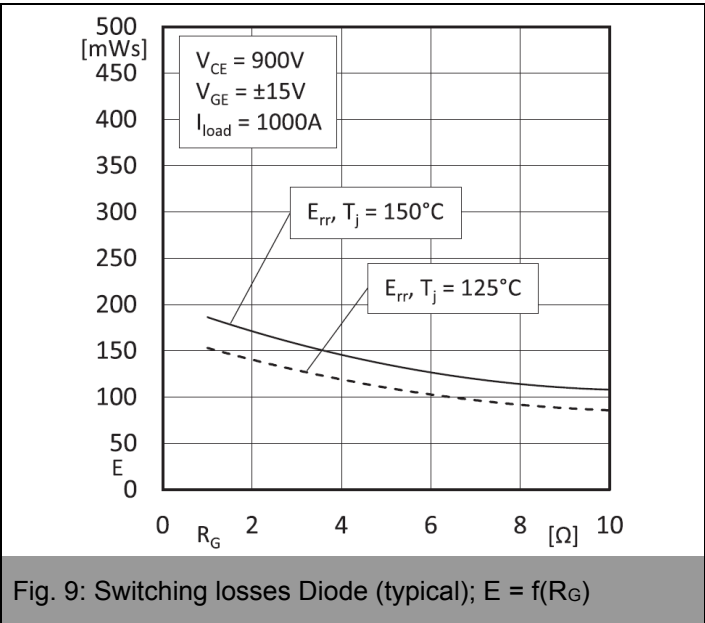
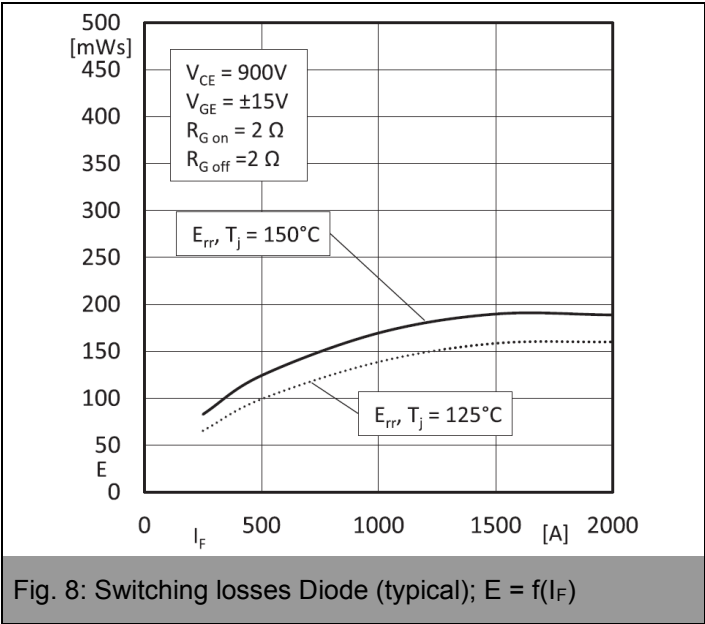
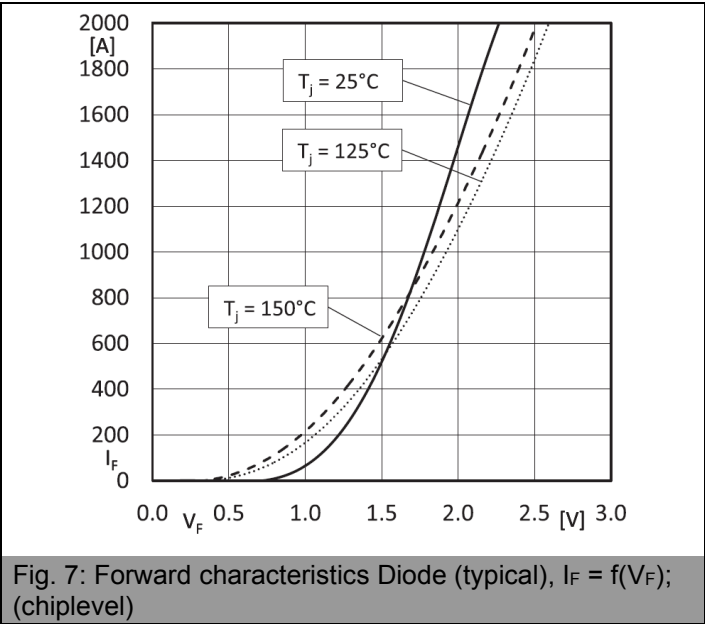


Fig. 6: RBSOA IGBT



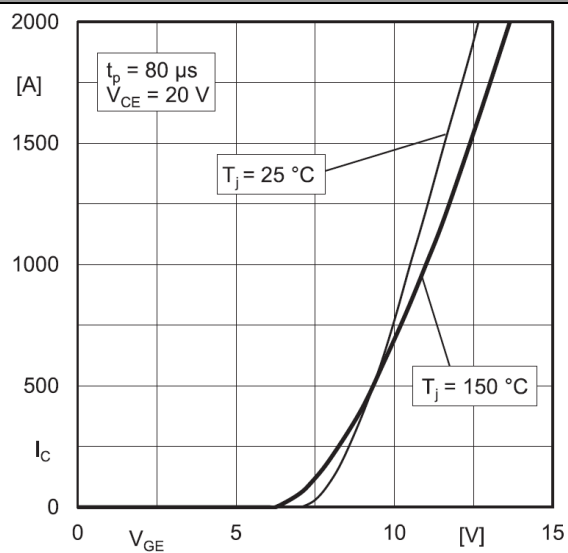


Fig. 13: Typical transfer characteristic

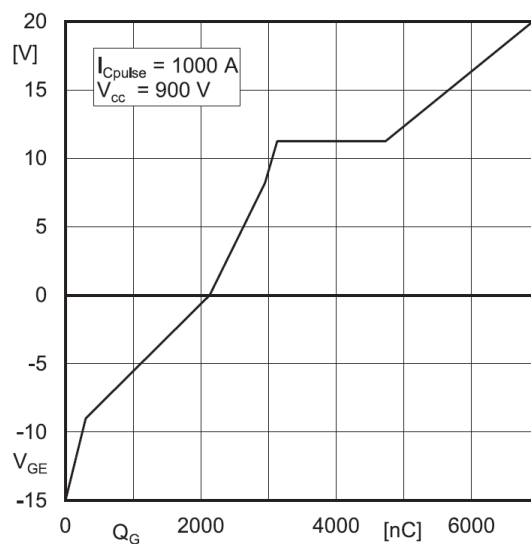
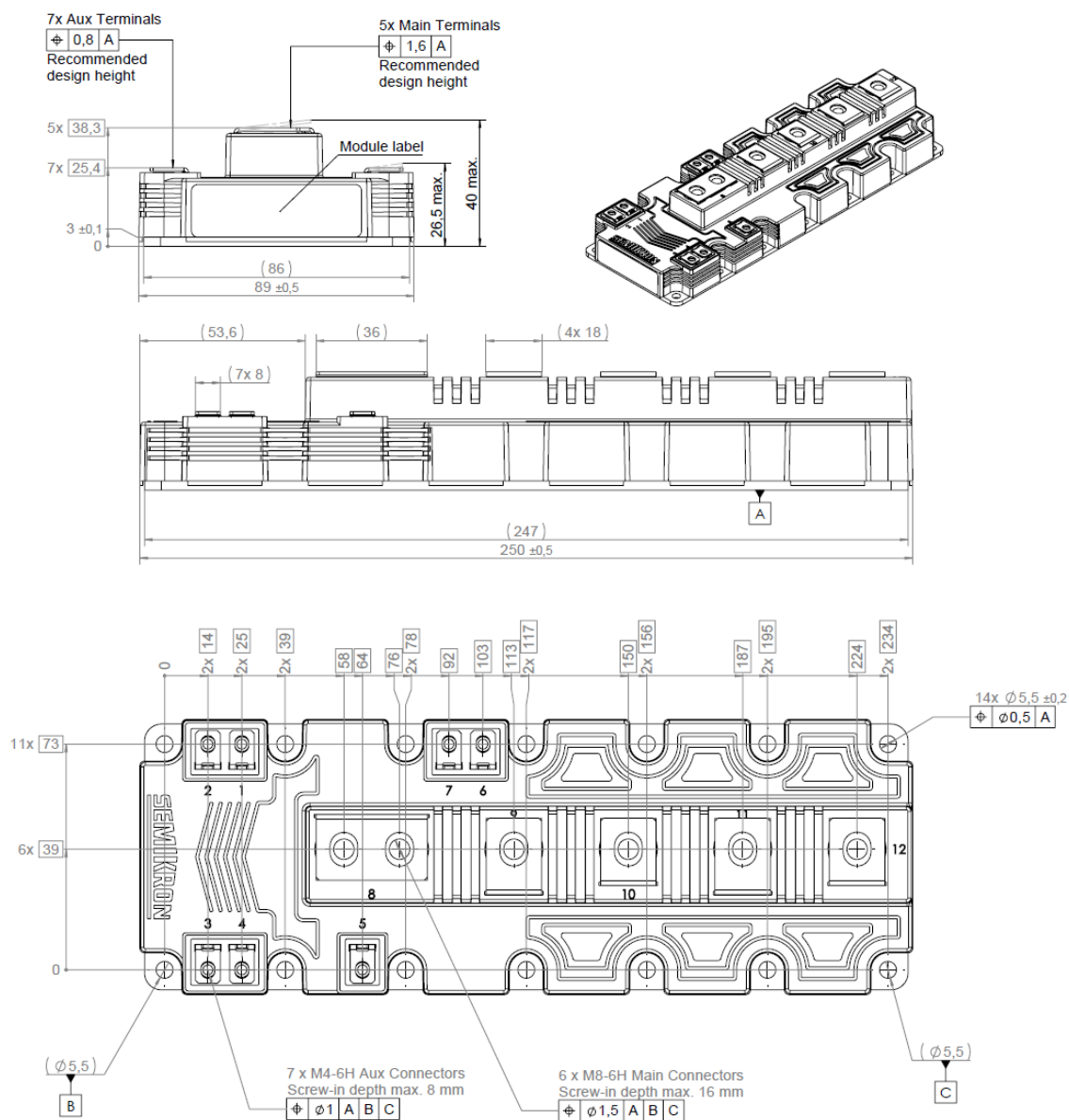


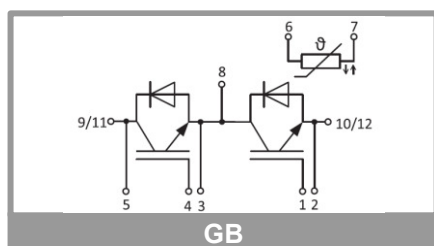
Fig. 14: Typical gate charge characteristic

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- Dimensions in mm
- General tolerances ±0.5mm

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

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