



SEMITRANS® 10

IGBT R8 Modules

SKM1000GB17R8

Features*

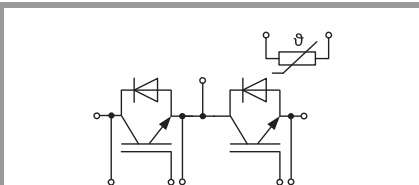
- Symmetrical current sharing
- Low-inductive module design
- High mechanical robustness
- UL recognized, file no. E63532

Typical Applications

- Motor Drives
- UPS Systems
- Solar Inverters

Remarks

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



GB

Absolute Maximum Ratings

Symbol	Conditions	Values	Unit
IGBT			
V_{CES}	$T_j = 25^\circ\text{C}$	1700	V
I_C	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	1574
		$T_c = 100^\circ\text{C}$	1027
I_{Cnom}		1000	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	2000	A
V_{GES}		-20 ... 20	V
t_{psc}	$V_{CC} = 1200\text{ V}$ $V_{GE} \leq 15\text{ V}$ $V_{CES} \leq 1700\text{ V}$	$T_j = 150^\circ\text{C}$	10
T_j		-40 ... 175	$^\circ\text{C}$
Inverse diode			
V_{RRM}	$T_j = 25^\circ\text{C}$	1700	V
I_F	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	1449
		$T_c = 100^\circ\text{C}$	905
I_{Fnom}		1000	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	2000	A
I_{FSM}	$t_p = 10\text{ ms, sin } 180^\circ, T_j = 25^\circ\text{C}$	6240	A
T_j		-40 ... 175	$^\circ\text{C}$
Module			
T_{stg}		-40 ... 150	$^\circ\text{C}$
V_{isol}	AC sinus 50 Hz, $t = 1\text{ min}$	4000	V

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
IGBT					
$V_{CE(sat)}$	$I_C = 1000\text{ A}$ $V_{GE} = 15\text{ V}$ chipelevel			$T_j = 25^\circ\text{C}$	1.66
				$T_j = 150^\circ\text{C}$	1.99
V_{CE0}	chipelevel			$T_j = 25^\circ\text{C}$	2.01
				$T_j = 150^\circ\text{C}$	2.33
r_{CE}	$V_{GE} = 15\text{ V}$ chipelevel			$T_j = 25^\circ\text{C}$	1.06
				$T_j = 150^\circ\text{C}$	1.12
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 36\text{ mA}$	5	5.8	6.5	0.95
					1.05
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = 1700\text{ V}, T_j = 25^\circ\text{C}$				0.60
C_{ies}	$V_{CE} = 25\text{ V}$				0.87
C_{oes}	$V_{GE} = 0\text{ V}$				1.06
C_{res}					1.28
Q_G	$V_{GE} = -15\text{ V} / +15\text{ V}$		5	5.8	6.5
R_{Gint}	$T_j = 25^\circ\text{C}$				6.0
$t_{d(on)}$	$V_{CC} = 900\text{ V}$				90.0
t_r	$I_C = 1000\text{ A}$				3.00
E_{on}	$V_{GE} = +15/-15\text{ V}$				0.24
$t_{d(off)}$	$R_{G on} = 0.7\ \Omega$				5640
t_f	$R_{G off} = 0.7\ \Omega$				1.8
E_{off}	$di/dt_{on} = 7.8\text{ kA}/\mu\text{s}$ $di/dt_{off} = 4.8\text{ kA}/\mu\text{s}$ $dv/dt = 4600\text{ V}/\mu\text{s}$ $L_s = 24\text{ nH}$			$T_j = 150^\circ\text{C}$	476
					105
$R_{th(j-c)}$	per IGBT				465
$R_{th(c-s)}$	per IGBT ($\lambda_{grease} = 0.81\text{ W}/(\text{m}^2\text{K})$)				713



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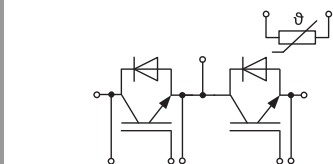
Typical Applications

- Motor Drives
- UPS Systems
- Solar Inverters

Remarks

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

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
V _F = V _{EC}	I _F = 1000 A	T _j = 25 °C		1.78	2.12	V
	V _{GE} = 0 V chiplevel	T _j = 150 °C		1.81	2.14	V
V _{F0}	chiplevel	T _j = 25 °C		1.32	1.56	V
		T _j = 150 °C		1.08	1.22	V
r _F	chiplevel	T _j = 25 °C		0.46	0.56	mΩ
		T _j = 150 °C		0.73	0.92	mΩ
I _{RRM}	I _F = 1000 A	T _j = 150 °C		711		A
Q _{rr}	di/dt _{off} = 8.1 kA/μs	T _j = 150 °C		325		μC
E _{rr}	V _{GE} = -15 V V _{CC} = 900 V	T _j = 150 °C		159		mJ
R _{th(j-c)}	per diode				0.042	K/W
R _{th(c-s)}	per diode (λ _{grease} =0.81 W/(m*K))			0.017		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/(m*K))			0.0041		K/W
R _{th(c-s)2}	including thermal coupling, T _s underneath module (λ _{grease} =0.81 W/(m*K))			0.007		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
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



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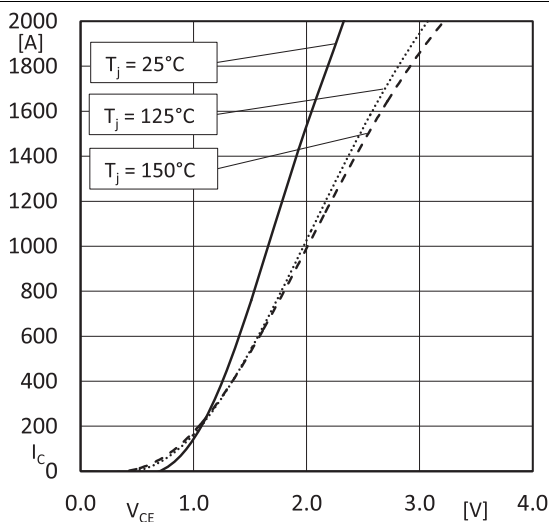


Fig. 1: Output characteristics IGBT (typical); $I_C = f(V_{CE})$; $V_{GE} = 15V$; (chipelevel)

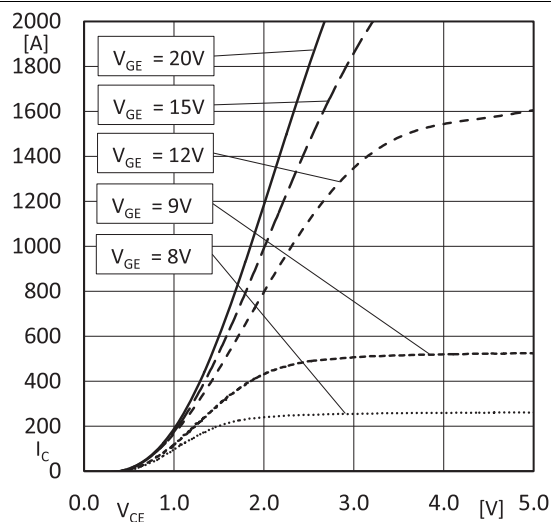


Fig. 2: Output characteristics IGBT (typical); $I_C = f(V_{CE})$; $T_j = 150^\circ C$; (chipelevel)

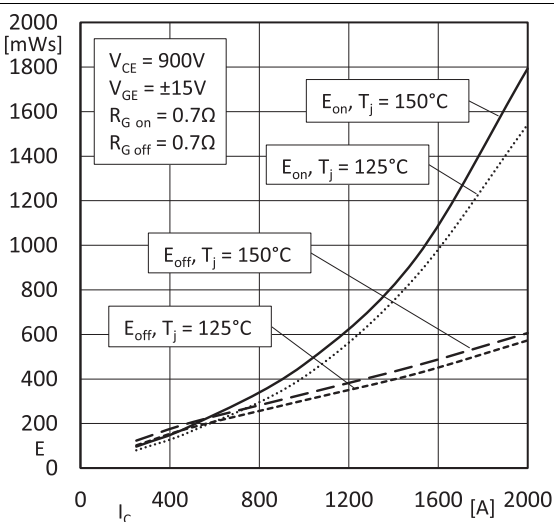


Fig. 3: Switching losses IGBT (typical); $E = f(I_C)$

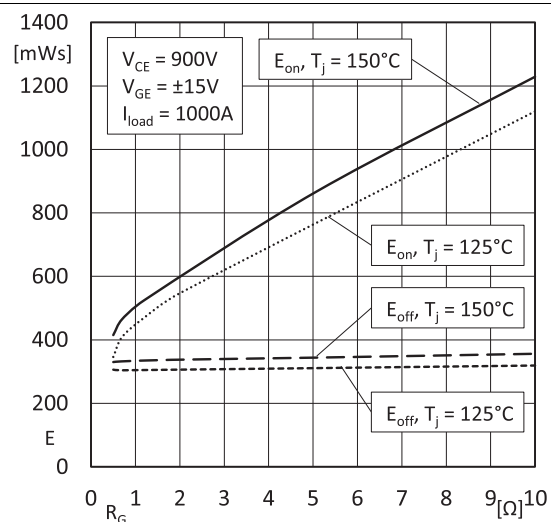


Fig. 4: Switching losses IGBT (typical); $E = f(R_G)$

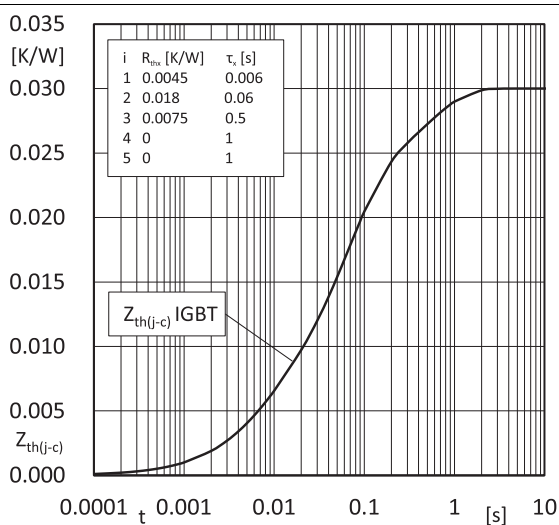


Fig. 5: Transient thermal impedance IGBT

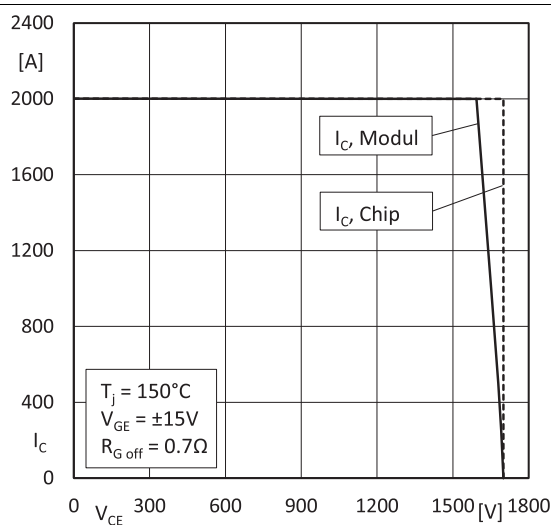


Fig. 6: RBSOA IGBT

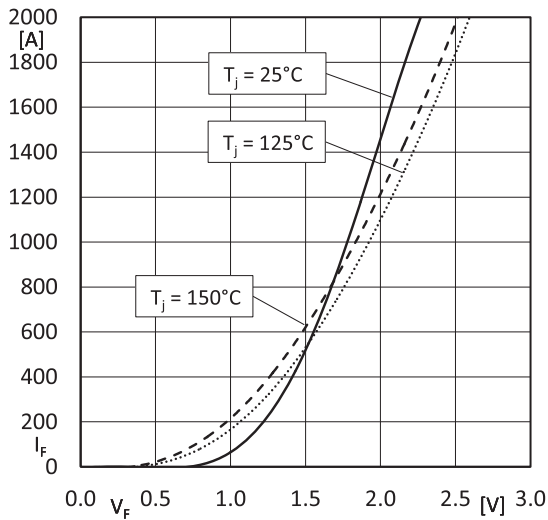


Fig. 7: Forward charact. Diode (typical); $I_F = f(V_F)$; (chipllevel)

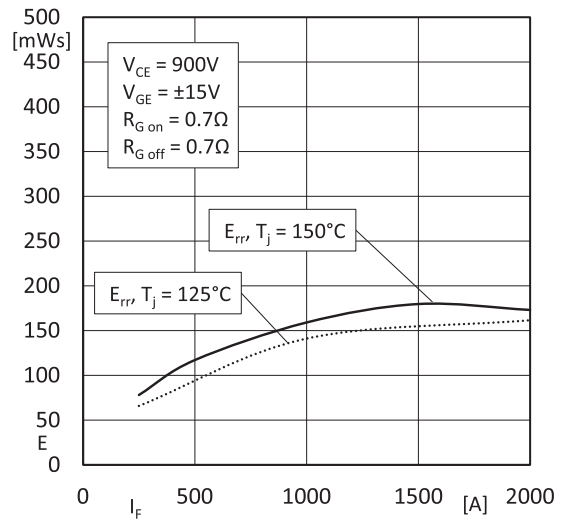


Fig. 8: Switching losses Diode (typical); $E = f(I_F)$

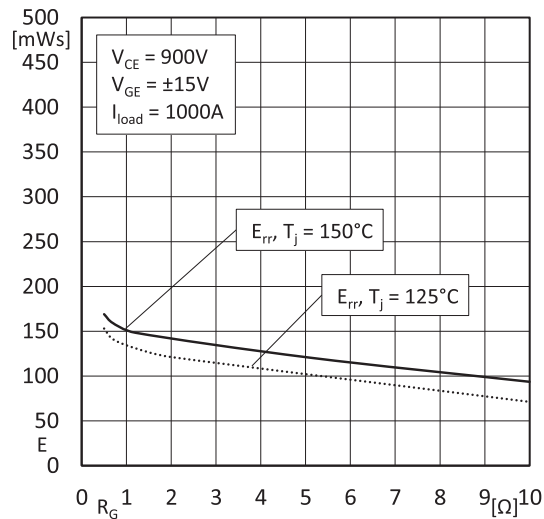


Fig. 9: Switching losses Diode (typical); $E = f(R_G)$

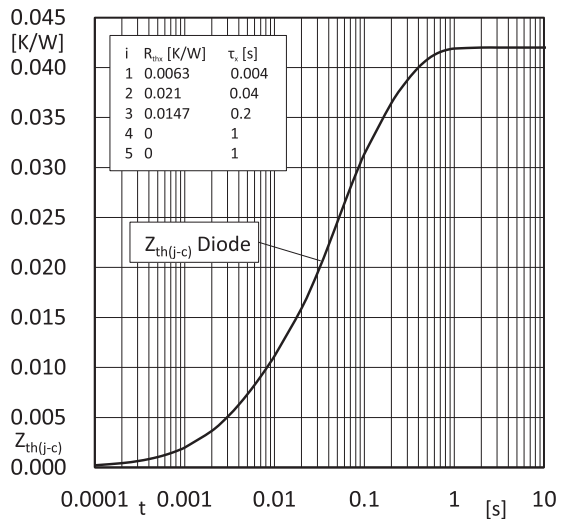


Fig. 10: Transient thermal impedance Diode

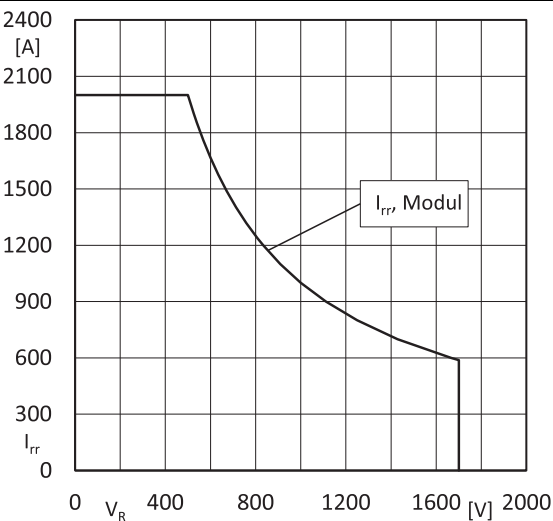


Fig. 11: RBSOA Diode

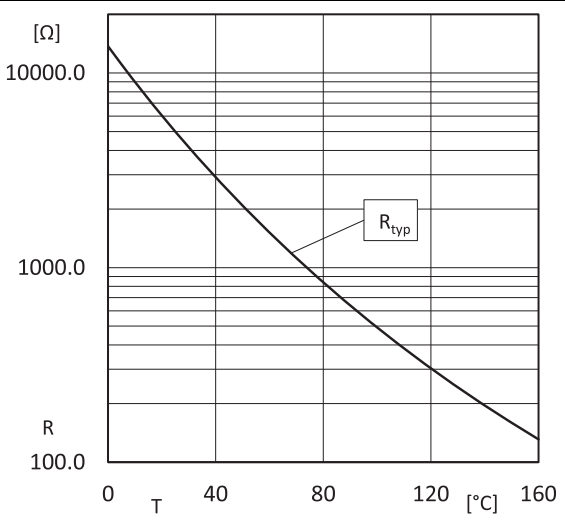


Fig. 12: NTC characteristics (typical)

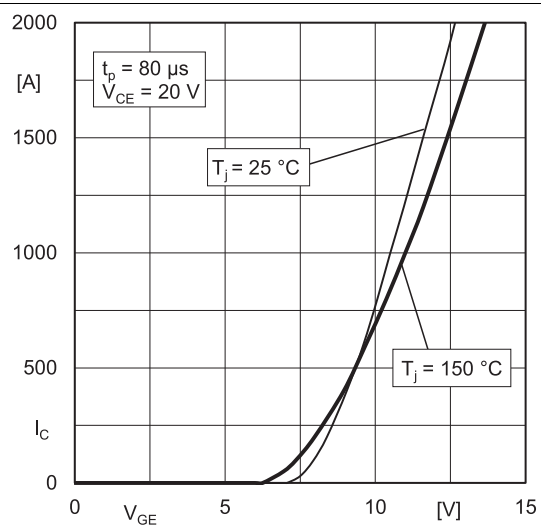


Fig. 13: Typ. transfer characteristic

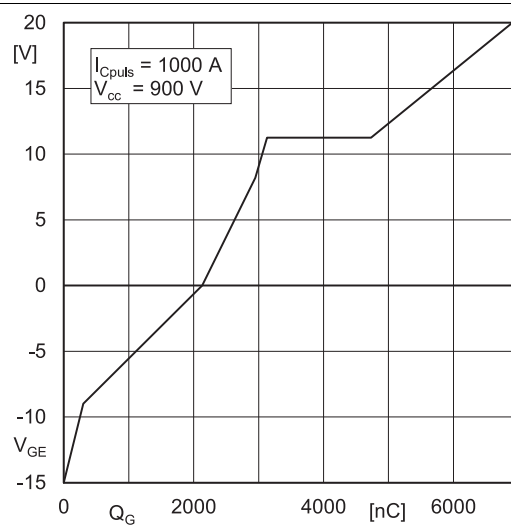
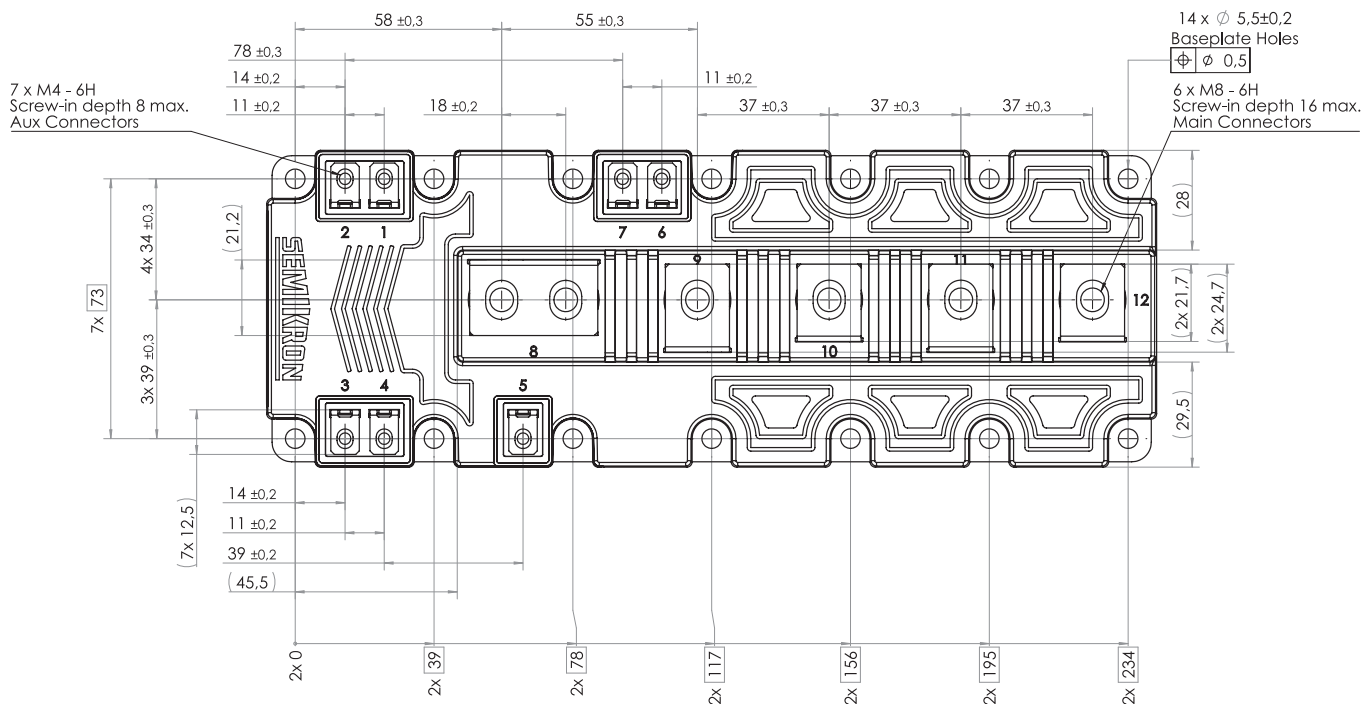
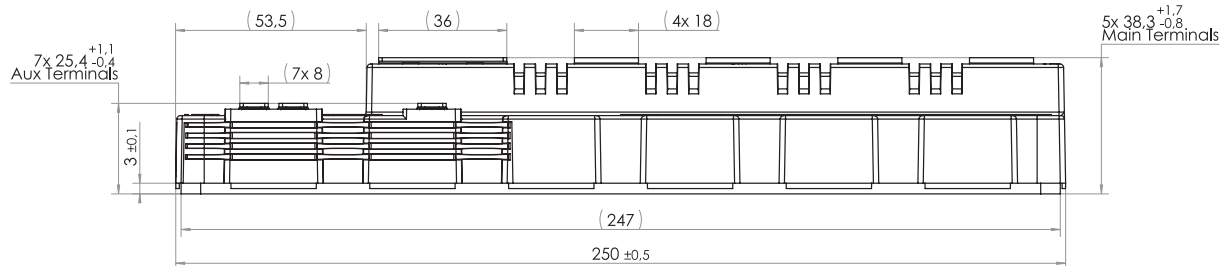
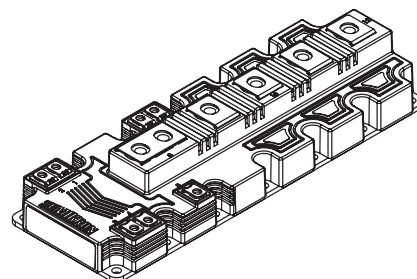
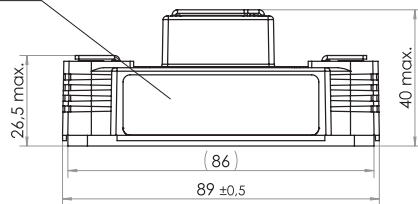


Fig. 14: Typ. gate charge characteristic

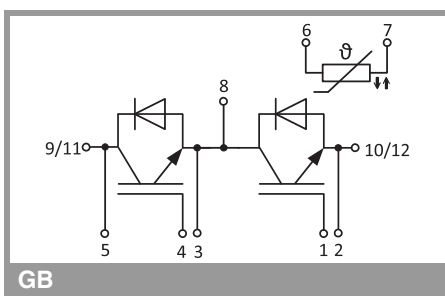
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Module label



- Dimensions in mm
- General tolerances ± 0.5 mm

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This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, chapter IX.

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