



SEMITRANS® 3

Trench IGBT Modules

SKM 600GB066D

Features

- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_C$

Typical Applications*

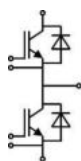
- AC inverter drives
- UPS
- Electronic welders

Remarks

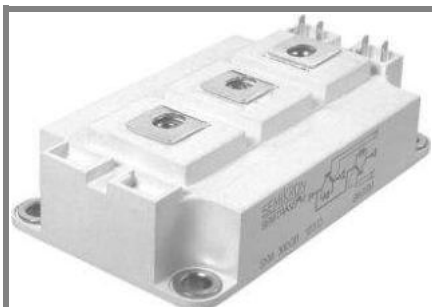
- Case temp. limited. to $T = 125^\circ\text{C}$, recomm. $T_{op} = -40 \dots +150^\circ\text{C}$, product rel. results valid for $T_{j \leq 150^\circ\text{C}}$
- SC data: $t_p \leq 6 \text{ s}$; $V_{GE} \leq 15\text{V}$; $T_j = 150^\circ\text{C}$; $V_{CC} \leq 360\text{V}$, use of soft R_G necessary !
- Take care of over-voltage caused by stray induct.
- $I_{DC} \leq 500\text{A}$ for $T_{Terminal} = 100^\circ\text{C}$

Absolute Maximum Ratings			T _{case} = 25°C, unless otherwise specified	
Symbol	Conditions		Values	Units
IGBT				
V _{CES}	T _j = 25 °C		600	V
I _C	T _j = 175 °C	T _c = 25 °C	760	A
		T _c = 80 °C	570	A
I _{CRM}	I _{CRM} =1,33xI _{Cnom}		800	A
V _{GES}			±20	V
t _{psc}	V _{CC} = 360 V; V _{GE} ≤ 15 V; T _j = 150 °C V _{CES} < 600 V		6	s
Inverse Diode				
I _F	T _j = 175 °C	T _c = 25 °C	700	A
		T _c = 80 °C	510	A
I _{FRM}	I _{FRM} =1,33xI _{Fnom}		800	A
Module				
I _{t(RMS)}			500	A
T _{vj}			- 40 + 175	°C
T _{stg}			- 40 + 125	°C
V _{isol}	AC, 1 min.		4000	V

Characteristics			T _{case} = 25°C, unless otherwise specified			
Symbol	Conditions		min.	typ.	max.	Units
IGBT						
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 9,6 mA		5	5,8	6,5	V
I _{CES}	V _{GE} = 0 V, V _{CE} = V _{CES} T _j = 25 °C			0,3	0,9	mA
V _{CE0}	T _j = 25 °C			0,9	1	V
	T _j = 150 °C			0,85	0,9	V
r _{CE}	V _{GE} = 15 V T _j = 25°C			0,9	1,5	mΩ
	T _j = 150°C			1,4	2	mΩ
V _{CE(sat)}	I _{Cnom} = 600 A, V _{GE} = 15 V T _j = 25°C _{chiplev.}			1,45	1,9	V
	T _j = 150°C _{chiplev.}			1,7	2,1	V
C _{ies}	V _{CE} = 25, V _{GE} = 0 V f = 1 MHz			37		nF
C _{oes}				2,3		nF
C _{res}				1,1		nF
Q _G	V _{GE} = -8V...+15V			4400		nC
R _{Gint}	T _j = °C			0,5		Ω
t _{d(on)}	R _{Gon} = 1,5 Ω	V _{CC} = 300V I _C = 600A		270		ns
t _r				77		ns
E _{on}	R _{Goff} = 1,5 Ω	T _j = 150 °C V _{GE} = -8V/+15V		7,5		mJ
t _{d(off)}				670		ns
t _f				77		ns
E _{off}				29,5		mJ
R _{th(j-c)}	per IGBT				0,08	K/W



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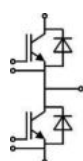
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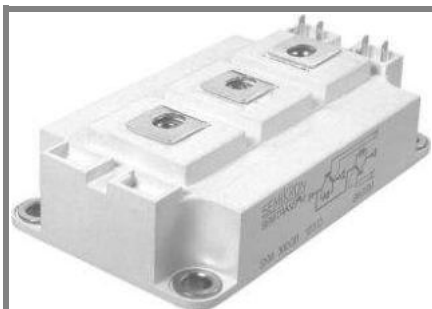
Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 600 \text{ A}$; $V_{GE} = 0 \text{ V}$ $T_j = 25^\circ\text{C}_{chiplev.}$		1,4	1,6	V
V_{F0}	$T_j = 25^\circ\text{C}$		0,95	1	V
r_F	$T_j = 25^\circ\text{C}$		0,8	1	mΩ
I_{RRM}	$I_F = 600 \text{ A}$ $T_j = 150^\circ\text{C}$		580		A
Q_{rr}	$di/dt = 8600 \text{ A/s}$		105		C
E_{rr}	$V_{GE} = -8 \text{ V}$; $V_{CC} = 300 \text{ V}$		25		mJ
$R_{th(j-c)D}$	per diode			0,125	K/W
Module					
L_{CE}			15	20	nH
$R_{CC'+EE'}$	res., terminal-chip $T_{case} = 25^\circ\text{C}$		0,35		mΩ
	$T_{case} = 125^\circ\text{C}$		0,5		mΩ
$R_{th(c-s)}$	per module			0,038	K/W
M_s	to heat sink M6	3		5	Nm
M_t	to terminals M6	2,5		5	Nm
w				325	g

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

* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.



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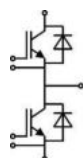
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Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	$i = 1$	48,4	mk/W
R_i	$i = 2$	19,5	mk/W
R_i	$i = 3$	3,1	mk/W
R_i	$i = 4$	4	mk/W
τ_{ui}	$i = 1$	0,054	s
τ_{ui}	$i = 2$	0,0144	s
τ_{ui}	$i = 3$	0,0012	s
τ_{ui}	$i = 4$	0,0026	s
$Z_{th(j-c)D}$			
R_i	$i = 1$	80	mk/W
R_i	$i = 2$	33	mk/W
R_i	$i = 3$	10,5	mk/W
R_i	$i = 4$	1,5	mk/W
τ_{ui}	$i = 1$	0,054	s
τ_{ui}	$i = 2$	0,01	s
τ_{ui}	$i = 3$	0,0007	s
τ_{ui}	$i = 4$	0,0019	s



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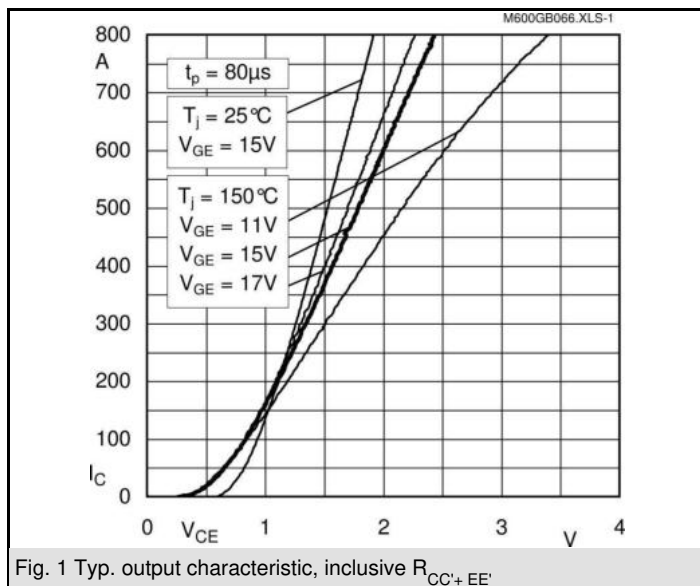


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

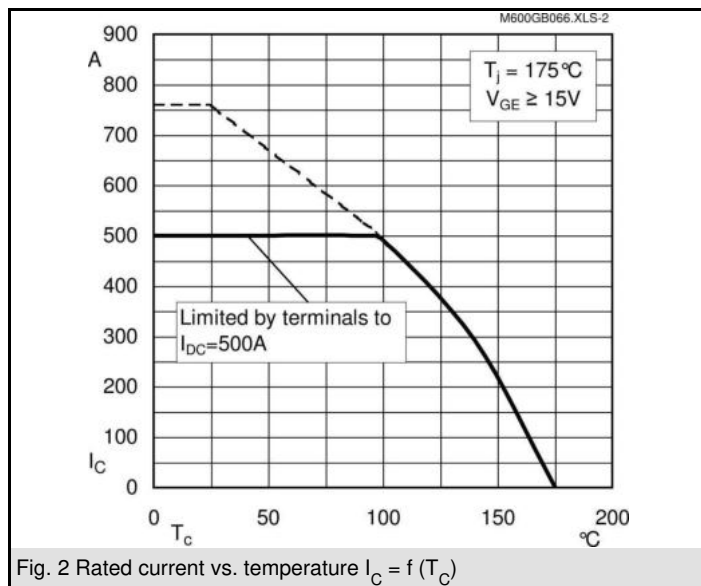


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

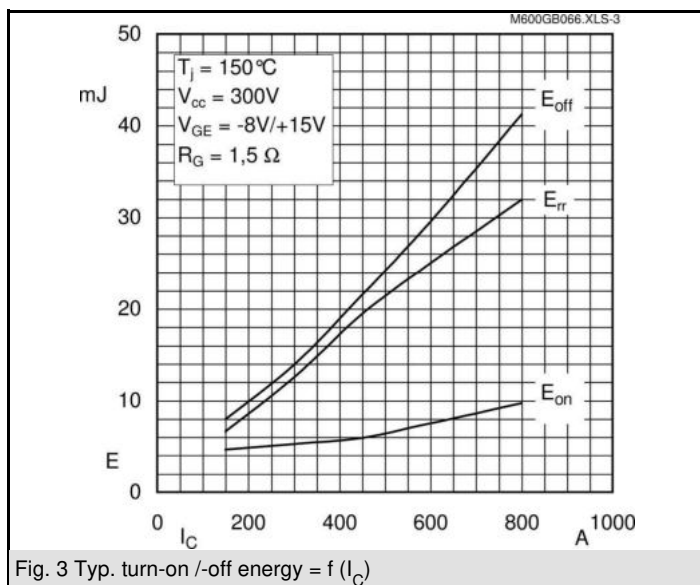


Fig. 3 Typ. turn-on /-off energy = $f(I_C)$

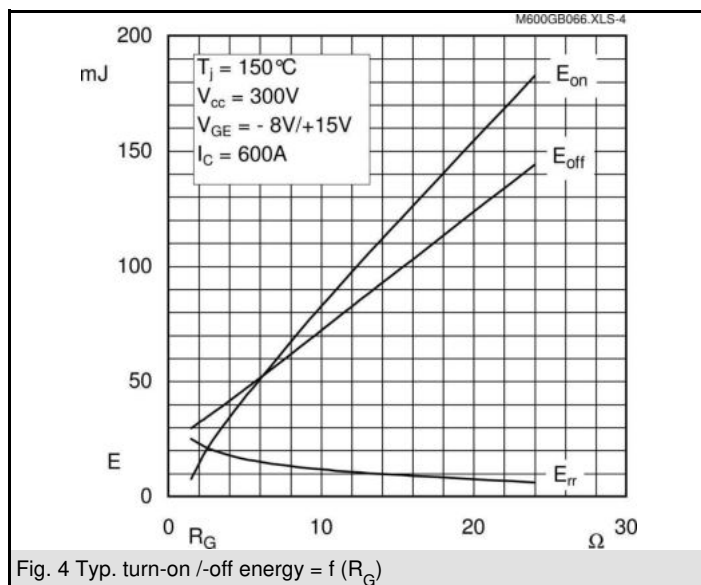


Fig. 4 Typ. turn-on /-off energy = $f(R_G)$

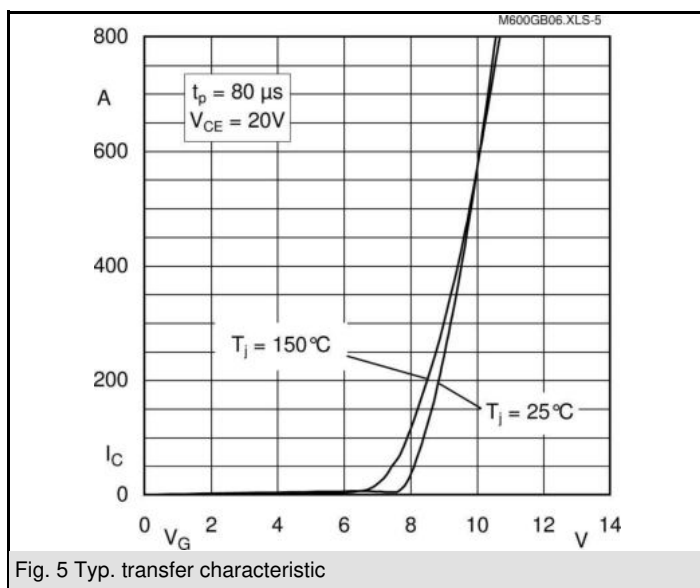


Fig. 5 Typ. transfer characteristic

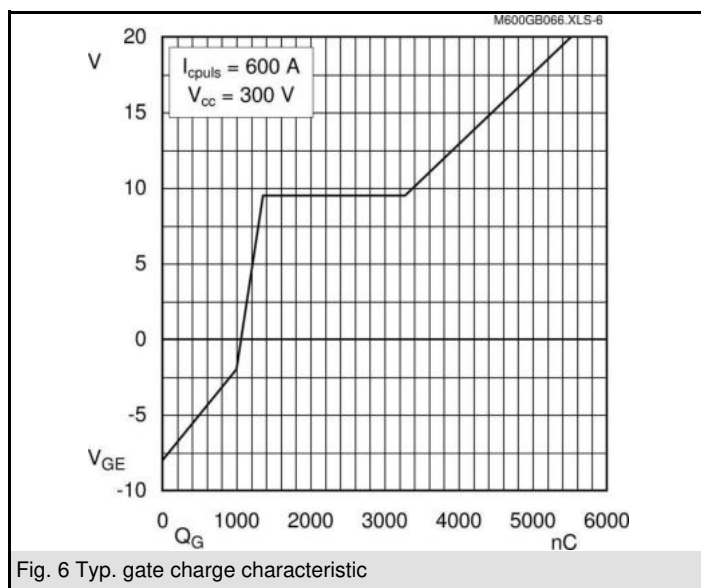
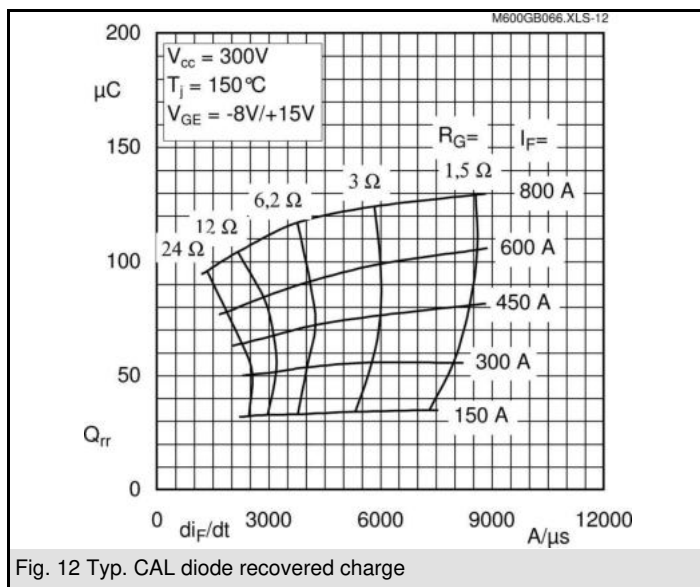
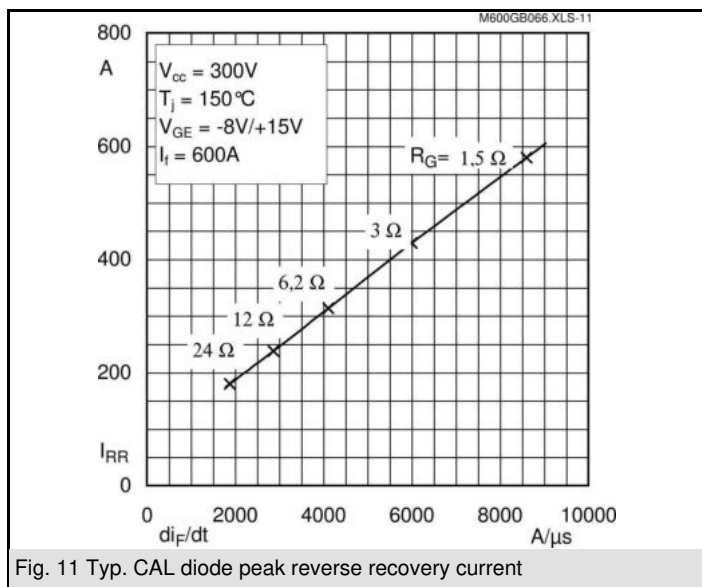
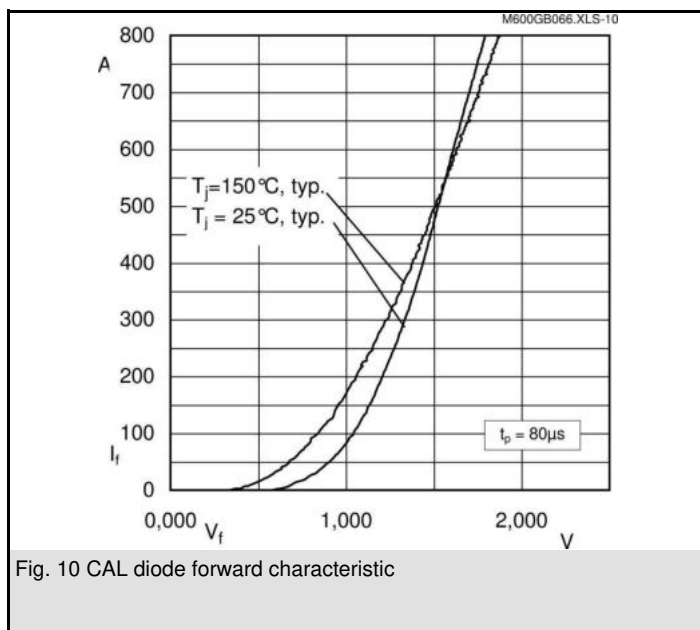
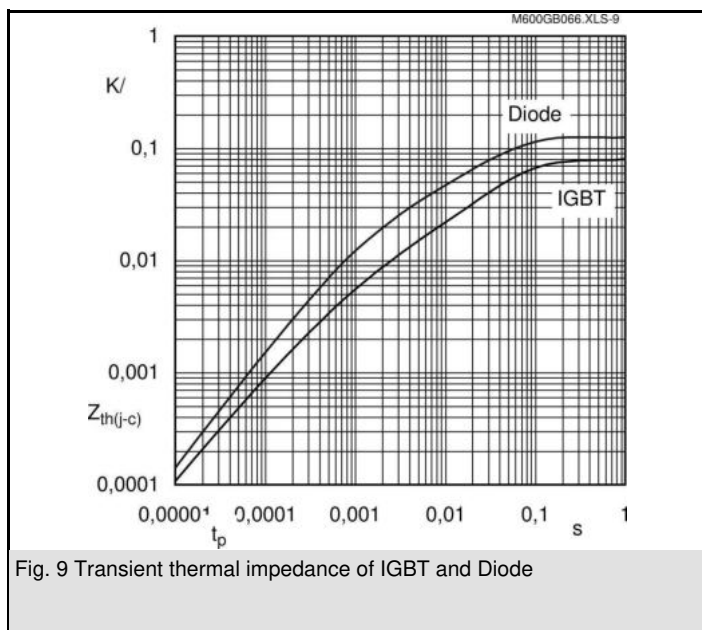
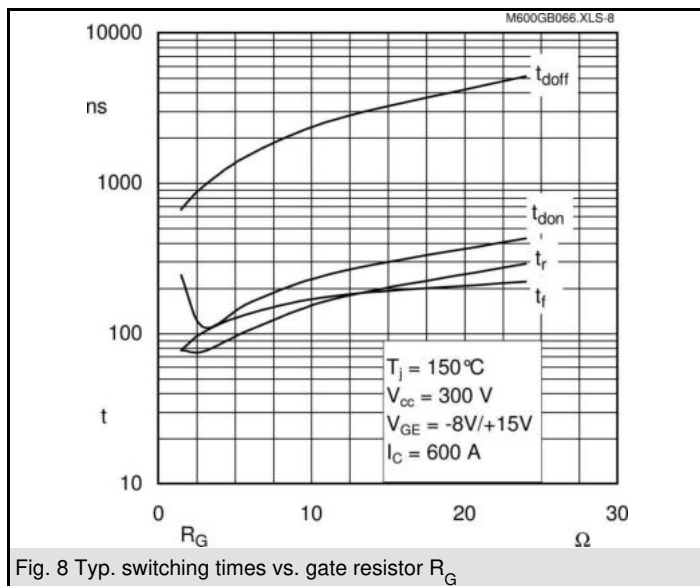
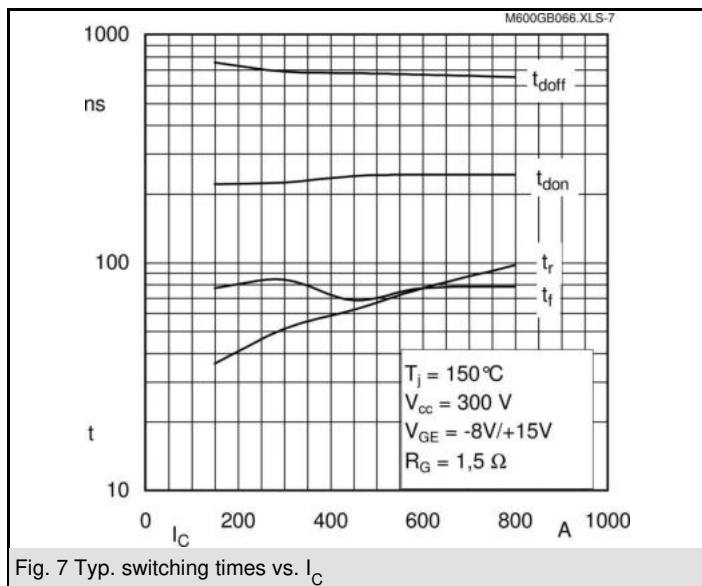


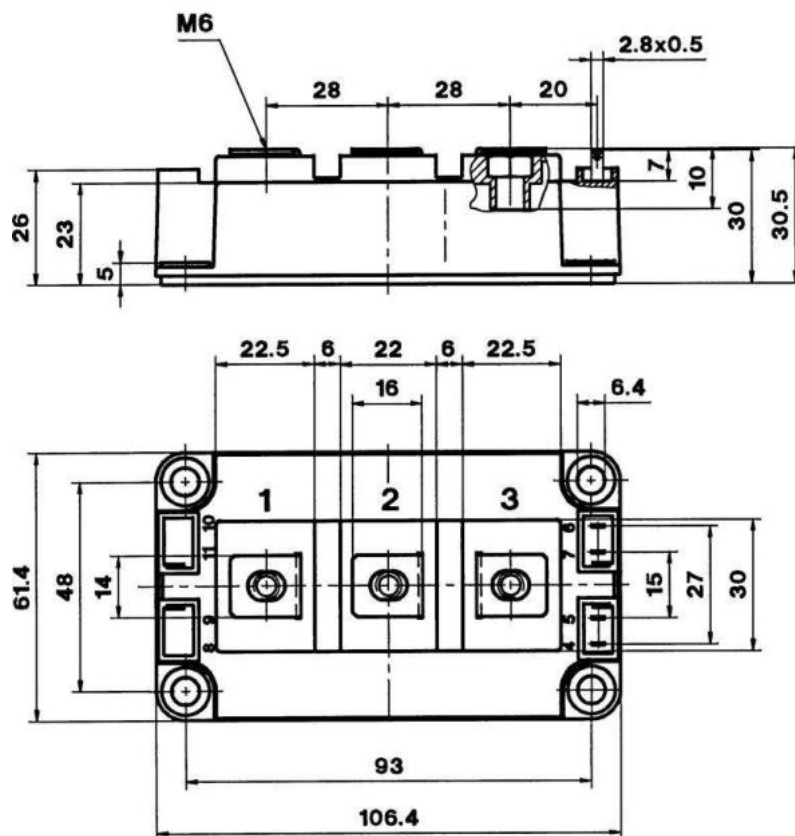
Fig. 6 Typ. gate charge characteristic



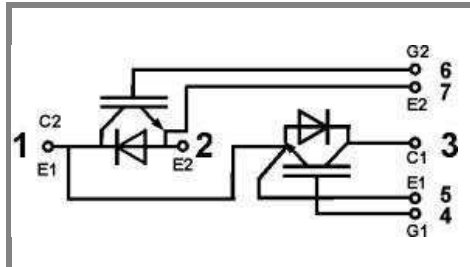
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