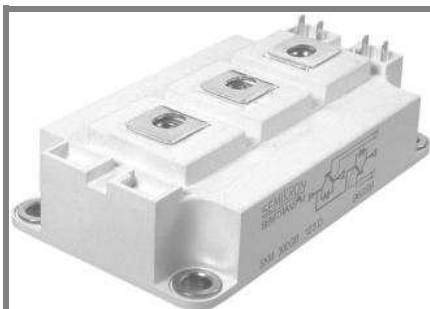




SEMITRANS® 3

Trench IGBT Modules

SKM 300GB066D

Features

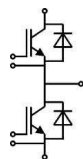
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_C$

Typical Applications*

- AC inverter drives
- UPS
- Electronic welders

Remarks

- Case temperature limited to $T_C = 125^\circ\text{C}$ max, recommended $T_{op} = -40 \dots +150^\circ\text{C}$
- Product reliability results are valid for $T_j \leq 150^\circ\text{C}$
- Short circuit 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 inductances

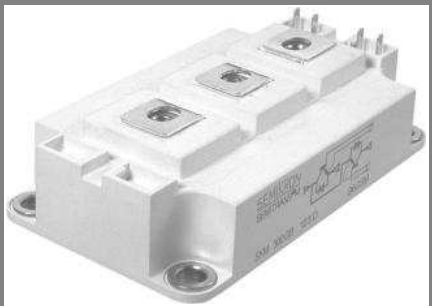


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Absolute Maximum Ratings		T _{case} = 25°C, unless otherwise specified		
Symbol	Conditions		Values	Units
IGBT				
V _{CES}	T _j = 25 °C		600	V
I _C	T _j = 175 °C	T _c = 25 °C	390	A
		T _c = 80 °C	300	A
I _{CRM}	I _{CRM} =2xI _{Cnom}		600	A
V _{GES}			± 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	350	A
		T _c = 80 °C	250	A
I _{FRM}	I _{FRM} =2xI _{Fnom}		600	A
I _{FSM}	t _p = 10 ms; sin. T _j = 175 °C		1760	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 = 4,8 mA	5	5,8	6,5	V	
I _{CES}	V _{GE} = 0 V, V _{CE} = V _{CES} T _j = 25 °C		0,15	0,45	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	1,8	3	mΩ
			T _j = 150°C	2,7	3,8	mΩ
V _{CE(sat)}	I _{Cnom} = 300 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		18,5		nF	
C _{oes}			1,2		nF	
C _{res}			0,55		nF	
Q _G	V _{GE} = -8V...+15V		2400		nC	
R _{Gint}	T _j = °C		1		Ω	
t _{d(on)}	R _{Gon} = 2,4 Ω	V _{CC} = 300V I _C = 300A T _j = 150 °C V _{GE} = -8V/+15V	150		ns	
t _r			48		ns	
E _{on}	7,5			mJ		
t _{d(off)}	540			ns		
t _f	53			ns		
E _{off}	11,5			mJ		
R _{th(j-c)}	per IGBT			0,15	K/W	

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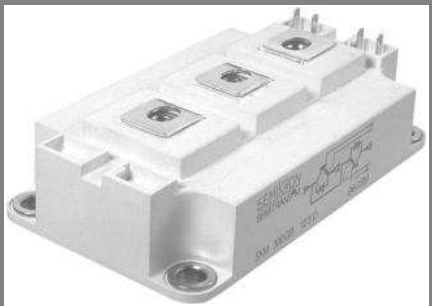
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Units
Inverse Diode						
V _F = V _{EC}	I _{Fnom} = 300 A; V _{GE} = 0 V	T _j = 25 °C _{chiplev.}		1,4	1,6	V
V _{F0}		T _j = 25 °C		0,95	1	V
r _F		T _j = 25 °C		1,5	2	mΩ
I _{RRM}	I _F = 300 A	T _j = 150 °C		340		A
Q _{rr}	di/dt = 7000 A/ s			47		C
E _{rr}	V _{GE} = -8 V; V _{CC} = 300 V			10,5		mJ
R _{th(j-c)D}	per diode				0,25	K/W
Module						
L _{CE}				15	20	nH
R _{CC'+EE'}	res., terminal-chip	T _{case} = 25 °C		0,35		mΩ
		T _{case} = 125 °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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Z_{th}	Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$				
	R_i	$i = 1$	107	mk/W
	R_i	$i = 2$	30	mk/W
	R_i	$i = 3$	11,6	mk/W
	R_i	$i = 4$	1,4	mk/W
	τ_{ui}	$i = 1$	0,054	s
	τ_{ui}	$i = 2$	0,0144	s
	τ_{ui}	$i = 3$	0,0007	s
	τ_{ui}	$i = 4$	0,0004	s
$Z_{th(j-c)D}$				
	R_i	$i = 1$	140	mk/W
	R_i	$i = 2$	82	mk/W
	R_i	$i = 3$	23,5	mk/W
	R_i	$i = 4$	4,5	mk/W
	τ_{ui}	$i = 1$	0,054	s
	τ_{ui}	$i = 2$	0,01	s
	τ_{ui}	$i = 3$	0,0015	s
	τ_{ui}	$i = 4$	0,0002	s



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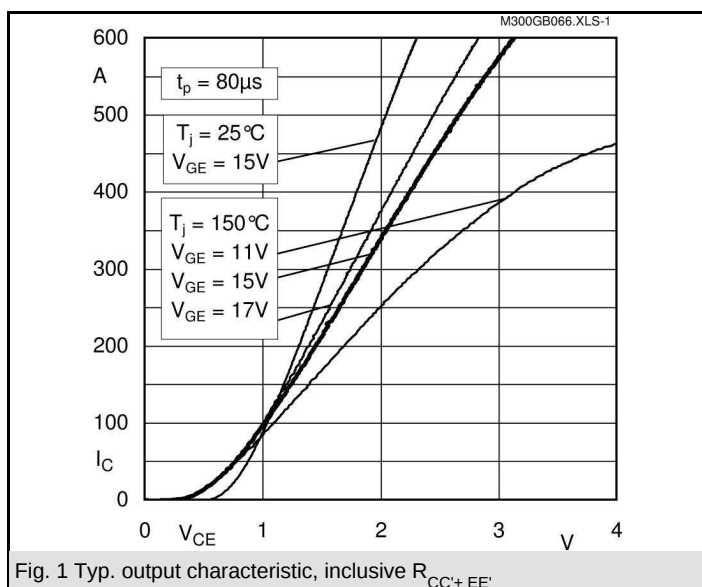


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

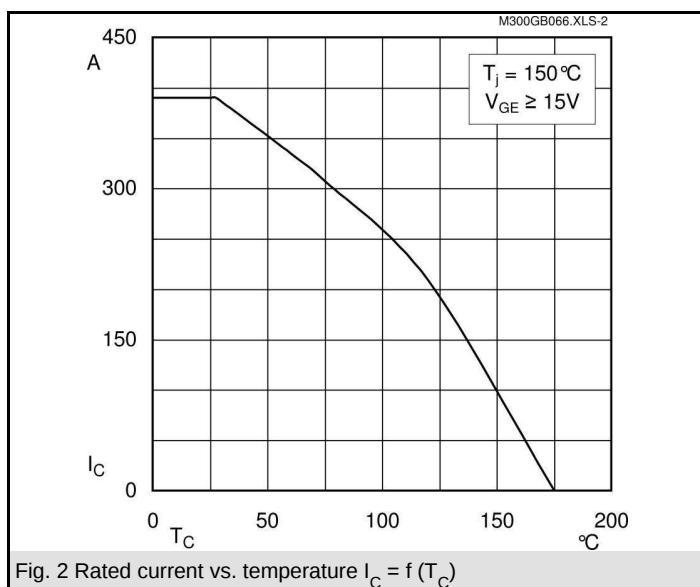


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

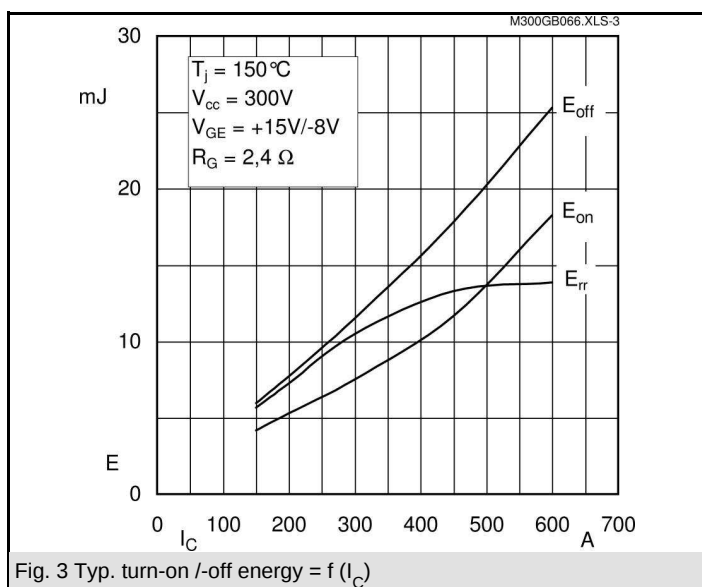


Fig. 3 Typ. turn-on /off energy = $f(I_C)$

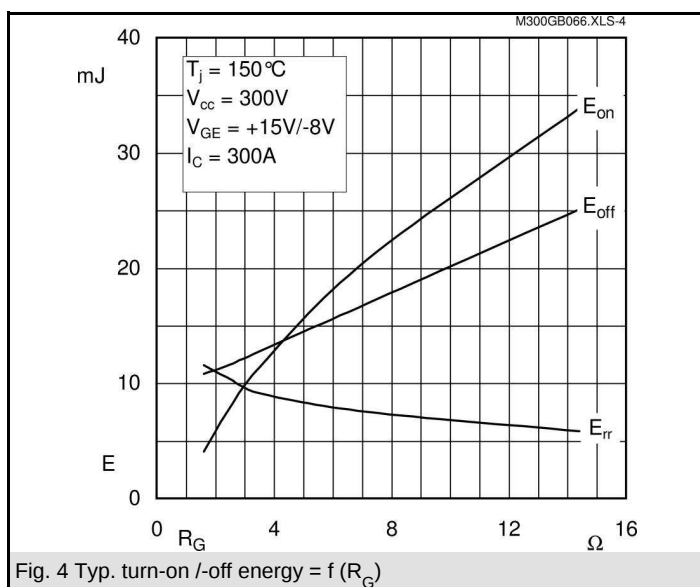


Fig. 4 Typ. turn-on /off energy = $f(R_G)$

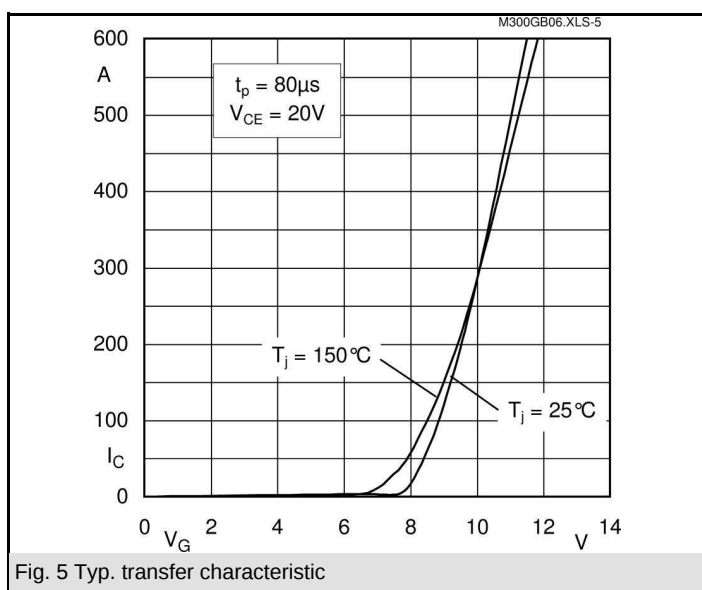


Fig. 5 Typ. transfer characteristic

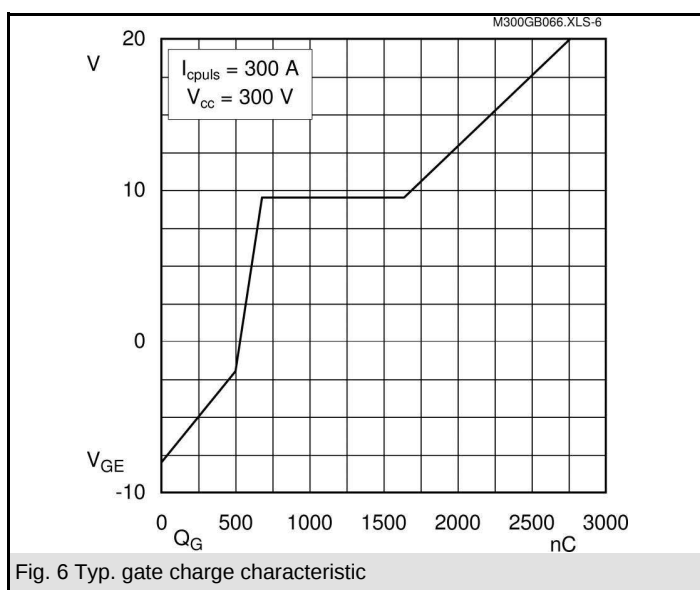
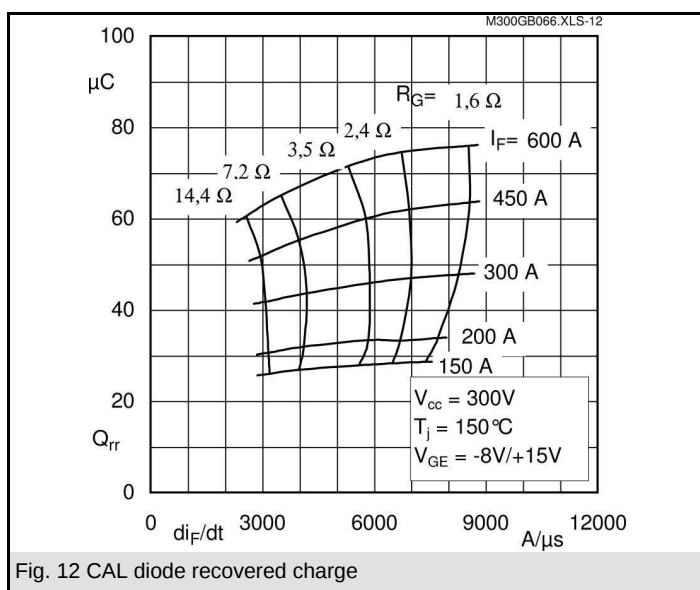
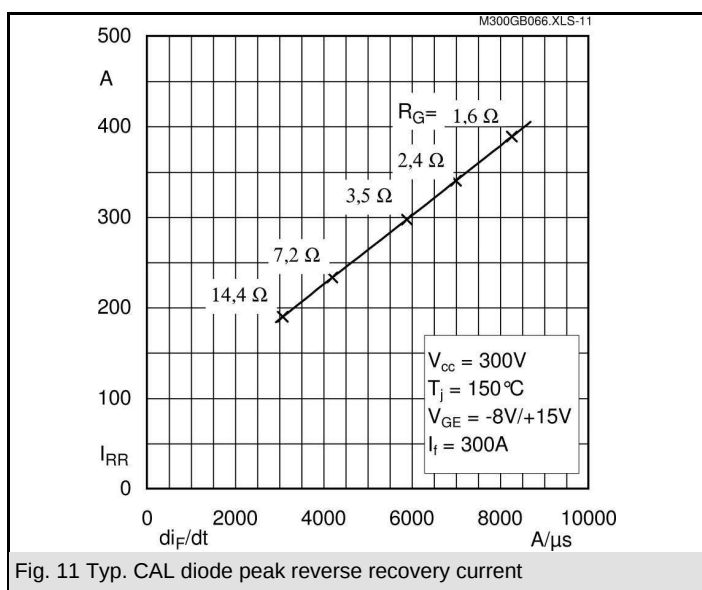
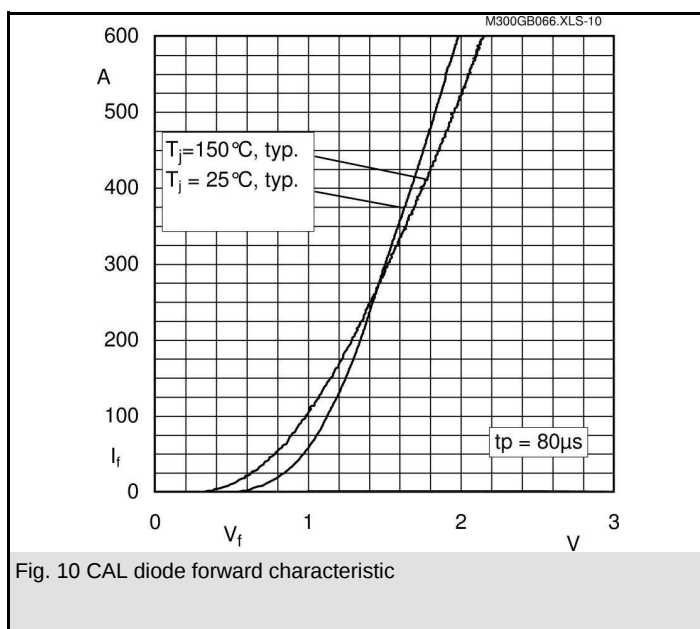
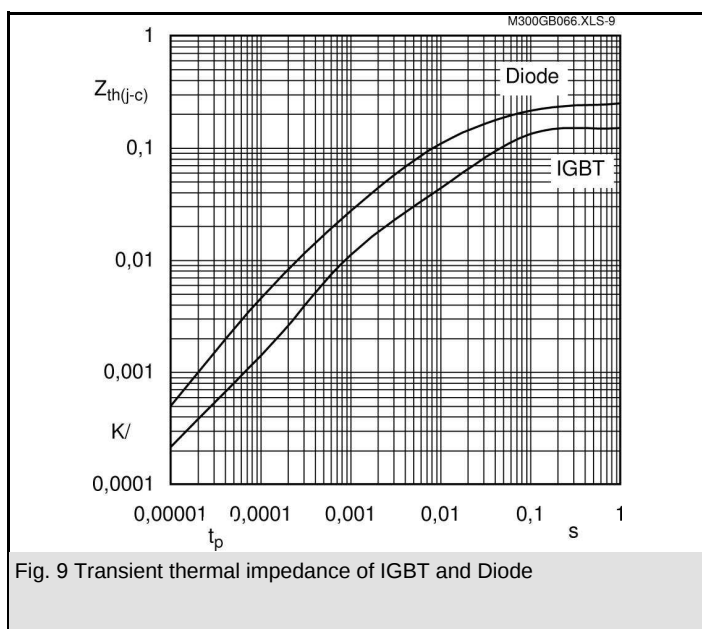
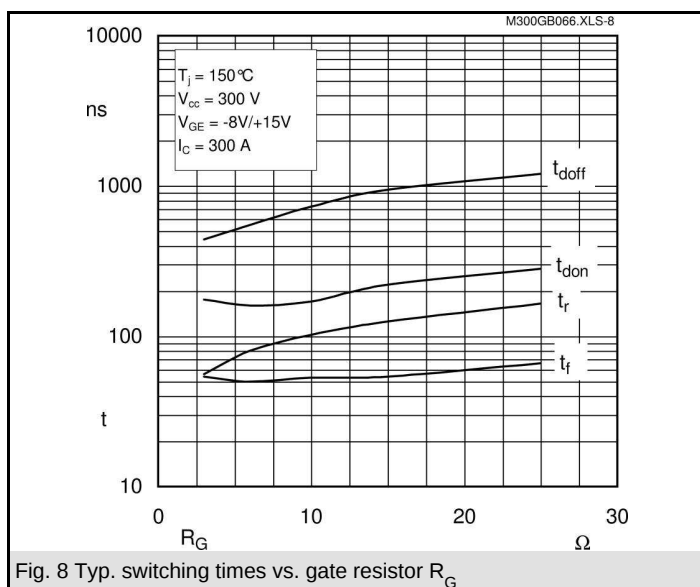
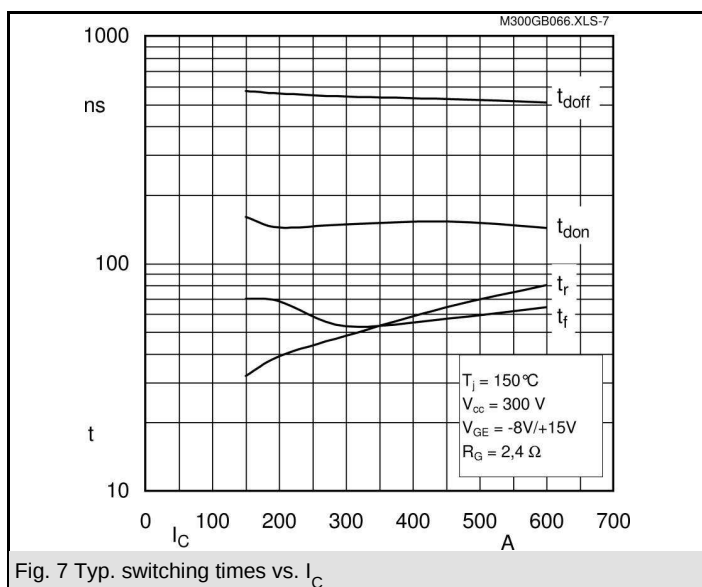


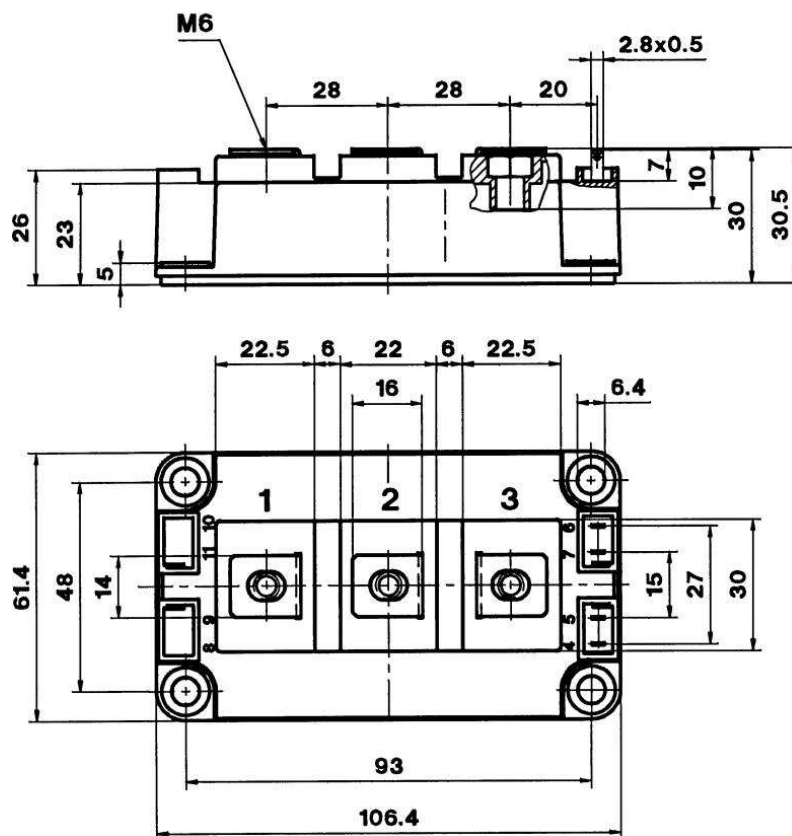
Fig. 6 Typ. gate charge characteristic



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Case D 56

