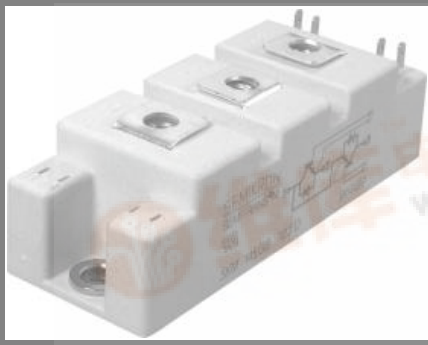


SKM 195GB066D



SEMITRANS[®] 2

Trench IGBT Modules

SKM195GB066D

SKM 195GAL066D

Preliminary Data

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

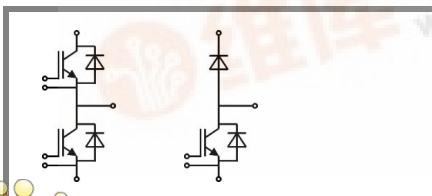
- AC inverter drives
- UPS
- Electronic welders

Remarks

- Case temperature limited to $T_c = 125^\circ\text{C}$ max., product rel. results valid for $T_j \leq 150^\circ\text{C}$
- SC data: Use of soft R_G necessary!
- Take care of over-voltage caused by stray induct.

Absolute Maximum Ratings		$T_{case} = 25^\circ\text{C}$, unless otherwise specified		
Symbol	Conditions	Values		Units
IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$	600		V
I_C	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	265	A
		$T_c = 80^\circ\text{C}$	200	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	400		A
V_{GES}		± 20		V
t_{psc}	$V_{CC} = 360\text{ V}; V_{GE} \leq 15\text{ V}; T_j = 150^\circ\text{C}$ $V_{CES} < 600\text{ V}$	6		μs
Inverse Diode				
I_F	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	200	A
		$T_c = 80^\circ\text{C}$	130	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	400		A
I_{FSM}	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 175^\circ\text{C}$	1400	A
Module				
$I_{t(RMS)}$		200		A
T_{vj}		- 40 ... + 175		$^\circ\text{C}$
T_{stg}		- 40 ... + 125		$^\circ\text{C}$
V_{isol}	AC, 1 min.	4000		V

Characteristics		$T_{case} = 25^\circ\text{C}$, unless otherwise specified				
Symbol	Conditions	min.	typ.	max.	Units	
IGBT						
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 3,2\text{ mA}$	5	5,8	6,5	V	
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$	$T_j = 25^\circ\text{C}$		0,13	0,38	mA
V_{CE0}		$T_j = 25^\circ\text{C}$		0,9	1	V
		$T_j = 150^\circ\text{C}$		0,85	0,9	V
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$		2,8	4,5	$\text{m}\Omega$
		$T_j = 150^\circ\text{C}$		4,3	6	$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 200\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$		1,45	1,9	V
		$T_j = 150^\circ\text{C}_{chiplev.}$		1,7	2,1	V
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$		12,3		nF
C_{oes}				0,77		nF
C_{res}				0,37		nF
Q_G	$V_{GE} = -8\text{V}...+15\text{V}$			1500		nC
R_{Gint}	$T_j = ^\circ\text{C}$			2		Ω
$t_{d(on)}$	$R_{Gon} = 3\ \Omega$	$V_{CC} = 300\text{V}$ $I_{Cnom} = 200\text{A}$			160	ns
t_r					68	ns
E_{on}					14	mJ
$t_{d(off)}$	$R_{Goff} = 3\ \Omega$	$T_j = 150^\circ\text{C}$ $V_{GE} = -8\text{V}/+15\text{V}$			520	ns
t_f					49	ns
E_{off}					8	mJ
$R_{th(j-c)}$	per IGBT			0,22		K/W



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Typical Applications

- AC inverter drives
- UPS
- Electronic welders

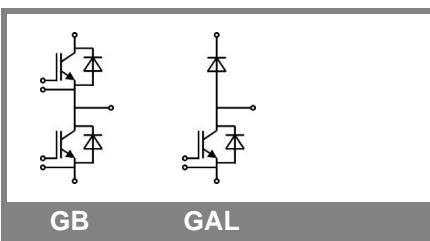
Remarks

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- SC data: Use of soft R_G necessary!
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Characteristics						
Symbol	Conditions	min.	typ.	max.	Units	
Inverse Diode						
$V_F = V_{EC}$	$I_{Fnom} = 200 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25^\circ\text{C}_{\text{chiplev.}}$		1,4	1,6	V
V_{F0}		$T_j = 25^\circ\text{C}$		0,95	1	V
r_F		$T_j = 25^\circ\text{C}$		2,3	3	mΩ
I_{RRM}	$I_{Fnom} = 200 \text{ A}$	$T_j = 150^\circ\text{C}$		100		A
Q_{rr}	$di/dt = 2000 \text{ A}/\mu\text{s}$			30		μC
E_{rr}	$V_{GE} = -8 \text{ V}; V_{CC} = 300 \text{ V}$			5,6		mJ
$R_{th(j-c)D}$	per diode				0,4	K/W
Module						
L_{CE}					30	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25^\circ\text{C}$		0,75		mΩ
		$T_{case} = 125^\circ\text{C}$		1		mΩ
$R_{th(c-s)}$	per module				0,05	K/W
M_s	to heat sink M6	3		5		Nm
M_t	to terminals M5	2,5		5		Nm
w					150	g

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

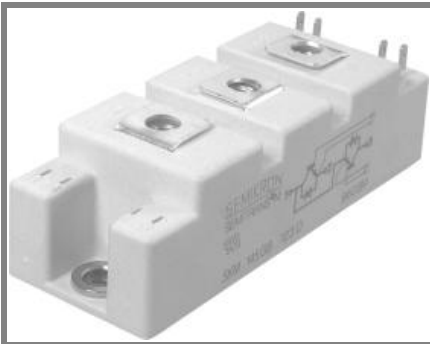
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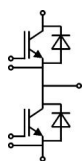
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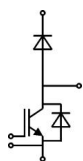
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Z_{th}		Values	Units
Symbol	Conditions		
$Z_{th(j-c)I}$			
R_i	$i = 1$	160	mk/W
R_i	$i = 2$	41	mk/W
R_i	$i = 3$	16	mk/W
R_i	$i = 4$	3	mk/W
τ_{u_i}	$i = 1$	0,0276	s
τ_{u_i}	$i = 2$	0,0406	s
τ_{u_i}	$i = 3$	0,001	s
τ_{u_i}	$i = 4$	0,0011	s
$Z_{th(j-c)D}$			
R_i	$i = 1$	250	mk/W
R_i	$i = 2$	110	mk/W
R_i	$i = 3$	35	mk/W
R_i	$i = 4$	5	mk/W
τ_{u_i}	$i = 1$	0,054	s
τ_{u_i}	$i = 2$	0,012	s
τ_{u_i}	$i = 3$	0,0015	s
τ_{u_i}	$i = 4$	0,0007	s

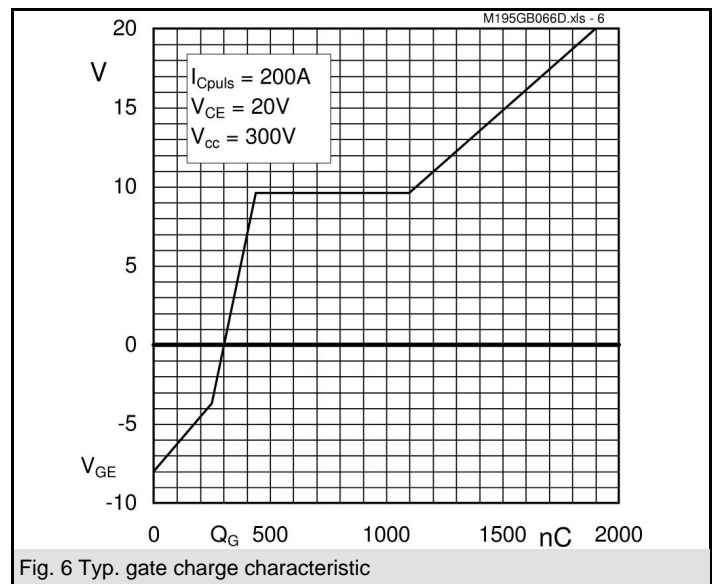
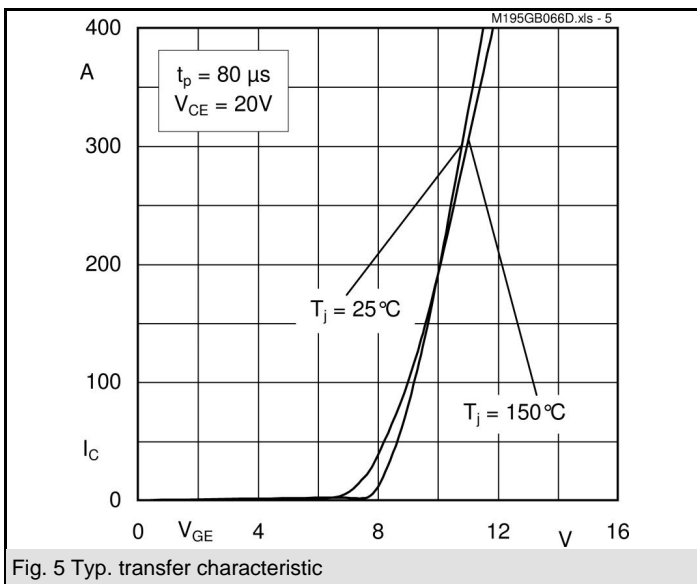
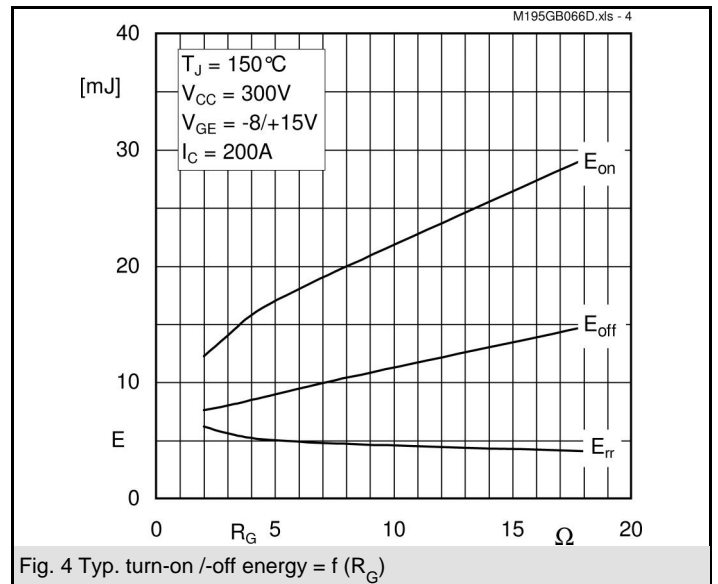
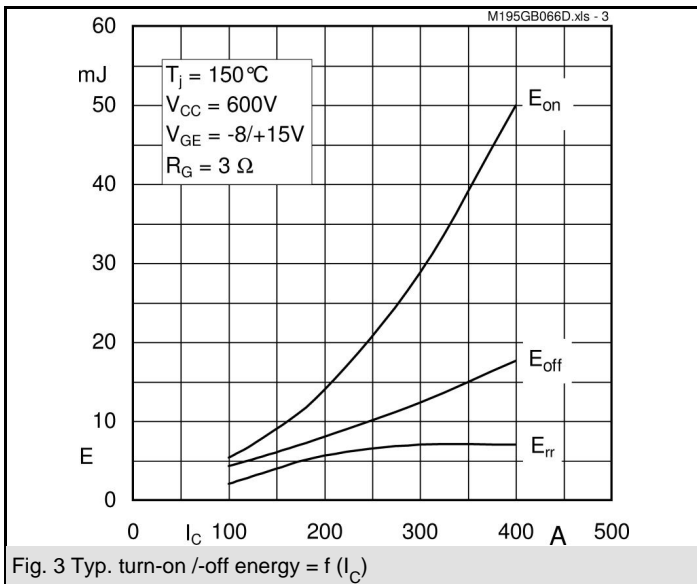
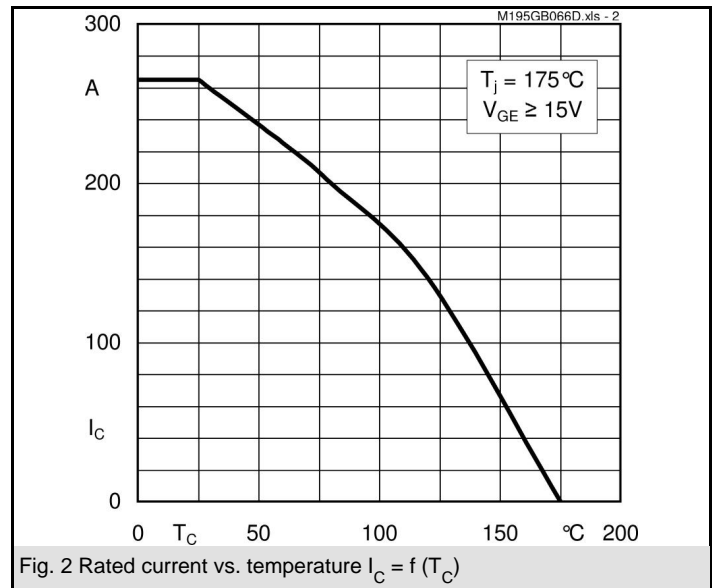
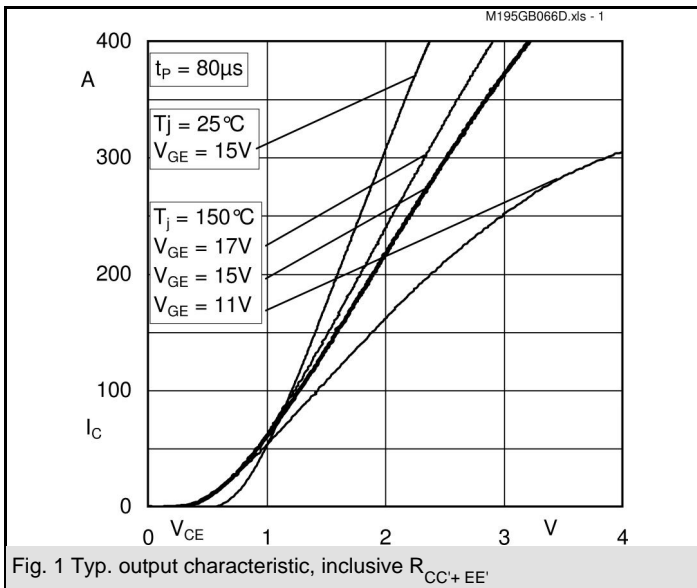


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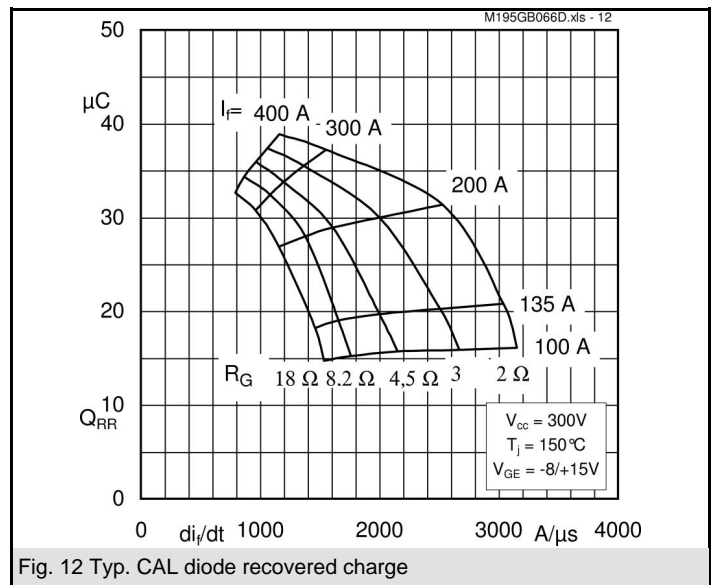
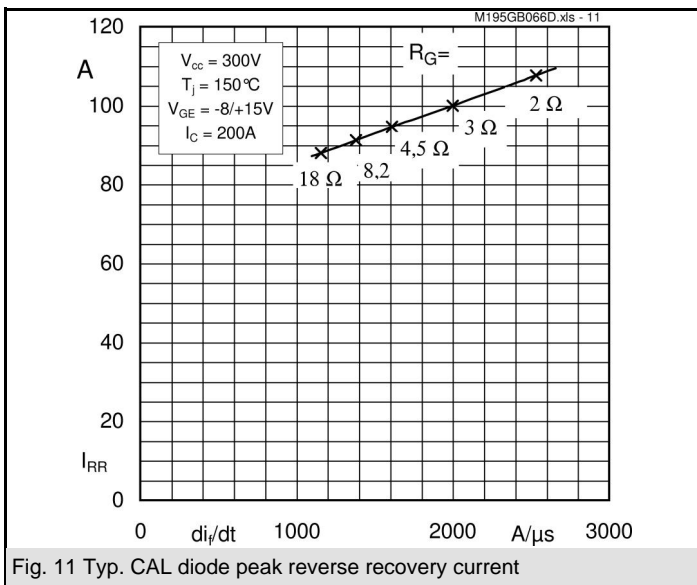
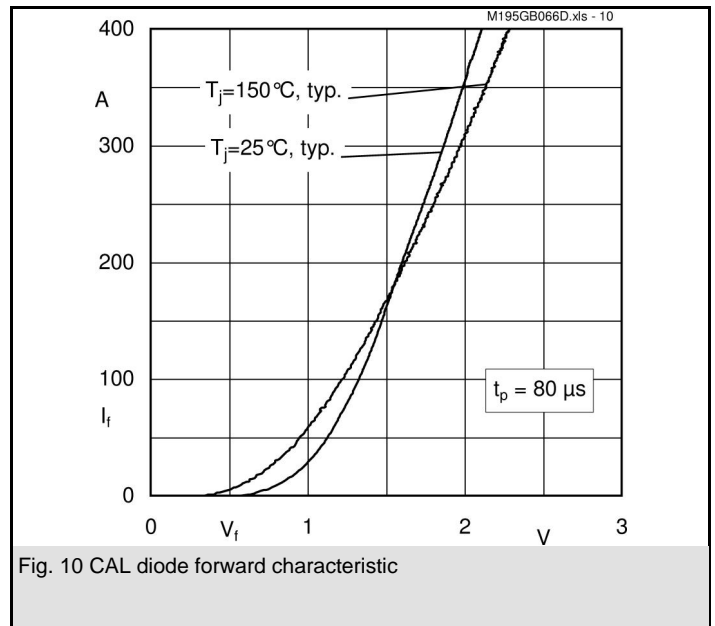
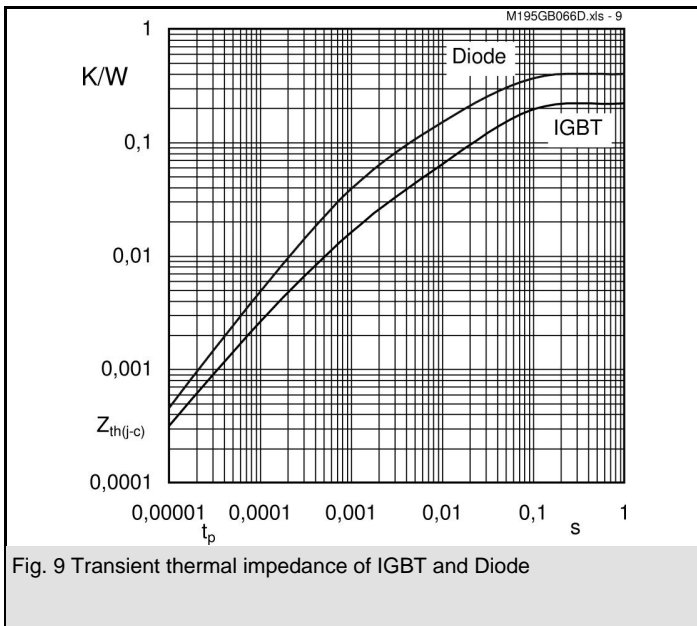
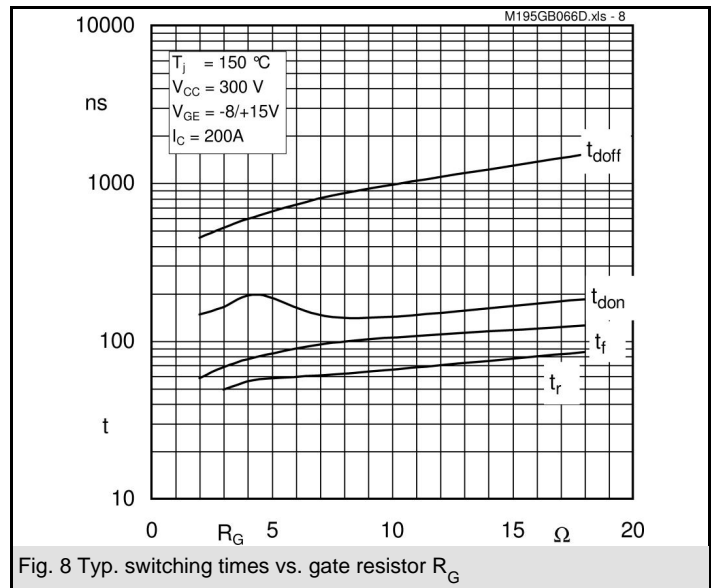
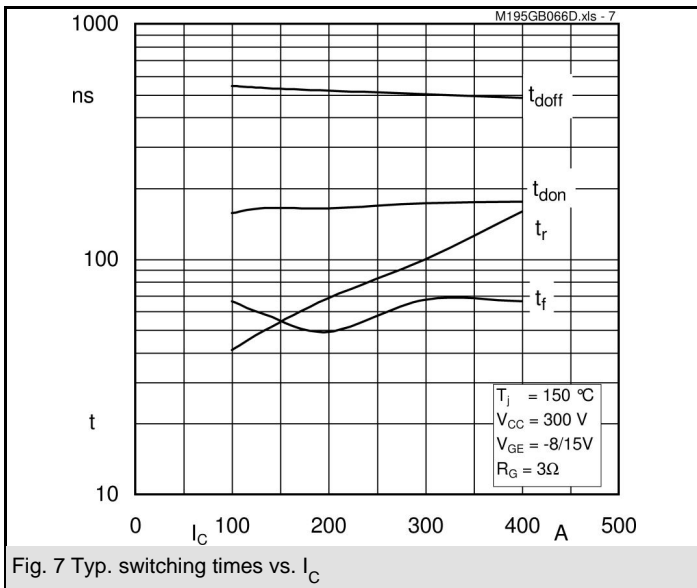


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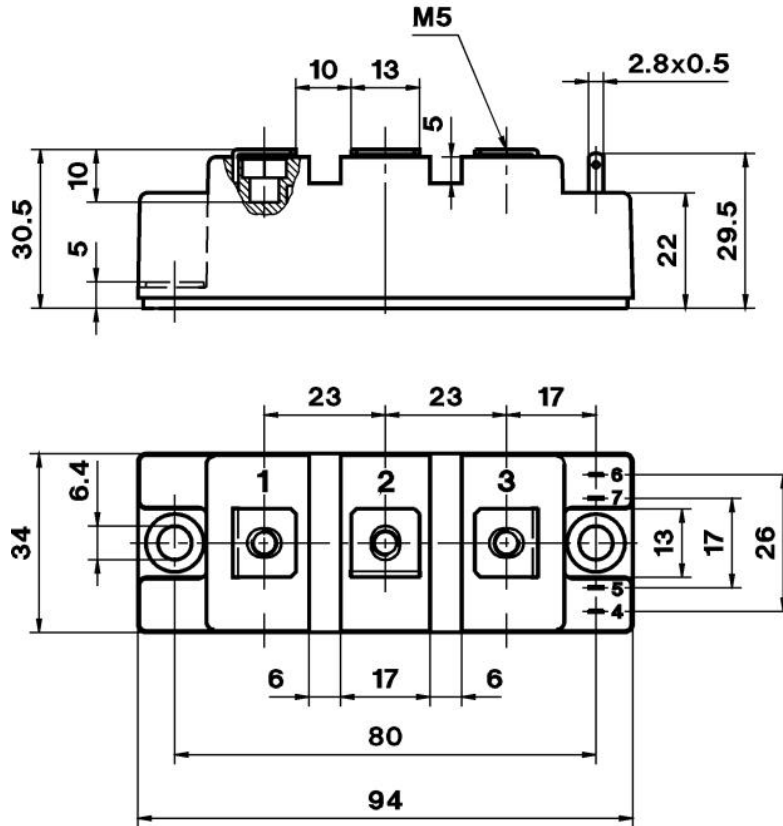


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Case D 61

