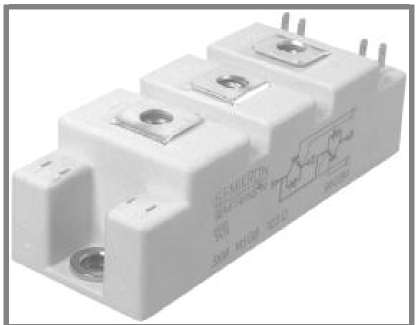


SEMITRANS® 2

Trench IGBT Modules

SKM 195GB126D

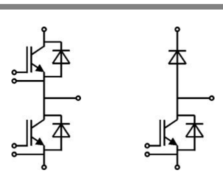
SKM 195GAL126D

Features

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

Typical Applications*

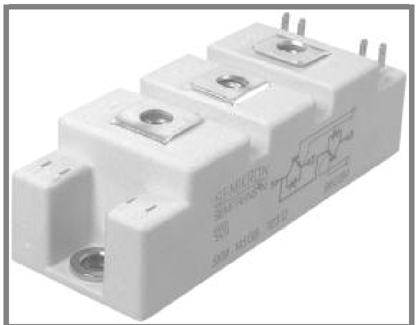
- AC inverter drives
- UPS
- Electronic welders



GB GAL

Absolute Maximum Ratings		T_{case} = 25°C, unless otherwise specified		
Symbol	**Conditions**		**Values**	**Units**
IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	T_j = 150 °C	T_c = 25 °C	220	A
		T_c = 80 °C	160	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		300	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 600 V; V_{GE} ≤ 20 V; VCES < 1200 V	T_j = 125 °C	10	µs
Inverse Diode				
I_F	T_j = 150 °C	T_c = 25 °C	170	A
		T_c = 80 °C	115	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		200	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	900	A
Freewheeling Diode				
I_F	T_j = 150 °C	T_c = 25 °C	170	A
		T_c = 80 °C	115	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		200	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	900	A
Module				
$I_{t(RMS)}$			200	A
T_{vj}			-40 ... +150	°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 = 6 mA		5	5,8	6,5	V
I_{CES}	V_{GE} = 0 V, V_{CE} = V_{CES}	T_j = 25 °C		0,1	0,3	mA
V_{CE0}		T_j = 25 °C		1	1,2	V
		T_j = 125 °C		0,9	1,1	V
r_{CE}	V_{GE} = 0 V	T_j = 25°C		4,7	6,3	mΩ
		T_j = 125°C		7,3	9	mΩ
$V_{CE(sat)}$	I_{Cnom} = 150 A, V_{GE} = 15 V	T_j = 25°C$_{chiplev.}$		1,7	2,15	V
		T_j = 125°C$_{chiplev.}$		2	2,45	V
C_{ies}				10,5		nF
C_{oes}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		0,9		nF
C_{res}				0,8		nF
Q_G	V_{GE} = -8V ...+20V			1380		nC
R_{Gint}	T_j = °C			5		Ω
$t_{d(on)}$		V_{CC} = 600V		280		ns
t_r	R_{Gon} = 2 Ω	I_C= 150A		50		ns
E_{on}		T_j = 125 °C		16		mJ
$t_{d(off)}$	R_{Goff} = 2 Ω	V_{GE} = ± 15V		560		ns
t_f				70		ns
E_{off}				24,5		mJ
$R_{th(j-c)}$	per IGBT				0,16	K/W



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SKM 195GB126D

SKM 195GAL126D

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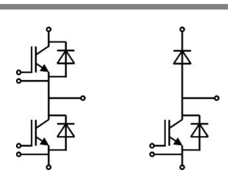

GB GAL

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 100 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		2	2,5	V
		T_j = 125 °$C_{chiplev.}$		1,8		V
V_{F0}		T_j = 25 °C		1,1	1,2	V
		T_j = 125 °C				V
r_F		T_j = 25 °C		9	13	mΩ
		T_j = 125 °C				mΩ
I_{RRM}	I_F = 150 A	T_j = 125 °C		86		A
Q_{rr}	di/dt = 2200 A/µs			17		µC
E_{rr}	V_{GE} = -15 V; V_{CC} = 600 V			5,8		mJ
$R_{th(j-c)D}$	per diode				0,32	K/W
Freewheeling diode						
$V_F = V_{EC}$	I_{Fnom} = 100 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		2	2,5	V
		T_j = 125 °$C_{chiplev.}$		1,8		V
V_{F0}		T_j = 25 °C		1,1	1,2	V
		T_j = 125 °C				V
r_F		T_j = 25 °C		9	13	V
		T_j = 125 °C				V
I_{RRM}	I_F = 150 A	T_j = 125 °C		86		A
Q_{rr}	di/dt = 2200 A/µs			17		µC
E_{rr}	V_{GE} = -15 V; V_{CC} = 600 V			5,8		mJ
$R_{th(j-c)FD}$	per diode				0,32	K/W
Module						
L_{CE}					30	nH
$R_{CC'+EE'}$	res., terminal-chip	T_{case}= 25 °C		0,75		mΩ
		T_{case}= 125 °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					160	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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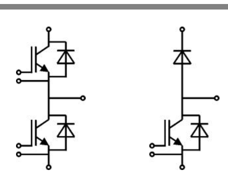

GB GAL

Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	i = 1	115	mk/W
R_i	i = 2	34	mk/W
R_i	i = 3	9	mk/W
R_i	i = 4	2	mk/W
tau_i	i = 1	0,0493	s
tau_i	i = 2	0,0174	s
tau_i	i = 3	0,0012	s
tau_i	i = 4	0,0002	s
$Z_{th(j-c)D}$			
R_i	i = 1	200	mk/W
R_i	i = 2	90	mk/W
R_i	i = 3	26	mk/W
R_i	i = 4	4	mk/W
tau_i	i = 1	0,054	s
tau_i	i = 2	0,0089	s
tau_i	i = 3	0,001	s
tau_i	i = 4	0,08	s

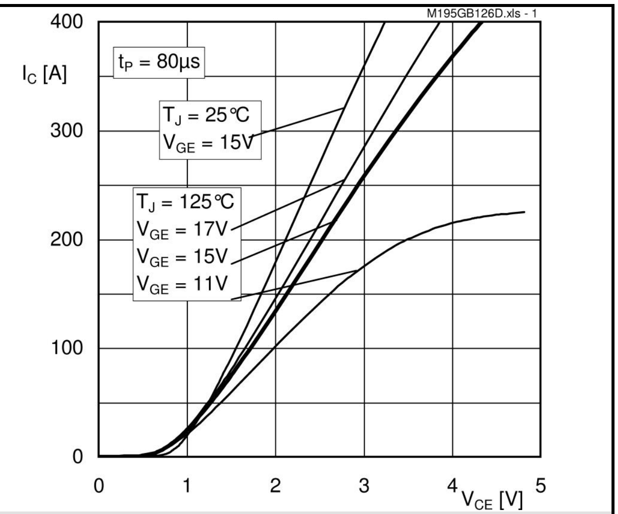

Fig. 1 Typ. output characteristic, inclusive $R_{CC'+ EE'}$

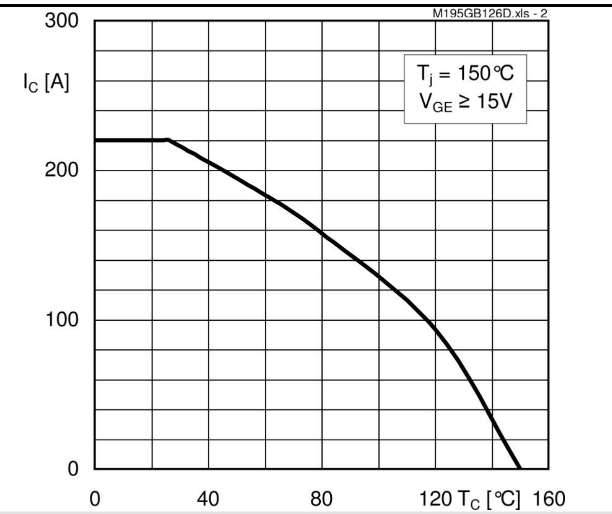

Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

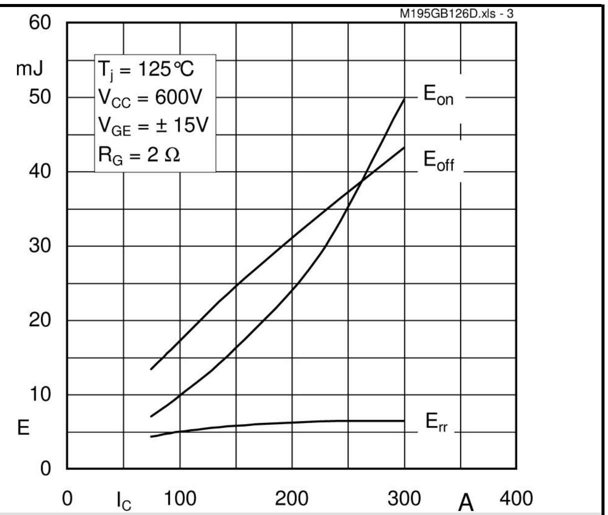

Fig. 3 Typ. turn-on /-off energy = f (I_C)

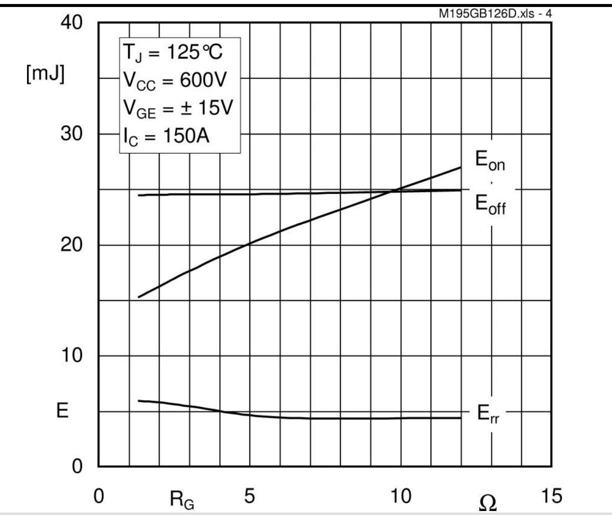

Fig. 4 Typ. turn-on /-off energy = f (R_G)

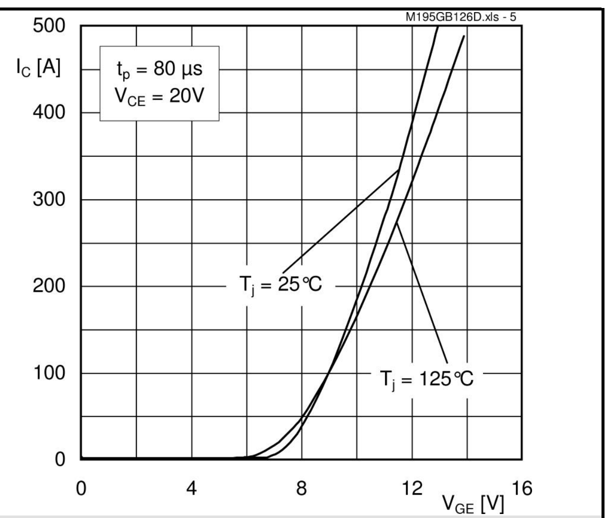

Fig. 5 Typ. transfer characteristic

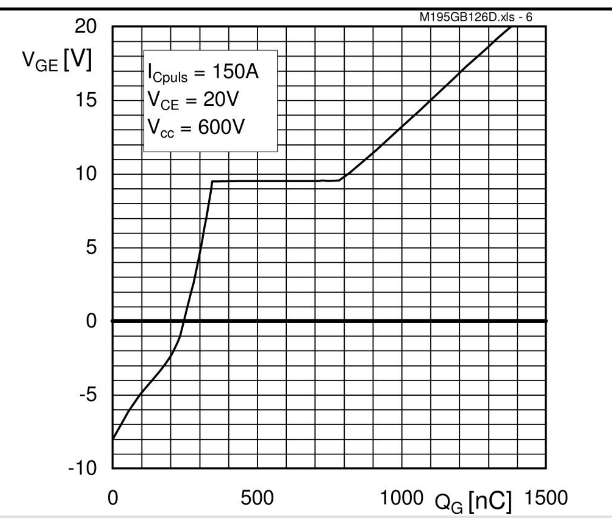

Fig. 6 Typ. gate charge characteristic

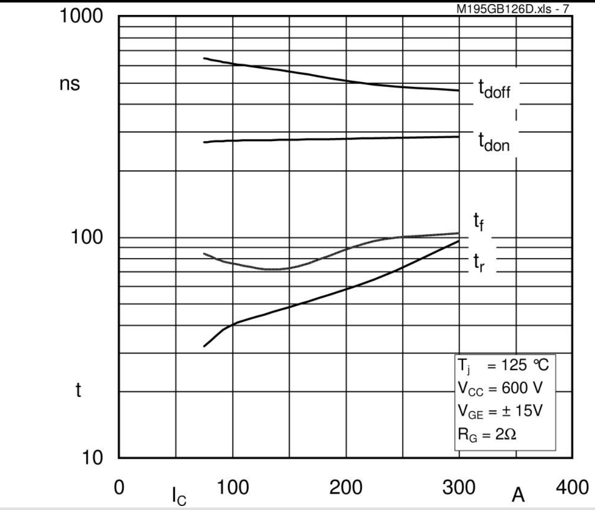

Fig. 7 Typ. switching times vs. I_C

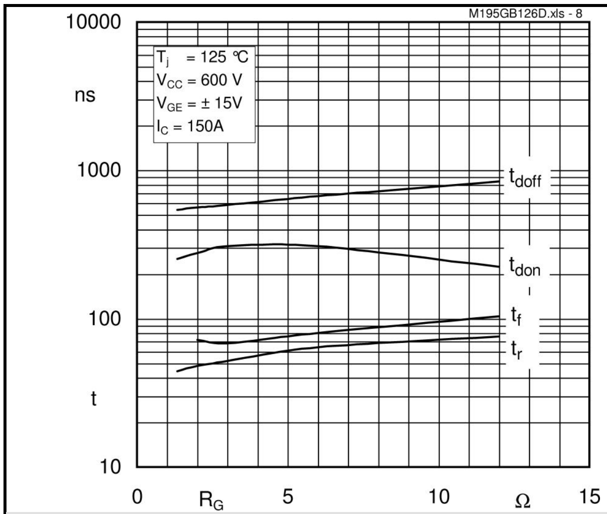

Fig. 8 Typ. switching times vs. gate resistor R_G

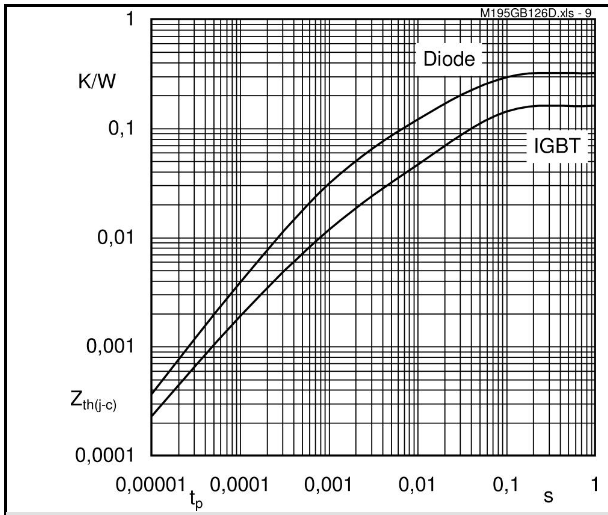

Fig. 9 Transient thermal impedance of IGBT

$Z_{thp(j-c)} = f(t_p)$; $D = t_p/t_c = t_p$*f

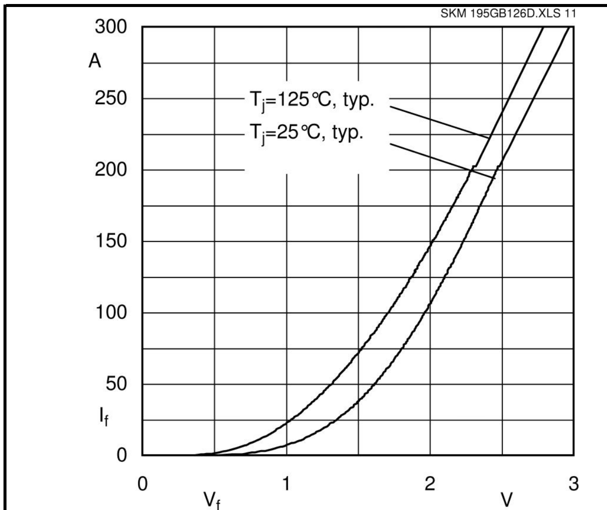

Fig. 10 Transient thermal impedance of FWD

$Z_{thp(j-c)} = f(t_p)$; $D = t_p/t_c = t_p$*f

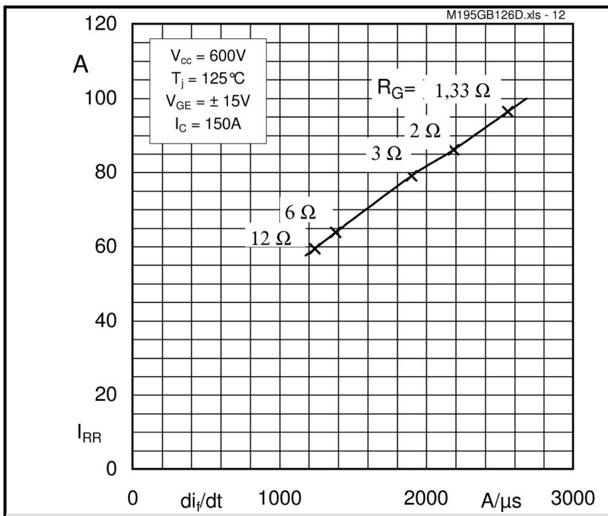

Fig. 11 CAL diode forward characteristic

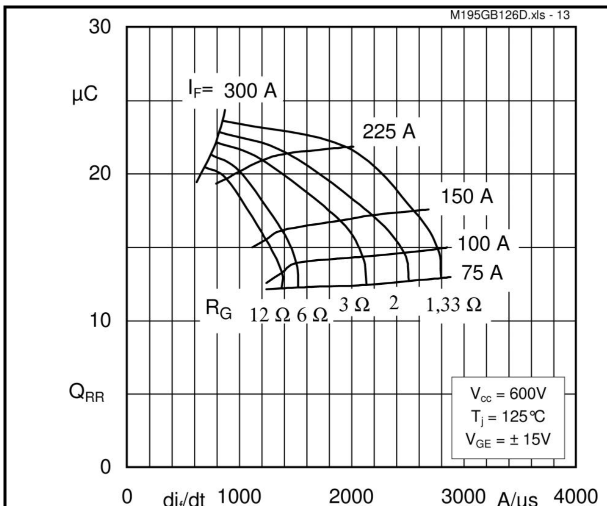

Fig. 12 Typ. CAL diode peak reverse recovery current

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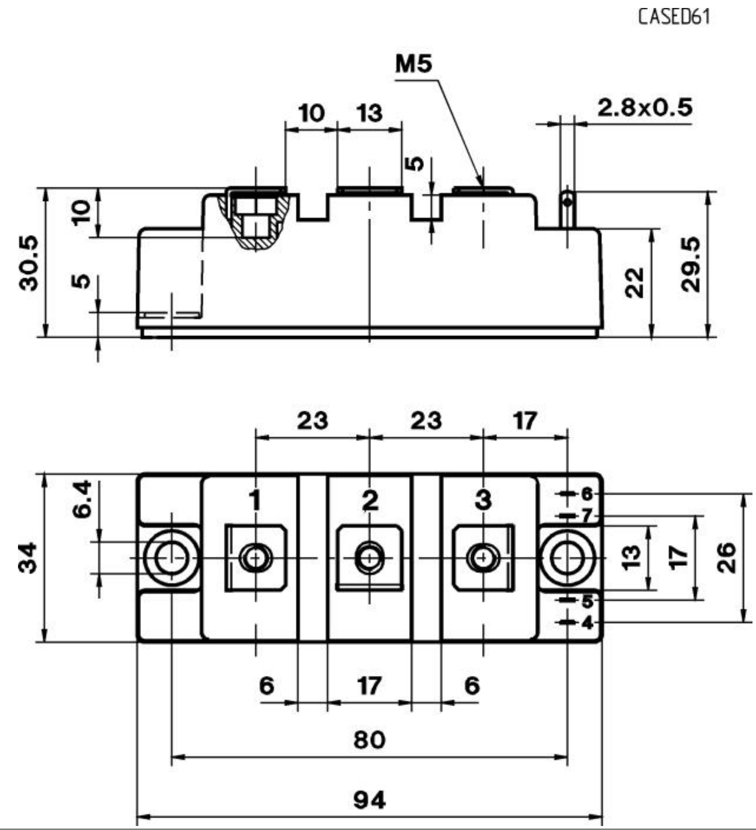
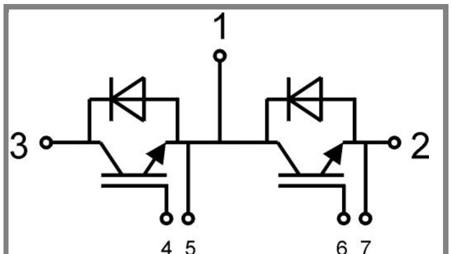
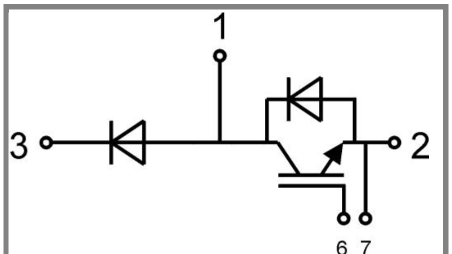


Case D 61



GB Case D61



GAL Case D 62

