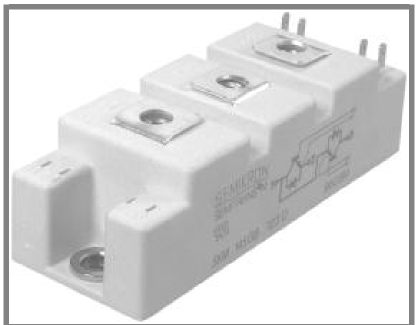
SKM 100GB176D



SEMITRANS® 2

Trench IGBT Modules

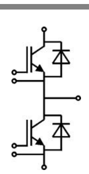
SKM 100GB176D

Features

- Homogeneous Si
- 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 mains 575 - 750 V AC
- Public transport (auxiliary syst.



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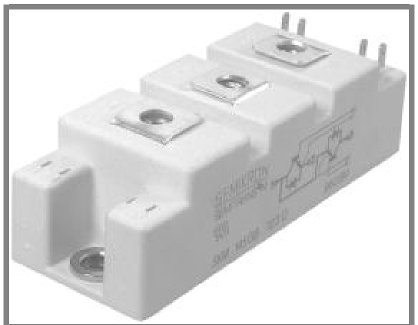
Absolute Maximum Ratings			T_{case} = 25°C, unless otherwise specified	
Symbol	**Conditions**		**Values**	**Units**
IGBT				
V_{CES}	T_j = 25 °C		1700	V
I_C	T_j = 150 °C	T_c = 25 °C	125	A
		T_c = 80 °C	90	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		150	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 1200 V; $V_{GE} \leq$ 20 V; V_{CES} < 1700 V	T_j = 125 °C	10	µs
Inverse Diode				
I_F	T_j = 150 °C	T_c = 25 °C	100	A
		T_c = 80 °C	70	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		150	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	720	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 = 3 mA		5,2	5,8	6,4	V
I_{CES}	V_{GE} = 0 V, V_{CE} = V_{CES}	T_j = 25 °C			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} = 15 V	T_j = 25°C		13	16,7	mΩ
		T_j = 125°C		20	24	mΩ
$V_{CE(sat)}$	I_{Cnom} = 75 A, V_{GE} = 15 V	T_j = 25°$C_{chiplev.}$		2	2,45	V
		T_j = 125°$C_{chiplev.}$		2,4	2,9	V
C_{ies}				5,7		nF
C_{oes}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		0,28		nF
C_{res}				0,22		nF
Q_G	V_{GE}=-8V/+15V			620		nC
R_{Gint}	T_j = 25 °C			8,5		Ω
$t_{d(on)}$		V_{CC} = 1200V		280		ns
t_r	R_{Gon} = 4,2 Ω	I_C= 75A		40		ns
E_{on}	di/dt = 1680 A/µs	T_j = 125 °C		44		mJ
$t_{d(off)}$	R_{Goff} = 4,2 Ω	V_{GE}=-15V		680		ns
t_f	di/dt = 490 A/µs	L_s = 20 nH		140		ns
E_{off}				28,5		mJ
$R_{th(j-c)}$	per IGBT				0,24	K/W



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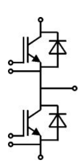
- AC inverter drives mains 575 - 750 V AC
- Public transport (auxiliary syst.

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 75 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		1,6	1,9	V
		T_j = 125 °$C_{chiplev.}$		1,6	1,9	V
V_{F0}		T_j = 25 °C		1,1	1,3	V
		T_j = 125 °C		0,9	1,1	V
r_F		T_j = 25 °C		6,7	8	mΩ
		T_j = 125 °C		9,3	11	mΩ
I_{RRM}	I_F = 75 A	T_j = 125 °C		78,5		A
Q_{rr}	di/dt = 1650 A/µs	L_S = 20 nH		29,6		µC
E_{rr}	V_{GE} = -15V ; V_{CC} = 1200 V			21,4		mJ
$R_{th(j-c)D}$	per diode				0,45	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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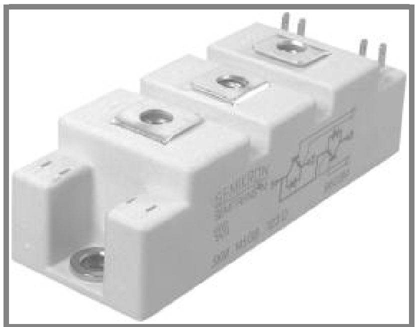

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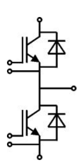

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Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	i = 1	160	mk/W
R_i	i = 2	60	mk/W
R_i	i = 3	16,5	mk/W
R_i	i = 4	3,5	mk/W
tau_i	i = 1	0,1056	s
tau_i	i = 2	0,009	s
tau_i	i = 3	0,0011	s
tau_i	i = 4	0,0005	s
$Z_{th(j-c)D}$			
R_i	i = 1	270	mk/W
R_i	i = 2	139	mk/W
R_i	i = 3	37	mk/W
R_i	i = 4	4	mk/W
tau_i	i = 1	0,0475	s
tau_i	i = 2	0,0104	s
tau_i	i = 3	0,0011	s
tau_i	i = 4	0,0003	s

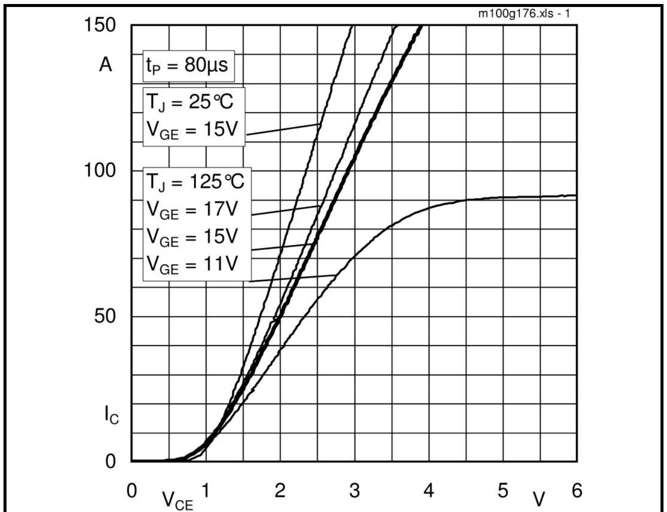

Fig. 1 Typ. output characteristic, inclusive $R_{CC'+ EE'}$

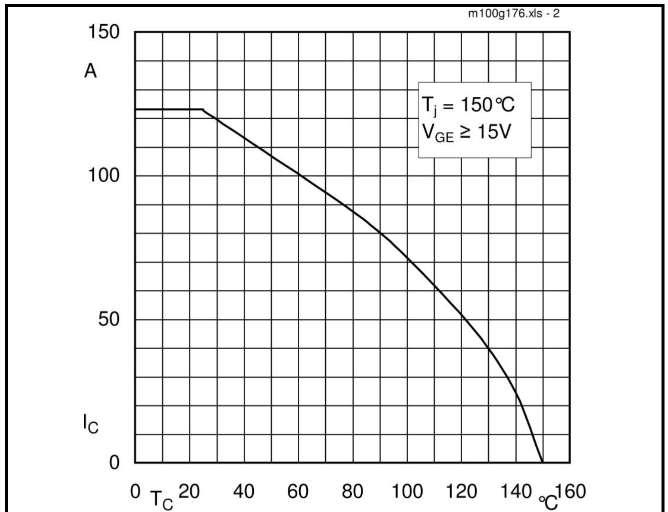

Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

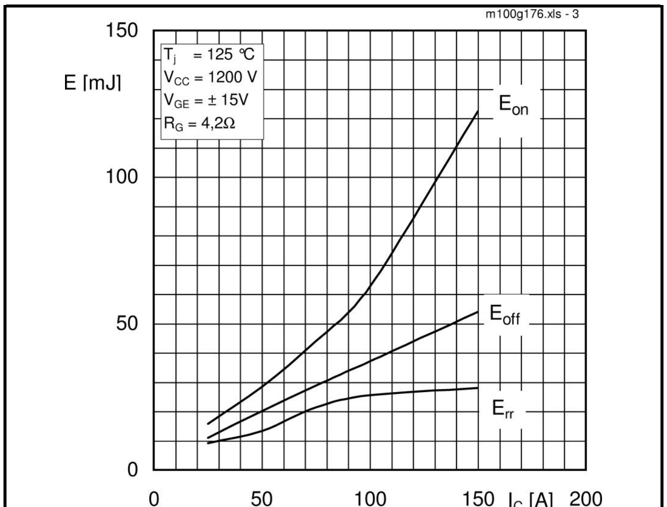

Fig. 3 Typ. turn-on /-off energy = f (I_C)

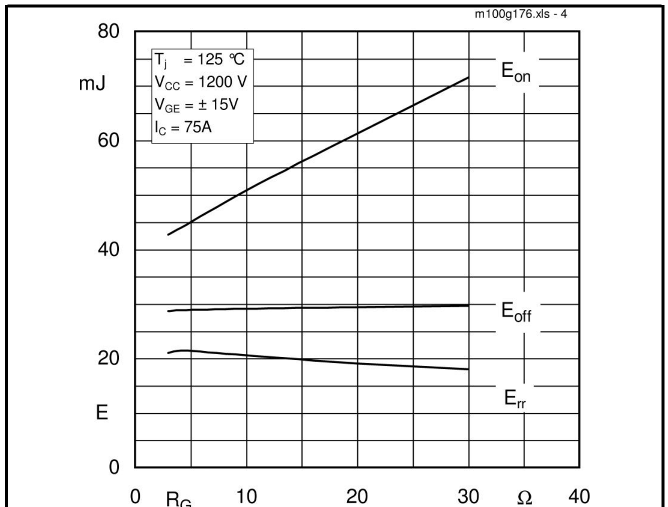

Fig. 4 Typ. turn-on /-off energy = f (R_G)

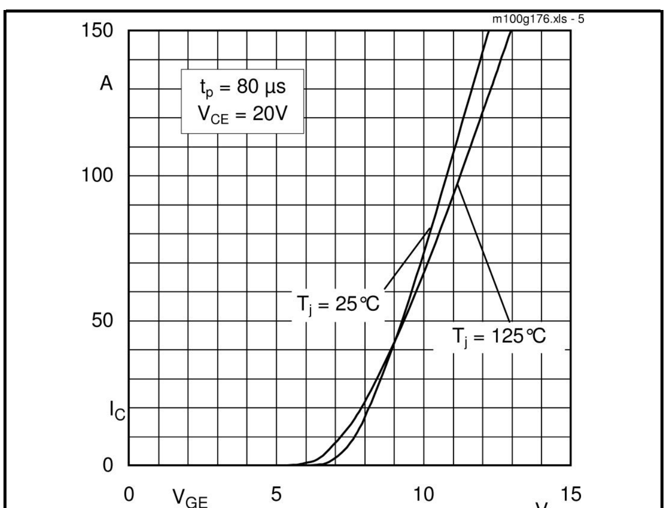

Fig. 5 Typ. transfer characteristic

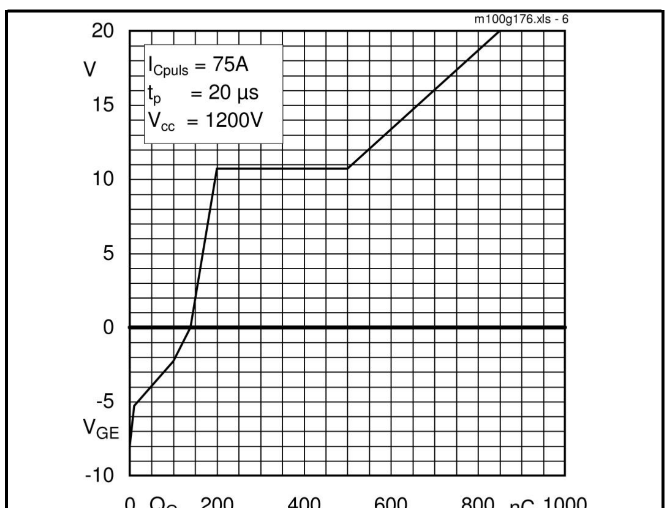

Fig. 6 Typ. gate charge characteristic

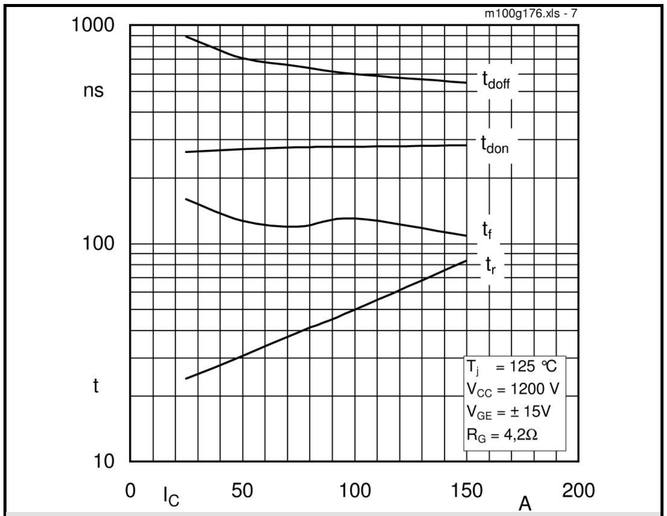

Fig. 7 Typ. switching times vs. I_C

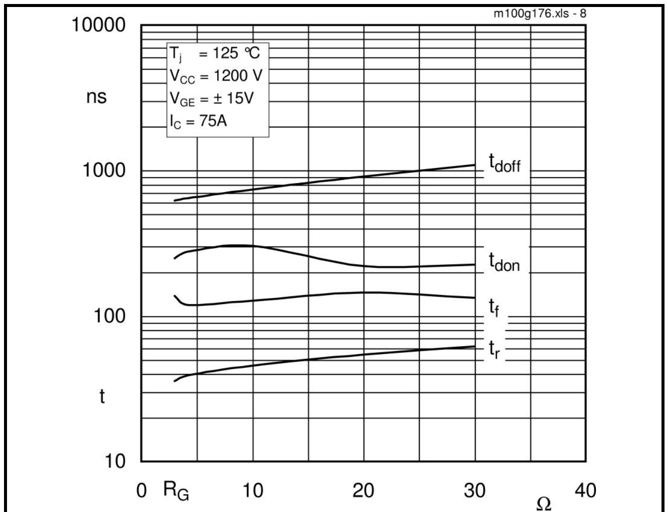

Fig. 8 Typ. switching times vs. gate resistor R_G

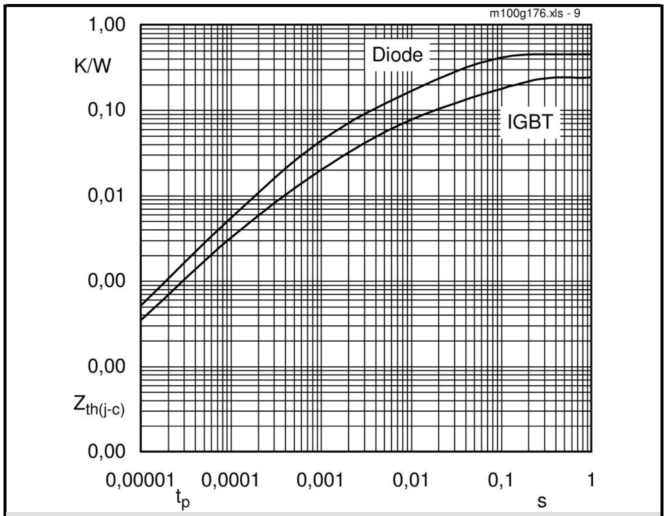

Fig. 9 Transient thermal impedance

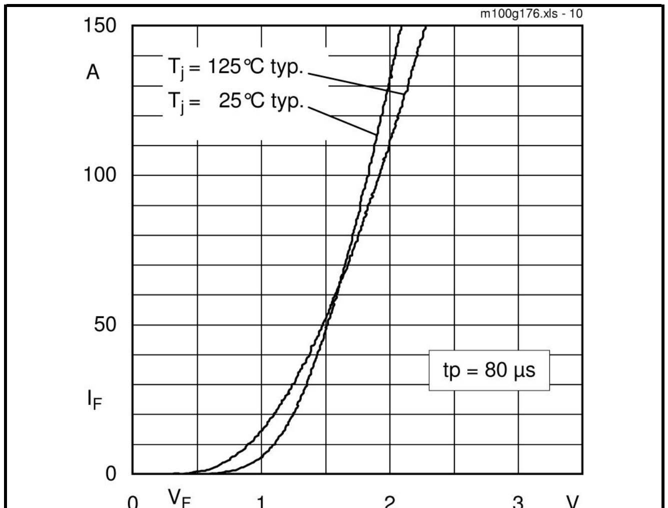

Fig. 10 CAL diode forward characteristic

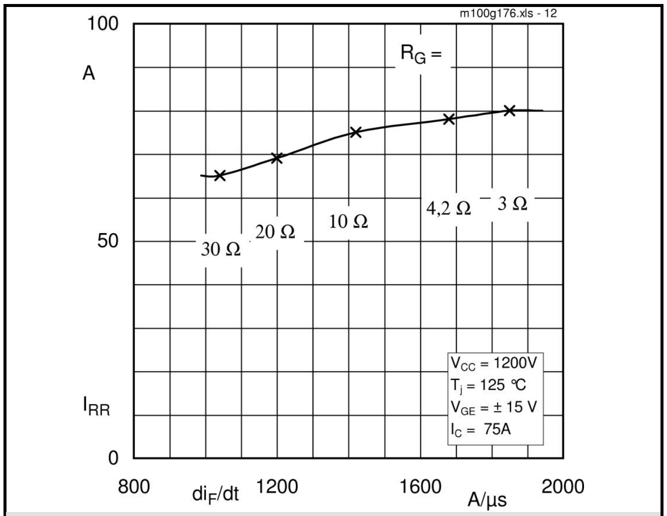

Fig. 11 Typ. CAL diode peak reverse recovery current

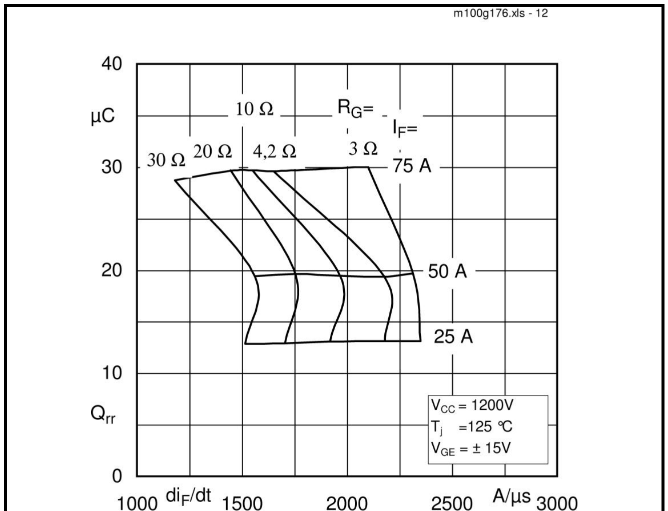

Fig. 12 Typ. CAL diode recovered charge

UL Recognized

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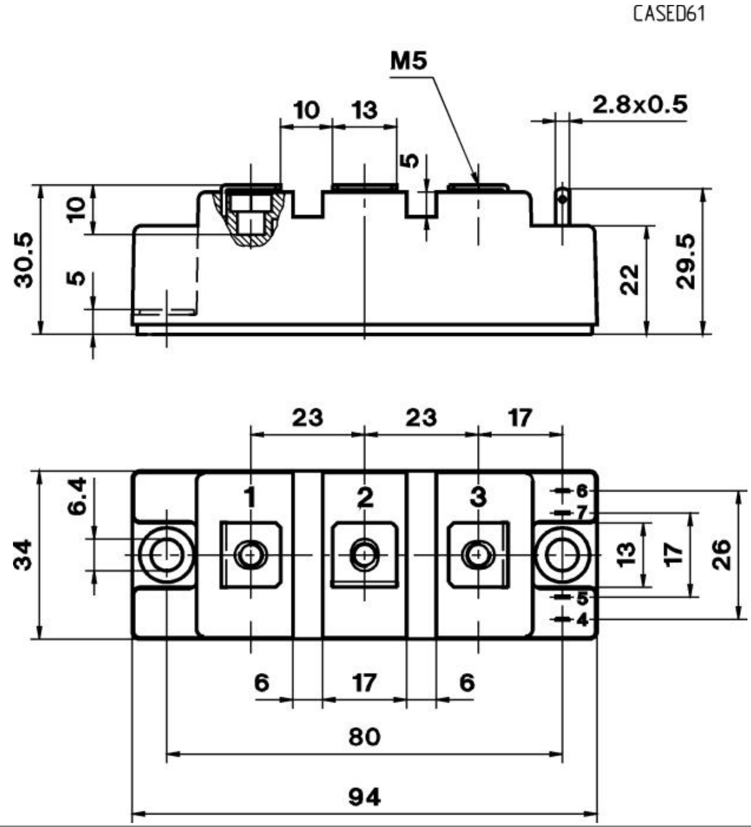
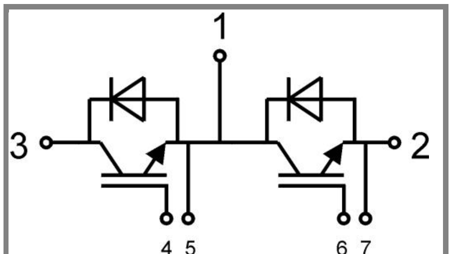


Case D 61



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Case D 61