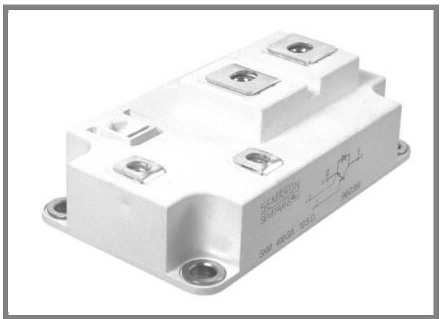
SKM 800GA176D



SEMITRANS^{TM} 4

Trench IGBT Modules

SKM 800GA176D

Preliminary Data

Features

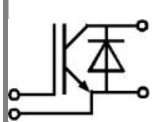
- Homogeneous Si
- Trench = Trenchgate technology
- V_{CEsat} with positive temperature coefficient
- High short circuit capability, self limiting to 6 x I_c

Typical Applications

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

Remarks

- $I_{DC} \leq 500$ A limited for $T_{Terminal}$ = 100 °C



GA

Absolute Maximum Ratings		T_c = 25 °C, unless otherwise specified	
Symbol	**Conditions**	**Values**	**Units**
IGBT			
V_{CES}		1700	V
I_C	T_c = 25 (80) °C	830 (590)	A
I_{CRM}	T_c = 25 (80) °C, t_p = 1 ms	1660 (1180)	A
V_{GES}		± 20	V
T_{vj}, (T_{stg})	$T_{OPERATION} \leq T_{stg}$	- 40 ... + 150 (125)	°C
V_{isol}	AC, 1 min.	4000	V
Inverse diode			
I_F = - I_C	T_c = 25 (80) °C	630 (440)	A
I_{FRM}	T_c = 25 (80) °C, t_p = 1 ms	1660 (1180)	A
I_{FSM}	t_p = 10 ms; sin.; T_j = 150 °C	3600	A

Characteristics			T_c = 25 °C, unless otherwise specified		
Symbol	**Conditions**	**min.**	**typ.**	**max.**	**Units**
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}$, I_C = 24 mA	5,2	5,8	6,4	V
I_{CES}	V_{GE} = 0, $V_{CE} = V_{CES}$, T_j = 25 (125) °C			2,4	mA
$V_{CE(TO)}$	T_j = 25 (125) °C		1 (0,9)	1,2 (1,1)	V
r_{CE}	V_{GE} = 15 V, T_j = 25 (125) °C		1,7 (2,5)	2,1	mΩ
$V_{CE(sat)}$	I_C = 600 A, V_{GE} = 15 V, chip level		2 (2,45)	2,45 (2,9)	V
C_{ies}	under following conditions		53		nF
C_{oes}	V_{GE} = 0, V_{CE} = 25 V, f = 1 MHz		3,5		nF
C_{res}			2,5		nF
L_{CE}				20	nH
$R_{CC'+EE'}$	res., terminal-chip T_c= 25 (125) °C		0,18 (0,22)		mΩ
$t_{d(on)}$	V_{CC} = 1200 V, I_C = 600 A		230		ns
t_r	$R_{Gon} = R_{Goff}$ = 3 Ω, T_j = 125 °C		90		ns
$t_{d(off)}$	V_{GE} = ± 15 V		1030		ns
t_f			160		ns
E_{on} (E_{off})			335 (245)		mJ
Inverse diode					
$V_F = V_{EC}$	I_F = 600 A; V_{GE} = 0 V; T_j = 25 (125) °C		1,6 (1,6)	1,9	V
$V_{T(TO)}$	T_j = 25 (125) °C		1,1	1,3	V
r_T	T_j = 25 (125) °C		1,5	2,2	mΩ
I_{RRM}	I_F = 600 A; T_j = 25 (125) °C		(650)		A
Q_{rr}	di/dt = 6400 A/µs		(230)		µC
E_{rr}	V_{GE} = 0 V		(155)		mJ
Thermal characteristics					
$R_{th(j-c)}$	per IGBT			0,04	K/W
$R_{th(j-c)D}$	per Inverse Diode			0,07	K/W
$R_{th(j-c)FD}$	per FWD				K/W
$R_{th(c-s)}$	per module			0,038	K/W
Mechanical data					
M_s	to heatsink (M6)	3		5	Nm
M_t	for terminals (M5)	2,5		5	Nm
w				330	g

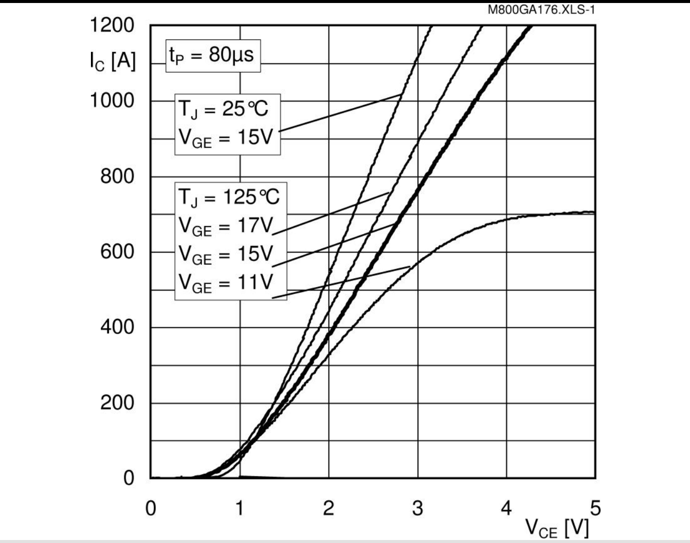


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

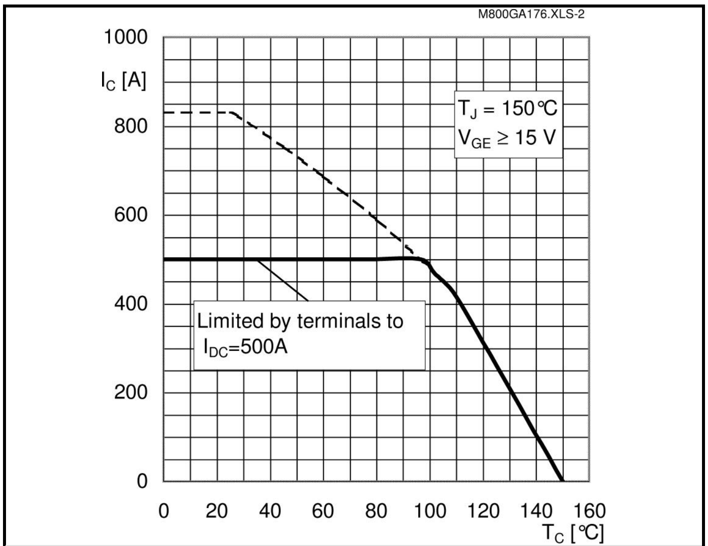


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

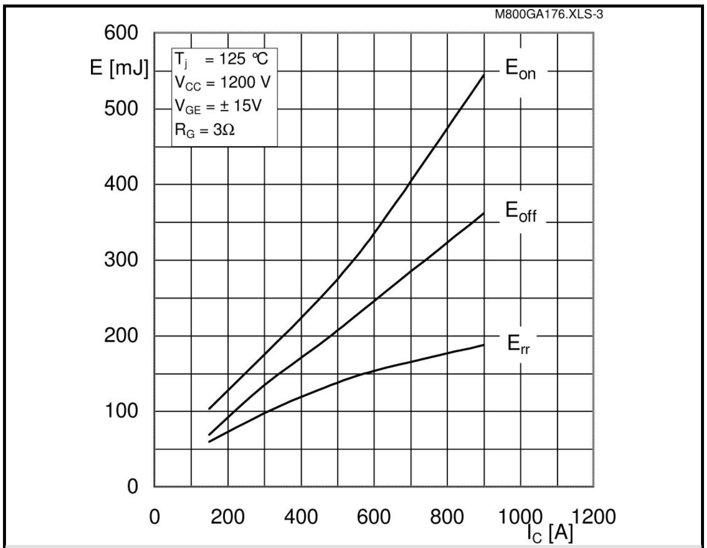


Fig. 3 Typ. turn-on /-off energy = f (I_C)

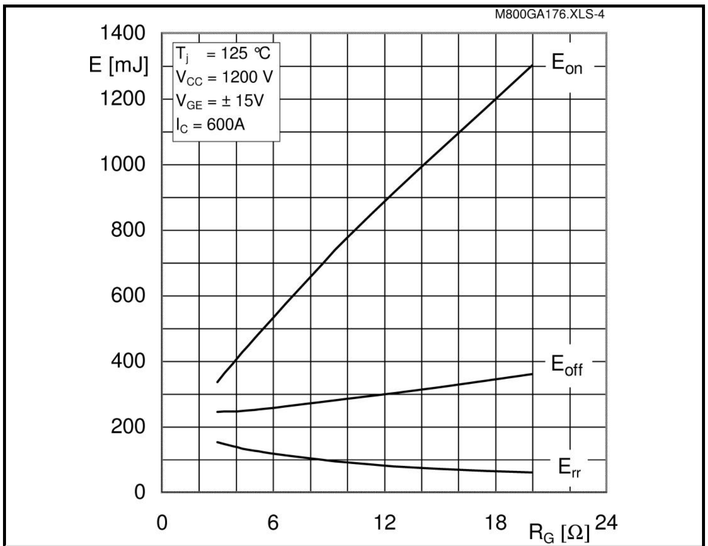


Fig. 4 Typ. turn-on /-off energy = f (R_G)

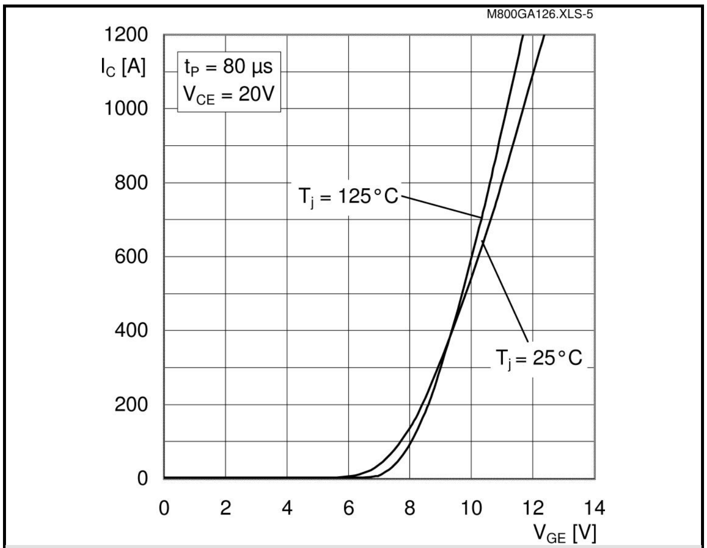


Fig. 5 Typ. transfer characteristic

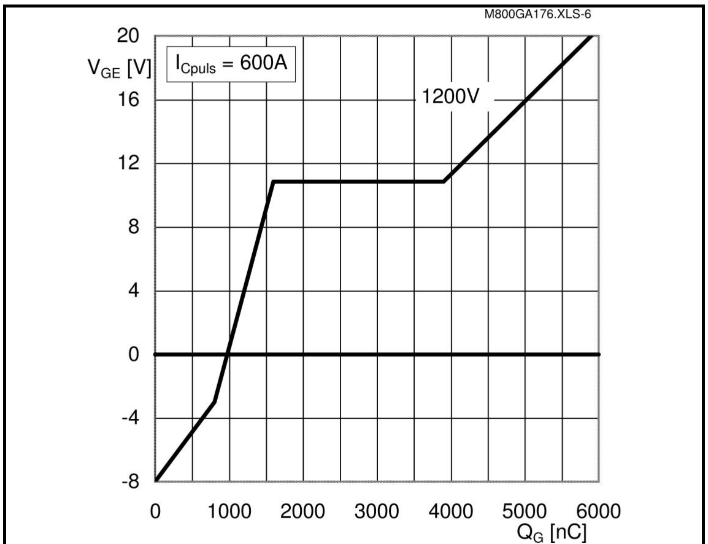


Fig. 6 Typ. gate charge characteristic

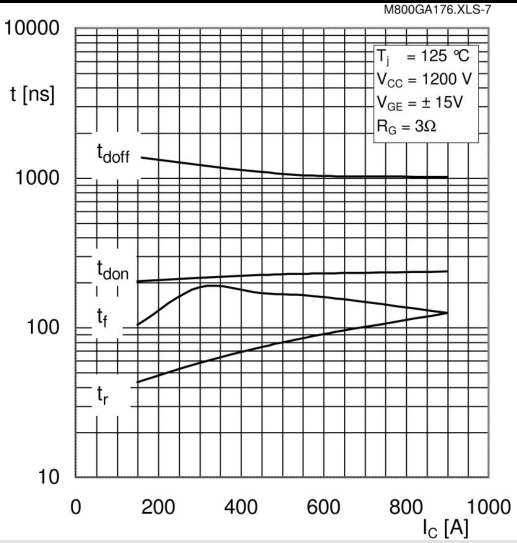


Fig. 7 Typ. switching times vs. I_C

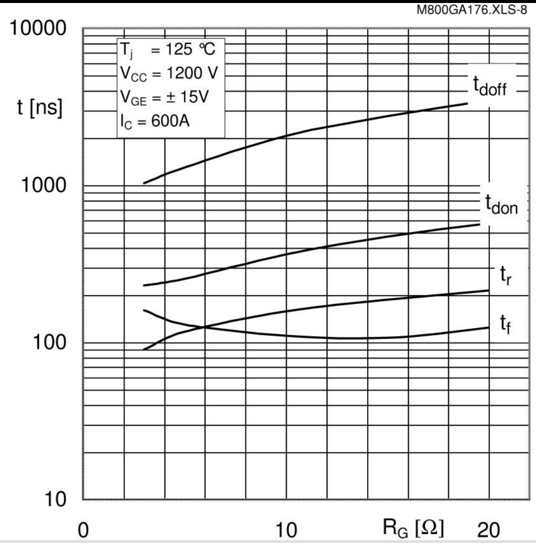


Fig. 8 Typ. switching times vs. gate resistor R_G

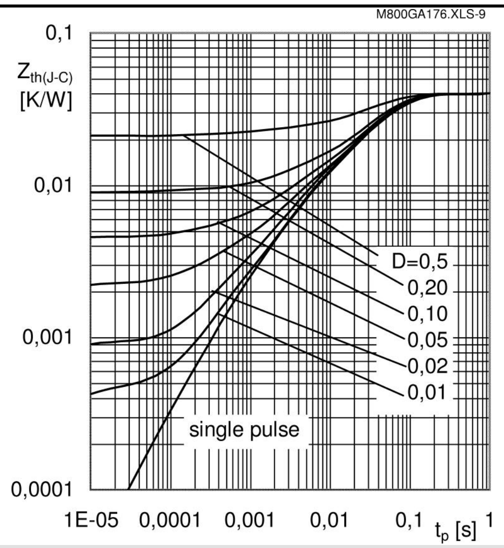


Fig. 9 Transient thermal impedance of IGBT

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

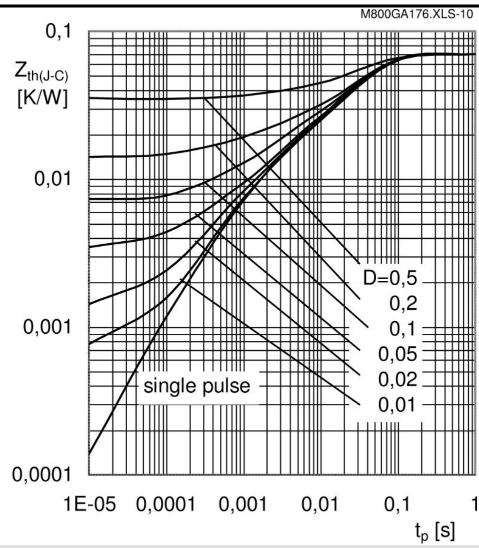


Fig. 10 Transient thermal impedance of Inverse CAL Diode

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

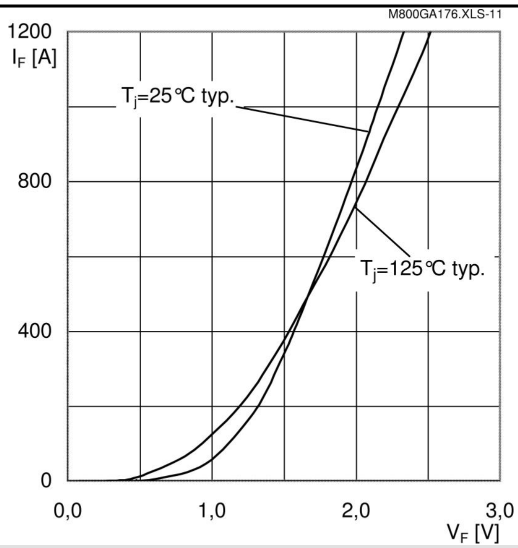


Fig. 11 CAL diode forward characteristic

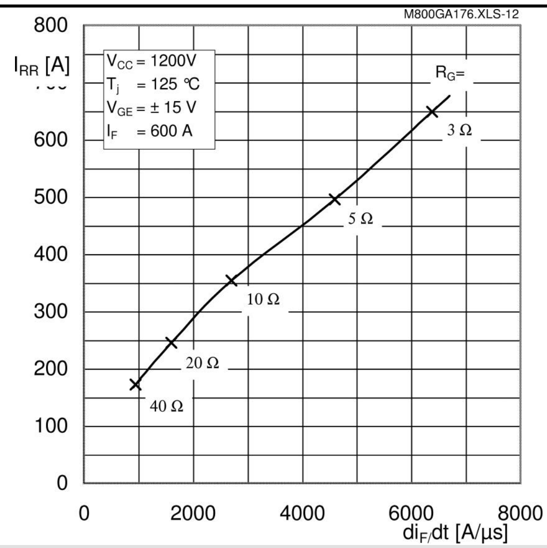


Fig. 12 Typ. CAL diode peak reverse recovery current

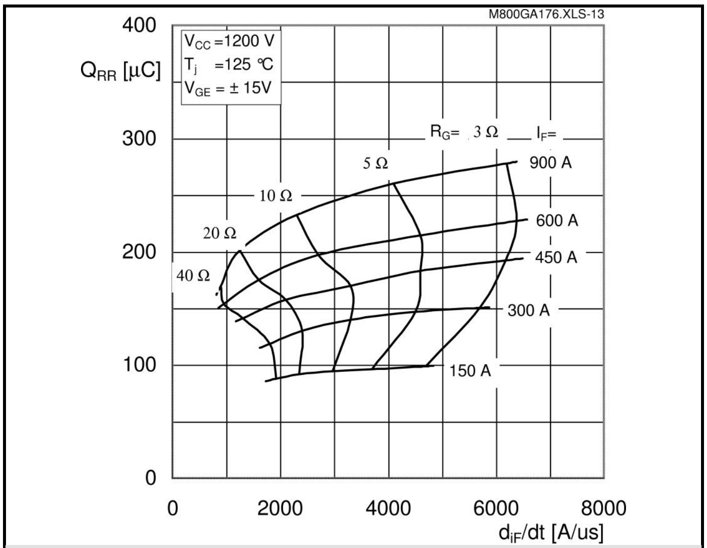
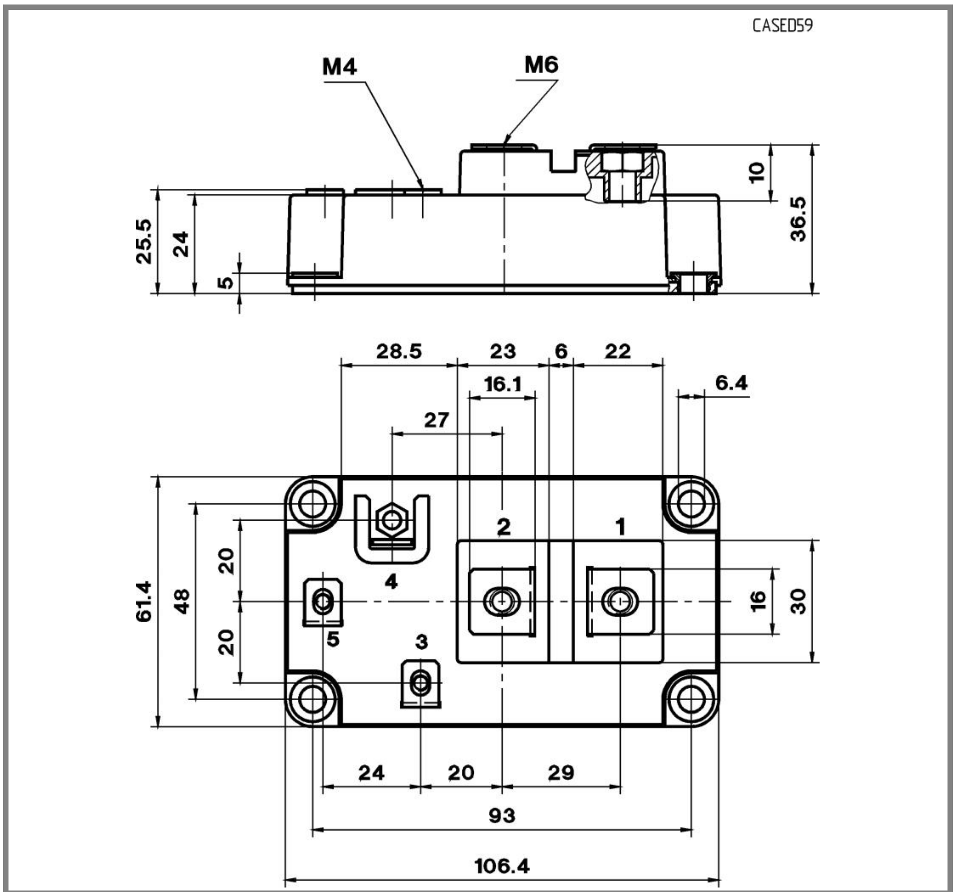
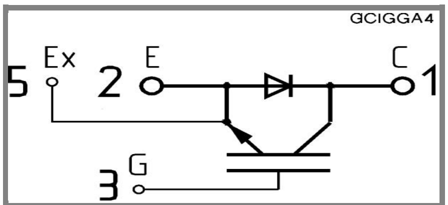


Fig. 13 Typ. CAL diode recovered charge



Case D 59



GA Case D 59

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

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.