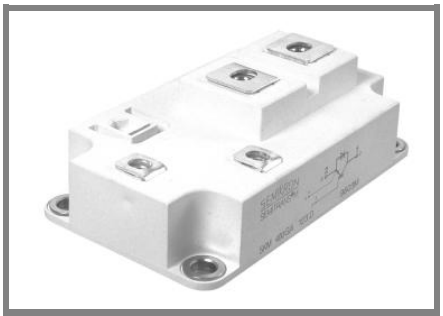
SKM 800GA126D



SEMITRANS® 4

Trench IGBT Modules

SKM 800GA126D

Preliminary Data

Features

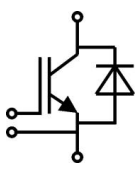
- Trench = Trenchgate technology
- V_{CEsat} with positive temperature coefficient
- High short circuit capability, self limiting to 6 x I_C

Typical Applications

- AC inverter drives
- UPS
- Electronic welders

Remarks

- $I_{DC} \leq$ 500A limited by terminals



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Absolute Maximum Ratings			T_c = 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_{case} = 25 °C	960	A
		T_{case} = 80 °C	620	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		1200	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 600 V; $V_{GE} \leq$ 20 V; V_{CES} < 1200 V	T_j = 125 °C	10	µs
Inverse Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	680	A
		T_{case} = 125 °C	470	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		1200	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	3600	A
Module				
$I_{t(RMS)}$			500	A
T_{vj}			- 40 ... + 150	°C
T_{stg}			- 40 ... + 125	°C
V_{isol}	AC, 1 min.		4000	V

Characteristics			T_c = 25 °C, unless otherwise specified			
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
IGBT						
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 16 mA		5	5,8	6,5	V
I_{CES}	V_{GE} = 0 V, V_{CE} = V_{CES}	T_j = 25 °C		0,2	0,6	mA
		T_j = 125 °C				mA
V_{CE0}		T_j = 25 °C		1	1,15	V
		T_j = 125 °C		0,9		V
r_{CE}	V_{GE} = 15 V	T_j = 25°C		1,2	1,7	mΩ
		T_j = 125°C		1,8		mΩ
$V_{CE(sat)}$	I_{Cnom} = 600 A, V_{GE} = 15 V	T_j = 25°C$_{chiplev.}$		1,7	2,15	V
		T_j = 125°C$_{chiplev.}$		2		V
C_{ies}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		42		nF
C_{oes}				3,3		nF
C_{res}				3,1		nF
Q_G	V_{GE} = -8V - +20V			5200		nC
R_{Gint}	T_j = °C			1,25		Ω
$t_{d(on)}$	R_{Gon} = 3 Ω	V_{CC} = 600V		220		ns
t_r		I_C= 600A		100		ns
E_{on}		T_j = 125 °C		65		mJ
$t_{d(off)}$	R_{Goff} = 3 Ω	V_{GE} = ± 15V		860		ns
t_f				135		ns
E_{off}				95		mJ
$R_{th(j-c)}$	per IGBT				0,042	K/W

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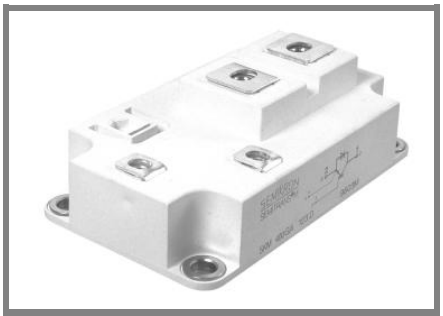

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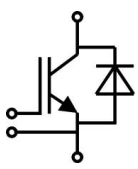

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Characteristics

Symbol	Conditions		min.	typ.	max.	Units
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 600 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		1,6	1,8	V
		T_j = 125 °$C_{chiplev.}$		1,6	1,8	V
V_{F0}		T_j = 25 °C		1	1,1	V
		T_j = 125 °C		0,8	0,9	V
r_F		T_j = 25 °C		1	1,2	mΩ
		T_j = 125 °C		1,3	1,5	mΩ
I_{RRM}	I_F = 600 A	T_j = 125 °C		540		A
Q_{rr}	di/dt = 6000 A/µs			125		µC
E_{rr}	V_{GE} = -15 V; V_{CC} = 600 V			59		mJ
$R_{th(j-c)D}$	per diode				0,09	K/W
Module						
L_{CE}				15	20	nH
$R_{CC'+EE'}$	res., terminal-chip	T_{case}= 25 °C		0,18		mΩ
		T_{case}= 125 °C		0,22		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 (M4)		2,5 (1,1)		5 (2)	Nm
w					330	g

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.

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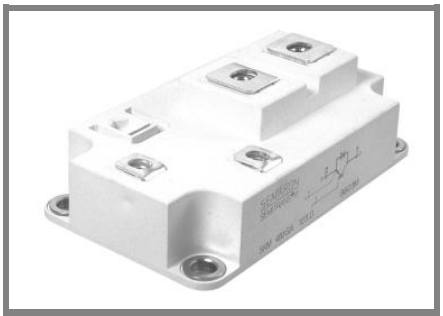

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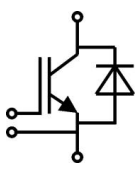

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Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	i = 1	30	mk/W
R_i	i = 2	9,5	mk/W
R_i	i = 3	2,2	mk/W
R_i	i = 4	0,3	mk/W
tau_i	i = 1	0,1043	s
tau_i	i = 2	0,009	s
tau_i	i = 3	0,0015	s
tau_i	i = 4	0,004	s
$Z_{th(j-c)D}$			
R_i	i = 1	62	mk/W
R_i	i = 2	23	mk/W
R_i	i = 3	4,2	mk/W
R_i	i = 4	0,8	mk/W
tau_i	i = 1	0,0566	s
tau_i	i = 2	0,0166	s
tau_i	i = 3	0,0015	s
tau_i	i = 4	0,0002	s

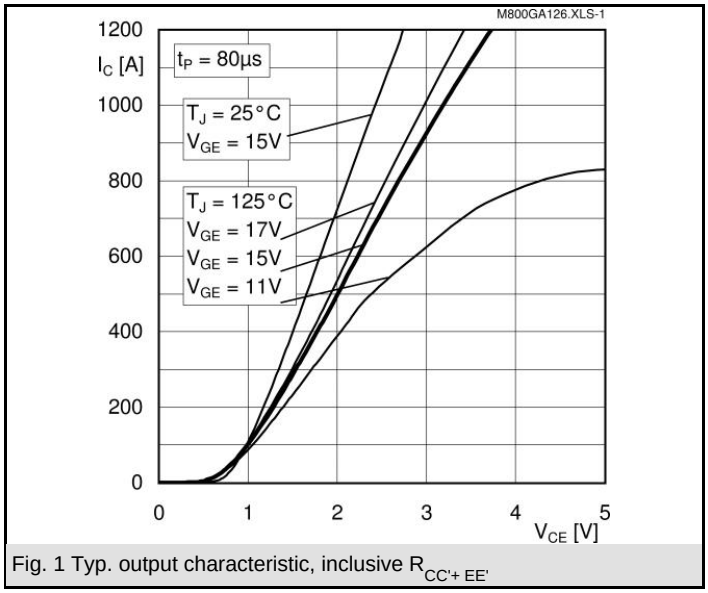


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

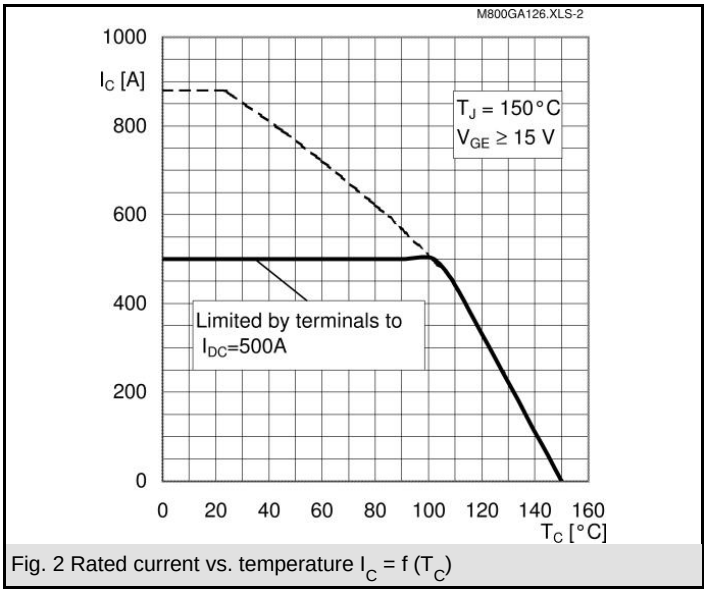


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

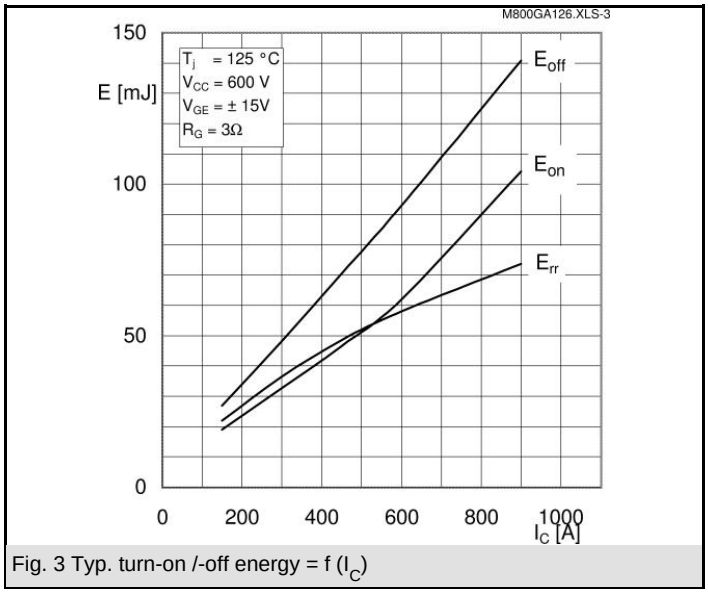


Fig. 3 Typ. turn-on /-off energy = f (I_C)

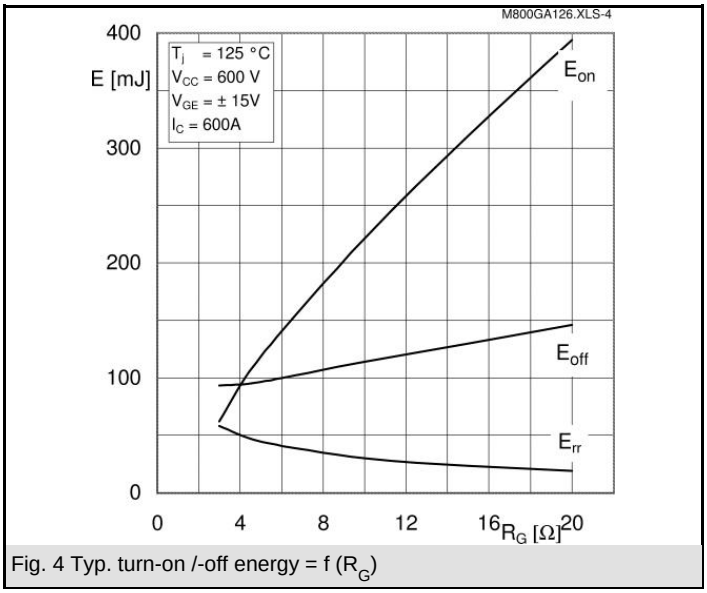


Fig. 4 Typ. turn-on /-off energy = f (R_G)

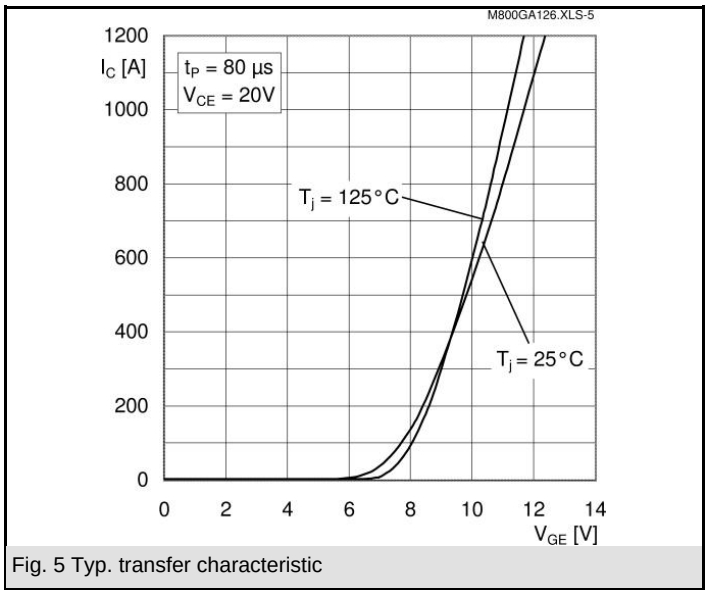


Fig. 5 Typ. transfer characteristic

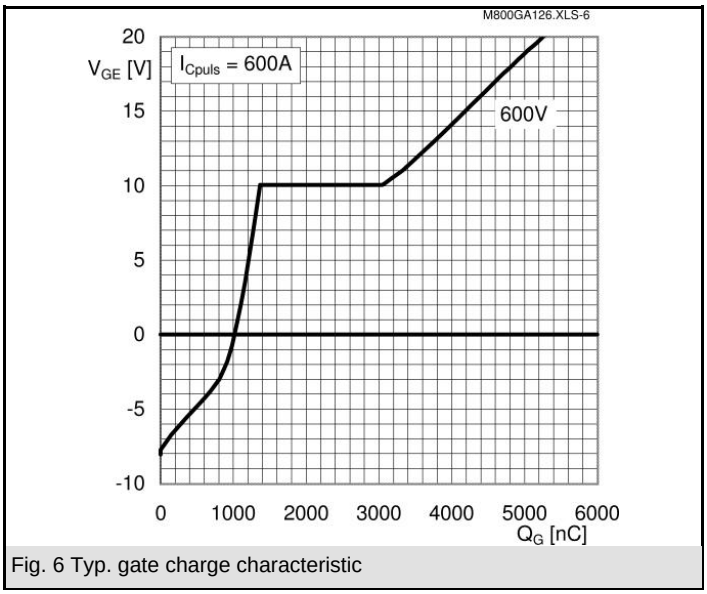


Fig. 6 Typ. gate charge characteristic

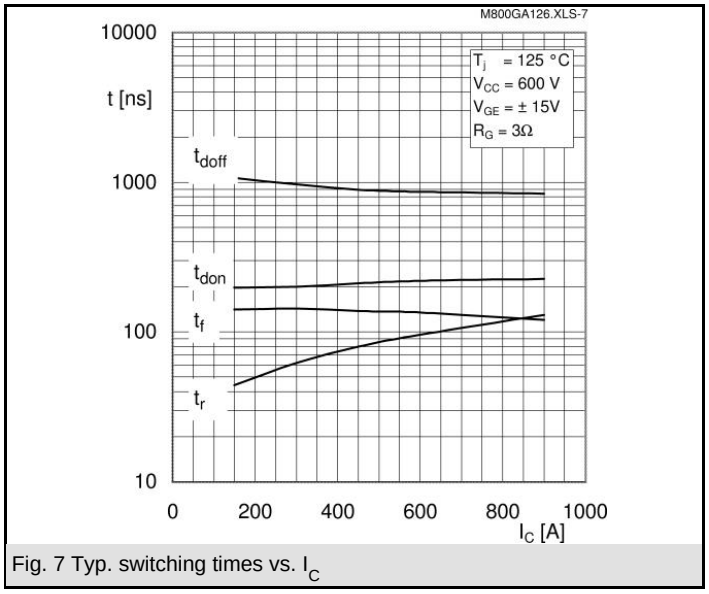


Fig. 7 Typ. switching times vs. I_C

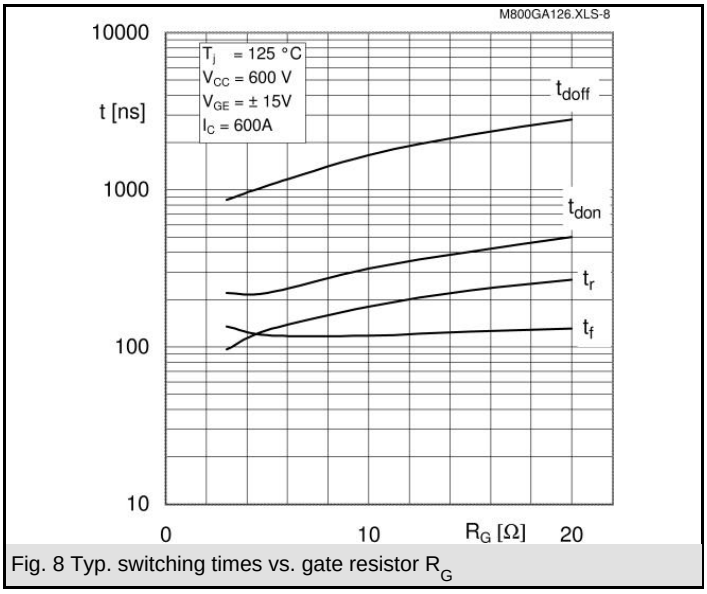


Fig. 8 Typ. switching times vs. gate resistor R_G

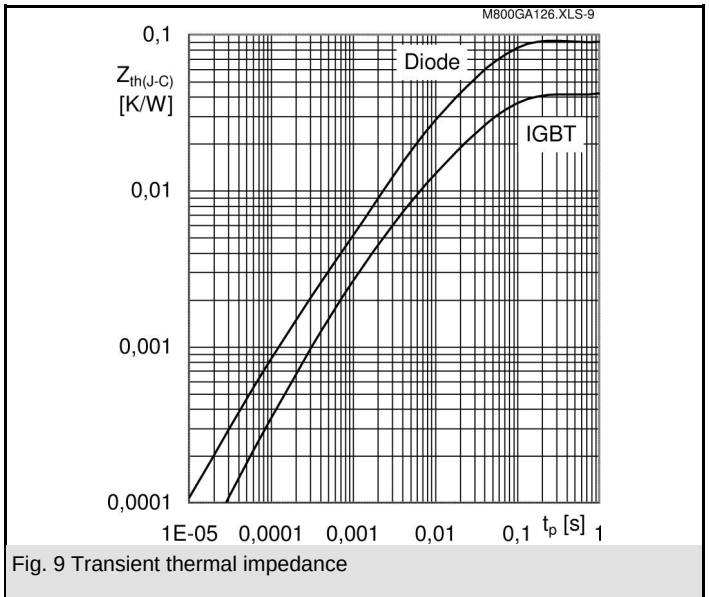


Fig. 9 Transient thermal impedance

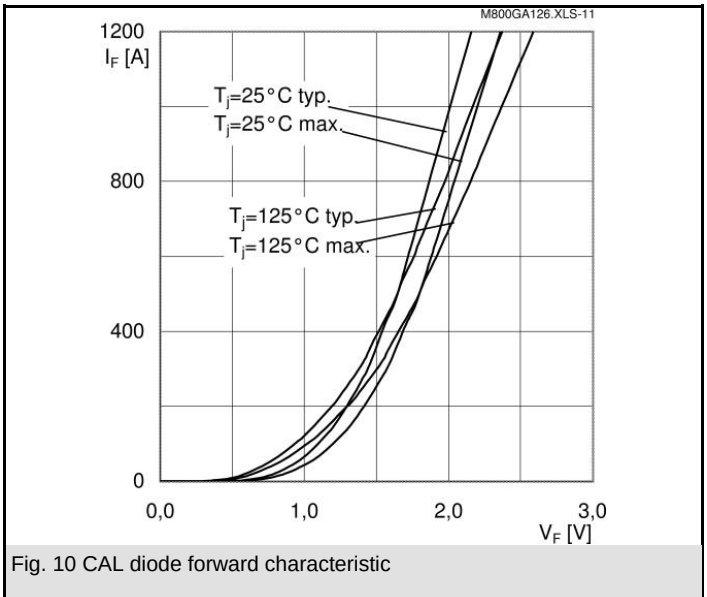


Fig. 10 CAL diode forward characteristic

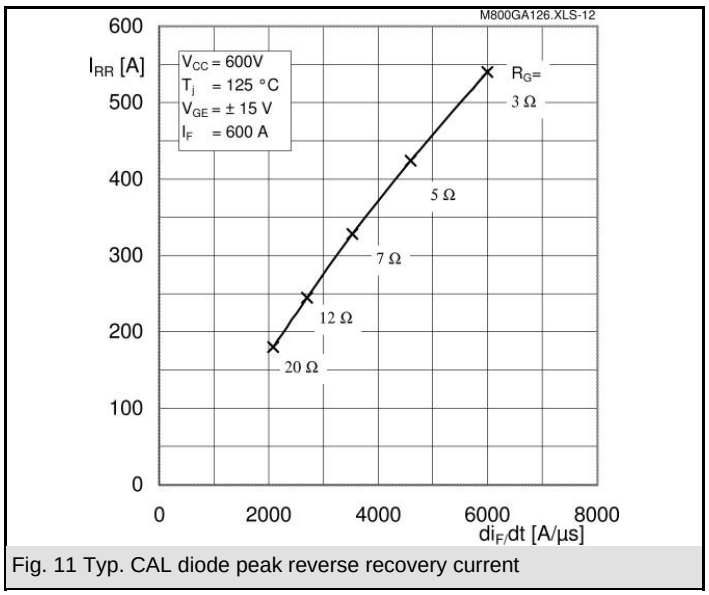


Fig. 11 Typ. CAL diode peak reverse recovery current

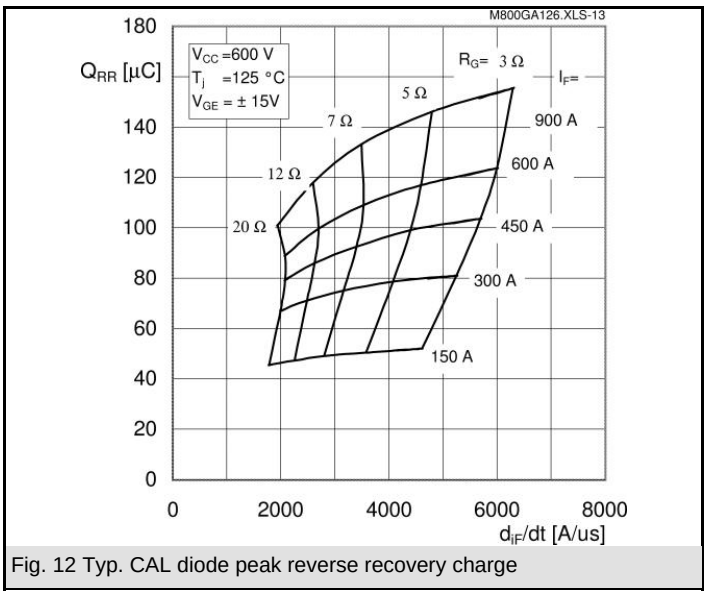
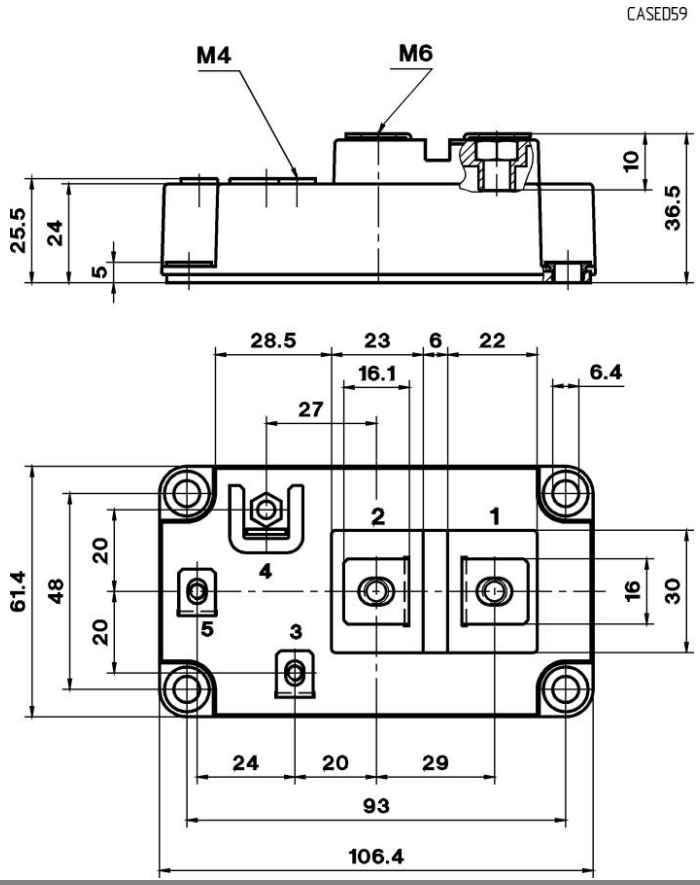
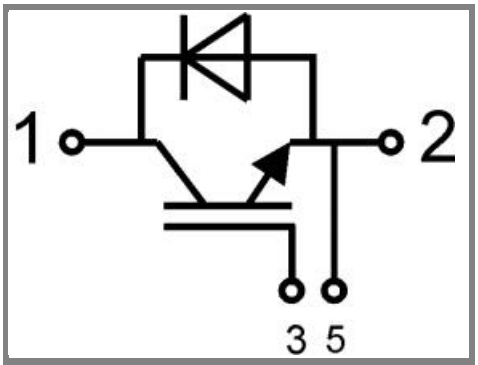


Fig. 12 Typ. CAL diode peak reverse recovery charge

UL Recognized File 63 532



Case D 59



Case D59 GA

