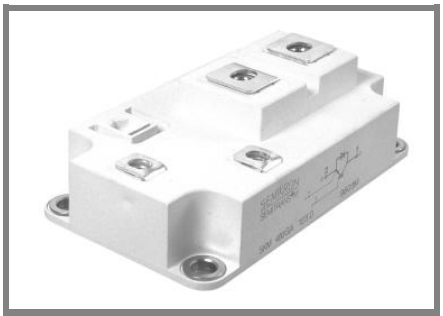
SKM 300GA128D



SEMITRANS® 4

SPT IGBT Modules

SKM 300GA128D

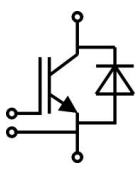
Preliminary Data

Features

- SPT = Soft-Punch-Through 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 for f_{sw} up to 20 kHz



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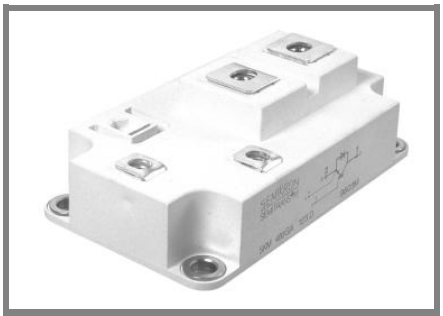
Absolute Maximum Ratings	T_{case} = 25°C, unless otherwise specified			
Symbol	**Conditions**		**Values**	**Units**
IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	T_j = 150 °C	T_c = 25 °C	370	A
		T_c = 80 °C	260	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		400	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 600 V; $V_{GE} \leq$ 20 V; V_{CES} < 1200 V	T_j = 125 °C	10	µs
Inverse Diode				
I_F	T_j = 150 °C	T_c = 25 °C	300	A
		T_c = 125 °C	210	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		400	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	2200	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_{case} = 25°C, unless otherwise specified					
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
IGBT						
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 8 mA		4,5	5,5	6,5	V
I_{CES}	V_{GE} = 0 V, V_{CE} = V_{CES}	T_j = 25 °C		0,2	0,6	mA
V_{CE0}		T_j = 25 °C		1	1,15	V
		T_j = 125 °C		0,9	1,05	V
r_{CE}	V_{GE} = 15 V	T_j = 25°C		4,5	6	mΩ
		T_j = 125°C		6	7,5	mΩ
$V_{CE(sat)}$	I_{Cnom} = 200 A, V_{GE} = 15 V	T_j = 25°C$_{chiplev.}$		1,9	2,35	V
		T_j = 125°C$_{chiplev.}$		2,1	2,55	V
C_{ies}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		4,5		nF
C_{oes}				0,35		nF
C_{res}				0,2		nF
Q_G	V_{GE} -8V / +20V			2400		nC
R_{Gint}	T_j = °C			1,25		Ω
$t_{d(on)}$	R_{Gon} = 5,1 Ω di/dt = 4900 A/µs	V_{CC} = 600V I_{Cnom}= 200A T_j = 125 °C V_{GE} = -15V L_s = 20 nH		80		ns
t_r				60		ns
E_{on}				22		mJ
$t_{d(off)}$	R_{Goff} = 5,1 Ω di/dt = 2500 A/µs			520		ns
t_f				65		ns
E_{off}				21		mJ
$R_{th(j-c)}$	per IGBT				0,085	K/W

SKM 300GA128D



SEMITRANS® 4

SPT IGBT Modules

SKM 300GA128D

Preliminary Data

Features

- SPT = Soft-Punch-Through technology
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- High short circuit capability, self limiting to 6 x I_C

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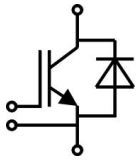

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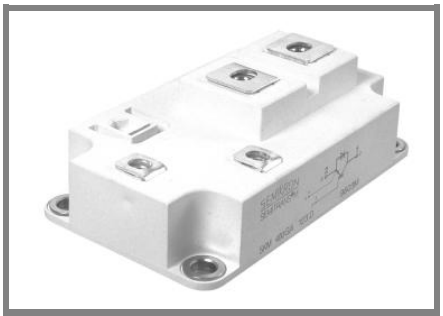
Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 200 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		2	2,5	V
		T_j = 125 °$C_{chiplev.}$		1,8		V
V_{F0}		T_j = 25 °C		1,1	1,2	V
		T_j = 125 °C				V
r_F		T_j = 25 °C		4,5	6,5	mΩ
		T_j = 125 °C				mΩ
I_{RRM}	I_{Fnom} = 200 A	T_j = 125 °C		250		A
Q_{rr}	di/dt = 5200 A/µs	L_S = 20 nH		35		µC
E_{rr}	V_{GE} = 0 V; V_{CC} = 600 V			16,5		mJ
$R_{th(j-c)D}$	per diode				0,15	K/W
Module						
L_{CE}				15	20	nH
$R_{CC'+EE'}$	res., terminal-chip	T_{case}= °C		0,18		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.

SKM 300GA128D



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Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	i = 1	1,25	mk/W
R_i	i = 2		mk/W
R_i	i = 3		mk/W
R_i	i = 4		mk/W
tau_i	i = 1		s
tau_i	i = 2		s
tau_i	i = 3		s
tau_i	i = 4		s

SPT IGBT Modules

SKM 300GA128D

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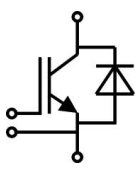

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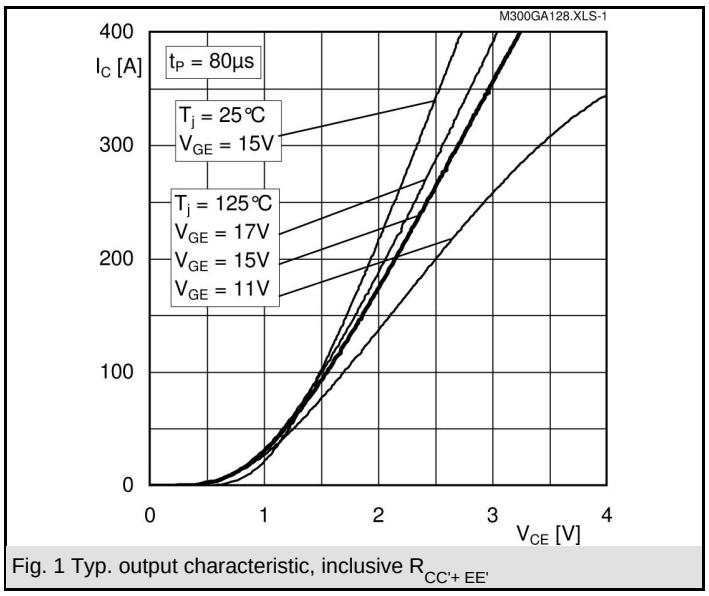

Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

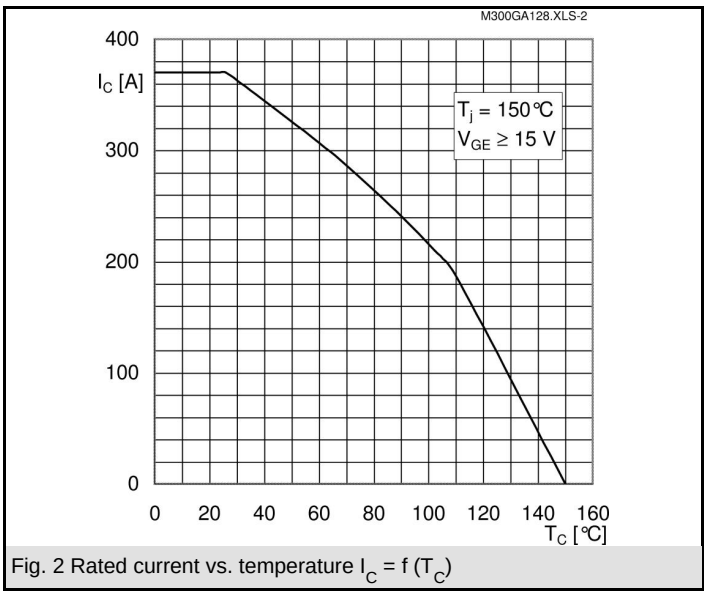

Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

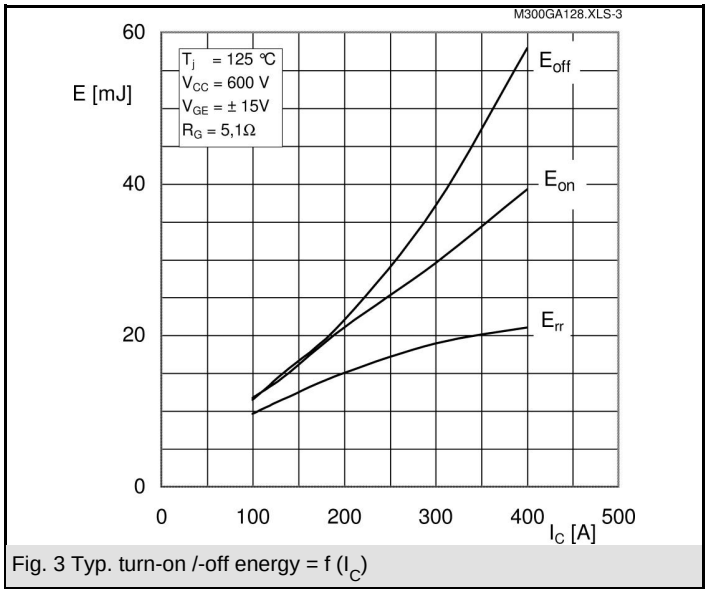

Fig. 3 Typ. turn-on /-off energy = f (I_C)

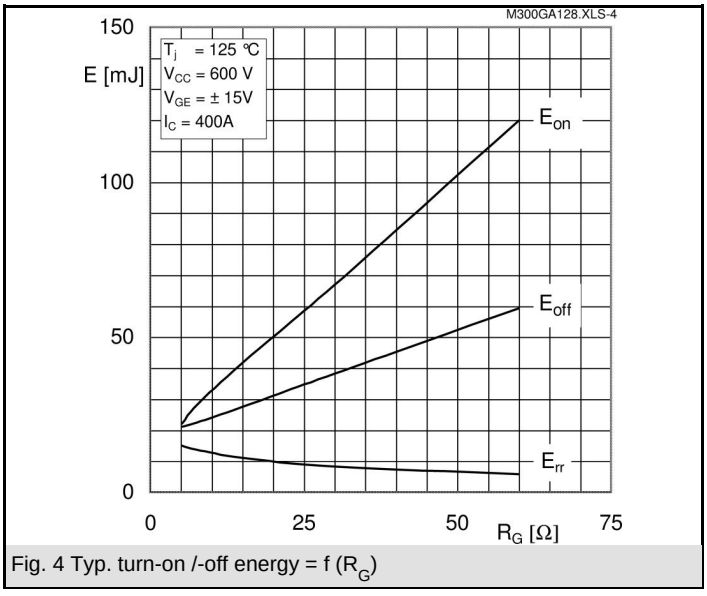

Fig. 4 Typ. turn-on /-off energy = f (R_G)

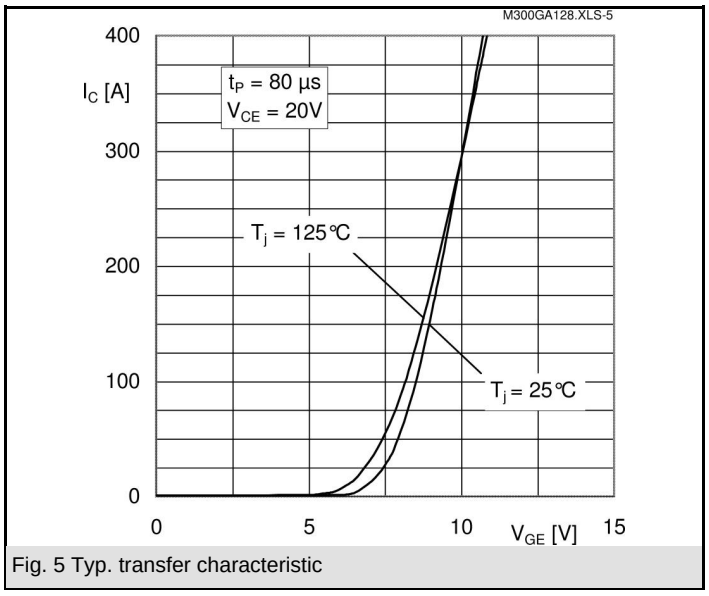

Fig. 5 Typ. transfer characteristic

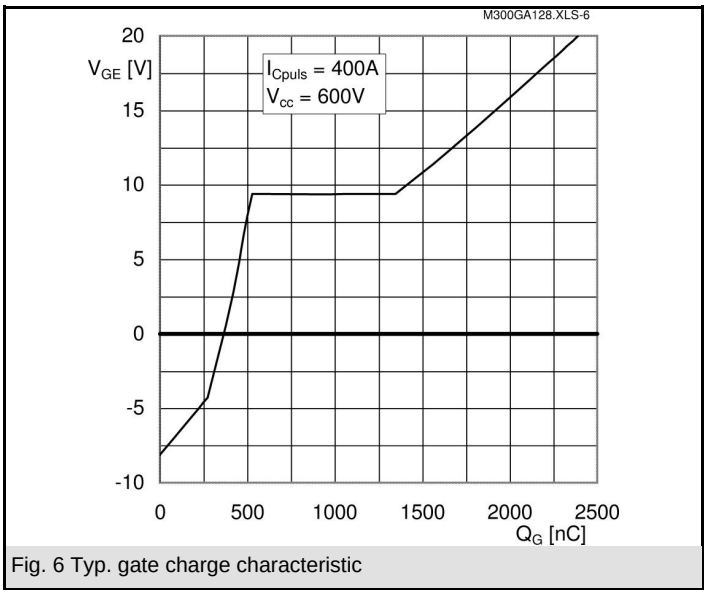

Fig. 6 Typ. gate charge characteristic

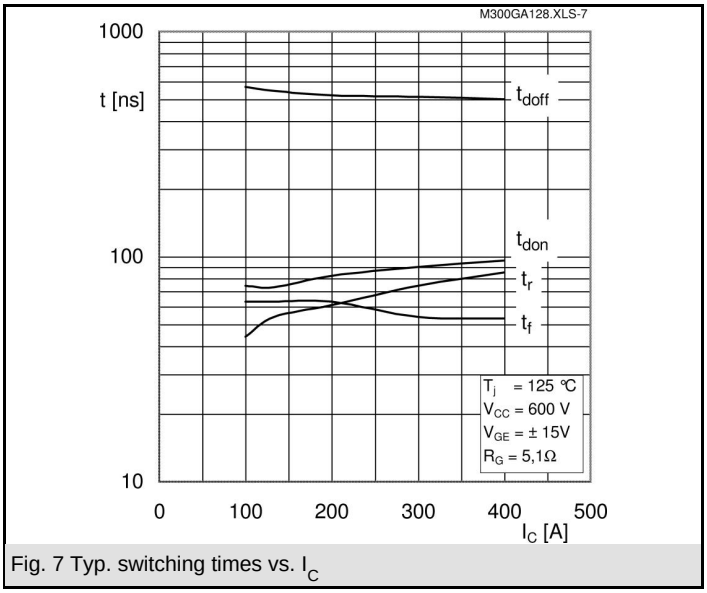

Fig. 7 Typ. switching times vs. I_C

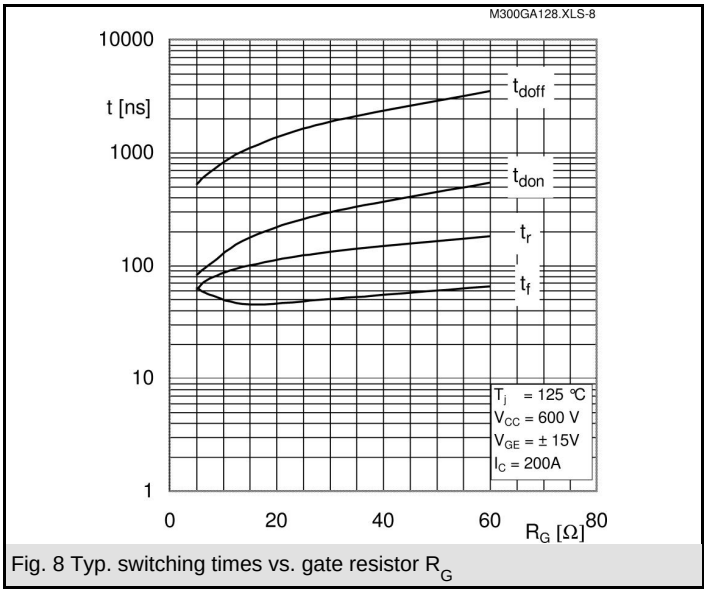

Fig. 8 Typ. switching times vs. gate resistor R_G

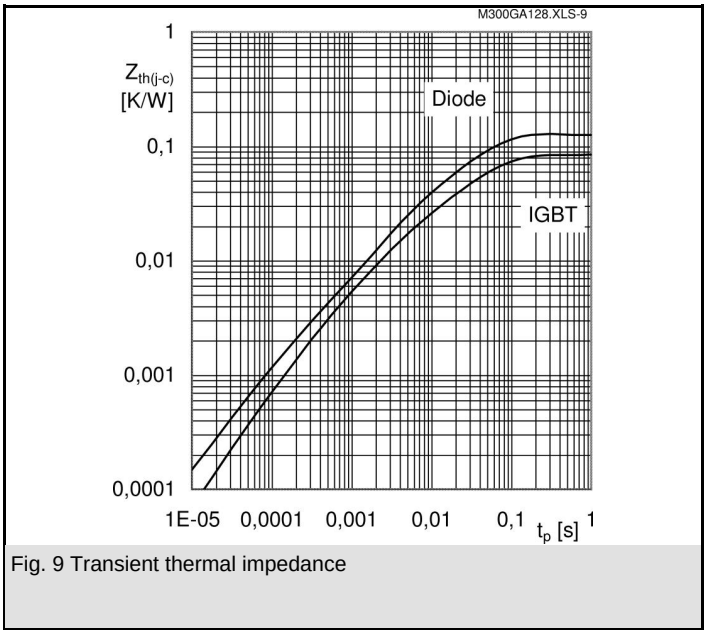

Fig. 9 Transient thermal impedance

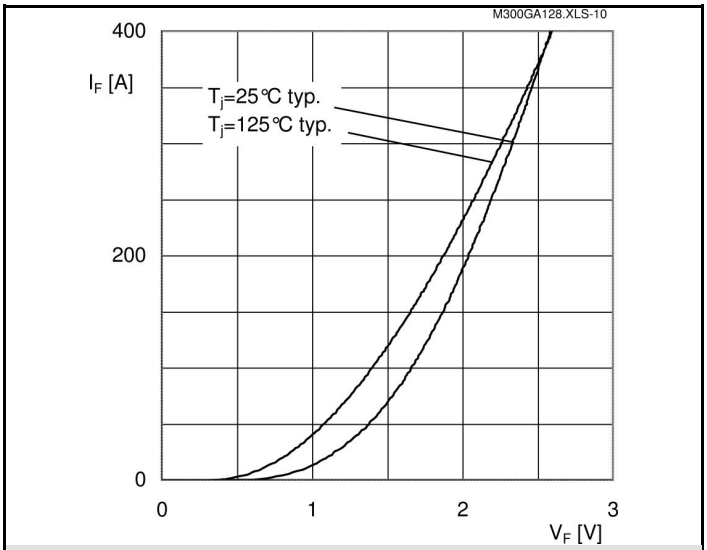

Fig. 10 CAL diode forward characteristic

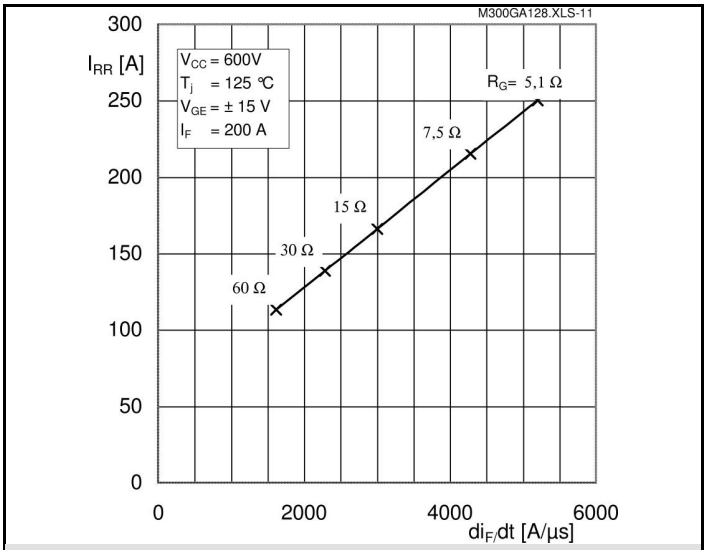

Fig. 11 Typ. CAL diode peak reverse recovery current

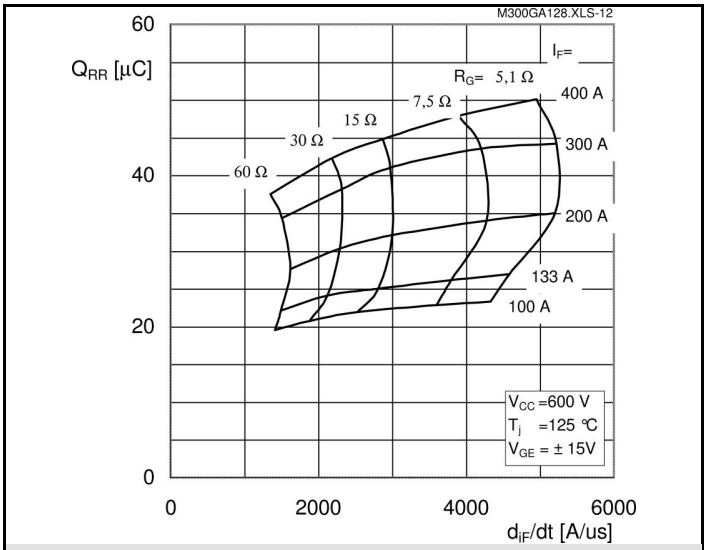

Fig. 12 Typ. CAL diode peak reverse recovery charge

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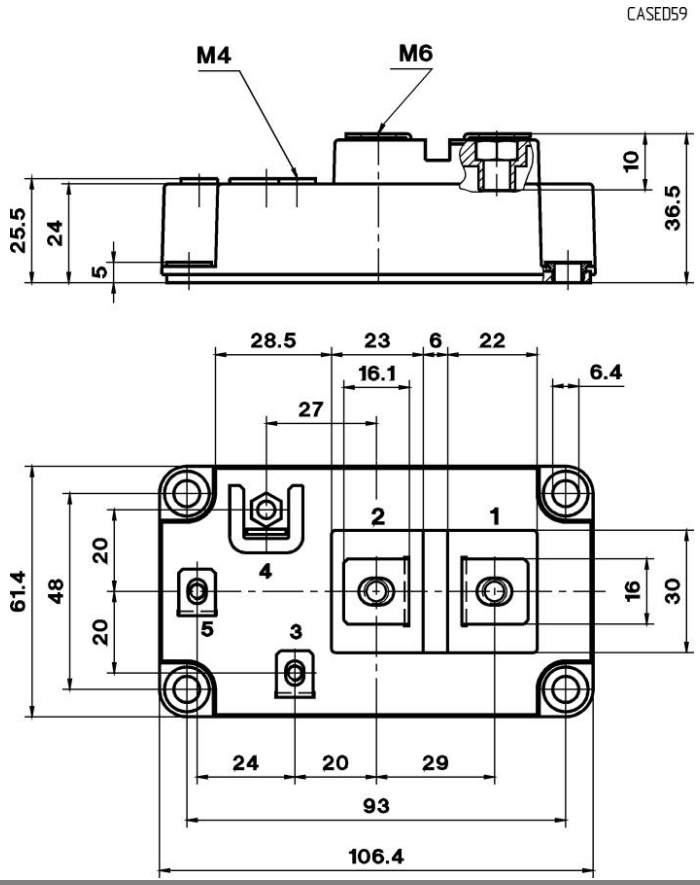
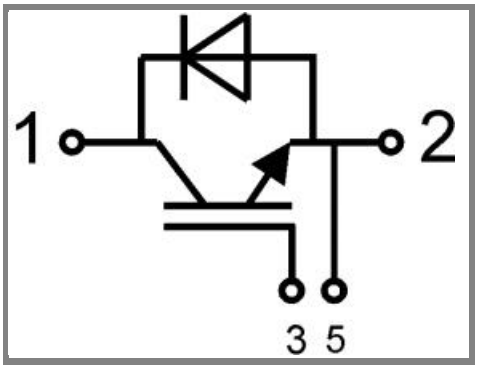
UL Recognized File no. E 63 532



Case D 59



GA Case D 59

