

# SKM 800GA176D



**SEMITRANS® 4**

## Trench IGBT Modules

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### Features

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

### Typical Applications\*

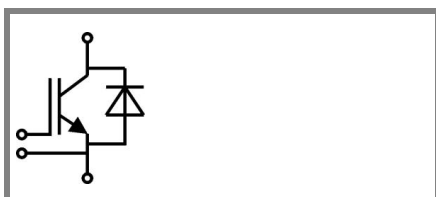
- AC inverter drives mains 575 - 750 V AC
- Public transport (auxiliary syst.)
- Wind power

### Remarks

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

Absolute Maximum Ratings		$T_c = 25$ °C, unless otherwise specified		
Symbol	Conditions	Values		Units
<b>IGBT</b>				
$V_{CES}$	$T_j = 25$ °C	1700		V
$I_C$	$T_j = 150$ °C	$T_c = 25$ °C	830	A
		$T_c = 80$ °C	590	A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	1200		A
$V_{GES}$		± 20		V
$t_{psc}$	$V_{CC} = 1200$ V; $V_{GE} \leq 20$ V; $T_j = 125$ °C $V_{CES} < 1700$ V	10		µs
<b>Inverse Diode</b>				
$I_F$	$T_j = 150$ °C	$T_c = 25$ °C	630	A
		$T_c = 80$ °C	440	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	1200		A
$I_{FSM}$	$t_p = 10$ ms; sin.	$T_j = 150$ °C	3600	A
<b>Module</b>				
$I_{t(RMS)}$		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
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}$ , $I_C = 24$ mA	5,2	5,8	6,4	V
$I_{CES}$	$V_{GE} = 0$ V, $V_{CE} = V_{CES}$			4	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	1,7	2,1	mΩ
		$T_j = 125$ °C	2,5		mΩ
$V_{CE(sat)}$	$I_{Cnom} = 600$ A, $V_{GE} = 15$ V	$T_j = 25$ °C <sub>chiplev.</sub>	2	2,45	V
		$T_j = 125$ °C <sub>chiplev.</sub>	2,45	2,9	V
$C_{ies}$	$V_{CE} = 25$ , $V_{GE} = 0$ V	$f = 1$ MHz	39,6		nF
$C_{oes}$			2,2		nF
$C_{res}$			2,5		nF
$Q_G$	$V_{GE} = -8V...+15V$	4800		nC	
$t_{d(on)}$	$R_{Gon} = 3$ Ω	$V_{CC} = 1200$ V $I_C = 600$ A	230		ns
$t_r$			90		ns
$E_{on}$			335		mJ
$t_{d(off)}$	$R_{Goff} = 3$ Ω	$T_j = 125$ °C $V_{GE} = \pm 15$ V	1030		ns
$t_f$			160		ns
$E_{off}$			245		mJ
$R_{th(j-c)}$	per IGBT	0,04		K/W	



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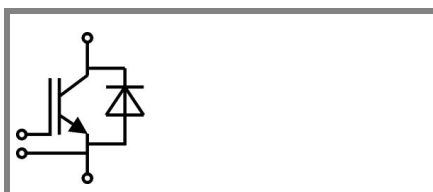
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### Characteristics

Symbol	Conditions	min.	typ.	max.	Units
<b>Inverse Diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 600$ A; $V_{GE} = 0$ V		1,6	1,9	V
	$T_j = 25$ °C <sub>chiplev.</sub>				V
	$T_j = 125$ °C <sub>chiplev.</sub>		1,6		V
$V_{F0}$	$T_j = 25$ °C		1,1	1,3	V
$r_F$	$T_j = 25$ °C		0,83	1	mΩ
$I_{RRM}$	$I_F = 600$ A		650		A
$Q_{rr}$	$di/dt = 6400$ A/μs		230		μC
$E_{rr}$	$V_{GE} = -15$ V; $V_{CC} = 1200$ V		155		mJ
$R_{th(j-c)D}$	per diode			0,07	K/W
<b>Module</b>					
$L_{CE}$			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.

\* 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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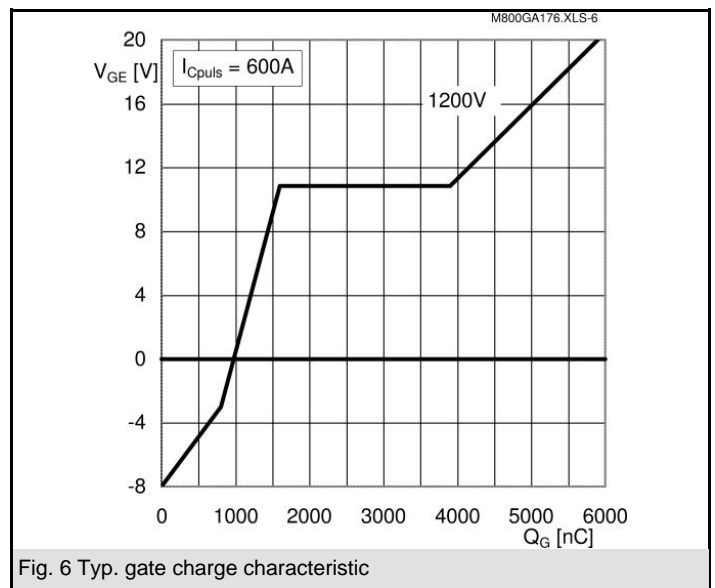
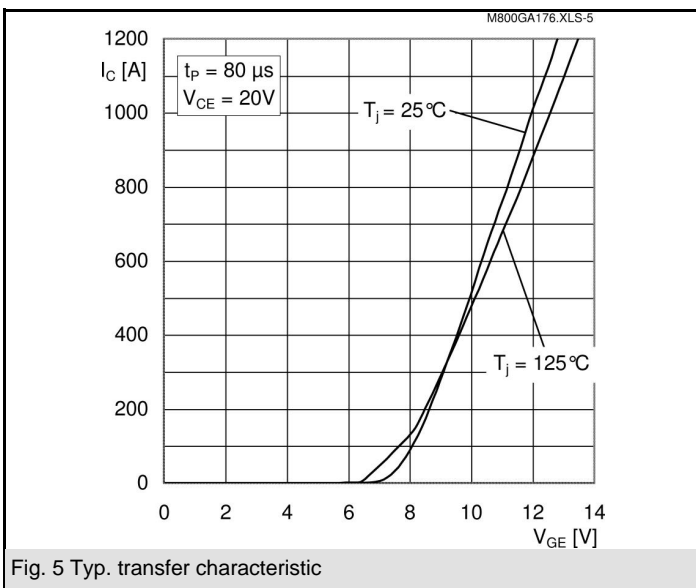
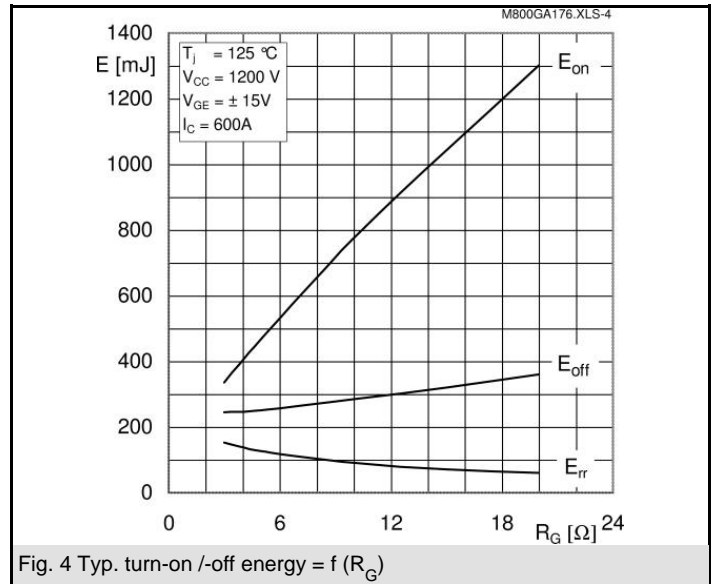
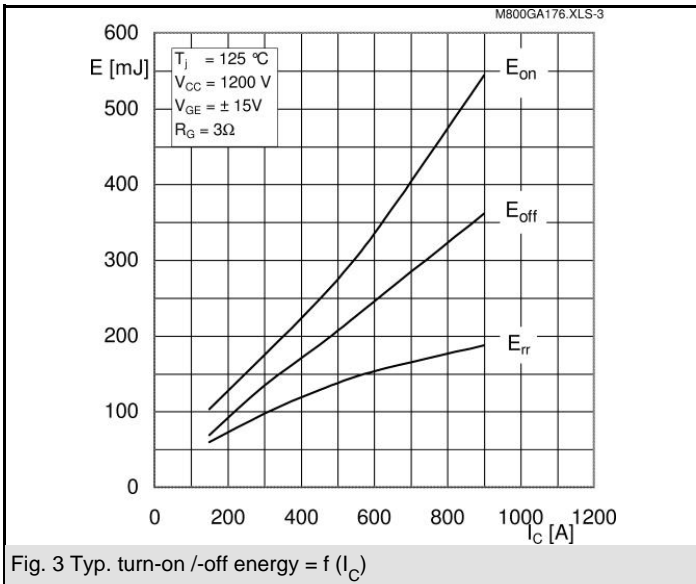
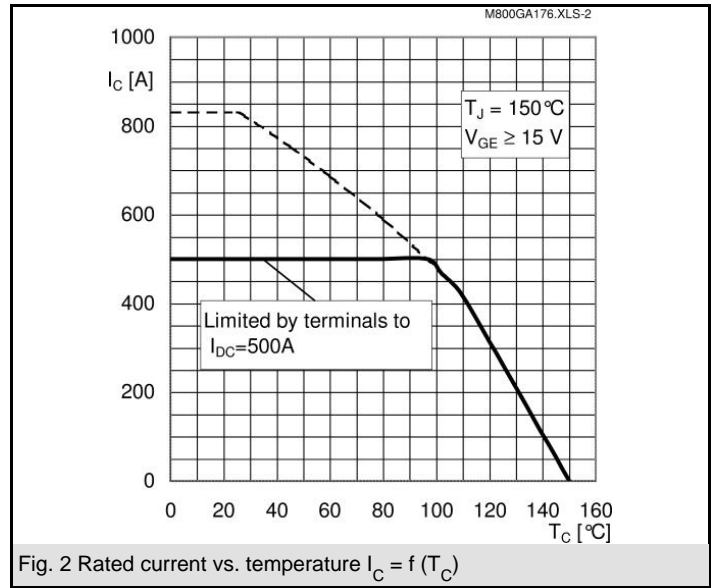
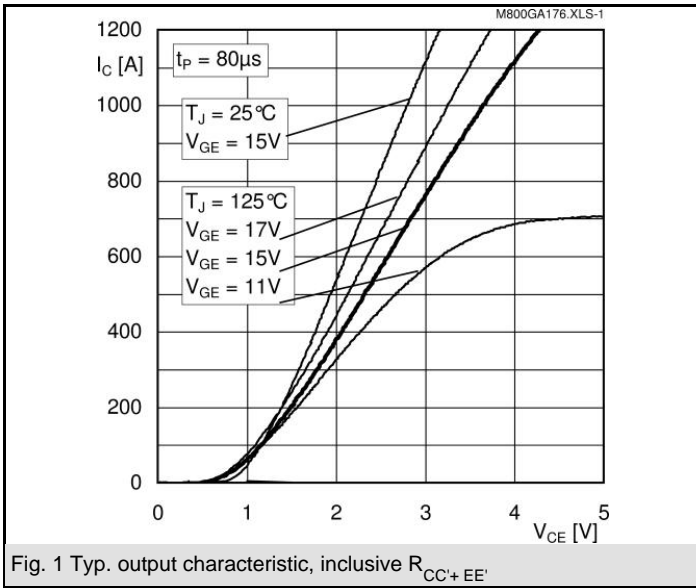
### Remarks

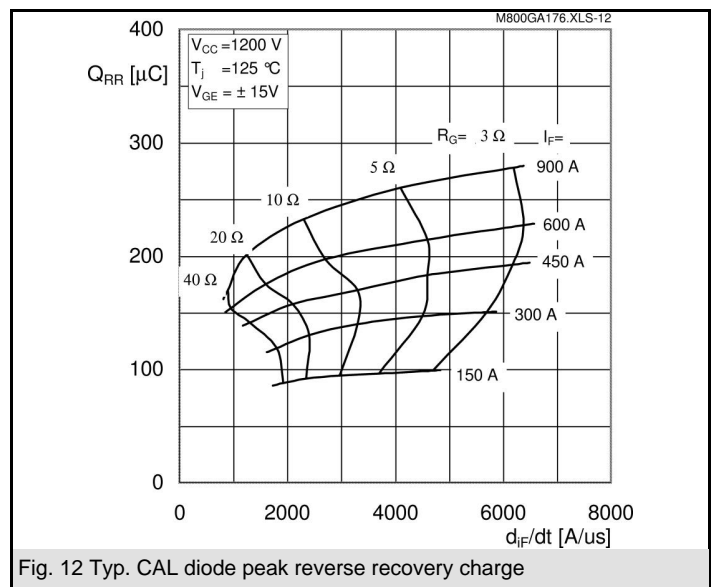
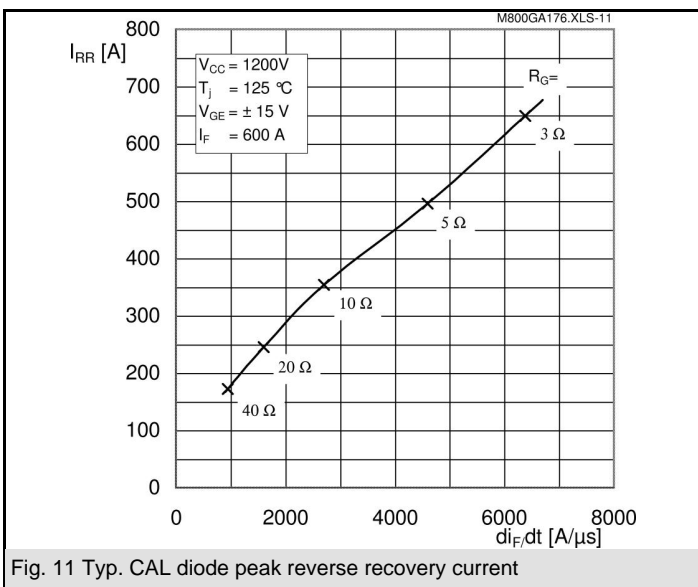
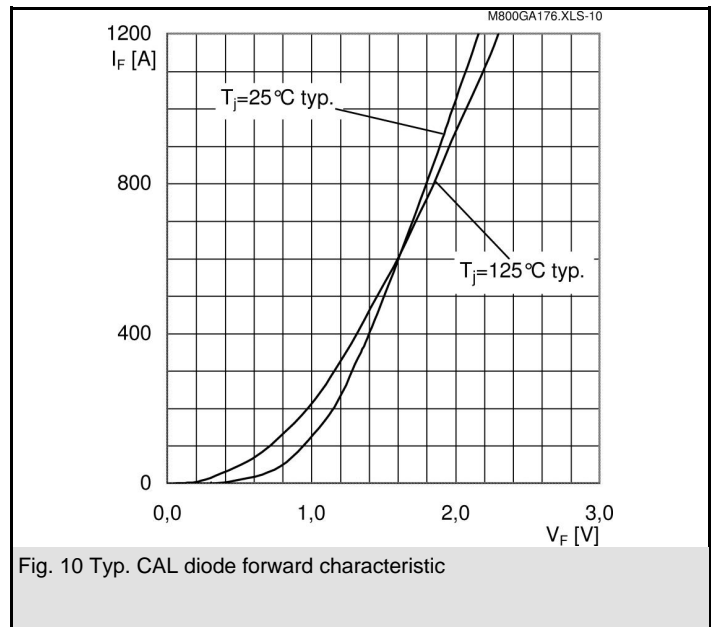
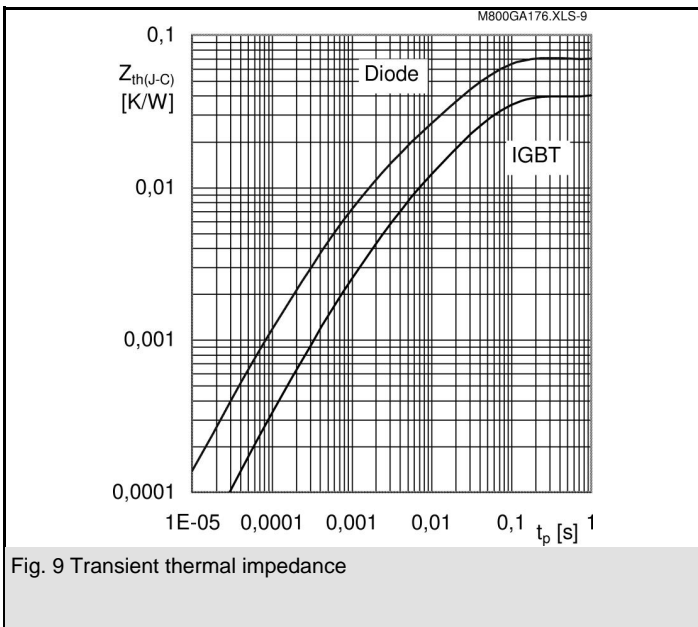
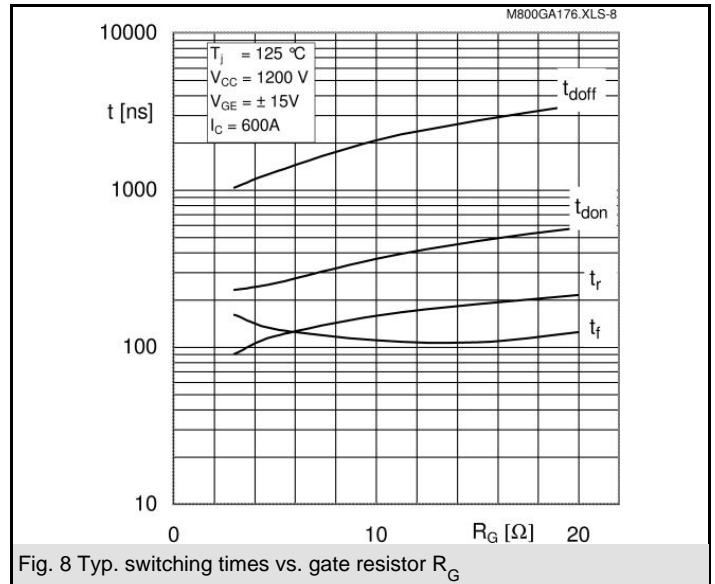
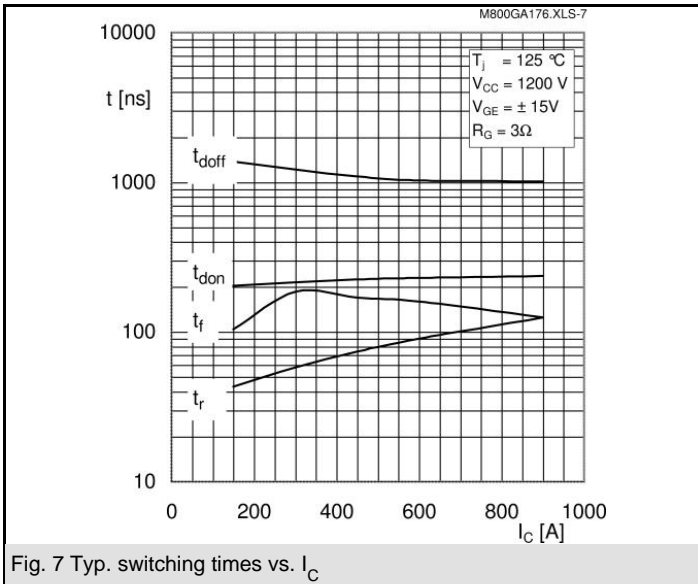
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$Z_{th}$		Conditions	Values	Units
<b><math>Z_{th(j-c)I}</math></b>				
$R_{\theta j-c}$	$i = 1$		28	mk/W
$R_{\theta j-c}$	$i = 2$		9,5	mk/W
$R_{\theta j-c}$	$i = 3$		2,17	mk/W
$R_{\theta j-c}$	$i = 4$		0,33	mk/W
$\tau_{\theta j-c}$	$i = 1$		0,0447	s
$\tau_{\theta j-c}$	$i = 2$		0,02	s
$\tau_{\theta j-c}$	$i = 3$		0,0015	s
$\tau_{\theta j-c}$	$i = 4$		0,0025	s
<b><math>Z_{th(j-c)D}</math></b>				
$R_{\theta j-c}$	$i = 1$		46	mk/W
$R_{\theta j-c}$	$i = 2$		17	mk/W
$R_{\theta j-c}$	$i = 3$		5,9	mk/W
$R_{\theta j-c}$	$i = 4$		1,1	mk/W
$\tau_{\theta j-c}$	$i = 1$		0,05	s
$\tau_{\theta j-c}$	$i = 2$		0,0075	s
$\tau_{\theta j-c}$	$i = 3$		0,002	s
$\tau_{\theta j-c}$	$i = 4$		0,0002	s



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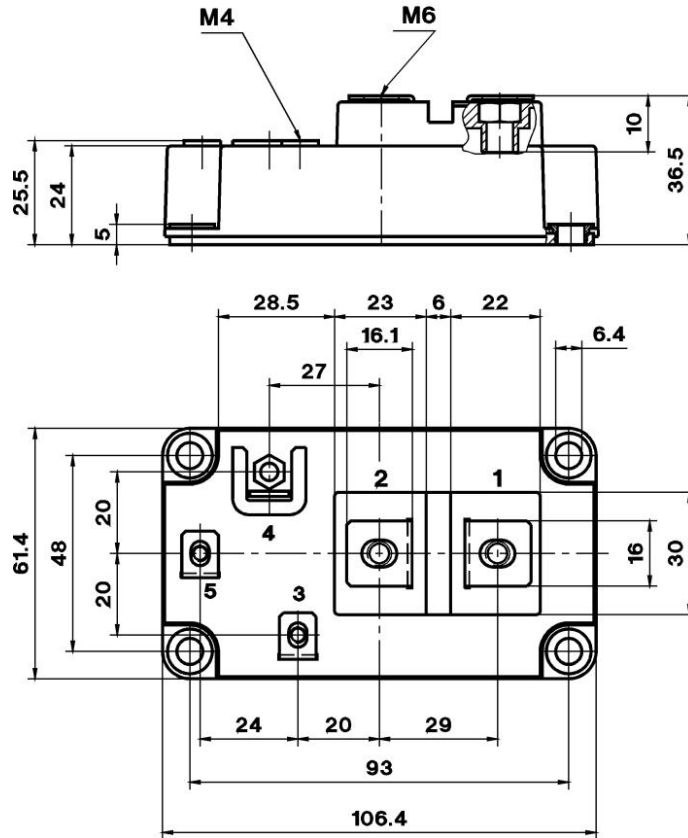


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UL Recognized

CASED59

File no. E 63 532



Case D 59

