

# SKM 600GA125D



**SEMITRANS® 4**

## Ultra Fast IGBT Modules

**SKM 600GA125D**

### Features

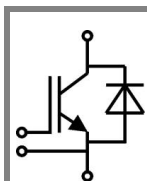
- NPT-IGBT with positive temperature coefficient of  $V_{CEsat}$
- Short circuit self limiting to  $6 \times I_C$
- Corresponds to standards: IEC 60721-3-3 (humidity) class 3K3/IEC 68T.1 climate 40/125/56

### Typical Applications\*

- Resonant inverters upto 100 kHz
- Inductive heating
- Electronic welders at  $f_{SW} > 20$  kHz

### Remarks

- $I_{DC} \leq 500A$  limited by terminals
- Take care of over-voltage caused by stray inductances.



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Absolute Maximum Ratings		$T_C = 25^\circ\text{C}$ , unless otherwise specified			
Symbol	Conditions	Values			Units
<b>IGBT</b>					
$V_{CES}$	$T_j = 25^\circ\text{C}$	1200			V
$I_C$	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	580		A
		$T_{case} = 80^\circ\text{C}$	400		A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	800			A
$V_{GES}$		$\pm 20$			V
$t_{psc}$	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125^\circ\text{C}$ $V_{CES} < 1200\text{ V}$	10			$\mu\text{s}$
<b>Inverse Diode</b>					
$I_F$	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	500		A
		$T_{case} = 80^\circ\text{C}$	350		A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	800			A
$I_{FSM}$	$t_p = 10\text{ ms}; \sin.$	$T_j = 150^\circ\text{C}$	3600		A
<b>Module</b>					
$I_{t(RMS)}$		500			A
$T_{vj}$		- 40 ... + 150 (125)			$^\circ\text{C}$
$T_{stg}$		125			$^\circ\text{C}$
$V_{isol}$	AC, 1 min.	4000			V

Characteristics		$T_C = 25^\circ\text{C}$ , unless otherwise specified				
Symbol	Conditions	min.	typ.	max.	Units	
<b>IGBT</b>						
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 16\text{ mA}$	4,5	5,5	6,5	V	
$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$	$T_j = 25^\circ\text{C}$	0,15		0,45	mA
		$T_j = 125^\circ\text{C}$	1,5		1,75	V
$V_{CE0}$			1,7		V	
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	4,5		5,3	$\text{m}\Omega$
		$T_j = 125^\circ\text{C}$	6			$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 400\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	3,3		3,85	V
		$T_j = 125^\circ\text{C}_{chiplev.}$	4			V
$C_{res}$	$V_{CE} = 25, V_{GE} = 0\text{ V}$			36	nF	
$C_{oes}$				3,8	nF	
$C_{res}$				3,5	nF	
$Q_G$	$V_{GE} = -8\text{ V} - +20\text{ V}$	4400			nC	
$R_{Gint}$	$T_j = ^\circ\text{C}$	1,25			$\Omega$	
$t_{d(on)}$	$R_{Gon} = 2,5\ \Omega$	$V_{CC} = 600\text{ V}$ $I_C = 400\text{ A}$	80		ns	
$t_r$			70		ns	
$E_{on}$			30		mJ	
$t_{d(off)}$	$R_{Goff} = 2,5\ \Omega$	$T_j = 125^\circ\text{C}$ $V_{GE} = \pm 15\text{ V}$	570		ns	
$t_f$			60		ns	
$E_{off}$					mJ	
$R_{th(j-c)}$	per IGBT	0,041			K/W	



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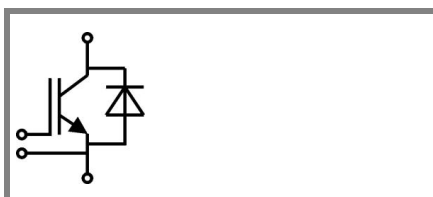
### Remarks

- $I_{DC} \leq 500A$  limited by terminals
- Take care of over-voltage caused by stray inductances.

Characteristics			min.	typ.	max.	Units
Symbol	Conditions					
<b>Inverse Diode</b>						
$V_F = V_{EC}$	$I_{Fnom} = 400 A$ ; $V_{GE} = 0 V$	$T_j = 25^\circ C_{chiplev.}$ $T_j = 125^\circ C_{chiplev.}$		2 1,8	2,5	V V
$V_{F0}$		$T_j = 25^\circ C$ $T_j = 125^\circ C$		1,1	1,2	V V
$r_F$		$T_j = 25^\circ C$ $T_j = 125^\circ C$		2,3	3,3	mΩ mΩ
$I_{RRM}$ $Q_{rr}$ $E_{rr}$	$I_F = 400 A$ $V_{GE} = 0 V$ ; $V_{CC} = 600 V$	$T_j = 125^\circ C$		460 65		A μC mJ
$R_{th(j-c)D}$	per diode				0,09	K/W
<b>Module</b>						
$L_{CE}$				15	20	nH
$R_{CC+EE}$	res., terminal-chip	$T_{case} = ^\circ C$		0,18		mΩ
$R_{th(c-s)}$	per module				0,038	K/W
$M_s$	to heat sink			3	5	Nm
$M_t$	to terminals			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 staff.



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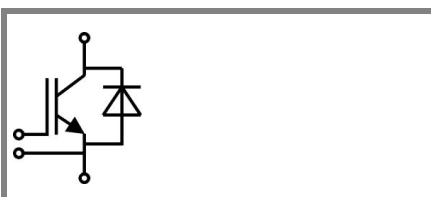
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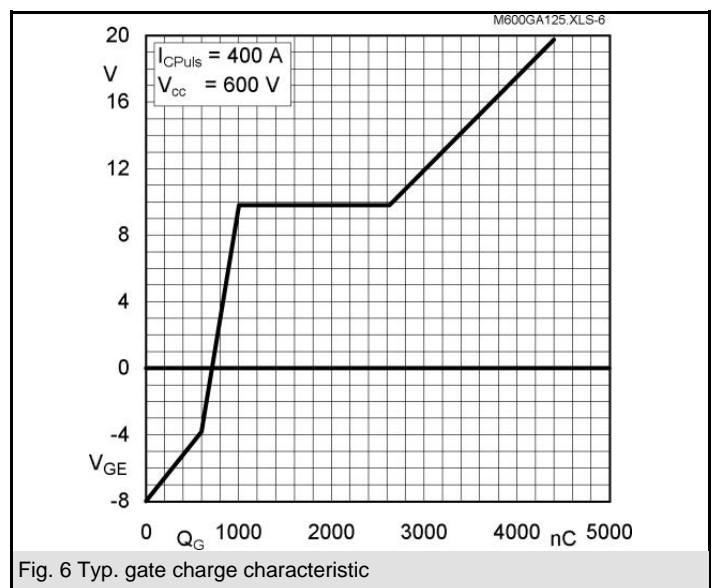
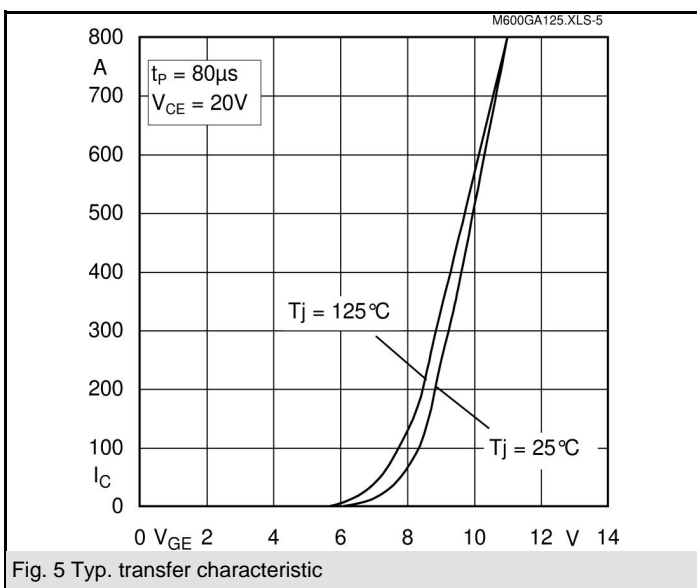
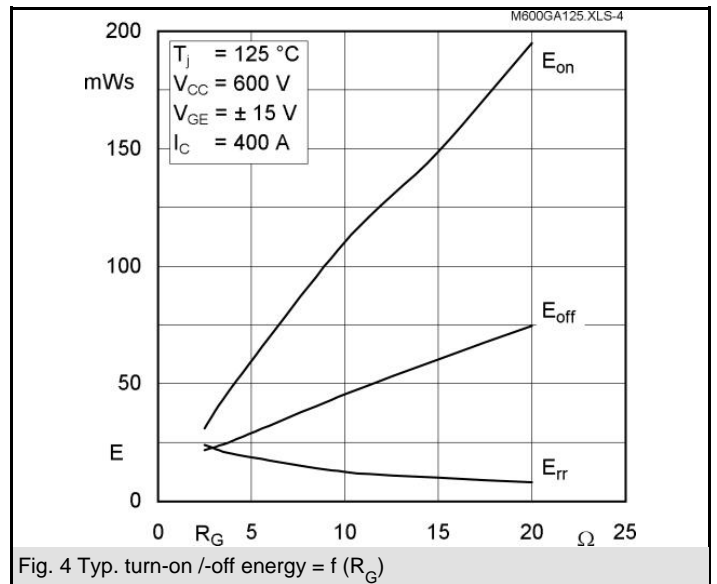
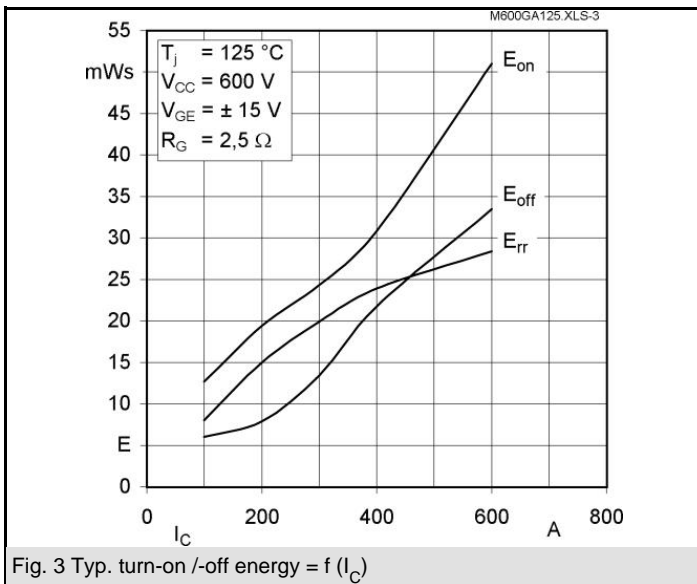
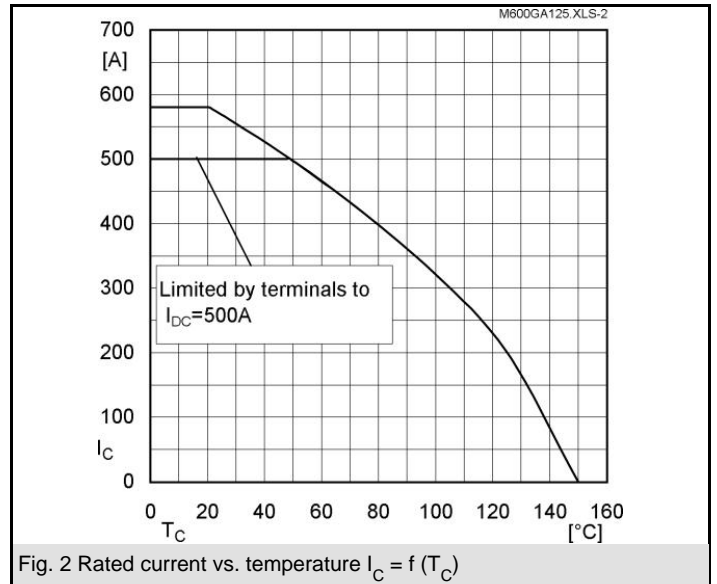
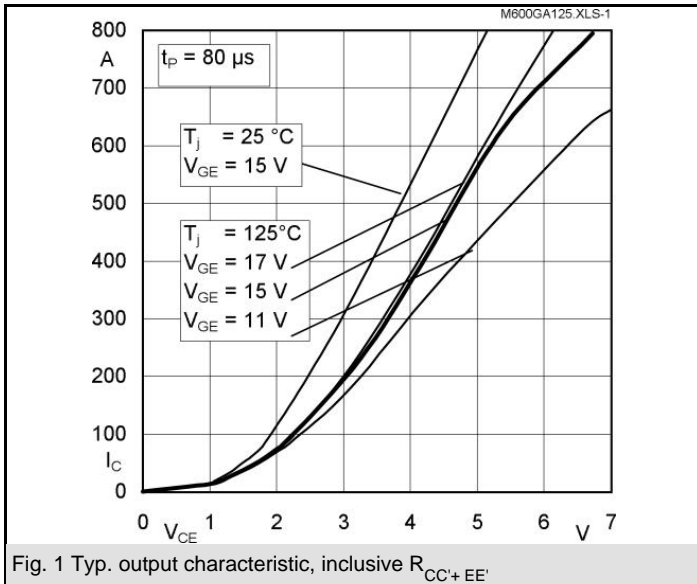
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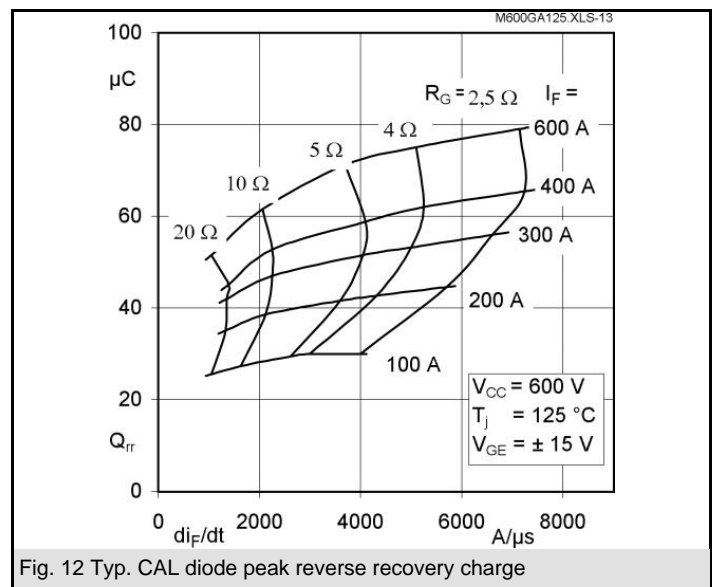
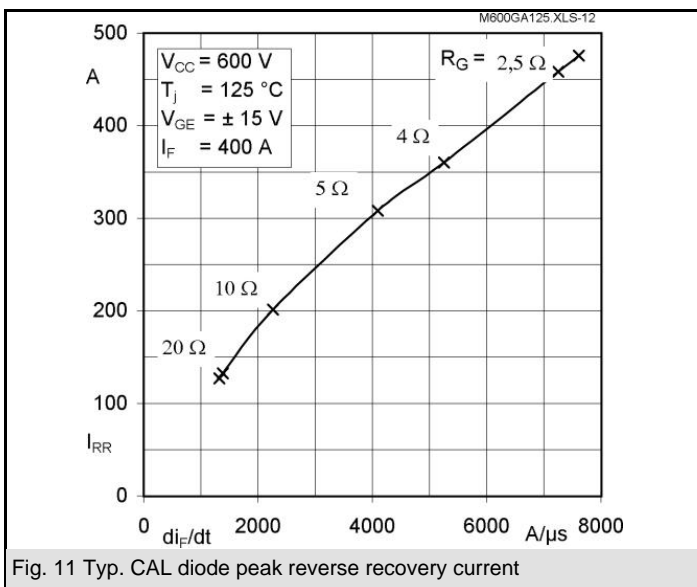
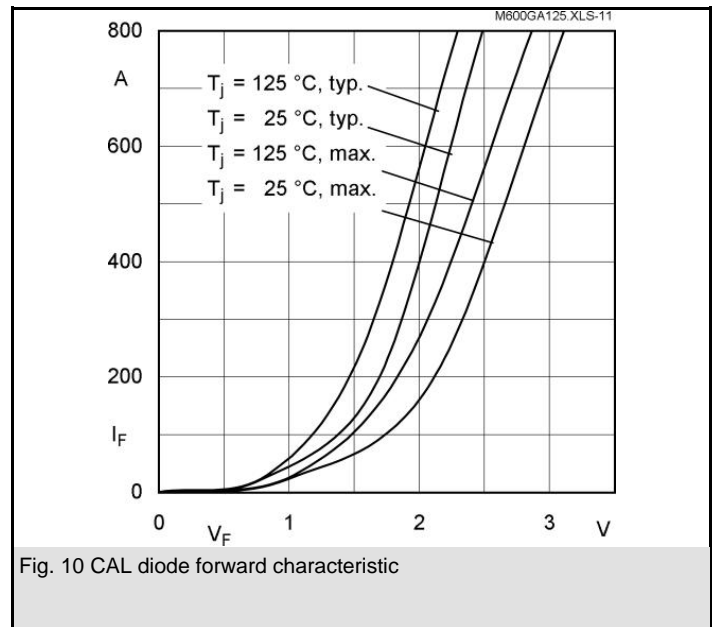
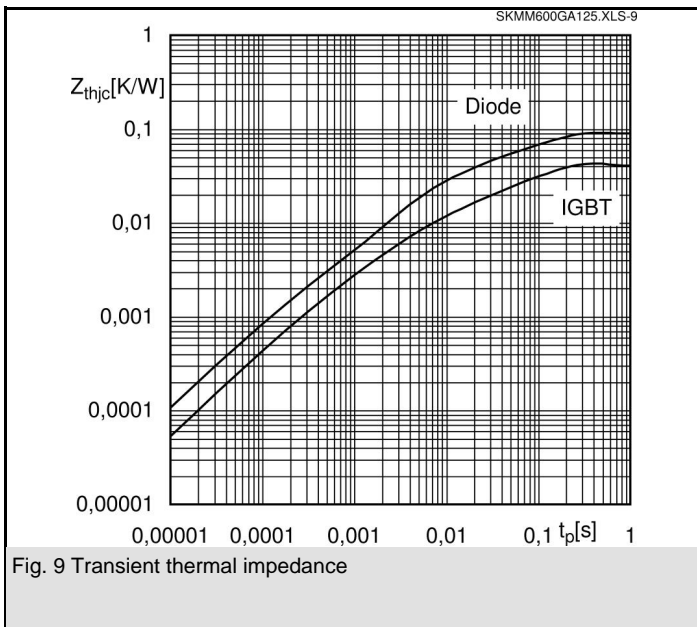
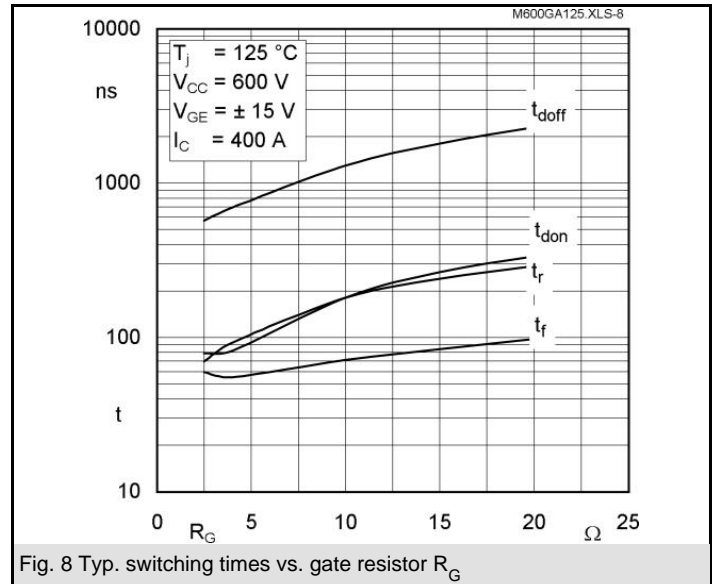
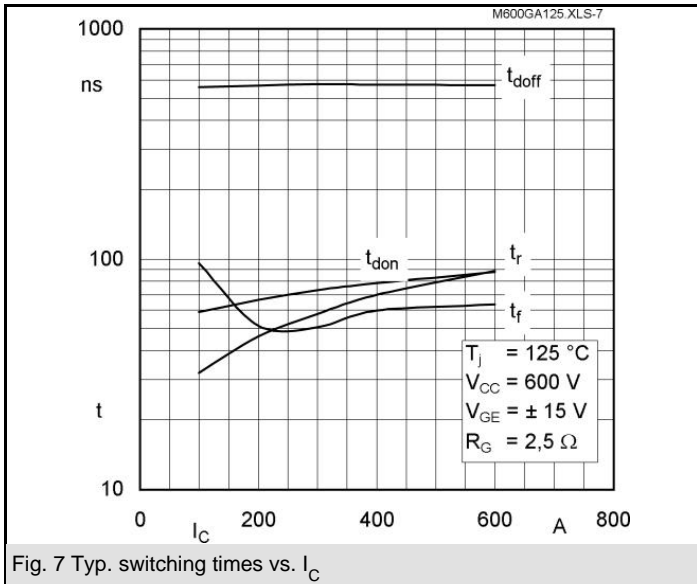
- $I_{DC} \leq 500A$  limited by terminals
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$Z_{th}$ Symbol	Conditions	Values	Units
<b><math>Z_{th(j-c)I}</math></b>			
$R_{\theta j-c}$	$i = 1$	29	mk/W
$R_{\theta j-c}$	$i = 2$	9	mk/W
$R_{\theta j-c}$	$i = 3$	2,6	mk/W
$R_{\theta j-c}$	$i = 4$	0,4	mk/W
$\tau_{\theta j-c}$	$i = 1$	0,1043	s
$\tau_{\theta j-c}$	$i = 2$	0,009	s
$\tau_{\theta j-c}$	$i = 3$	0,001	s
$\tau_{\theta j-c}$	$i = 4$	0,0002	s
<b><math>Z_{th(j-c)D}</math></b>			
$R_{\theta j-c}$	$i = 1$	62	mk/W
$R_{\theta j-c}$	$i = 2$	23	mk/W
$R_{\theta j-c}$	$i = 3$	4,2	mk/W
$R_{\theta j-c}$	$i = 4$	0,8	mk/W
$\tau_{\theta j-c}$	$i = 1$	0,0566	s
$\tau_{\theta j-c}$	$i = 2$	0,0166	s
$\tau_{\theta j-c}$	$i = 3$	0,0015	s
$\tau_{\theta j-c}$	$i = 4$	0,0002	s



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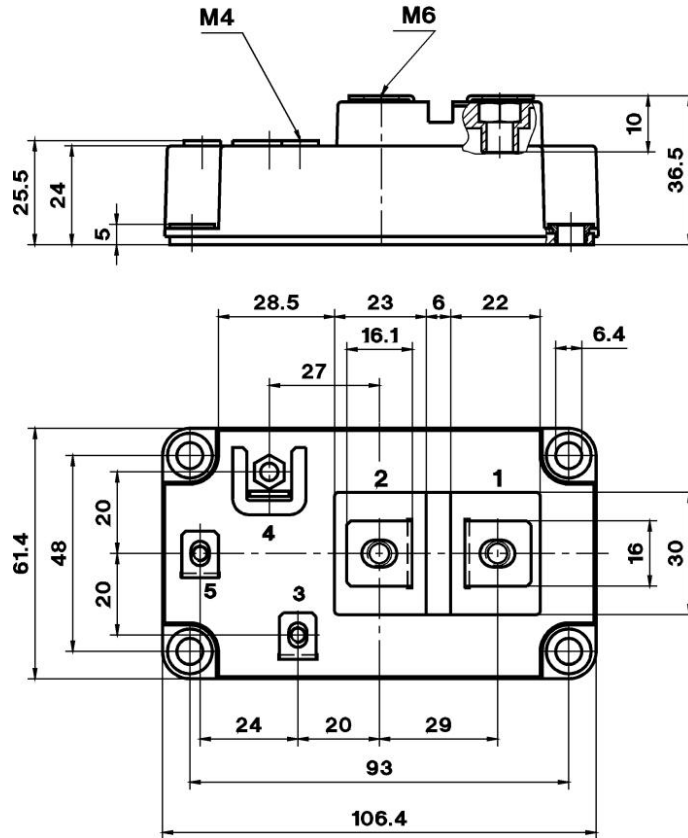


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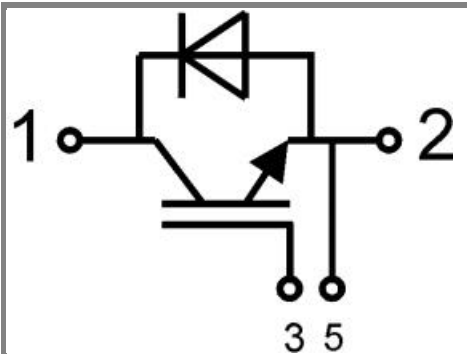
UL Recognized

CASED59

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Case D 59



Case D59

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