



SEMITRANS® 4

Ultra Fast IGBT Modules

SKM 600GA125D

Preliminary Data

Features

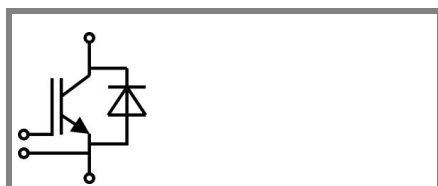
- NPT-IGBT with positive temperature coefficient of V_{CEsat}
- Short circuit self limiting to $6 \times I_C$
- Corresponds to standards: IEC 60721-3-3 (humidity) class 3K3/IEC 68T.1 climate 40/125/56

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
IGBT					
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}				± 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	μs
Inverse Diode					
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
Module					
$I_{t(RMS)}$				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 °C, unless otherwise specified			
Symbol	Conditions		min.	typ.	max.	Units
IGBT						
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 16 mA		4,5	5,5	6,5	V
I _{CES}	V _{GE} = 0 V, V _{CE} = V _{CES} T _j = 25 °C			0,15	0,45	mA
V _{CE0}	T _j = 25 °C			1,5	1,75	V
	T _j = 125 °C			1,7		V
r _{CE}	V _{GE} = 15 V	T _j = 25°C		4,5	5,3	mΩ
		T _j = 125°C		6		mΩ
V _{CE(sat)}	I _{Cnom} = 400 A, V _{GE} = 15 V	T _j = 25°C _{chiplev.}		3,3	3,85	V
		T _j = 125°C _{chiplev.}		4		V
C _{ies}	V _{CE} = 25, V _{GE} = 0 V	f = 1 MHz		36		nF
C _{oes}				3,8		nF
C _{res}				3,5		nF
Q _G	V _{GE} = -8V - +20V			4400		nC
R _{Gint}	T _j = °C			1,25		Ω
t _{d(on)}	R _{Gon} = 2,5 Ω	V _{CC} = 600V I _{Cnom} = 400A T _j = 125 °C V _{GE} = ± 15V		80		ns
t _r				70		ns
E _{on}				30		mJ
t _{d(off)}	R _{Goff} = 2,5 Ω			570		ns
t _f				60		ns
E _{off}					mJ	
R _{th(j-c)}	per IGBT				0,041	K/W

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

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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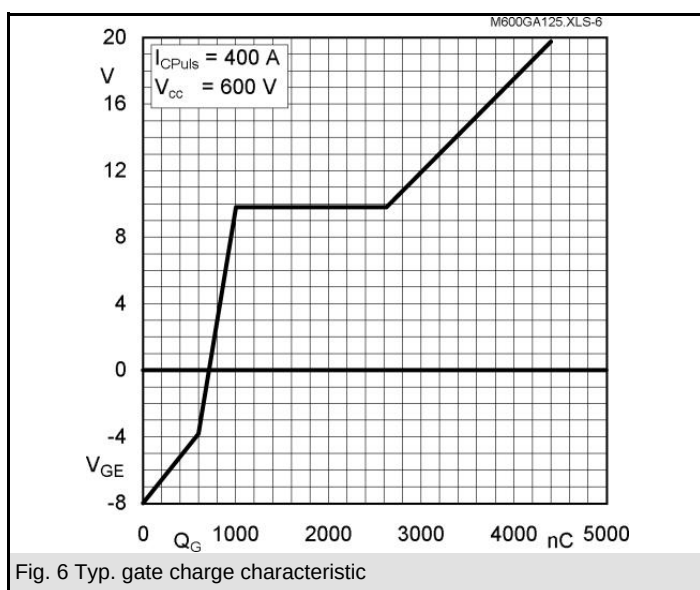
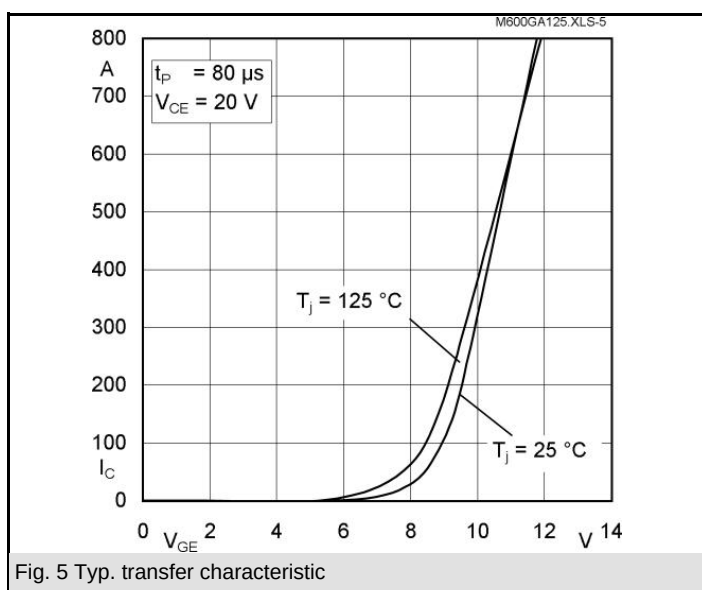
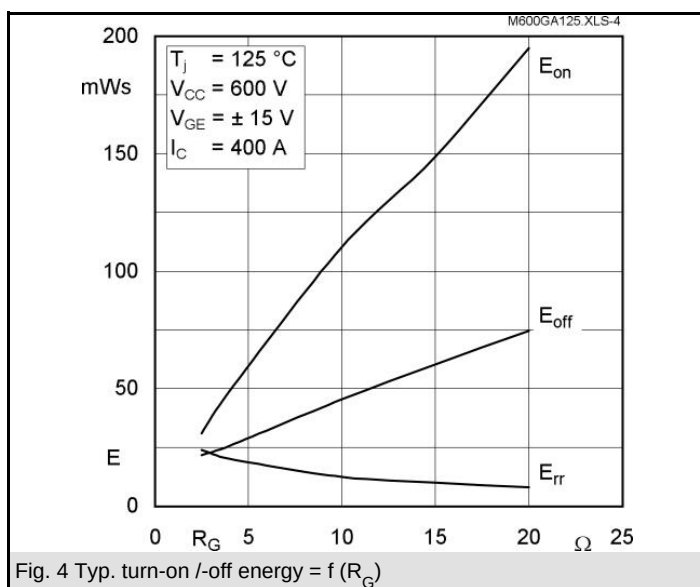
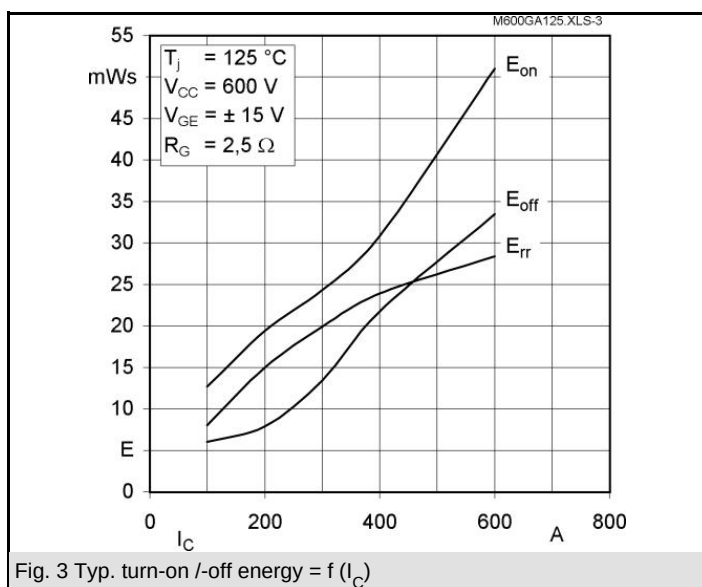
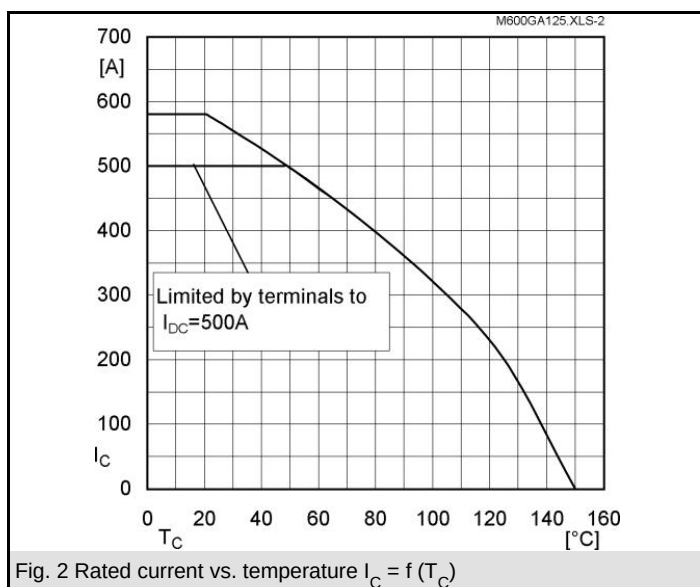
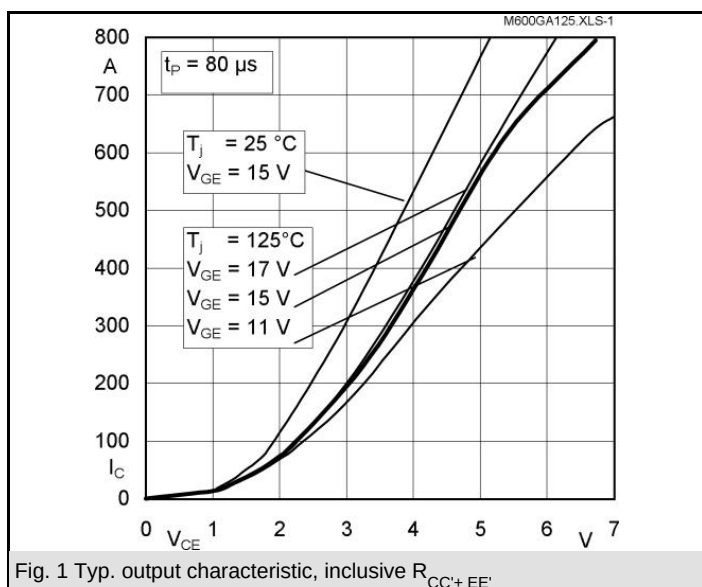
Remarks

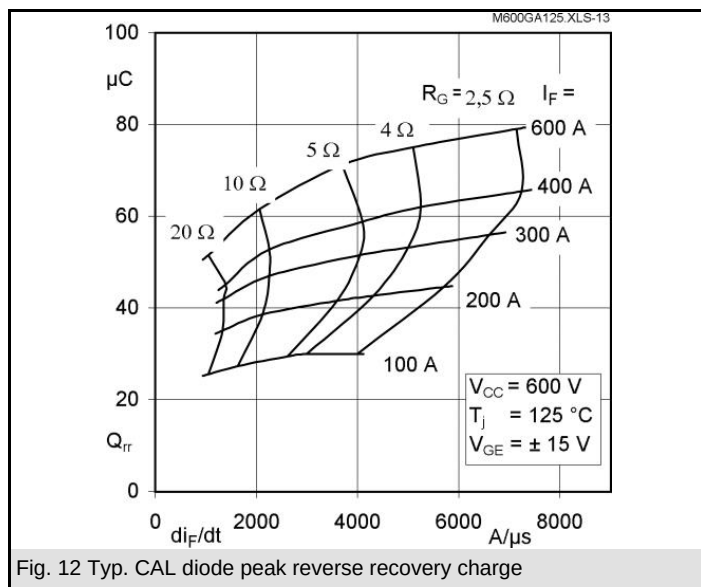
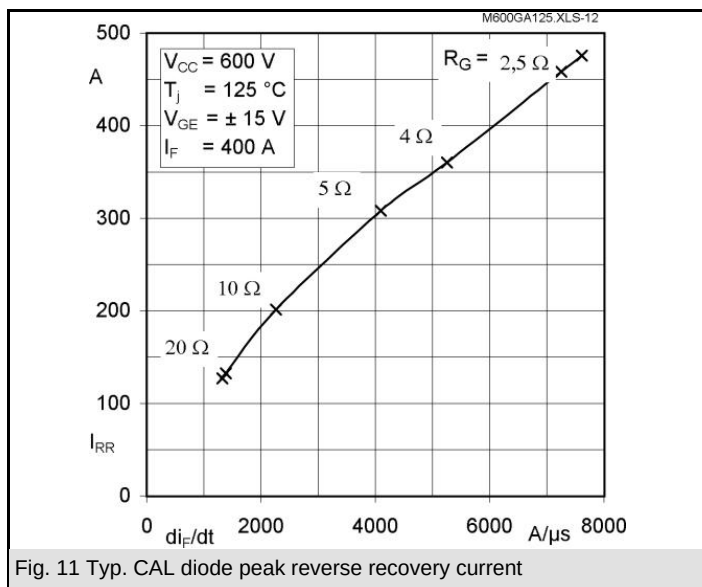
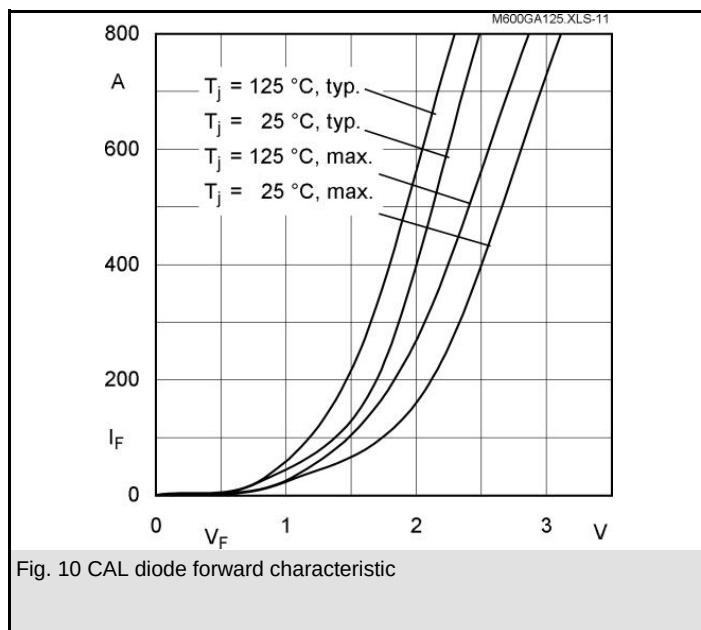
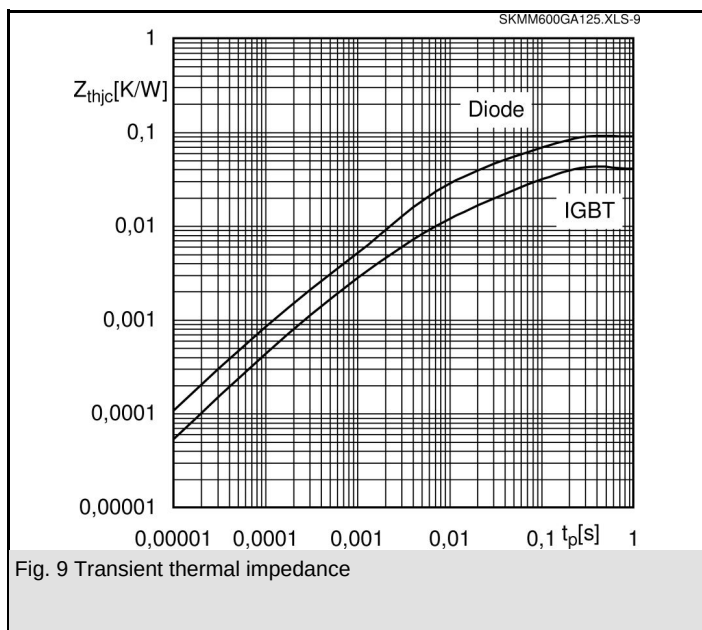
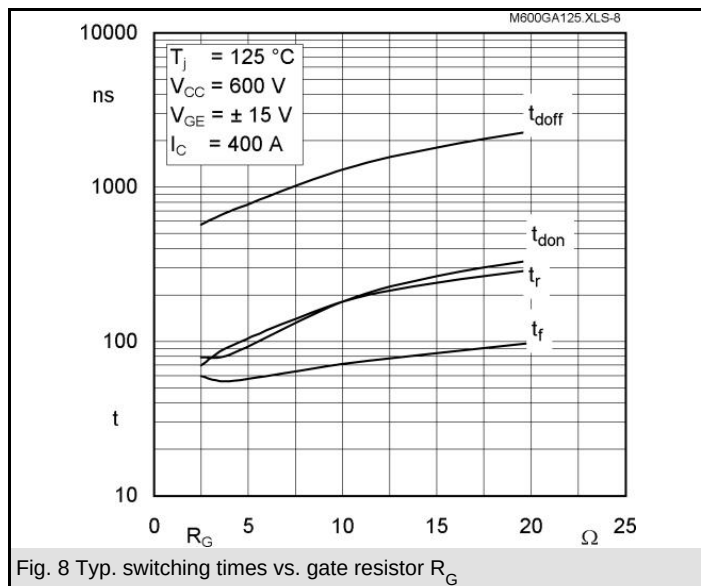
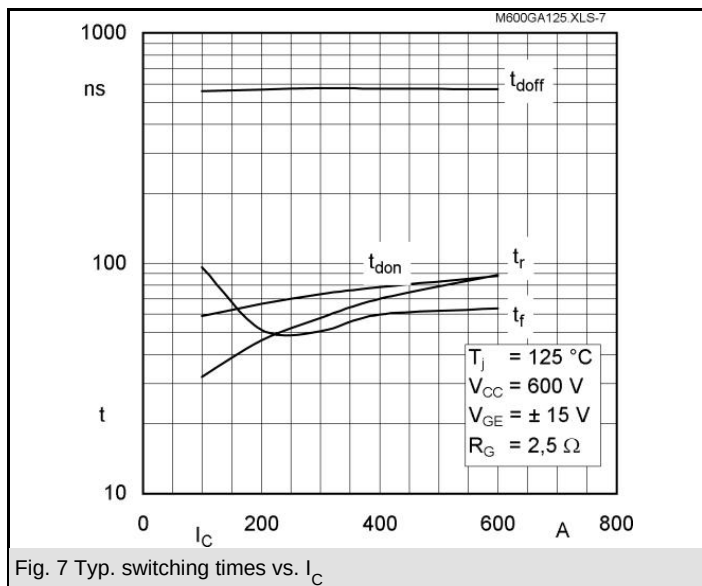
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- Take care of over-voltage caused by stray inductances.

Z_{th}			
Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	$i = 1$	29	mk/W
R_i	$i = 2$	9	mk/W
R_i	$i = 3$	2,6	mk/W
R_i	$i = 4$	0,4	mk/W
τ_{u_i}	$i = 1$	0,1043	s
τ_{u_i}	$i = 2$	0,009	s
τ_{u_i}	$i = 3$	0,001	s
τ_{u_i}	$i = 4$	0,0002	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
τ_{u_i}	$i = 1$	0,0566	s
τ_{u_i}	$i = 2$	0,0166	s
τ_{u_i}	$i = 3$	0,0015	s
τ_{u_i}	$i = 4$	0,0002	s



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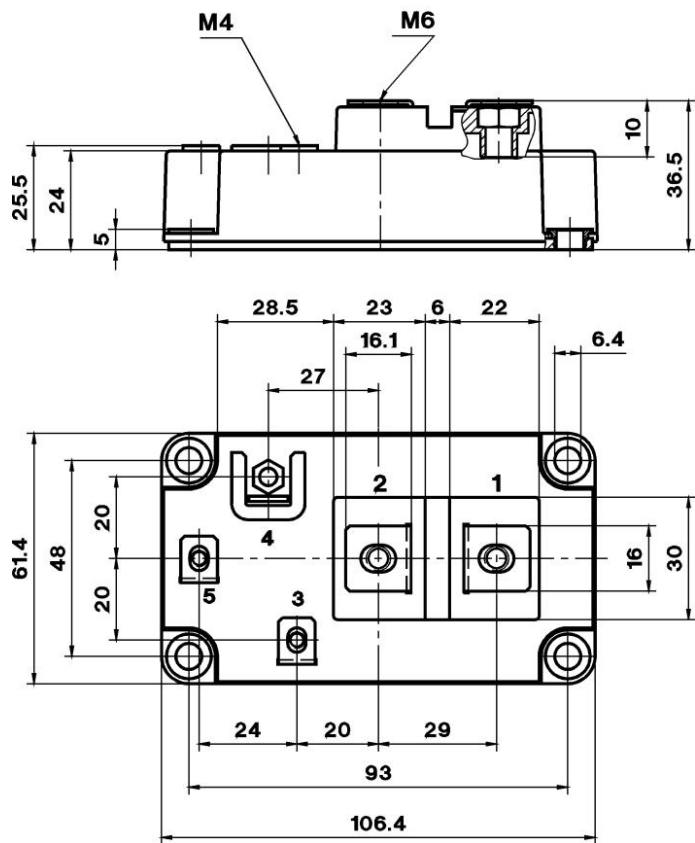


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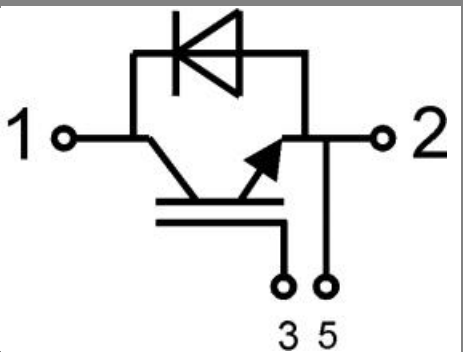
UL Recognized

CASED59

File 63 532



Case D 59



Case D59

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