

SKM 500GA123D



SEMITRANS® 4

IGBT Modules

SKM 500GA123D

SKM 500GA123DS

Features

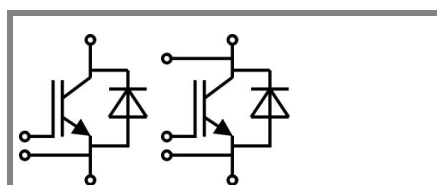
- MOS input (voltage controlled)
- N channel, homogeneous Si
- Low inductance case
- Very low tail current with low temperature dependence
- High short circuit capability, self limiting to $6 \times I_{Cnom}$
- Latch-up free
- Fast & soft CAL diodes
- Isolated copper baseplate using DBC Direct Copper Bonding Technology
- Large clearance (12 mm) and creepage distances (20 mm)

Typical Applications

- AC inverter drives
- UPS

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	500	A
		T _{case} = 80 °C	420	A
I _{CRM}	I _{CRM} =2xI _{Cnom}		800	A
V _{GES}			± 20	V
t _{psc}	V _{CC} = 600 V; V _{GE} ≤ 20 V; T _j = 125 °C V _{CES} < 1200 V		10	µs
Inverse Diode				
I _F	T _j = 150 °C	T _{case} = 25 °C	500	A
		T _{case} = 80 °C	350	A
I _{FRM}	I _{FRM} =2xI _{Fnom}		800	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.		2500	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			0,1	0,3	mA
V _{CE0}	T _j = 25 °C			1,4	1,6	V
	T _j = 125 °C			1,6	1,8	V
r _{CE}	V _{GE} = 15 V T _j = 25 °C			2,75	3,5	mΩ
	T _j = 125 °C			3,75	4,75	mΩ
V _{CE(sat)}	I _{Cnom} = 400 A, V _{GE} = 15 V T _j = °C _{chiplev.}			2,5	3	V
C _{ies}	V _{CE} = 25, V _{GE} = 0 V f = 1 MHz			26	40	nF
C _{oes}				4	5,2	nF
C _{res}				2	2,6	nF
R _{Gint}	T _j = °C			1,25		Ω
t _{d(on)}	R _{Gon} = 3,3 Ω	V _{CC} = 600V I _{Cnom} = 400A		250	600	ns
t _r				170	340	ns
E _{on}				45		mJ
t _{d(off)}	R _{Goff} = 3,3 Ω	T _j = 125 °C V _{GE} = ± 15V		900	1100	ns
t _f				100	125	ns
E _{off}						mJ
R _{th(i-c)}	per IGBT				0,041	K/W



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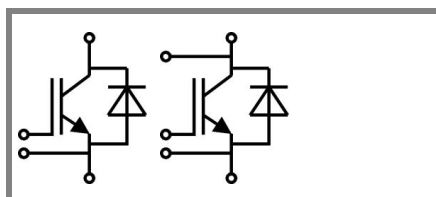
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Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 400 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{\text{chiplev.}}$	2	2,5	V
		$T_j = 125 \text{ }^\circ\text{C}_{\text{chiplev.}}$	1,8		V
V_{F0}		$T_j = 25 \text{ }^\circ\text{C}$	1,1	1,2	V
		$T_j = 125 \text{ }^\circ\text{C}$			V
r_F		$T_j = 25 \text{ }^\circ\text{C}$	2,3	3,3	mΩ
		$T_j = 125 \text{ }^\circ\text{C}$			mΩ
I_{RRM}	$I_{Fnom} = 400 \text{ A}$	$T_j = 25 \text{ }^\circ\text{C}$	90		A
Q_{rr}	$di/dt = 2000 \text{ A}/\mu\text{s}$		15		μC
E_{rr}	$V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$				mJ
$R_{th(j-c)D}$	per diode			0,09	K/W
Freewheeling Diode					
$V_F = V_{EC}$	$I_{Fnom} = \text{A}; V_{GE} = \text{V}$	$T_j = \text{ }^\circ\text{C}_{\text{chiplev.}}$			V
V_{F0}		$T_j = 25 \text{ }^\circ\text{C}$			V
		$T_j = 125 \text{ }^\circ\text{C}$			V
r_F		$T_j = 25 \text{ }^\circ\text{C}$			V
		$T_j = 125 \text{ }^\circ\text{C}$			V
I_{RRM}	$I_{Fnom} = \text{A}$	$T_j = \text{ }^\circ\text{C}$			A
Q_{rr}					μC
E_{rr}	$V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$				mJ
	per diode				K/W
Module					
L_{CE}			15	20	nH
R_{CC+EE}	res., terminal-chip	$T_{\text{case}} = 25 \text{ }^\circ\text{C}$	0,18		mΩ
		$T_{\text{case}} = 125 \text{ }^\circ\text{C}$	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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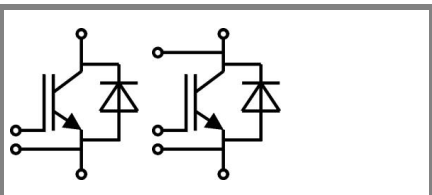
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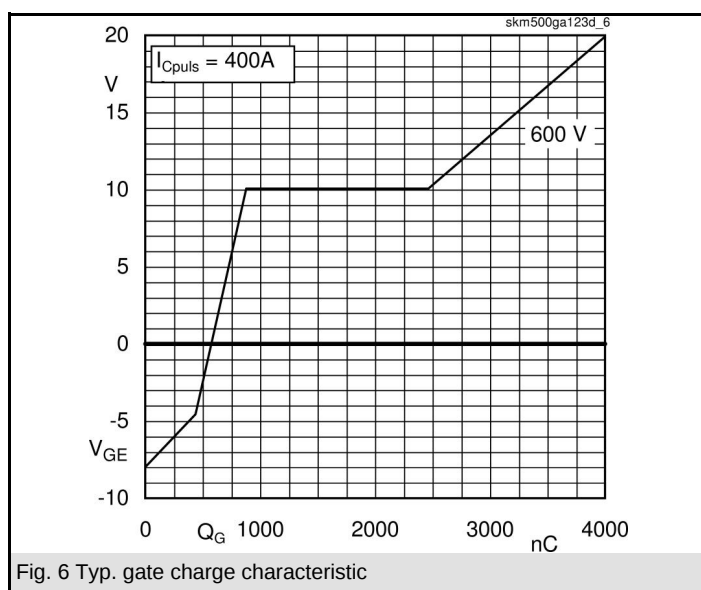
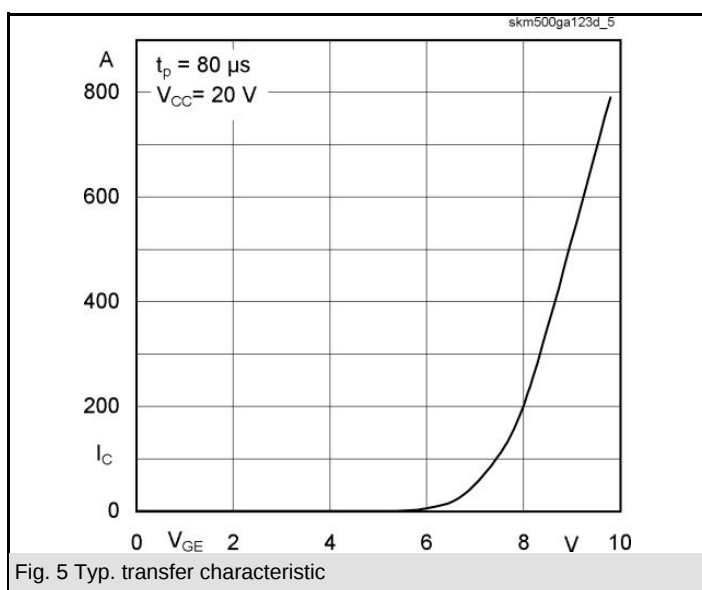
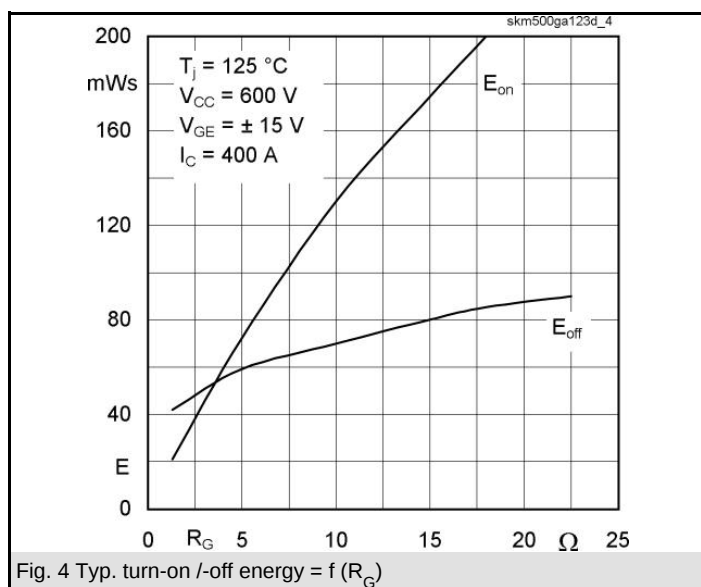
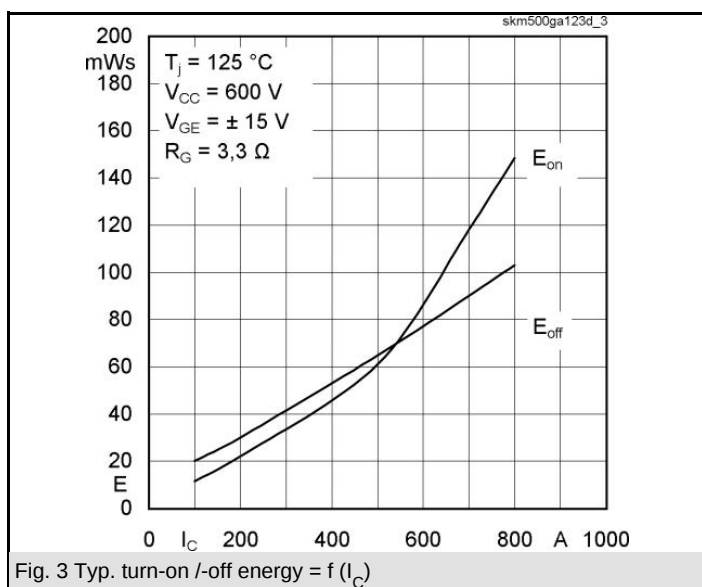
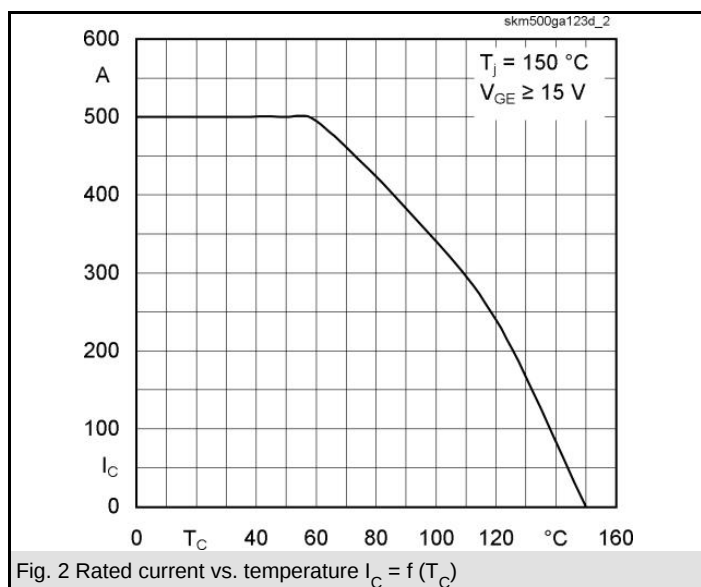
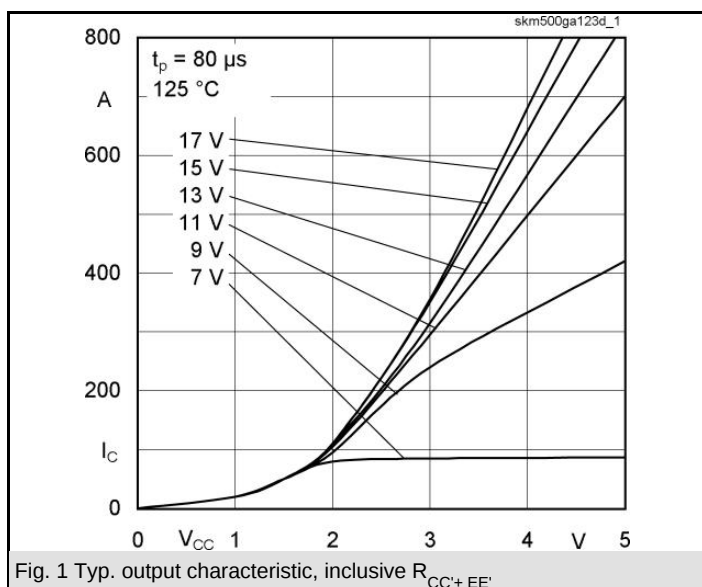
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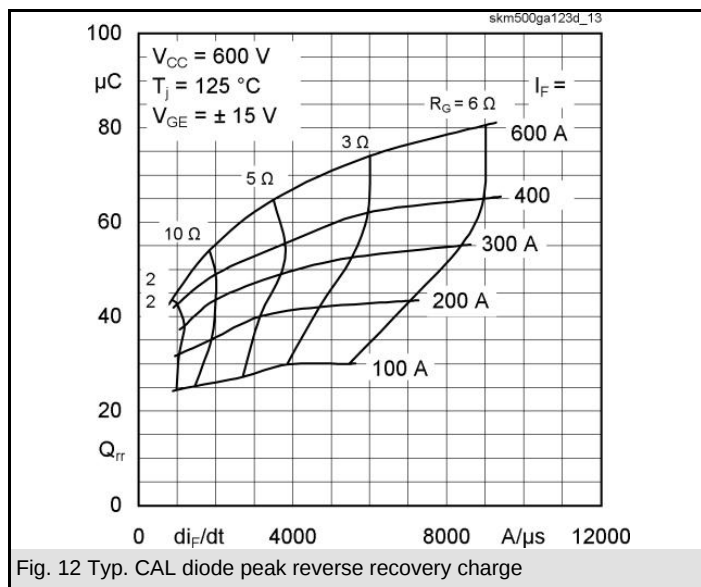
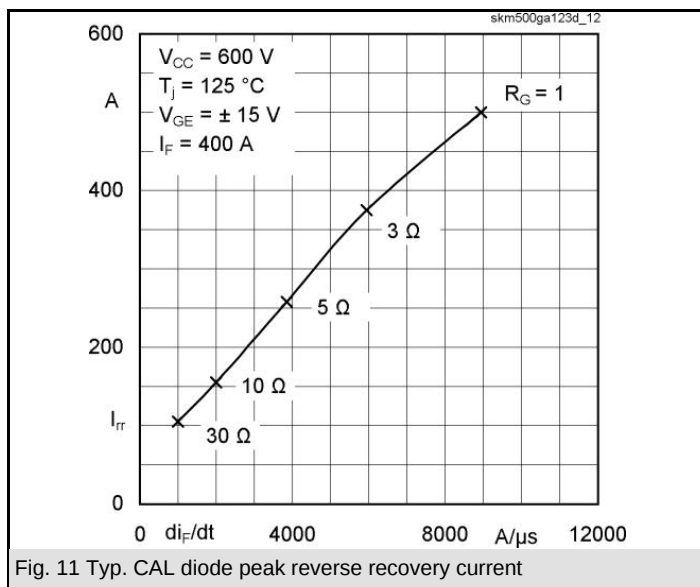
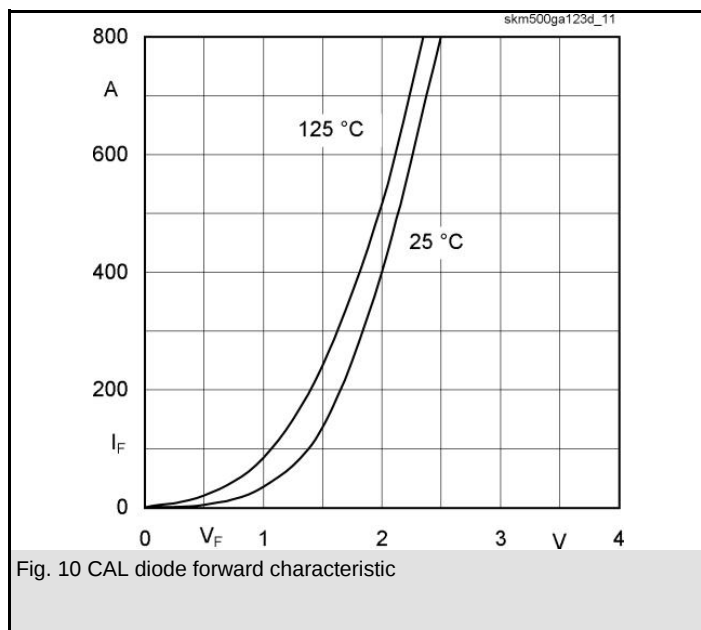
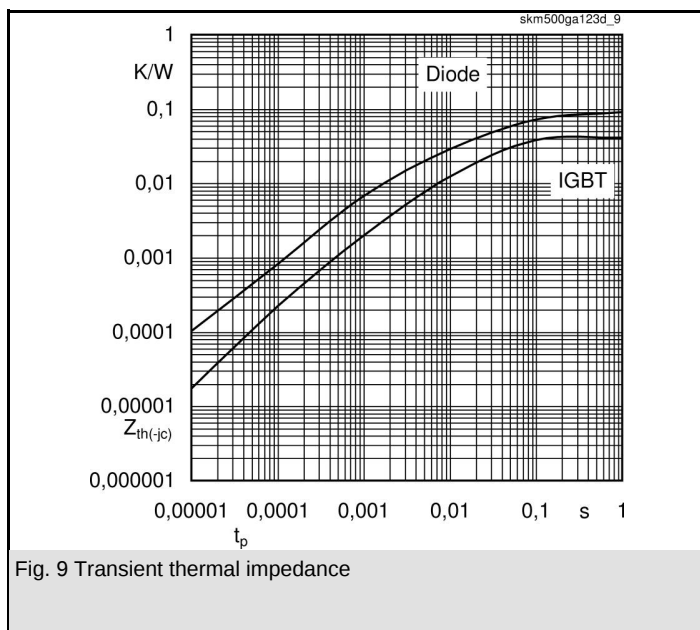
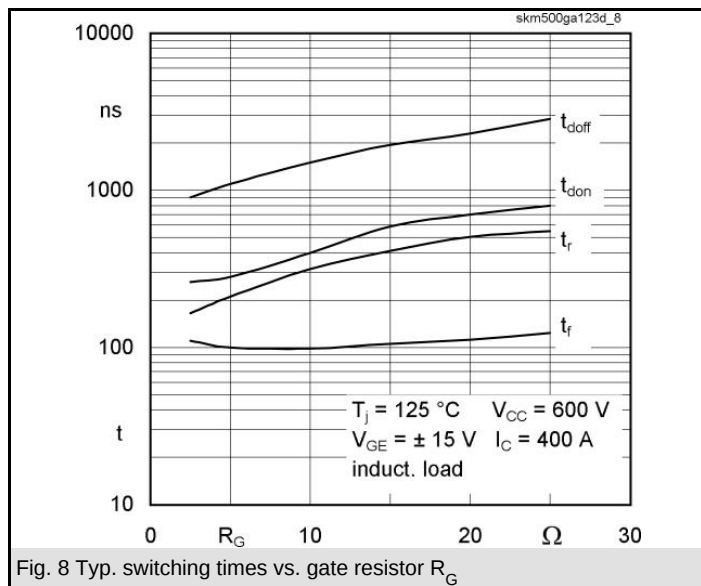
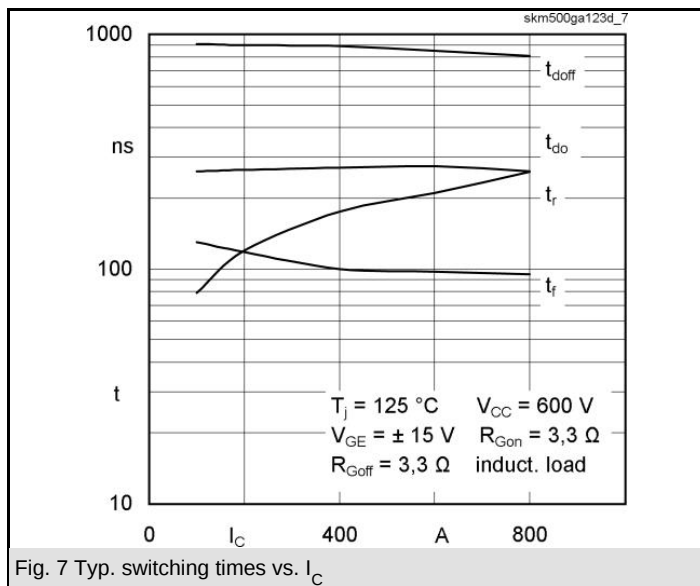
Z_{th}			
Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	$i = 1$	29	mk/W
R_i	$i = 2$	10	mk/W
R_i	$i = 3$	1,8	mk/W
R_i	$i = 4$	0,2	mk/W
τ_{ui}	$i = 1$	0,04	s
τ_{ui}	$i = 2$	0,0189	s
τ_{ui}	$i = 3$	0,0017	s
τ_{ui}	$i = 4$	0,001	s
$Z_{th(j-c)D}$			
R_i	$i = 1$	60	mk/W
R_i	$i = 2$	23	mk/W
R_i	$i = 3$	6,2	mk/W
R_i	$i = 4$	0,8	mk/W
τ_{ui}	$i = 1$	0,0366	s
τ_{ui}	$i = 2$	0,042	s
τ_{ui}	$i = 3$	0,0009	s
τ_{ui}	$i = 4$	0,002	s



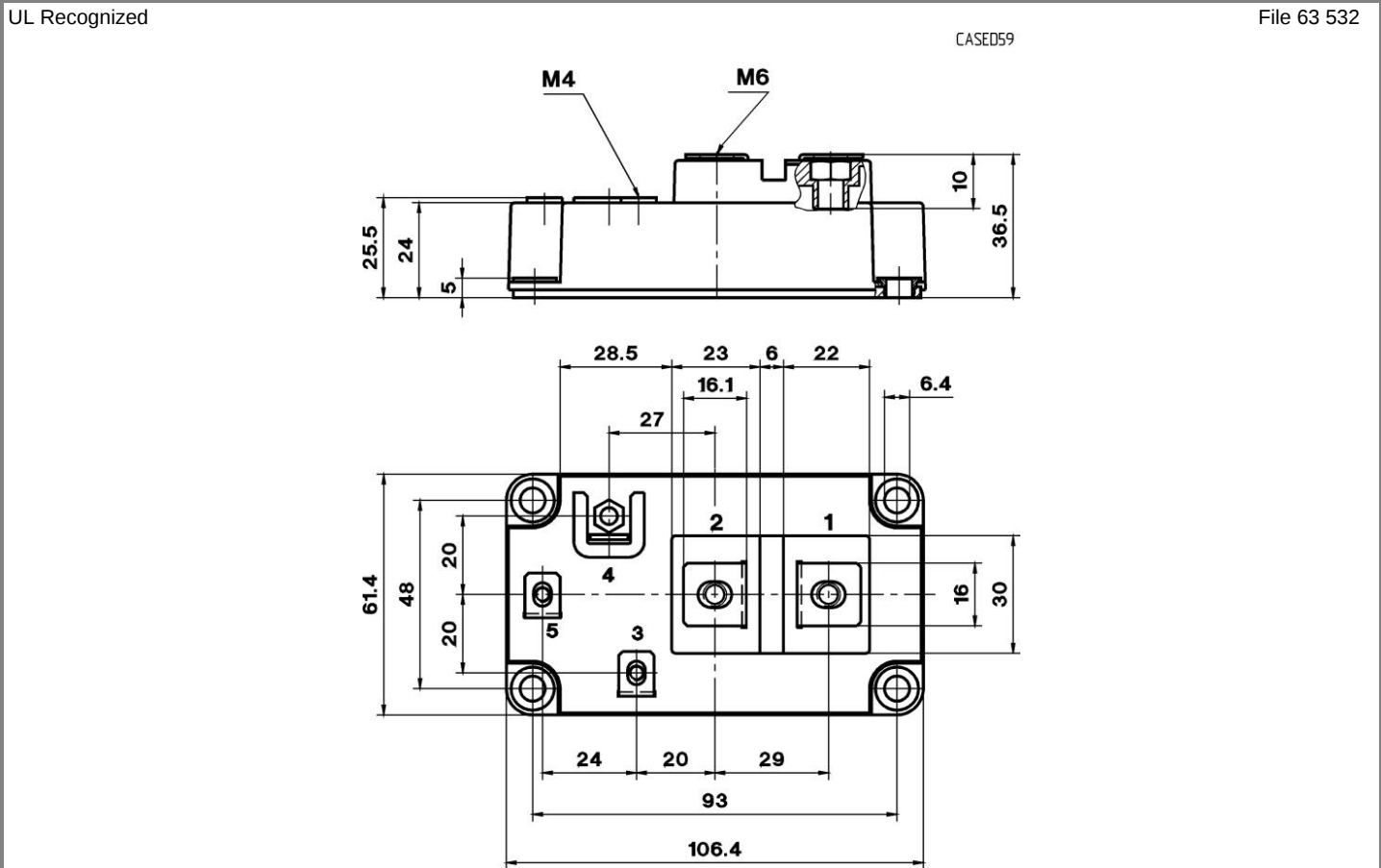
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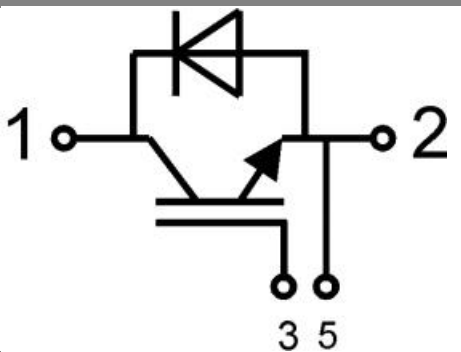




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Case D 60



GA Case D 60

