

SKM 500GA123D



SEMITRANS® 4

IGBT Modules

SKM 500GA123D

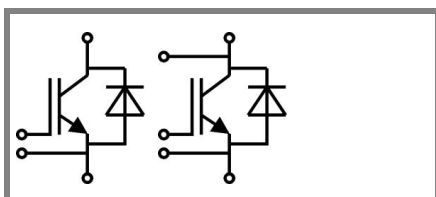
SKM 500GA123DS

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



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Absolute Maximum Ratings		$T_c = 25\text{ }^\circ\text{C}$, unless otherwise specified		
Symbol	Conditions	Values		Units
IGBT				
V_{CES}	$T_j = 25\text{ }^\circ\text{C}$	1200		V
I_C	$T_j = 150\text{ }^\circ\text{C}$	$T_{case} = 25\text{ }^\circ\text{C}$	500	
		$T_{case} = 80\text{ }^\circ\text{C}$	420	
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	800		A
V_{GES}		± 20		V
t_{psc}	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125\text{ }^\circ\text{C}$ $V_{CES} < 1200\text{ V}$	10		μs
Inverse Diode				
I_F	$T_j = 150\text{ }^\circ\text{C}$	$T_{case} = 25\text{ }^\circ\text{C}$	500	
		$T_{case} = 80\text{ }^\circ\text{C}$	350	
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	800		A
I_{FSM}	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 150\text{ }^\circ\text{C}$	3600	
Module				
$I_{t(RMS)}$		500		A
T_{vj}		- 40 ... + 150		$^\circ\text{C}$
T_{stg}		- 40 ... + 125		$^\circ\text{C}$
V_{isol}	AC, 1 min.	2500		V

Characteristics		$T_c = 25\text{ }^\circ\text{C}$, unless otherwise specified				
Symbol	Conditions	min.	typ.	max.	Units	
IGBT						
$V_{GE(th)}$	$V_{GE} = V_{CE}; I_C = 16\text{ mA}$	4,5	5,5	6,5	V	
I_{CES}	$V_{GE} = 0\text{ V}; V_{CE} = V_{CES}$	$T_j = 25\text{ }^\circ\text{C}$		0,1	0,3	
V_{CE0}		$T_j = 25\text{ }^\circ\text{C}$		1,4	1,6	
		$T_j = 125\text{ }^\circ\text{C}$		1,6	1,8	
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ }^\circ\text{C}$		2,75	3,5	
		$T_j = 125\text{ }^\circ\text{C}$		3,75	4,75	
$V_{CE(sat)}$	$I_{Cnom} = 400\text{ A}; V_{GE} = 15\text{ V}$	$T_j = \text{ }^\circ\text{C}_{chiplev.}$		2,5	3	
C_{ies}	$V_{CE} = 25; V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$		26	40	
C_{oes}				4	5,2	
C_{res}				2	2,6	
R_{Gint}	$T_j = \text{ }^\circ\text{C}$			1,25	Ω	
$t_{d(on)}$	$R_{Gon} = 3,3\ \Omega$	$V_{CC} = 600\text{ V}$ $I_C = 400\text{ A}$			250	600
t_r					170	340
E_{on}					45	
$t_{d(off)}$	$R_{Goff} = 3,3\ \Omega$	$T_j = 125\text{ }^\circ\text{C}$ $V_{GE} = \pm 15\text{ V}$			900	1100
t_f					100	125
E_{off}						
$R_{th(j-c)}$	per IGBT			0,041	K/W	



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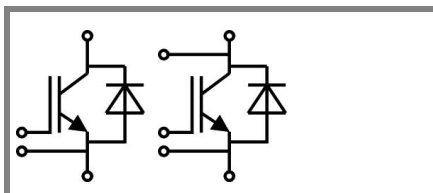
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Characteristics

Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 400 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	2	2,5	V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$	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}	$I_F = 400 \text{ A}$	$T_j = 25 \text{ }^\circ\text{C}$	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					
$V_F = V_{EC}$	$I_{Fnom} = \text{A}; V_{GE} = \text{V}$	$T_j = \text{ }^\circ\text{C}_{chiplev.}$			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}	$I_F = \text{A}$	$T_j = \text{ }^\circ\text{C}$			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	$T_{case} = 25 \text{ }^\circ\text{C}$	0,18		mΩ
		$T_{case} = 125 \text{ }^\circ\text{C}$	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.

* 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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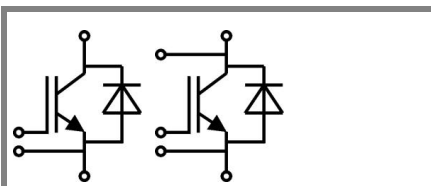
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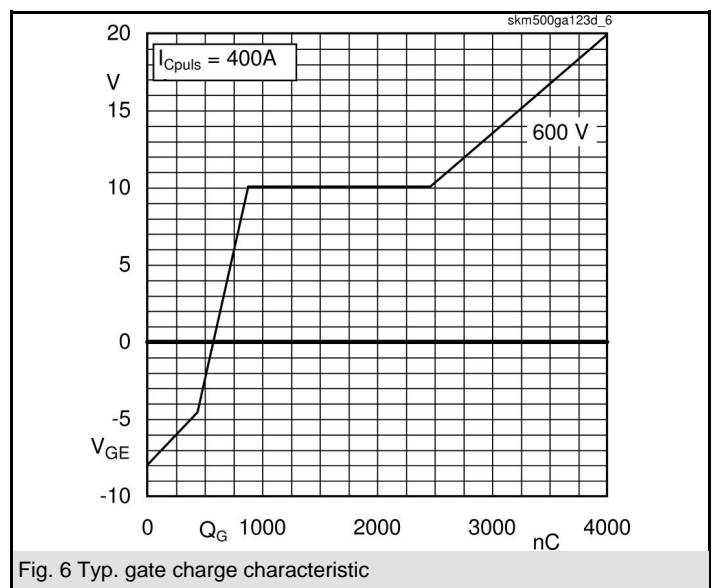
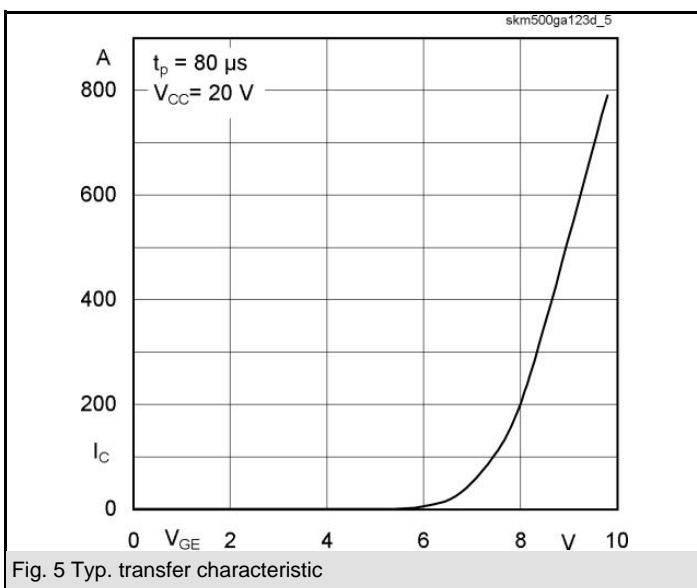
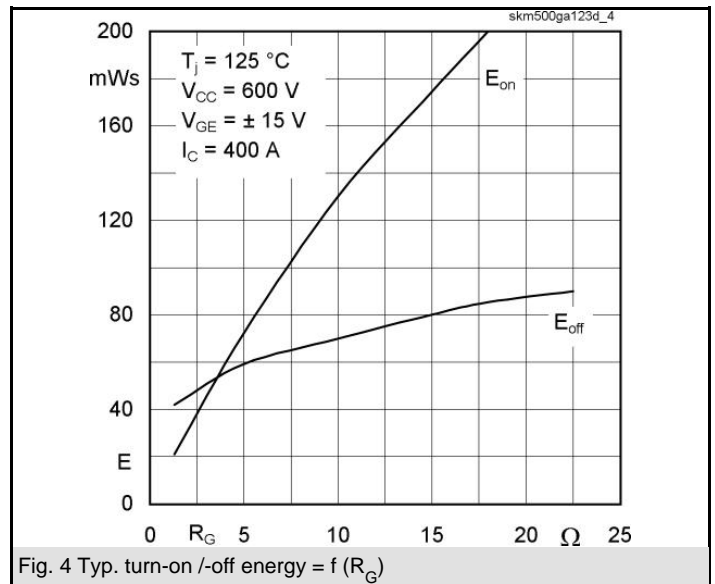
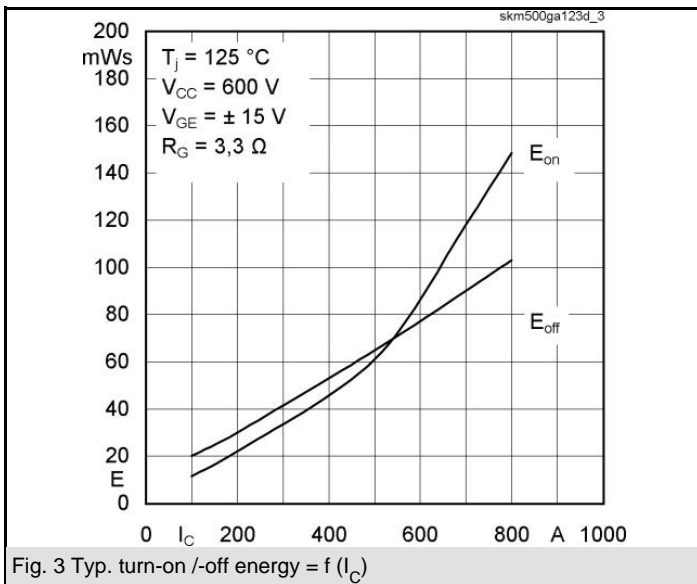
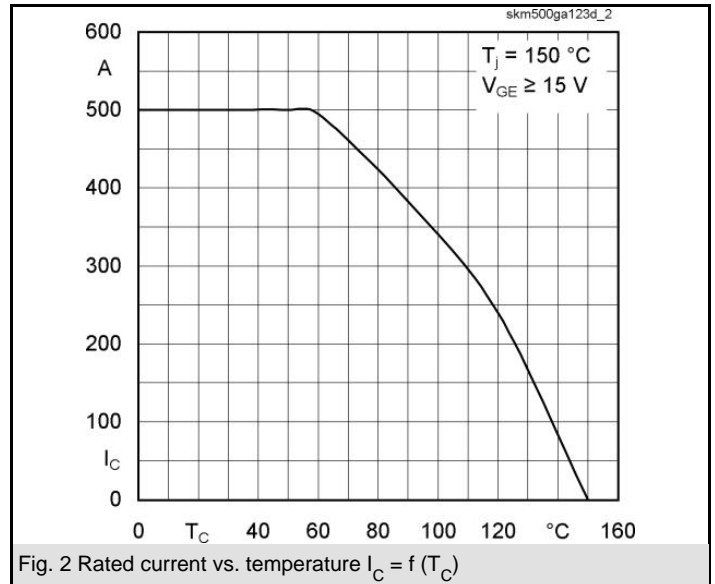
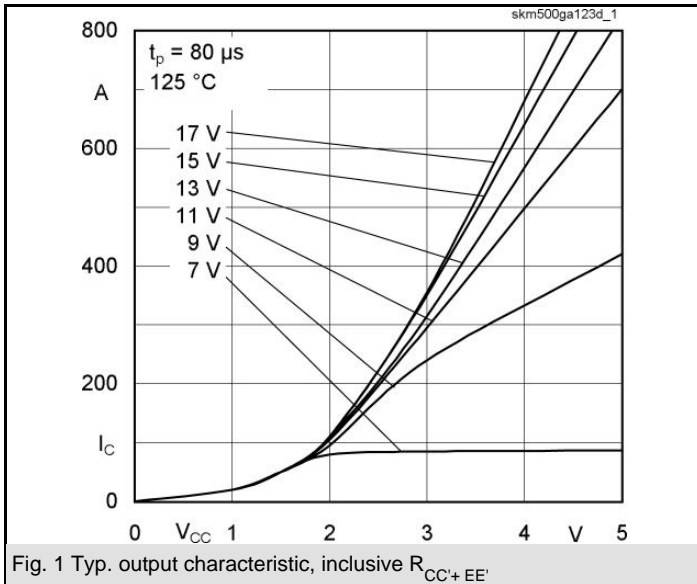
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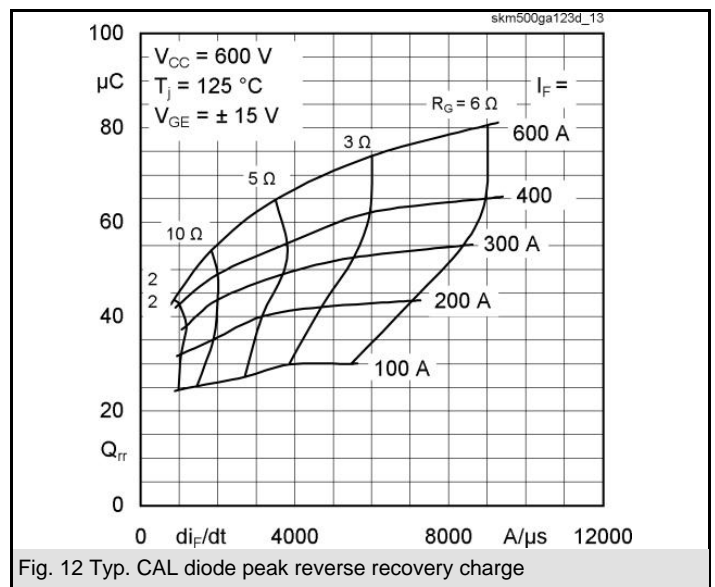
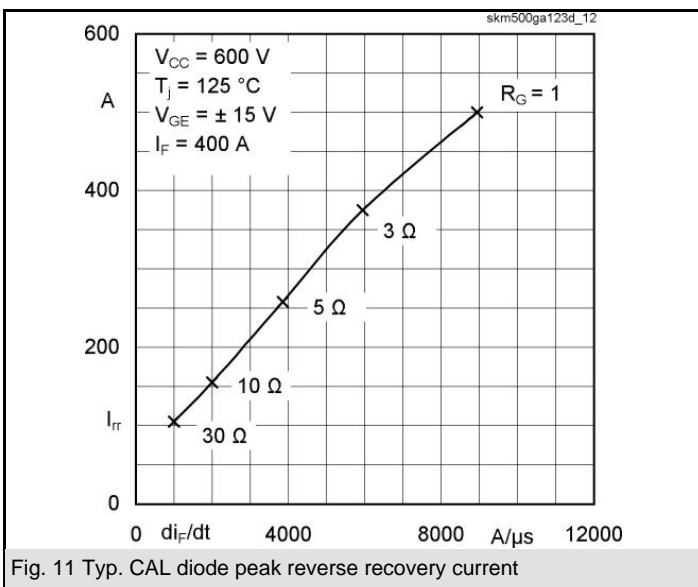
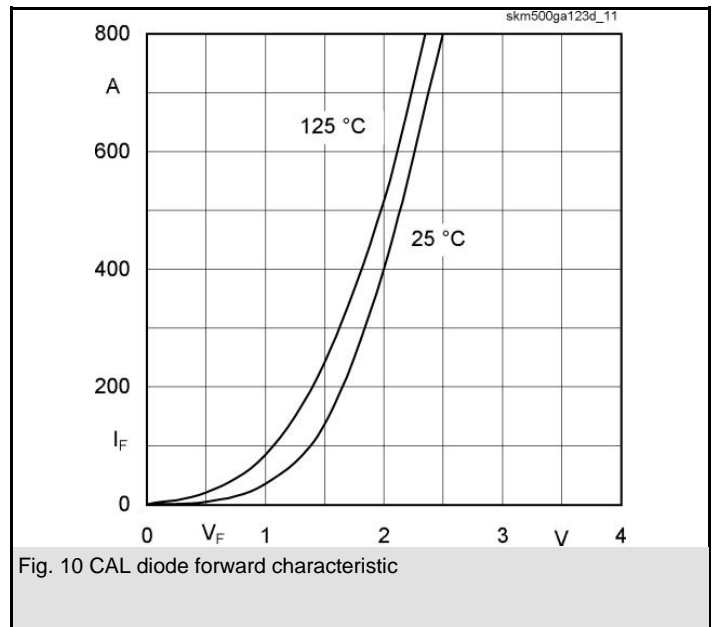
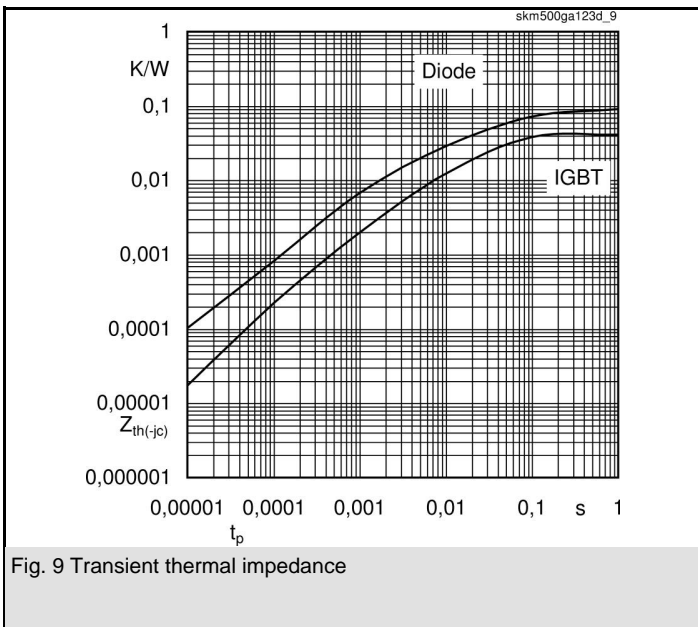
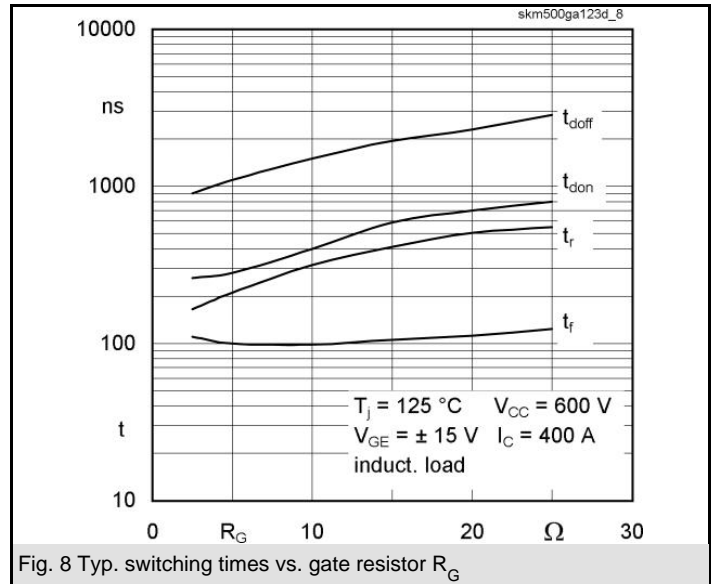
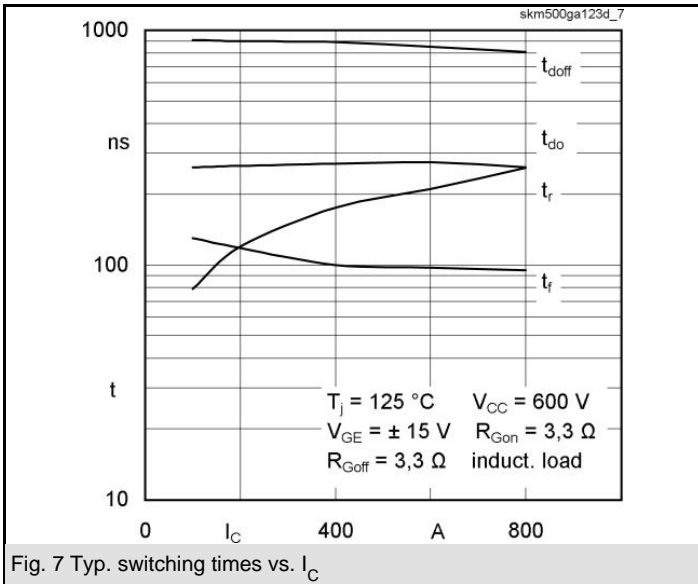


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Z_{th}		Conditions	Values	Units
Symbol				
$Z_{th(j-c)I}$				
R_f	$i = 1$		29	mk/W
R_f	$i = 2$		10	mk/W
R_f	$i = 3$		1,8	mk/W
R_f	$i = 4$		0,2	mk/W
τ_{u_i}	$i = 1$		0,04	s
τ_{u_i}	$i = 2$		0,0189	s
τ_{u_i}	$i = 3$		0,0017	s
τ_{u_i}	$i = 4$		0,001	s
Symbol				
$Z_{th(j-c)D}$				
R_f	$i = 1$		60	mk/W
R_f	$i = 2$		23	mk/W
R_f	$i = 3$		6,2	mk/W
R_f	$i = 4$		0,8	mk/W
τ_{u_i}	$i = 1$		0,0366	s
τ_{u_i}	$i = 2$		0,042	s
τ_{u_i}	$i = 3$		0,0009	s
τ_{u_i}	$i = 4$		0,002	s



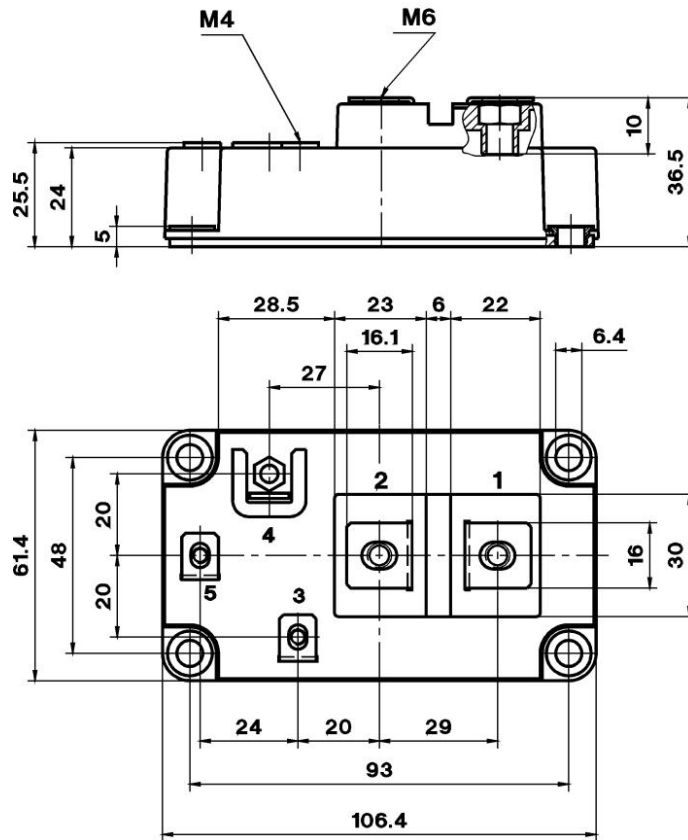


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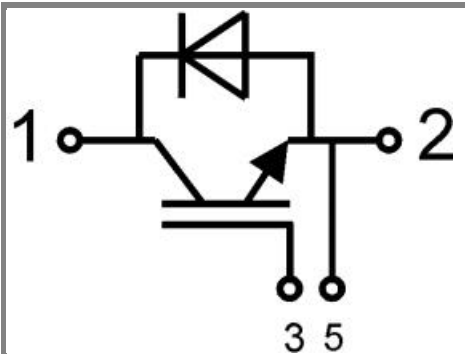
UL Recognized

CASED59

File 63 532



Case D 60



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Case D 60

