

SKM 400GA123D



SEMITRANS® 4

IGBT Modules

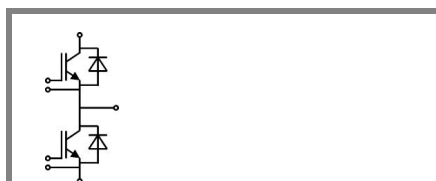
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Features

- 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 inverse CAL diodes
- Isolated copper baseplate using DBC Direct Copper Bonding Technology
- Large clearance (12 mm) and creepage distances (20 mm)

Typical Applications

- Switching (not for linear use)



GA

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	$T_j = 150\text{ }^{\circ}\text{C}$	$T_{case} = 25\text{ }^{\circ}\text{C}$	400	A
		$T_{case} = 80\text{ }^{\circ}\text{C}$	360	A
I_{CRM}	$I_{CRM}=2 \times I_{Cnom}$		600	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	$T_j = 150\text{ }^{\circ}\text{C}$	$T_{case} = 25\text{ }^{\circ}\text{C}$	390	A
		$T_{case} = 80\text{ }^{\circ}\text{C}$	260	A
I_{FRM}	$I_{FRM}=2 \times I_{Fnom}$		600	A
I_{FSM}	$t_p = 10\text{ ms}; \sin.$	$T_j = 150\text{ }^{\circ}\text{C}$	2880	A
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 °C, unless otherwise specified			
Symbol	Conditions		min.	typ.	max.	Units
IGBT						
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 12 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			3,66	4,66	mΩ
	T _j = 125°C			5	6,33	mΩ
V _{CE(sat)}	I _{Cnom} = 300 A, V _{GE} = 15 V T _j = °C _{chiplev.}			2,5	3	V
C _{ies}				22	30	nF
C _{oes}	V _{CE} = 25, V _{GE} = 0 V f = 1 MHz			3,3	4	nF
C _{res}				1,2	1,6	nF
Q _G	V _{GE} = -8V - +20V			3000		nC
R _{Gint}	T _j = °C			1,25		Ω
t _{d(on)}	R _{Gon} = 3,3 Ω	V _{CC} = 600V I _{Cnom} = 300A		200	400	ns
t _r				115	220	ns
E _{on}				38		mJ
t _{d(off)}	R _{Goff} = 3,3 Ω	T _j = 125 °C V _{GE} = ± 15V		720	900	ns
t _f				80	100	ns
E _{off}				40		mJ
R _{th(j-c)}	per IGBT				0,045	K/W



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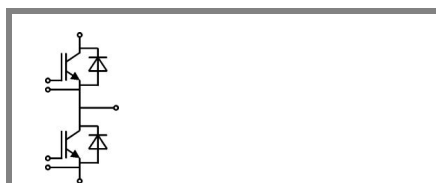
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Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 300 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{\text{chiplev.}}$	2	2,5	V
		$T_j = 125 \text{ }^\circ\text{C}_{\text{chiplev.}}$	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		$T_j = 25 \text{ }^\circ\text{C}$	3	4,3	mΩ
		$T_j = 125 \text{ }^\circ\text{C}$			mΩ
I_{RRM}	$I_{Fnom} = 300 \text{ A}$	$T_j = 25 \text{ }^\circ\text{C}$	85		A
Q_{rr}	$di/dt = 2000 \text{ A}/\mu\text{s}$		13		μC
E_{rr}	$V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$				mJ
$R_{th(j-c)D}$	per diode			0,125	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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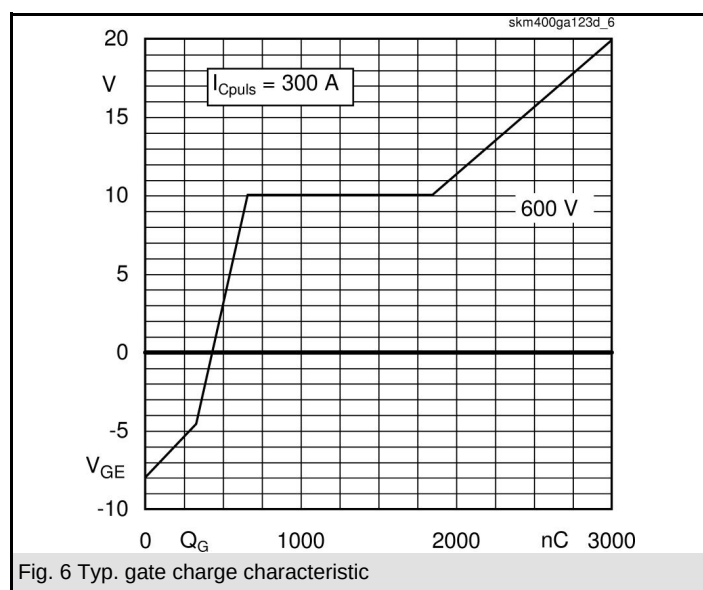
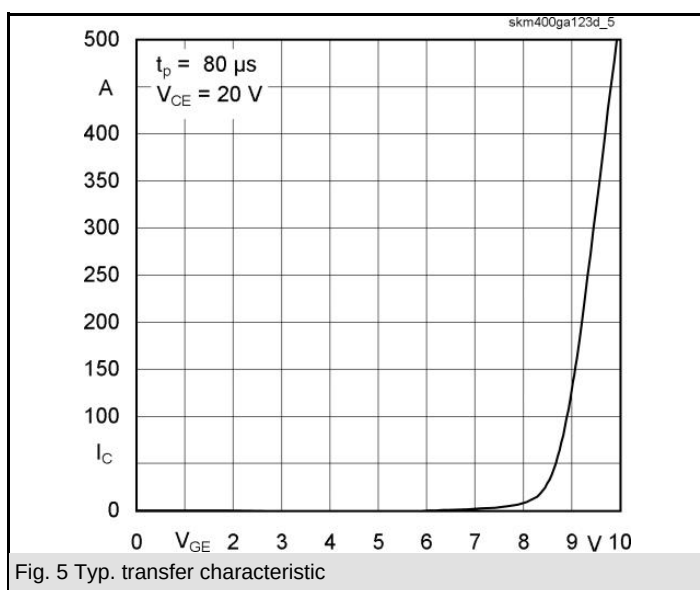
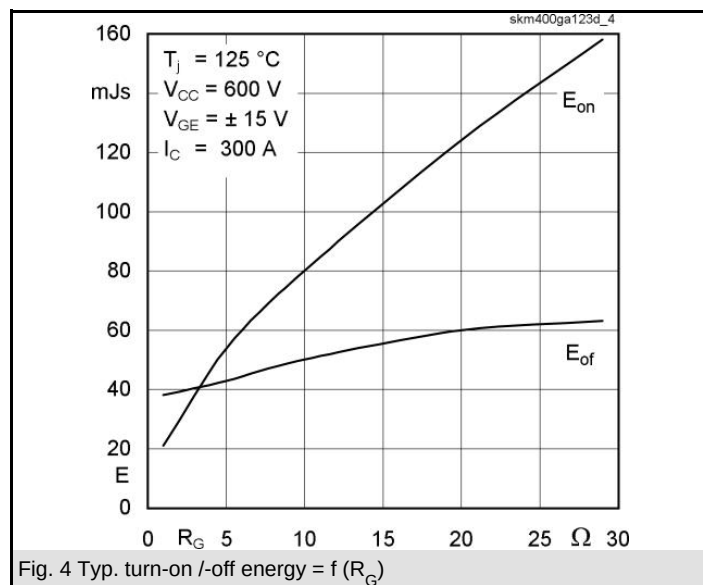
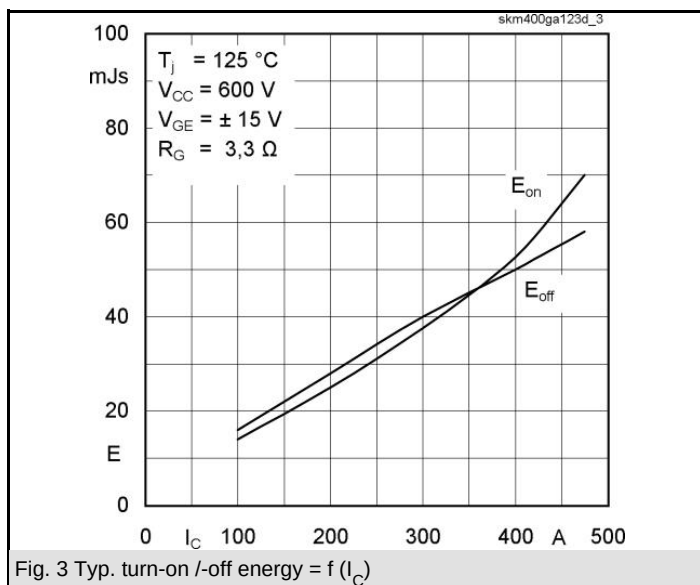
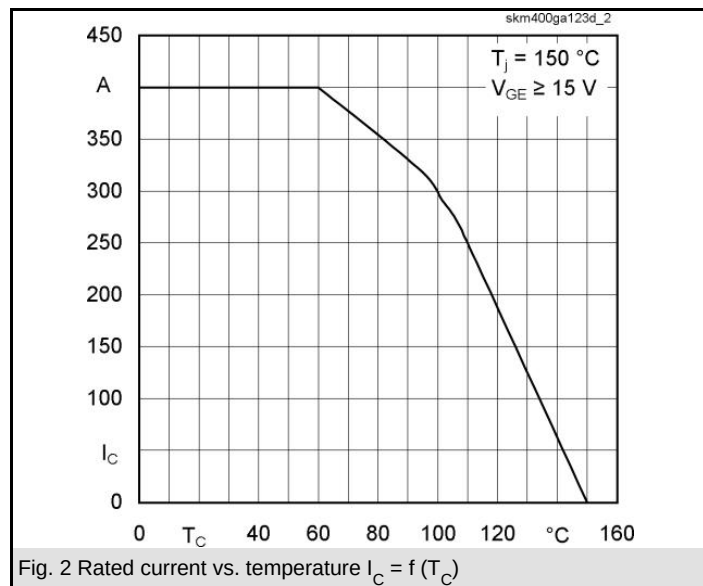
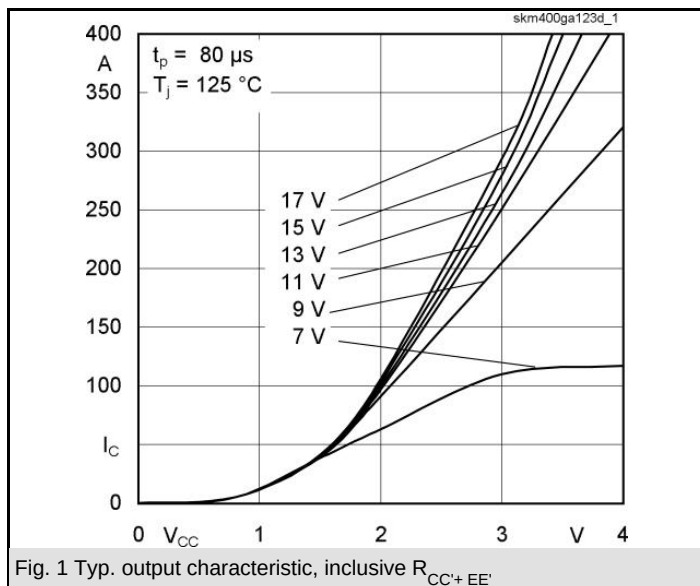
Typical Applications

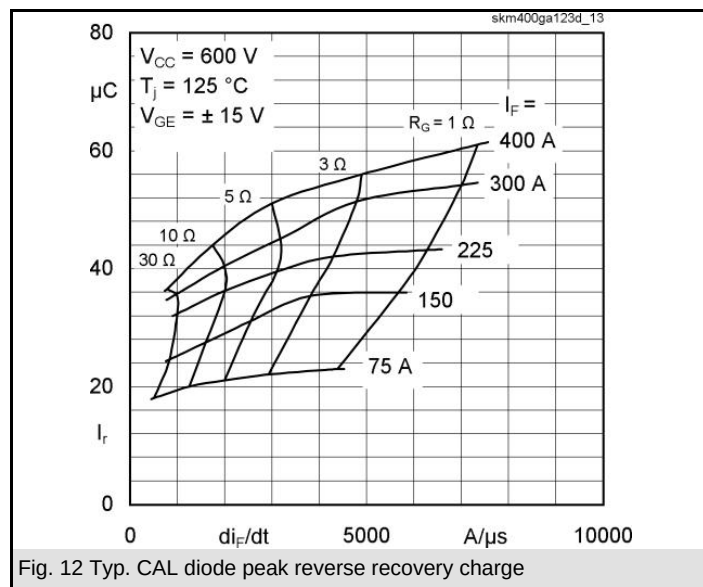
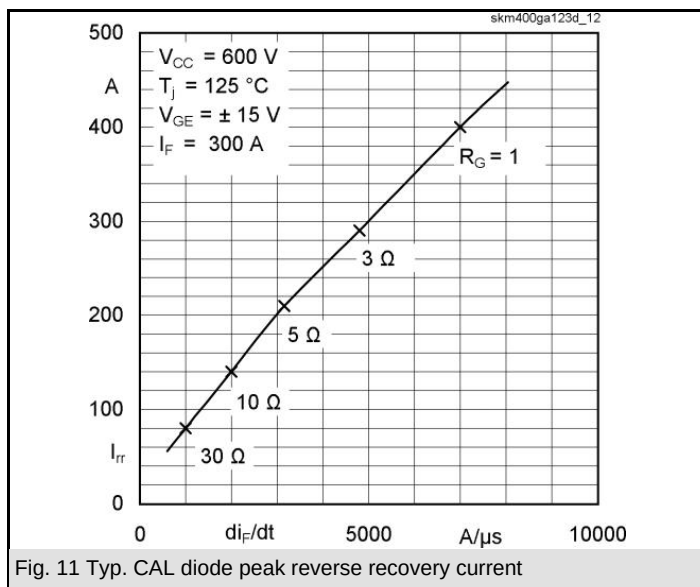
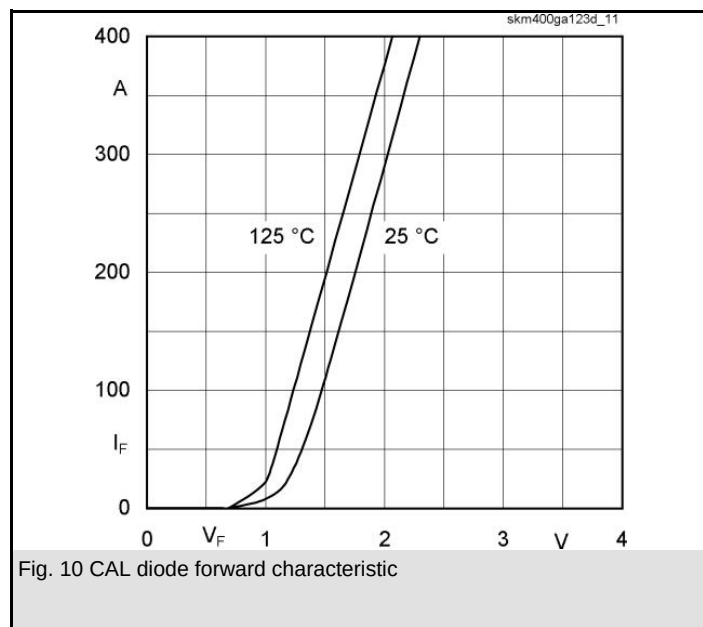
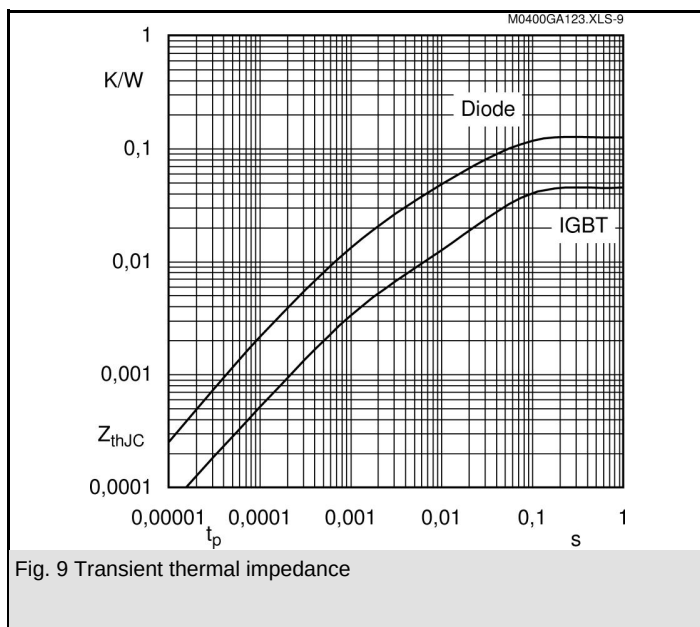
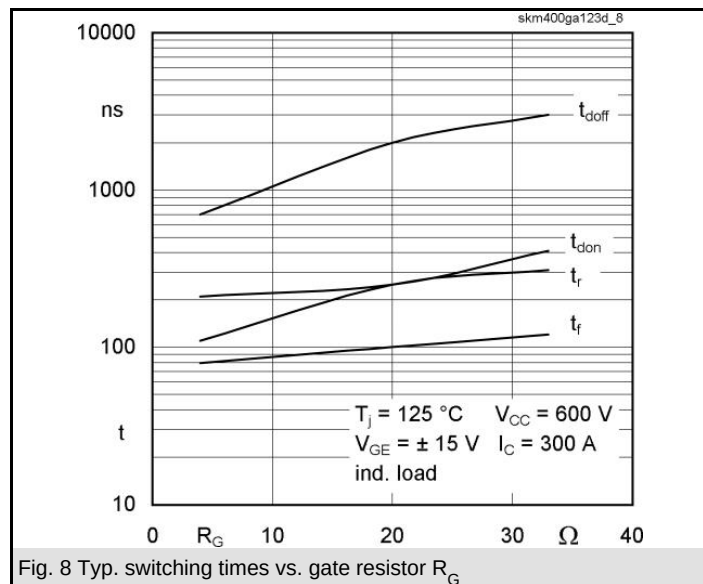
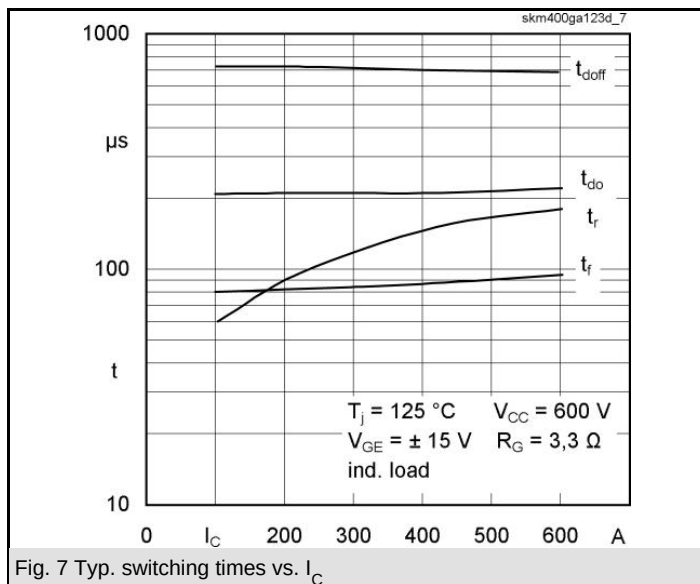
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Z_{th}			
Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	$i = 1$	33	mk/W
R_i	$i = 2$	8,8	mk/W
R_i	$i = 3$	2,6	mk/W
R_i	$i = 4$	0,6	mk/W
τ_{u_i}	$i = 1$	0,05	s
τ_{u_i}	$i = 2$	0,009	s
τ_{u_i}	$i = 3$	0,0024	s
τ_{u_i}	$i = 4$	0,0001	s
$Z_{th(j-c)D}$			
R_i	$i = 1$	85	mk/W
R_i	$i = 2$	31	mk/W
R_i	$i = 3$	7,8	mk/W
R_i	$i = 4$	1,2	mk/W
τ_{u_i}	$i = 1$	0,0537	s
τ_{u_i}	$i = 2$	0,0086	s
τ_{u_i}	$i = 3$	0,003	s
τ_{u_i}	$i = 4$	0,0001	s



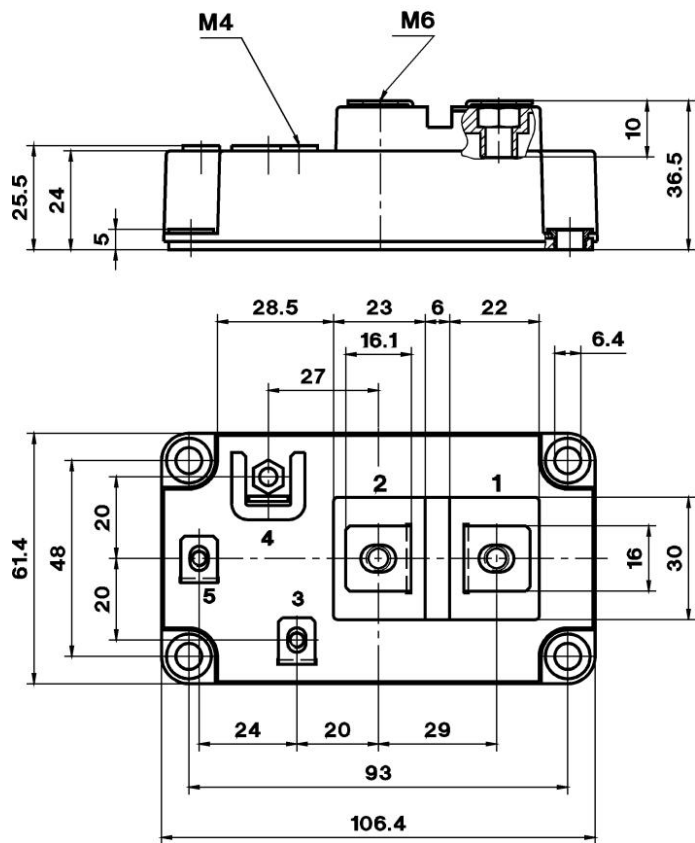


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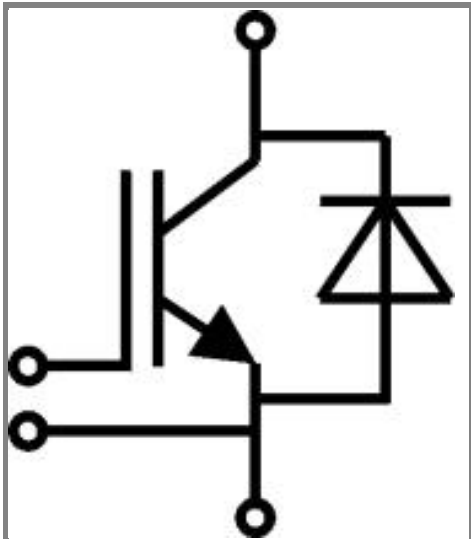
UL Recognized

CASED59

File 63 532



Case D 59



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