



SEMITRANS® 3

Ultra Fast IGBT Module

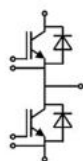
SKM 300GB125D

Features

- NPT - Non punch-through IGBT
- Low inductance case
- Short tail current with low temperature dependence
- High short circuit capability, self limiting
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Direct Copper Bonding Technology
- Large clearance (10 mm) and creepage distances (20 mm)

Typical Applications*

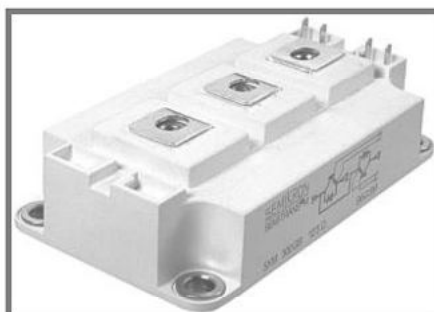
- Switched mode power supplies at $f_{sw} > 20$ kHz
- Resonant inverters up to 100 kHz
- Inductive heating
- UPS Uninterruptable power supplies at $f_{sw} > 20$ kHz
- Electronic welders at $f_{sw} > 20$ kHz



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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	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$		300	A
		$T_{case} = 80^\circ\text{C}$		210	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$			400	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	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$		260	A
		$T_{case} = 80^\circ\text{C}$		180	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$			400	A
I_{FSM}	$t_p = 10\text{ ms; sin.}$	$T_j = 150^\circ\text{C}$		1800	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.			4000	V

Characteristics				$T_c = 25^\circ\text{C}$, unless otherwise specified		
Symbol	Conditions			min.	typ.	max. Units
IGBT						
$V_{GE(th)}$	$V_{GE} = V_{CE}; I_C = 8\text{ mA}$			4,5	5,5	6,5 V
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$	$T_j = 25^\circ\text{C}$			0,1	0,3 mA
V_{CE0}		$T_j = 25^\circ\text{C}$			1,5	1,75 V
		$T_j = 125^\circ\text{C}$			1,7	V
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$			9	10,5 m Ω
		$T_j = 125^\circ\text{C}$			11,5	m Ω
$V_{CE(sat)}$	$I_{Cnom} = 200\text{ A}, V_{GE} = 15\text{ V}$	$T_j = ^\circ\text{C}_{chipleve.}$			3,3	3,85 V
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$			18	24 nF
C_{oes}					2,5	3,2 nF
C_{res}					1	1,3 nF
Q_G	$V_{GE} = 0\text{ V} - +20\text{ V}$				2000	nC
R_{Gint}	$T_j = ^\circ\text{C}$				2,5	Ω
$t_{d(on)}$	$R_{Gon} = 3\text{ }\Omega$	$V_{CC} = 600\text{ V}$ $I_C = 200\text{ A}$			130	ns
t_r					40	ns
E_{on}	$R_{Goff} = 3\text{ }\Omega$	$T_j = 125^\circ\text{C}$ $V_{GE} = \pm 15\text{ V}$			16	mJ
$t_{d(off)}$					460	ns
t_f					30	ns
E_{off}						mJ
$R_{th(j-c)}$	per IGBT					0,075 K/W



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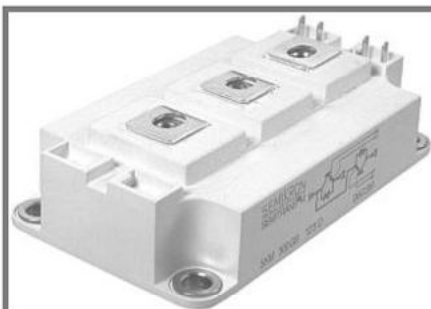
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Characteristics

Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 200$ A; $V_{GE} = 0$ V				
	$T_J = 25$ °C _{chiplev.}		2	2,5	V
	$T_J = 125$ °C _{chiplev.}		1,8		V
V_{F0}					
	$T_J = 25$ °C		1,1	1,2	V
	$T_J = 125$ °C				V
r_F					
	$T_J = 25$ °C		4,5	6,5	mΩ
	$T_J = 125$ °C				mΩ
I_{RRM}	$I_F = 200$ A		340		A
Q_{rr}	$di/dt = 8000$ A/μs		46		μC
E_{rr}	$V_{GE} = 0$ V; $V_{CC} = 600$ V				mJ
$R_{th(j-c)D}$	per diode			0,18	K/W
Module					
L_{CE}			15	20	nH
$R_{CC'+EE'}$	res., terminal-chip				
	$T_{case} = 25$ °C		0,35		mΩ
	$T_{case} = 125$ °C		0,5		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	2,5		5	Nm
w				325	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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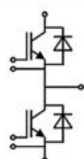
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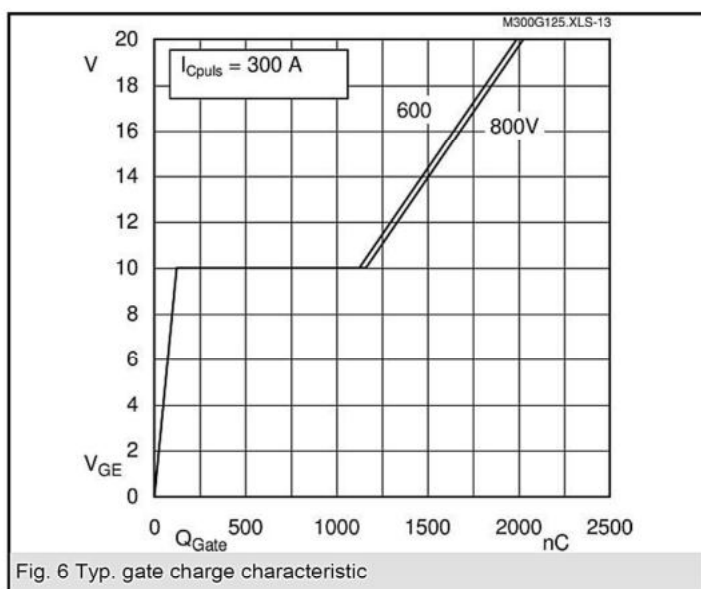
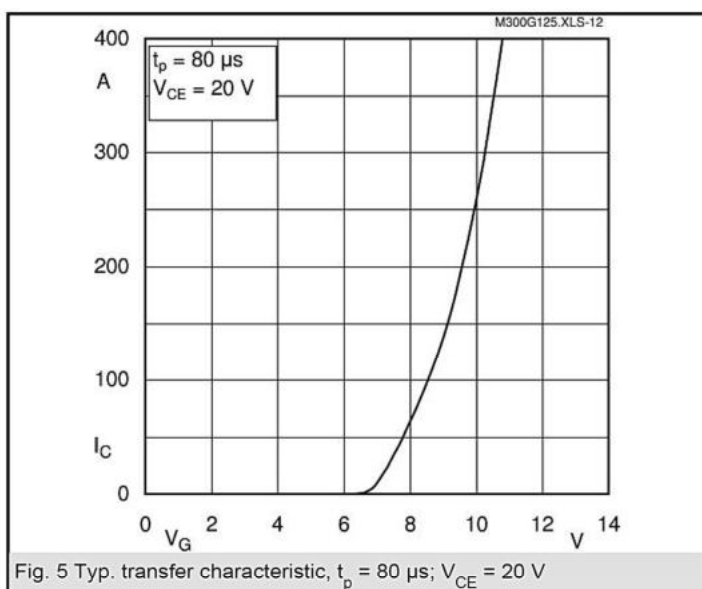
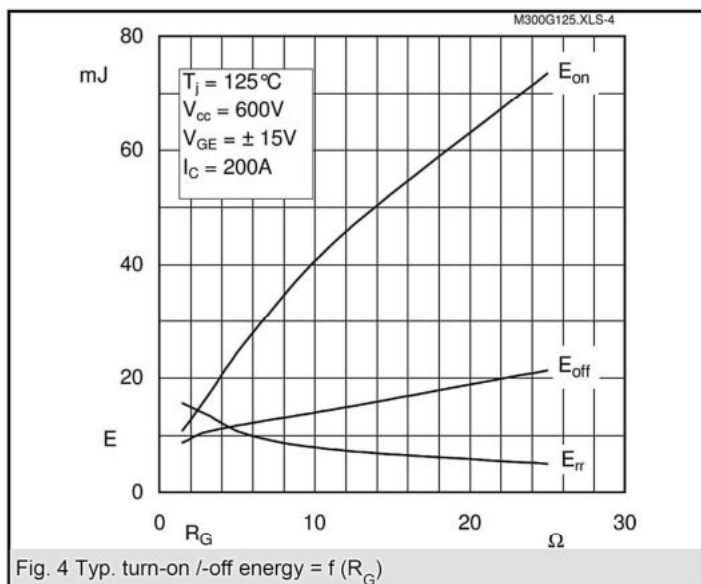
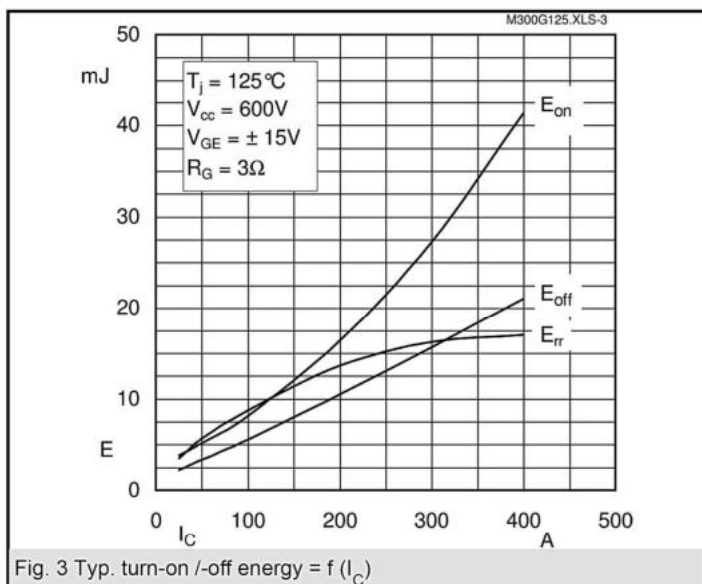
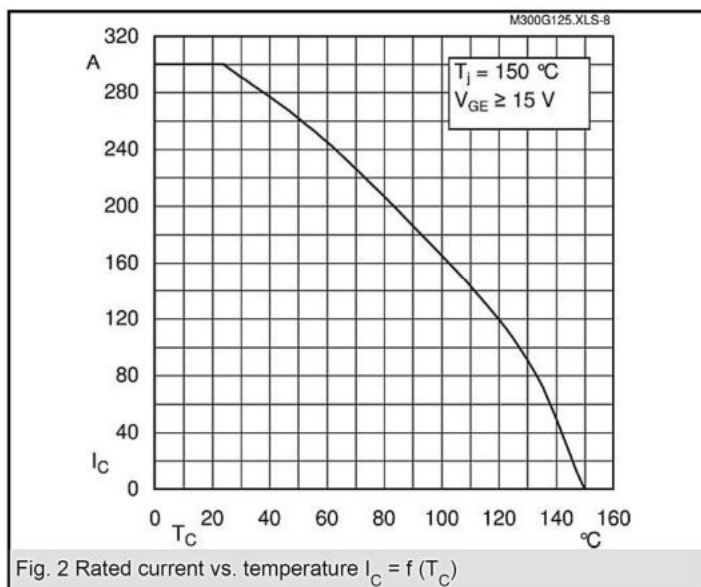
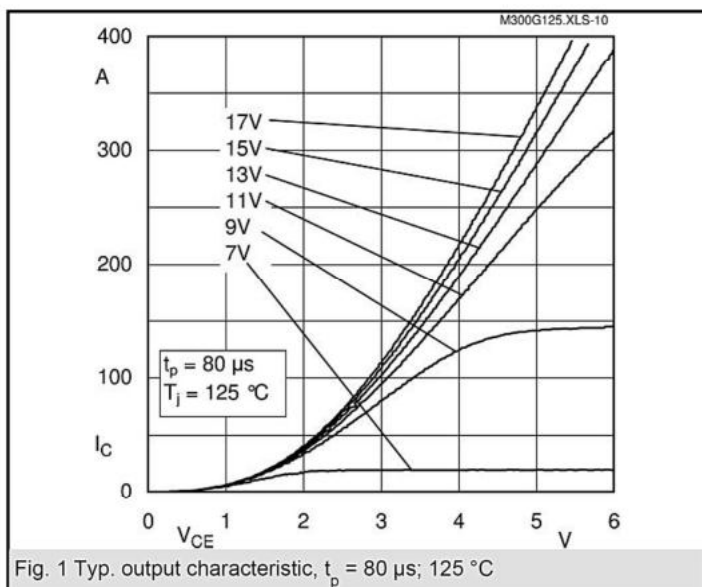
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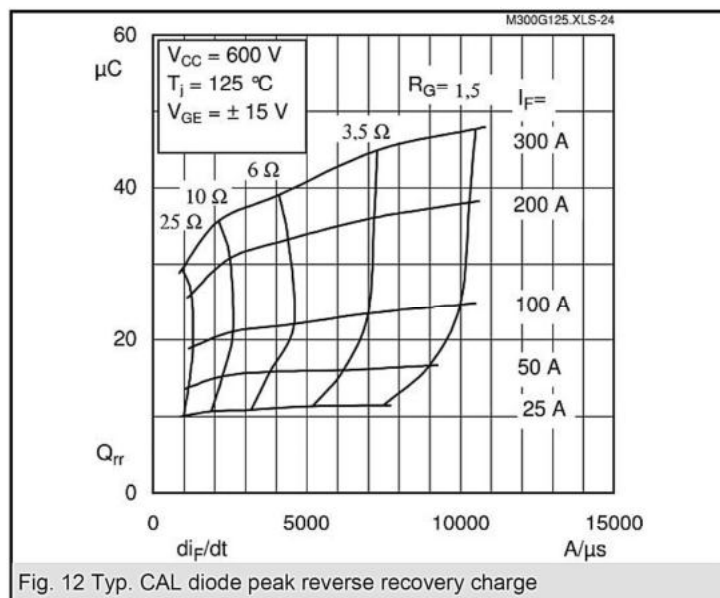
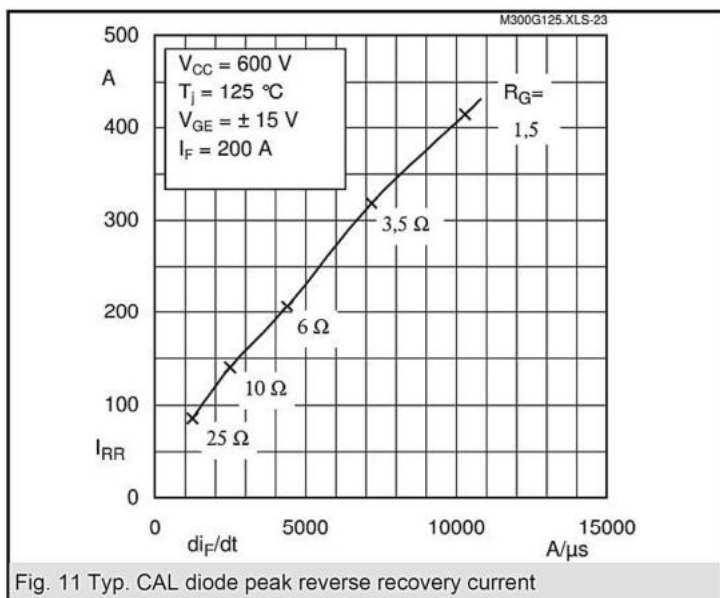
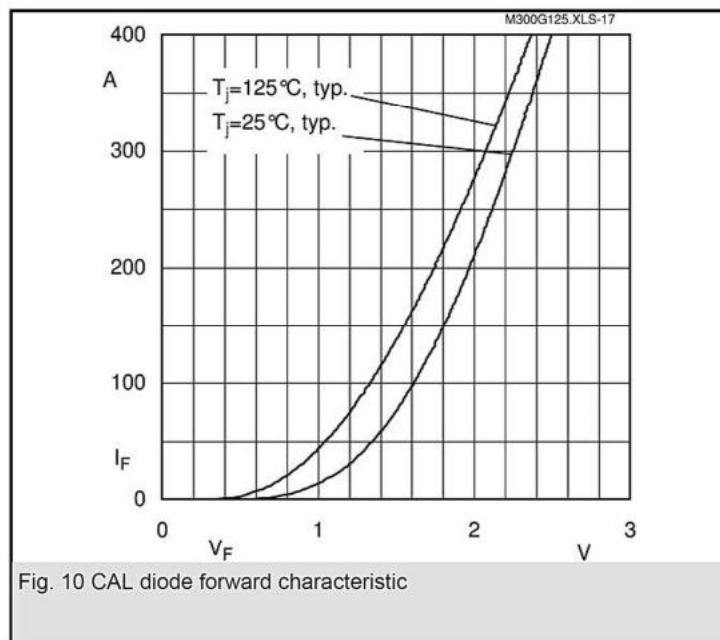
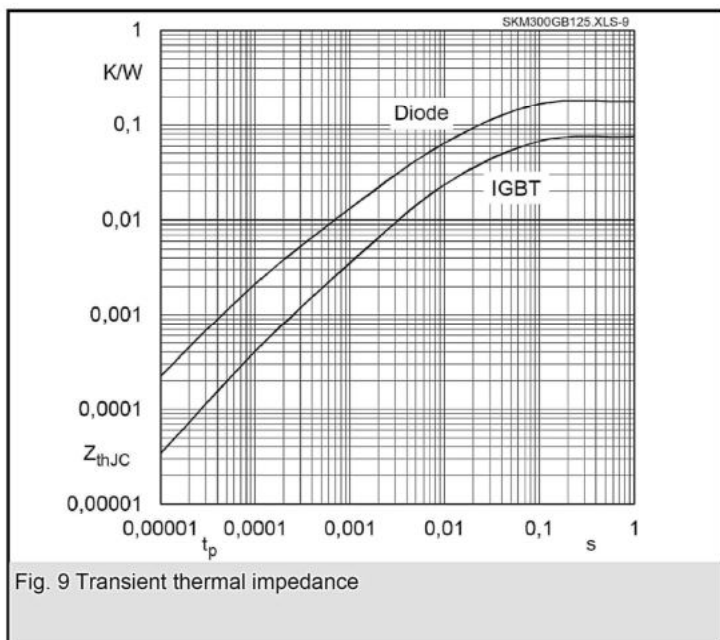
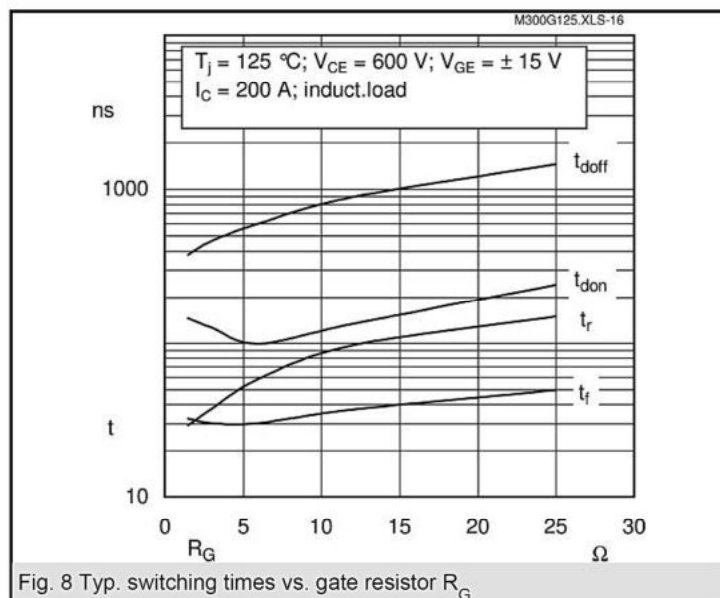
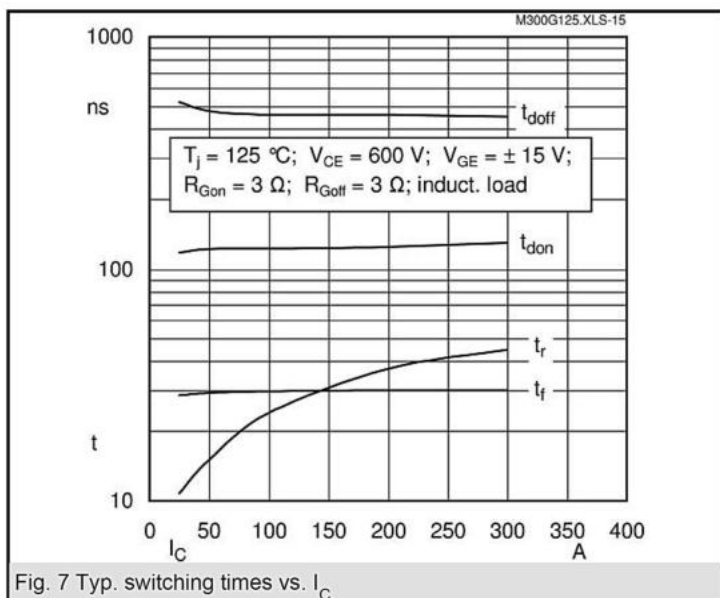
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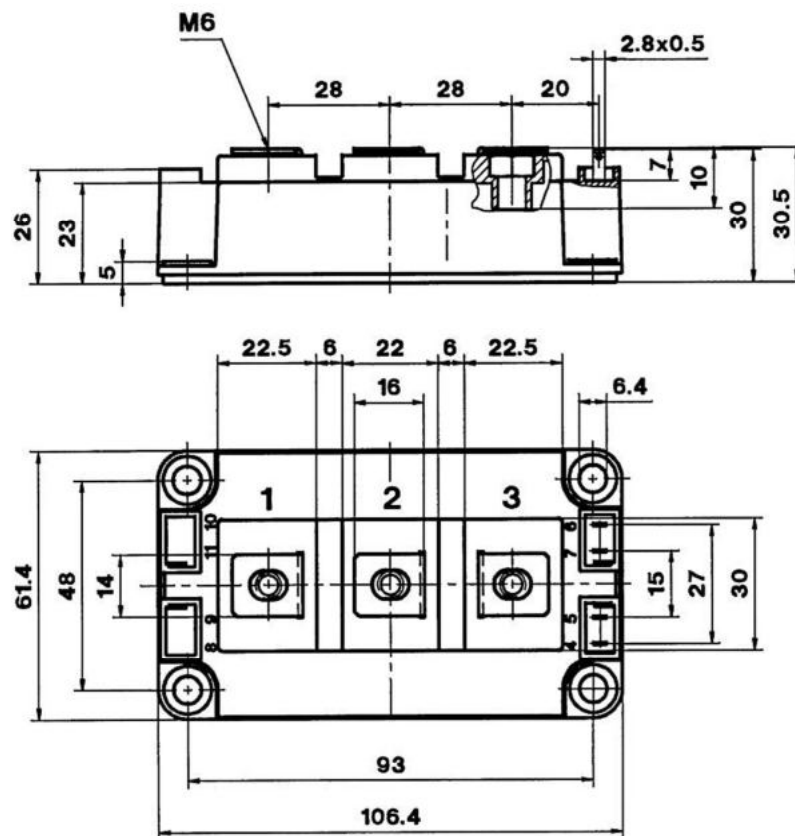


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Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	$i = 1$	53	mK/W
R_i	$i = 2$	18,5	mK/W
R_i	$i = 3$	3,1	mK/W
R_i	$i = 4$	0,4	mK/W
τ_{ui}	$i = 1$	0,04	s
τ_{ui}	$i = 2$	0,0189	s
τ_{ui}	$i = 3$	0,0017	s
τ_{ui}	$i = 4$	0,003	s
$Z_{th(j-c)D}$			
R_i	$i = 1$	115	mK/W
R_i	$i = 2$	52	mK/W
R_i	$i = 3$	11	mK/W
R_i	$i = 4$	2	mK/W
τ_{ui}	$i = 1$	0,0366	s
τ_{ui}	$i = 2$	0,0113	s
τ_{ui}	$i = 3$	0,003	s
τ_{ui}	$i = 4$	0,0002	s







Case D 56

