



SEMITRANS® 2

Trench IGBT Modules

SKM 195GB126D

SKM 195GAL126D

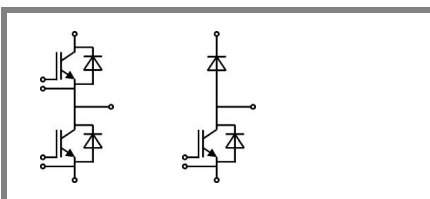
Preliminary Data

Features

- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_C$

Typical Applications

- AC inverter drives
- UPS
- Electronic welders

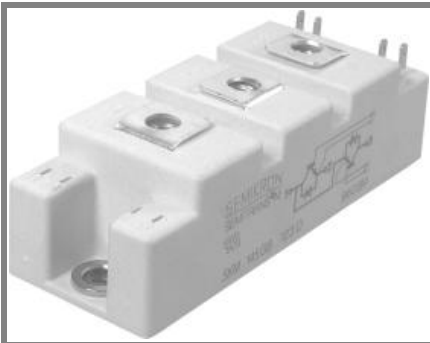


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Absolute Maximum Ratings		$T_{case} = 25^\circ\text{C}$, unless otherwise specified		
Symbol	Conditions	Values		Units
IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$	1200		V
I_C	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	220	A
		$T_c = 80^\circ\text{C}$	160	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	300		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	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	170	A
		$T_c = 80^\circ\text{C}$	115	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	200		A
I_{FSM}	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 150^\circ\text{C}$	900	A
Freewheeling Diode				
I_F	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	170	A
		$T_c = 80^\circ\text{C}$	115	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	200		A
I_{FSM}	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 150^\circ\text{C}$	900	A
Module				
$I_{t(RMS)}$		200		A
T_{vj}		-40 ... +150		$^\circ\text{C}$
T_{stg}		-40 ... +125		$^\circ\text{C}$
V_{isol}	AC, 1 min.	4000		V

Characteristics		$T_{case} = 25^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 6\text{ mA}$	5	5,8	6,5	V
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$		0,1	0,3	mA
V_{CE0}		$T_j = 25^\circ\text{C}$	1	1,2	V
		$T_j = 125^\circ\text{C}$	0,9	1,1	V
r_{CE}	$V_{GE} = 0\text{ V}$	$T_j = 25^\circ\text{C}$	4,7	6,3	m Ω
		$T_j = 125^\circ\text{C}$	7,3	9	m Ω
$V_{CE(sat)}$	$I_{Cnom} = 150\text{ A}, V_{GE} = 15\text{ V}$		1,7	2,15	V
			2	2,45	V
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	10,5		nF
C_{oes}			0,9		nF
C_{res}			0,8		nF
Q_G	$V_{GE} = -8\text{ V} \dots +20\text{ V}$	1380		nC	
R_{Gint}	$T_j = ^\circ\text{C}$	5		Ω	
$t_{d(on)}$	$R_{Gon} = 2\ \Omega$	$V_{CC} = 600\text{ V}$ $I_{Cnom} = 150\text{ A}$	280		ns
t_r			50		ns
E_{on}	$R_{Goff} = 2\ \Omega$	$T_j = 125^\circ\text{C}$ $V_{GE} = \pm 15\text{ V}$	16		mJ
$t_{d(off)}$			560		ns
t_f			70		ns
E_{off}			24,5		mJ
$R_{th(j-c)}$	per IGBT			0,16	K/W



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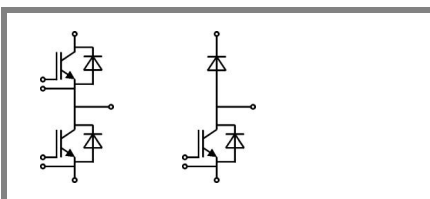
Typical Applications

- AC inverter drives
- UPS
- Electronic welders

Characteristics			min.	typ.	max.	Units
Symbol	Conditions					
Inverse Diode						
$V_F = V_{EC}$	$I_{Fnom} = 100 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$		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		$T_j = 25 \text{ }^\circ\text{C}$		9	13	mΩ
		$T_j = 125 \text{ }^\circ\text{C}$				mΩ
I_{RRM}	$I_{Fnom} = 150 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$		86		A
Q_{rr}	$di/dt = 2200 \text{ A}/\mu\text{s}$			17		μC
E_{rr}	$V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$			5,8		mJ
$R_{th(j-c)D}$	per diode				0,32	K/W
Freewheeling diode						
$V_F = V_{EC}$	$I_{Fnom} = 100 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$		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		$T_j = 25 \text{ }^\circ\text{C}$		9	13	V
		$T_j = 125 \text{ }^\circ\text{C}$				V
I_{RRM}	$I_{Fnom} = 150 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$		86		A
Q_{rr}	$di/dt = 2200 \text{ A}/\mu\text{s}$			17		μC
E_{rr}	$V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$			5,8		mJ
$R_{th(j-c)FD}$	per diode				0,32	K/W
Module						
L_{CE}					30	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25 \text{ }^\circ\text{C}$		0,75		mΩ
		$T_{case} = 125 \text{ }^\circ\text{C}$		1		mΩ
$R_{th(c-s)}$	per module				0,05	K/W
M_s	to heat sink M6			3	5	Nm
M_t	to terminals M5			2,5	5	Nm
w					160	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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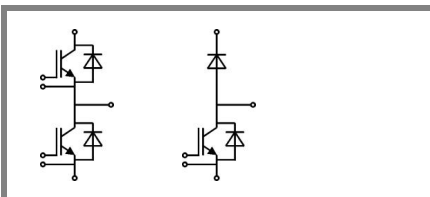
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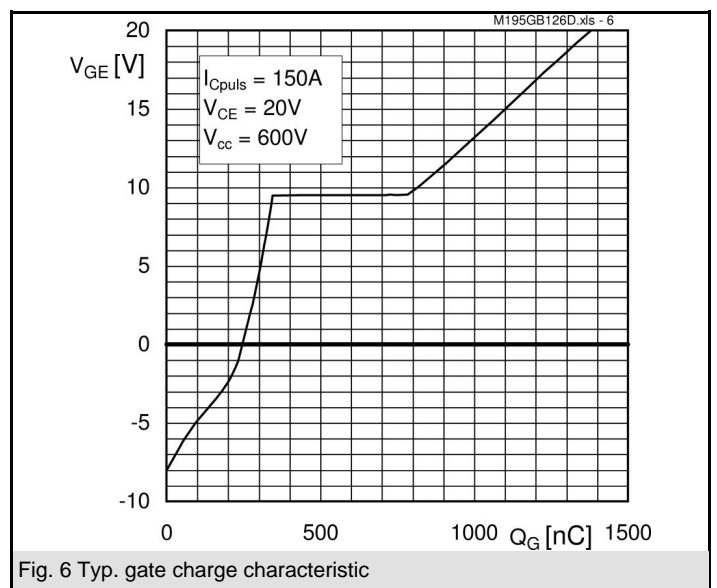
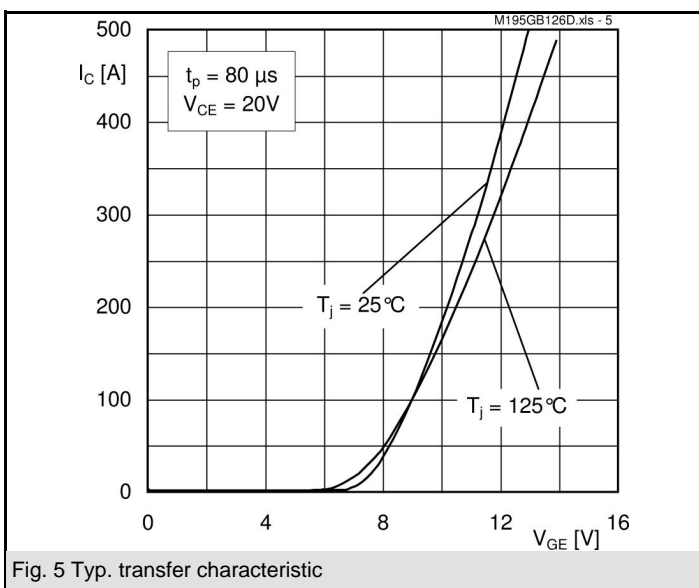
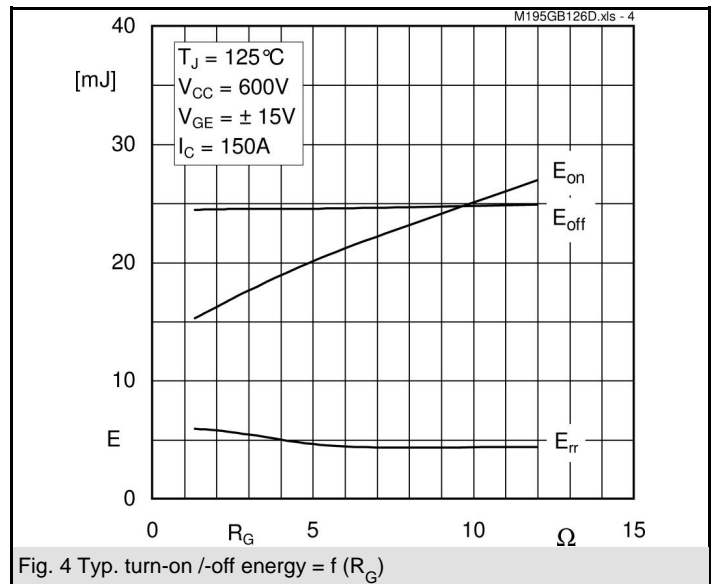
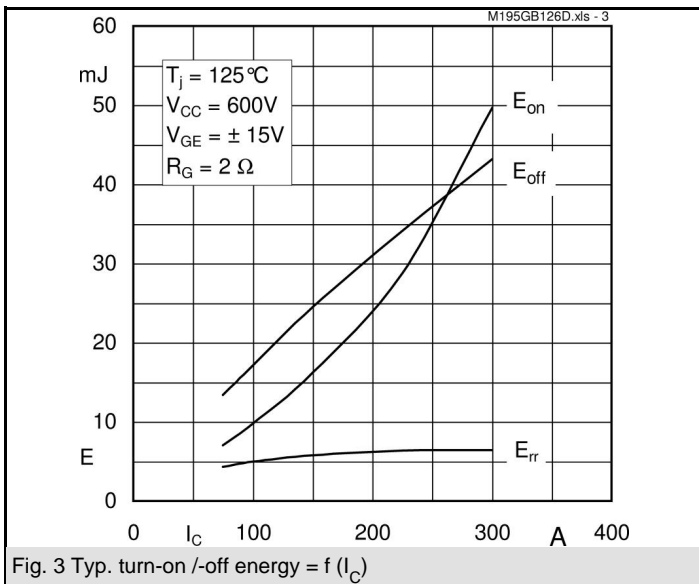
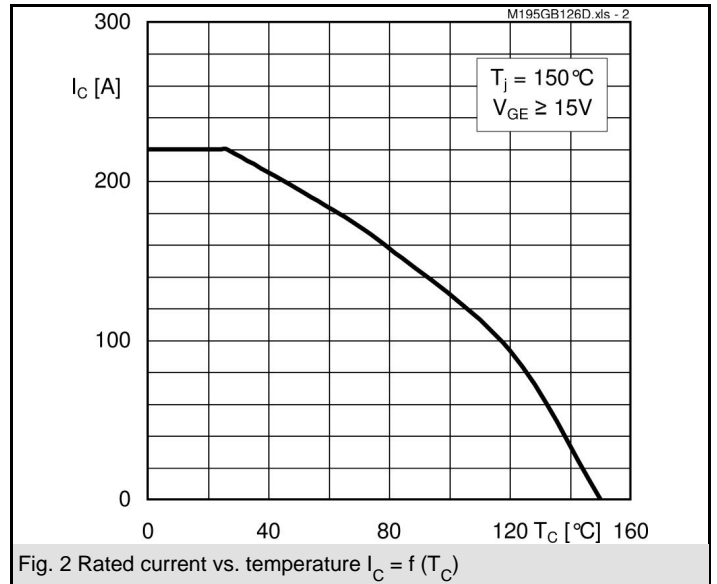
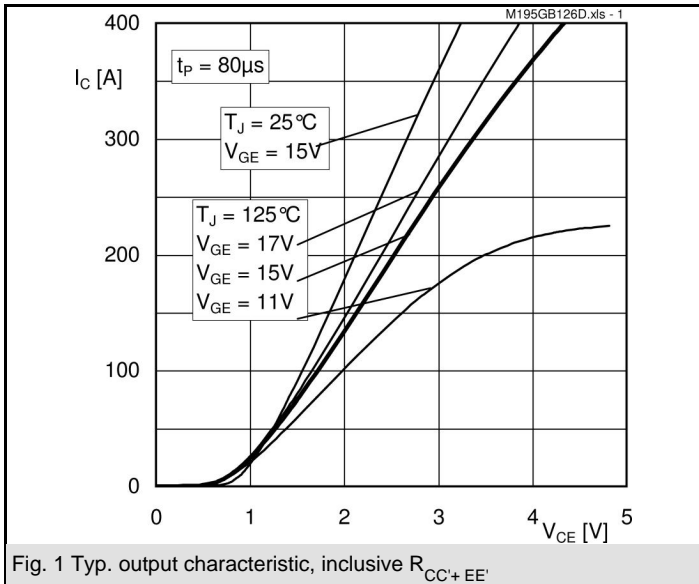
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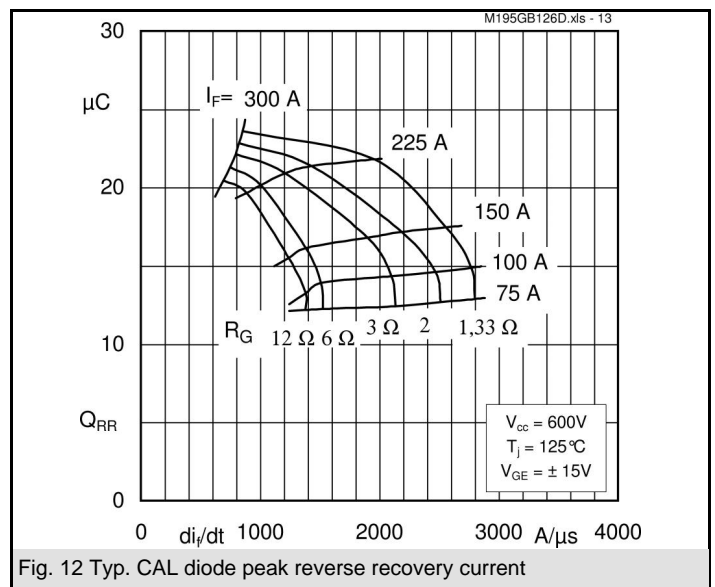
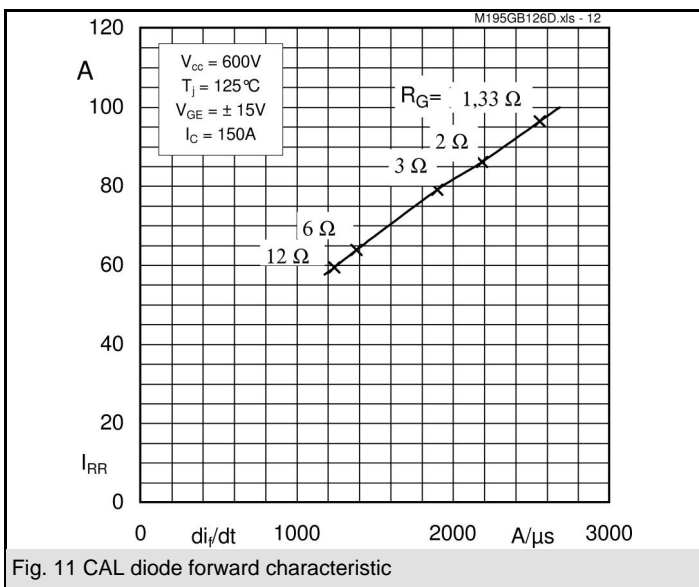
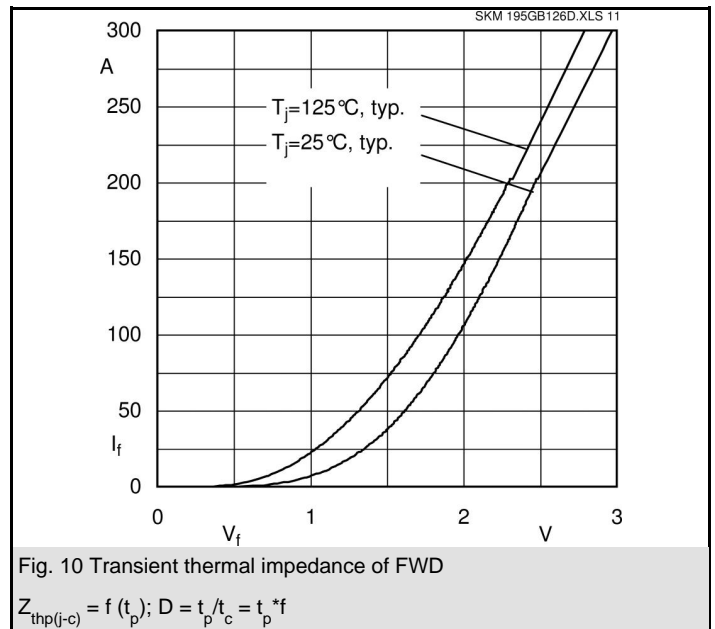
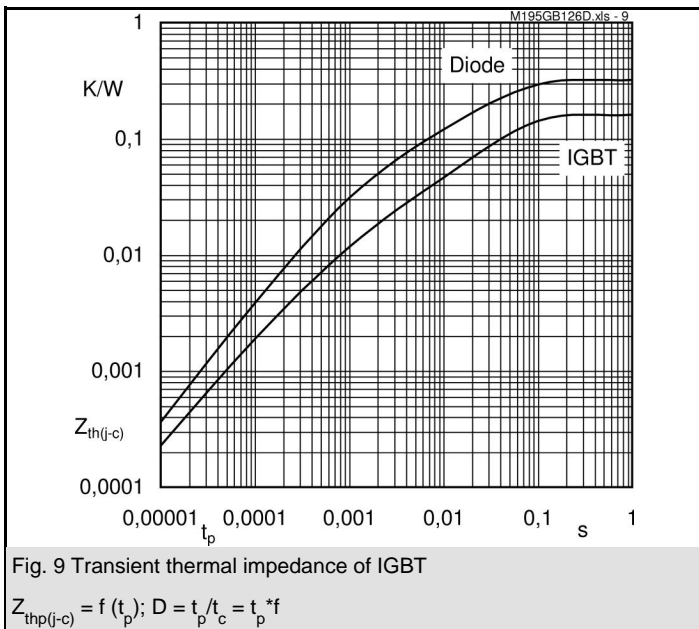
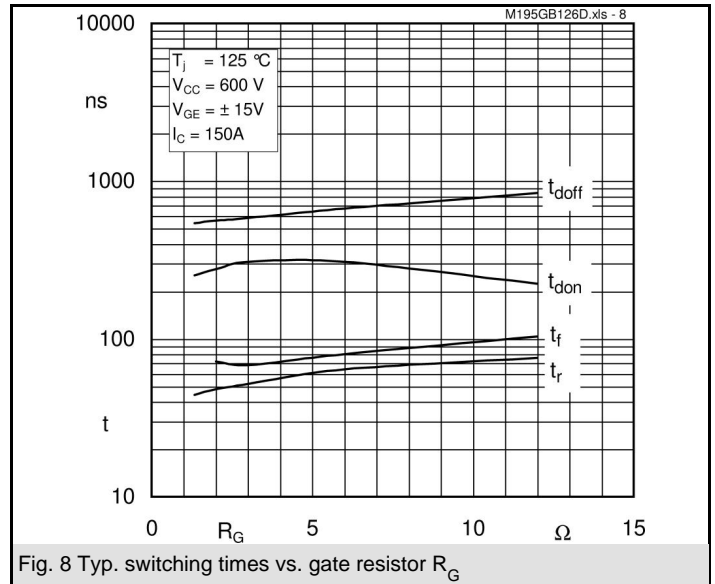
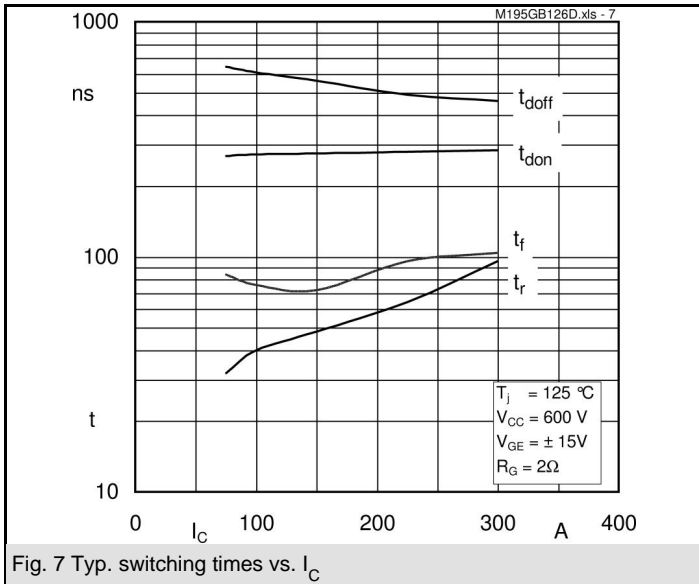
Z_{th}		Conditions	Values	Units
$Z_{th(j-c)I}$				
$R_{\theta j-c}$		$i = 1$	115	mk/W
$R_{\theta j-c}$		$i = 2$	34	mk/W
$R_{\theta j-c}$		$i = 3$	9	mk/W
$R_{\theta j-c}$		$i = 4$	2	mk/W
$\tau_{\theta j-c}$		$i = 1$	0,0493	s
$\tau_{\theta j-c}$		$i = 2$	0,0174	s
$\tau_{\theta j-c}$		$i = 3$	0,0012	s
$\tau_{\theta j-c}$		$i = 4$	0,0002	s
$Z_{th(j-c)D}$				
$R_{\theta j-cD}$		$i = 1$	200	mk/W
$R_{\theta j-cD}$		$i = 2$	90	mk/W
$R_{\theta j-cD}$		$i = 3$	26	mk/W
$R_{\theta j-cD}$		$i = 4$	4	mk/W
$\tau_{\theta j-cD}$		$i = 1$	0,054	s
$\tau_{\theta j-cD}$		$i = 2$	0,0089	s
$\tau_{\theta j-cD}$		$i = 3$	0,001	s
$\tau_{\theta j-cD}$		$i = 4$	0,08	s

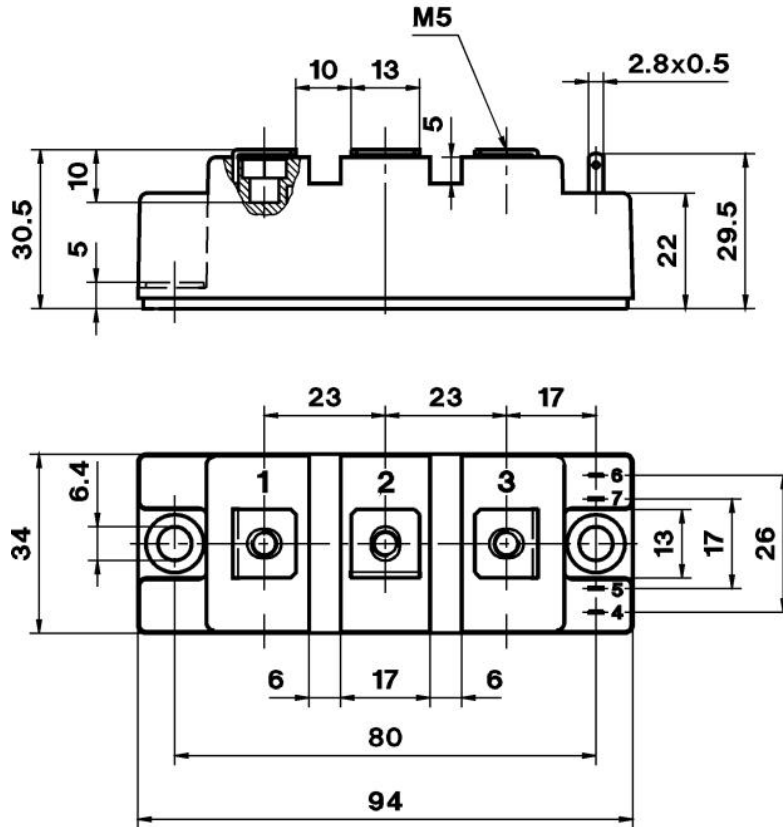


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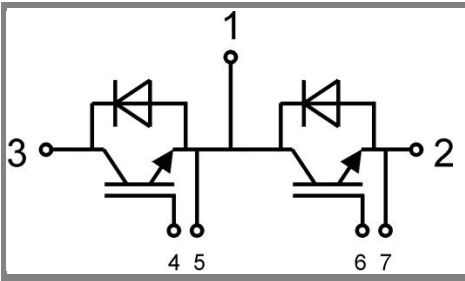
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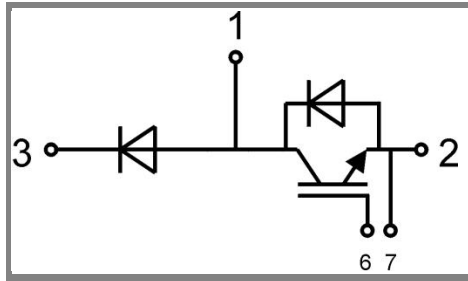




Case D 61



GB Case D61



GAL Case D 62