



SEMITRANS® 2

IGBT Modules

SKM 145GB123D

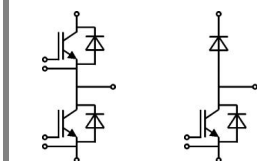
SKM 145GAL123D

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 DCB Direct Copper Bonding
- Large clearance (10 mm) and creepage distances (20 mm)

Typical Applications

- Switching (not for linear use)
- AC inverter drives



GB

GAL

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	$T_j = 150\text{ }^{\circ}\text{C}$	$T_{case} = 25\text{ }^{\circ}\text{C}$	145	A
		$T_{case} = 80\text{ }^{\circ}\text{C}$	110	A
I_{CRM}	$I_{CRM}=2 \times I_{Cnom}$		200	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	$T_j = 150\text{ }^{\circ}\text{C}$	$T_{case} = 25\text{ }^{\circ}\text{C}$	130	A
		$T_{case} = 80\text{ }^{\circ}\text{C}$	90	A
I_{FRM}	$I_{FRM}=2 \times I_{Fnom}$		200	A
I_{FSM}	$t_p = 10\text{ ms}; \sin.$	$T_j = 150\text{ }^{\circ}\text{C}$	900	A
Freewheeling Diode				
I_F	$T_j = 150\text{ }^{\circ}\text{C}$	$T_{case} = 25\text{ }^{\circ}\text{C}$	170	A
		$T_{case} = 80\text{ }^{\circ}\text{C}$	115	A
I_{FRM}	$I_{FRM}=2 \times I_{Fnom}$		300	A
I_{FSM}	$t_p = 10\text{ ms}; \sin.$	$T_j = 150\text{ }^{\circ}\text{C}$	1440	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.		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 = 4 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		11	14	mΩ
		T _j = 125°C		15	19	mΩ
V _{CE(sat)}	I _{Cnom} = 100 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		6,5	8,5	nF
C _{oes}				1	1,5	nF
C _{res}				0,5	0,6	nF
Q _G	V _{GE} = -8V - +20V			1000		nC
R _{Gint}	T _j = °C			5		Ω
t _{d(on)}	R _{Gon} = 6,8 Ω	V _{CC} = 600V I _{Cnom} = 100A		160	320	ns
t _r				80	160	ns
E _{on}	R _{Goff} = 6,8 Ω	T _j = 125 °C V _{GE} = -15V		16		mJ
t _{d(off)}				400	520	ns
t _f				70	100	ns
E _{off}				12		mJ
R _{th(j-c)}	per IGBT				0,15	K/W



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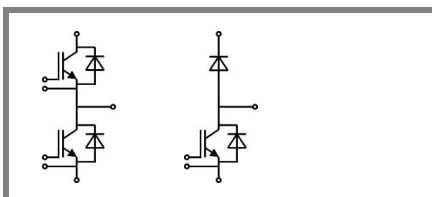
Typical Applications

- Switching (not for linear use)
- AC inverter drives

Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 100 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	2	2,5	V
		$T_j = 125^\circ\text{C}_{chiplev.}$	1,8		V
V_{F0}		$T_j = 25^\circ\text{C}$	1,1	1,4	V
		$T_j = 125^\circ\text{C}$			V
r_F		$T_j = 25^\circ\text{C}$	9	11	mΩ
		$T_j = 125^\circ\text{C}$			mΩ
I_{RRM}	$I_{Fnom} = 100 \text{ A}$	$T_j = 25^\circ\text{C}$	35		A
Q_{rr}	$di/dt = 1000 \text{ A}/\mu\text{s}$		5		μC
E_{rr}	$V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$				mJ
$R_{th(j-c)D}$	per diode			0,36	K/W
Freewheeling Diode					
$V_F = V_{EC}$	$I_{Fnom} = 150 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	2	2,5	V
		$T_j = 125^\circ\text{C}_{chiplev.}$	1,8		V
V_{F0}		$T_j = 25^\circ\text{C}$	1,1	1,4	V
		$T_j = 125^\circ\text{C}$			V
r_F		$T_j = 25^\circ\text{C}$	9	11	V
		$T_j = 125^\circ\text{C}$			V
I_{RRM}	$I_{Fnom} = 150 \text{ A}$	$T_j = 25^\circ\text{C}$	55		A
Q_{rr}			8		μC
E_{rr}	$V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$				mJ
$R_{th(j-c)FD}$	per diode			0,3	K/W
Module					
L_{CE}				30	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25^\circ\text{C}$	0,75		mΩ
		$T_{case} = 125^\circ\text{C}$	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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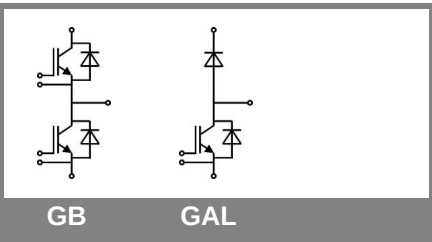
Features

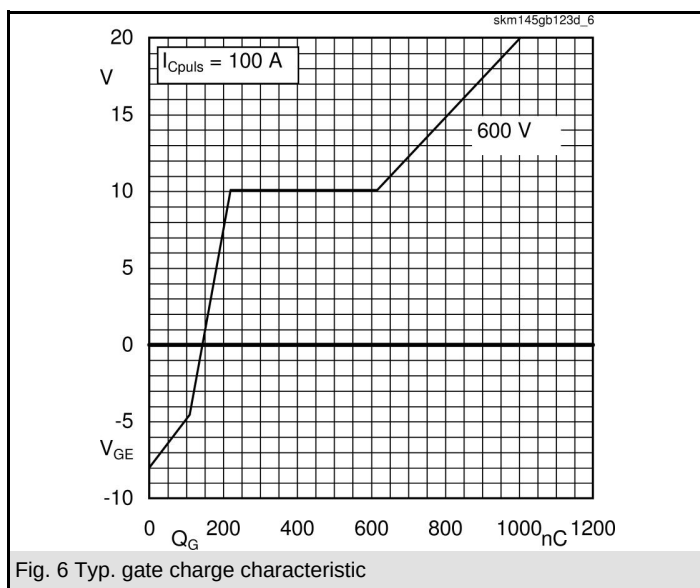
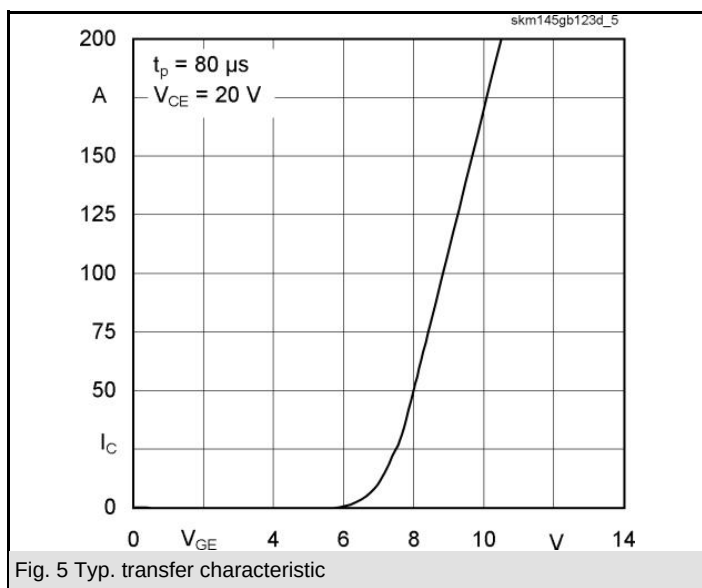
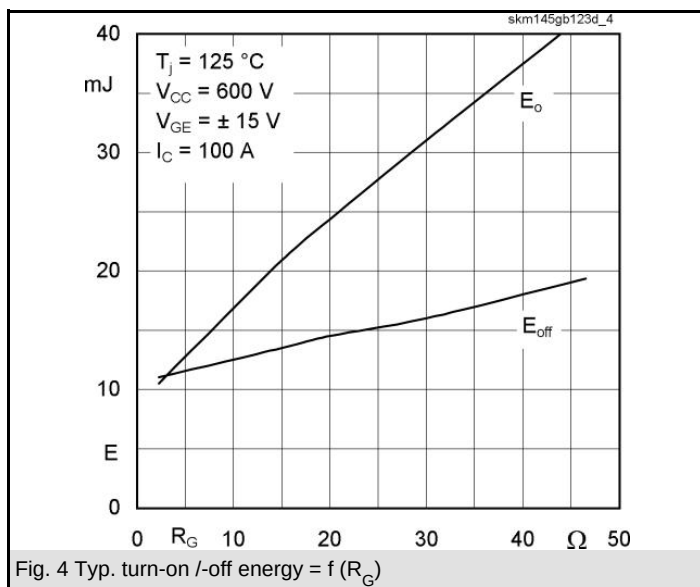
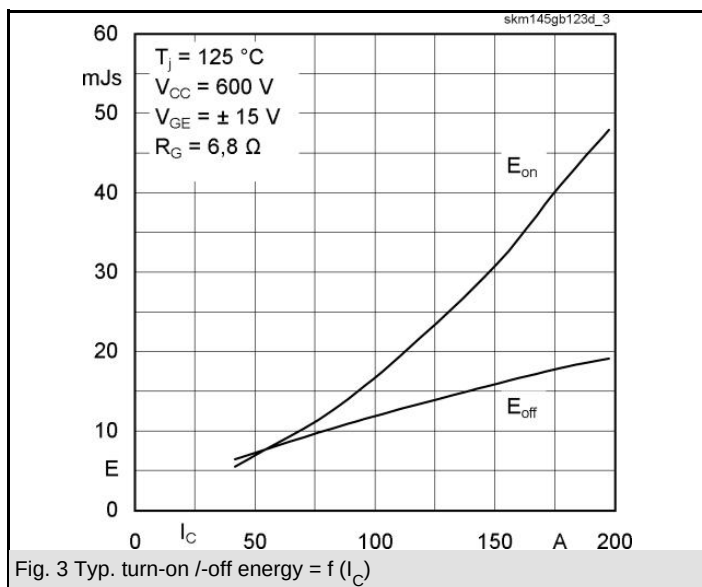
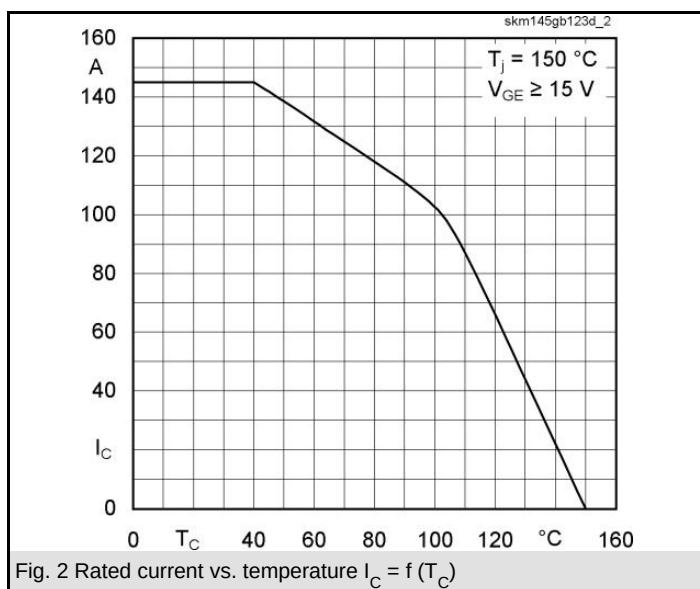
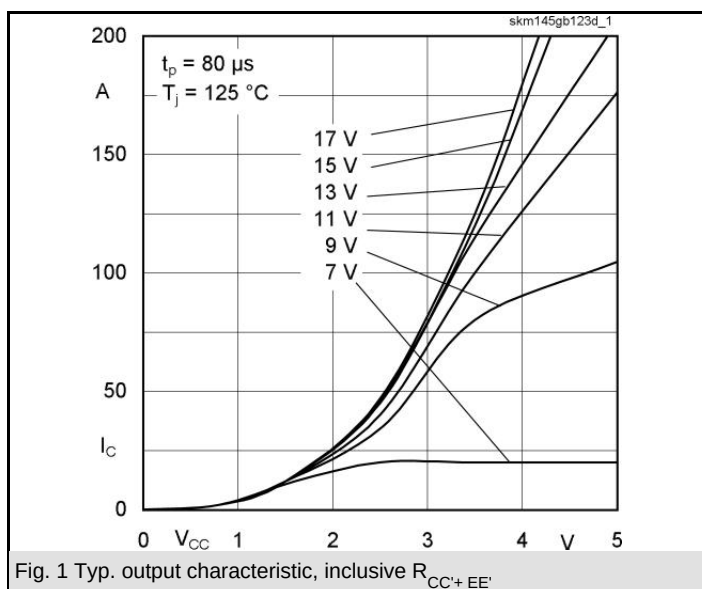
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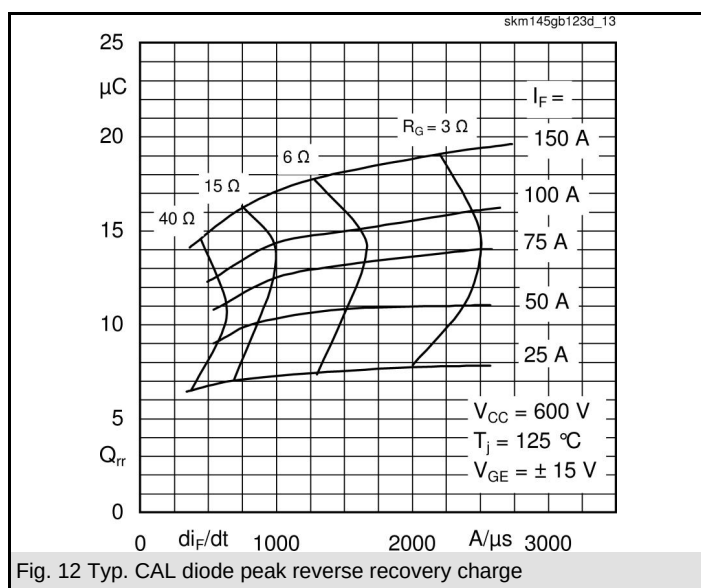
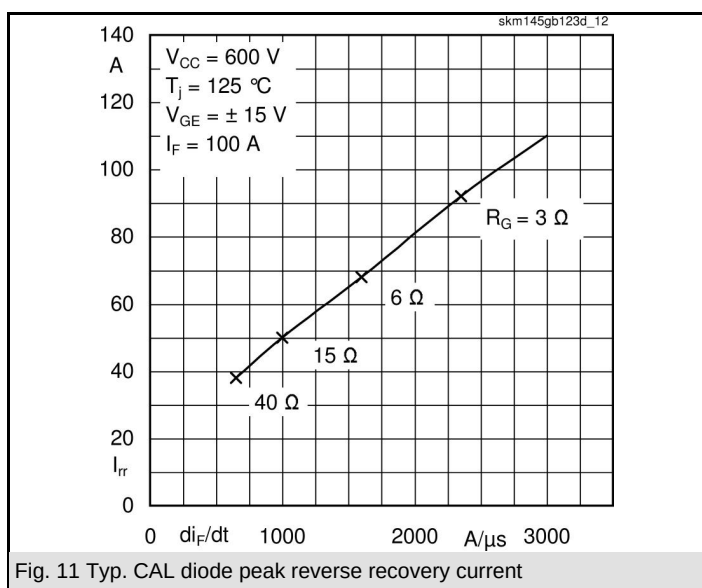
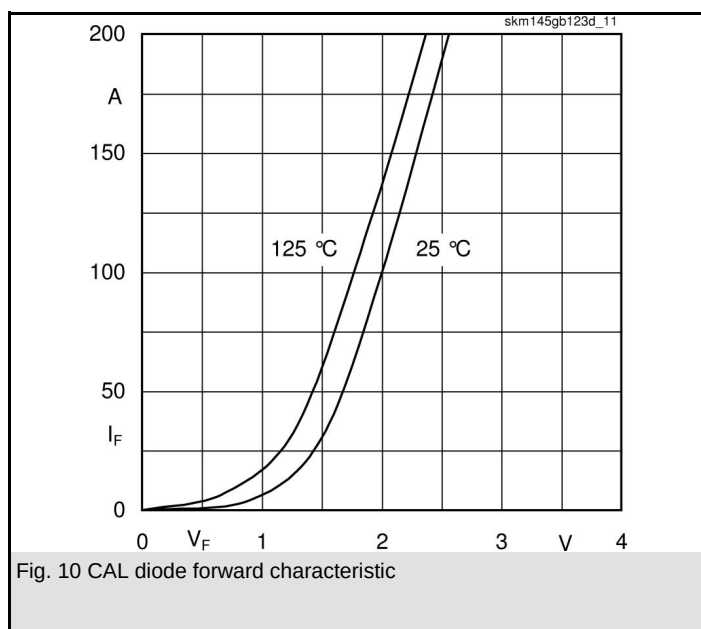
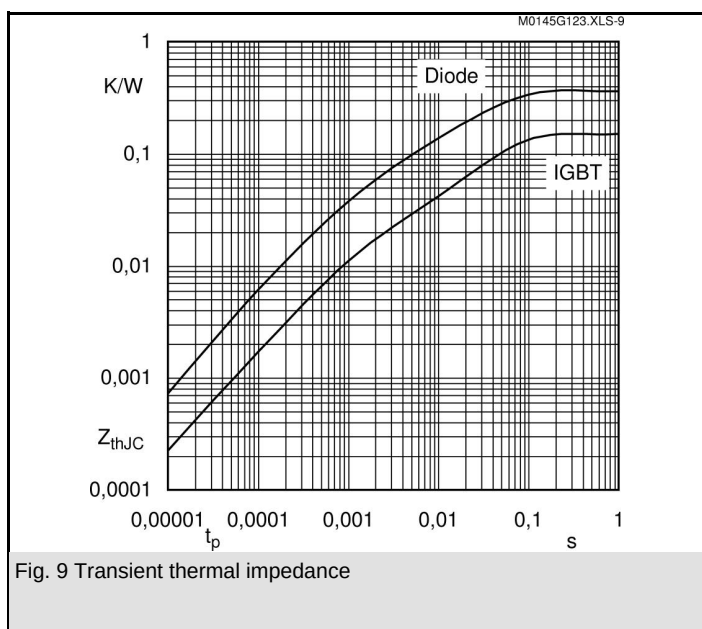
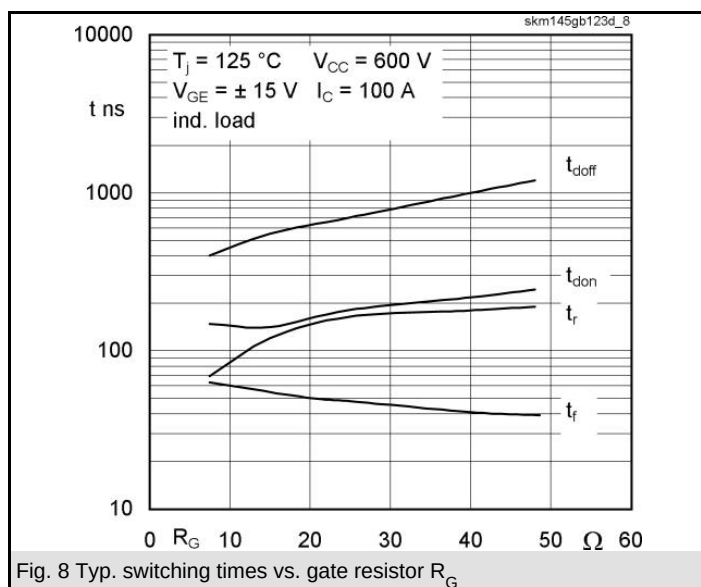
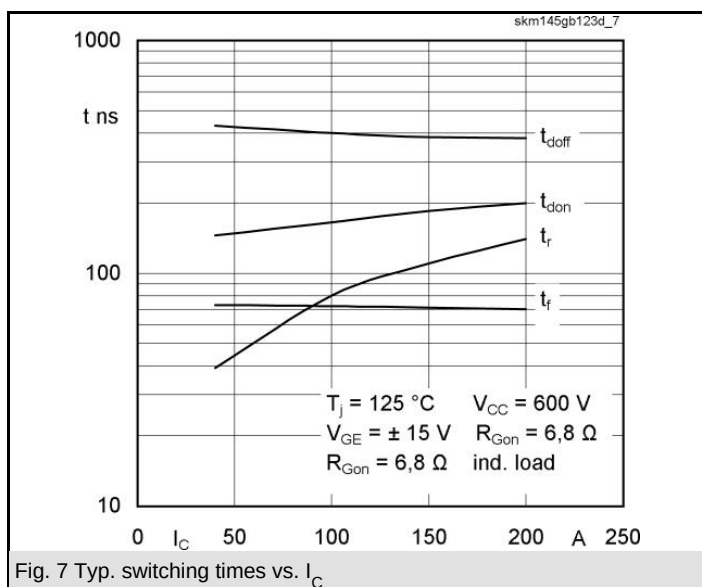
Typical Applications

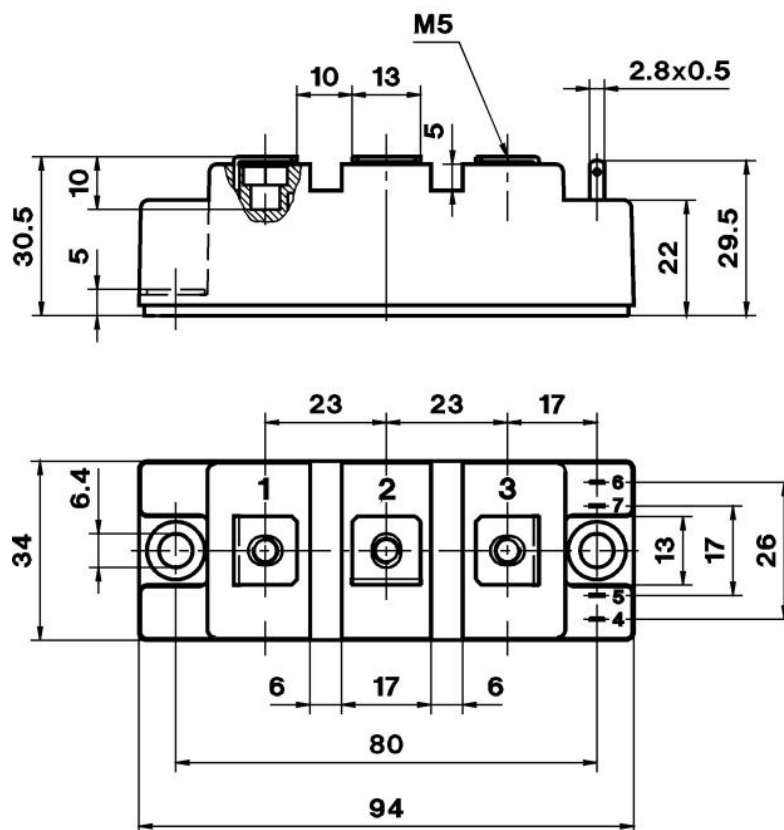
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Z_{th}			
Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	$i = 1$	100	mk/W
R_i	$i = 2$	38	mk/W
R_i	$i = 3$	10	mk/W
R_i	$i = 4$	2	mk/W
τ_{ui}	$i = 1$	0,03	s
τ_{ui}	$i = 2$	0,0287	s
τ_{ui}	$i = 3$	0,0012	s
τ_{ui}	$i = 4$	0,0002	s
$Z_{th(j-c)D}$			
R_i	$i = 1$	240	mk/W
R_i	$i = 2$	95	mk/W
R_i	$i = 3$	22	mk/W
R_i	$i = 4$	3	mk/W
τ_{ui}	$i = 1$	0,054	s
τ_{ui}	$i = 2$	0,0113	s
τ_{ui}	$i = 3$	0,0012	s
τ_{ui}	$i = 4$	0,005	s

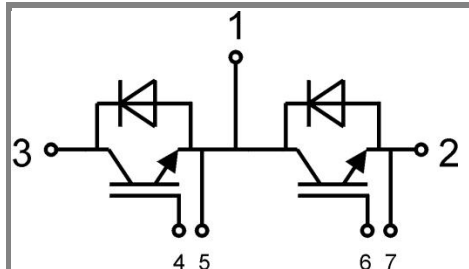






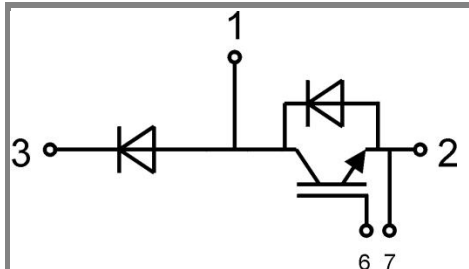


Case D 61



GB

Case D 61



GAL

Case D 62 (→ D 61)