



SEMITRANS® 2

IGBT Modules

SKM 145GB123D

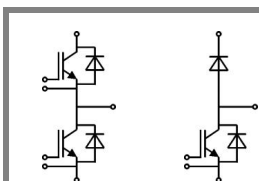
SKM 145GAL123D

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



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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	$T_j = 150\text{ }^{\circ}\text{C}$	$T_{case} = 25\text{ }^{\circ}\text{C}$	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 _C = 100A		160	320	ns
t _r				80	160	ns
E _{on}					16	
t _{d(off)}	R _{Goff} = 6,8 Ω	T _j = 125 °C		400	520	ns
t _f		V _{GE} = -15V		70	100	ns
E _{off}					12	
R _{th(j-c)}	per IGBT				0,15	K/W



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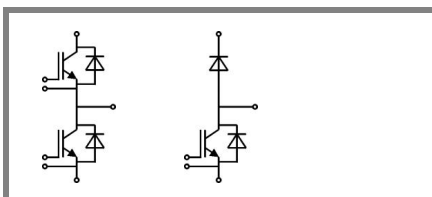
Typical Applications*

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

Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{F\text{nom}} = 100 \text{ A}; V_{GE} = 0 \text{ V}$				
	$T_j = 25^\circ\text{C}_{\text{chiplev.}}$		2	2,5	V
	$T_j = 125^\circ\text{C}_{\text{chiplev.}}$		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}	$I_F = 100 \text{ A}$		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					
$V_F = V_{EC}$	$I_{F\text{nom}} = 150 \text{ A}; V_{GE} = 0 \text{ V}$				
	$T_j = 25^\circ\text{C}_{\text{chiplev.}}$		2	2,5	V
	$T_j = 125^\circ\text{C}_{\text{chiplev.}}$		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}	$I_F = 150 \text{ A}$		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				
	$T_{\text{case}} = 25^\circ\text{C}$		0,75		mΩ
	$T_{\text{case}} = 125^\circ\text{C}$		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.

* 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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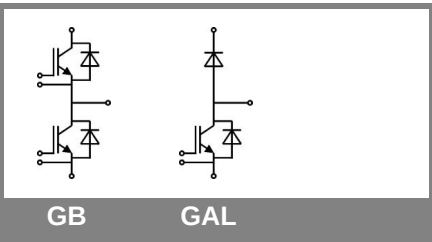
Features

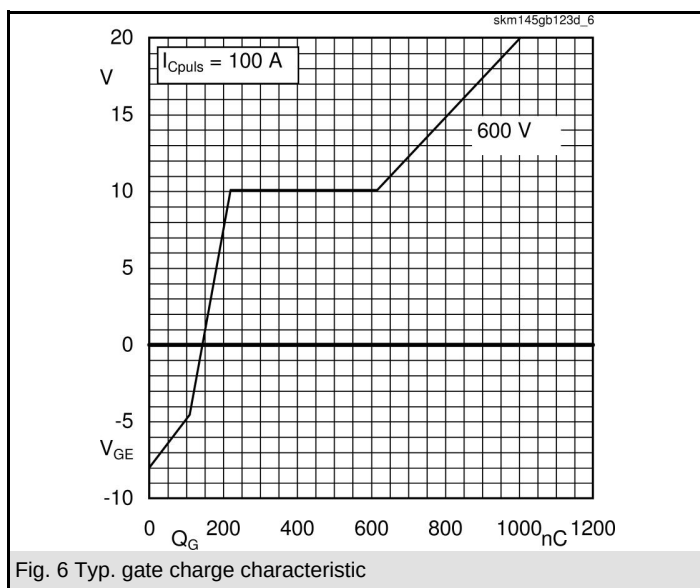
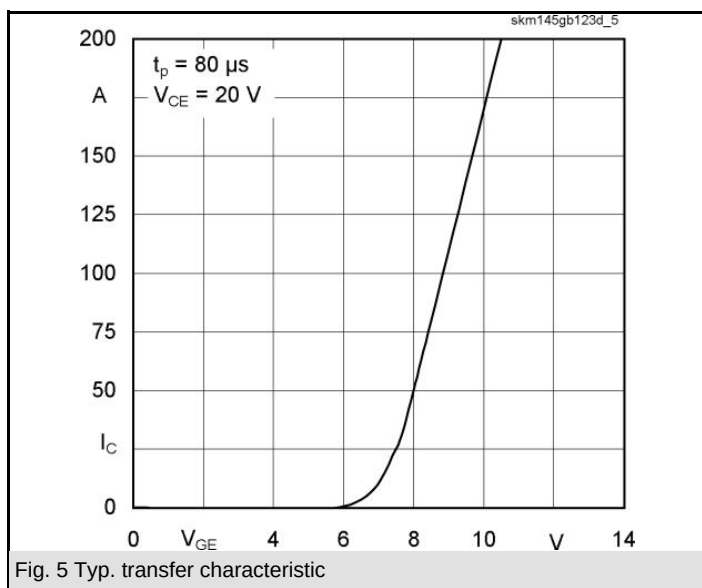
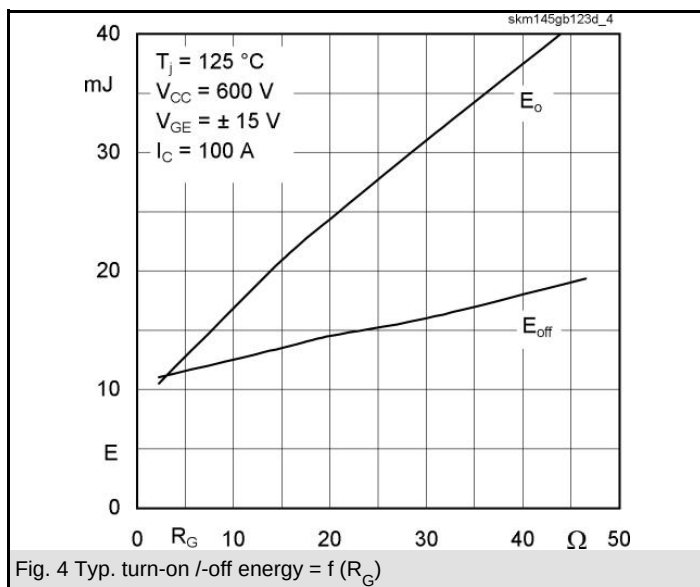
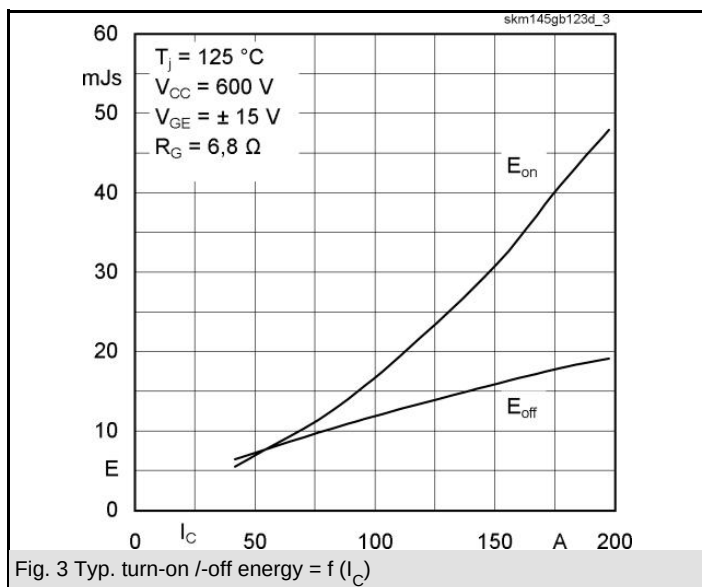
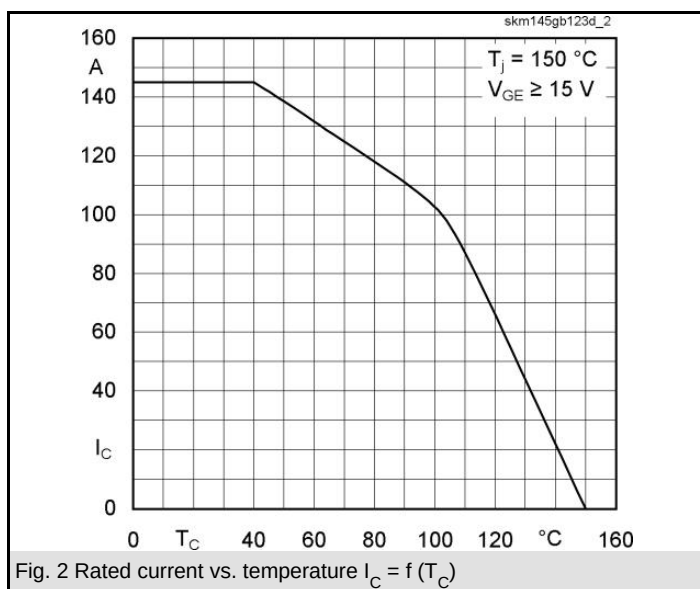
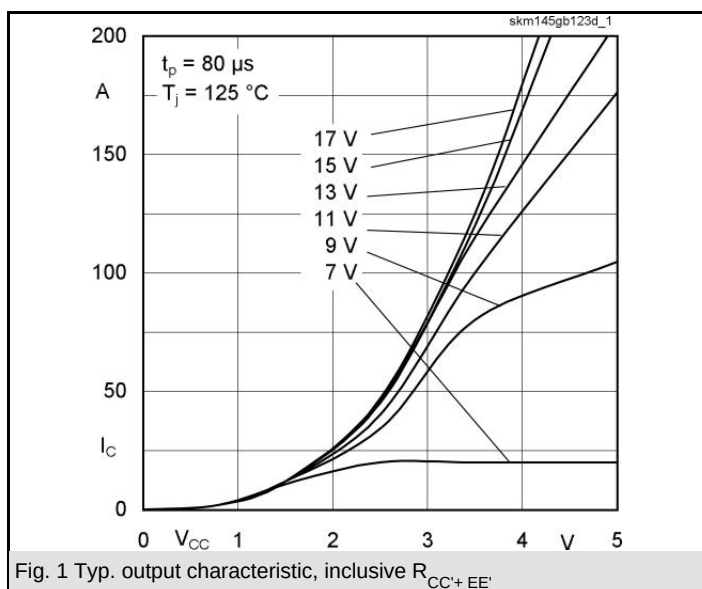
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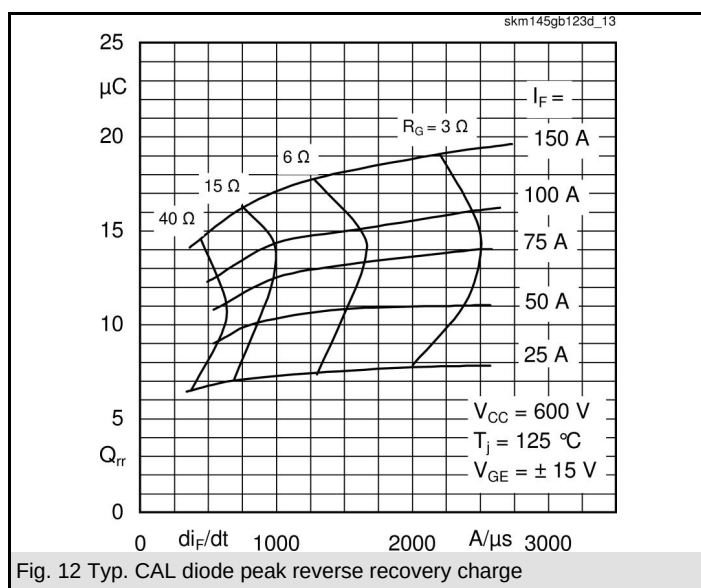
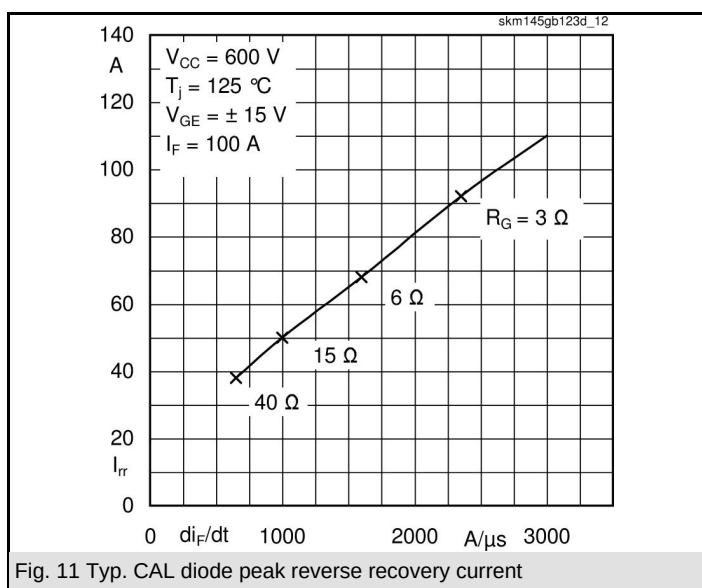
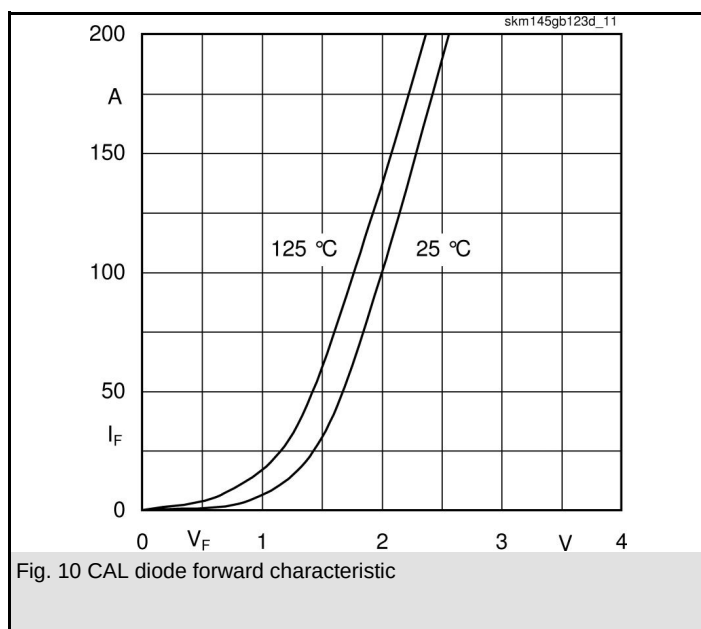
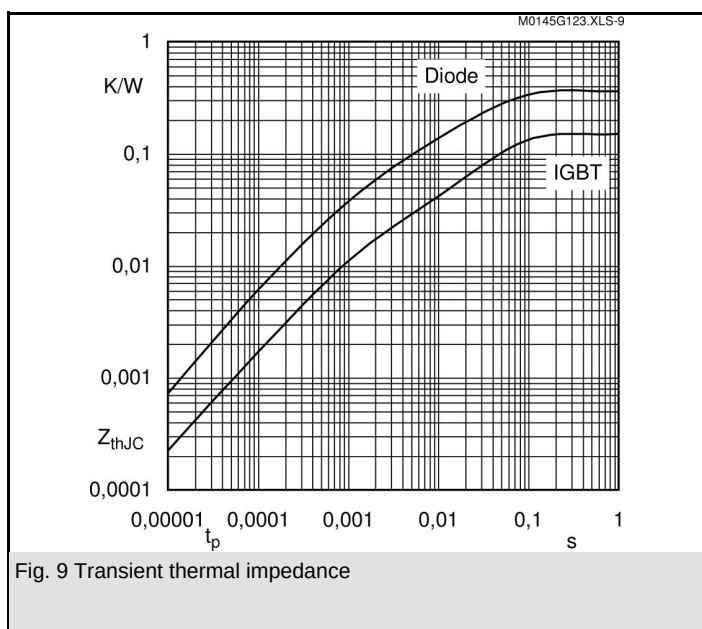
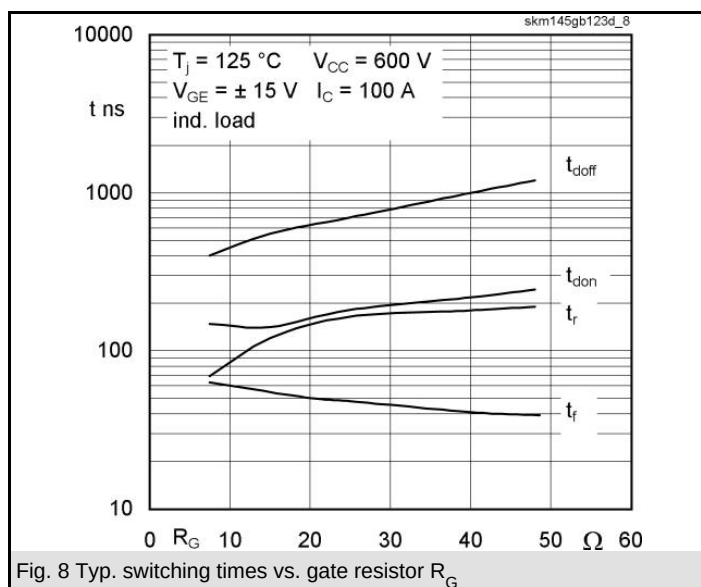
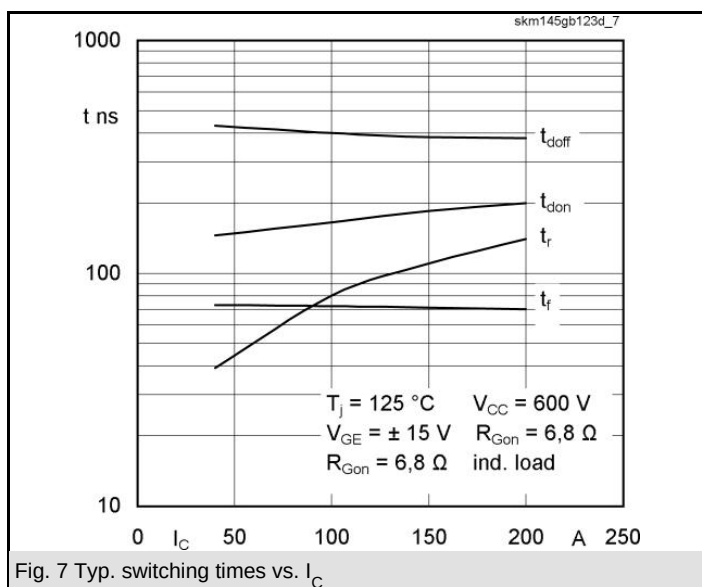
Typical Applications*

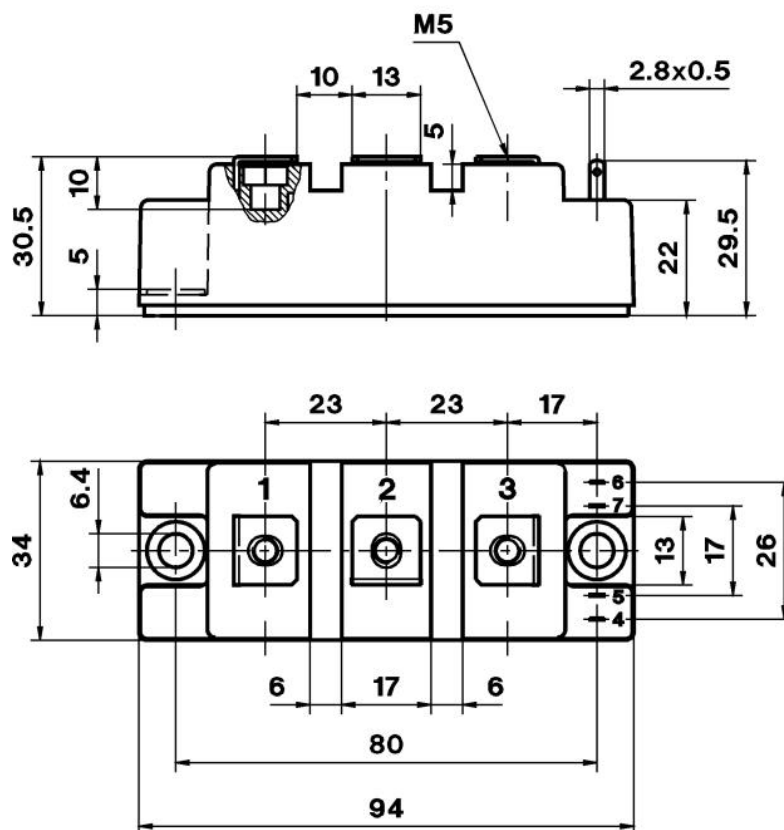
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- AC inverter drives

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

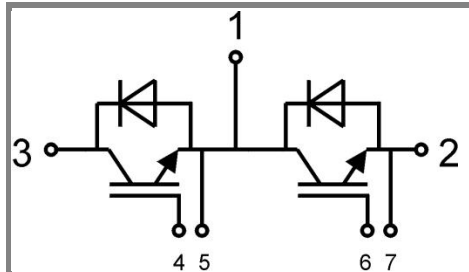






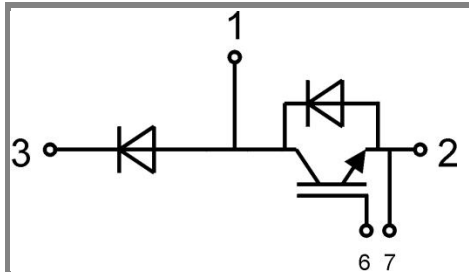


Case D 61



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Case D 61



GAL

Case D 62 (→ D 61)