

SEMITRANS® 2

IGBT Modules

SKM 100GB123D

SKM 100GAL123D

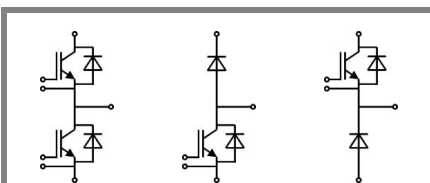
SKM 100GAR123D

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 Technology
- Large clearance (10 mm) and creepage distances (20 mm)

Typical Applications*

- AC inverter drives
- UPS



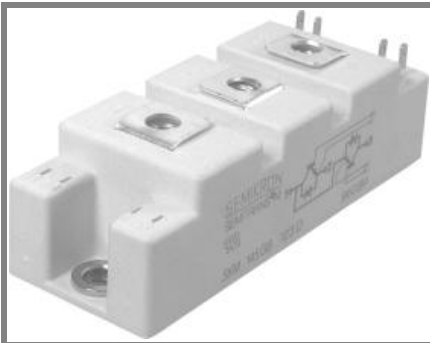
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GAL

GAR

Absolute Maximum Ratings		$T_c = 25\text{ °C}$, unless otherwise specified		
Symbol	Conditions	Values	Units	
IGBT				
V_{CES}	$T_j = 25\text{ °C}$	1200	V	
I_C	$T_j = 150\text{ °C}$	$T_{case} = 25\text{ °C}$	100	A
		$T_{case} = 80\text{ °C}$	90	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	150	A	
V_{GES}		± 20	V	
t_{psc}	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125\text{ °C}$ $V_{CES} < 1200\text{ V}$	10	μs	
Inverse Diode				
I_F	$T_j = 150\text{ °C}$	$T_{case} = 25\text{ °C}$	95	A
		$T_{case} = 80\text{ °C}$	65	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	150	A	
I_{FSM}	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 150\text{ °C}$	720	A
Freewheeling Diode				
I_F	$T_j = 150\text{ °C}$	$T_{case} = 25\text{ °C}$	130	A
		$T_{case} = 80\text{ °C}$	90	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	200	A	
I_{FSM}	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 150\text{ °C}$	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.	2500	V	

Characteristics		$T_c = 25\text{ °C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 2\text{ mA}$	4,5	5,5	6,5	V
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$		0,1	0,3	mA
V_{CE0}		$T_j = 25\text{ °C}$	1,4	1,6	V
		$T_j = 125\text{ °C}$	1,6	1,8	V
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}$	14,6	18,6	$\text{m}\Omega$
		$T_j = 125\text{ °C}$	20	25,3	$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 75\text{ A}, V_{GE} = 15\text{ V}$		2,5	3	V
C_{ies}			5	6,6	nF
C_{oes}	$V_{CE} = 25, V_{GE} = 0\text{ V}$		0,72	0,9	nF
C_{res}			0,38	0,5	nF
Q_G	$V_{GE} = -8\text{ V} - +20\text{ V}$		750		nC
R_{Gint}	$T_j = \text{°C}$		5		Ω
$t_{d(on)}$	$R_{Gon} = 15\ \Omega$	$V_{CC} = 600\text{ V}$ $I_C = 75\text{ A}$	30	60	ns
t_r			70	140	ns
E_{on}	$R_{Goff} = 15\ \Omega$	$T_j = 125\text{ °C}$ $V_{GE} = \pm 15\text{ V}$	10		mJ
$t_{d(off)}$			450	600	ns
t_f			70	90	ns
E_{off}			8		mJ
$R_{th(j-c)}$	per IGBT			0,18	K/W



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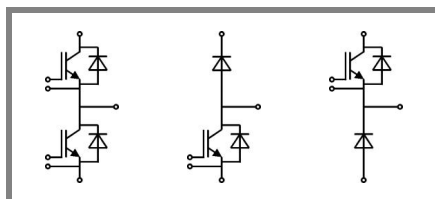
SKM 100GAR123D

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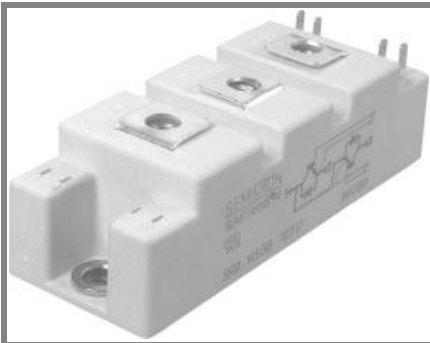
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Characteristics		min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 75 \text{ A}; V_{GE} = 0 \text{ V}$		2	2,5	V
	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$				V
	$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$		1,8		V
V_{F0}			1,1	1,2	V
	$T_j = 25 \text{ }^\circ\text{C}$				V
	$T_j = 125 \text{ }^\circ\text{C}$				V
r_F			12	17	mΩ
	$T_j = 25 \text{ }^\circ\text{C}$				mΩ
	$T_j = 125 \text{ }^\circ\text{C}$				mΩ
I_{RRM}	$I_F = 75 \text{ A}$		40		A
Q_{rr}	$di/dt = 800 \text{ A}/\mu\text{s}$		3		μC
E_{rr}	$V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$				mJ
$R_{th(j-c)D}$	per diode			0,5	K/W
Freewheeling Diode					
$V_F = V_{EC}$	$I_{Fnom} = 100 \text{ A}; V_{GE} = 0 \text{ V}$		2	2,5	V
	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$				V
	$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$		1,8		V
V_{F0}			1,1	1,2	V
	$T_j = 25 \text{ }^\circ\text{C}$				V
	$T_j = 125 \text{ }^\circ\text{C}$				V
r_F			9	13	V
	$T_j = 25 \text{ }^\circ\text{C}$				V
	$T_j = 125 \text{ }^\circ\text{C}$				V
I_{RRM}	$I_F = 100 \text{ A}$		50		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
$R_{th(j-c)FD}$	per diode			0,36	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.

* 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 staff.

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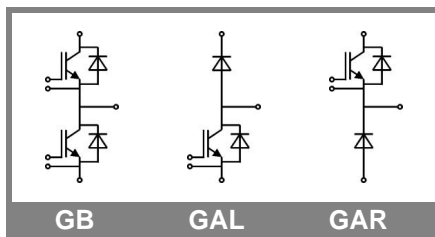
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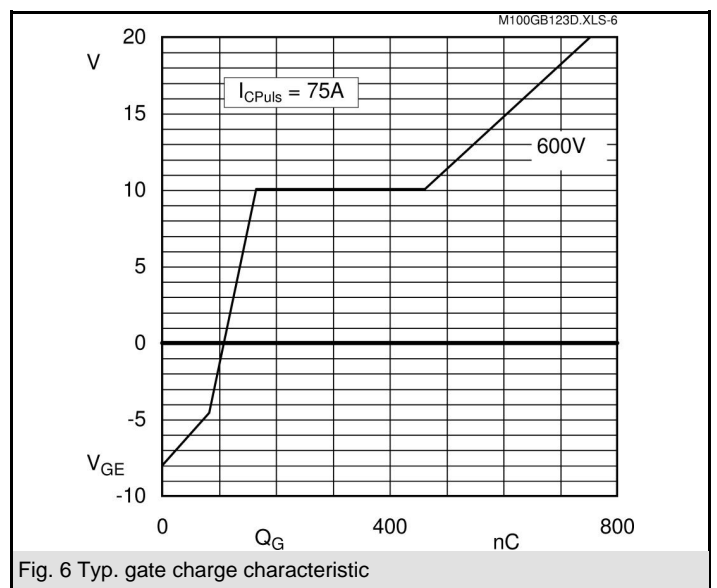
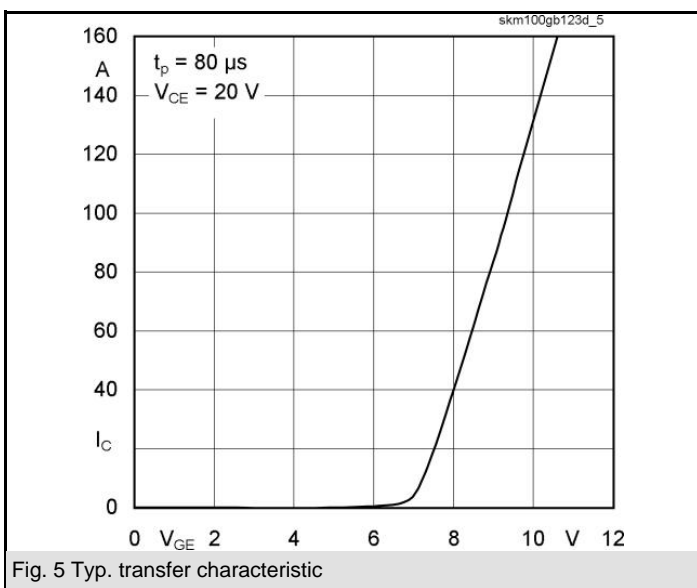
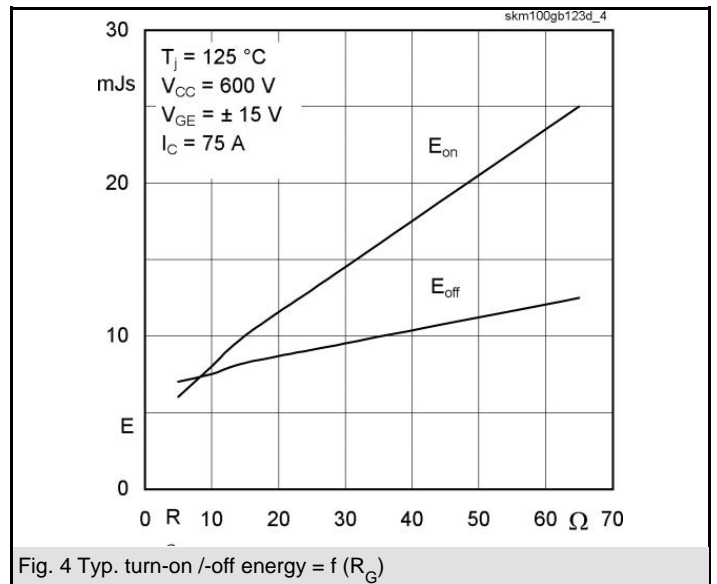
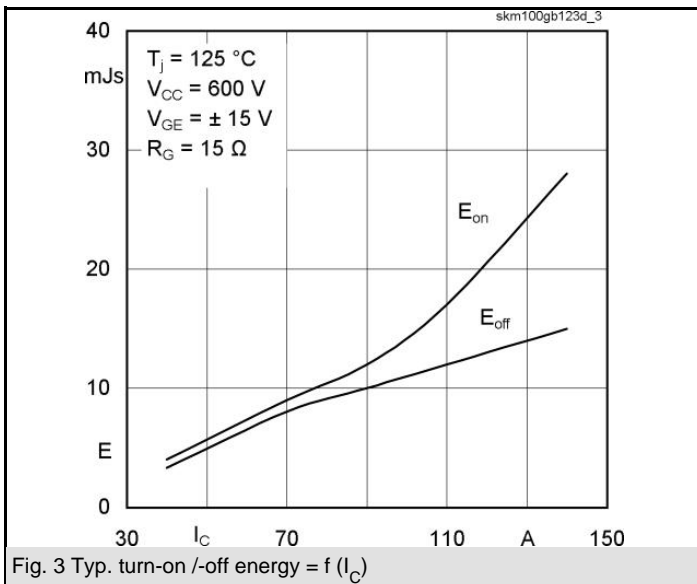
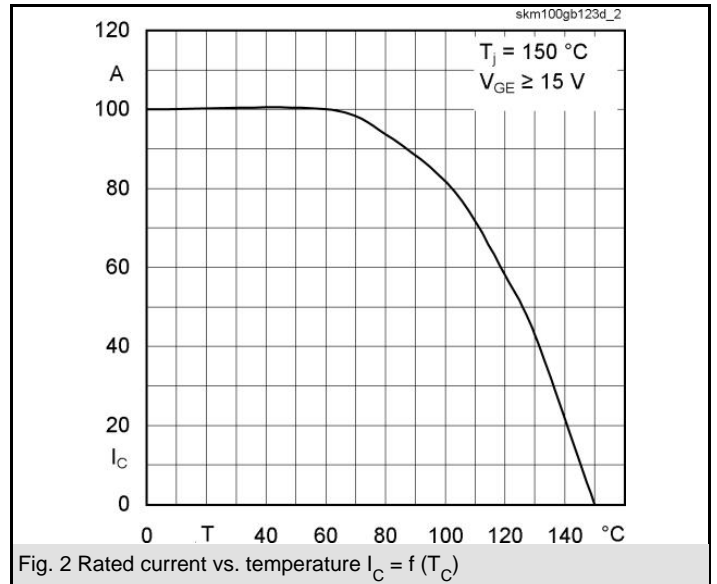
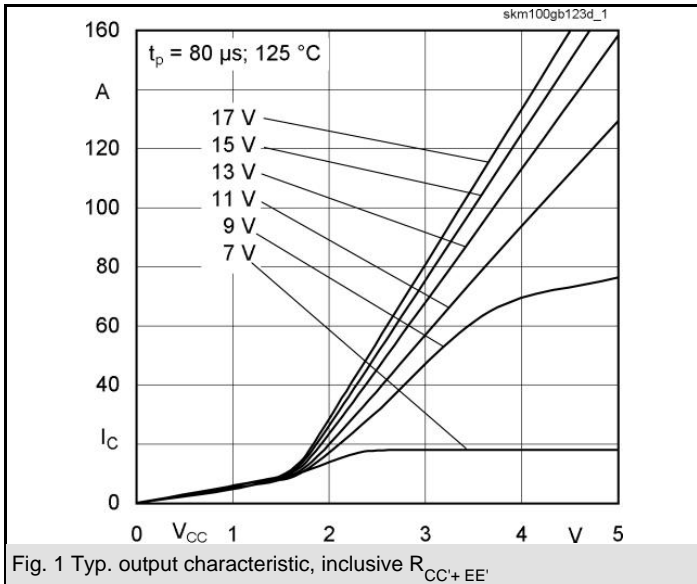
Z_{th}			
Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
$R_{\theta j-c}$	$i = 1$	162	mk/W
$R_{\theta j-c}$	$i = 2$	14	mk/W
$R_{\theta j-c}$	$i = 3$	2,7	mk/W
$R_{\theta j-c}$	$i = 4$	1,3	mk/W
$\tau_{th j-c}$	$i = 1$	0,204	s
$\tau_{th j-c}$	$i = 2$	0,0242	s
$\tau_{th j-c}$	$i = 3$	0,0013	s
$\tau_{th j-c}$	$i = 4$	0	s
$Z_{th(j-c)D}$			
$R_{\theta j-c}$	$i = 1$	320	mk/W
$R_{\theta j-c}$	$i = 2$	150	mk/W
$R_{\theta j-c}$	$i = 3$	0,0265	mk/W
$R_{\theta j-c}$	$i = 4$	3,5	mk/W
$\tau_{th j-c}$	$i = 1$	0,05	s
$\tau_{th j-c}$	$i = 2$	0,0104	s
$\tau_{th j-c}$	$i = 3$	0,0034	s
$\tau_{th j-c}$	$i = 4$	0,0003	s

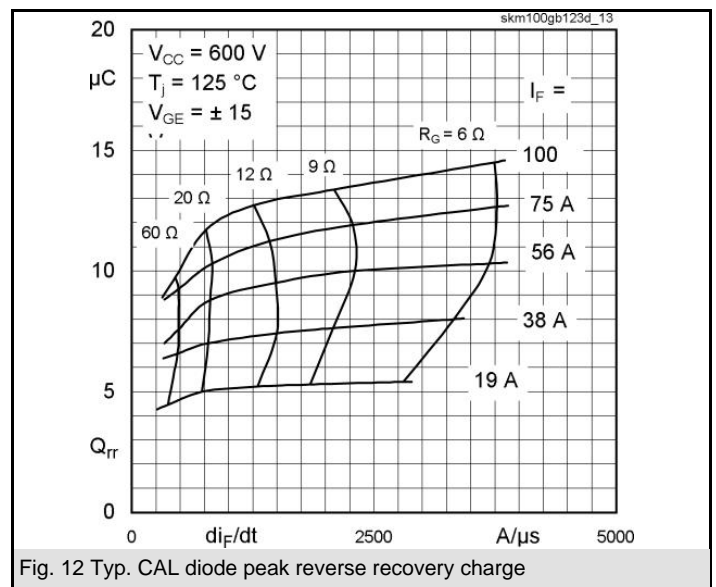
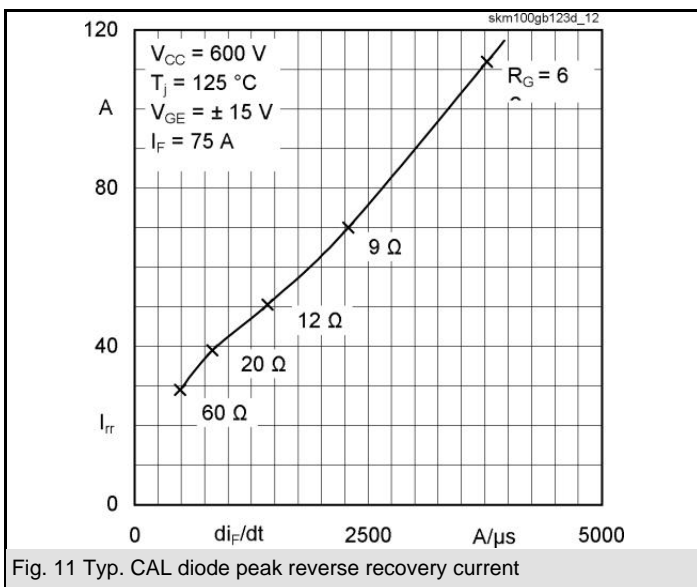
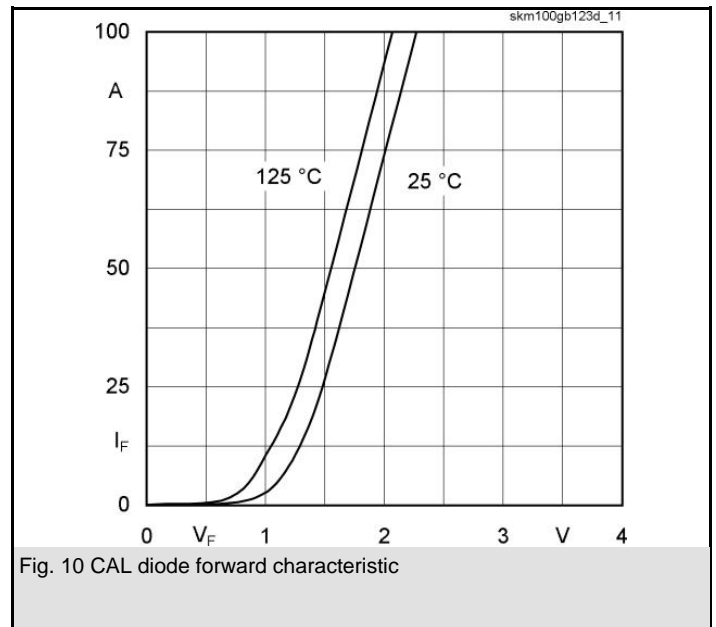
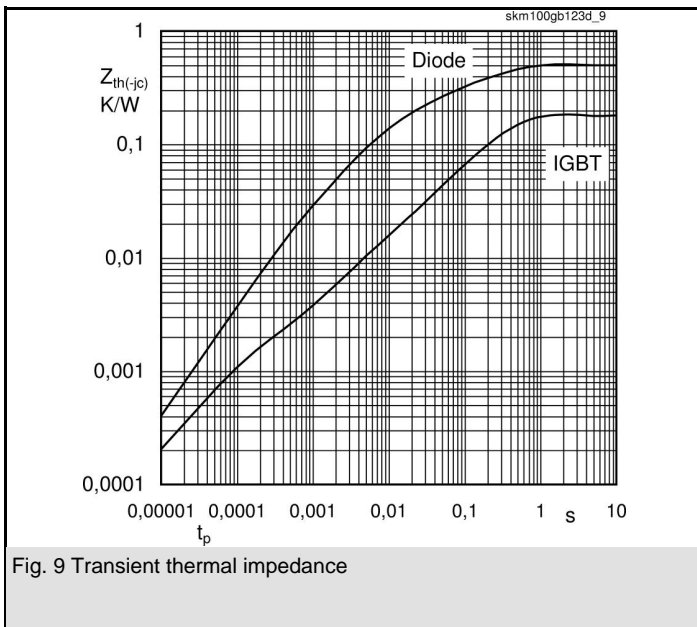
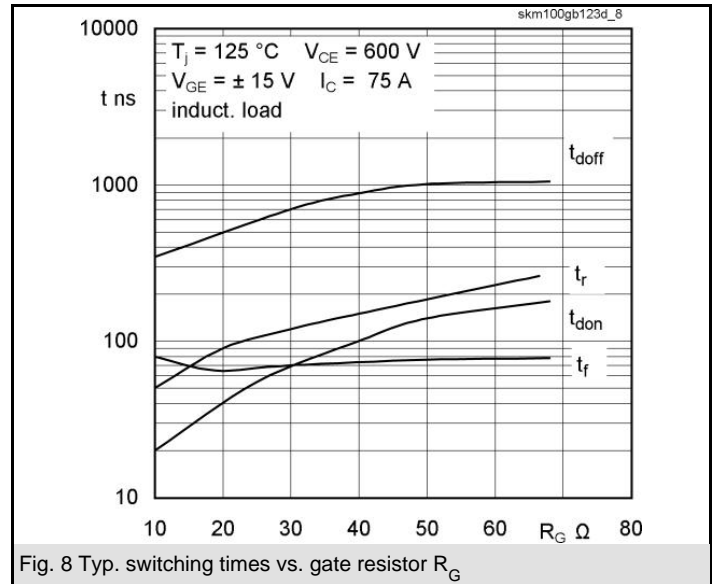
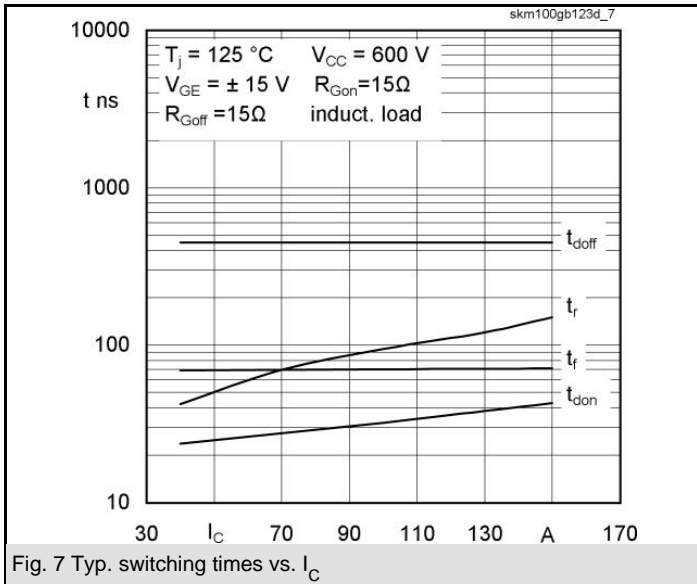


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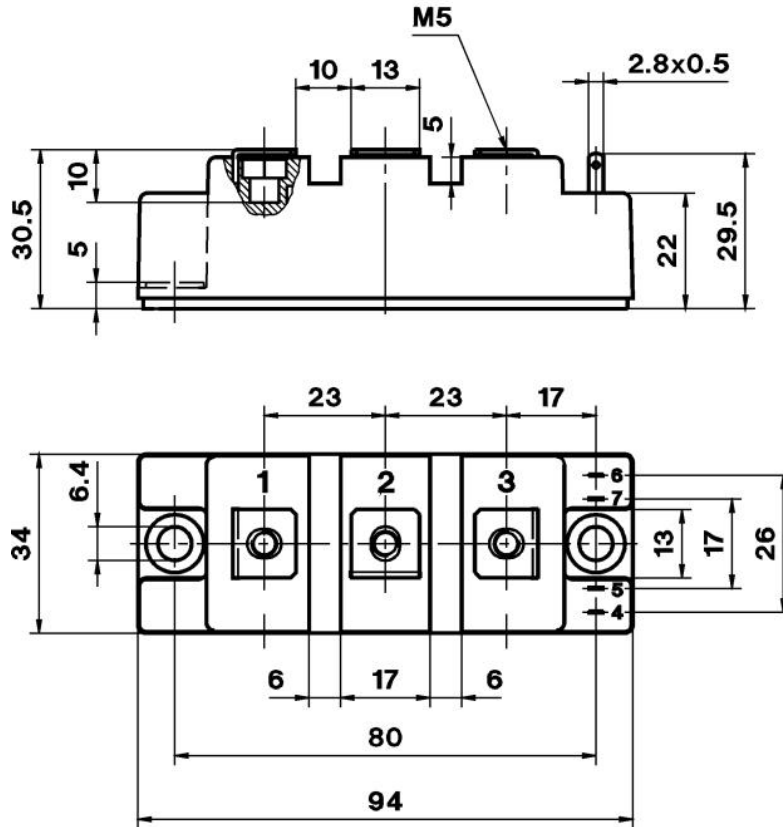


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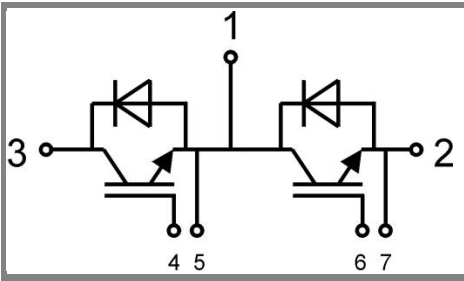
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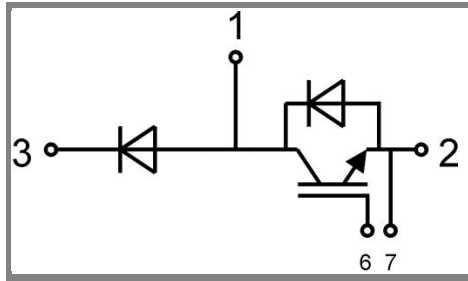
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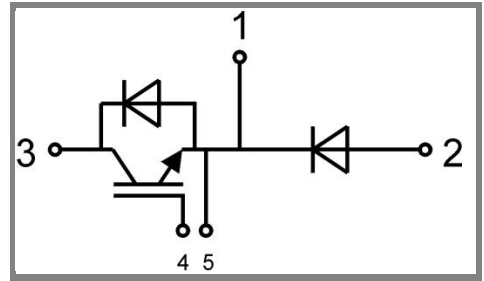
Case D 61



GB Case D 61



GAL Case D 62 (→ D 61)



GAR Case D 63 (→ D 61)