

# SKM 145GB123D



**SEMITRANS<sup>®</sup> 2**

## IGBT Modules

**SKM 145GB123D**

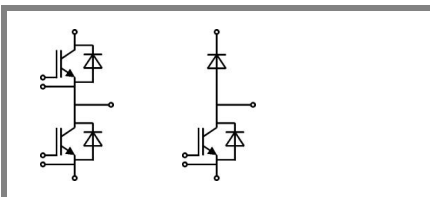
**SKM 145GAL123D**

### 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		$T_c = 25\text{ °C}$ , unless otherwise specified		
Symbol	Conditions	Values		Units
<b>IGBT</b>				
$V_{CES}$	$T_j = 25\text{ °C}$	1200		V
$I_C$	$T_j = 150\text{ °C}$	$T_{case} = 25\text{ °C}$	145	A
		$T_{case} = 80\text{ °C}$	110	A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	200		A
$V_{GES}$		$\pm 20$		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		$\mu\text{s}$
<b>Inverse Diode</b>				
$I_F$	$T_j = 150\text{ °C}$	$T_{case} = 25\text{ °C}$	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
<b>Freewheeling Diode</b>				
$I_F$	$T_j = 150\text{ °C}$	$T_{case} = 25\text{ °C}$	170	A
		$T_{case} = 80\text{ °C}$	115	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	300		A
$I_{FSM}$	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 150\text{ °C}$	1440	A
<b>Module</b>				
$I_{t(RMS)}$		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		
<b>IGBT</b>							
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 4\text{ mA}$	4,5	5,5	6,5	V		
$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$	$T_j = 25\text{ °C}$		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	
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}$		11	14	$\text{m}\Omega$	
		$T_j = 125\text{ °C}$		15	19	$\text{m}\Omega$	
$V_{CE(sat)}$	$I_{Cnom} = 100\text{ A}, V_{GE} = 15\text{ V}$	$T_j = ^{\circ}\text{C}_{chiplev.}$		2,5	3	V	
$C_{ies}$	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$		6,5	8,5	nF	
$C_{oes}$				1	1,5	nF	
$C_{res}$				0,5	0,6	nF	
$Q_G$	$V_{GE} = -8\text{ V} - +20\text{ V}$			1000	nC		
$R_{Gint}$	$T_j = ^{\circ}\text{C}$			5	$\Omega$		
$t_{d(on)}$	$R_{Gon} = 6,8\ \Omega$	$V_{CC} = 600\text{ V}$ $I_C = 100\text{ A}$			160	320	ns
					80	160	ns
$E_{on}$	$R_{Goff} = 6,8\ \Omega$	$T_j = 125\text{ °C}$ $V_{GE} = -15\text{ V}$			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	



**SEMITRANS® 2**

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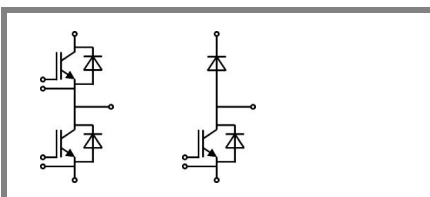
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### Typical Applications

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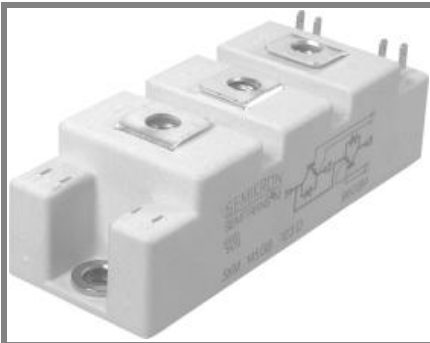
**GAL**

Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
<b>Inverse Diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 100 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	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	1,4	V
		$T_j = 125 \text{ }^\circ\text{C}$			V
$r_F$		$T_j = 25 \text{ }^\circ\text{C}$	9	11	mΩ
		$T_j = 125 \text{ }^\circ\text{C}$			mΩ
$I_{RRM}$	$I_F = 100 \text{ A}$	$T_j = 25 \text{ }^\circ\text{C}$	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
<b>Freewheeling Diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 150 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	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	1,4	V
		$T_j = 125 \text{ }^\circ\text{C}$			V
$r_F$		$T_j = 25 \text{ }^\circ\text{C}$	9	11	V
		$T_j = 125 \text{ }^\circ\text{C}$			V
$I_{RRM}$	$I_F = 150 \text{ A}$	$T_j = 25 \text{ }^\circ\text{C}$	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
<b>Module</b>					
$L_{CE}$				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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## IGBT Modules

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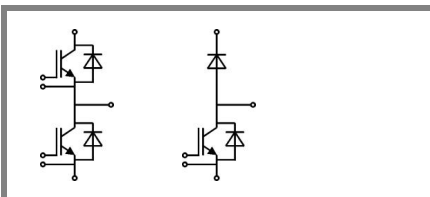
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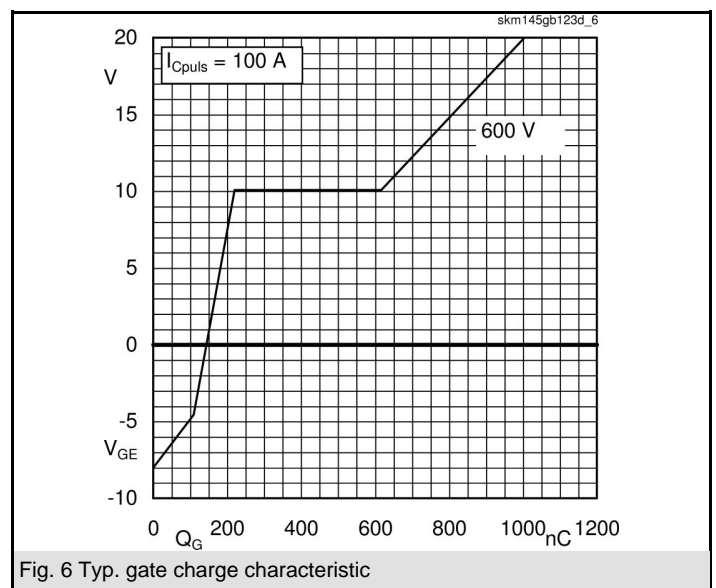
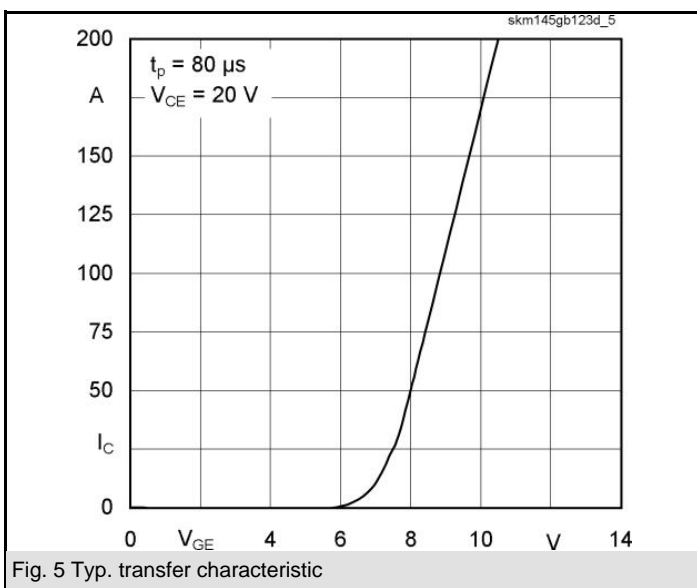
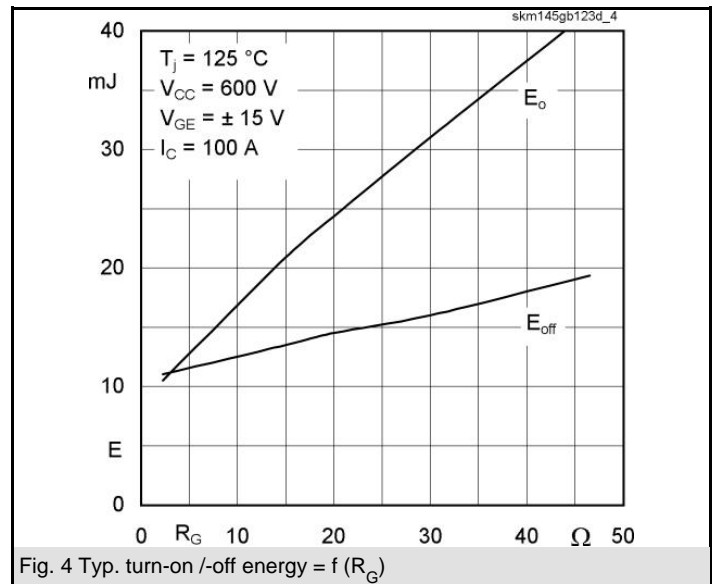
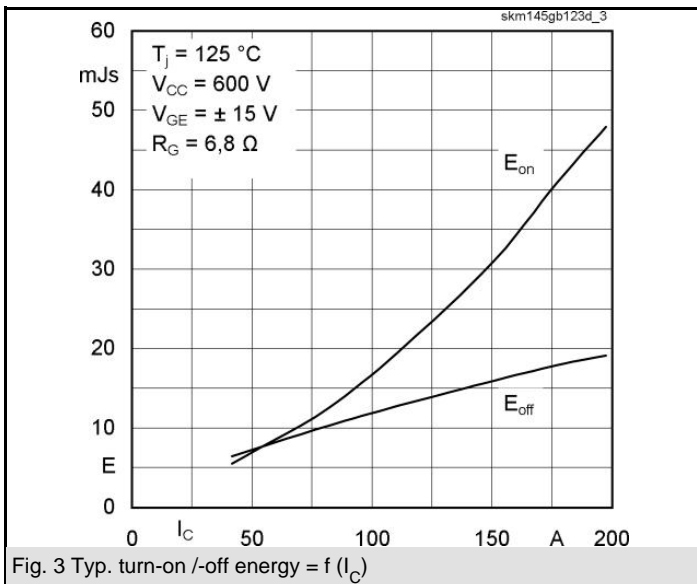
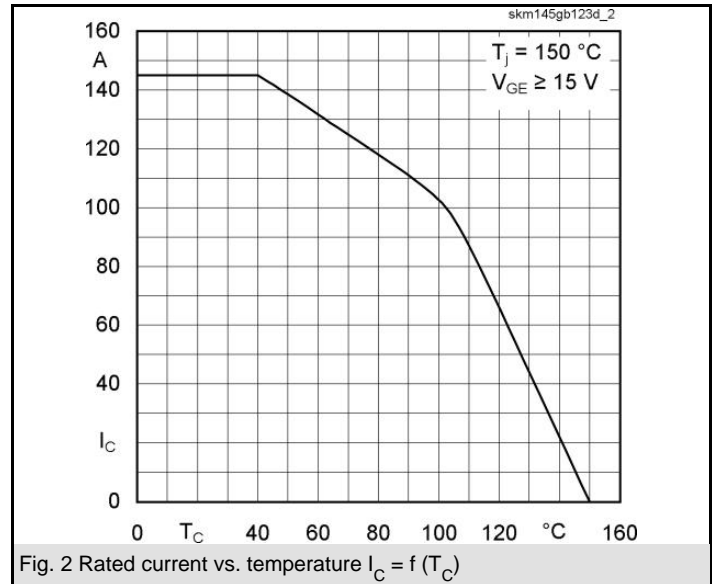
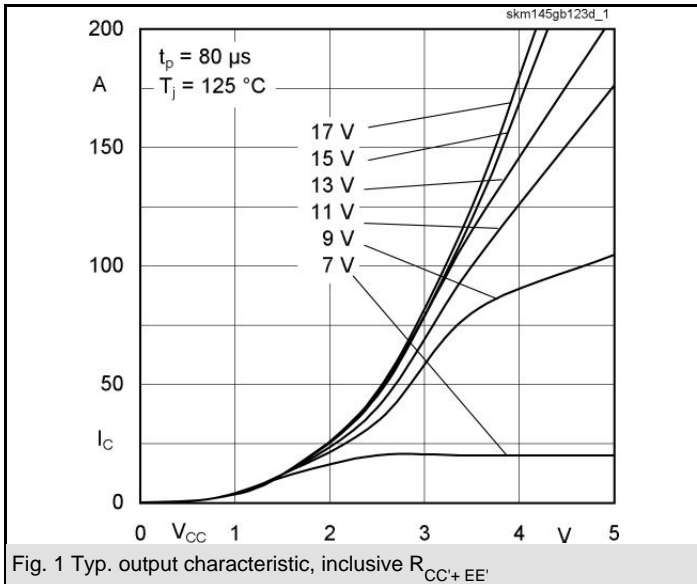
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- AC inverter drives

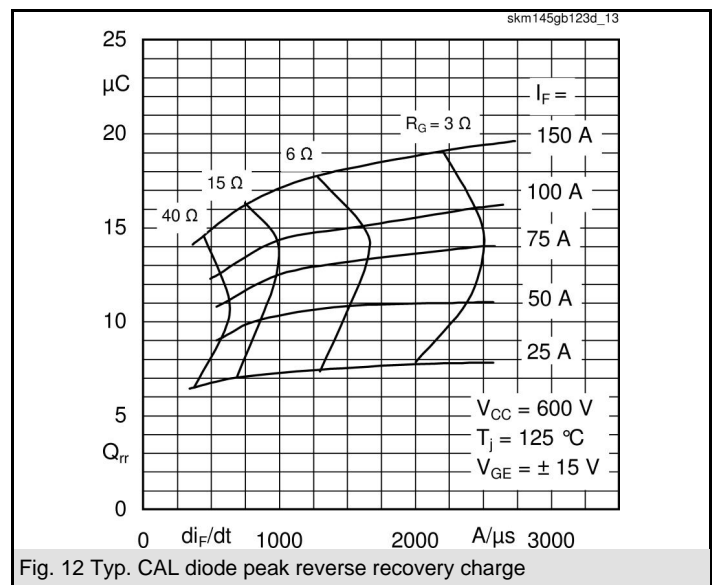
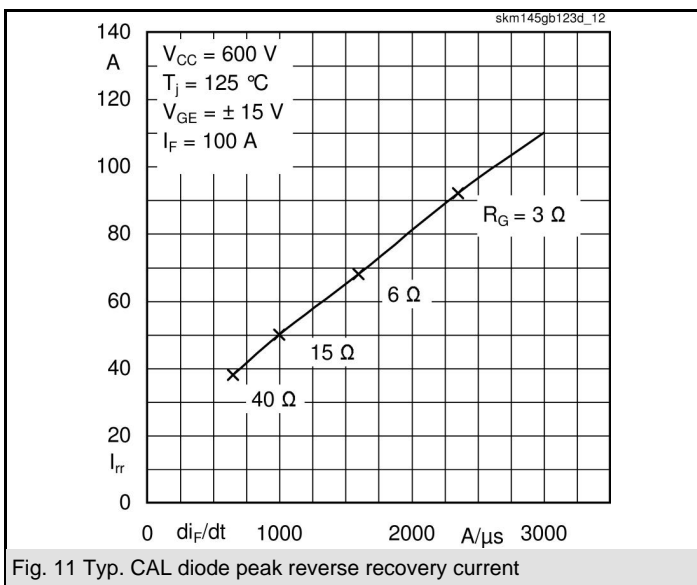
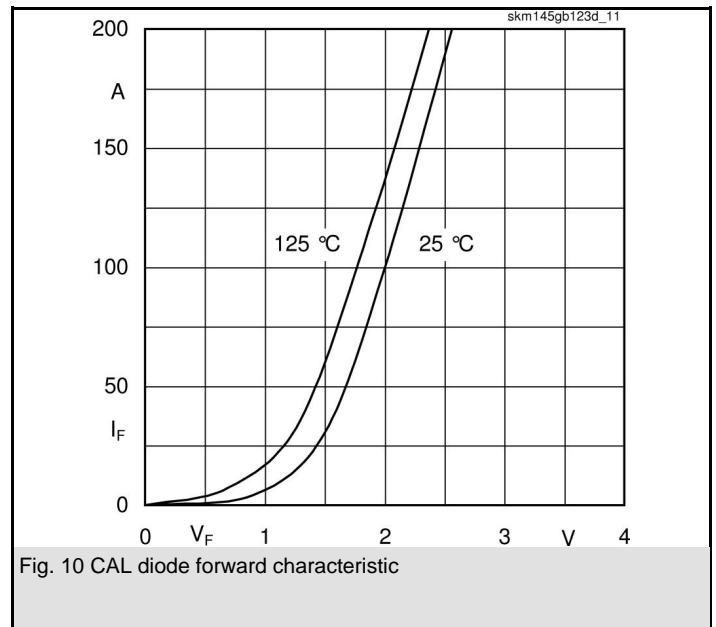
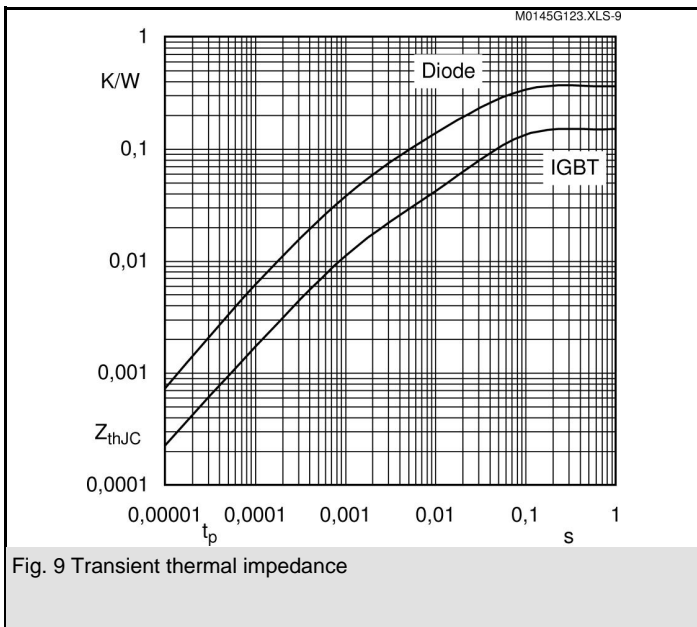
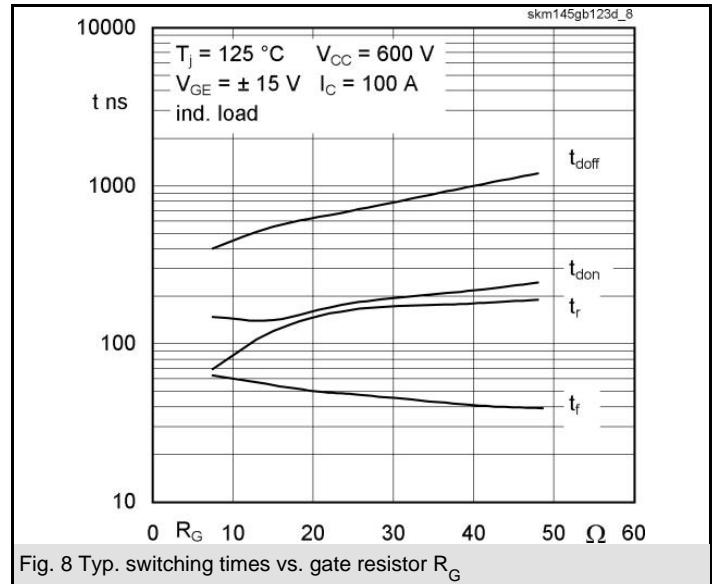
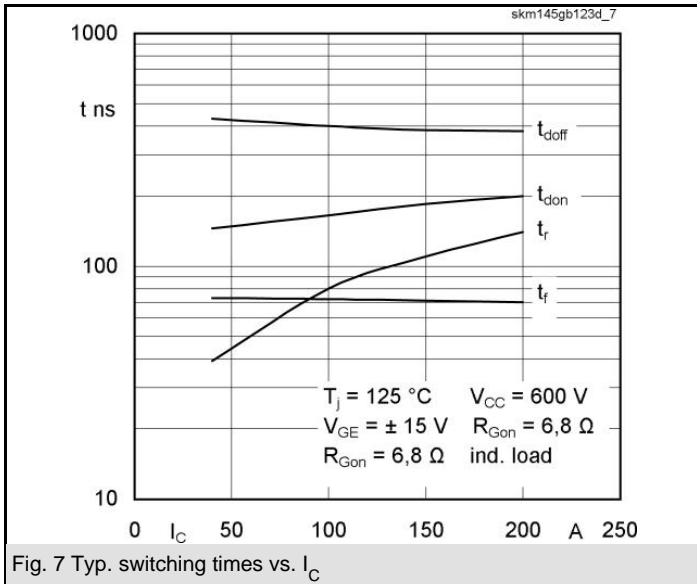
$Z_{th}$				
Symbol	Conditions	Values		Units
$Z_{th(j-c)I}$				
$R_{\theta j-c}$	$i = 1$	100		mk/W
$R_{\theta j-c}$	$i = 2$	38		mk/W
$R_{\theta j-c}$	$i = 3$	10		mk/W
$R_{\theta j-c}$	$i = 4$	2		mk/W
$\tau_{th j-c}$	$i = 1$	0,03		s
$\tau_{th j-c}$	$i = 2$	0,0287		s
$\tau_{th j-c}$	$i = 3$	0,0012		s
$\tau_{th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



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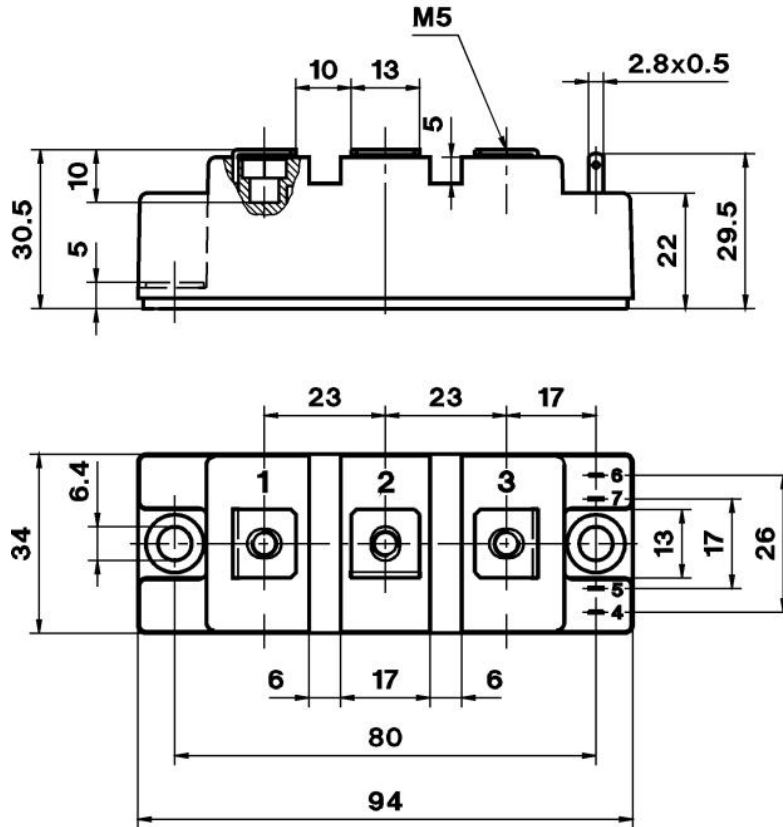


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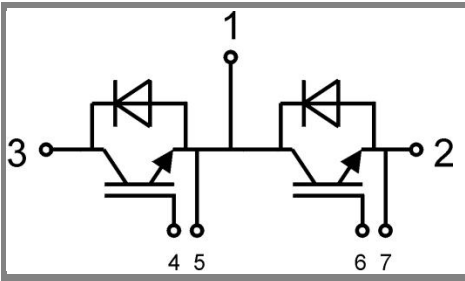
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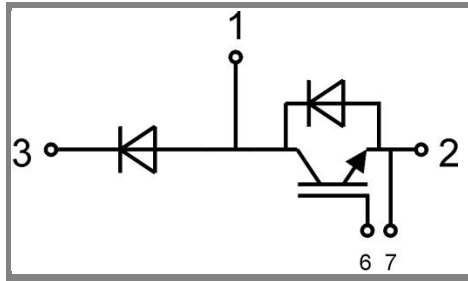
File no. E 63 532



Case D 61



GB Case D 61



GAL Case D 62 (→ D 61)