



**SEMITRANS® 2**

## IGBT Modules

SKM 100GB123D

SKM 100GAL123D

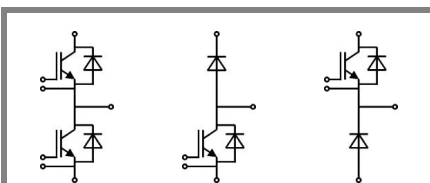
SKM 100GAR123D

### 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



GB

GAL

GAR

Absolute Maximum Ratings		$T_c = 25\text{ }^\circ\text{C}$ , unless otherwise specified		
Symbol	Conditions	Values		Units
<b>IGBT</b>				
$V_{CES}$	$T_j = 25\text{ }^\circ\text{C}$	1200		V
$I_C$	$T_j = 150\text{ }^\circ\text{C}$	$T_{case} = 25\text{ }^\circ\text{C}$	100	A
		$T_{case} = 80\text{ }^\circ\text{C}$	90	A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	150		A
$V_{GES}$		$\pm 20$		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		$\mu\text{s}$
<b>Inverse Diode</b>				
$I_F$	$T_j = 150\text{ }^\circ\text{C}$	$T_{case} = 25\text{ }^\circ\text{C}$	95	A
		$T_{case} = 80\text{ }^\circ\text{C}$	65	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	150		A
$I_{FSM}$	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 150\text{ }^\circ\text{C}$	720	A
<b>Freewheeling Diode</b>				
$I_F$	$T_j = 150\text{ }^\circ\text{C}$	$T_{case} = 25\text{ }^\circ\text{C}$	130	A
		$T_{case} = 80\text{ }^\circ\text{C}$	90	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	200		A
$I_{FSM}$	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 150\text{ }^\circ\text{C}$	900	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		$T_c = 25\text{ }^\circ\text{C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 2\text{ mA}$	4,5	5,5	6,5	V
$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$		0,1	0,3	mA
$V_{CE0}$		$T_j = 25\text{ }^\circ\text{C}$	1,4	1,6	V
		$T_j = 125\text{ }^\circ\text{C}$	1,6	1,8	V
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ }^\circ\text{C}$	14,6	18,6	m $\Omega$
		$T_j = 125\text{ }^\circ\text{C}$	20	25,3	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
$C_{res}$	$f = 1\text{ MHz}$		0,38	0,5	nF
$Q_G$	$V_{GE} = -8\text{ V} - +20\text{ V}$		750		nC
$R_{Gint}$	$T_j = \text{ }^\circ\text{C}$		5		$\Omega$
$t_{d(on)}$	$R_{Gon} = 15\text{ }^\circ\Omega$	$V_{CC} = 600\text{ V}$ $I_C = 75\text{ A}$	30	60	ns
$t_r$			70	140	ns
$E_{on}$			10		mJ
$t_{d(off)}$	$R_{Goff} = 15\text{ }^\circ\Omega$	$T_j = 125\text{ }^\circ\text{C}$ $V_{GE} = \pm 15\text{ V}$	450	600	ns
$t_f$			70	90	ns
$E_{off}$			8		mJ
$R_{th(j-c)}$	per IGBT			0,18	K/W



**SEMITRANS® 2**

## IGBT Modules

**SKM 100GB123D**

**SKM 100GAL123D**

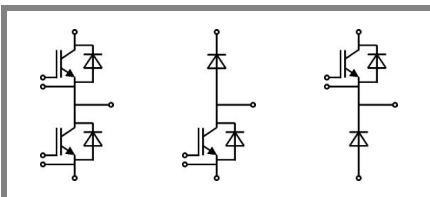
**SKM 100GAR123D**

### 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



GB

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Characteristics			min.	typ.	max.	Units
<b>Inverse Diode</b>						
$V_F = V_{EC}$	$I_{Fnom} = 75 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$ $T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$		2 1,8	2,5	V V
$V_{F0}$		$T_j = 25 \text{ }^\circ\text{C}$ $T_j = 125 \text{ }^\circ\text{C}$		1,1	1,2	V V
$r_F$		$T_j = 25 \text{ }^\circ\text{C}$ $T_j = 125 \text{ }^\circ\text{C}$		12	17	mΩ mΩ
$I_{RRM}$ $Q_{rr}$ $E_{rr}$	$I_F = 75 \text{ A}$ $di/dt = 800 \text{ A}/\mu\text{s}$ $V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$	$T_j = 125 \text{ }^\circ\text{C}$		40 3		A μC mJ
$R_{th(j-c)D}$	per diode				0,5	K/W
<b>Freewheeling Diode</b>						
$V_F = V_{EC}$	$I_{Fnom} = 100 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$ $T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$		2 1,8	2,5	V V
$V_{F0}$		$T_j = 25 \text{ }^\circ\text{C}$ $T_j = 125 \text{ }^\circ\text{C}$		1,1	1,2	V V
$r_F$		$T_j = 25 \text{ }^\circ\text{C}$ $T_j = 125 \text{ }^\circ\text{C}$		9	13	V V
$I_{RRM}$ $Q_{rr}$ $E_{rr}$	$I_F = 100 \text{ A}$ $di/dt = 1000 \text{ A}/\mu\text{s}$ $V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}$		50 5		A μC mJ
$R_{th(j-c)FD}$	per diode				0,36	K/W
<b>Module</b>						
$L_{CE}$					30	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25 \text{ }^\circ\text{C}$ $T_{case} = 125 \text{ }^\circ\text{C}$		0,75 1		mΩ 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.

# SKM 100GB123D



**SEMITRANS<sup>®</sup> 2**

## IGBT Modules

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**SKM 100GAL123D**

**SKM 100GAR123D**

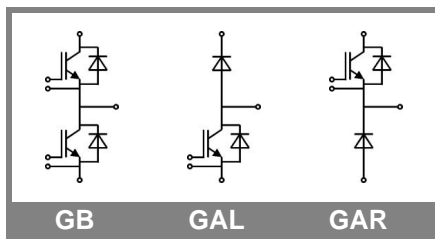
### Features

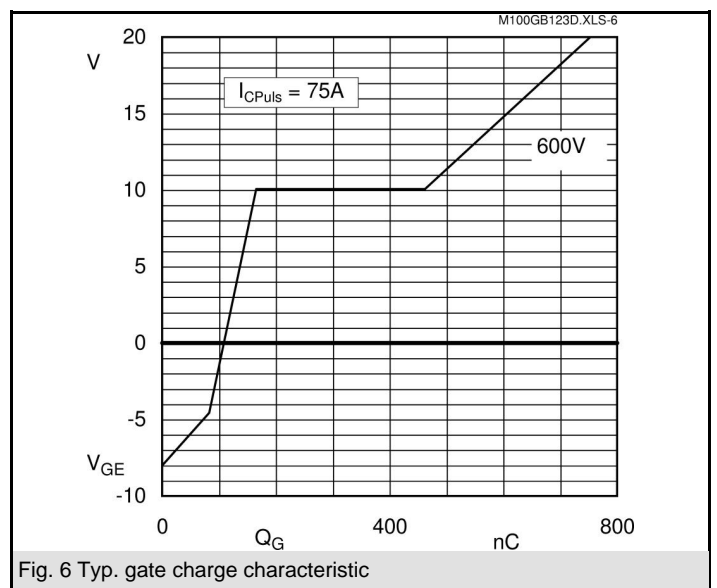
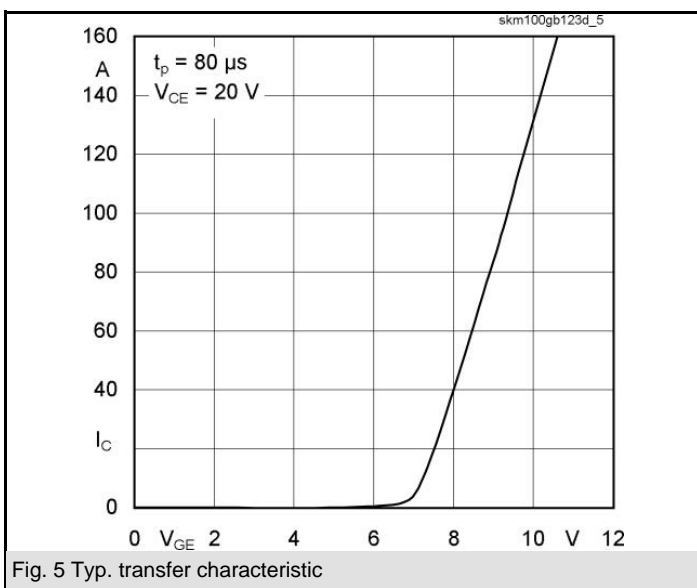
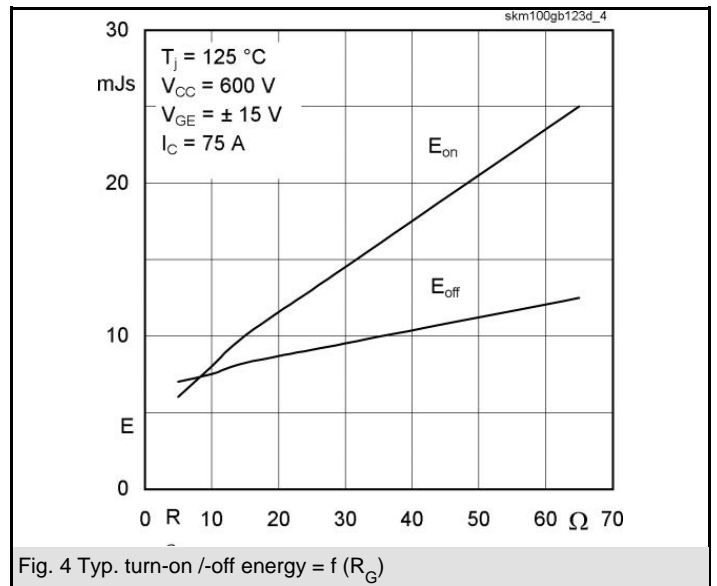
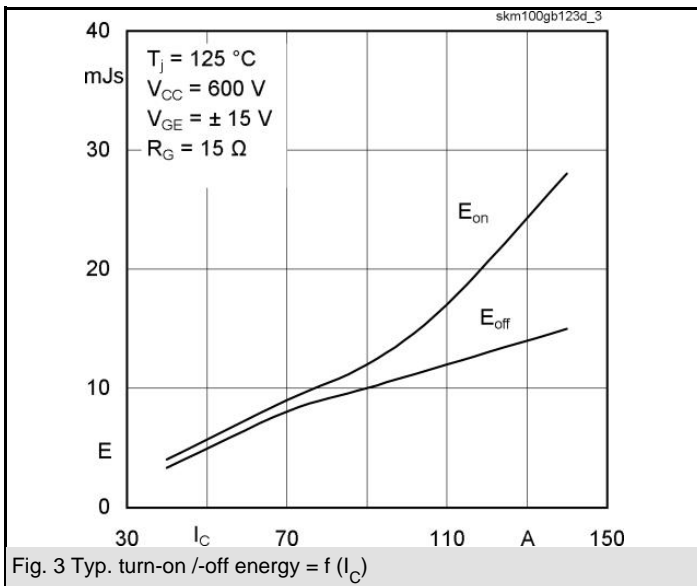
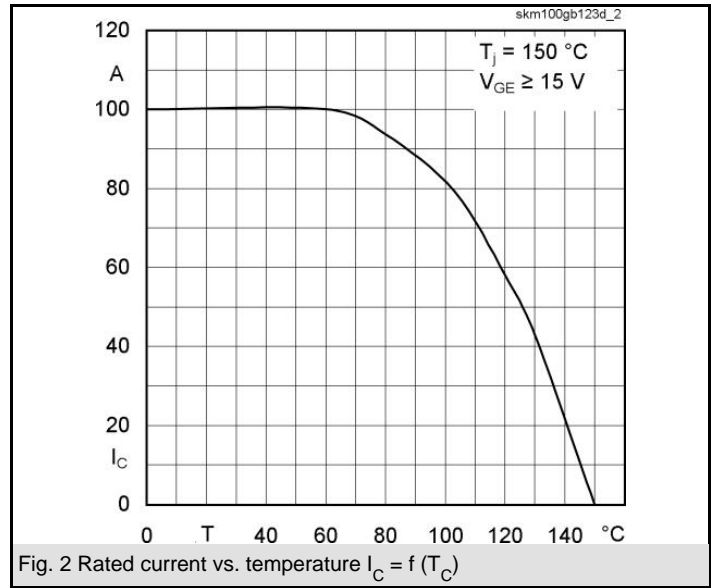
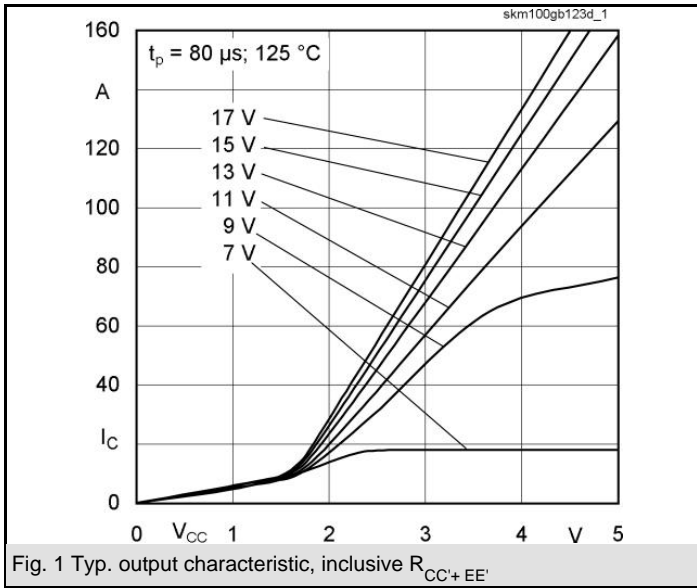
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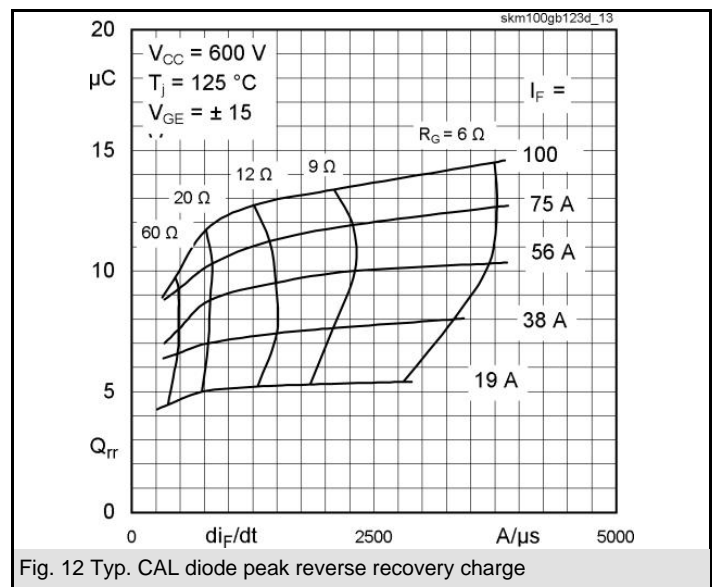
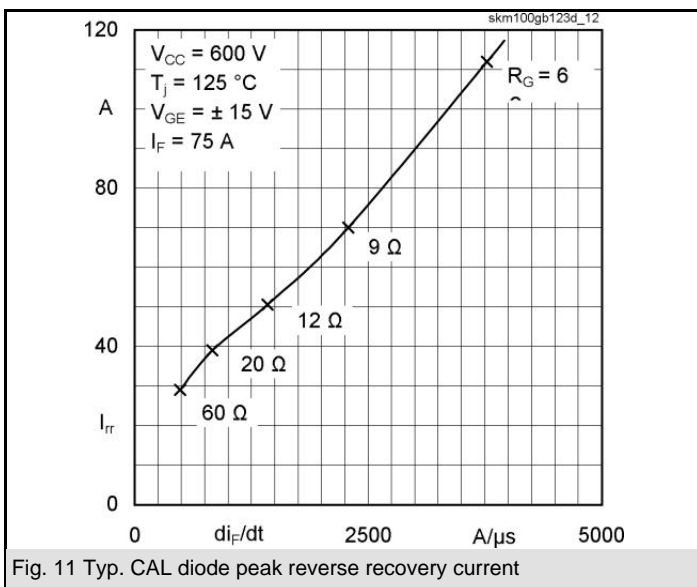
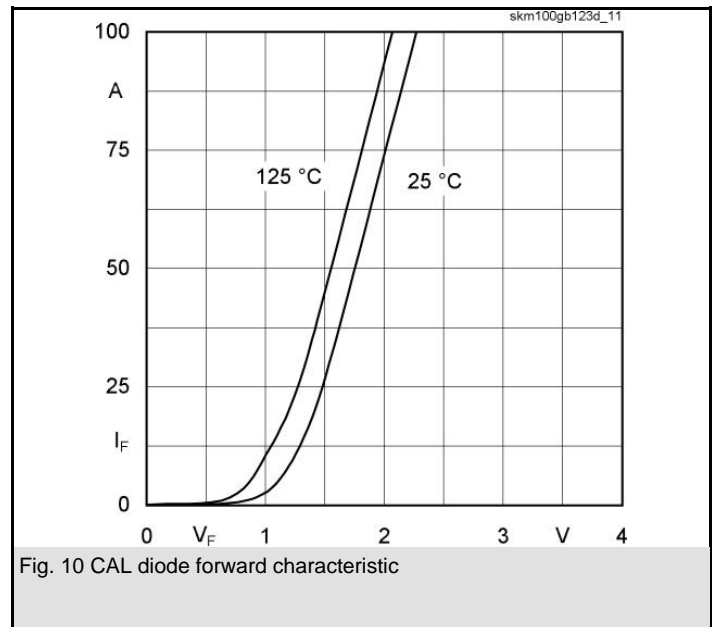
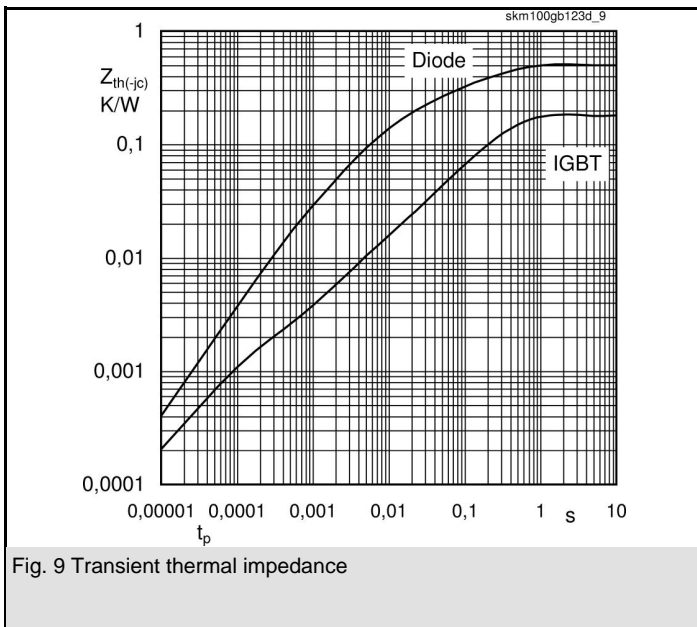
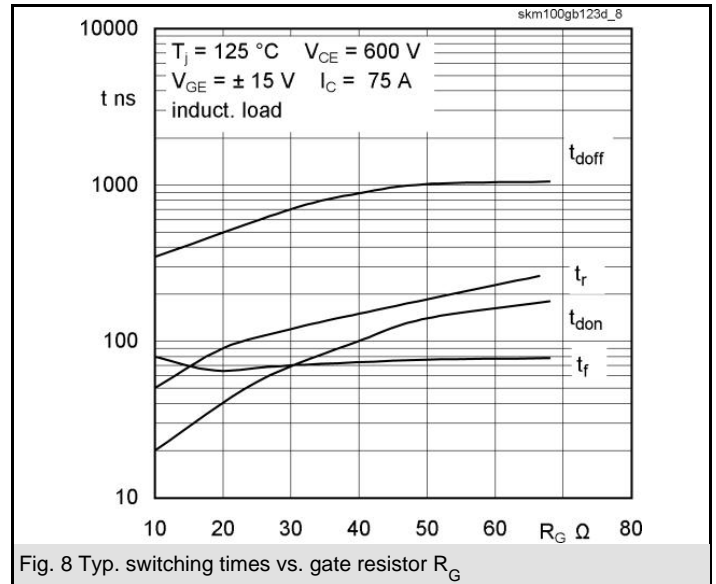
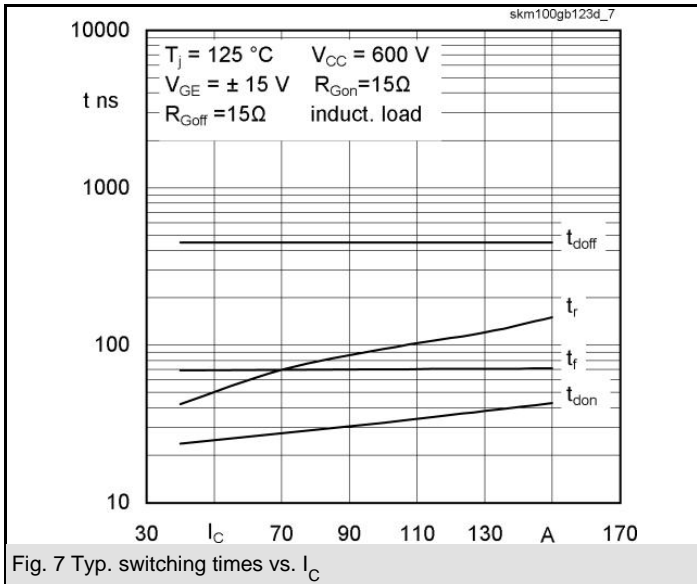
### Typical Applications\*

- AC inverter drives
- UPS

$Z_{th}$			
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







# SKM 100GB123D

UL Recognized

CASED61

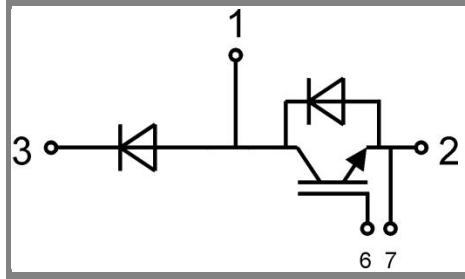
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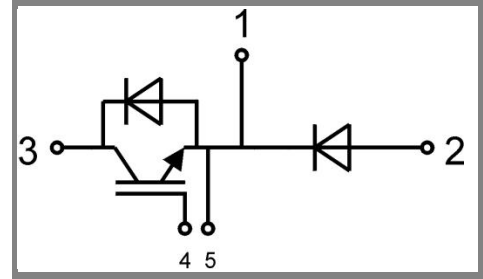
Case D 61



GB Case D 61



GAL Case D 62 (→ D 61)



GAR Case D 63 (→ D 61)