

# SKM 100GB123D



SEMITRANS® 2

## IGBT Modules

SKM 100GB123D

SKM 100GAL123D

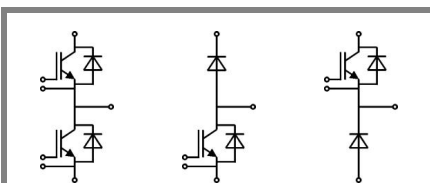
SKM 100GAR123D

## 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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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	
$I_{FSM}$	$t_p = 10\text{ ms}; \sin.$	$T_j = 150\text{ }^\circ\text{C}$	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	
$I_{FSM}$	$t_p = 10\text{ ms}; \sin.$	$T_j = 150\text{ }^\circ\text{C}$	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 $\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 75\text{ A}, V_{GE} = 15\text{ V}$	$T_j = \text{ }^\circ\text{C}_{chiplev.}$	2,5	3	V	
$C_{ies}$	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	5		6,6	nF
$C_{oes}$			0,72		0,9	nF
$C_{res}$			0,38		0,5	nF
$Q_G$	$V_{GE} = -8\text{ V} - +20\text{ V}$		750		nC	
$R_{Gint}$	$T_j = \text{ }^\circ\text{C}$		5		$\Omega$	
$t_{d(on)}$	$R_{Gon} = 15\text{ }^\circ\Omega$	$V_{CC} = 600\text{ V}$ $I_{Cnom} = 75\text{ A}$	30		60	ns
			70		140	ns
$E_{on}$	$R_{Goff} = 15\text{ }^\circ\Omega$	$T_j = 125\text{ }^\circ\text{C}$ $V_{GE} = \pm 15\text{ V}$	10			mJ
			450		600	ns
$t_{d(off)}$			70		90	ns
			8			mJ
$R_{th(j-c)}$	per IGBT		0,18		K/W	



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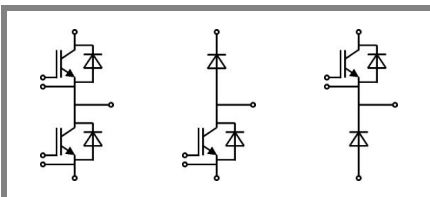
**SKM 100GAR123D**

### Features

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### Typical Applications

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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
$I_{RRM}$ $Q_{rr}$ $E_{rr}$	$I_{Fnom} = 75 \text{ A}$ $di/dt = 800 \text{ A}/\mu\text{s}$ $V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$	$T_j = 125 \text{ }^\circ\text{C}$		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
$I_{RRM}$ $Q_{rr}$ $E_{rr}$	$I_{Fnom} = 100 \text{ A}$ $di/dt = 1000 \text{ A}/\mu\text{s}$ $V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}$		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.

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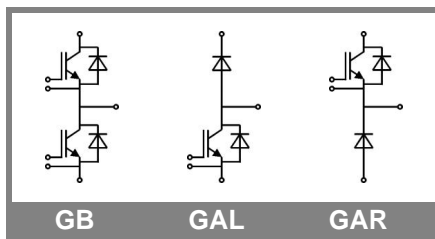
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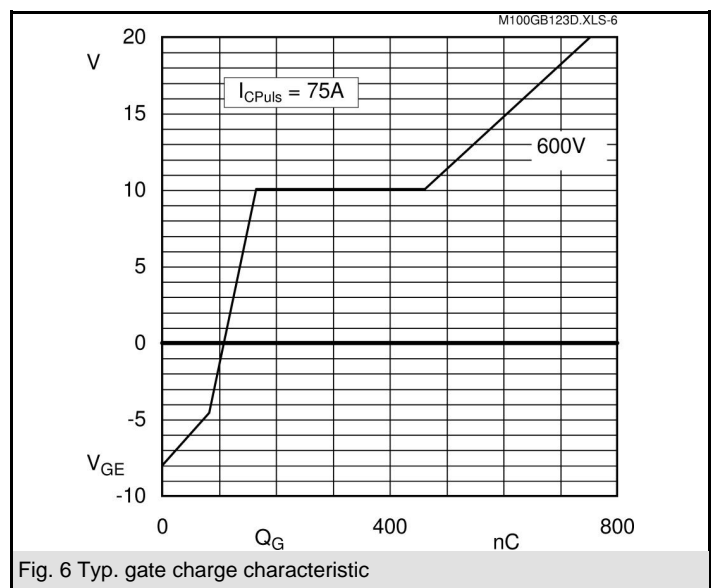
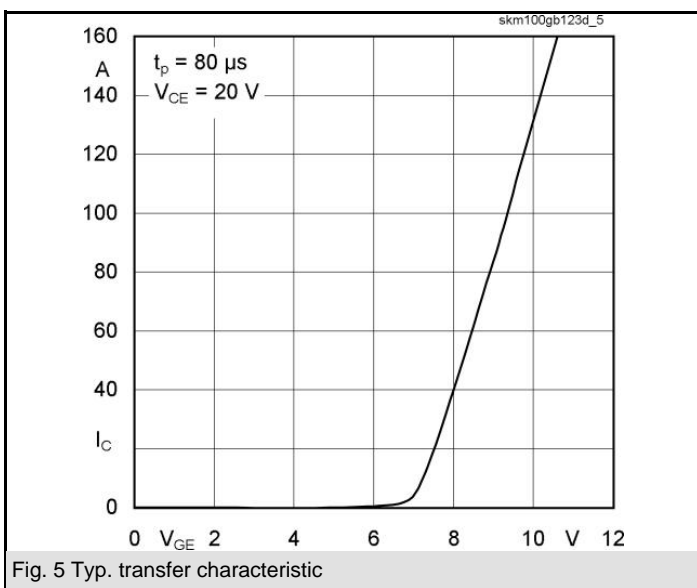
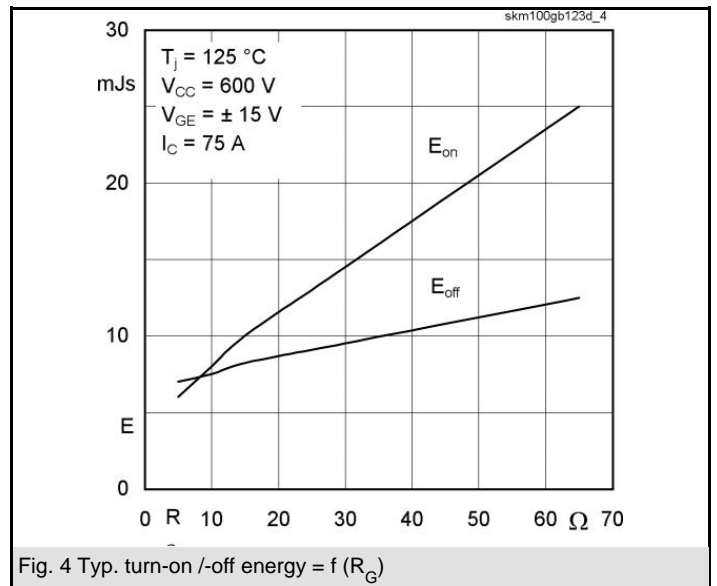
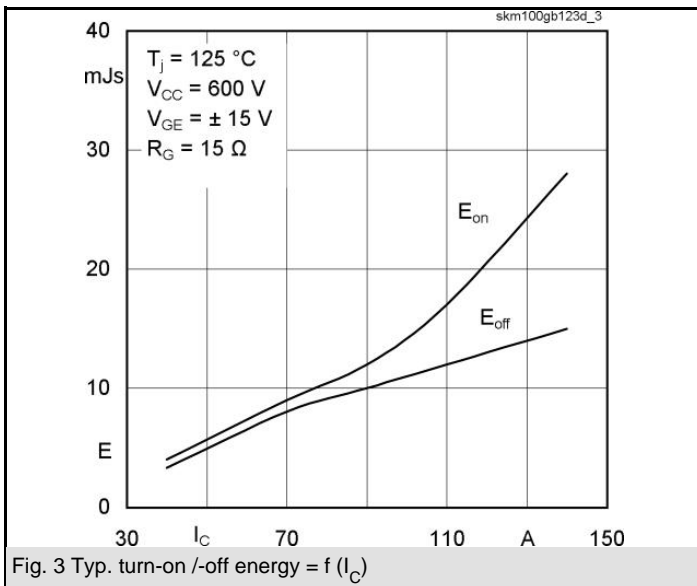
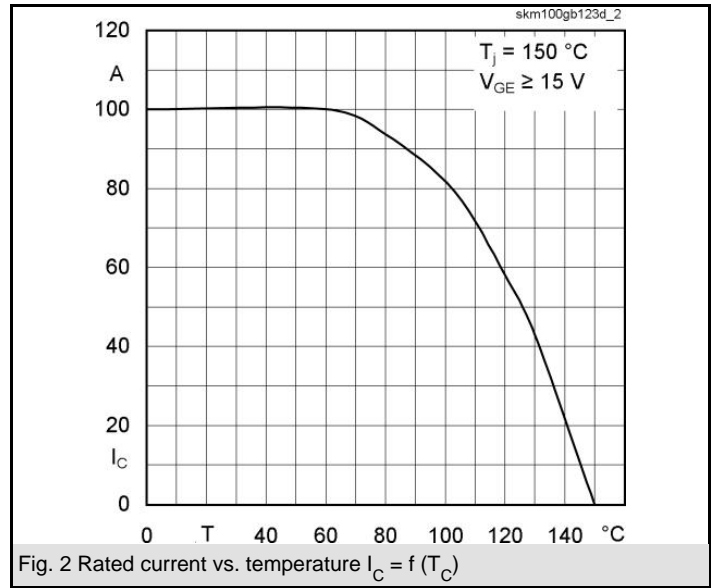
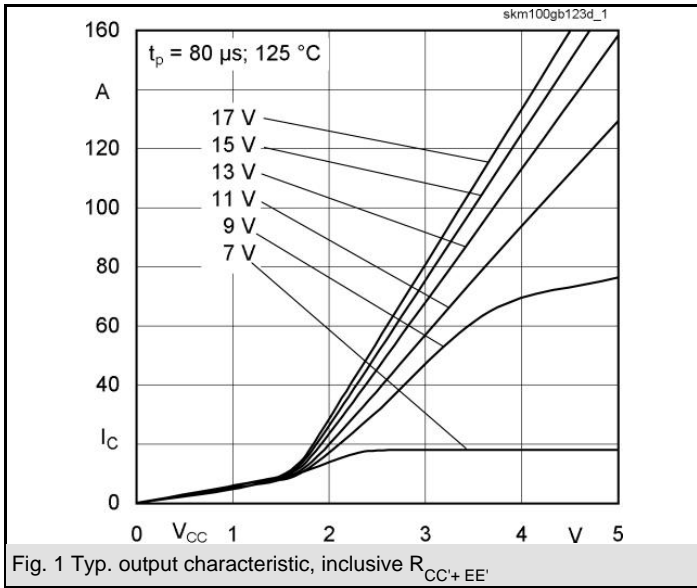
$Z_{th}$			
Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
$R_{\theta}$	$i = 1$	162	mk/W
$R_{\theta}$	$i = 2$	14	mk/W
$R_{\theta}$	$i = 3$	2,7	mk/W
$R_{\theta}$	$i = 4$	1,3	mk/W
$\tau_{\theta}$	$i = 1$	0,204	s
$\tau_{\theta}$	$i = 2$	0,0242	s
$\tau_{\theta}$	$i = 3$	0,0013	s
$\tau_{\theta}$	$i = 4$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

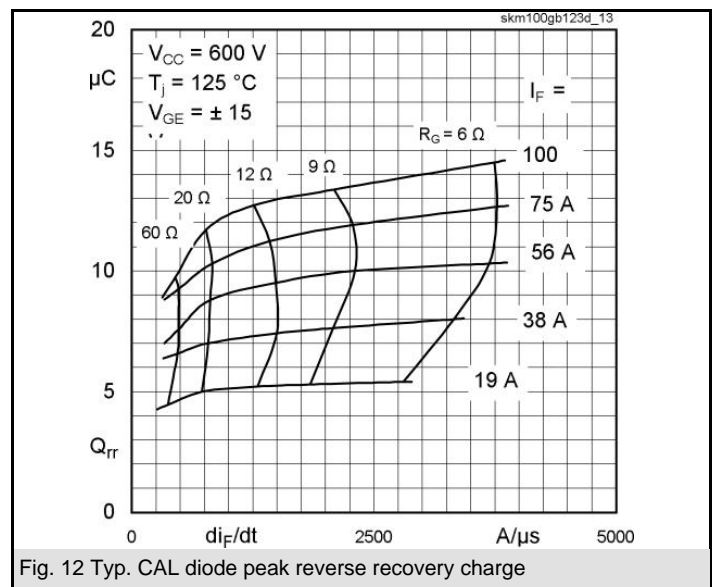
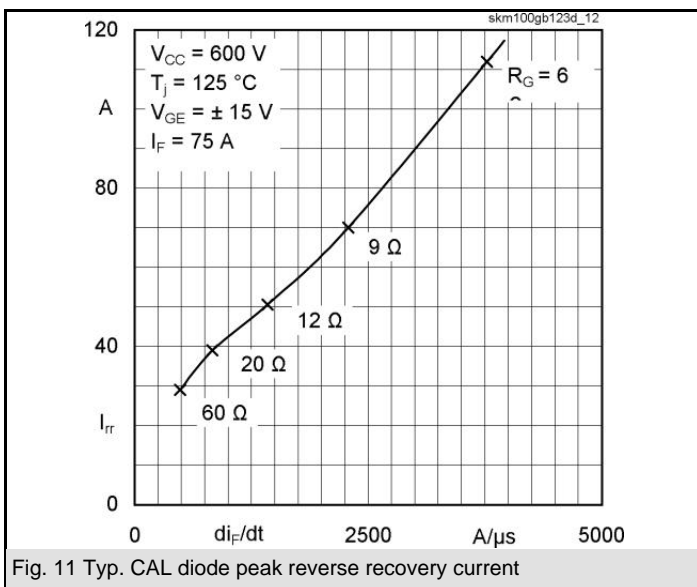
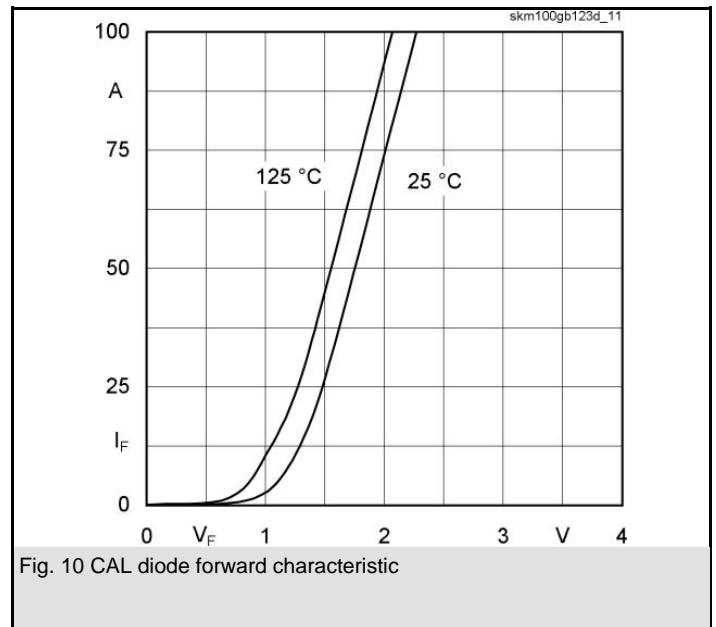
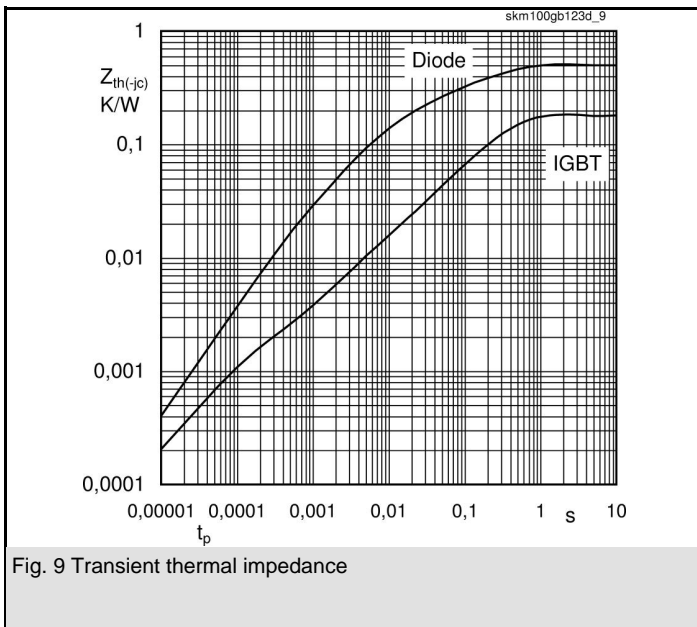
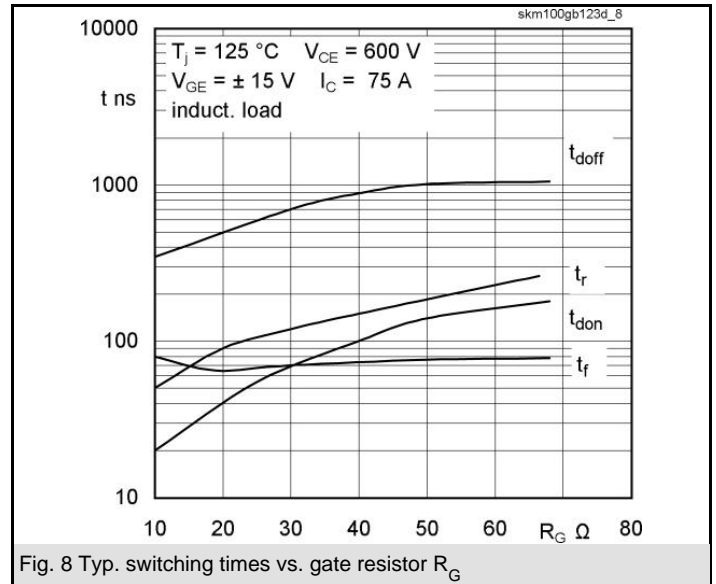
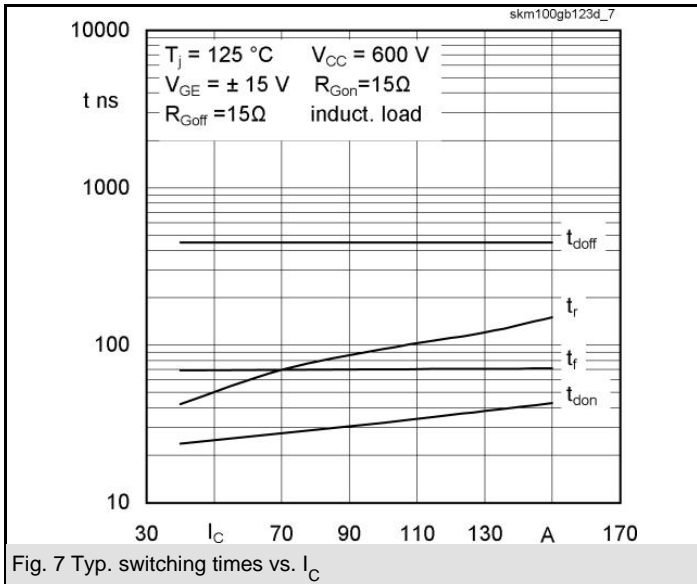


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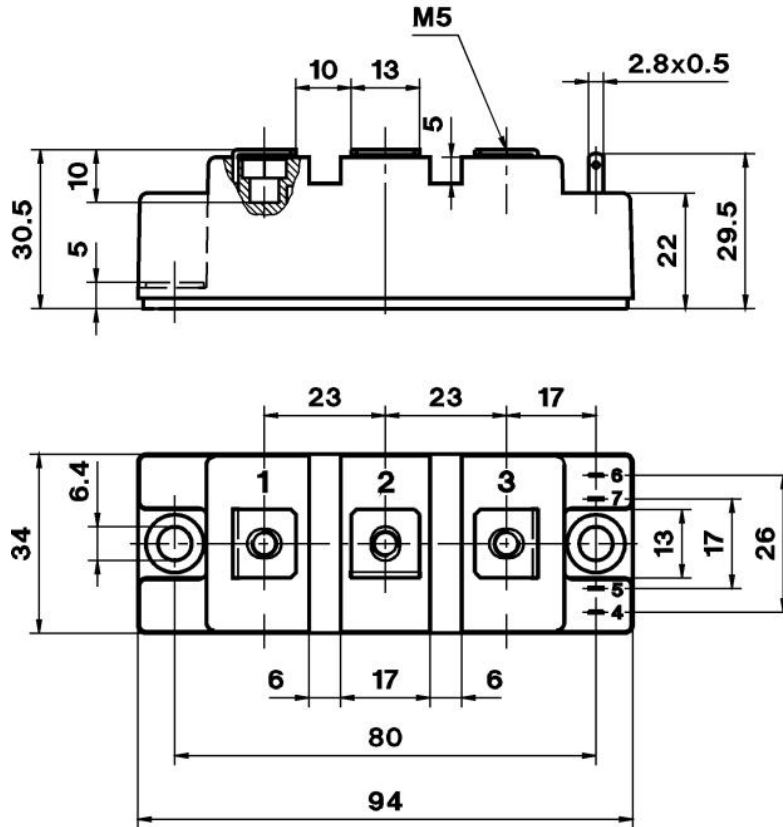


# SKM 100GB123D

UL Recognized

CASED61

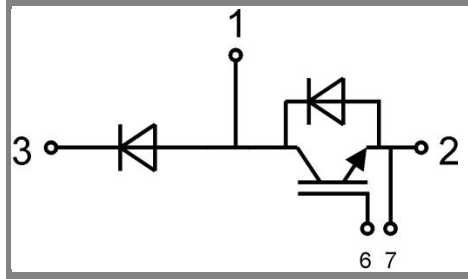
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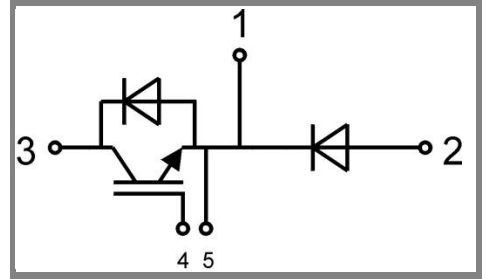
Case D 61



GB Case D 61



GAL Case D 62 (→ D 61)



GAR Case D 63 (→ D 61)