

# SKM 300GB123D



**SEMITRANS<sup>®</sup> 3**

## IGBT Modules

**SKM 300GB123D**

**SKM 300GAL123D**

**SKM 300GAR123D**

### 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 (12 mm) and creepage distance (20 mm)

### Typical Applications

- AC inverter drives
- UPS



GB

GAL

GAR

Absolute Maximum Ratings		$T_c = 25^\circ\text{C}$ , unless otherwise specified			
Symbol	Conditions	Values		Units	
<b>IGBT</b>					
$V_{CES}$	$T_j = 25^\circ\text{C}$	1200		V	
$I_C$	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	300	A	
		$T_{case} = 80^\circ\text{C}$	220	A	
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	400		A	
$V_{GES}$		$\pm 20$		V	
$t_{psc}$	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125^\circ\text{C}$ $V_{CES} < 1200\text{ V}$	10		$\mu\text{s}$	
<b>Inverse Diode</b>					
$I_F$	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	260	A	
		$T_{case} = 80^\circ\text{C}$	180	A	
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	400		A	
$I_{FSM}$	$t_p = 10\text{ ms}; \sin.$	$T_j = 150^\circ\text{C}$	2200		A
<b>Freewheeling Diode</b>					
$I_F$	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	350	A	
		$T_{case} = 80^\circ\text{C}$	230	A	
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	600		A	
$I_{FSM}$	$t_p = 10\text{ ms}; \sin$	$T_j = 150^\circ\text{C}$	2900		A
<b>Module</b>					
$I_{t(RMS)}$		500		A	
$T_{vj}$		- 40...+ 150		$^\circ\text{C}$	
$T_{stg}$		- 40...+ 125		$^\circ\text{C}$	
$V_{isol}$	AC, 1 min.	2500		V	

Characteristics		$T_c = 25^\circ\text{C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 8\text{ mA}$	4,5	5,5	6,5	V
$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$		0,1	0,3	mA
$V_{CE0}$		$T_j = 25^\circ\text{C}$	1,4	1,6	V
		$T_j = 125^\circ\text{C}$	1,6	1,8	V
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	5,5	7	m $\Omega$
		$T_j = 125^\circ\text{C}$	7,5	9,5	m $\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 200\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	2,5	3	V
		$T_j = 125^\circ\text{C}_{chiplev.}$	3,1	3,7	V
$C_{ies}$	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	18	24	nF
$C_{oes}$			2,5	3,2	nF
$C_{res}$			1	1,3	nF
$Q_G$	-8V - +20V	2000		nC	
$R_{Gint}$	$T_j = ^\circ\text{C}$	2,5		$\Omega$	
$t_{d(on)}$	$R_{Gon} = 4,7\ \Omega$	$V_{CC} = 600\text{ V}$ $I_{Cnom} = 200\text{ A}$ $T_j = 125^\circ\text{C}$	250	400	ns
			90	160	ns
$E_{on}$	$R_{Goff} = 4,7\ \Omega$		28		mJ
$t_{d(off)}$			550	700	ns
$t_f$			70	100	ns
$E_{off}$			26		mJ
$R_{th(j-c)}$	per IGBT			0,075	K/W



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## IGBT Modules

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**SKM 300GAL123D**

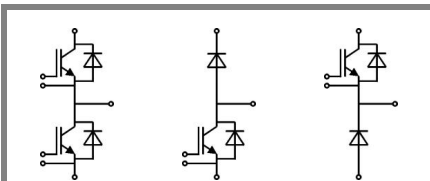
**SKM 300GAR123D**

### Features

- MOS input (voltage controlled)
- N channel, Homogeneous Si
- Low inductance case
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Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
<b>Inverse Diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 200 \text{ A}; V_{GE} = 0 \text{ V}$		2	2,5	V
$V_{F0}$			1,1	1,2	V
					V
$r_F$			4,5	6,5	mΩ
					mΩ
$I_{RRM}$	$I_{Fnom} = 200 \text{ A}$		105		A
$Q_{rr}$	$di/dt = 4000 \text{ A}/\mu\text{s}$		10		μC
$E_{rr}$	$V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$				mJ
$R_{th(j-c)D}$	per diode			0,18	K/W
<b>Freewheeling Diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 300 \text{ A}; V_{GE} = 0 \text{ V}$		2	2,5	V
$V_{F0}$			1,1	1,2	V
					V
$r_F$			3	4,3	V
					V
$I_{RRM}$	$I_{Fnom} = 200 \text{ A}$		140		A
$Q_{rr}$	$di/dt = 3500 \text{ A}/\mu\text{s}$		34		μC
$E_{rr}$	$V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$				mJ
$R_{th(j-c)FD}$	per diode			0,15	K/W
<b>Module</b>					
$L_{CE}$			15	20	nH
$R_{CC+EE}$	res., terminal-chip	$T_{case} = 25 \text{ °C}$	0,35		mΩ
		$T_{case} = 125 \text{ °C}$	0,5		mΩ
$R_{th(c-s)}$	per module			0,038	K/W
$M_s$	to heat sink M6	3		5	Nm
$M_t$	to terminals M6	2,5		5	Nm
w				325	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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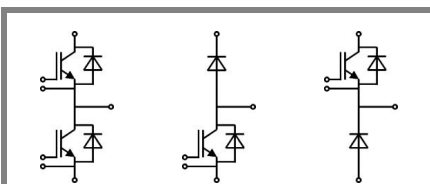
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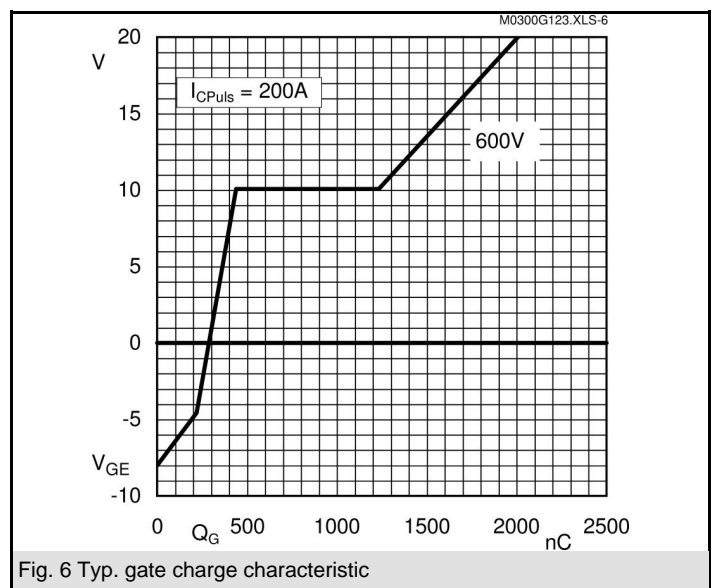
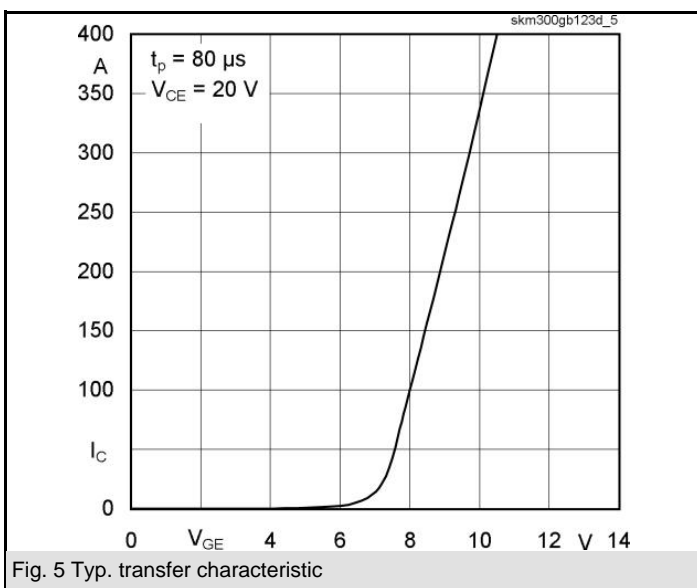
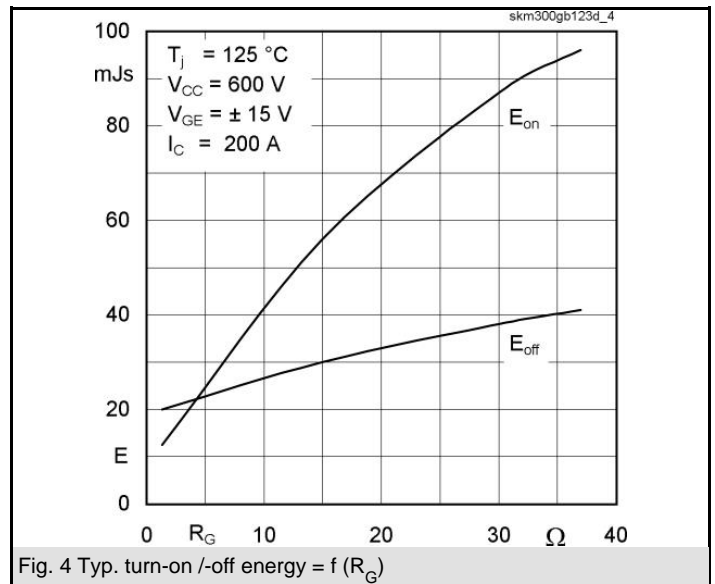
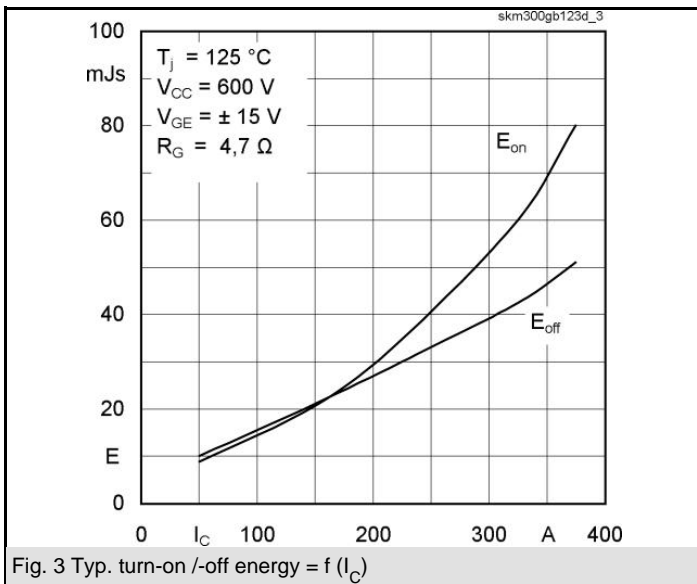
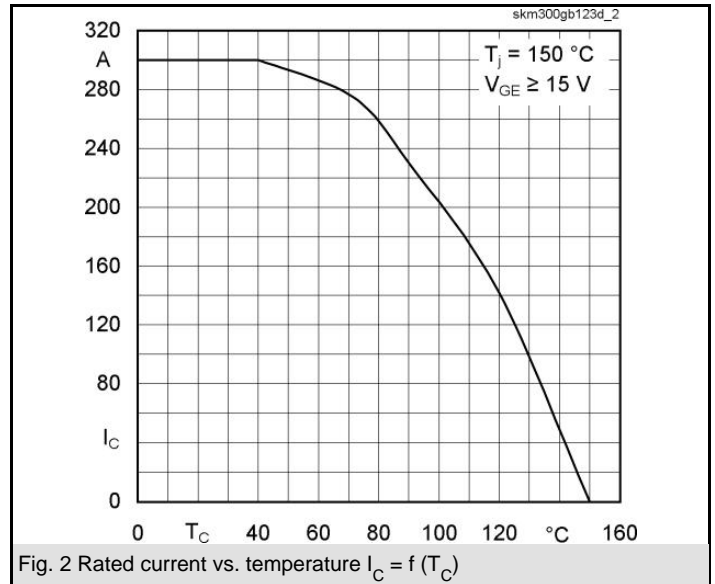
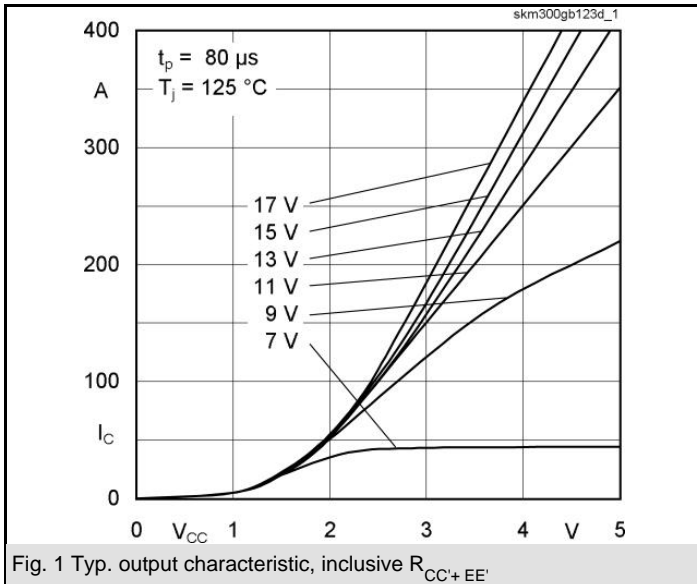
$Z_{th}$		Conditions	Values	Units
<b>Symbol</b>				
$Z_{th(j-c)I}$				
$R_f$		$i = 1$	53	mk/W
$R_f$		$i = 2$	18,5	mk/W
$R_f$		$i = 3$	3,1	mk/W
$R_f$		$i = 4$	0,4	mk/W
$\tau_{u_i}$		$i = 1$	0,04	s
$\tau_{u_i}$		$i = 2$	0,0189	s
$\tau_{u_i}$		$i = 3$	0,0017	s
$\tau_{u_i}$		$i = 4$	0,003	s
$Z_{th(j-c)D}$				
$R_f$		$i = 1$	0,1151	mk/W
$R_f$		$i = 2$	0,0525	mk/W
$R_f$		$i = 3$	0,0111	mk/W
$R_f$		$i = 4$	0,0022	mk/W
$\tau_{u_i}$		$i = 1$	0,0366	s
$\tau_{u_i}$		$i = 2$	0,0113	s
$\tau_{u_i}$		$i = 3$	0,003	s
$\tau_{u_i}$		$i = 4$	0,0002	s

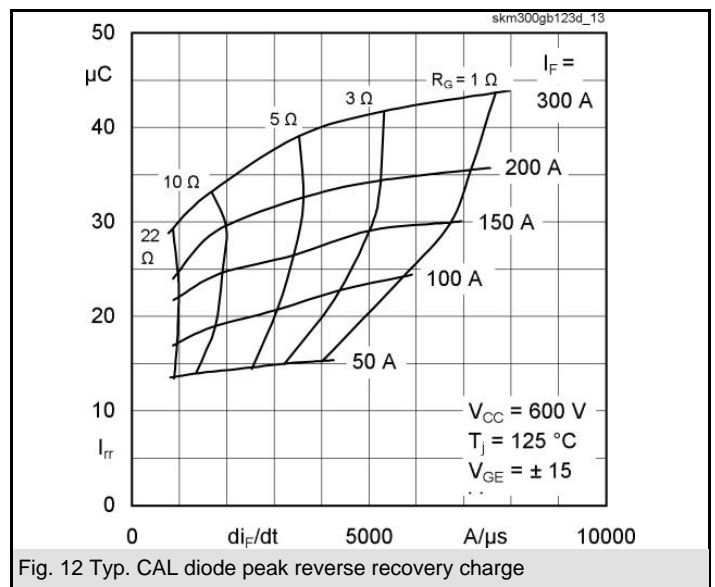
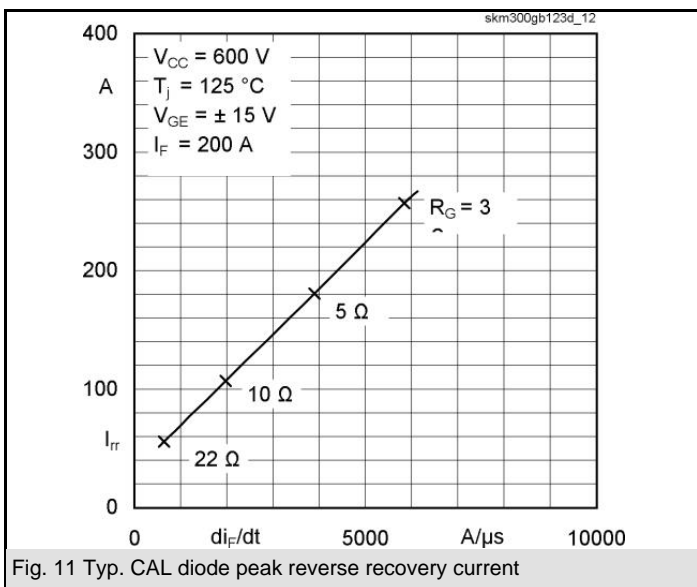
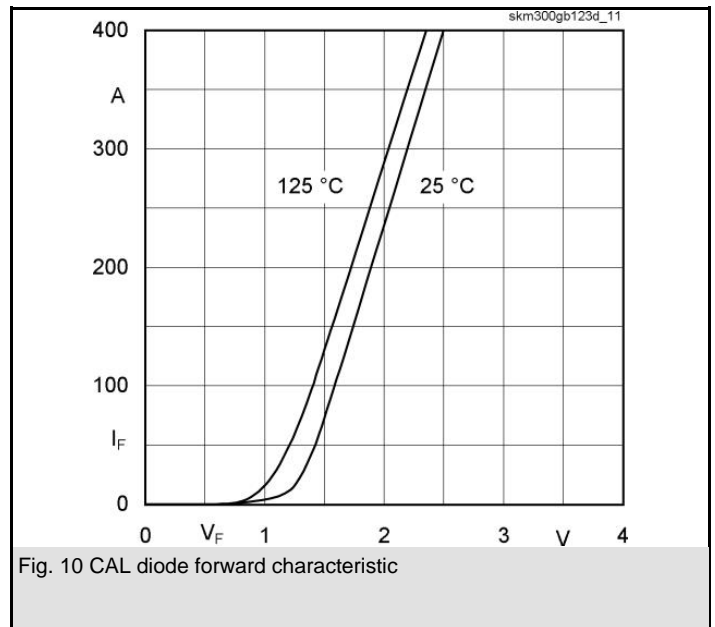
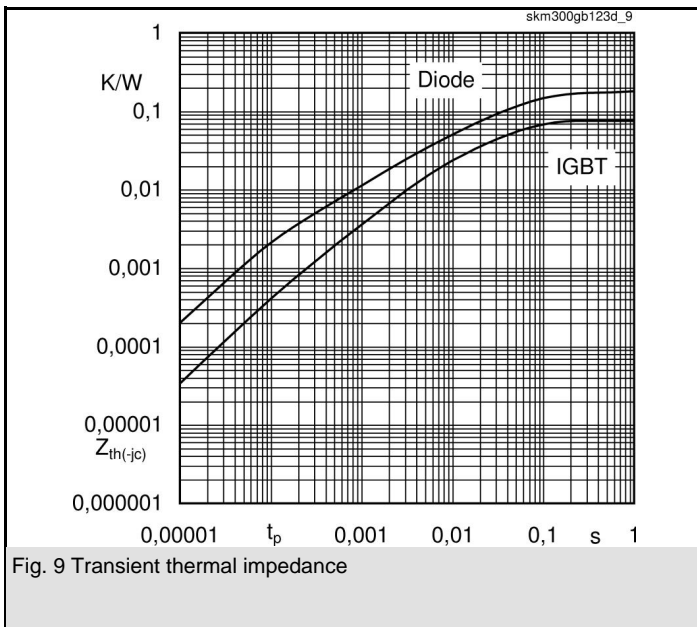
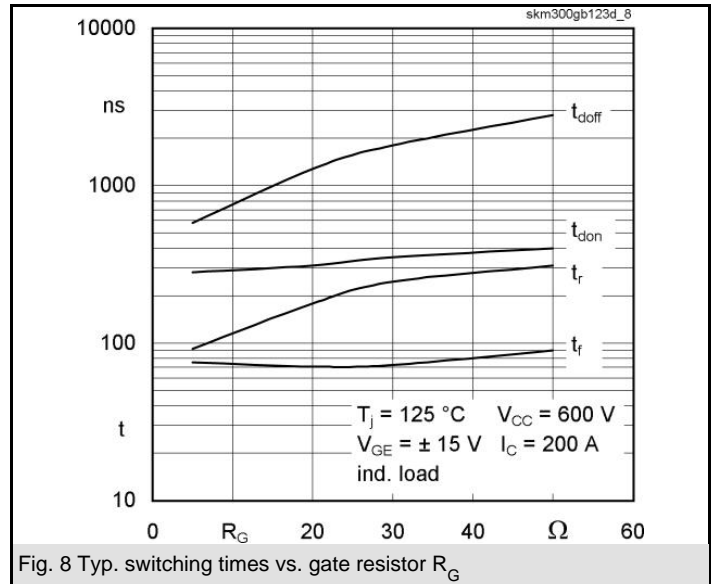
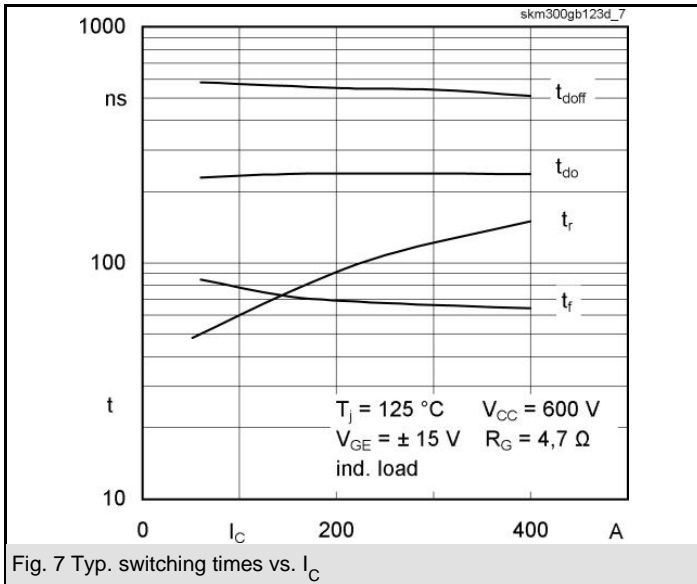


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# SKM 300GB123D

UL Recognized

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File 63 532



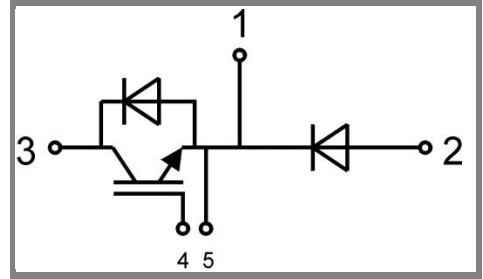
Case D 56



GB Case D 56



GAL Case D 57 (→ D 56)



GAR Case D 58 (→ D 56)