

SEMITOP[®] 2

IGBT Module

SK60GAL123

SK60GAR123

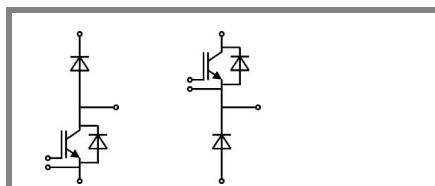
Preliminary Data

Features

- Compact design
- One screw mounting
- Heat transfer and isolation through direct copper bonded aluminium oxide ceramic (DCB)
- N-channel homogeneous silicon structure (NPT-Non punch-through IGBT)
- High short circuit capability
- $V_{ce,sat}$ with positive coefficient
- Low tail current with low temperature dependence

Typical Applications

- Switching (not for linear use)
- Inverter
- Switched mode power supplies
- UPS

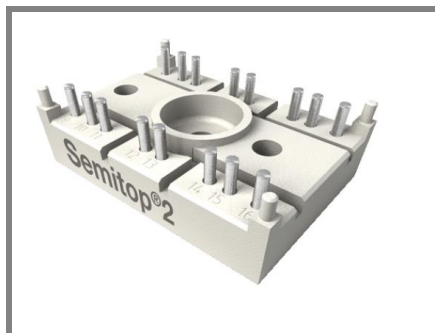


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Absolute Maximum Ratings		$T_s = 25\text{ }^\circ\text{C}$, unless otherwise specified		
Symbol	Conditions	Values	Units	
IGBT				
V_{CES}	$T_j = 25\text{ }^\circ\text{C}$	1200	V	
I_C	$T_j = 125\text{ }^\circ\text{C}$	$T_s = 25\text{ }^\circ\text{C}$	58	A
		$T_s = 80\text{ }^\circ\text{C}$	40	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	100	A	
V_{GES}		± 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	μs	
Inverse Diode				
I_F	$T_j = 150\text{ }^\circ\text{C}$	$T_s = 25\text{ }^\circ\text{C}$	33	A
		$T_s = 80\text{ }^\circ\text{C}$	23	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$		A	
I_{FSM}	$t_p = 10\text{ ms}$; half sine wave $T_j = 150\text{ }^\circ\text{C}$	110	A	
Freewheeling Diode				
I_F	$T_j = 150\text{ }^\circ\text{C}$	$T_{case} = 25\text{ }^\circ\text{C}$	57	A
		$T_{case} = 80\text{ }^\circ\text{C}$	38	A
I_{FRM}			A	
I_{FSM}	$t_p = 10\text{ ms}$; half sine wave $T_j = 150\text{ }^\circ\text{C}$	550	A	
Module				
$I_{t(RMS)}$			A	
T_{vj}		-40 ... +150	$^\circ\text{C}$	
T_{stg}		-40 ... +125	$^\circ\text{C}$	
V_{isol}	AC, 1 min.	2500	V	

Characteristics		$T_s = 25\text{ }^\circ\text{C}$, 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}	$V_{GE} = 0\text{ V}$, $V_{CE} = V_{CES}$	$T_j = 25\text{ }^\circ\text{C}$		0,3	mA
		$T_j = 125\text{ }^\circ\text{C}$			mA
I_{GES}	$V_{CE} = 0\text{ V}$, $V_{GE} = 30\text{ V}$	$T_j = 25\text{ }^\circ\text{C}$		300	nA
		$T_j = 125\text{ }^\circ\text{C}$			nA
V_{CE0}		$T_j = 25\text{ }^\circ\text{C}$	1,2		V
		$T_j = 125\text{ }^\circ\text{C}$	1,2		V
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ }^\circ\text{C}$	26		m Ω
		$T_j = 125\text{ }^\circ\text{C}$	38		m Ω
$V_{CE(sat)}$	$I_{Cnom} = 50\text{ A}$, $V_{GE} = 15\text{ V}$	$T_j = 25\text{ }^\circ\text{C}_{chiplev.}$	2,5	3	V
		$T_j = 125\text{ }^\circ\text{C}_{chiplev.}$	3,1	3,7	V
C_{ies}	$V_{CE} = 25$, $V_{GE} = 0\text{ V}$		3,3		nF
C_{oes}		$f = 1\text{ MHz}$	0,5		nF
C_{res}			0,22		nF
Q_G	$V_{GE} = 0 \dots 20\text{ V}$		285		nC
$t_{d(on)}$	$R_{Gon} = 22\text{ }^\circ\Omega$	$V_{CC} = 600\text{ V}$ $I_{Cnom} = 50\text{ A}$	70		ns
			90		ns
t_r	$R_{Goff} = 22\text{ }^\circ\Omega$	$T_j = 125\text{ }^\circ\text{C}$	9,9		mJ
			460		ns
E_{on}		$V_{GE} = \pm 15\text{ V}$	30		ns
			5,3		mJ
$R_{th(j-s)}$	per IGBT			0,6	K/W



SEMISTOP[®] 2

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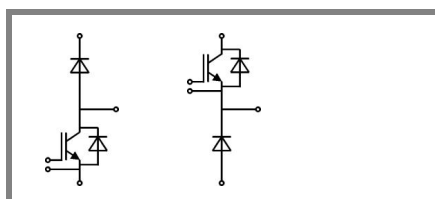
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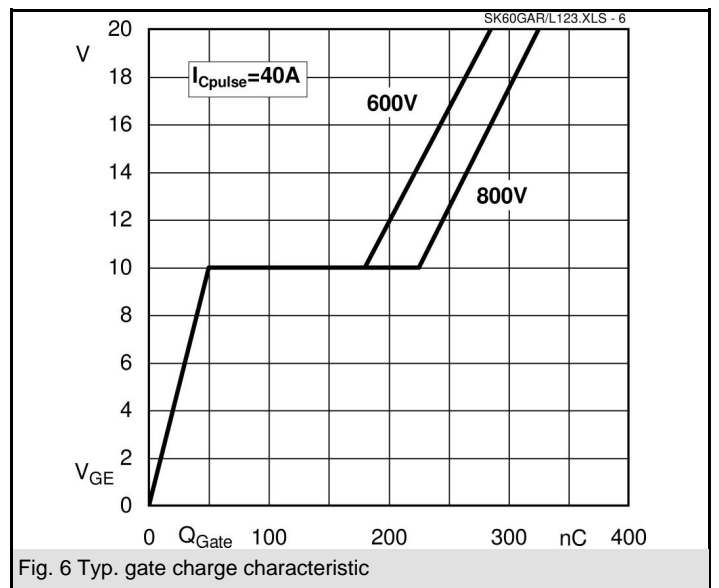
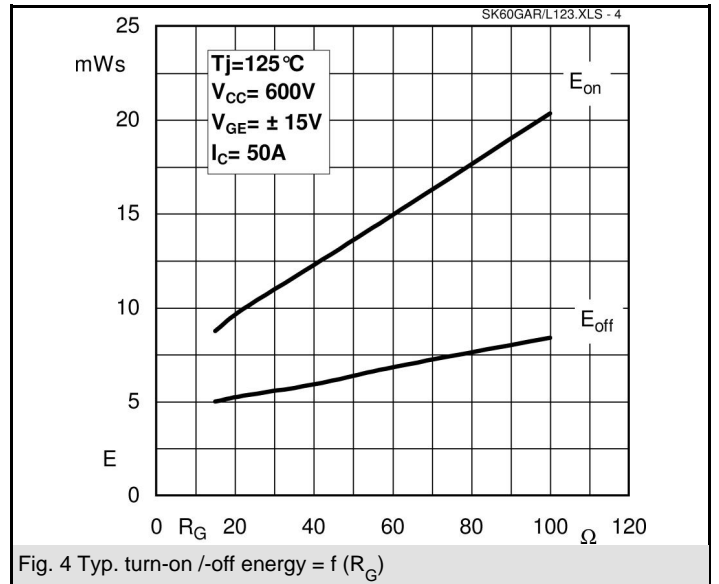
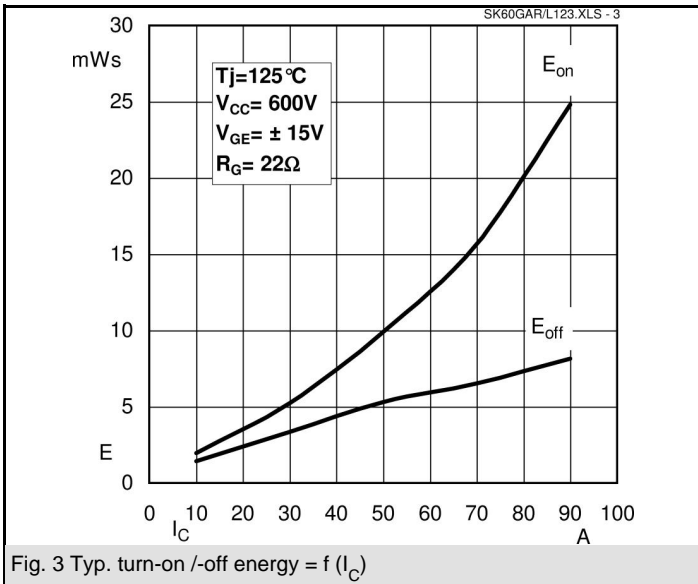
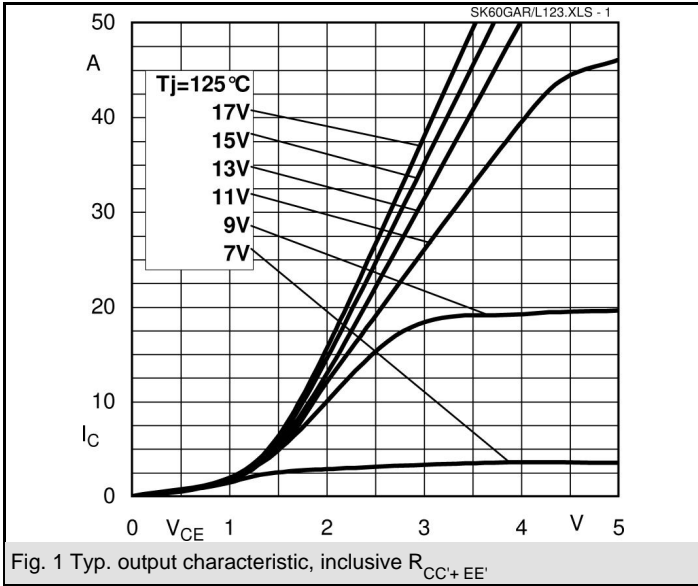
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Characteristics

Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 10 \text{ A}; V_{GE} = 0 \text{ V}$		2	2,5	V
			1,8	2,3	V
V_{F0}			1	1,2	V
r_F			80		mΩ
I_{RRM}	$I_{Fnom} = 10 \text{ A}$		12		A
Q_{rr}	$di/dt = -300 \text{ A}/\mu\text{s}$		1,8		μC
E_{rr}	$V_{CC} = 600 \text{ V}$		0,4		mJ
$R_{th(j-s)D}$	per diode			2,1	K/W
Freewheeling Diode					
$V_F = V_{EC}$	$I_{Fnom} = 50 \text{ A}; V_{GE} = 0 \text{ V}$		1	2,5	V
			1,8		V
V_{F0}			1	1,2	V
r_F			18	22	V
I_{RRM}	$I_{Fnom} = 50 \text{ A}$		40		A
Q_{rr}	$di/dt = -800 \text{ A}/\mu\text{s}$		8		μC
E_{rr}	$V_R = 600 \text{ V}$		2,3		mJ
$R_{th(j-s)FD}$	per diode			0,9	K/W
M_s	to heat sink M1			2	Nm
w			21		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.



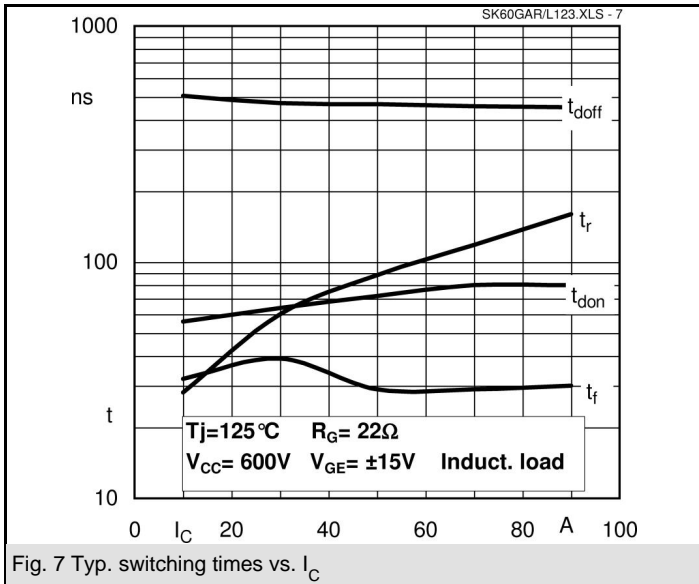


Fig. 7 Typ. switching times vs. I_C

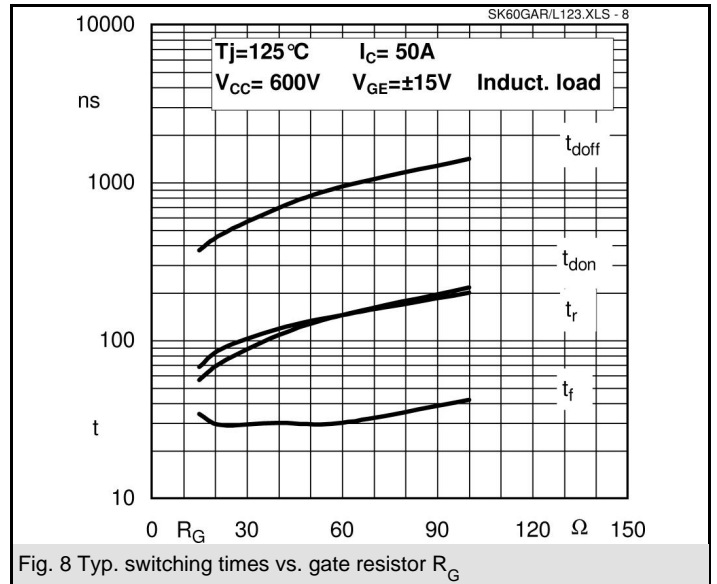


Fig. 8 Typ. switching times vs. gate resistor R_G

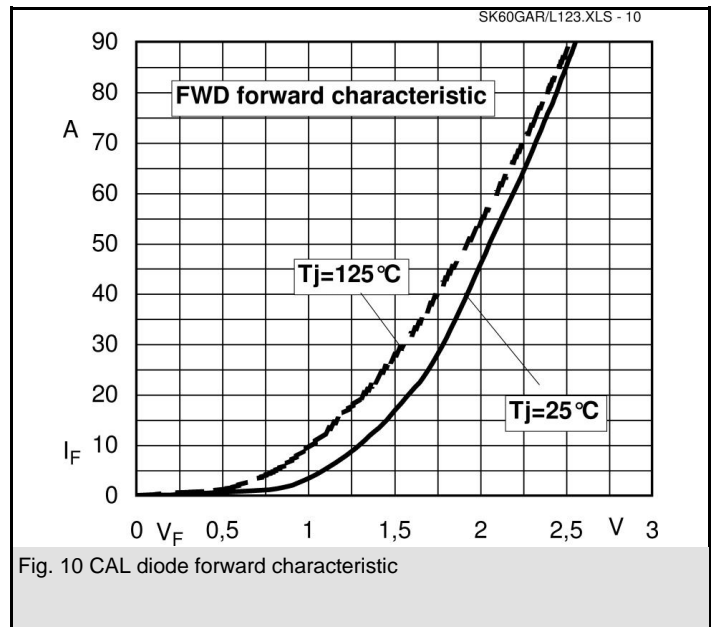
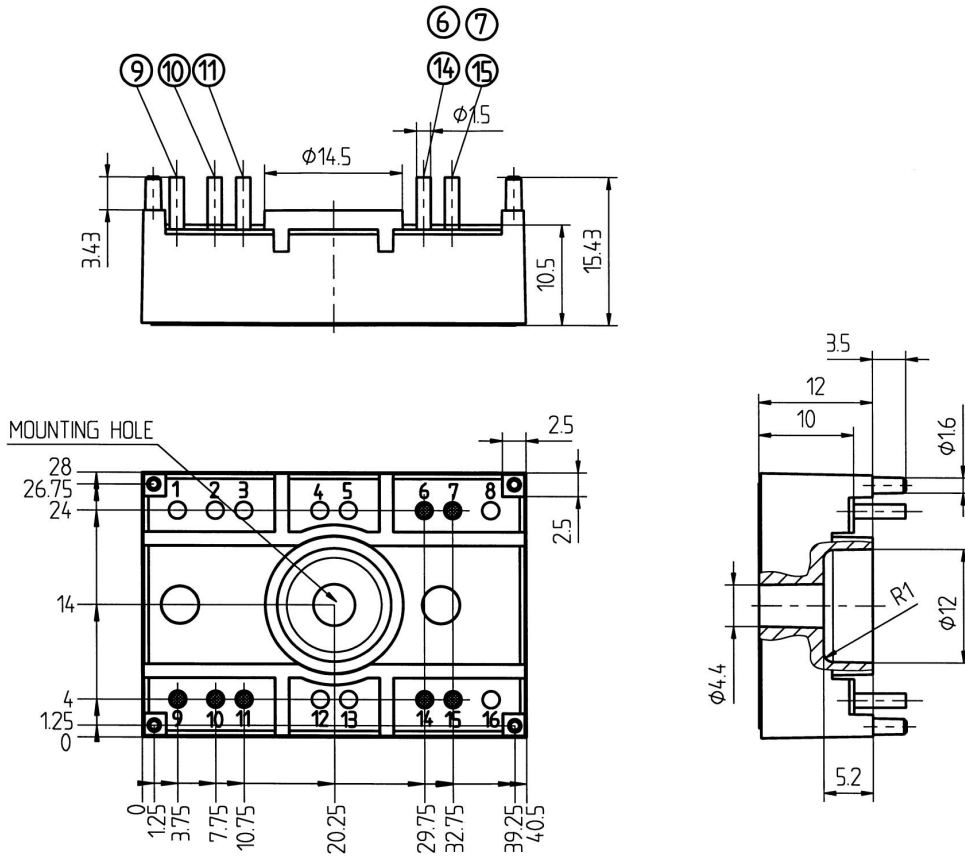
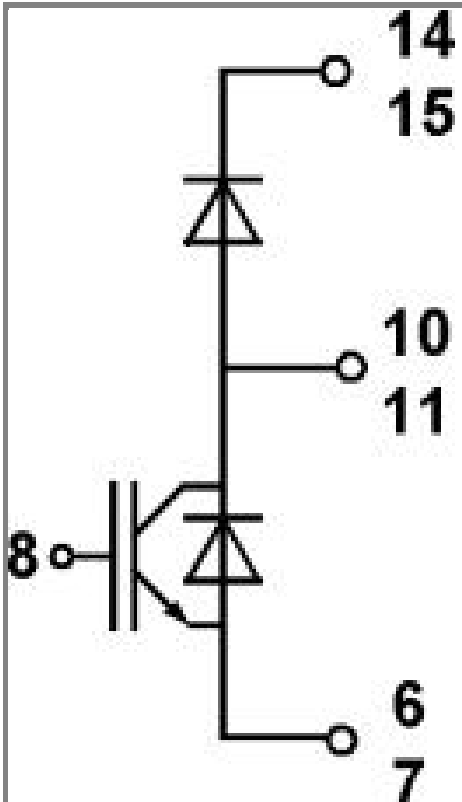


Fig. 10 CAL diode forward characteristic

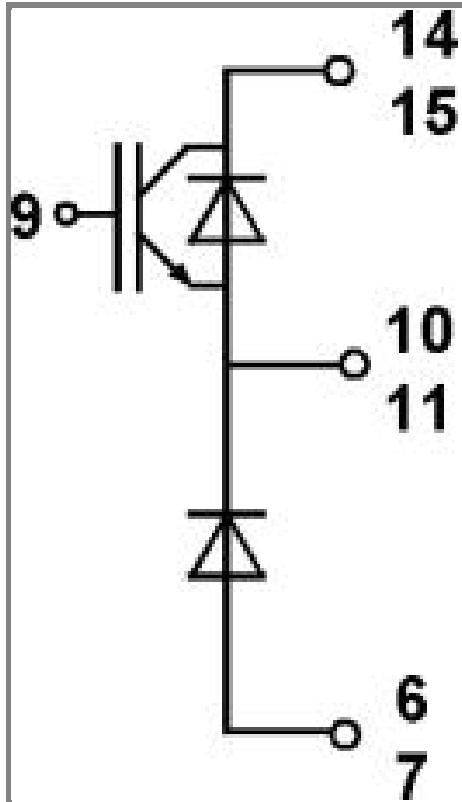


Case T18 (Suggested hole diameter, in the PCB, for solder pins and plastic mounting pins: 2mm)



Case T18

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Case T18

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