

SEMITOP[®] 2

IGBT Module

SK60GAL123

SK60GAR123

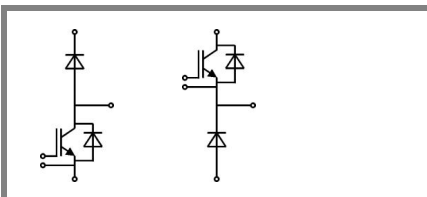
Preliminary Data

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



GAL

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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}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	3,3		nF	
C_{oes}			0,5		nF	
C_{res}			0,22		nF	
Q_G	$V_{GE} = 0 \dots 20\text{ V}$	285		nC		
$t_{d(on)}$ t_r E_{on}	$R_{Gon} = 22\text{ }^\circ\Omega$	$V_{CC} = 600\text{ V}$ $I_C = 50\text{ A}$	70		ns	
			$T_j = 125\text{ }^\circ\text{C}$	90		ns
$t_{d(off)}$ t_f E_{off}	$R_{Goff} = 22\text{ }^\circ\Omega$	$V_{GE} = \pm 15\text{ V}$	9,9		mJ	
			$T_j = 125\text{ }^\circ\text{C}$	460		ns
$R_{th(j-s)}$	per IGBT	30		ns		
		5,3		mJ		
				0,6	K/W	



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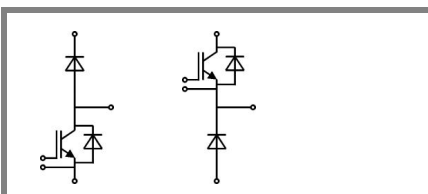
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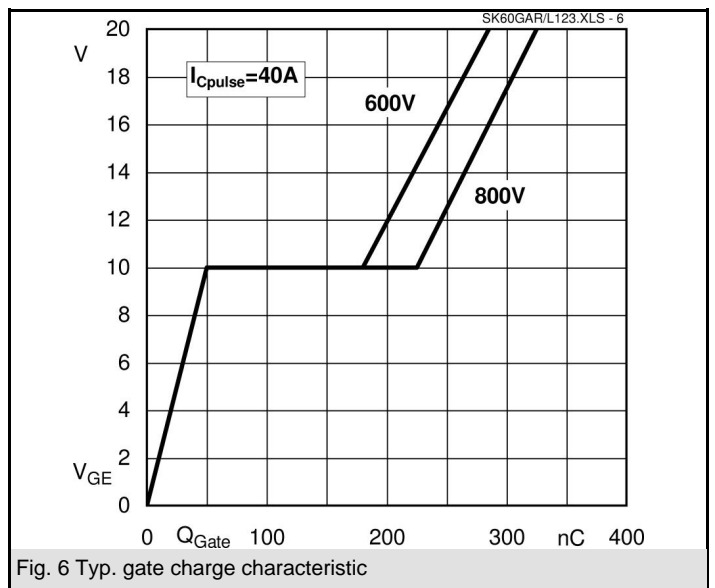
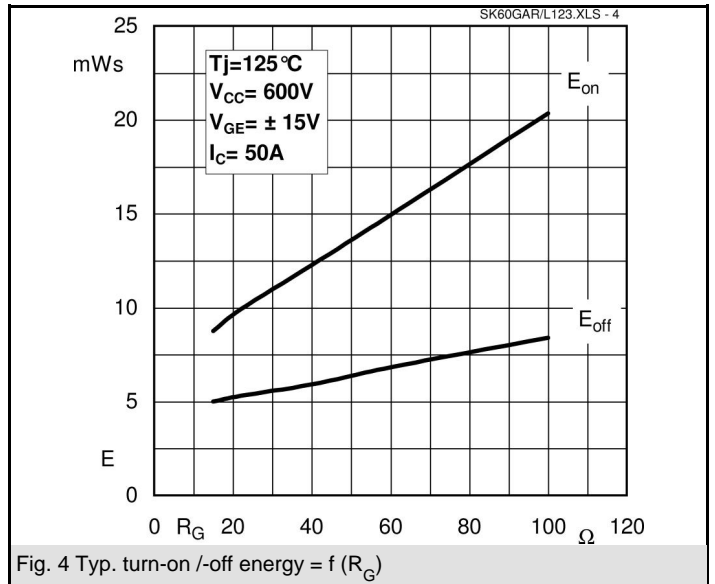
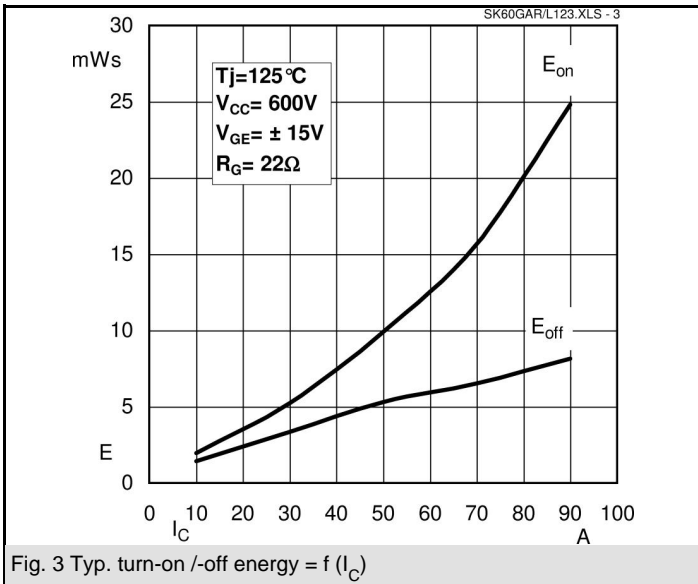
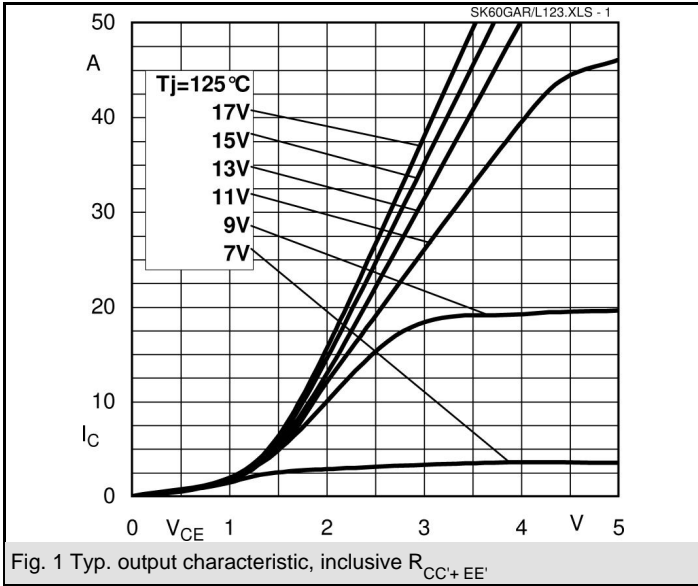
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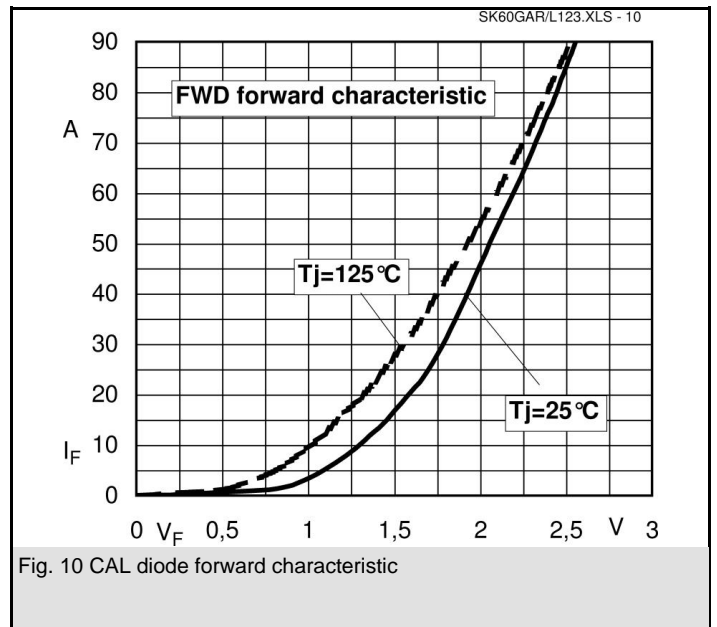
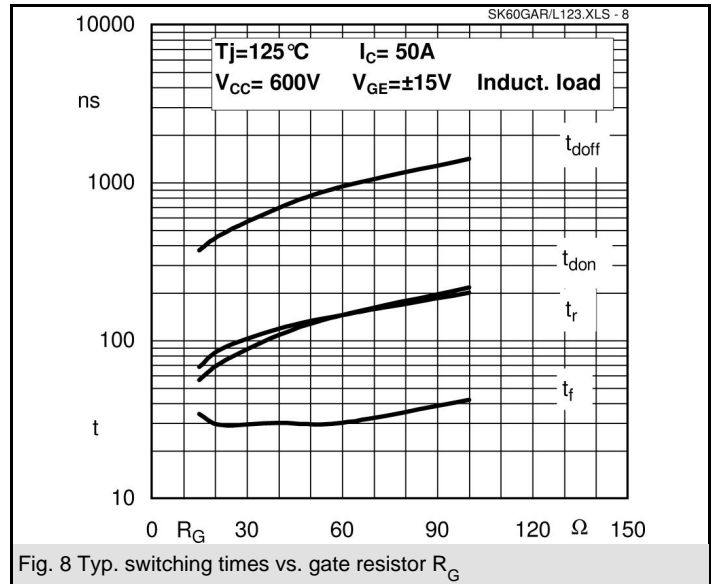
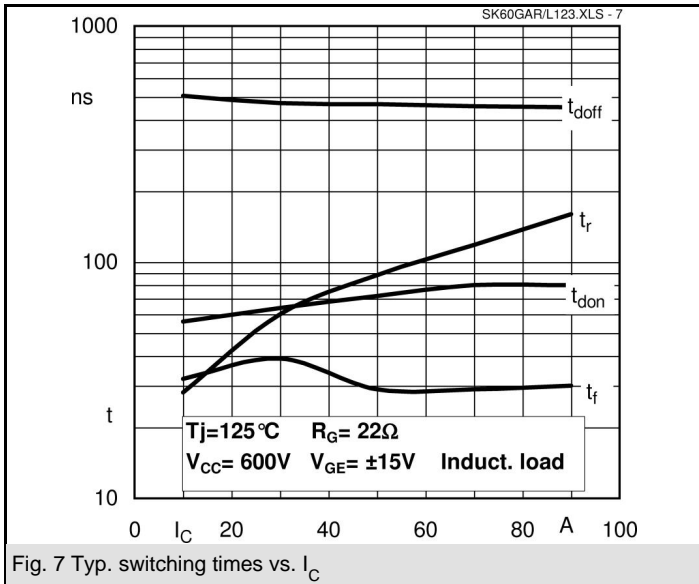
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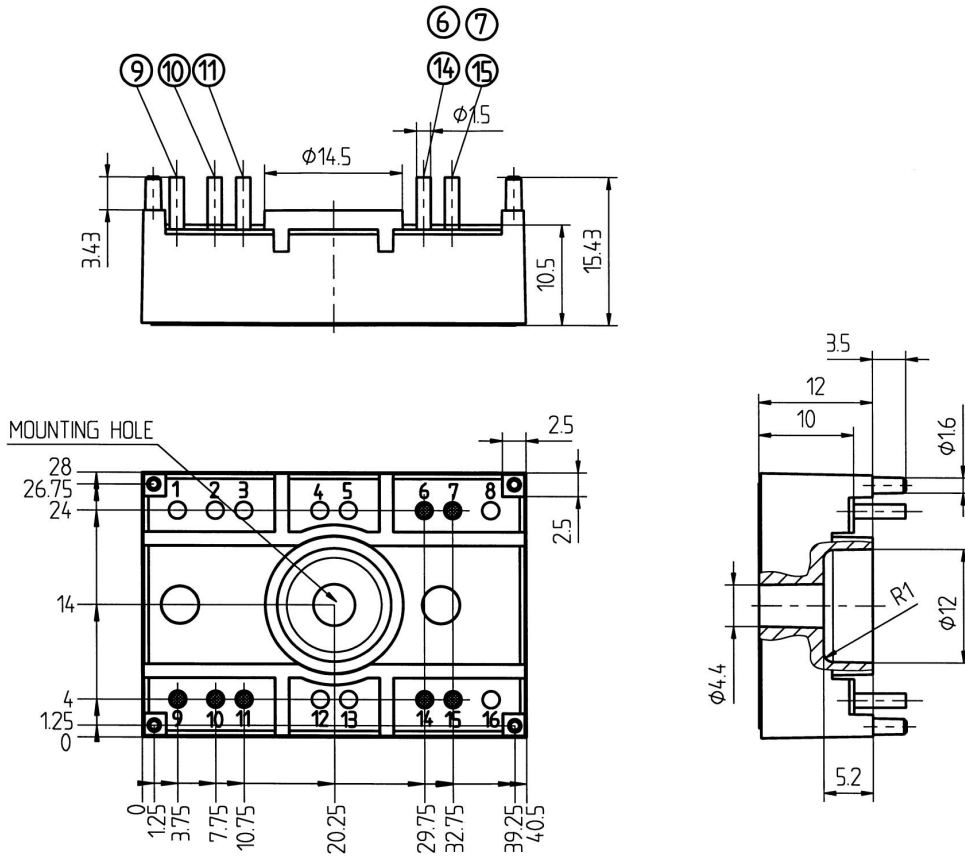
Characteristics				min.	typ.	max.	Units
Symbol	Conditions						
Inverse Diode							
$V_F = V_{EC}$	$I_{Fnom} = 10 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$		2		2,5	V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$		1,8		2,3	V
V_{F0}		$T_j = 125 \text{ }^\circ\text{C}$		1		1,2	V
r_F		$T_j = 125 \text{ }^\circ\text{C}$		80			m Ω
I_{RRM}	$I_F = 10 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$		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							
$V_F = V_{EC}$	$I_{Fnom} = 50 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$		1		2,5	V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$		1,8			V
V_{F0}		$T_j = 125 \text{ }^\circ\text{C}$		1		1,2	V
r_F		$T_j = 125 \text{ }^\circ\text{C}$		18		22	V
I_{RRM}	$I_F = 50 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$		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.

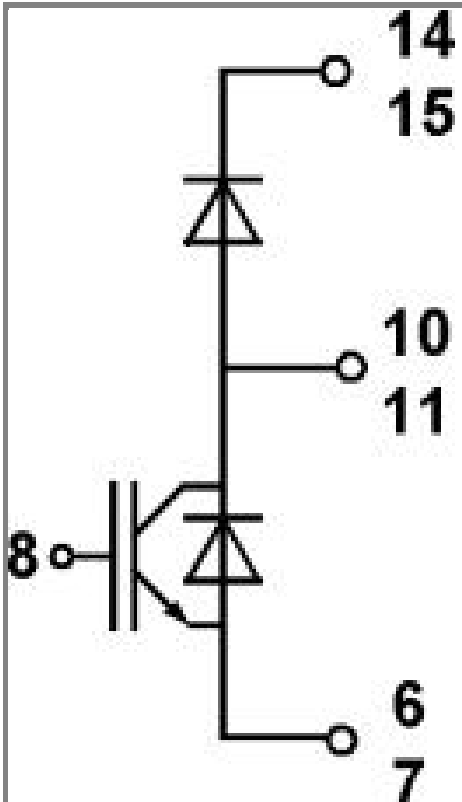
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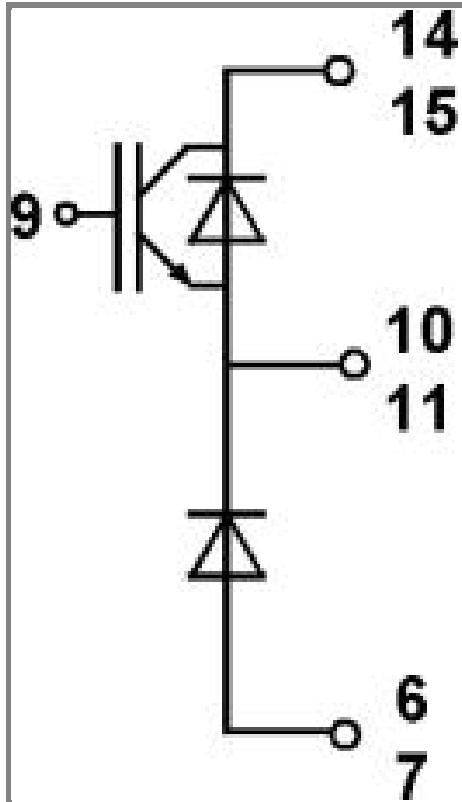


Case T18 (Suggested hole diameter, in the PCB, for solder pins and plastic mounting pins: 2mm)



Case T18

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Case T18

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