

SEMITOP[®] 2

IGBT Module

SK60GAL123

SK60GAR123

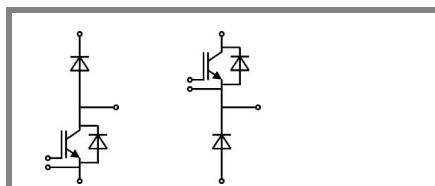
Preliminary Data

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

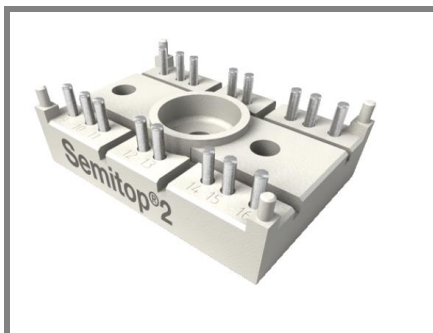


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Absolute Maximum Ratings		$T_s = 25\text{ °C}$, unless otherwise specified	
Symbol	Conditions	Values	Units
IGBT			
V_{CES}	$T_j = 25\text{ °C}$	1200	V
I_C	$T_j = 125\text{ °C}$	$T_s = 25\text{ °C}$	58 A
		$T_s = 80\text{ °C}$	40 A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	100	A
V_{GES}		± 20	V
t_{psc}	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125\text{ °C}$ $V_{CES} < 1200\text{ V}$	10	μs
Inverse Diode			
I_F	$T_j = 150\text{ °C}$	$T_s = 25\text{ °C}$	33 A
		$T_s = 80\text{ °C}$	23 A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$		A
I_{FSM}	$t_p = 10\text{ ms};$ half sine wave $T_j = 150\text{ °C}$	110	A
Freewheeling Diode			
I_F	$T_j = 150\text{ °C}$	$T_{case} = 25\text{ °C}$	57 A
		$T_{case} = 80\text{ °C}$	38 A
I_{FRM}			A
I_{FSM}	$t_p = 10\text{ ms};$ half sine wave $T_j = 150\text{ °C}$	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		$T_s = 25\text{ °C}$, 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}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$	$T_j = 25\text{ °C}$		0,3	mA
		$T_j = 125\text{ °C}$			mA
I_{GES}	$V_{CE} = 0\text{ V}, V_{GE} = 30\text{ V}$			300	nA
V_{CE0}		$T_j = 25\text{ °C}$	1,2		V
		$T_j = 125\text{ °C}$	1,2		V
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}$	26		$\text{m}\Omega$
		$T_j = 125\text{ °C}$	38		$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 50\text{ A}, V_{GE} = 15\text{ V}$		2,5	3	V
			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
$t_{d(on)}$	$R_{Gon} = 22\ \Omega$	$V_{CC} = 600\text{ V}$ $I_{Cnom} = 50\text{ A}$	70		ns
t_r			90		ns
E_{on}	$R_{Goff} = 22\ \Omega$	$T_j = 125\text{ °C}$ $V_{GE} = \pm 15\text{ V}$	9,9		mJ
$t_{d(off)}$			460		ns
t_f			30		ns
E_{off}			5,3		mJ
$R_{th(j-s)}$	per IGBT			0,6	K/W



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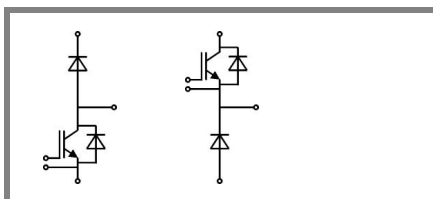
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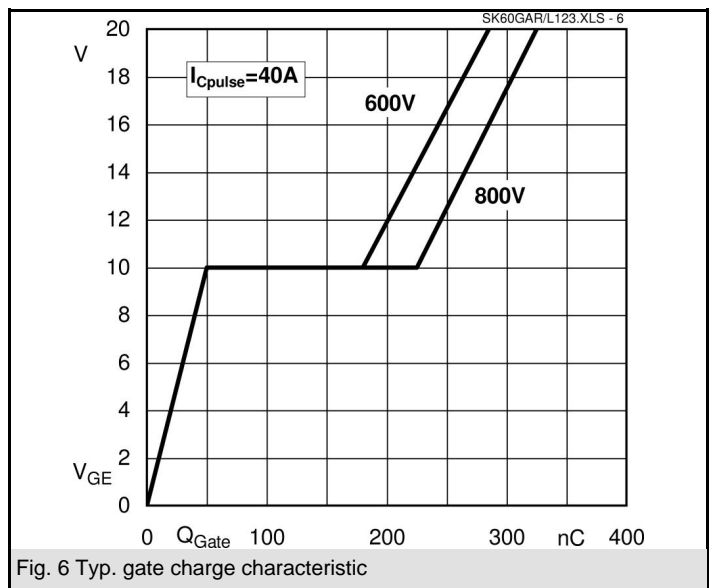
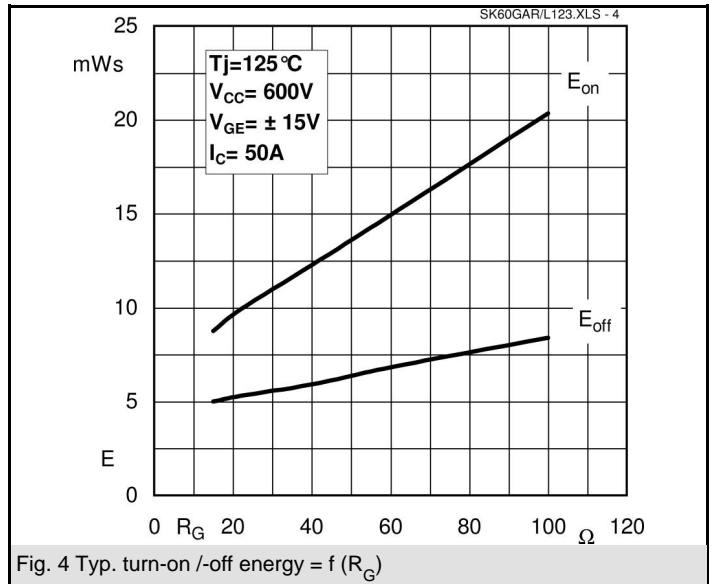
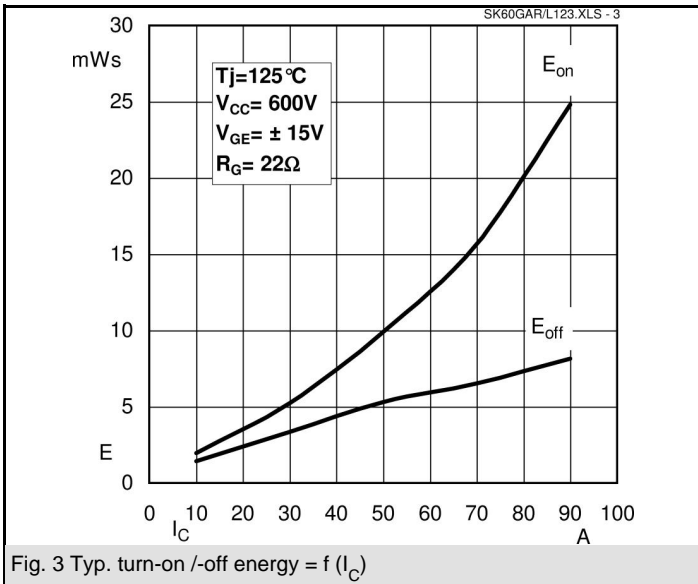
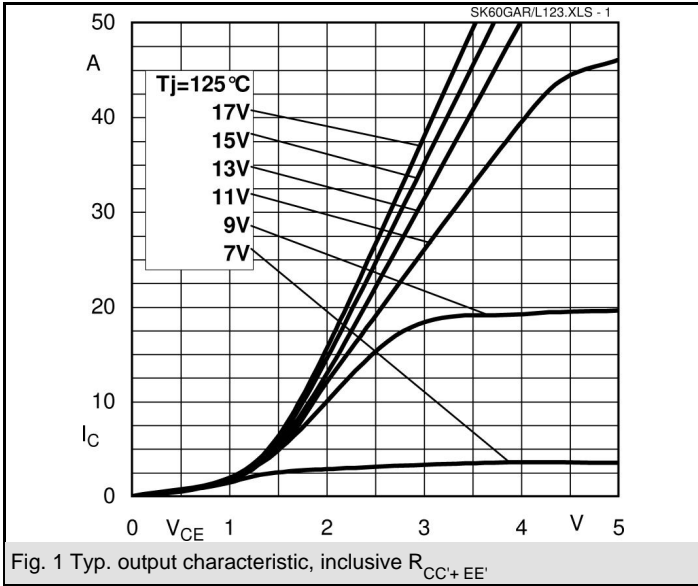
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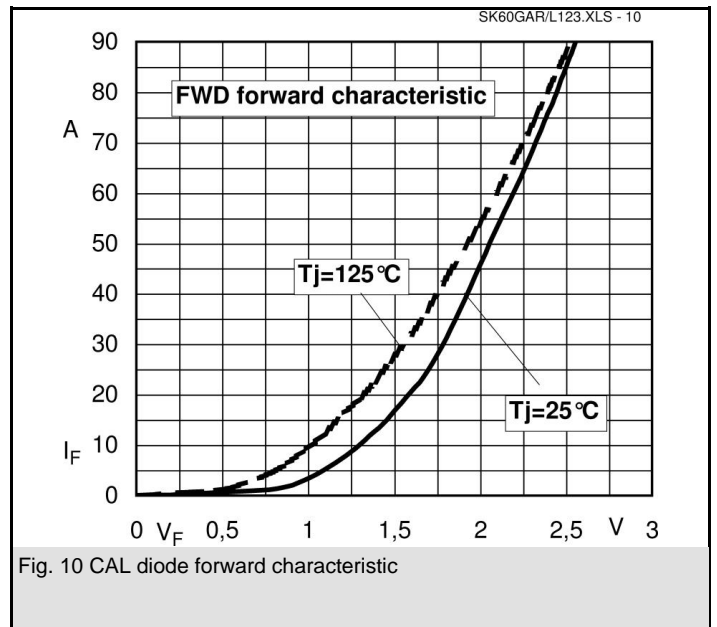
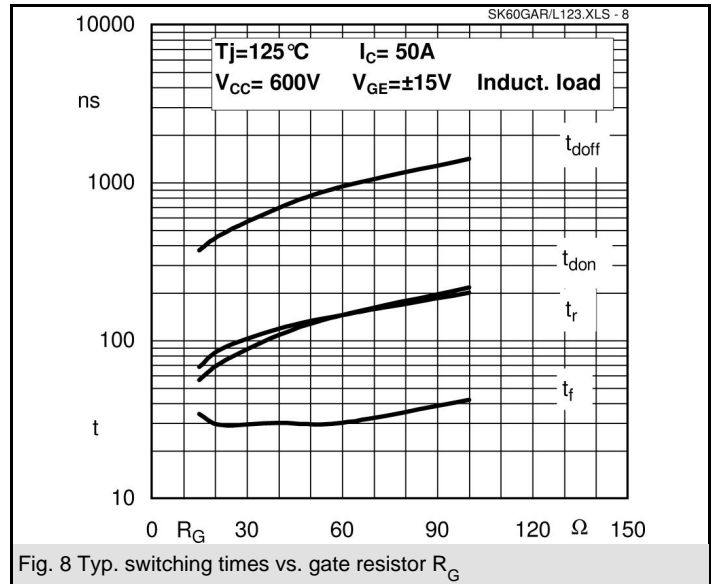
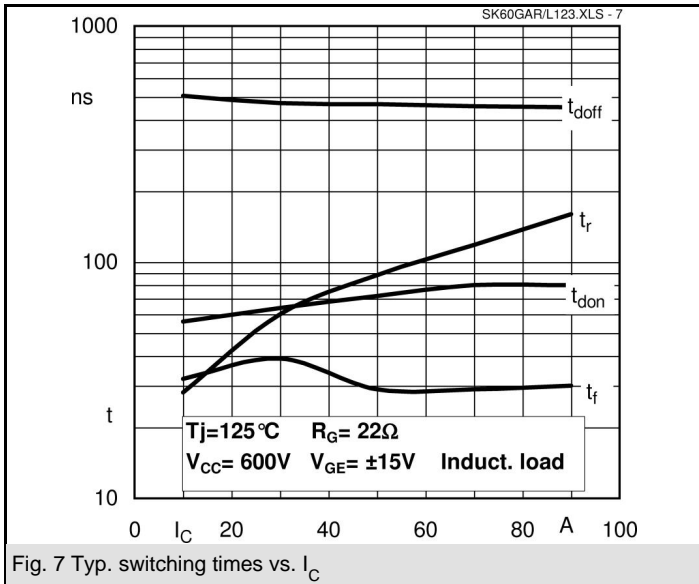
Characteristics

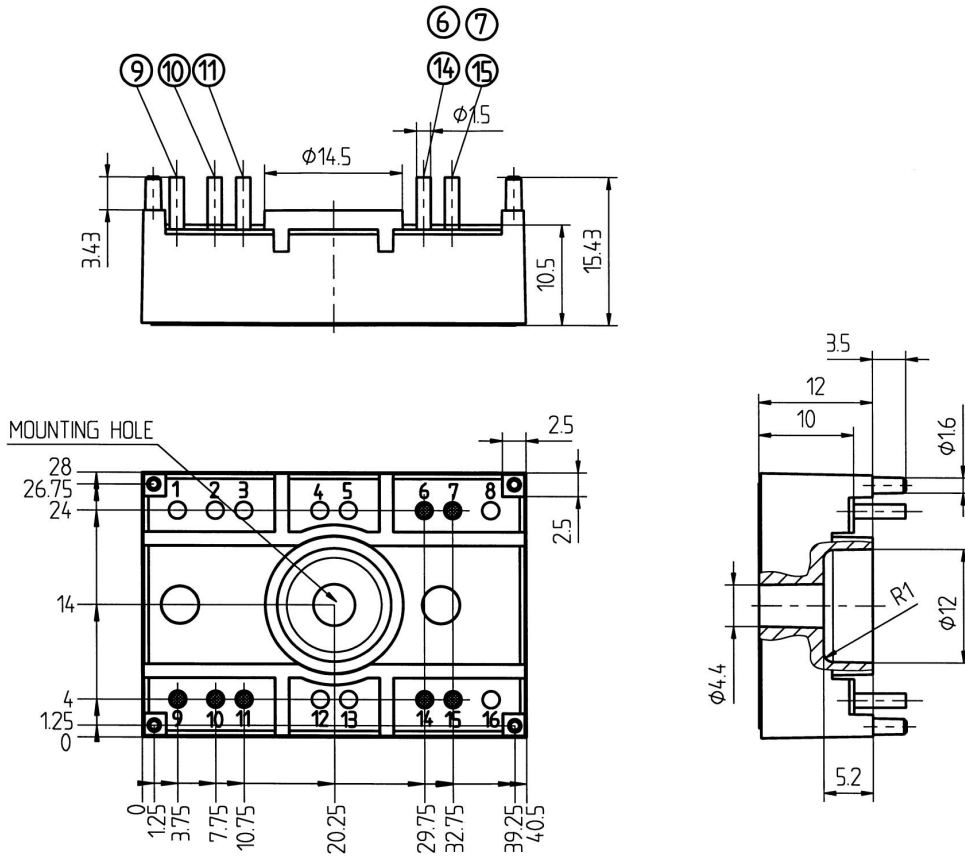
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 10 \text{ A}; V_{GE} = 0 \text{ V}$		2	2,5	V
			1,8	2,3	V
					V
V_{F0}			1	1,2	V
r_F			80		mΩ
I_{RRM}	$I_{Fnom} = 10 \text{ A}$		12		A
Q_{rr}	$di/dt = -300 \text{ A}/\mu\text{s}$		1,8		μC
E_{rr}	$V_{CC} = 600 \text{ V}$		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
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.

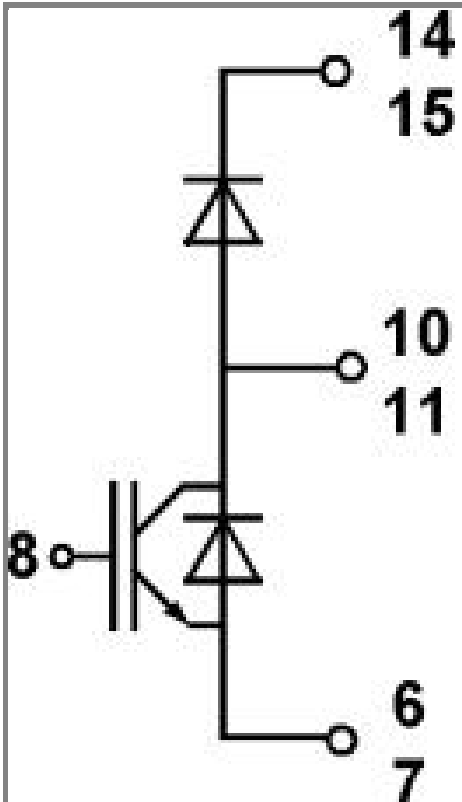
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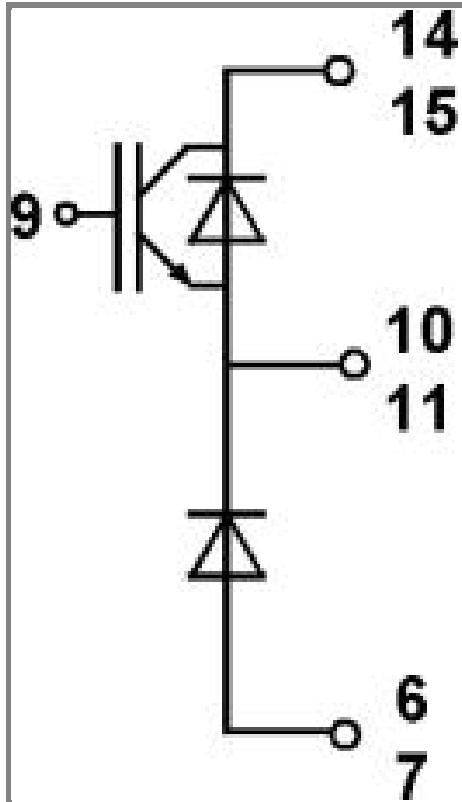


Case T18 (Suggested hole diameter, in the PCB, for solder pins and plastic mounting pins: 2mm)



Case T18

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