



SEMITOP[®] 2

IGBT Module

SK60GAL123

SK60GAR123

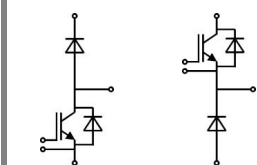
Preliminary Data

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

GAR

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 °C, unless otherwise specified			
Symbol	Conditions		min.	typ.	max.	Units
IGBT						
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 2 mA		4,5	5,5	6,5	V
I _{CES}	V _{GE} = 0 V, V _{CE} = V _{CES}	T _J = 25 °C T _J = 125 °C			0,3	mA mA
I _{GES}	V _{CE} = 0 V, V _{GE} = 30 V	T _J = 25 °C T _J = 125 °C			300	nA nA
V _{CE0}		T _J = 25 °C T _J = 125 °C		1,2 1,2		V V
r _{CE}	V _{GE} = 15 V	T _J = 25°C T _J = 125°C		26 38		mΩ mΩ
V _{CE(sat)}	I _{Cnom} = 50 A, V _{GE} = 15 V	T _J = 25°C _{chiplev.} T _J = 125°C _{chiplev.}		2,5 3,1	3 3,7	V V
C _{ies} C _{oes} C _{res}	V _{CE} = 25, V _{GE} = 0 V	f = 1 MHz		3,3 0,5 0,22		nF nF nF
Q _G	V _{GE} =0 ... 20 V			285		nC
t _{d(on)} t _r E _{on}	R _{Gon} = 22 Ω	V _{CC} = 600V I _C = 50A		70 90 9,9		ns ns mJ
t _{d(off)} t _f E _{off}	R _{Goff} = 22 Ω	T _J = 125 °C V _{GE} =±15V		460 30 5,3		ns ns mJ
R _{th(l-s)}	per IGBT				0,6	K/W



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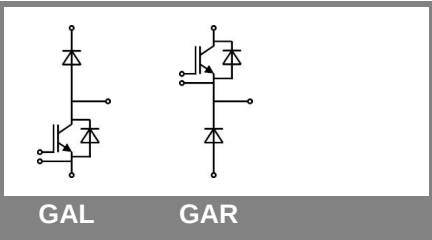
Typical Applications*

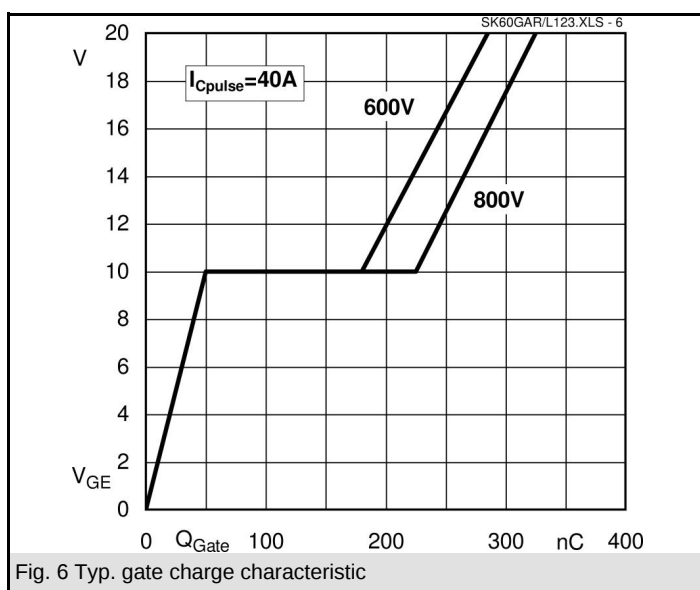
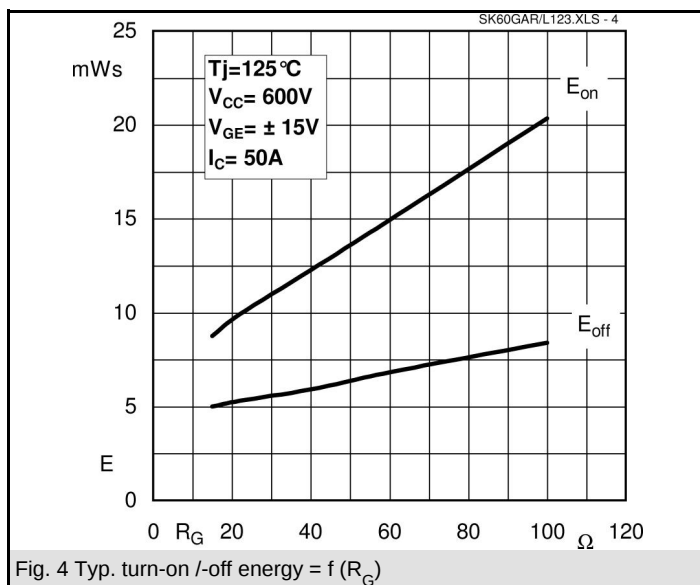
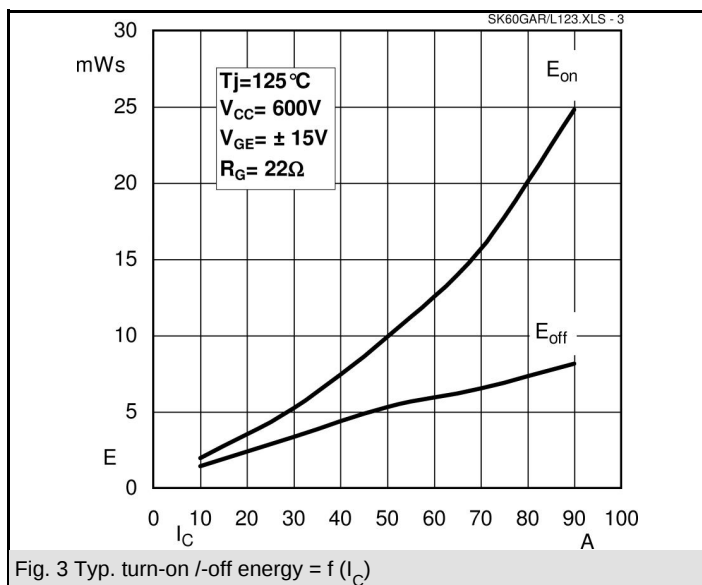
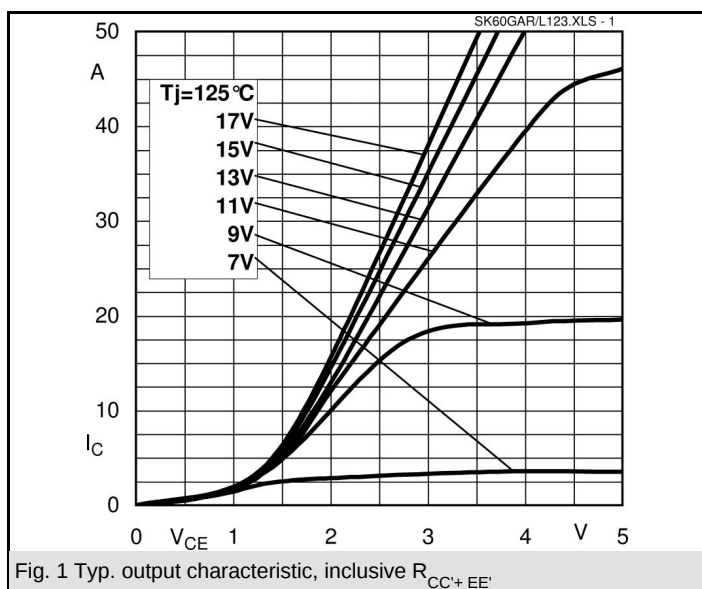
- Switching (not for linear use)
- Inverter
- Switched mode power supplies
- UPS

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

* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.





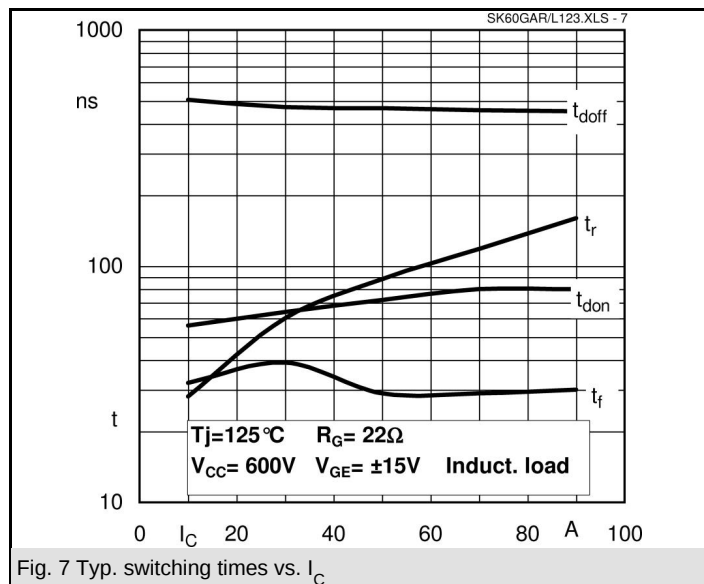


Fig. 7 Typ. switching times vs. I_C

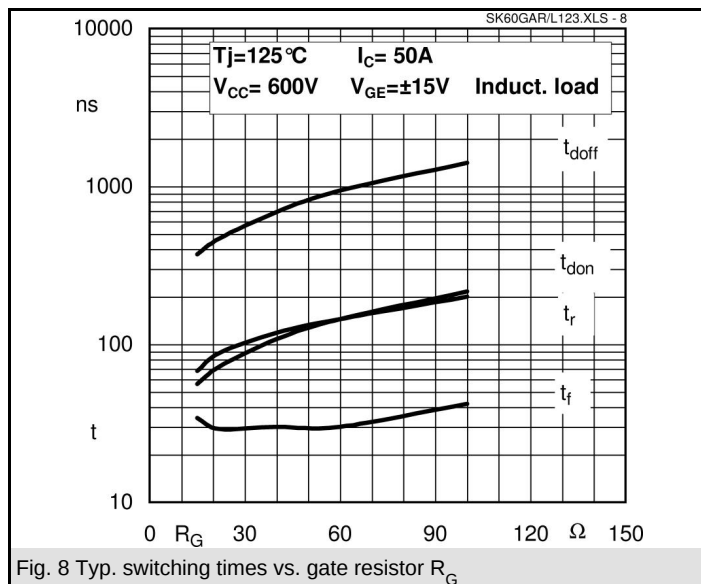


Fig. 8 Typ. switching times vs. gate resistor R_G

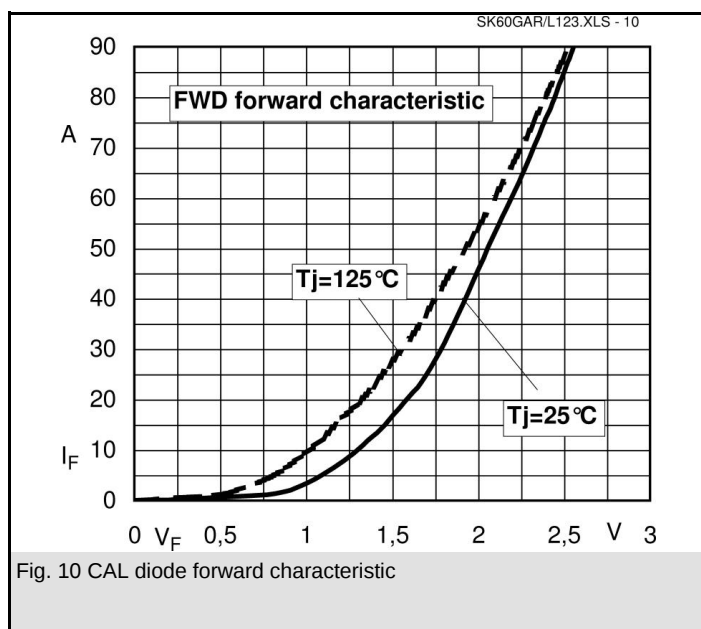
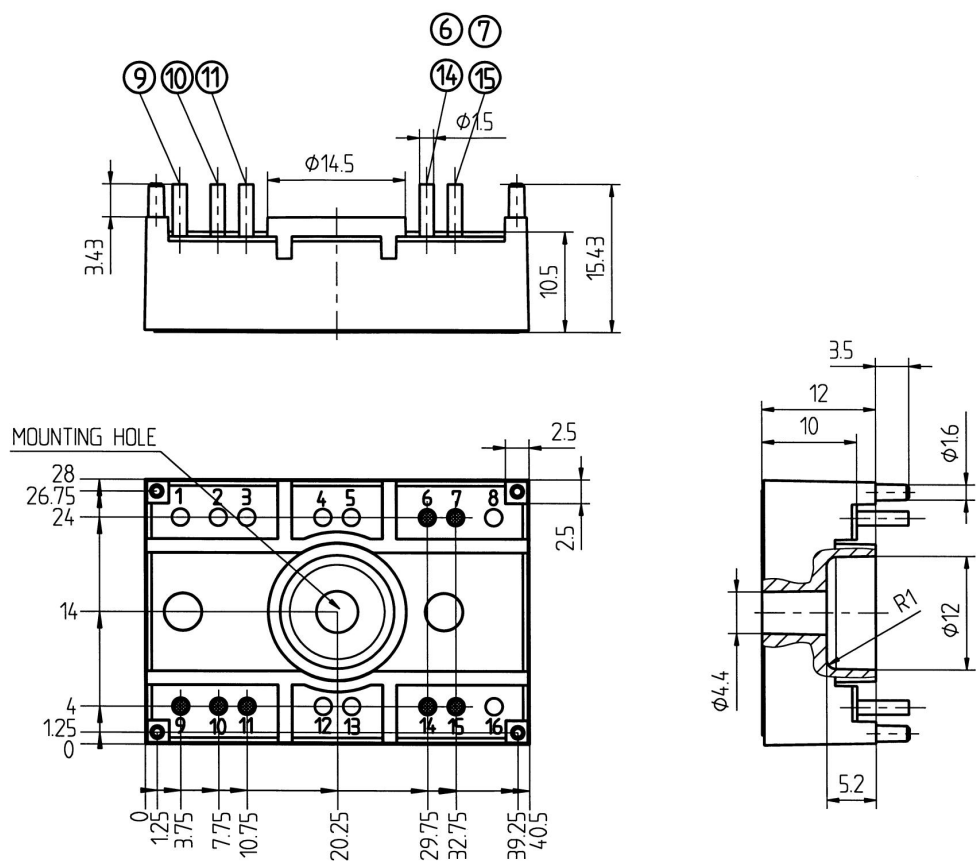


Fig. 10 CAL diode forward characteristic

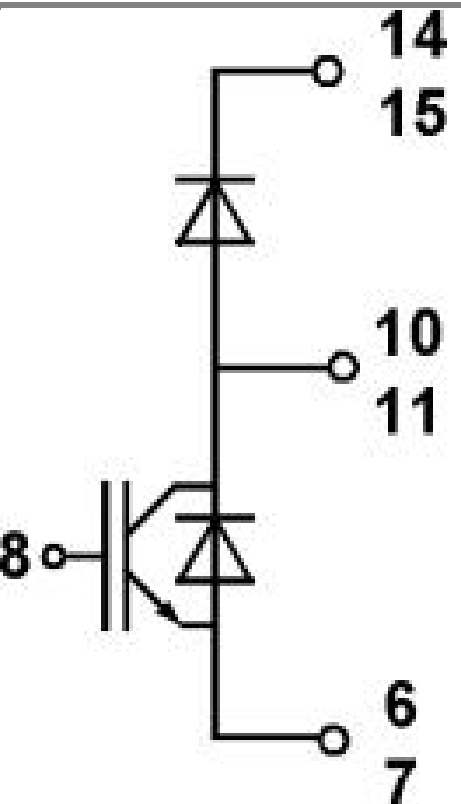
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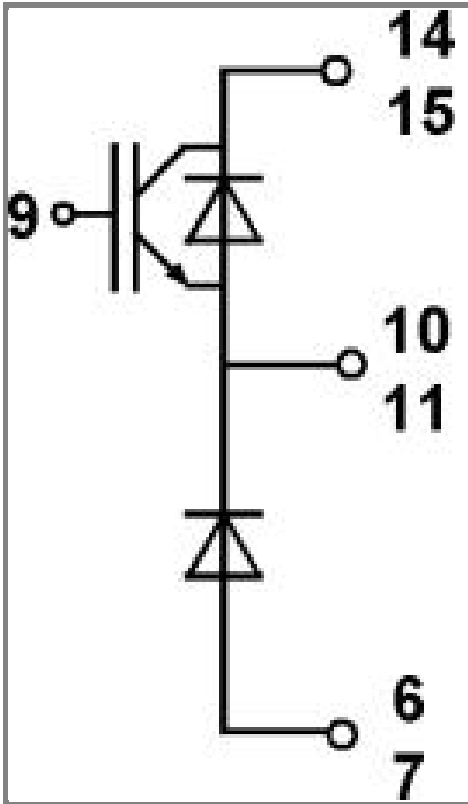
no. E 63 532



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



Case T18 GAL



Case T18 GAR