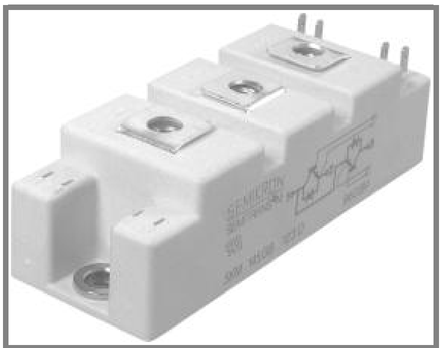
SKM 50GB123D ...



SEMITRANS® 2

IGBT Modules

SKM 50GB123D

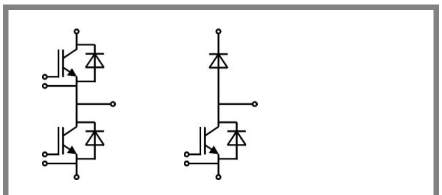
SKM 50GAL123D

Features

- MOS input (voltage controlled)
- Low inductance case
- Low tail current with low temperature dependence
- High short circuit capability, self limiting to 6xI_{CNOM}
- Fast and soft CAL diodes
- Isolated copper base plate using DCB (Direct Copper Bonding Technology)

Typical Applications*

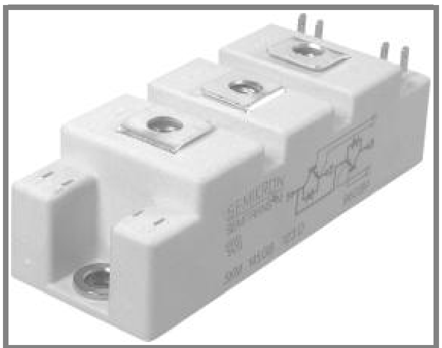
- AC inverter drives
- Power supplies



GB GAL

Absolute Maximum Ratings		T_c = 25 °C, unless otherwise specified		
Symbol	**Conditions**		**Values**	**Units**
IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	T_j = 150 °C	T_{case} = 25 °C	50	A
		T_{case} = 80 °C	40	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		100	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 600 V; V_{GE} ≤ 20 V; VCES < 1200 V	T_j = 125 °C	10	µs
Inverse Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	50	A
		T_{case} = 80 °C	40	A
I_{FRM}	I_{FRM} = 2xI_{Fnom}		100	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	550	A
Freewheeling Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	50	A
		T_{case} = 80 °C	40	A
I_{FRM}	IFRM = 2xIFnom		100	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	550	A
Module				
$I_{t(RMS)}$			200	A
T_{vj}			- 40 ...+150	°C
T_{stg}			125	°C
V_{isol}	AC, 1 min.		2500	V

Characteristics		T_c = 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		0,1	0,3	mA
		T_j = 125 °C				mA
V_{CE0}		T_j = 25 °C		1	1,15	V
		T_j = 125 °C		0,9	1,05	V
r_{CE}	V_{GE} = 15 V	T_j = 25°C		30	37	mΩ
		T_j = 125°C		44	53	mΩ
$V_{CE(sat)}$	I_{Cnom} = 50 A, V_{GE} = 15 V	T_j = 25°$C_{chiplev.}$		2,5	3	V
		T_j = 125°$C_{chiplev.}$		3,1	3,7	V
C_{ies}				3,3		nF
C_{oes}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		0,5		nF
C_{res}				0,2		nF
Q_G	V_{GE} = -8V - +20V			500		nC
R_{Gint}	T_j = °C			2,5		Ω
$t_{d(on)}$	R_{Gon} = 27 Ω	V_{CC} = 600V		70		ns
t_r		I_C= 40A		60		ns
E_{on}		T_j = 125 °C		7		mJ
$t_{d(off)}$	R_{Goff} = 27 Ω			400		ns
t_f				45		ns
E_{off}				4,5		mJ
$R_{th(j-c)}$	per IGBT				0,4	K/W



SEMITRANS® 2

IGBT Modules

SKM 50GB123D

SKM 50GAL123D

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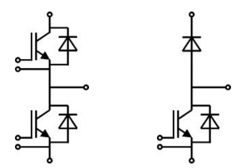

GB GAL

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 50 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		2	2,5	V
		T_j = 125 °$C_{chiplev.}$		1,8		V
V_{F0}		T_j = 25 °C		1,1	1,2	V
		T_j = 125 °C				V
r_F		T_j = 25 °C		18	26	mΩ
		T_j = 125 °C			22	mΩ
I_{RRM}	I_F = 40 A	T_j = 125 °C		35		A
Q_{rr}	di/dt = 800 A/µs			7		µC
E_{rr}	V_{cc} = 600V			2		mJ
$R_{th(j-c)}$	per diode				0,7	K/W
Freewheeling Diode						
$V_F = V_{EC}$	I_{Fnom} = 50 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		2	2,5	V
		T_j = 125 °$C_{chiplev.}$		1,8		V
V_{F0}		T_j = 25 °C		1,1	1,2	V
		T_j = 125 °C				V
r_F		T_j = 25 °C		18	26	V
		T_j = 125 °C				V
I_{RRM}	I_F = 40 A	T_j = 125 °C		35		A
Q_{rr}	di/dt = 800 A/µs			7		µC
E_{rr}	V_{cc} = 600V			2		mJ
$R_{th(j-c)}$	per diode				0,7	K/W
Module						
L_{CE}					30	nH
$R_{CC'+EE'}$	res., terminal-chip	T_{case}= 25 °C		0,75		mΩ
		T_{case}= 125 °C		1		mΩ
$R_{th(c-s)}$	per module				0,05	K/W
M_s	to heat sink M6		3		5	Nm
M_t	to terminals M5		2,5		5	Nm
w					160	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.

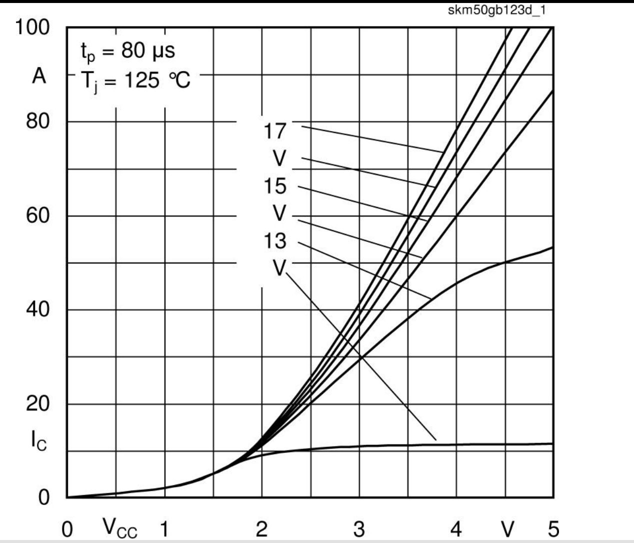

Fig. 1 Typ. output characteristic, inclusive $R_{CC'+ EE'}$

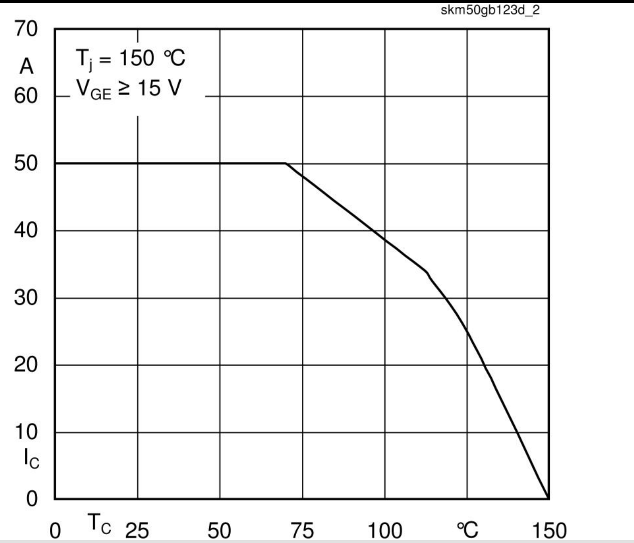

Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

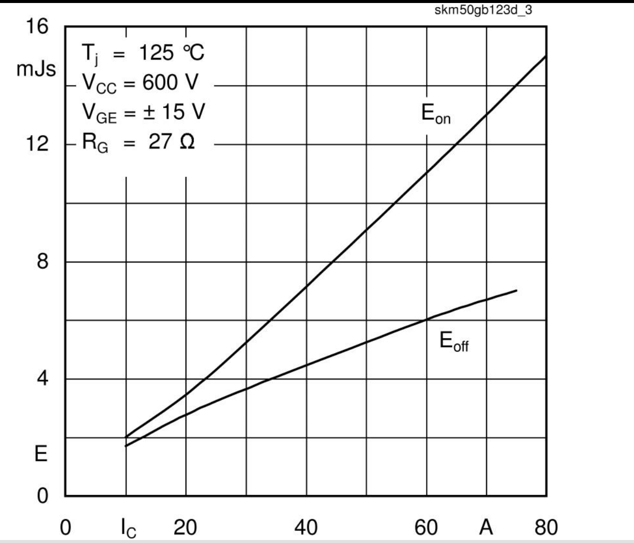

Fig. 3 Typ. turn-on /-off energy = f (I_C)

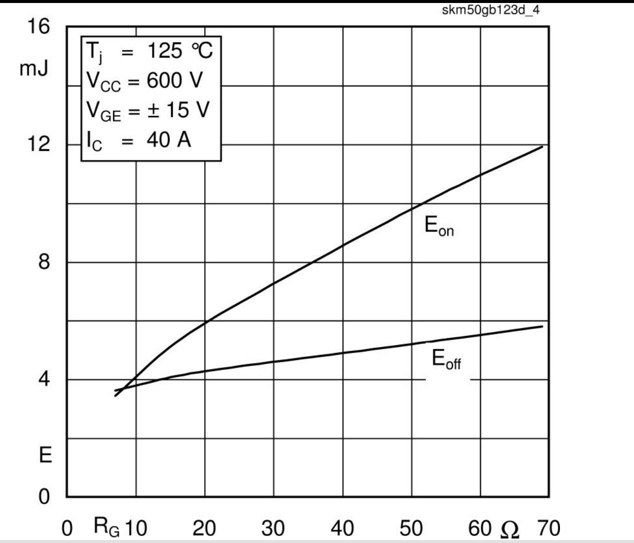

Fig. 4 Typ. turn-on /-off energy = f (R_G)

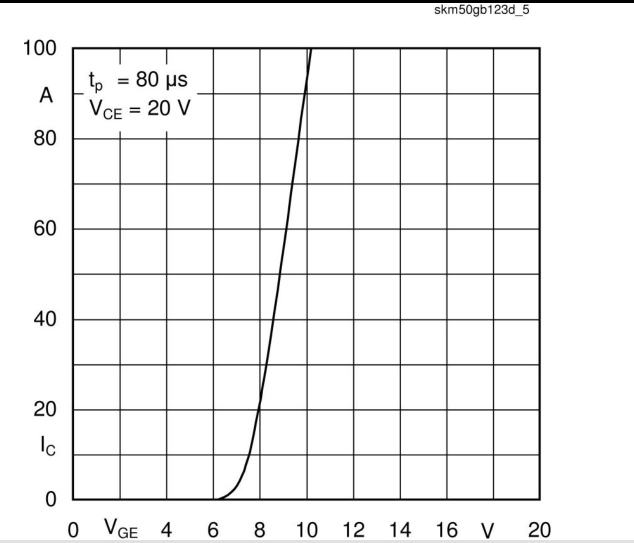

Fig. 5 Typ. transfer characteristic

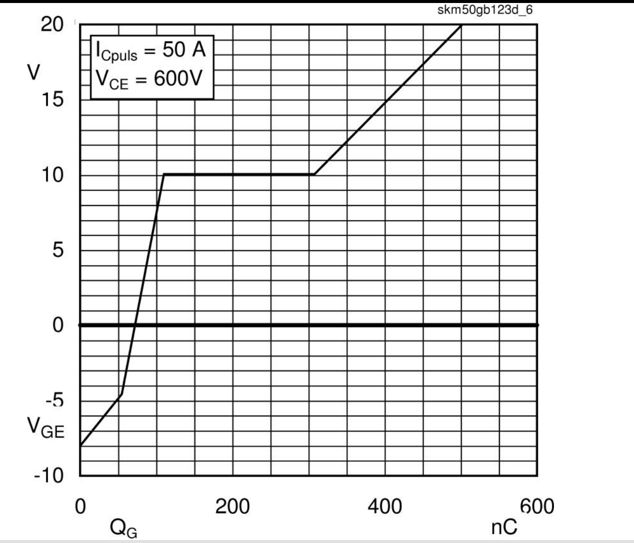

Fig. 6 Typ. gate charge characteristic

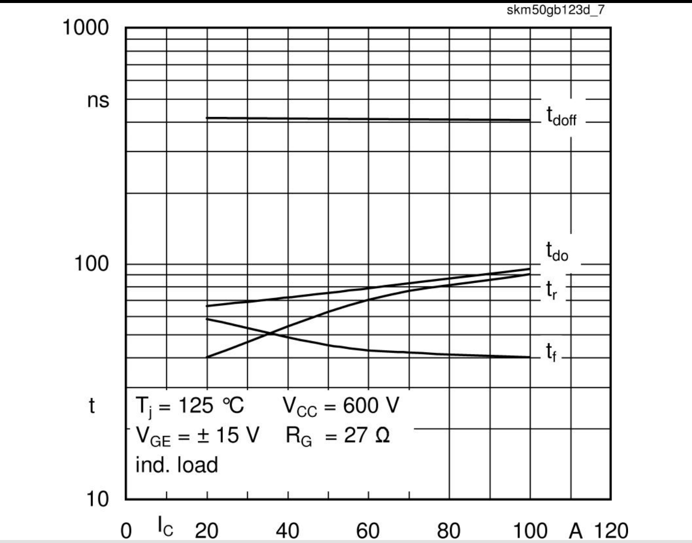

Fig. 7 Typ. switching times vs. I_C

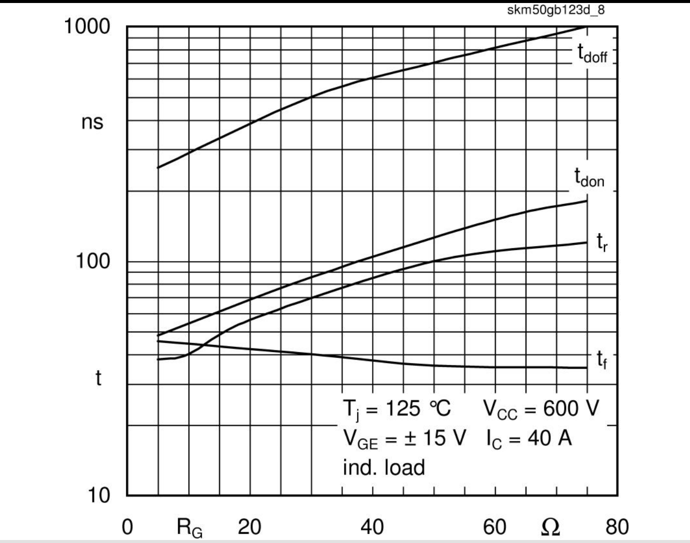

Fig. 8 Typ. switching times vs. gate resistor R_G

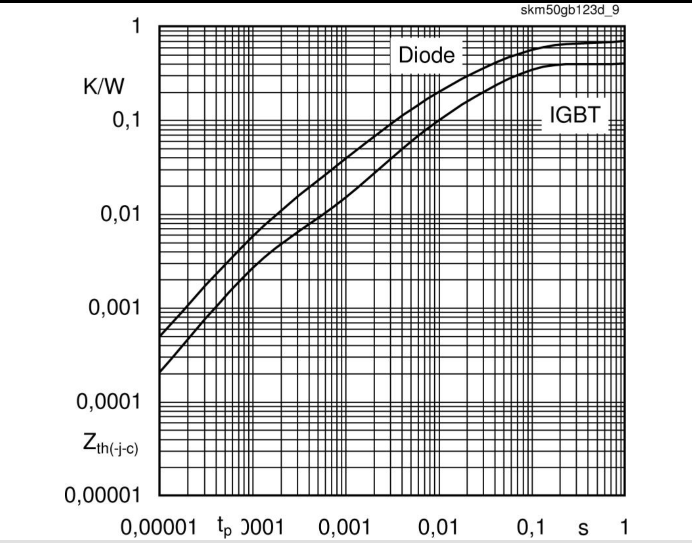

Fig. 9 Transient thermal impedance

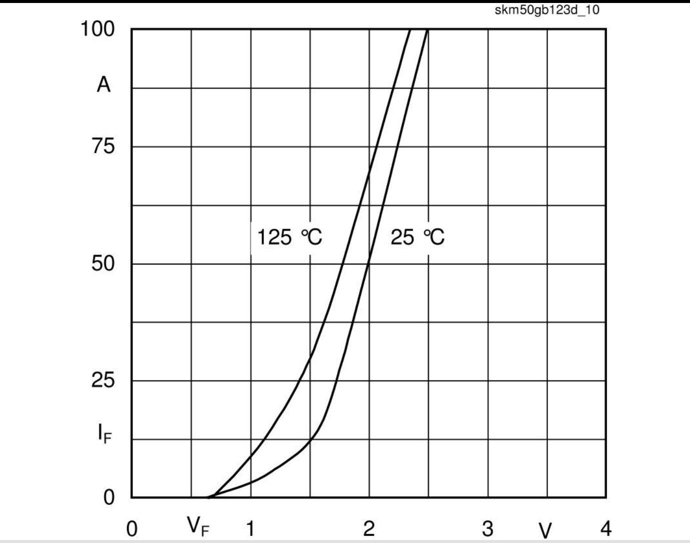

Fig. 10 CAL diode forward characteristic

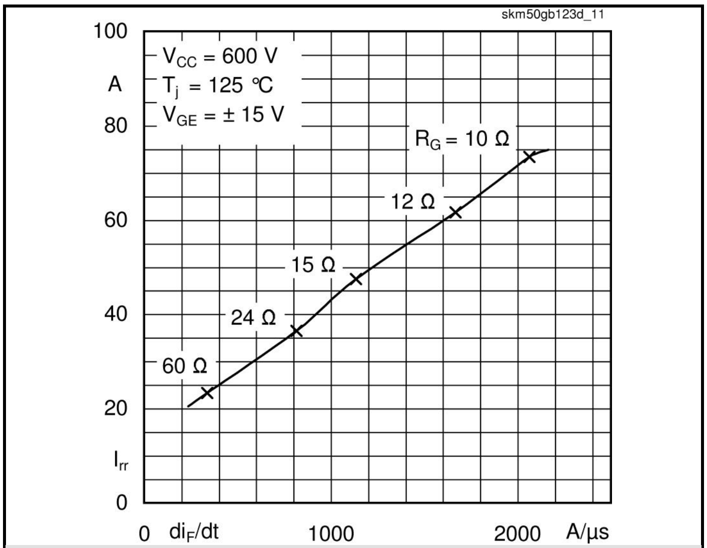

Fig. 11 Typ. CAL diode peak reverse recovery current

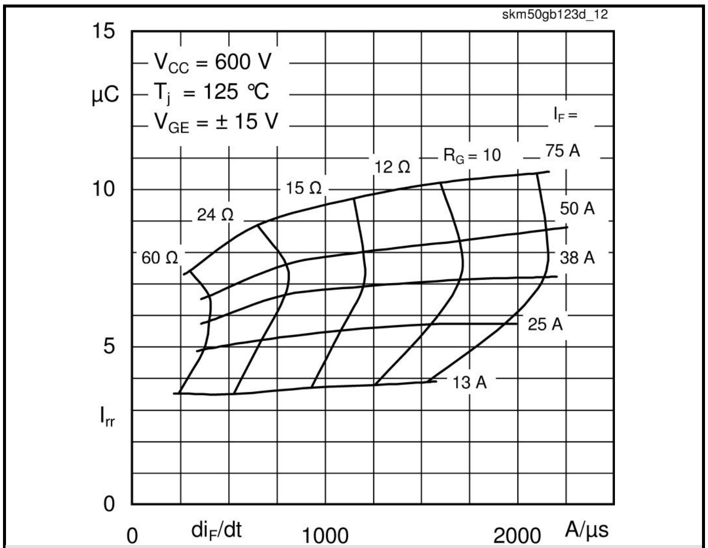

Fig. 12 Typ. CAL diode recovered charge

UL recognized

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