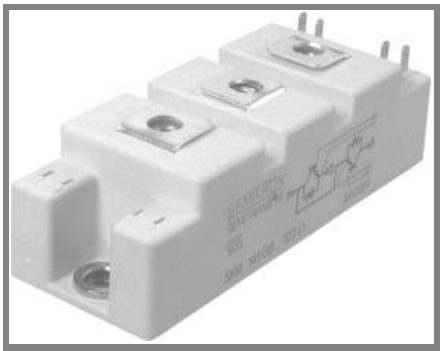
SKM 145GB123D



SEMITRANS® 2

IGBT Modules

SKM 145GB123D

SKM 145GAL123D

Features

- MOS input (voltage controlled)
- N channel, Homogeneous Si
- Low inductance case
- Very low tail current with low temperature dependence
- High short circuit capability, self limiting to 6 x I_{cnom}
- Latch-up free
- Fast & soft inverse CAL diodes
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Typical Applications

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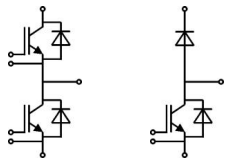
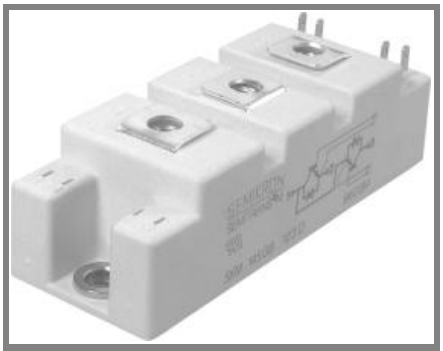


GB **GAL**

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	145	A
		T_{case} = 80 °C	110	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		200	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 600 V; $V_{GE} \leq$ 20 V; V_{CES} < 1200 V	T_j = 125 °C	10	µs
Inverse Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	130	A
		T_{case} = 80 °C	90	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		200	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	900	A
Freewheeling Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	170	A
		T_{case} = 80 °C	115	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		300	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	1440	A
Module				
$I_{t(RMS)}$			200	A
T_{vj}			- 40 ...+ 150	°C
T_{stg}			- 40 ...+ 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 = 4 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
V_{CE0}		T_j = 25 °C		1,4	1,6	V
		T_j = 125 °C		1,6	1,8	V
r_{CE}	V_{GE} = 15 V	T_j = 25°C		11	14	mΩ
		T_j = 125°C		15	19	mΩ
$V_{CE(sat)}$	I_{Cnom} = 100 A, V_{GE} = 15 V	T_j = °$C_{chiplev.}$		2,5	3	V
C_{ies}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		6,5	8,5	nF
C_{oes}				1	1,5	nF
C_{res}				0,5	0,6	nF
Q_G	V_{GE} = -8V - +20V			1000		nC
R_{Gint}	T_j = °C			5		Ω
$t_{d(on)}$	R_{Gon} = 6,8 Ω	V_{CC} = 600V		160	320	ns
t_r		I_{Cnom}= 100A		80	160	ns
E_{on}		T_j = 125 °C		16		mJ
$t_{d(off)}$	R_{Goff} = 6,8 Ω	V_{GE} = -15V		400	520	ns
t_f				70	100	ns
E_{off}				12		mJ
$R_{th(j-c)}$	per IGBT				0,15	K/W

SKM 145GB123D



SEMITRANS® 2

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SKM 145GB123D

SKM 145GAL123D

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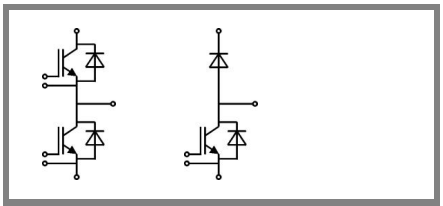

GB **GAL**

Characteristics

Symbol	Conditions		min.	typ.	max.	Units
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 100 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	1,4	V
		T_j = 125 °C				V
r_F		T_j = 25 °C		9	11	mΩ
		T_j = 125 °C				mΩ
I_{RRM}	I_{Fnom} = 100 A	T_j = 25 °C		35		A
Q_{rr}	di/dt = 1000 A/µs			5		µC
E_{rr}	V_{GE} = 0 V; V_{CC} = 600 V					mJ
$R_{th(j-c)D}$	per diode				0,36	K/W
Freewheeling Diode						
$V_F = V_{EC}$	I_{Fnom} = 150 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	1,4	V
		T_j = 125 °C				V
r_F		T_j = 25 °C		9	11	V
		T_j = 125 °C				V
I_{RRM}	I_{Fnom} = 150 A	T_j = 25 °C		55		A
Q_{rr}				8		µC
E_{rr}	V_{GE} = 0 V; V_{CC} = 600 V					mJ
$R_{th(j-c)FD}$	per diode				0,3	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.

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.

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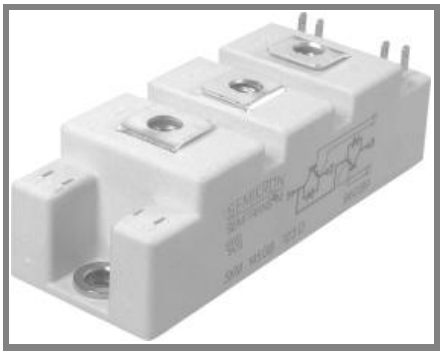

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SKM 145GB123D

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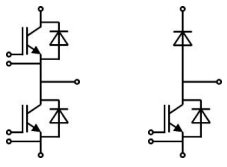


GB **GAL**

Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	i = 1	100	mk/W
R_i	i = 2	38	mk/W
R_i	i = 3	10	mk/W
R_i	i = 4	2	mk/W
tau_i	i = 1	0,03	s
tau_i	i = 2	0,0287	s
tau_i	i = 3	0,0012	s
tau_i	i = 4	0,0002	s
$Z_{th(j-c)D}$			
R_i	i = 1	240	mk/W
R_i	i = 2	95	mk/W
R_i	i = 3	22	mk/W
R_i	i = 4	3	mk/W
tau_i	i = 1	0,054	s
tau_i	i = 2	0,0113	s
tau_i	i = 3	0,0012	s
tau_i	i = 4	0,005	s

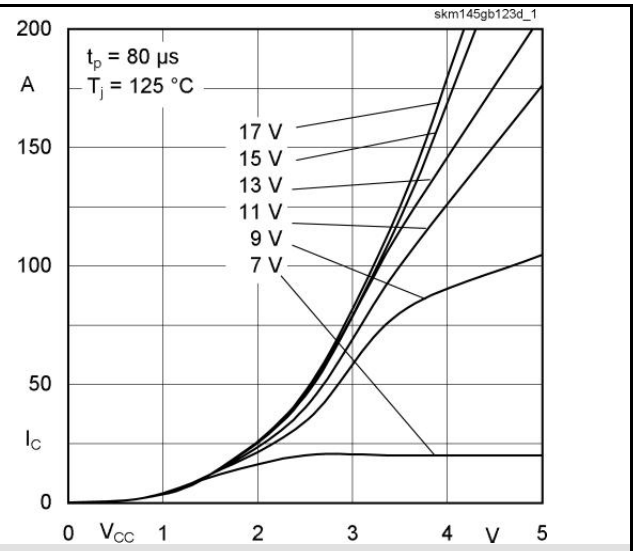


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

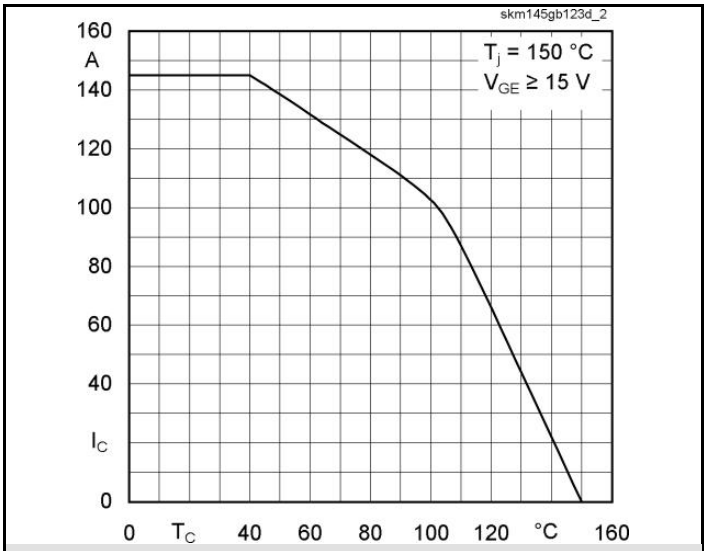


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

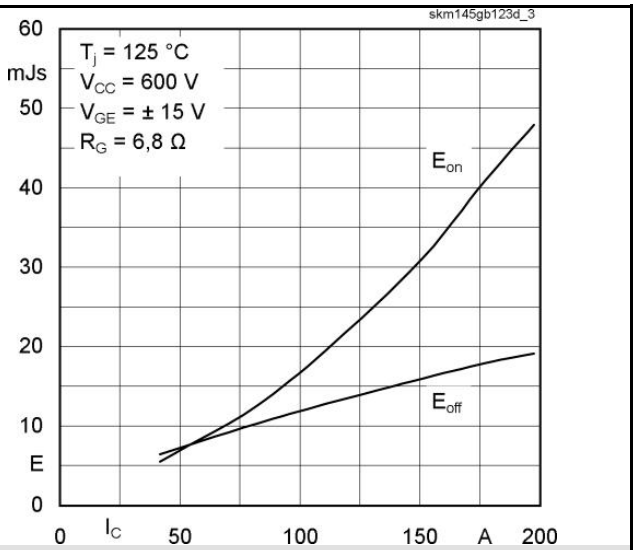


Fig. 3 Typ. turn-on /-off energy = f (I_C)

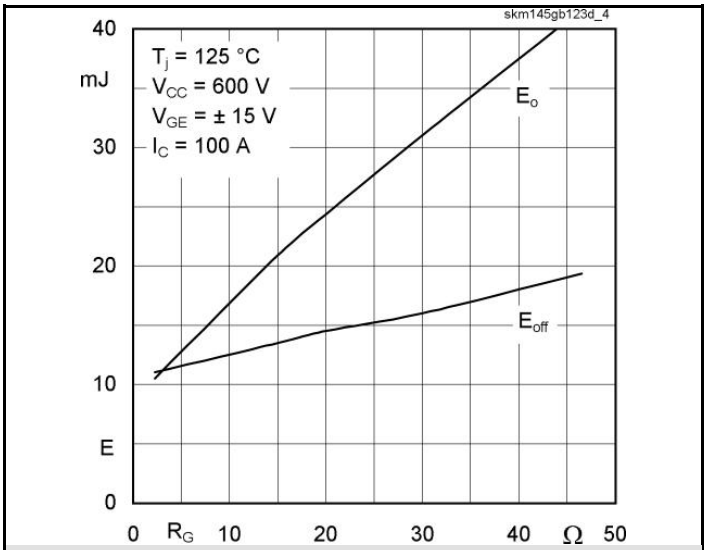


Fig. 4 Typ. turn-on /-off energy = f (R_G)

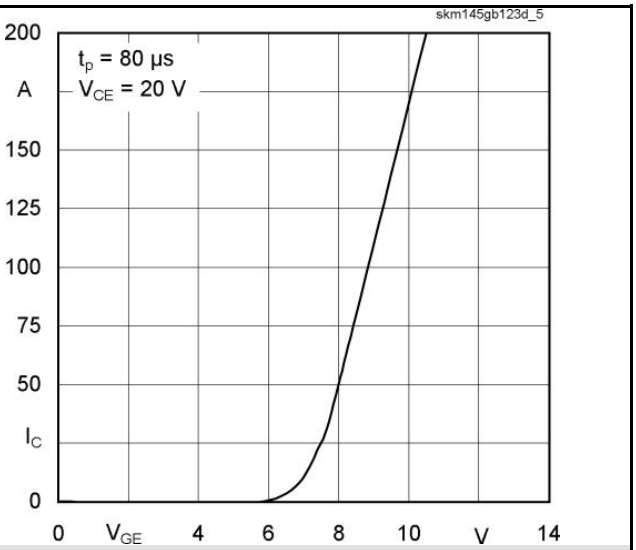


Fig. 5 Typ. transfer characteristic

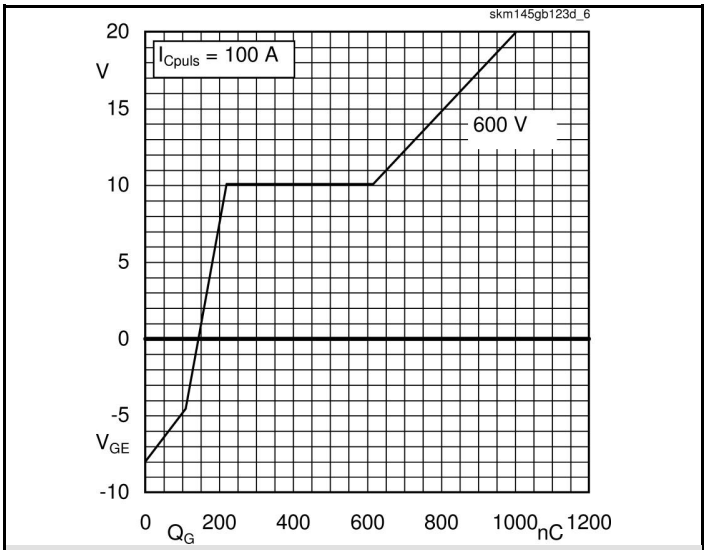


Fig. 6 Typ. gate charge characteristic

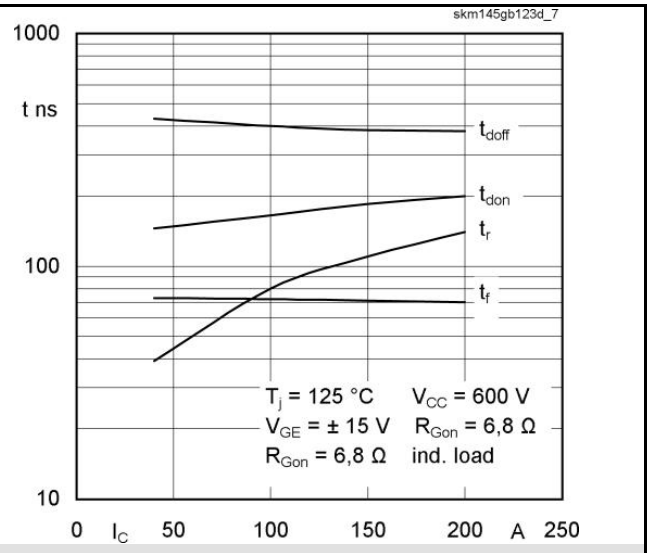


Fig. 7 Typ. switching times vs. I_C

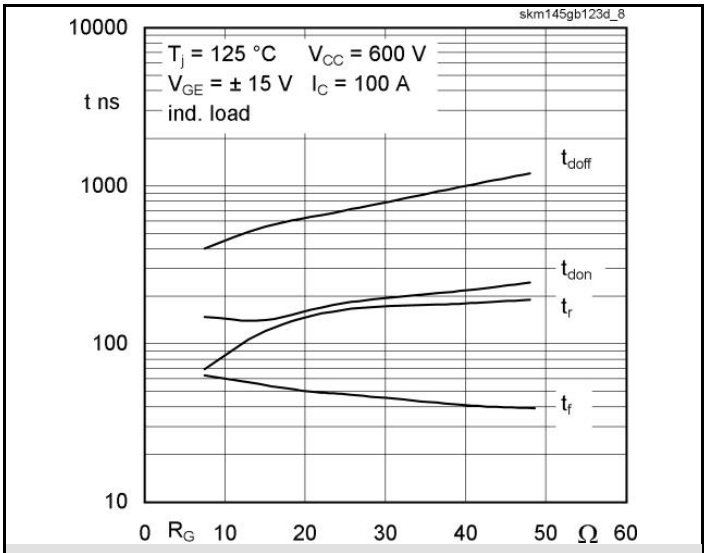


Fig. 8 Typ. switching times vs. gate resistor R_G

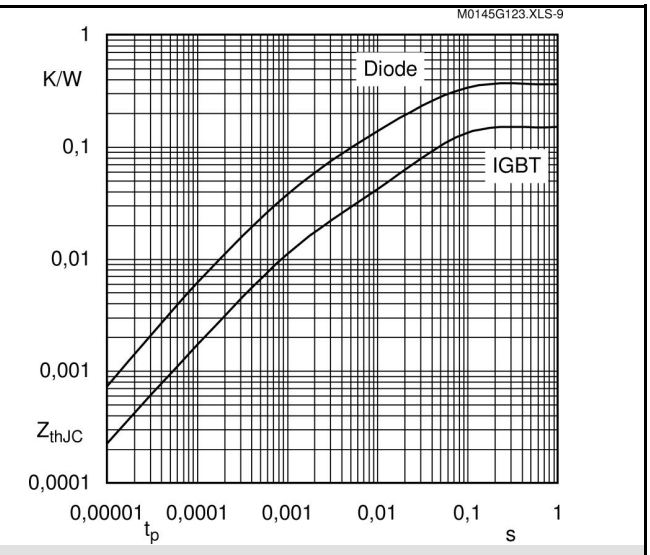


Fig. 9 Transient thermal impedance

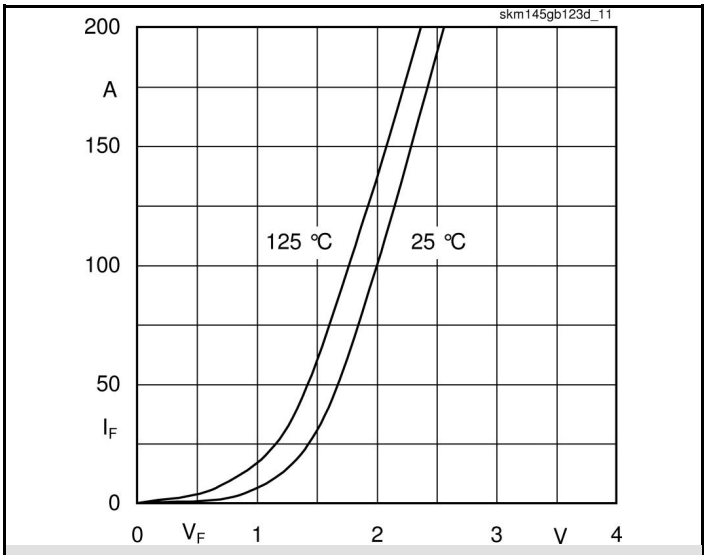


Fig. 10 CAL diode forward characteristic

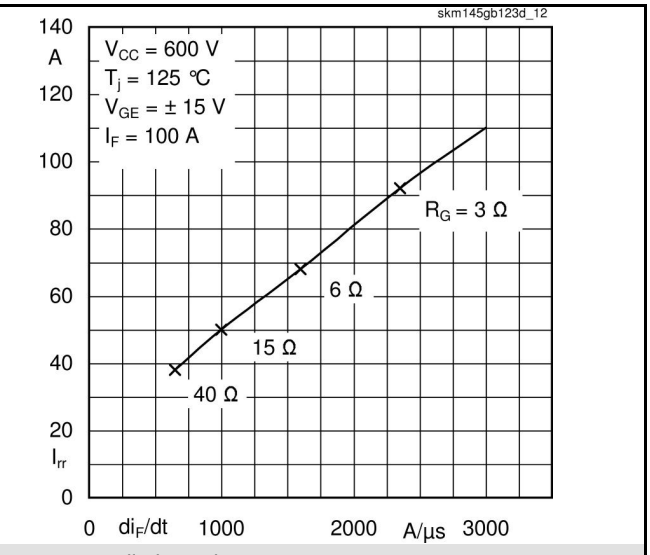


Fig. 11 Typ. CAL diode peak reverse recovery current

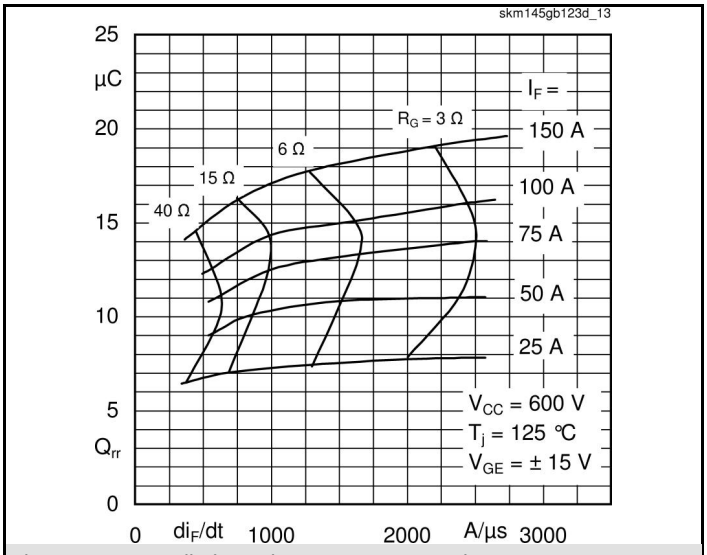
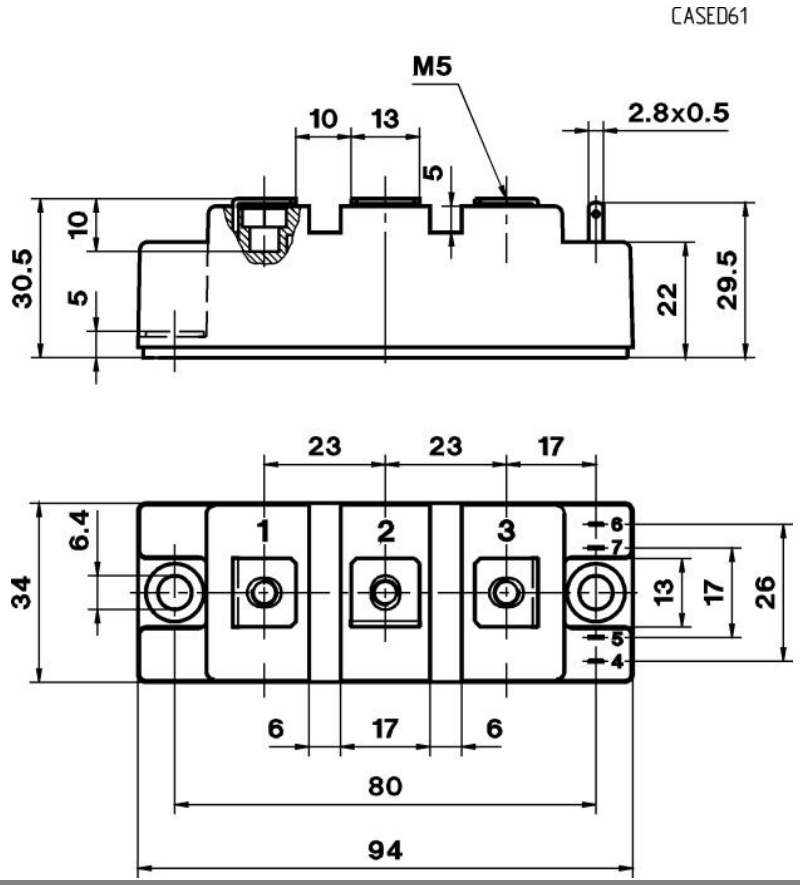


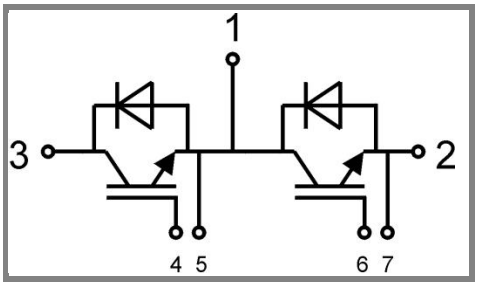
Fig. 12 Typ. CAL diode peak reverse recovery charge

SKM 145GB123D

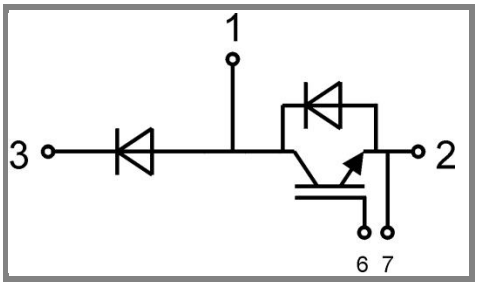
UL Recognized File no. E 63 532



Case D 61



GB Case D 61



GAL Case D 62 (➞ D 61)

