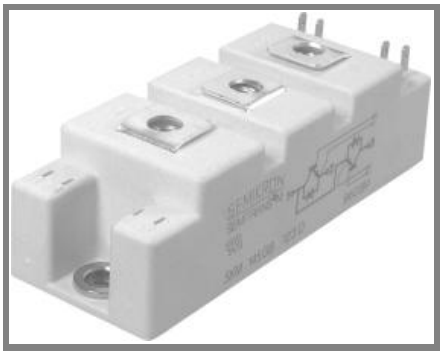
SKM 145GB128D ...



SEMITRANS® 2

SPT IGBT Module

SKM 145GB128D

SKM 145GAL128D

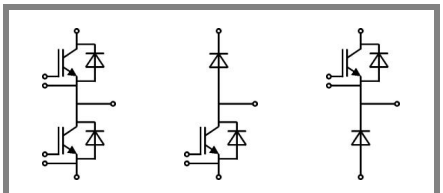
SKM 145GAR128D

Features

- SPT = Soft-Punch-Through technology
- V_{CEsat} with positive temperature coefficient
- High short circuit capability, self limiting to 6 x I_c

Typical Applications

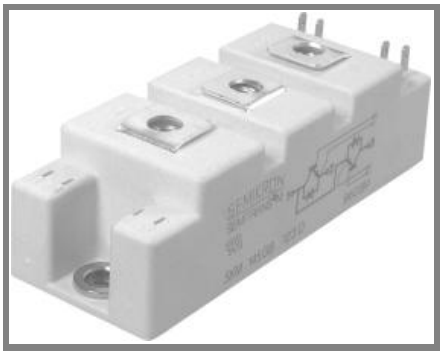
- AC inverter drives
- UPS
- Electronic welders at f_{sw} up to 20kHz



GB GAL GAR

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	190	A
		T_{case} = 80 °C	135	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	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
Module				
$I_{t(RMS)}$			200	A
T_{vj}			- 40...+ 150	°C
T_{stg}			- 40...+ 125	°C
V_{isol}	AC, 1 min.		4000	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	1,15	V
		T_j = 125 °C		0,9	1,05	V
r_{CE}	V_{GE} = 15 V	T_j = 25°C		9	12	mΩ
		T_j = 125°C		12	15	mΩ
$V_{CE(sat)}$	I_{Cnom} = 100 A, V_{GE} = 15 V	T_j = 25°C$_{chiplev.}$		1,9	2,35	V
		T_j = 125°C$_{chiplev.}$		2,1	2,55	V
C_{ies}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		9		nF
C_{oes}				1		nF
C_{res}				1		nF
Q_G	V_{GE} = -8V - +20V			1200		nC
R_{Gint}	T_j = °C			4		Ω
$t_{d(on)}$	R_{Gon} = 3 Ω	V_{CC} = 600V		210		ns
t_r		I_{Cnom}= 100A		40		ns
E_{on}		T_j = 125 °C		12		mJ
$t_{d(off)}$	R_{Goff} = 3 Ω	V_{GE} =±15V		430		ns
t_f				65		ns
E_{off}				10		mJ
$R_{th(j-c)}$	per IGBT				0,165	K/W



SEMITRANS® 2

SPT IGBT Module

SKM 145GB128D

SKM 145GAL128D

SKM 145GAR128D

Features

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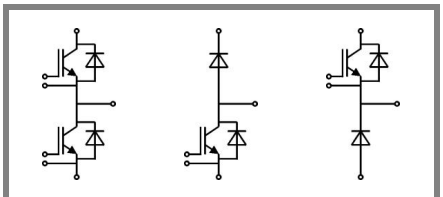


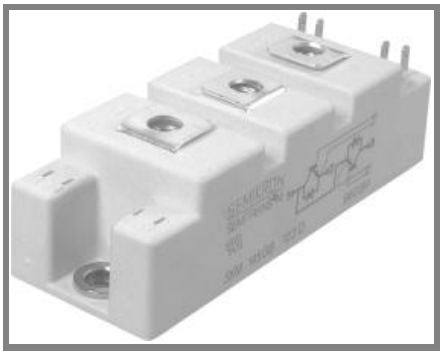
GB **GAL** **GAR**

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	1,2	V
		T_j = 125 °C				V
r_F		T_j = 25 °C		9	13	mΩ
		T_j = 125 °C				mΩ
I_{RRM}	I_{Fnom} = 100 A	T_j = 125 °C		120		A
Q_{rr}	di/dt = 3500 A/µs			18,5		µC
E_{rr}	V_{GE} = -15 V; V_{CC} = 600 V			7		mJ
$R_{th(j-c)D}$	per diode				0,36	K/W
Freewheeling 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	1,2	V
r_F		T_j = 25 °C		9	13	V
I_{RRM}	I_{Fnom} = 100 A	T_j = 125 °C		120		A
Q_{rr}	di/dt = 0 A/µs			18,5		µC
E_{rr}	V_{GE} = -15 V; V_{CC} = 600 V			7		mJ
$R_{th(j-c)FD}$	per diode				0,36	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.



SEMITRANS® 2

SPT IGBT Module

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SKM 145GAL128D

SKM 145GAR128D

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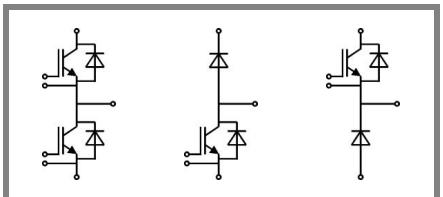


GB **GAL** **GAR**

Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	i = 1	120	mk/W
R_i	i = 2	34	mk/W
R_i	i = 3	9	mk/W
R_i	i = 4	2	mk/W
tau_i	i = 1	0,03	s
tau_i	i = 2	0,1123	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	21,5	mk/W
R_i	i = 4	3,5	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

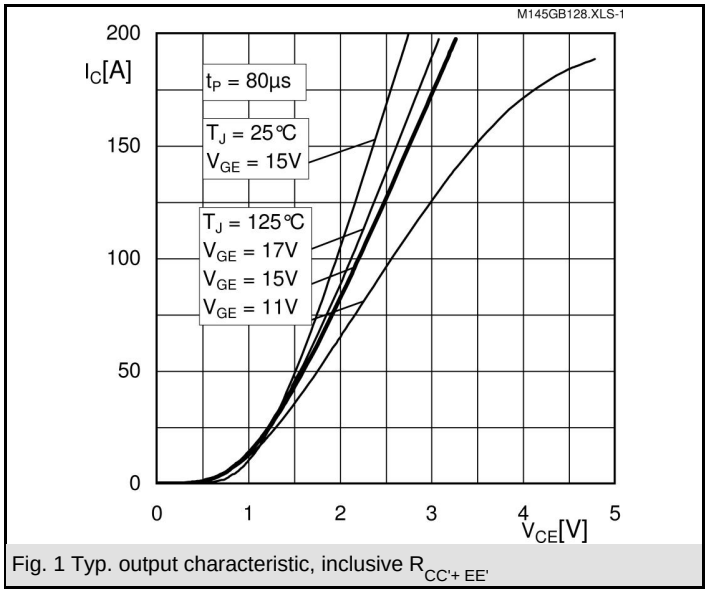


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+ EE'}$

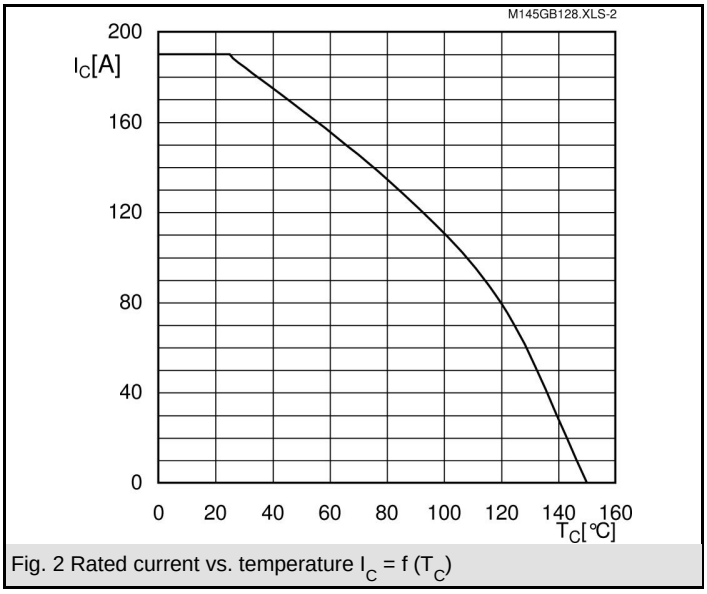


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

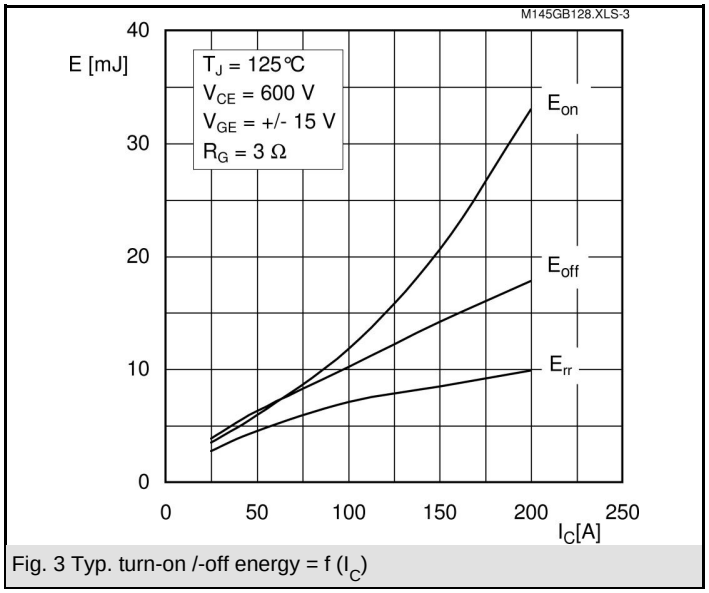


Fig. 3 Typ. turn-on /-off energy = f (I_C)

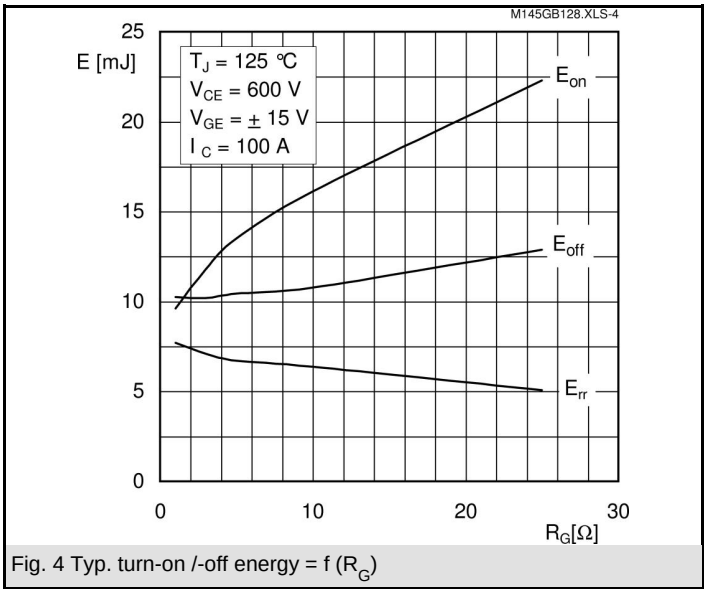


Fig. 4 Typ. turn-on /-off energy = f (R_G)

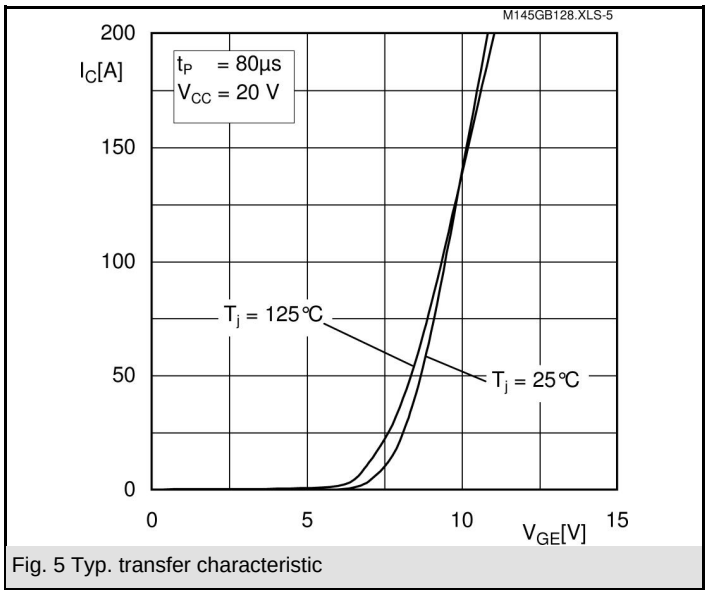


Fig. 5 Typ. transfer characteristic

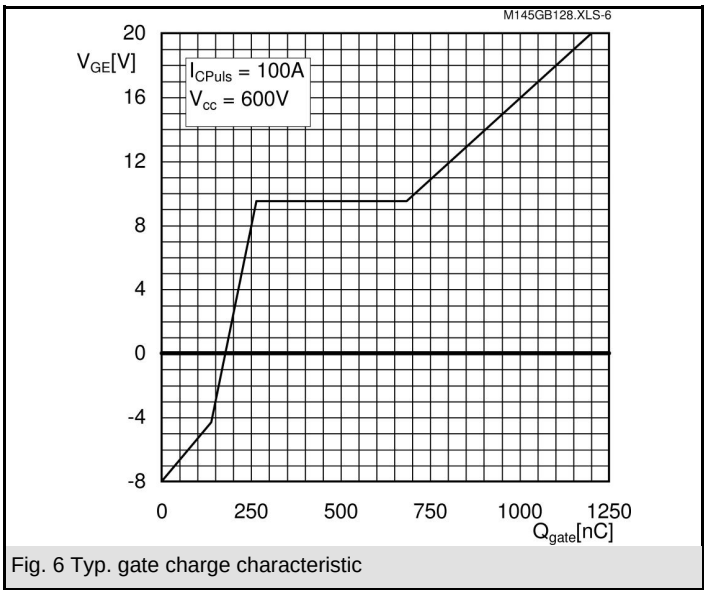


Fig. 6 Typ. gate charge characteristic

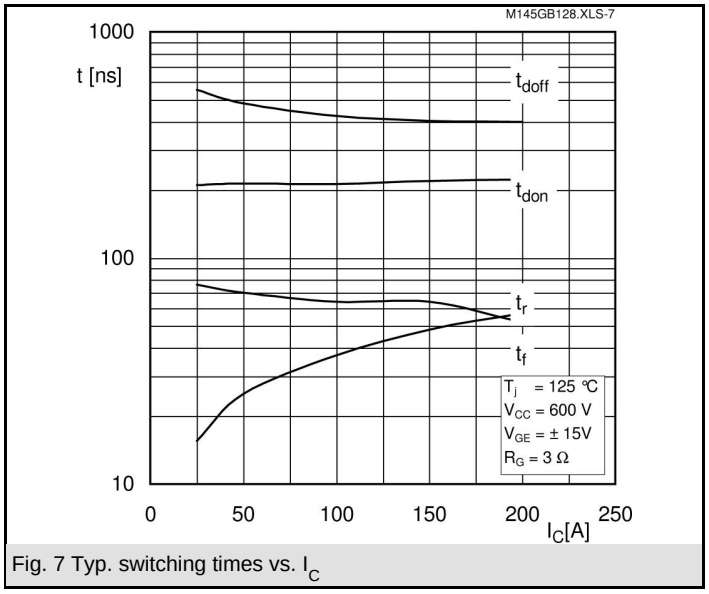


Fig. 7 Typ. switching times vs. I_C

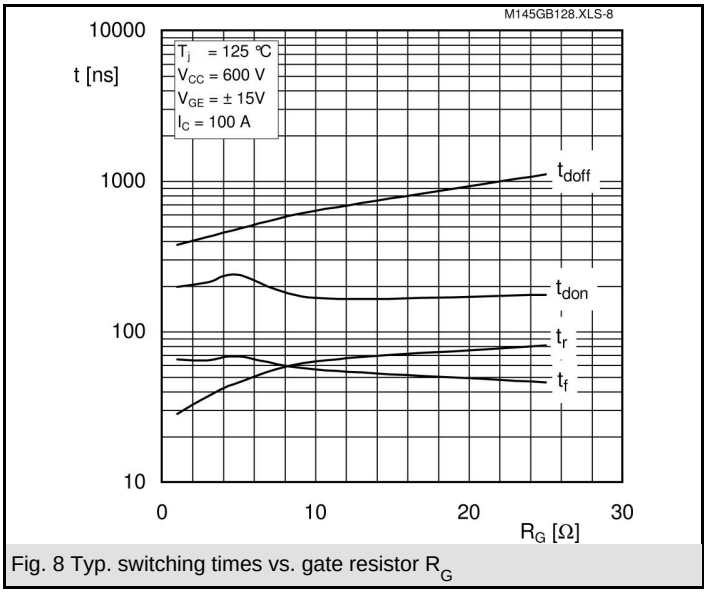


Fig. 8 Typ. switching times vs. gate resistor R_G

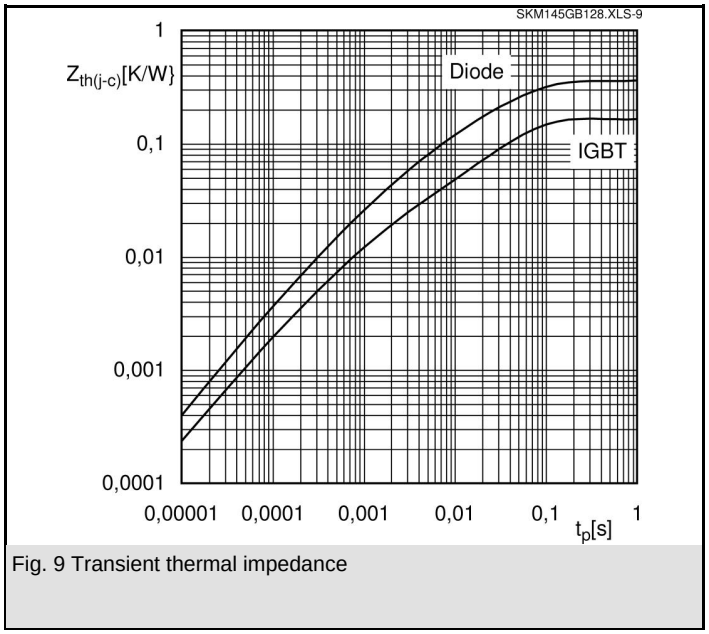


Fig. 9 Transient thermal impedance

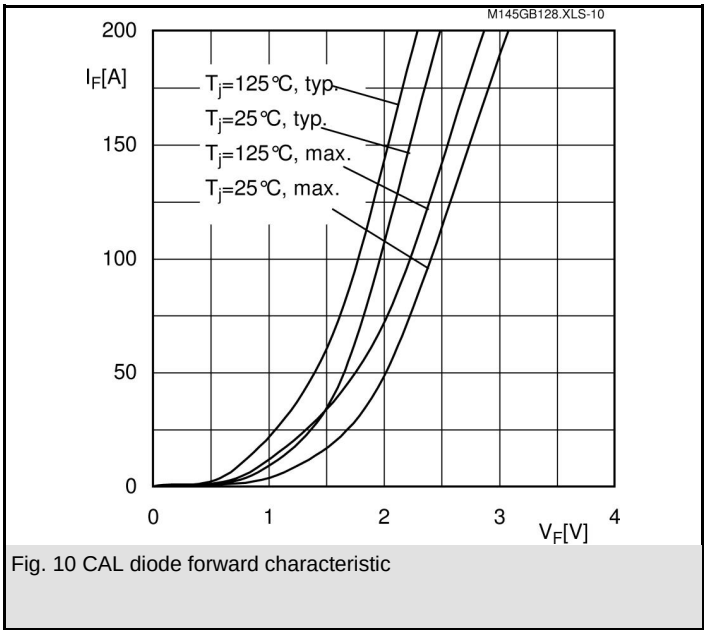


Fig. 10 CAL diode forward characteristic

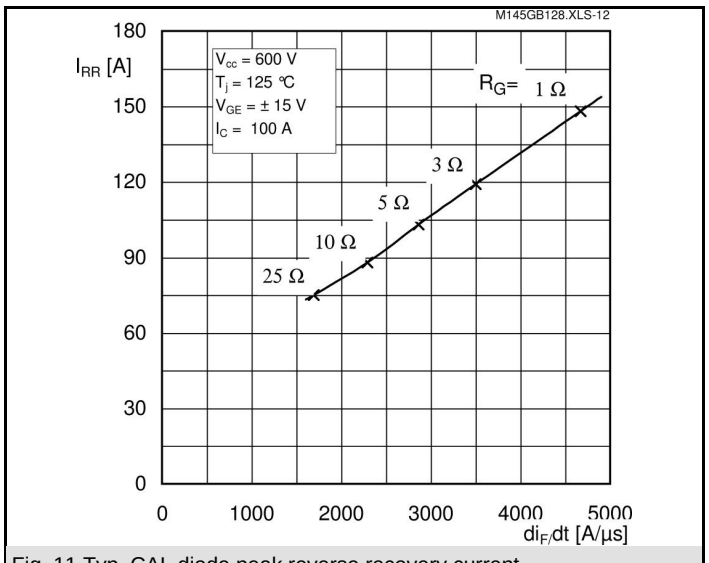


Fig. 11 Typ. CAL diode peak reverse recovery current

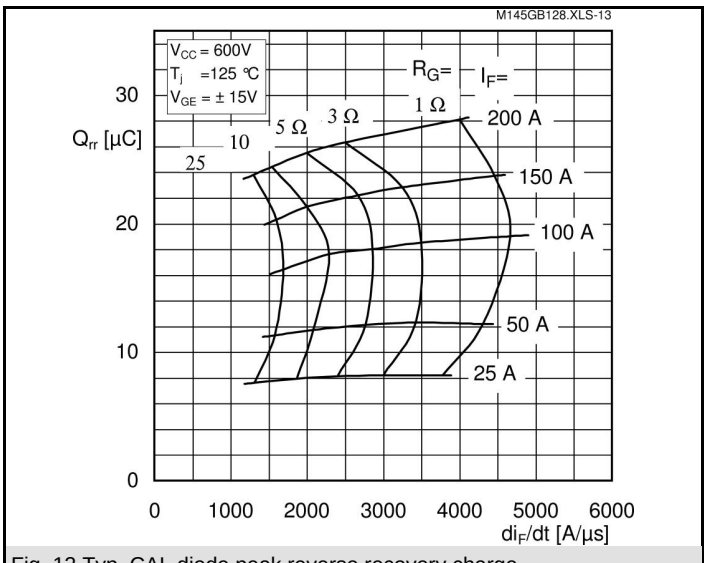
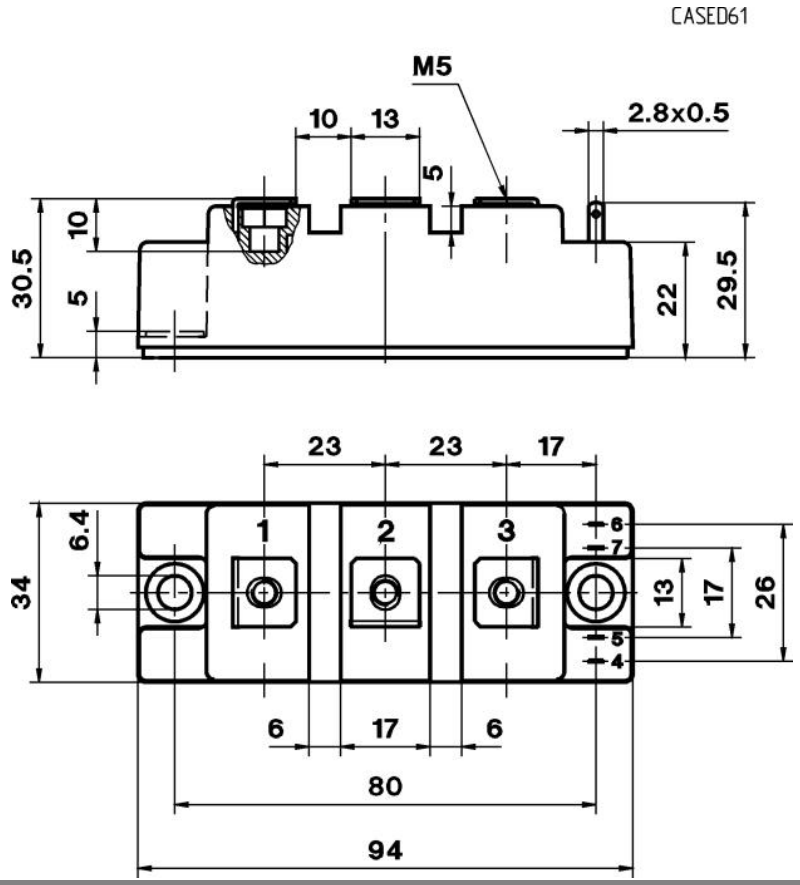
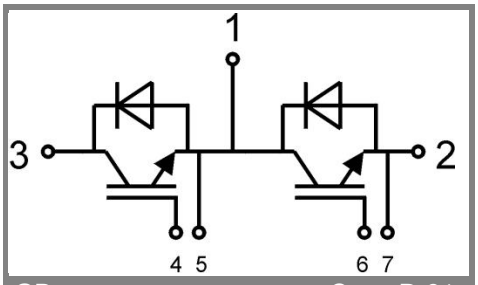


Fig. 12 Typ. CAL diode peak reverse recovery charge

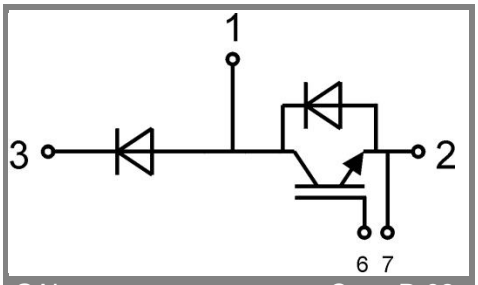
UL Regonized File no. E 63 532



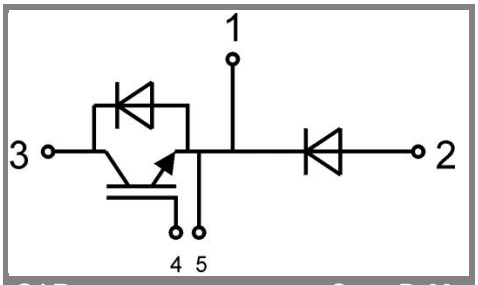
Case D 61, Case D 62, Case D 63



GB Case D 61



GAL Case D 62



GAR Case D 63

