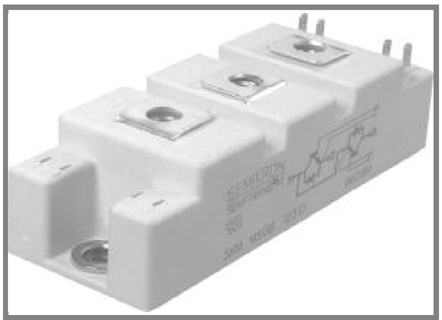


SEMITRANS® 2

SPT IGBT Module

SKM 75GB128D

Features

- SPT = Soft-Punch-Through technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability, self limiting to 6 x I_C

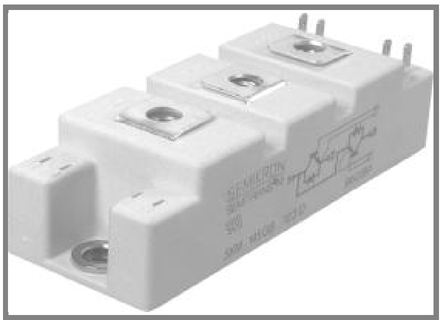
Typical Applications

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

GB

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_c = 25 °C	100	A
		T_c = 80 °C	70	A
I_{CRM}	I_{CRM}=2xI_{Cnom}, t_p = 1 ms		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	75	A
		T_{case} = 80 °C	50	A
I_{FRM}	I_{FRM} = 2xI_{Fnom}, t_p = 1 ms		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}	$T_{OPERATION}$≤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 = 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
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		18	24	mΩ
		T_j = 125°C		24	30	mΩ
$V_{CE(sat)}$	I_{Cnom} = 50 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		4,5		nF
C_{oes}				0,6		nF
C_{res}				0,55		nF
Q_G	V_{GE} = -8V - +20V			600		nC
R_{Gint}	T_j = 25 °C			5		Ω
$t_{d(on)}$	R_{Gon} = 6 Ω	V_{CC} = 600V I_{Cnom}= 50A T_j = 125 °C V_{GE} = ±15V		160		ns
t_r				35		ns
E_{on}				6		mJ
$t_{d(off)}$	R_{Goff} = 6 Ω			310		ns
t_f				65		ns
E_{off}				8		mJ
$R_{th(j-c)}$	per IGBT				0,3	K/W



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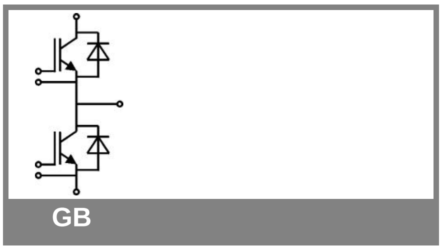
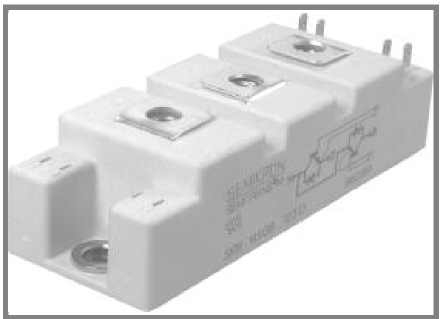


GB

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
r_F		T_j = 25 °C		18	26	mΩ
I_{RRM}	I_{Fnom} = 50 A	T_j = 125 °C		55		A
Q_{rr}	di/dt = 2100 A/µs			7,3		µC
E_{off}	V_{GE} = -15 V; V_{CC} = 600 V			2,6		mJ
$R_{th(j-c)D}$	per diode				0,6	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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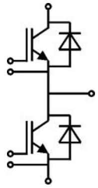

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Z_{th}

Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	i = 1	210	mk/W
R_i	i = 2	70	mk/W
R_i	i = 3	17	mk/W
R_i	i = 4	3	mk/W
tau_i	i = 1	0,0382	s
tau_i	i = 2	0,0242	s
tau_i	i = 3	0,0013	s
tau_i	i = 4	0,0002	s
$Z_{th(j-c)D}$			
R_i	i = 1	400	mk/W
R_i	i = 2	160	mk/W
R_i	i = 3	35,5	mk/W
R_i	i = 4	4,5	mk/W
tau_i	i = 1	0,0831	s
tau_i	i = 2	0,0063	s
tau_i	i = 3	0,0022	s
tau_i	i = 4	0,08	s

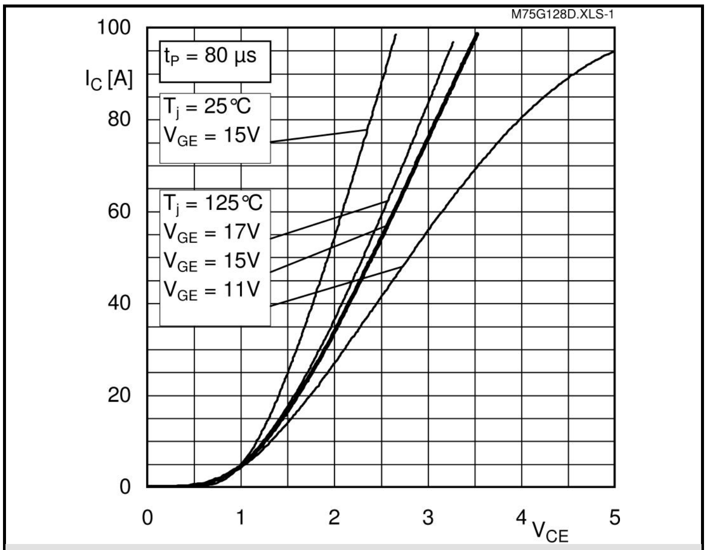


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

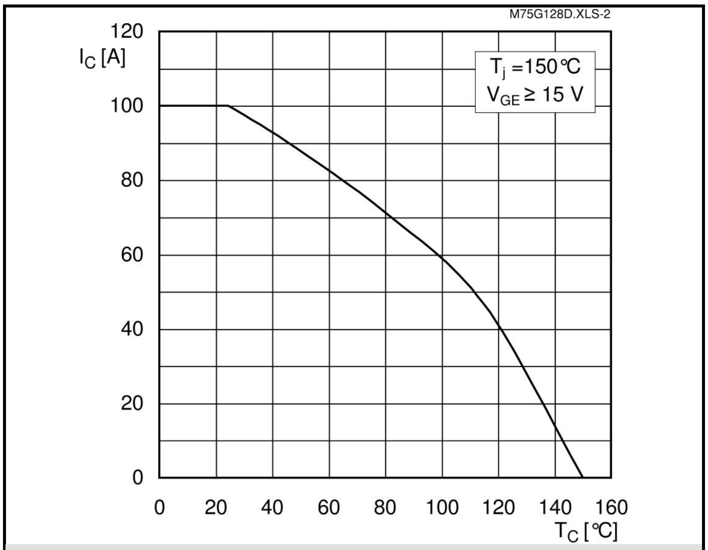


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

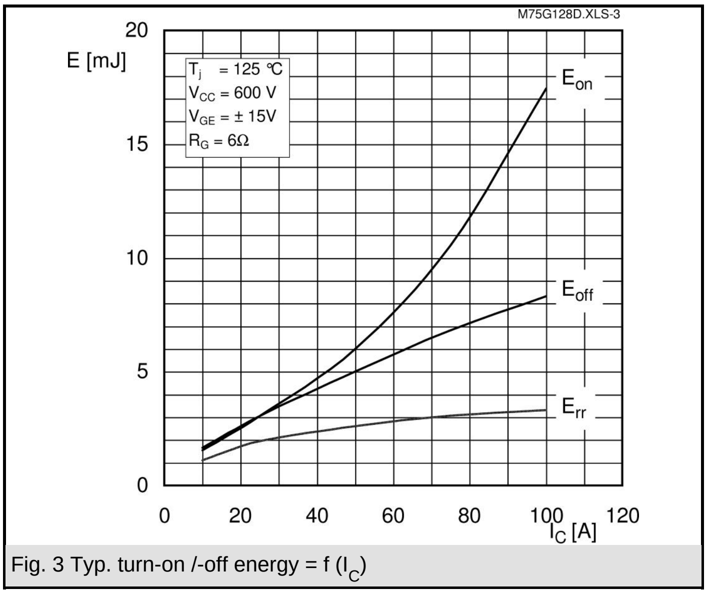


Fig. 3 Typ. turn-on /-off energy = f (I_C)

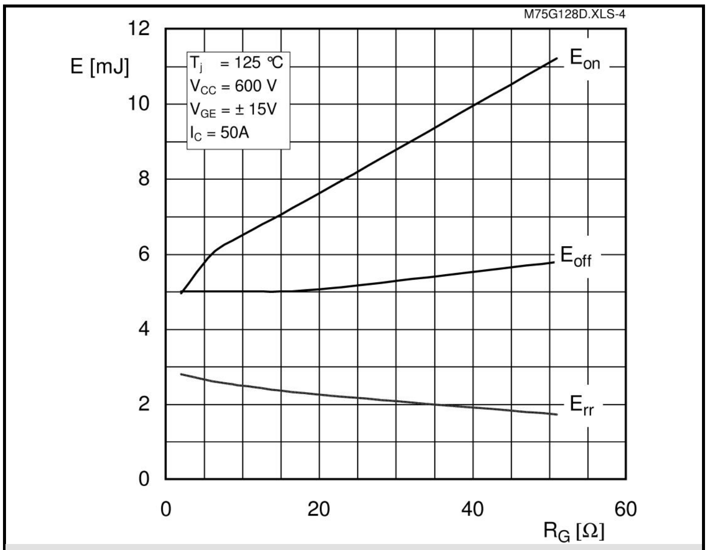


Fig. 4 Typ. turn-on /-off energy = f (R_G)

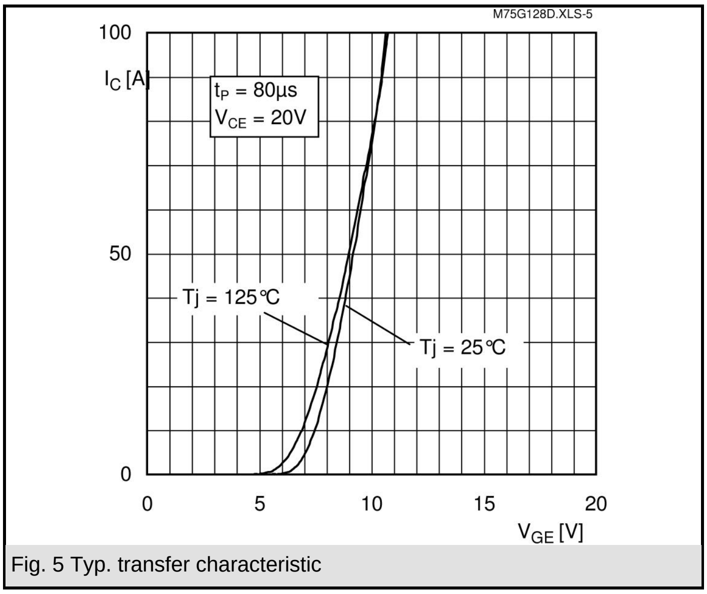


Fig. 5 Typ. transfer characteristic

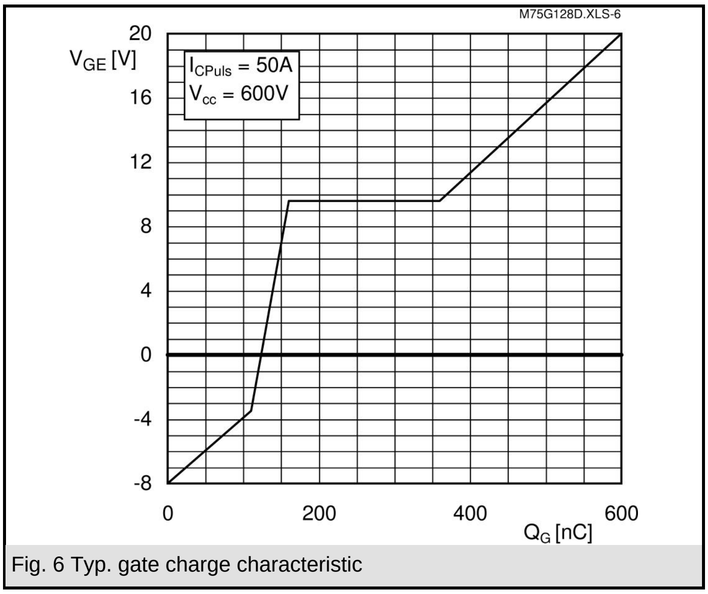


Fig. 6 Typ. gate charge characteristic

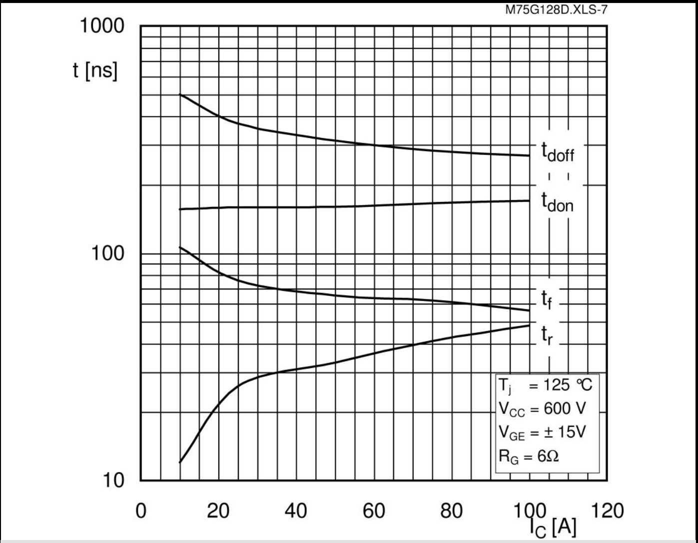


Fig. 7 Typ. switching times vs. I_C

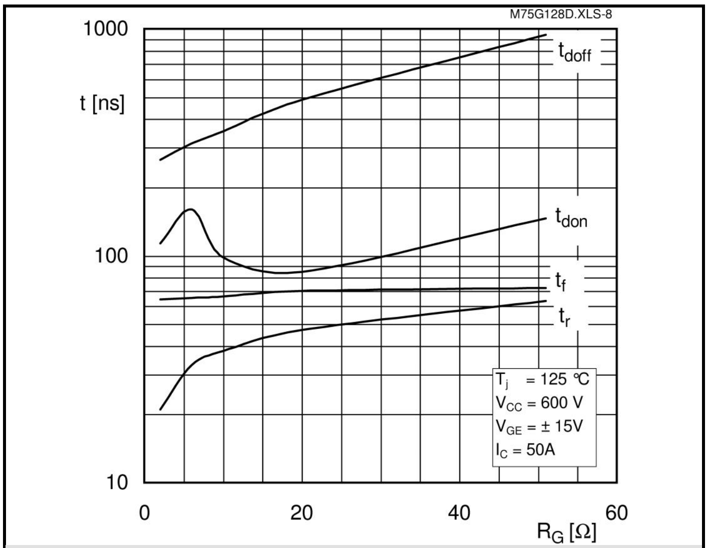


Fig. 8 Typ. switching times vs. gate resistor R_G

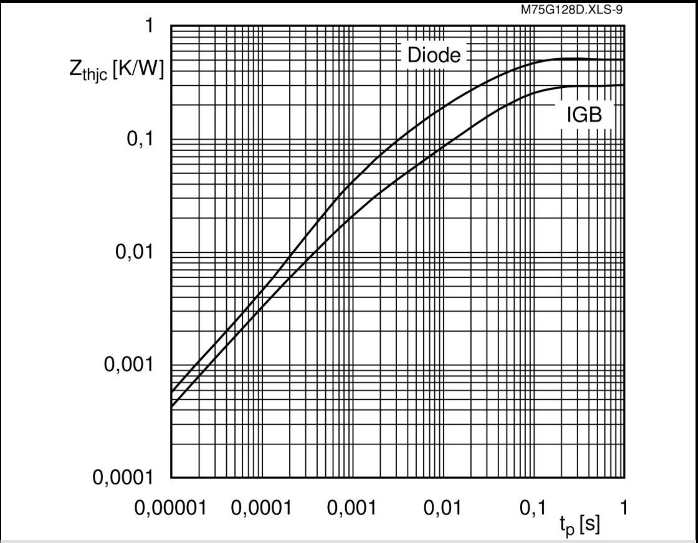


Fig. 9 Transient thermal impedance

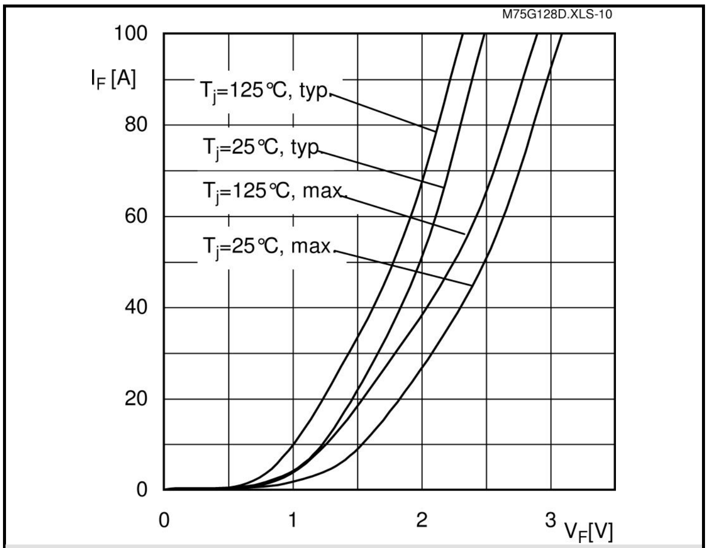


Fig. 10 CAL diode forward characteristic

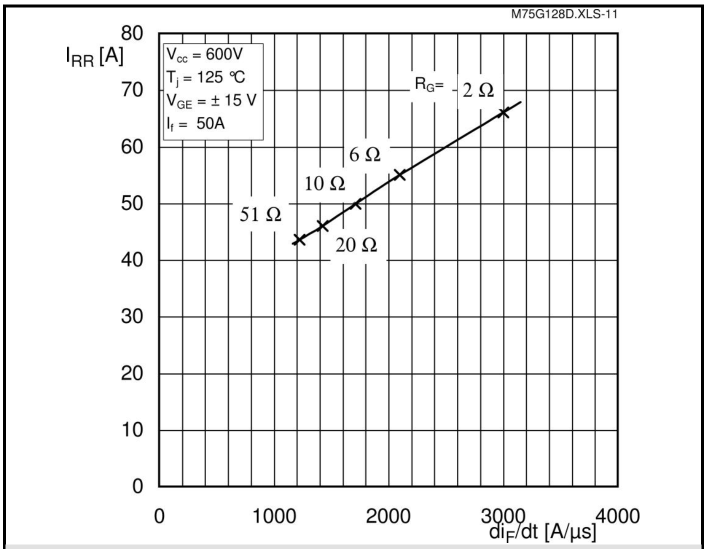


Fig. 11 Typ. CAL diode peak reverse recovery current

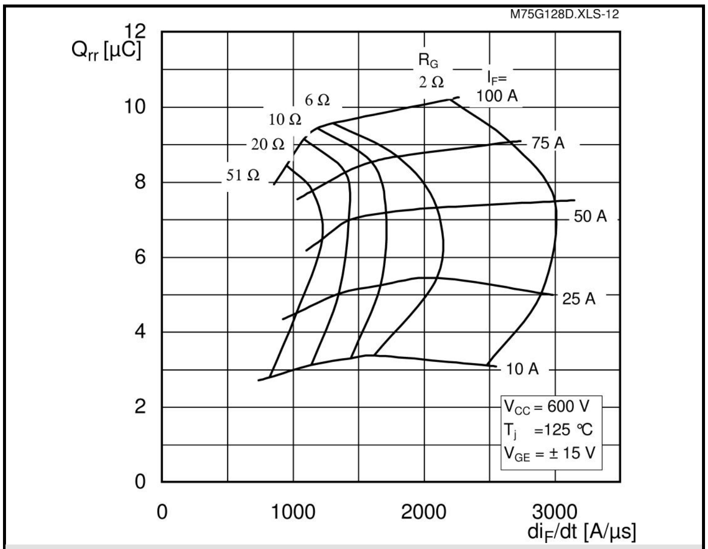
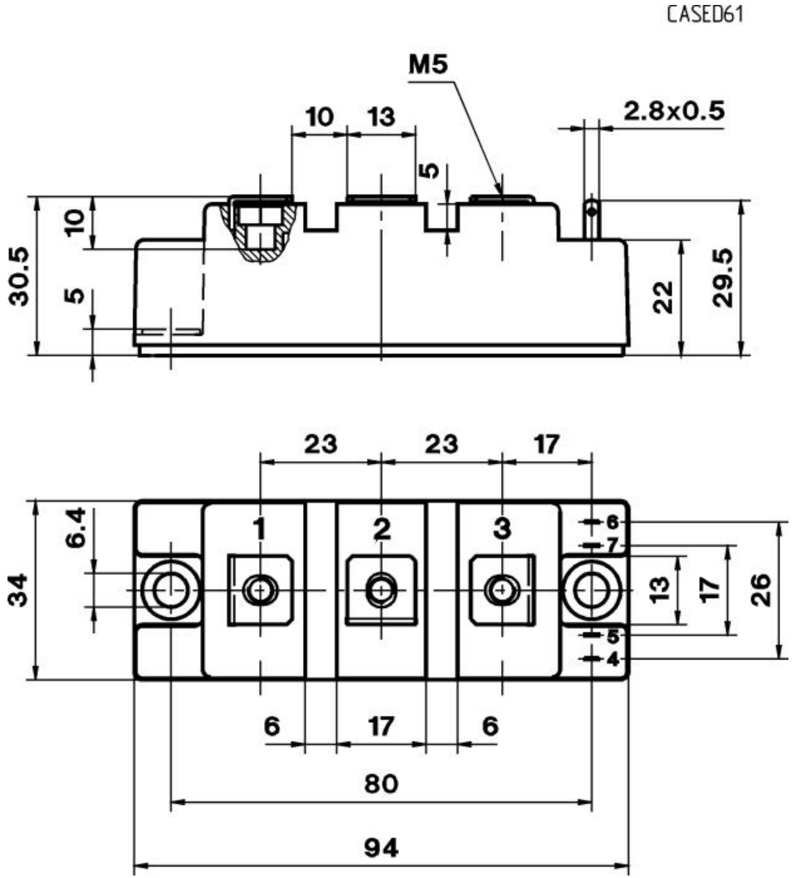


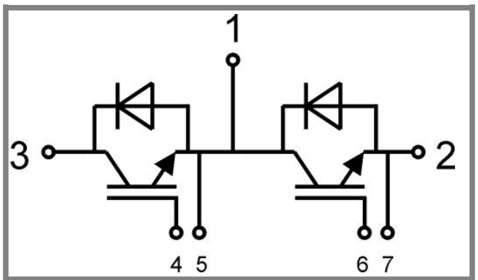
Fig. 12 Typ. CAL diode peak reverse recovery charge

UL Recognized
File no. E 63 532

Dimensions in mm



Case D 61



GB Case D 61