

SEMITRANS® 2

SPT IGBT Module

SKM 145GB128D

SKM 145GAL128D

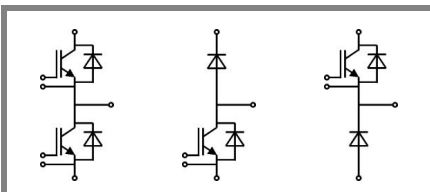
SKM 145GAR128D

Features

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

Typical Applications

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



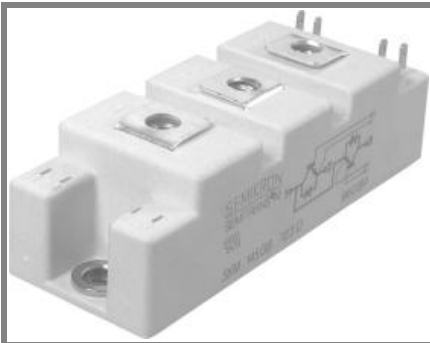
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Absolute Maximum Ratings		$T_C = 25^\circ\text{C}$, unless otherwise specified		
Symbol	Conditions	Values		Units
IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$	1200		V
I_C	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	190	A
		$T_{case} = 80^\circ\text{C}$	135	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	200		A
V_{GES}		± 20		V
t_{psc}	$V_{CC} = 600\text{V}; V_{GE} \leq 20\text{V}; T_j = 125^\circ\text{C}$ $V_{CES} < 1200\text{V}$	10		μs
Inverse Diode				
I_F	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	130	A
		$T_{case} = 80^\circ\text{C}$	90	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	200		A
I_{FSM}	$t_p = 10\text{ms}; \text{sin.}$	$T_j = 150^\circ\text{C}$	900	A
Freewheeling Diode				
I_F	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	130	A
		$T_{case} = 80^\circ\text{C}$	90	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	200		A
I_{FSM}	$t_p = 10\text{ms}; \text{sin.}$	$T_j = 150^\circ\text{C}$	900	A
Module				
$I_{t(RMS)}$		200		A
T_{vj}		- 40...+ 150		$^\circ\text{C}$
T_{stg}		- 40...+ 125		$^\circ\text{C}$
V_{isol}	AC, 1 min.	4000		V

Characteristics		$T_C = 25^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 4\text{mA}$	4,5	5,5	6,5	V
I_{CES}	$V_{GE} = 0\text{V}, V_{CE} = V_{CES}$		0,1	0,3	mA
V_{CE0}		$T_j = 25^\circ\text{C}$	1	1,15	V
		$T_j = 125^\circ\text{C}$	0,9	1,05	V
r_{CE}	$V_{GE} = 15\text{V}$	$T_j = 25^\circ\text{C}$	9	12	m Ω
		$T_j = 125^\circ\text{C}$	12	15	m Ω
$V_{CE(sat)}$	$I_{Cnom} = 100\text{A}, V_{GE} = 15\text{V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	1,9	2,35	V
		$T_j = 125^\circ\text{C}_{chiplev.}$	2,1	2,55	V
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{V}$	$f = 1\text{MHz}$	9		nF
C_{oes}			1		nF
C_{res}			1		nF
Q_G	$V_{GE} = -8\text{V} - +20\text{V}$	1200		nC	
R_{Gint}	$T_j = ^\circ\text{C}$	4		Ω	
$t_{d(on)}$	$R_{Gon} = 3\Omega$	$V_{CC} = 600\text{V}$ $I_{Cnom} = 100\text{A}$	210		ns
t_r			40		ns
E_{on}	$R_{Goff} = 3\Omega$	$T_j = 125^\circ\text{C}$ $V_{GE} = \pm 15\text{V}$	12		mJ
$t_{d(off)}$			430		ns
t_f			65		ns
E_{off}			10		mJ
$R_{th(j-c)}$	per IGBT			0,165	K/W



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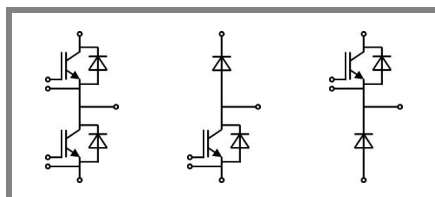
Typical Applications

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

Characteristics		min.	typ.	max.	Units
Symbol	Conditions				
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 100 \text{ A}; V_{GE} = 0 \text{ V}$		2	2,5	V
			1,8		V
V_{F0}			1,1	1,2	V
					V
r_F			9	13	mΩ
					mΩ
I_{RRM}	$I_{Fnom} = 100 \text{ A}$		120		A
Q_{rr}	$di/dt = 3500 \text{ A}/\mu\text{s}$		18,5		μC
E_{rr}	$V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$		7		mJ
$R_{th(j-c)D}$	per diode			0,36	K/W
Freewheeling Diode					
$V_F = V_{EC}$	$I_{Fnom} = 100 \text{ A}; V_{GE} = 0 \text{ V}$		2	2,5	V
			1,8		V
V_{F0}			1,1	1,2	V
r_F			9	13	V
I_{RRM}	$I_{Fnom} = 100 \text{ A}$		120		A
Q_{rr}	$di/dt = 0 \text{ A}/\mu\text{s}$		18,5		μC
E_{rr}	$V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$		7		mJ
$R_{th(j-c)FD}$	per diode			0,36	K/W
Module					
L_{CE}				30	nH
$R_{CC+EE'}$	res., terminal-chip	$T_{case} = 25 \text{ °C}$	0,75		mΩ
		$T_{case} = 125 \text{ °C}$	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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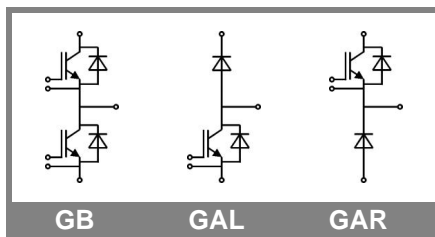
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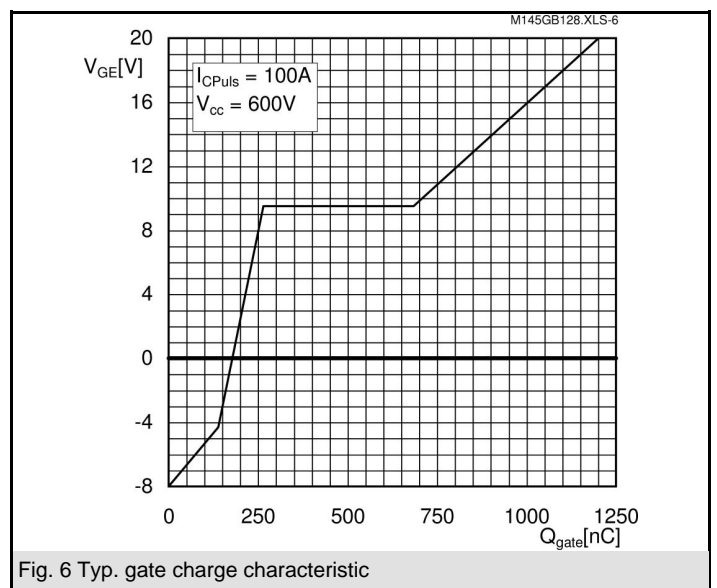
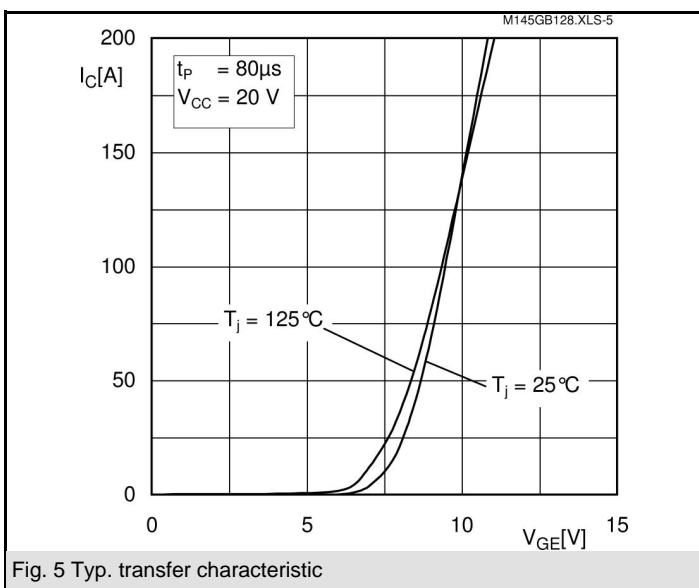
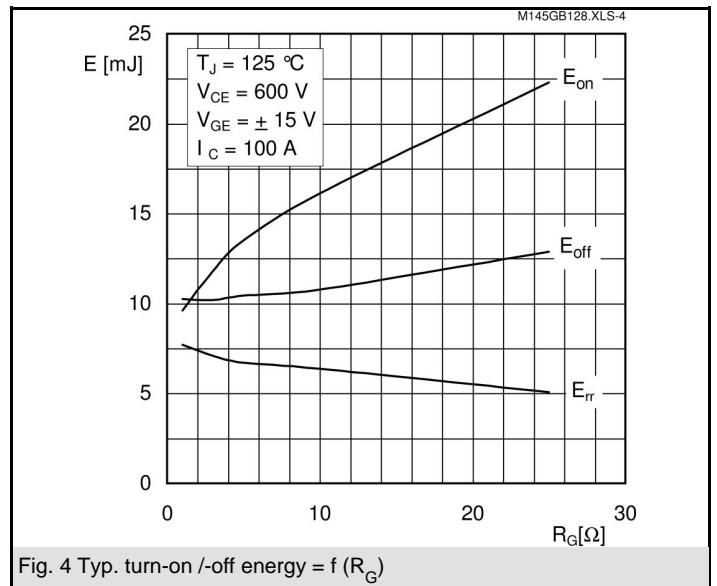
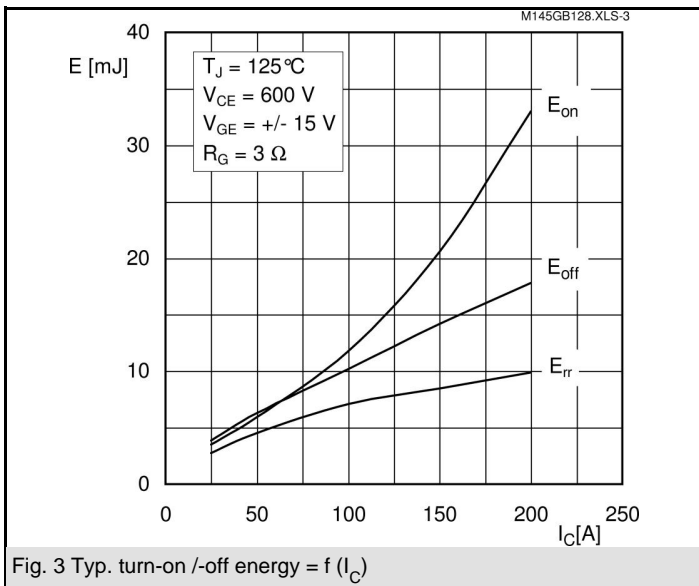
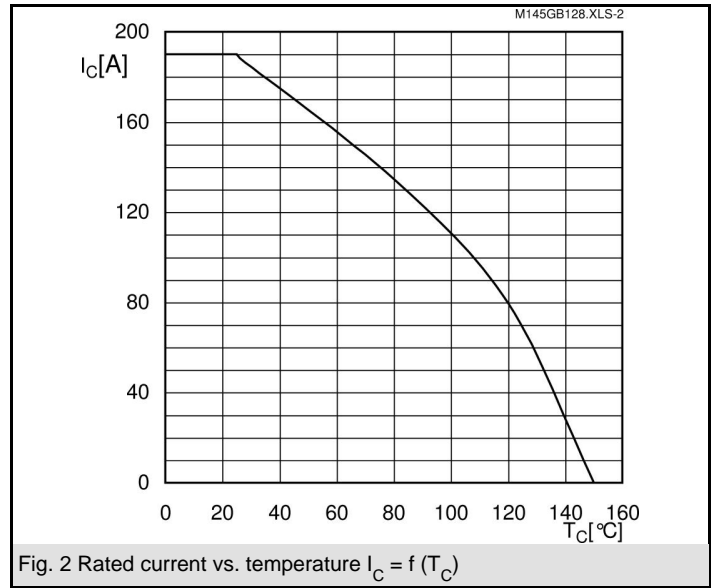
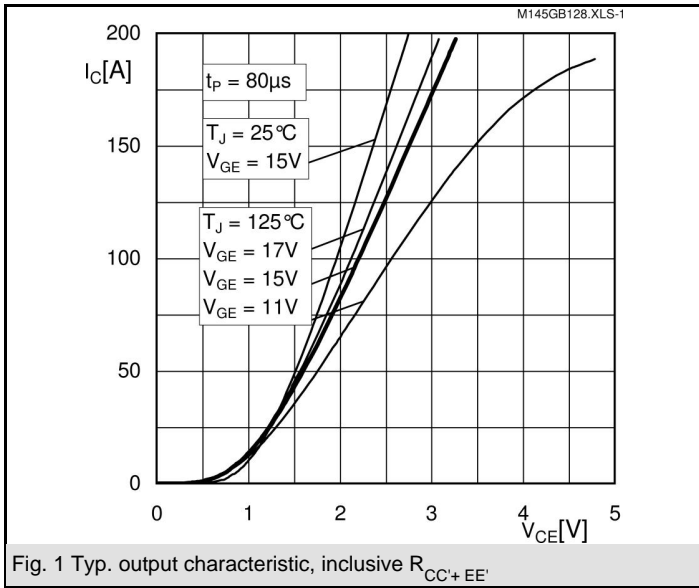
Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
$R_{\theta j-c}$	$i = 1$	120	mk/W
$R_{\theta j-c}$	$i = 2$	34	mk/W
$R_{\theta j-c}$	$i = 3$	9	mk/W
$R_{\theta j-c}$	$i = 4$	2	mk/W
$\tau_{\theta j-c}$	$i = 1$	0,03	s
$\tau_{\theta j-c}$	$i = 2$	0,1123	s
$\tau_{\theta j-c}$	$i = 3$	0,0012	s
$\tau_{\theta j-c}$	$i = 4$	0,0002	s
$Z_{th(j-c)D}$			
$R_{\theta j-cD}$	$i = 1$	240	mk/W
$R_{\theta j-cD}$	$i = 2$	95	mk/W
$R_{\theta j-cD}$	$i = 3$	21,5	mk/W
$R_{\theta j-cD}$	$i = 4$	3,5	mk/W
$\tau_{\theta j-cD}$	$i = 1$	0,054	s
$\tau_{\theta j-cD}$	$i = 2$	0,0113	s
$\tau_{\theta j-cD}$	$i = 3$	0,0012	s
$\tau_{\theta j-cD}$	$i = 4$	0,005	s

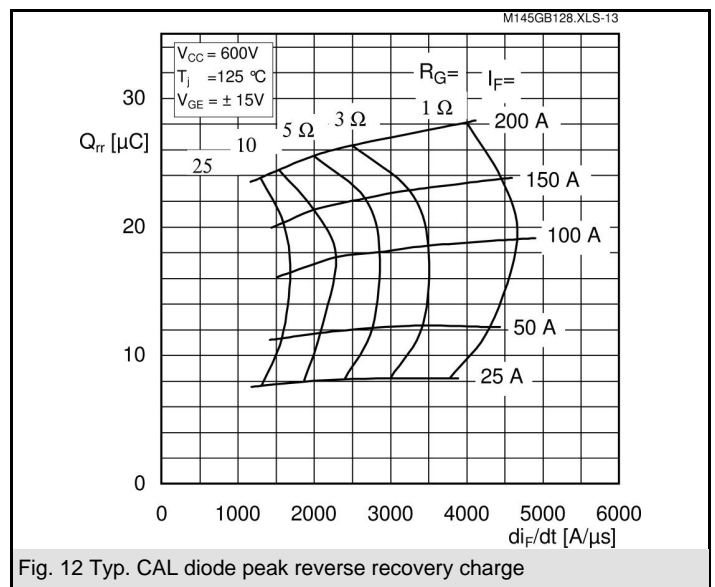
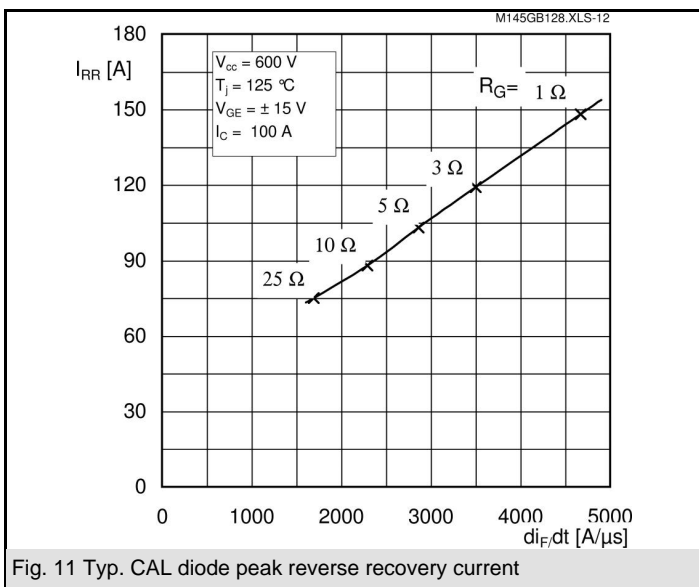
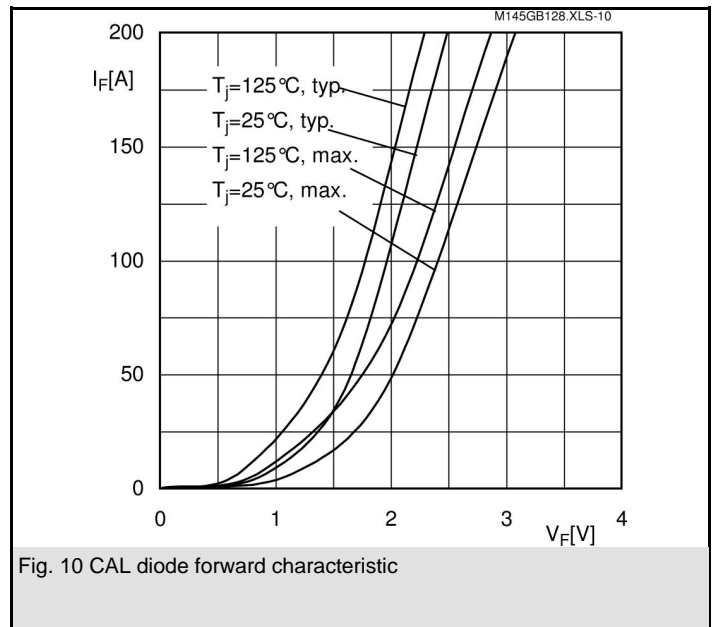
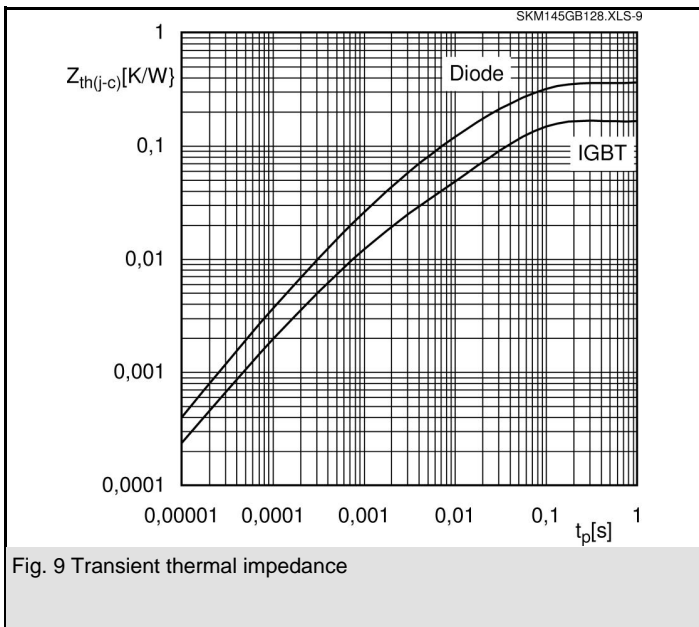
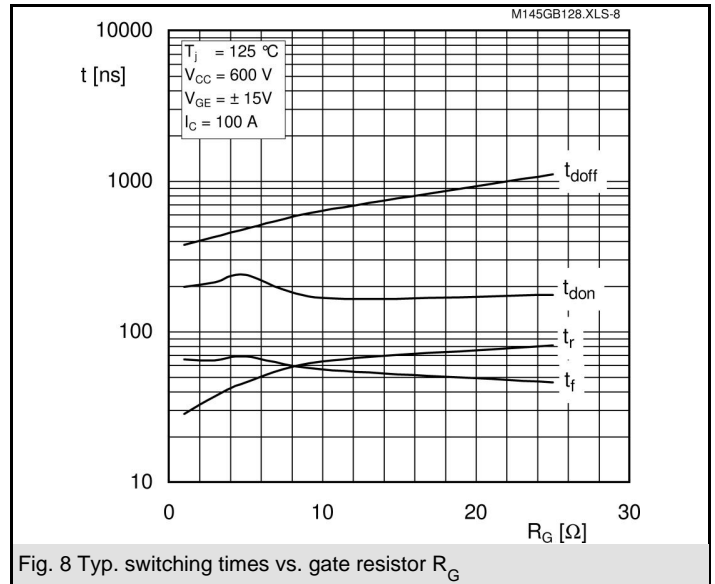
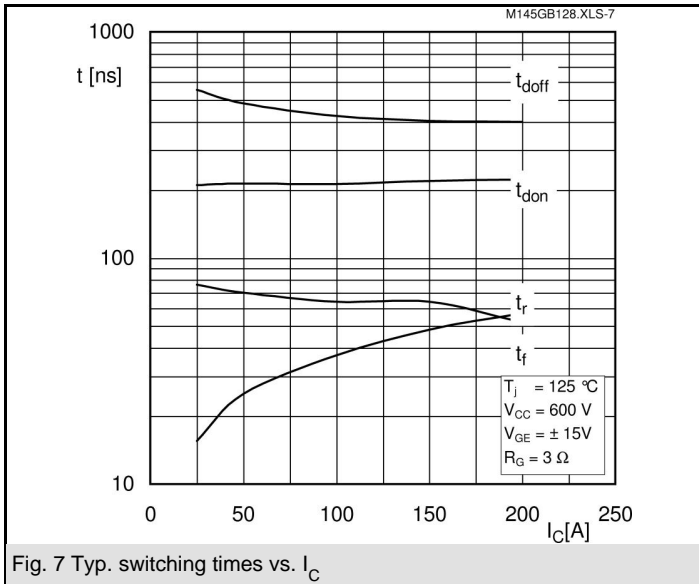


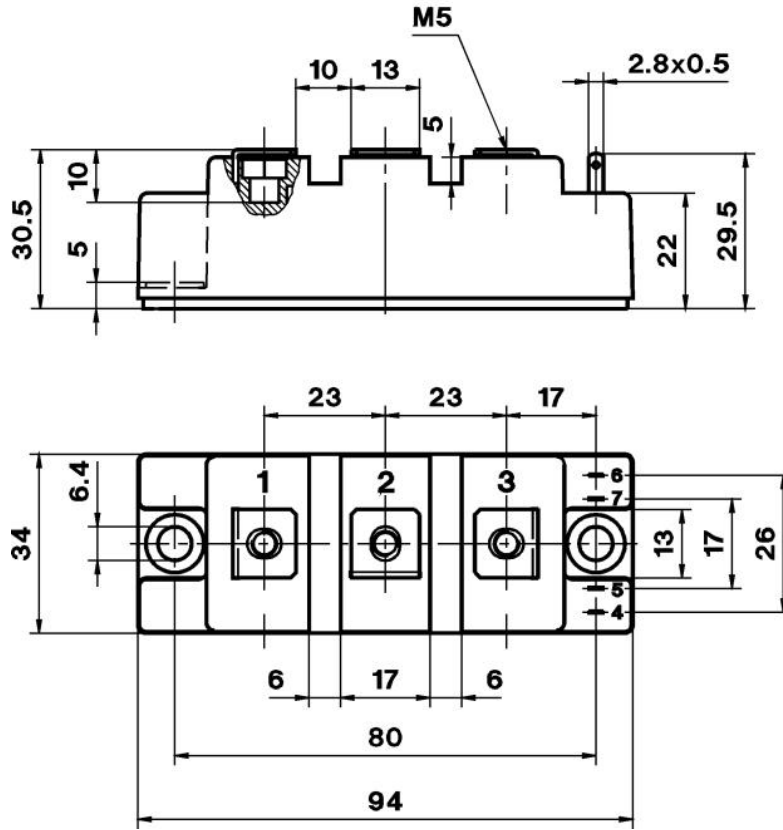
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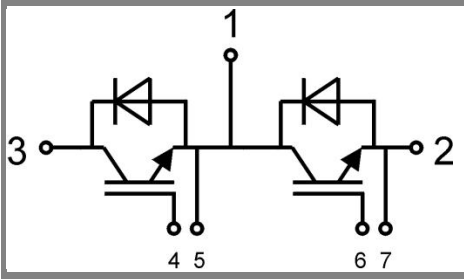
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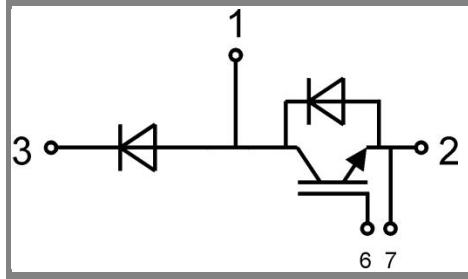




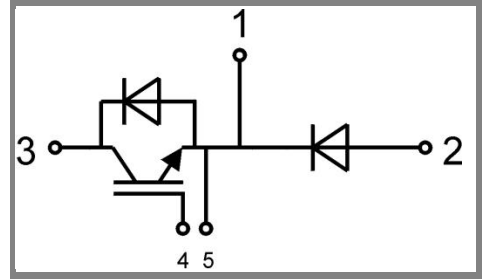
Case D 61, Case D 62, Case D 63



GB Case D 61



GAL Case D 62



GAR Case D 63