

# SKM 195GB066D



**SEMITRANS<sup>®</sup> 2**

## Trench IGBT Modules

**SKM195GB066D**

**SKM 195GAL066D**

Preliminary Data

### Features

- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$  with positive temperature coefficient
- High short circuit capability, self limiting to  $6 \times I_C$

### Typical Applications

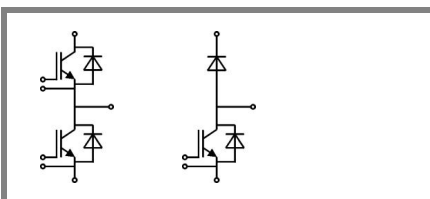
- AC inverter drives
- UPS
- Electronic welders

### Remarks

- Case temperature limited to  $T_c = 125^\circ\text{C}$  max., product rel. results valid for  $T_j \leq 150^\circ\text{C}$
- SC data: Use of soft  $R_G$  necessary!
- Take care of over-voltage caused by stray induct.

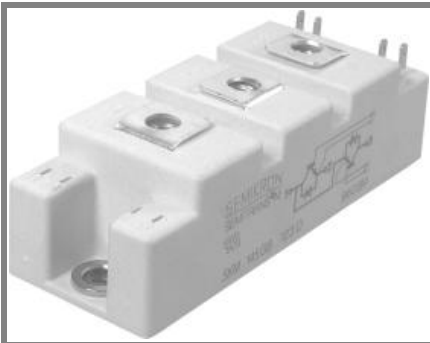
Absolute Maximum Ratings		$T_{case} = 25^\circ\text{C}$ , unless otherwise specified		
Symbol	Conditions	Values	Units	
<b>IGBT</b>				
$V_{CES}$	$T_j = 25^\circ\text{C}$	600	V	
$I_C$	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	265	A
		$T_c = 80^\circ\text{C}$	200	A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	400	A	
$V_{GES}$		$\pm 20$	V	
$t_{psc}$	$V_{CC} = 360\text{ V}; V_{GE} \leq 15\text{ V}; T_j = 150^\circ\text{C}$ $V_{CES} < 600\text{ V}$	6	$\mu\text{s}$	
<b>Inverse Diode</b>				
$I_F$	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	200	A
		$T_c = 80^\circ\text{C}$	130	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	400	A	
$I_{FSM}$	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 175^\circ\text{C}$	1400	A
<b>Module</b>				
$I_{t(RMS)}$		200	A	
$T_{vj}$		- 40 ... + 175	$^\circ\text{C}$	
$T_{stg}$		- 40 ... + 125	$^\circ\text{C}$	
$V_{isol}$	AC, 1 min.	4000	V	

Characteristics		$T_{case} = 25^\circ\text{C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 3,2\text{ mA}$	5	5,8	6,5	V
$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$	$T_j = 25^\circ\text{C}$	0,13	0,38	mA
			$T_j = 150^\circ\text{C}$	0,85	
$V_{CE0}$		$T_j = 25^\circ\text{C}$	0,9	1	V
		$T_j = 150^\circ\text{C}$	0,85	0,9	V
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	2,8	4,5	$\text{m}\Omega$
		$T_j = 150^\circ\text{C}$	4,3	6	$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 200\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	1,45	1,9	V
		$T_j = 150^\circ\text{C}_{chiplev.}$	1,7	2,1	V
$C_{res}$	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	12,3		nF
$C_{oes}$			0,77		nF
$C_{res}$			0,37		nF
$Q_G$	$V_{GE} = -8\text{V}...+15\text{V}$		1500		nC
$R_{Gint}$	$T_j = ^\circ\text{C}$		2		$\Omega$
$t_{d(on)}$	$R_{Gon} = 3\ \Omega$	$V_{CC} = 300\text{V}$ $I_{Cnom} = 200\text{A}$	160		ns
$t_r$			68		ns
$E_{on}$	$R_{Goff} = 3\ \Omega$	$T_j = 150^\circ\text{C}$ $V_{GE} = -8\text{V}/+15\text{V}$	14		mJ
$t_{d(off)}$			520		ns
$t_f$			49		ns
$E_{off}$			8		mJ
$R_{th(j-c)}$	per IGBT			0,22	K/W



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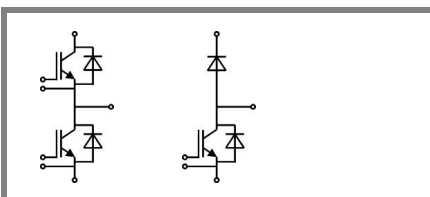
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Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
<b>Inverse Diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 200 \text{ A}; V_{GE} = 0 \text{ V}$		1,4	1,6	V
$V_{F0}$			0,95	1	V
$r_F$			2,3	3	mΩ
$I_{RRM}$	$I_{Fnom} = 200 \text{ A}$		100		A
$Q_{rr}$	$di/dt = 2000 \text{ A}/\mu\text{s}$		30		μC
$E_{rr}$	$V_{GE} = -8 \text{ V}; V_{CC} = 300 \text{ V}$		5,6		mJ
$R_{th(j-c)D}$	per diode			0,4	K/W
<b>Module</b>					
$L_{CE}$				30	nH
$R_{CC+EE}$	res., terminal-chip	$T_{case} = 25^\circ\text{C}$	0,75		mΩ
		$T_{case} = 125^\circ\text{C}$	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				150	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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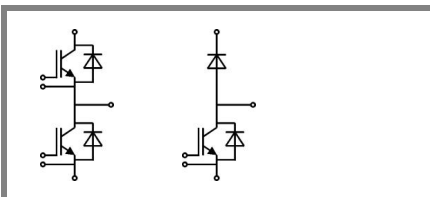
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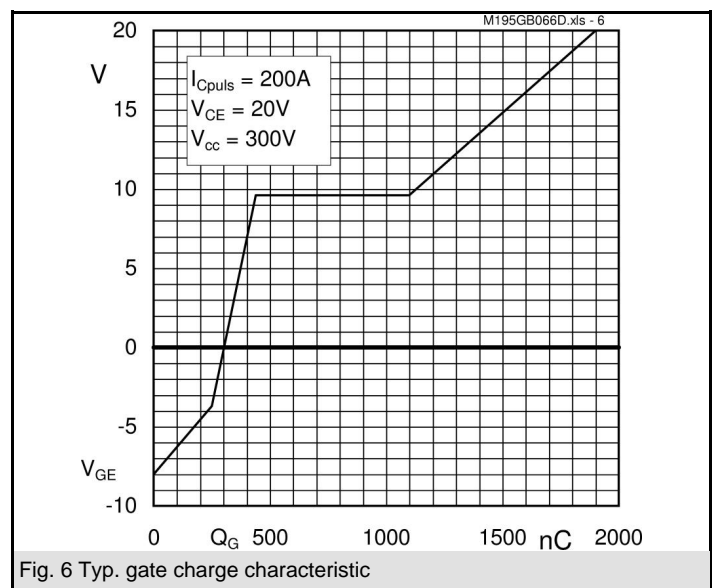
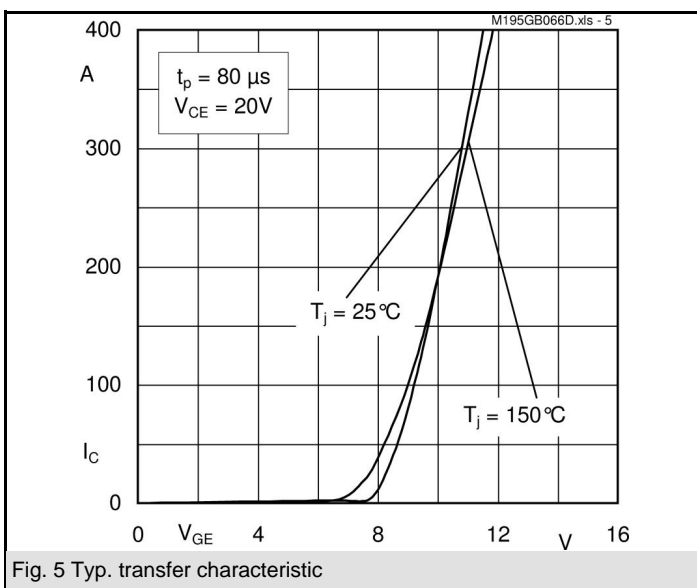
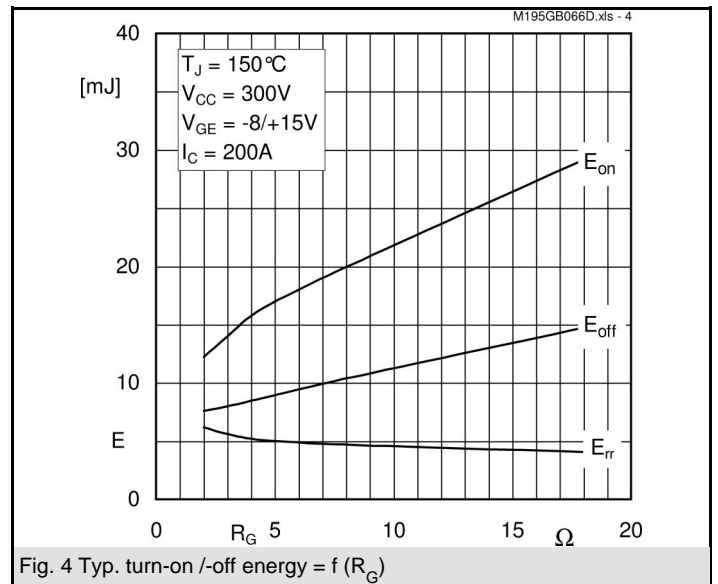
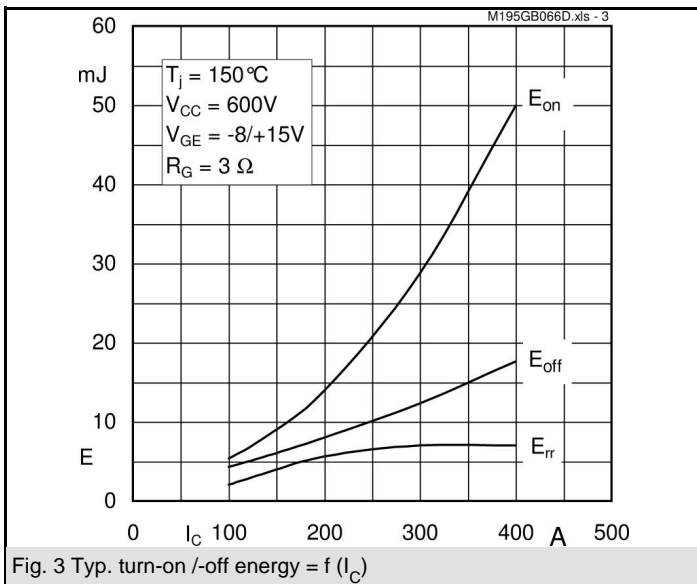
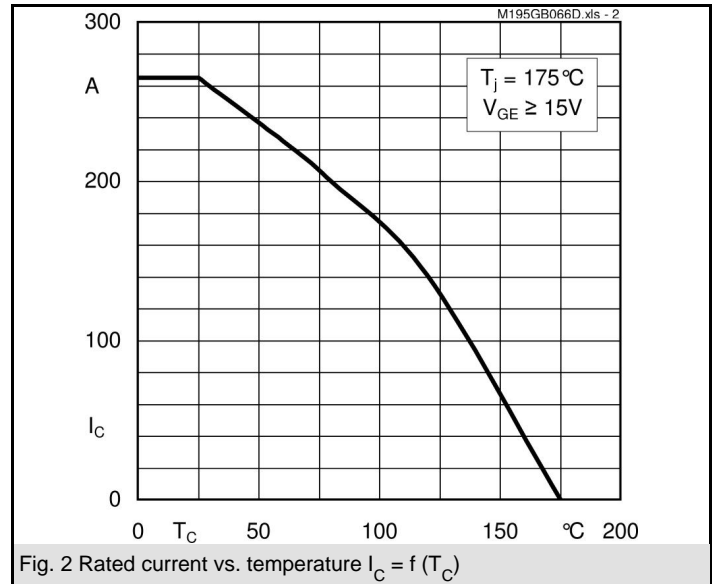
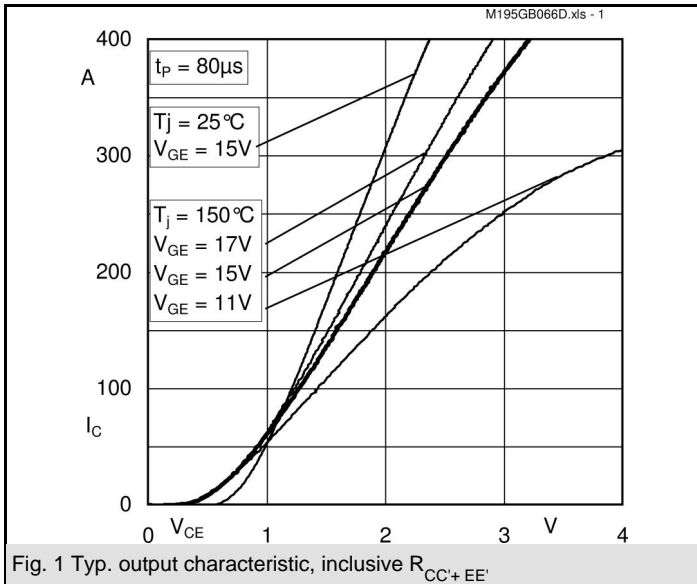
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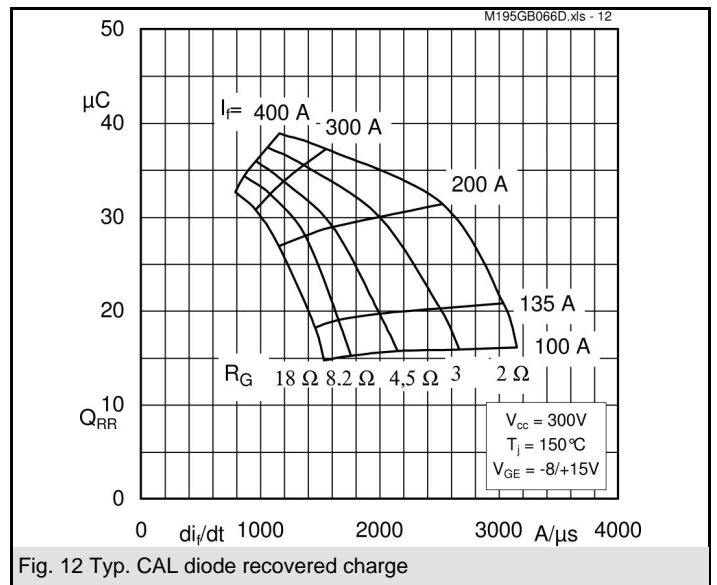
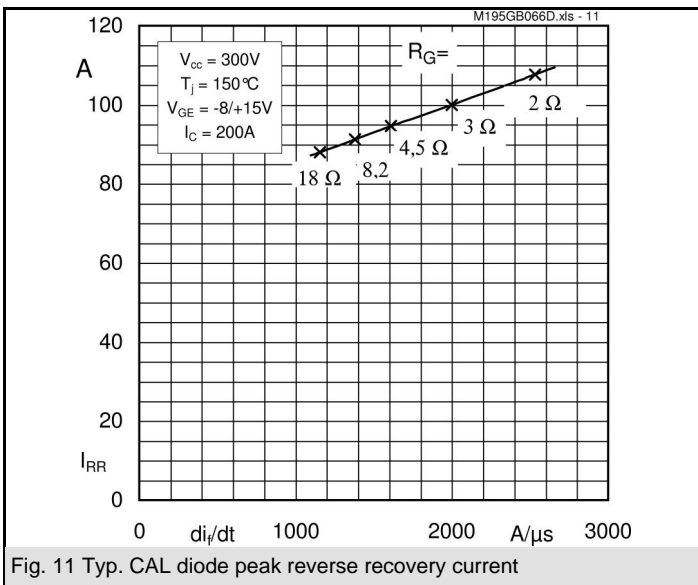
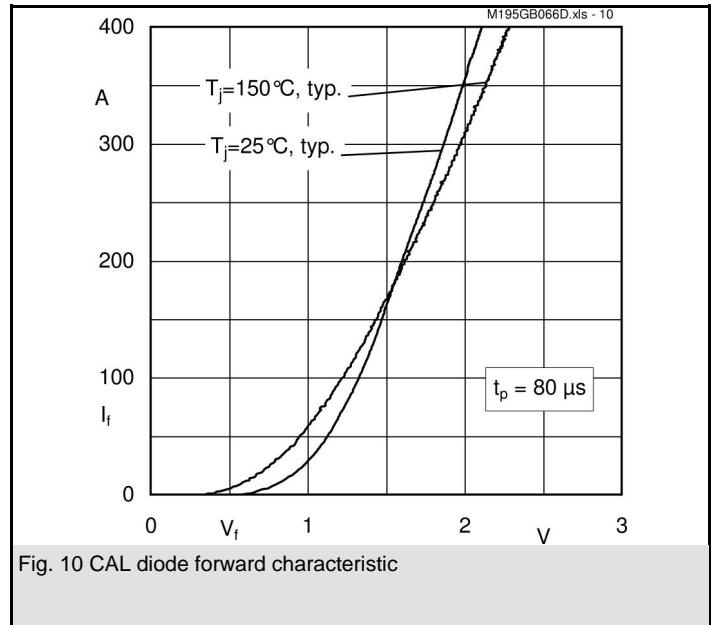
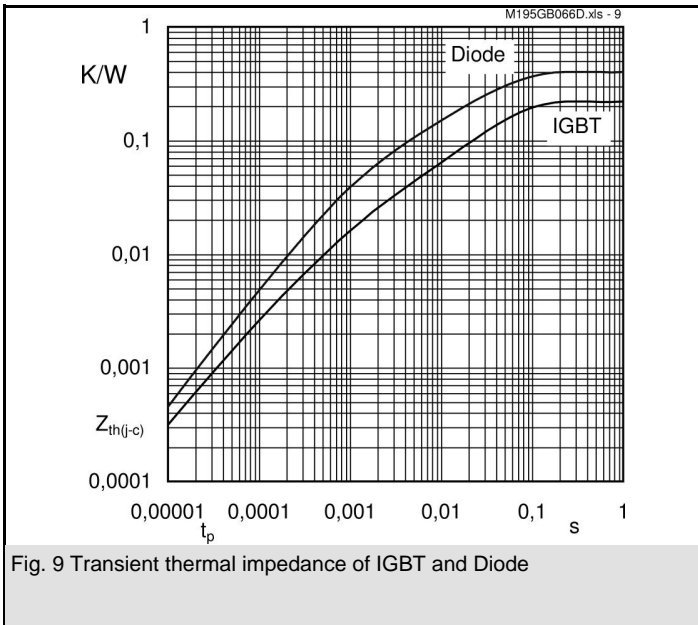
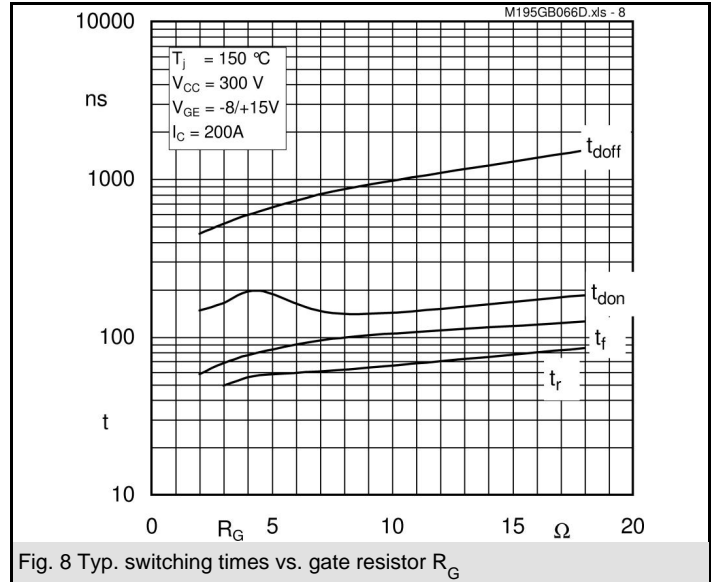
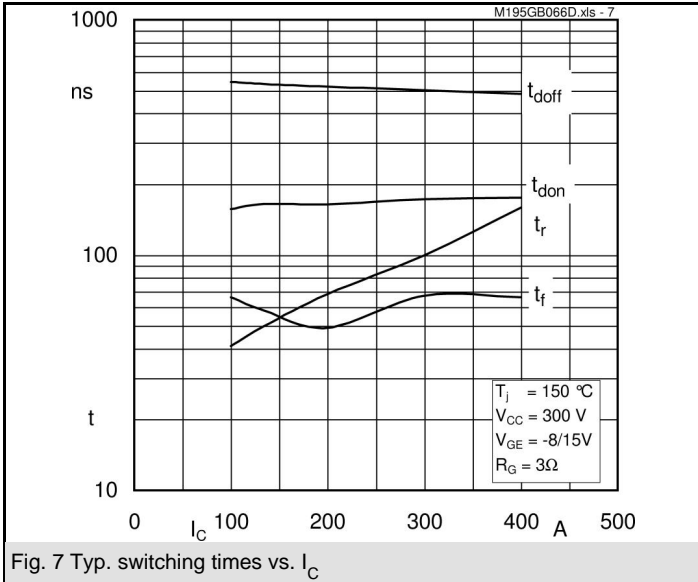
$Z_{th}$		Conditions	Values	Units
<b>Symbol</b>				
$Z_{th(j-c)I}$				
$R_{\theta j-c}$	$i = 1$		160	mk/W
$R_{\theta j-c}$	$i = 2$		41	mk/W
$R_{\theta j-c}$	$i = 3$		16	mk/W
$R_{\theta j-c}$	$i = 4$		3	mk/W
$\tau_{th(j-c)I}$	$i = 1$		0,0276	s
$\tau_{th(j-c)I}$	$i = 2$		0,0406	s
$\tau_{th(j-c)I}$	$i = 3$		0,001	s
$\tau_{th(j-c)I}$	$i = 4$		0,0011	s
<b>Symbol</b>				
$Z_{th(j-c)D}$				
$R_{\theta j-c}$	$i = 1$		250	mk/W
$R_{\theta j-c}$	$i = 2$		110	mk/W
$R_{\theta j-c}$	$i = 3$		35	mk/W
$R_{\theta j-c}$	$i = 4$		5	mk/W
$\tau_{th(j-c)D}$	$i = 1$		0,054	s
$\tau_{th(j-c)D}$	$i = 2$		0,012	s
$\tau_{th(j-c)D}$	$i = 3$		0,0015	s
$\tau_{th(j-c)D}$	$i = 4$		0,0007	s



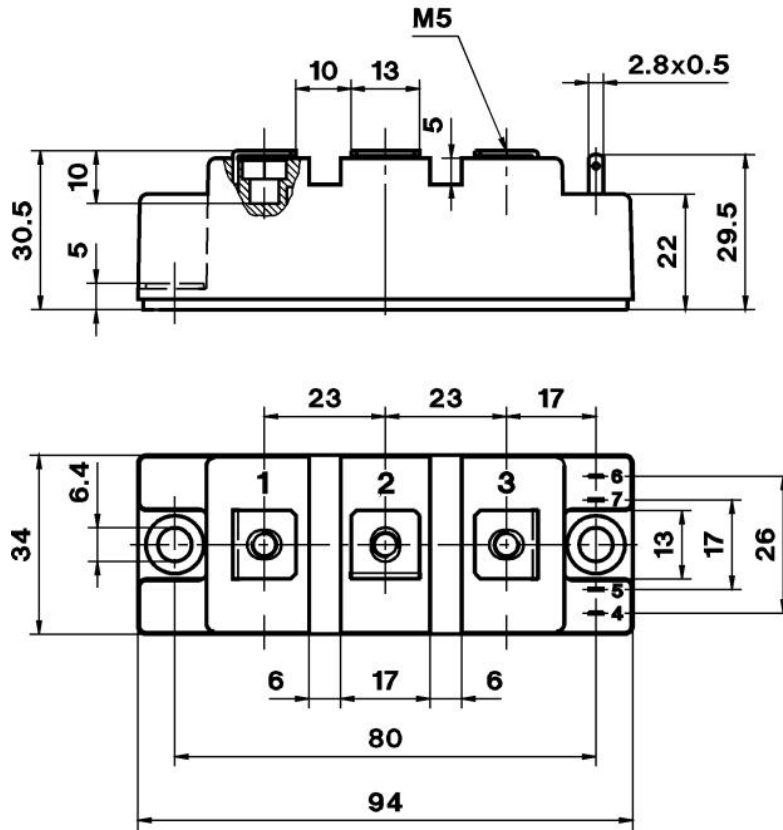
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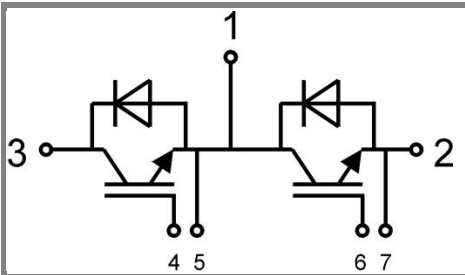




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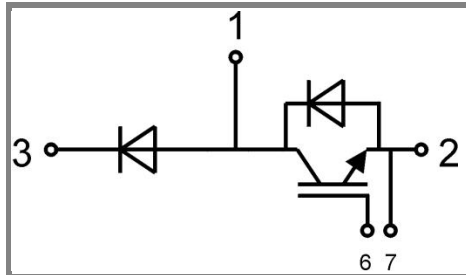


Case D 61



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Case D 61



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Case D 62