

# SKM 75GB176D



**SEMITRANS® 2**

## Trench IGBT Modules

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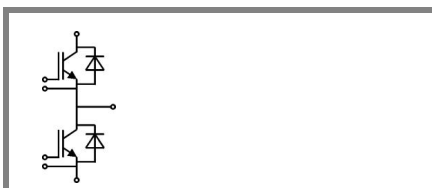
Preliminary Data

### 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 mains 575 - 750 V AC
- Public transport (auxiliary syst.)

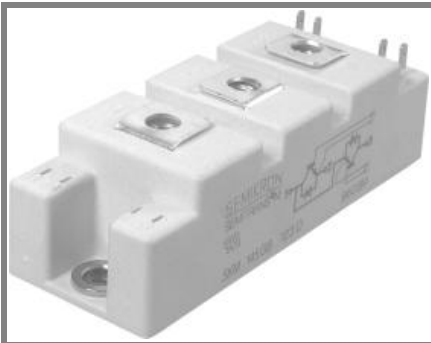


**GB**

Absolute Maximum Ratings		$T_{case} = 25^\circ\text{C}$ , unless otherwise specified		
Symbol	Conditions	Values	Units	
<b>IGBT</b>				
$V_{CES}$	$T_j = 25^\circ\text{C}$	1700	V	
$I_C$	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	80	A
		$T_c = 80^\circ\text{C}$	55	A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	100	A	
$V_{GES}$		$\pm 20$	V	
$t_{psc}$	$V_{CC} = 1200\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125^\circ\text{C}$ $V_{CES} < 1700\text{ V}$	10	$\mu\text{s}$	
<b>Inverse Diode</b>				
$I_F$	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	80	A
		$T_c = 80^\circ\text{C}$	55	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	100	A	
$I_{FSM}$	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 150^\circ\text{C}$	550	A
<b>Module</b>				
$I_{t(RMS)}$		200	A	
$T_{vj}$		-40 ... +150	$^\circ\text{C}$	
$T_{stg}$		-40 ... +125	$^\circ\text{C}$	
$V_{isol}$	AC, 1 min.	4000	V	

Characteristics		$T_{case} = 25^\circ\text{C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 2\text{ mA}$	5,2	5,8	6,4	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	1,2	V
		$T_j = 125^\circ\text{C}$	0,9	1,1	V
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	20	25	m $\Omega$
		$T_j = 125^\circ\text{C}$	31	36	m $\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 50\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	2	2,45	V
		$T_j = 125^\circ\text{C}_{chiplev.}$	2,45	2,9	V
$C_{res}$	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	4,3		nF
$C_{oes}$			0,18		nF
$C_{res}$			0,15		nF
$Q_G$	$V_{GE} = -8\text{V}...+15\text{V}$		410		nC
$R_{Gint}$	$T_j = 25^\circ\text{C}$		9,5		$\Omega$
$t_{d(on)}$	$R_{Gon} = 6,2\ \Omega$ $di/dt = 1680\text{ A}/\mu\text{s}$	$V_{CC} = 1200\text{V}$ $I_{Cnom} = 50\text{A}$	210		ns
$t_r$			30		ns
$E_{on}$			25		mJ
$t_{d(off)}$	$R_{Goff} = 6,2\ \Omega$ $di/dt = 320\text{ A}/\mu\text{s}$	$T_j = 125^\circ\text{C}$ $V_{GE} = \pm 15\text{V}$	590		ns
$t_f$			135		ns
$E_{off}$			18		mJ
$R_{th(j-c)}$	per IGBT			0,38	K/W

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Characteristics			min.	typ.	max.	Units
Symbol	Conditions					
<b>Inverse Diode</b>						
$V_F = V_{EC}$	$I_{Fnom} = 50 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$		1,7	1,9	V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$		1,8	2	V
$V_{F0}$		$T_j = 25 \text{ }^\circ\text{C}$		1,1	1,3	V
		$T_j = 125 \text{ }^\circ\text{C}$		0,9	1,1	V
$r_F$		$T_j = 25 \text{ }^\circ\text{C}$		12	12	mΩ
		$T_j = 125 \text{ }^\circ\text{C}$		18	18	mΩ
$I_{RRM}$	$I_{Fnom} = 50 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$		52		A
$Q_{rr}$	$di/dt = 1320 \text{ A}/\mu\text{s}$			20		μC
$E_{rr}$	$V_{GE} = -15 \text{ V}; V_{CC} = 1200 \text{ V}$			14,5		mJ
$R_{th(j-c)D}$	per diode				0,55	K/W
<b>Module</b>						
$L_{CE}$					30	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25 \text{ }^\circ\text{C}$		0,75		mΩ
		$T_{case} = 125 \text{ }^\circ\text{C}$		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					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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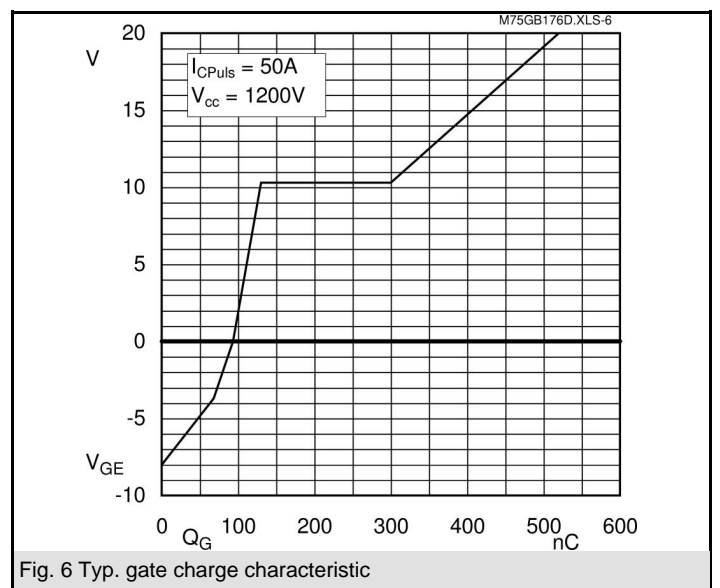
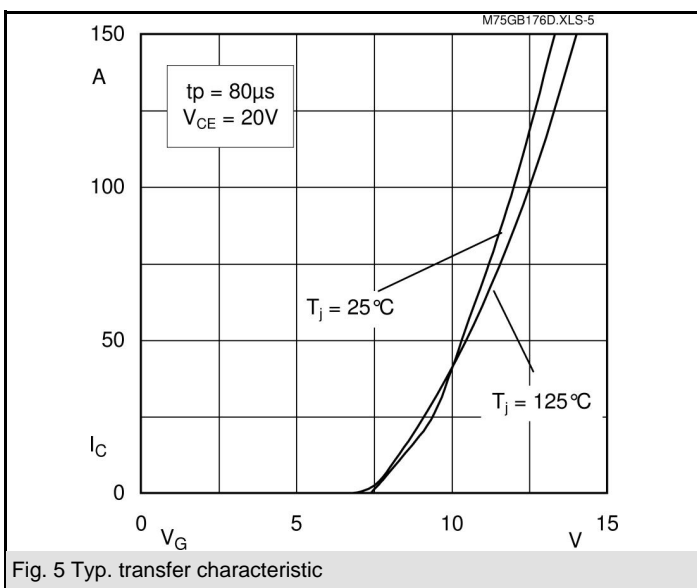
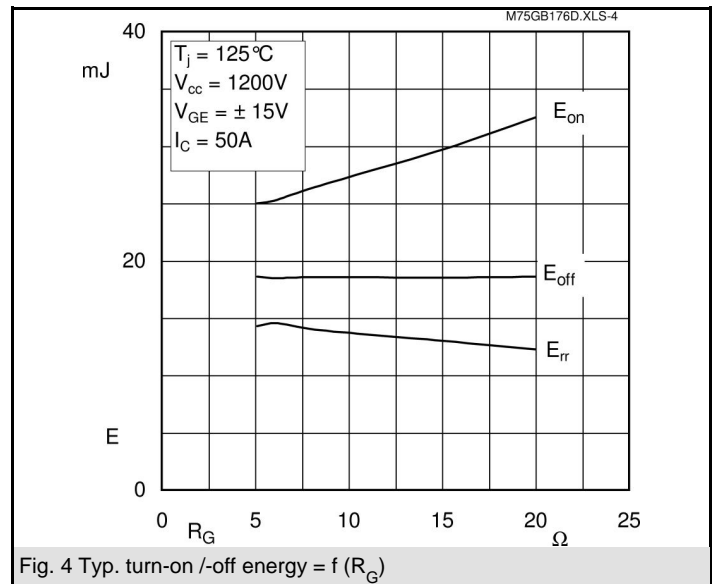
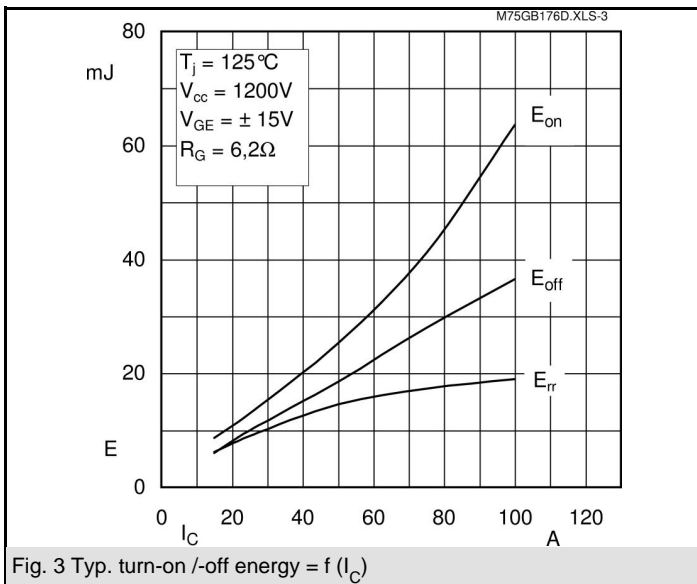
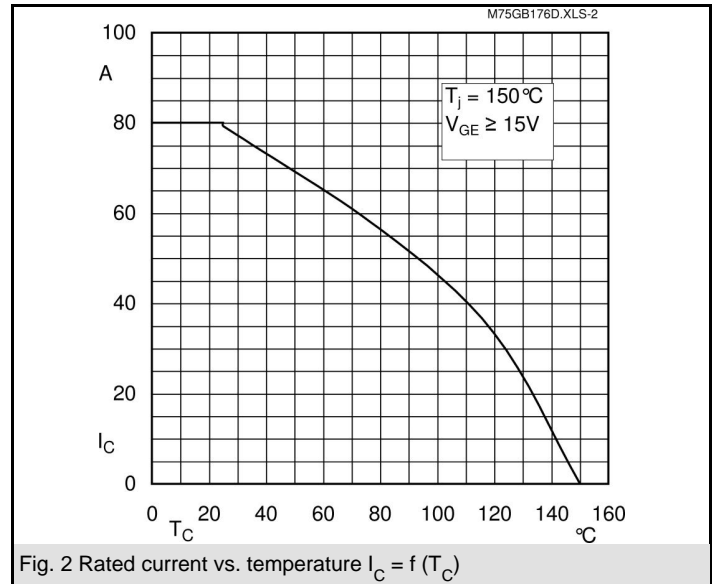
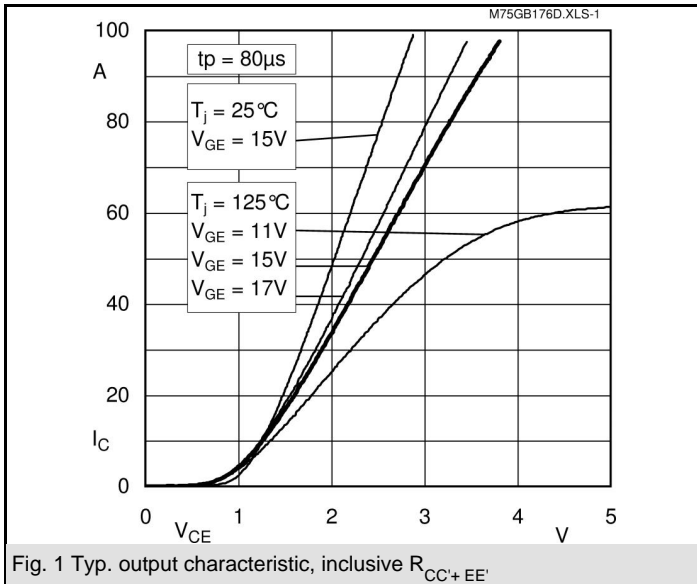
### Typical Applications

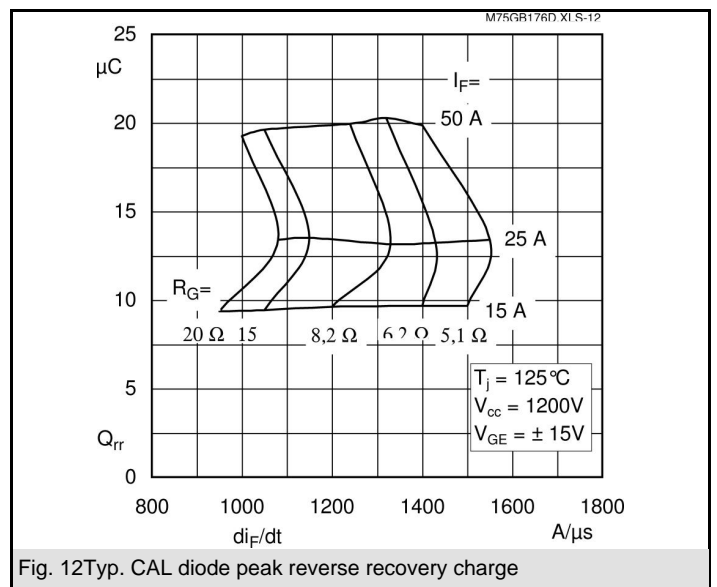
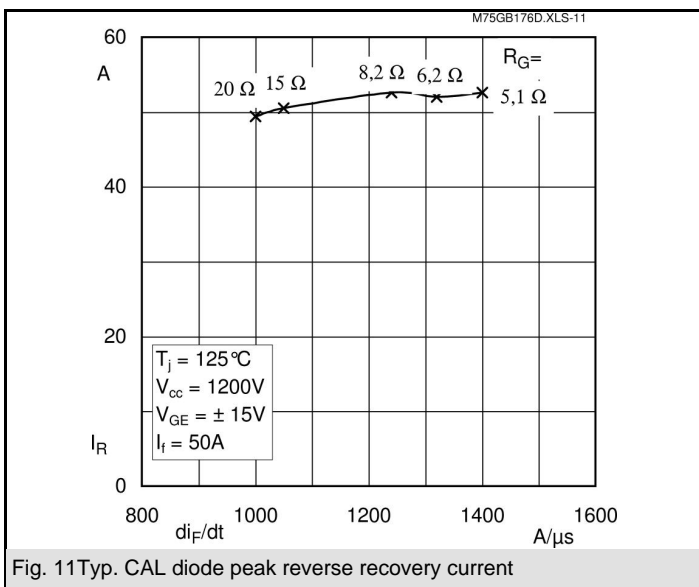
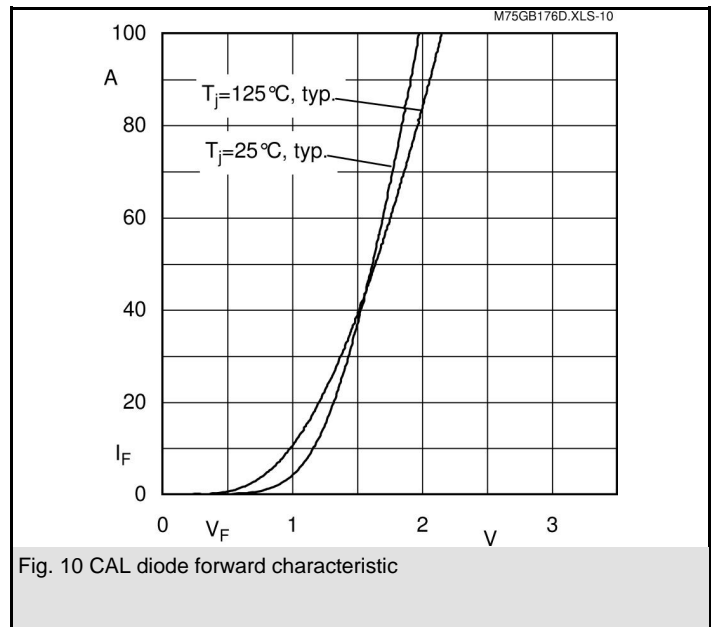
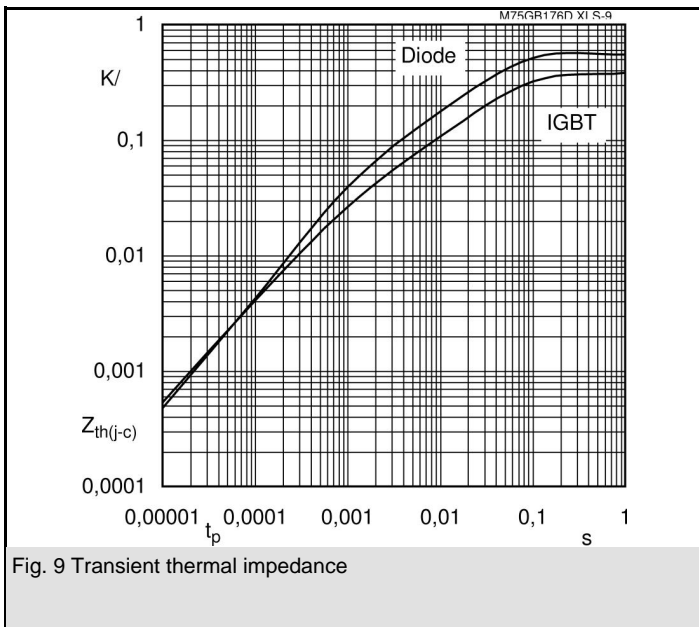
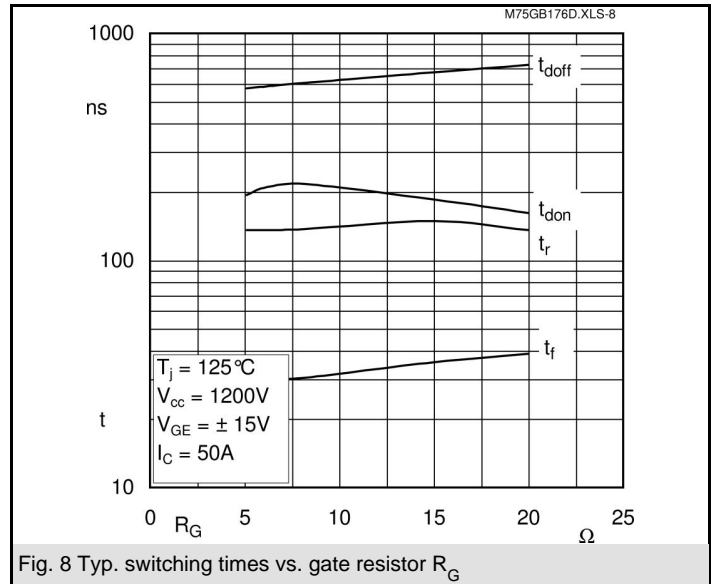
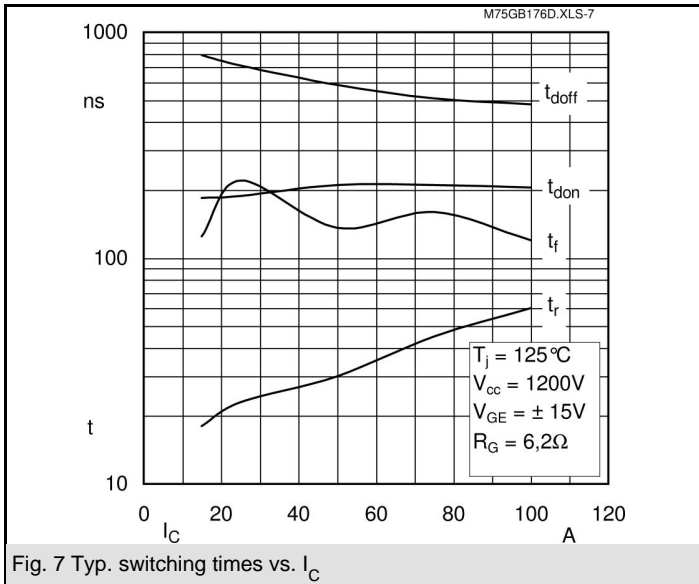
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$Z_{th}$				
Symbol	Conditions	Values		Units
$Z_{th(j-c)I}$				
$R_{\theta j-c}$	$i = 1$	270		mk/W
$R_{\theta j-c}$	$i = 2$	85		mk/W
$R_{\theta j-c}$	$i = 3$	21		mk/W
$R_{\theta j-c}$	$i = 4$	4		mk/W
$\tau_{\theta j-c}$	$i = 1$	0,0393		s
$\tau_{\theta j-c}$	$i = 2$	0,0786		s
$\tau_{\theta j-c}$	$i = 3$	0,0014		s
$\tau_{\theta j-c}$	$i = 4$	0,0002		s
$Z_{th(j-c)D}$				
$R_{\theta j-cD}$	$i = 1$	360		mk/W
$R_{\theta j-cD}$	$i = 2$	150		mk/W
$R_{\theta j-cD}$	$i = 3$	36		mk/W
$R_{\theta j-cD}$	$i = 4$	4		mk/W
$\tau_{\theta j-cD}$	$i = 1$	0,0262		s
$\tau_{\theta j-cD}$	$i = 2$	0,0417		s
$\tau_{\theta j-cD}$	$i = 3$	0,0012		s
$\tau_{\theta j-cD}$	$i = 4$	0,001		s



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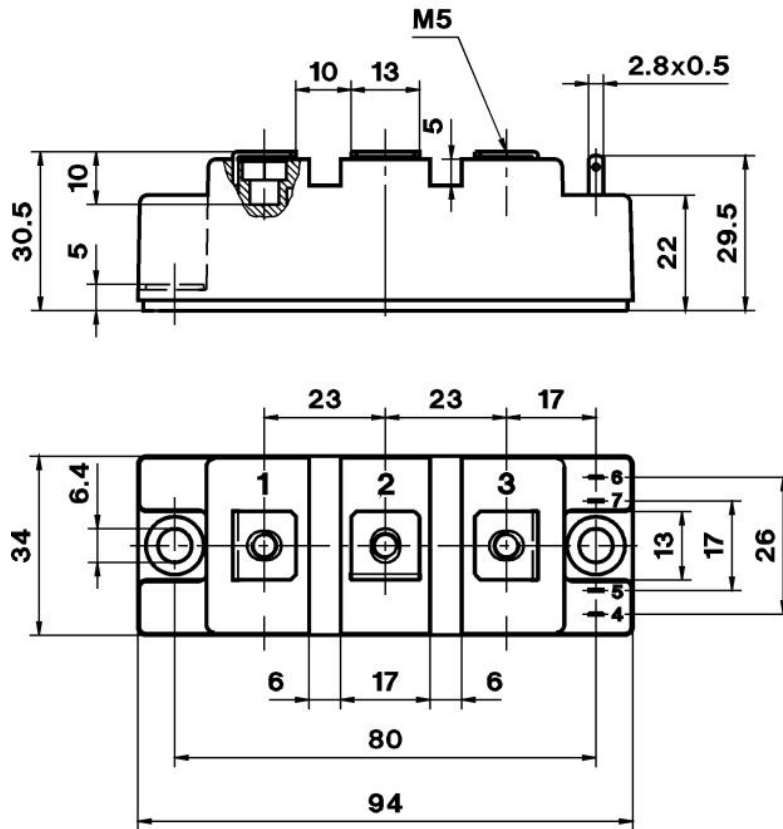


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