

# SKM 75GB176D



**SEMITRANS<sup>®</sup> 2**

## Trench IGBT Modules

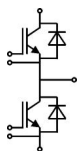
**SKM 75GB176D**

### 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	
$I_{FSM}$	$t_p = 10\text{ ms}; \sin.$	$T_j = 150^\circ\text{C}$	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
$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$			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	$\text{m}\Omega$
		$T_j = 125^\circ\text{C}$	31	36	$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 50\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	2	2,45	V
		$T_j = 125^\circ\text{C}_{chiplev.}$	2,45	2,9	V
$C_{ies}$	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	4,3		nF
$C_{oes}$			0,18		nF
$C_{res}$			0,15		nF
$Q_G$	$V_{GE} = -8\text{V} \dots +15\text{V}$		410		nC
$R_{Gint}$	$T_j = 25^\circ\text{C}$		9,5		$\Omega$
$t_{d(on)}$	$R_{Gon} = 6,2\ \Omega$ $di/dt = 1680\text{ A}/\mu\text{s}$	$V_{CC} = 1200\text{V}$ $I_C = 50\text{A}$	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
			135		ns
$E_{off}$			18		mJ
$R_{th(j-c)}$	per IGBT			0,38	K/W

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### Typical Applications\*

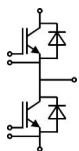
- AC inverter drives mains 575 - 750 V AC
- Public transport (auxiliary syst.)

### Characteristics

Symbol	Conditions	min.	typ.	max.	Units
<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	m $\Omega$
		$T_j = 125 \text{ }^\circ\text{C}$	18	18	m $\Omega$
$I_{RRM}$	$I_F = 50 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$	52		A
$Q_{rr}$	$di/dt = 1320 \text{ A}/\mu\text{s}$		20		$\mu\text{C}$
$E_{rr}$	$V_{GE} = -15 \text{ V}; V_{CC} = 1200 \text{ V}$		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		m $\Omega$
		$T_{case} = 125 \text{ }^\circ\text{C}$	1		m $\Omega$
$R_{th(c-s)}$	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.

\* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.



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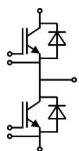
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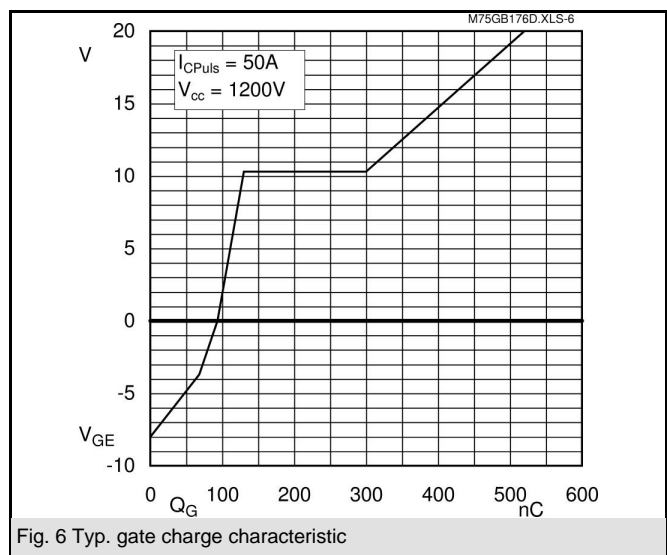
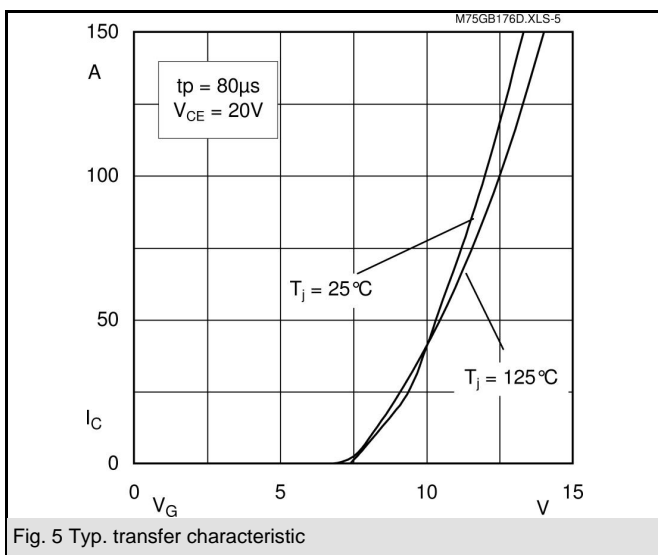
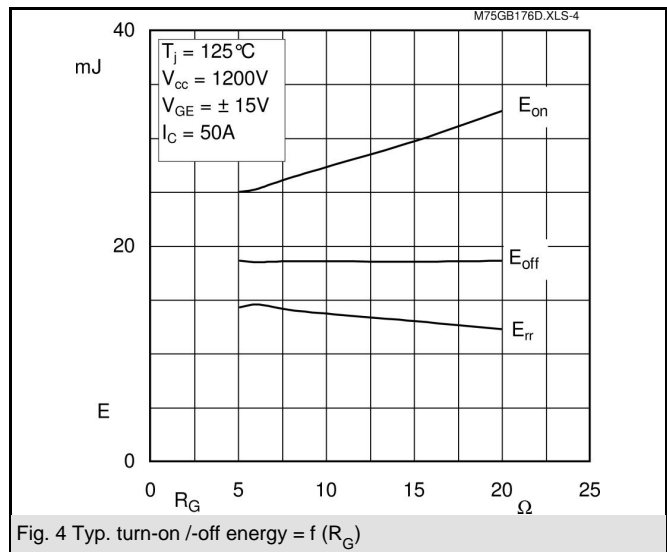
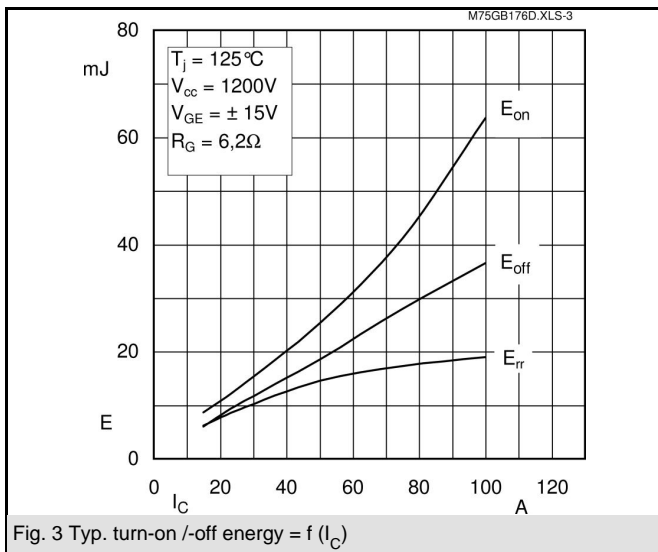
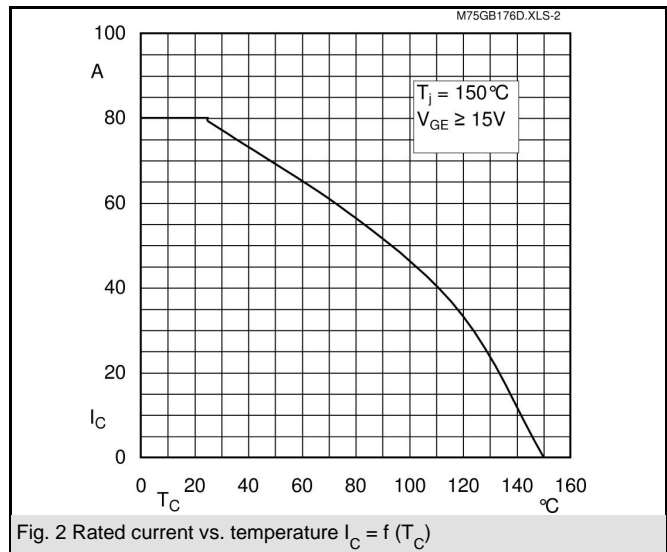
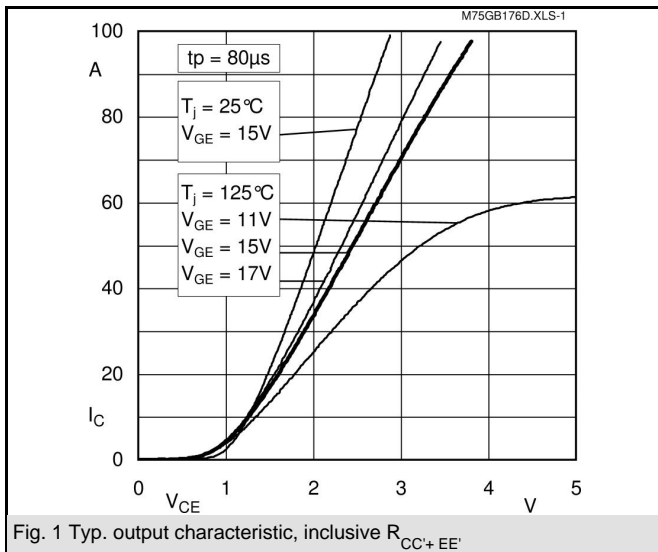
#### Typical Applications\*

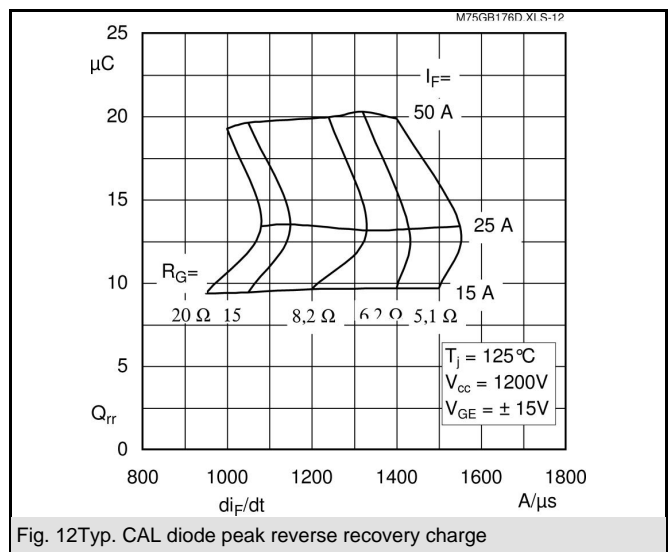
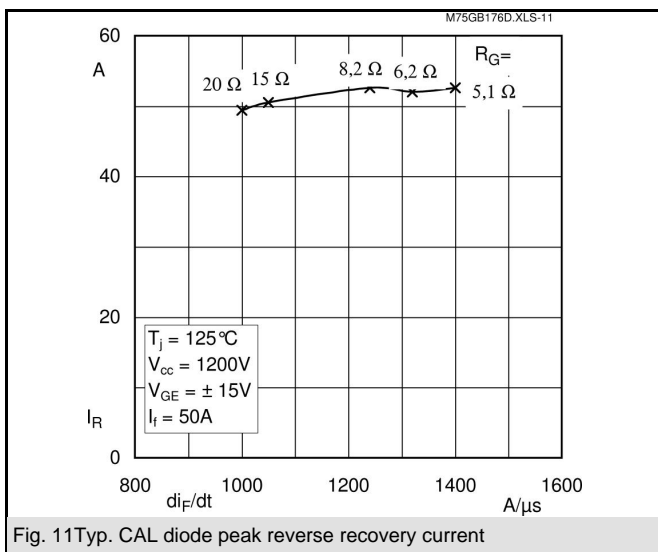
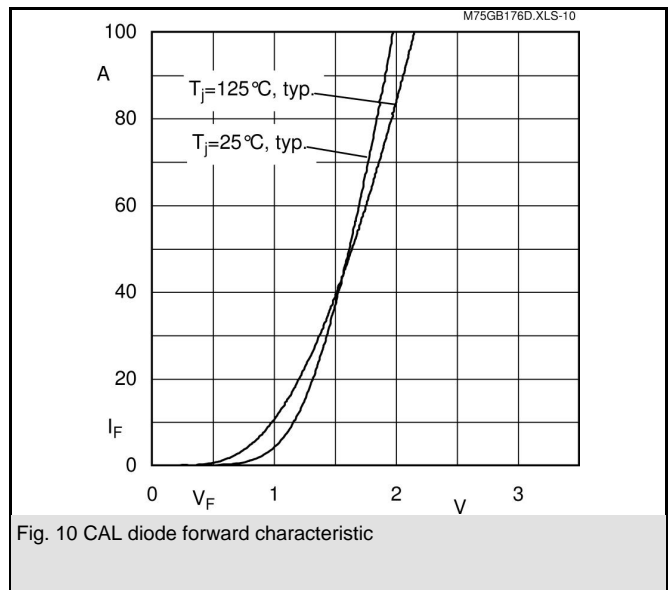
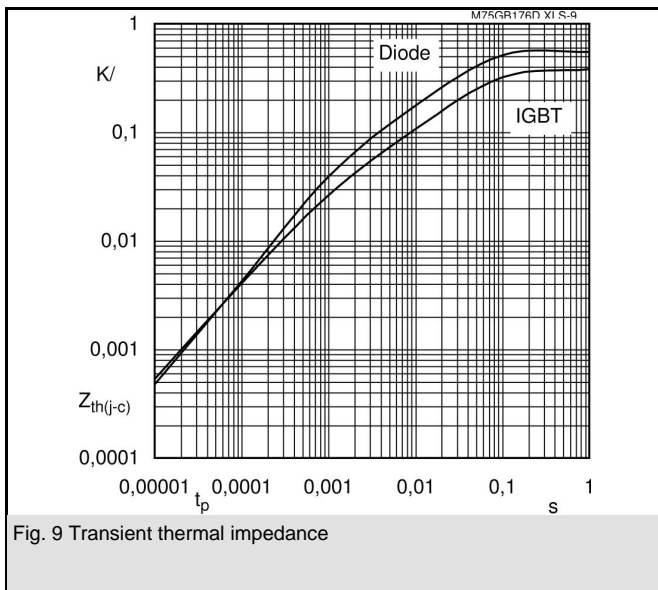
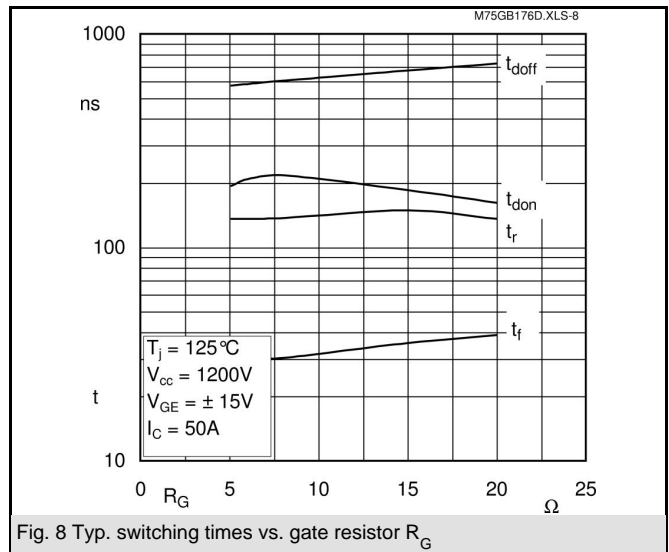
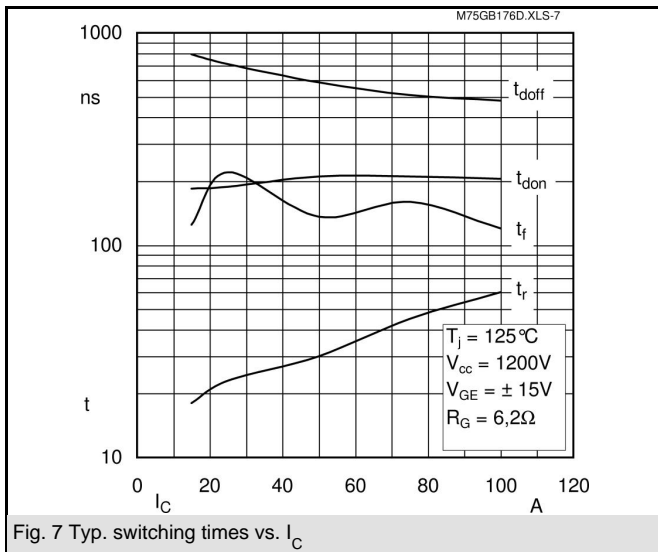
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$Z_{th}$		Values	Units
Symbol	Conditions		
$Z_{th(j-c)}$			
$R_{\theta j-c1}$	$i = 1$	270	mk/W
$R_{\theta j-c2}$	$i = 2$	85	mk/W
$R_{\theta j-c3}$	$i = 3$	21	mk/W
$R_{\theta j-c4}$	$i = 4$	4	mk/W
$\tau_{\theta j-c1}$	$i = 1$	0,0393	s
$\tau_{\theta j-c2}$	$i = 2$	0,0786	s
$\tau_{\theta j-c3}$	$i = 3$	0,0014	s
$\tau_{\theta j-c4}$	$i = 4$	0,0002	s
$Z_{th(j-c)D}$			
$R_{\theta j-cD1}$	$i = 1$	360	mk/W
$R_{\theta j-cD2}$	$i = 2$	150	mk/W
$R_{\theta j-cD3}$	$i = 3$	36	mk/W
$R_{\theta j-cD4}$	$i = 4$	4	mk/W
$\tau_{\theta j-cD1}$	$i = 1$	0,0262	s
$\tau_{\theta j-cD2}$	$i = 2$	0,0417	s
$\tau_{\theta j-cD3}$	$i = 3$	0,0012	s
$\tau_{\theta j-cD4}$	$i = 4$	0,001	s



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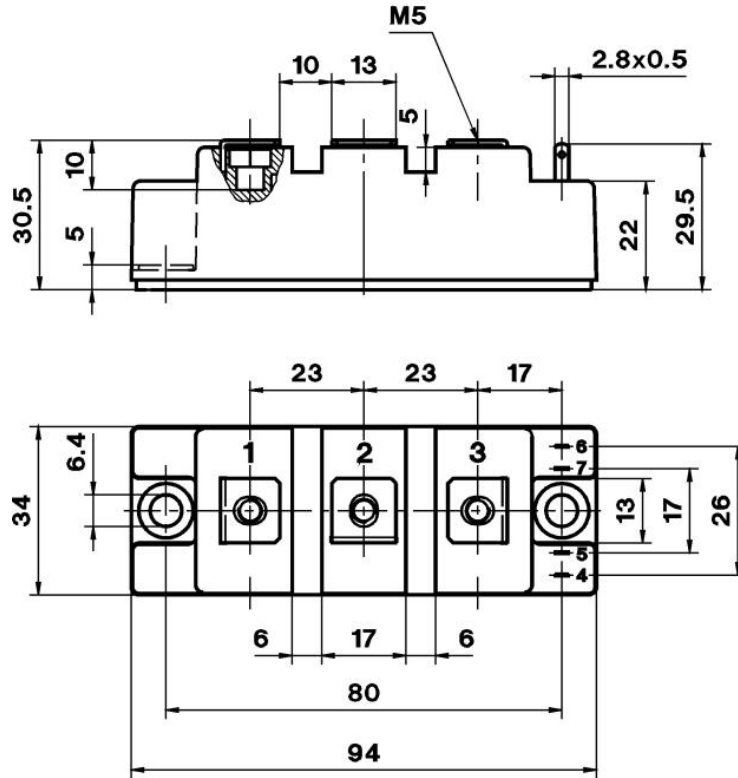


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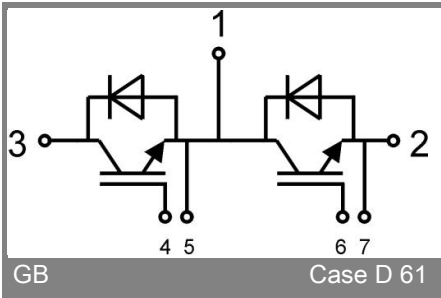
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