

# SKM 145GB066D



**SEMITRANS® 2**

## Trench IGBT Modules

**SKM 145GB066D**

Preliminary Data

### Features

- 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, recomm.  $T_{op} = -40 \dots +150^\circ\text{C}$ , product rel. results valid for  $T_j \leq 150^\circ\text{C}$
- SC data:  $t_p \leq 6\mu\text{s}$ ;  $V_{GE} \leq 15\text{V}$ ;  $T_j = 150^\circ\text{C}$ ;  $V_{CC} \leq 360\text{V}$ , use of soft  $R_G$  necessary!
- Take care of over-voltage caused by stray induct.



**GB**

Absolute Maximum Ratings		$T_{case} = 25^\circ\text{C}$ , unless otherwise specified		
Symbol	Conditions	Values	Units	
<b>IGBT</b>				
$V_{CES}$	$T_j = 25^\circ\text{C}$	600	V	
$I_C$	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	195	A
		$T_c = 80^\circ\text{C}$	150	A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	300	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>				
$I_F$	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	150	A
		$T_c = 80^\circ\text{C}$	100	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	300	A	
$I_{FSM}$	$t_p = 10\text{ms}$ ; sin.	$T_j = 175^\circ\text{C}$	880	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>					
$V_{GE(th)}$	$V_{GE} = V_{CE}$ ; $I_C = 2,4\text{mA}$	5	5,8	6,5	V
$I_{CES}$	$V_{GE} = 0\text{V}$ ; $V_{CE} = V_{CES}$		0,08	0,25	mA
$V_{CE0}$		$T_j = 25^\circ\text{C}$	0,9	1	V
		$T_j = 150^\circ\text{C}$	0,85	0,9	V
$r_{CE}$	$V_{GE} = 15\text{V}$	$T_j = 25^\circ\text{C}$	3,7	6	m $\Omega$
		$T_j = 150^\circ\text{C}$	5,7	8	m $\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 150\text{A}$ ; $V_{GE} = 15\text{V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	1,45	1,9	V
		$T_j = 150^\circ\text{C}_{chiplev.}$	1,7	2,1	V
$C_{res}$	$V_{CE} = 25$ ; $V_{GE} = 0\text{V}$	$f = 1\text{MHz}$	9,25		nF
$C_{oes}$			0,6		nF
$C_{res}$			0,28		nF
$Q_G$	$V_{GE} = -8\text{V} \dots +15\text{V}$		1100		nC
$R_{Gint}$	$T_j = ^\circ\text{C}$		2		$\Omega$
$t_{d(on)}$	$R_{Gon} = 4,3\ \Omega$	$V_{CC} = 300\text{V}$ $I_{Cnom} = 150\text{A}$	150		ns
$t_r$			52		ns
$E_{on}$	$R_{Goff} = 4,3\ \Omega$	$T_j = 150^\circ\text{C}$ $V_{GE} = -8/+15\text{V}$	8,5		mJ
$t_{d(off)}$			490		ns
$t_f$			46		ns
$E_{off}$			5,5		mJ
$R_{th(j-c)}$	per IGBT			0,3	K/W



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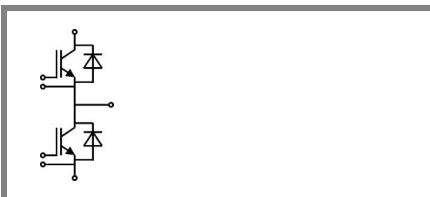
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Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
<b>Inverse Diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 150\text{ A}$ ; $V_{GE} = 0\text{ V}$		1,4	1,6	V
					$T_j = 25^\circ\text{C}_{chiplev.}$
					$T_j = 150^\circ\text{C}_{chiplev.}$
$V_{F0}$			0,95	1	V
$r_F$			3	4	mΩ
$I_{RRM}$	$I_{Fnom} = 150\text{ A}$		90		A
$Q_{rr}$	$di/dt = 2100\text{ A}/\mu\text{s}$		20		μC
$E_{rr}$	$V_{GE} = -8\text{ V}$ ; $V_{CC} = 300\text{ V}$		3,5		mJ
$R_{th(j-c)D}$	per diode			0,5	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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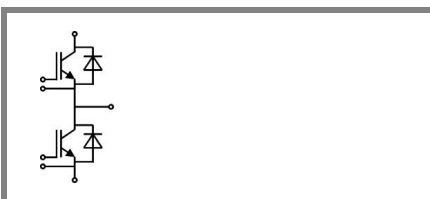
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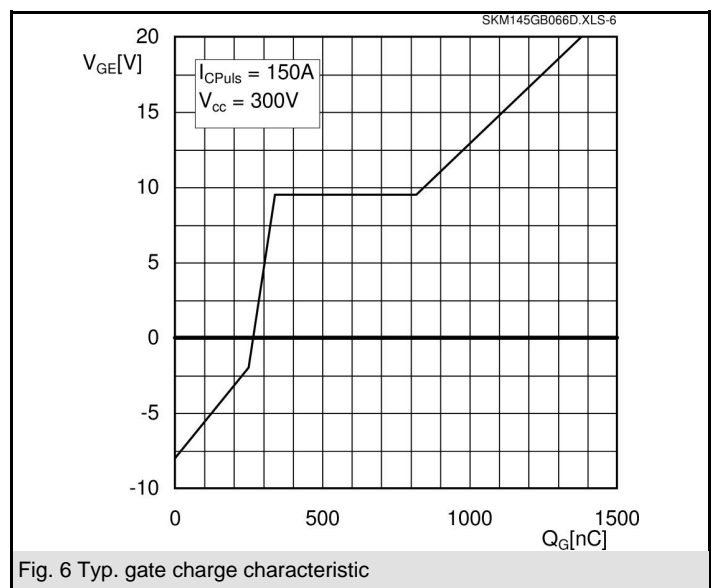
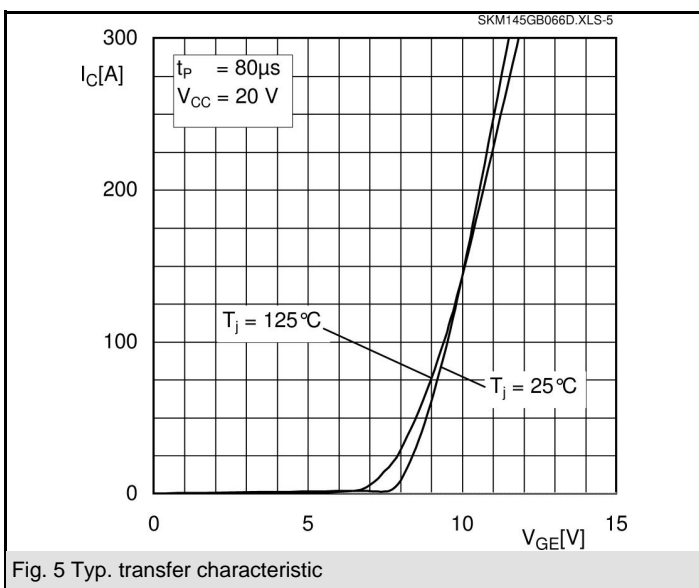
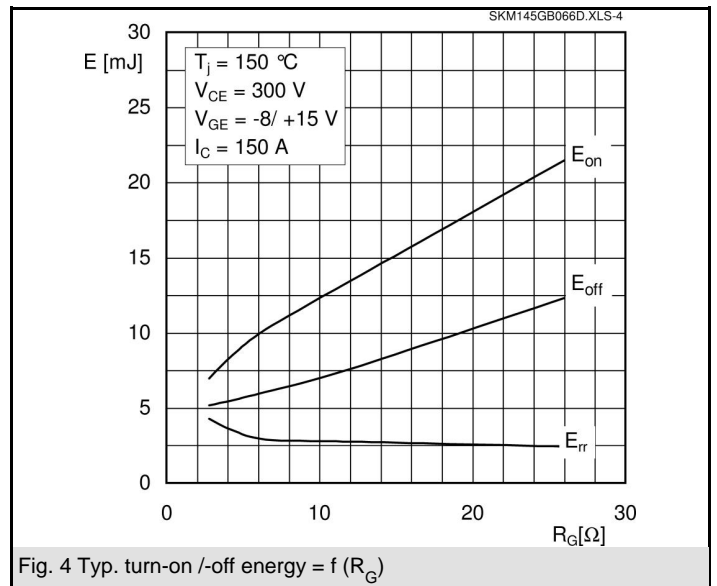
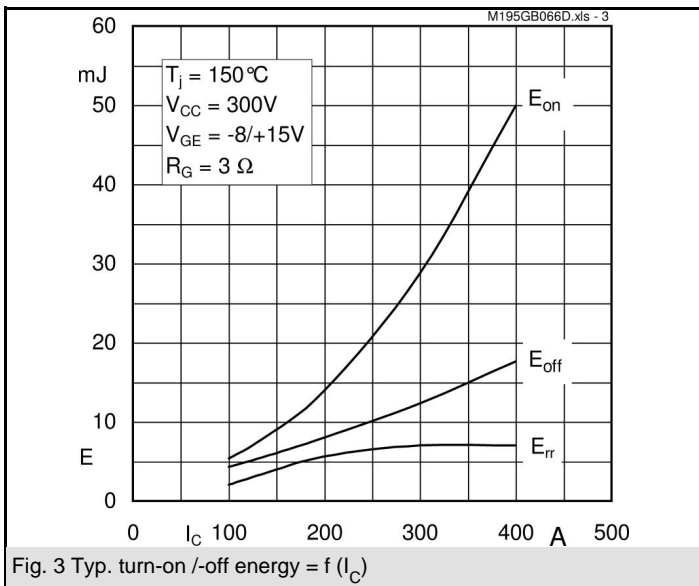
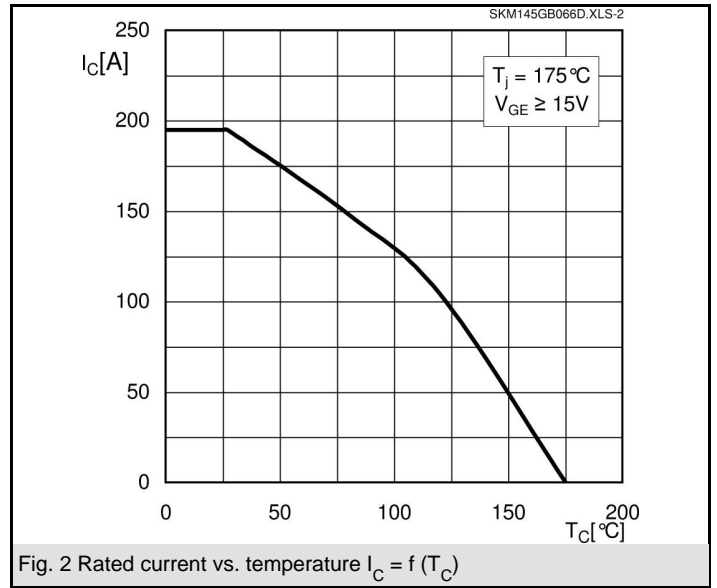
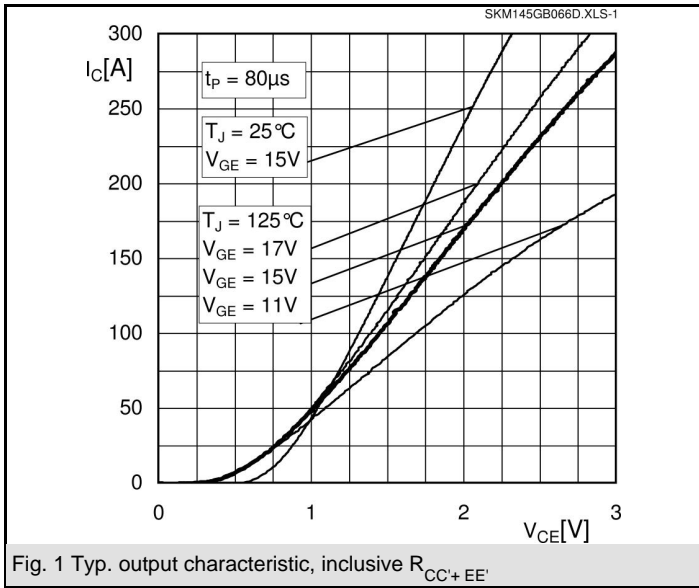
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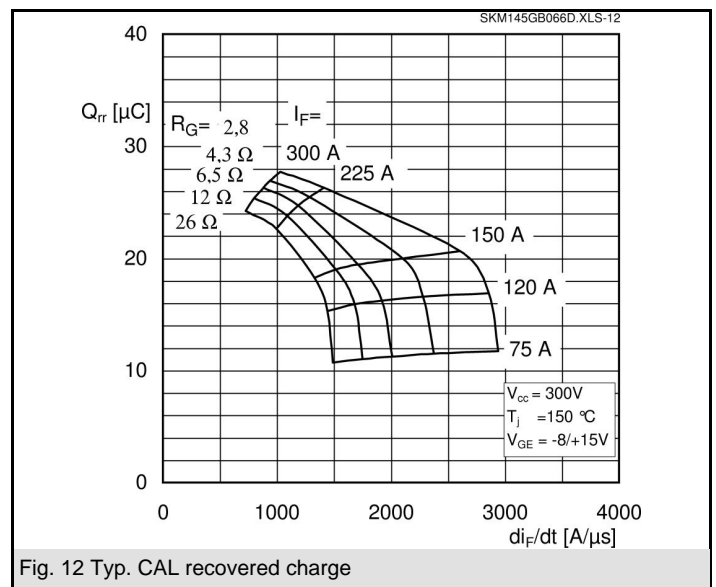
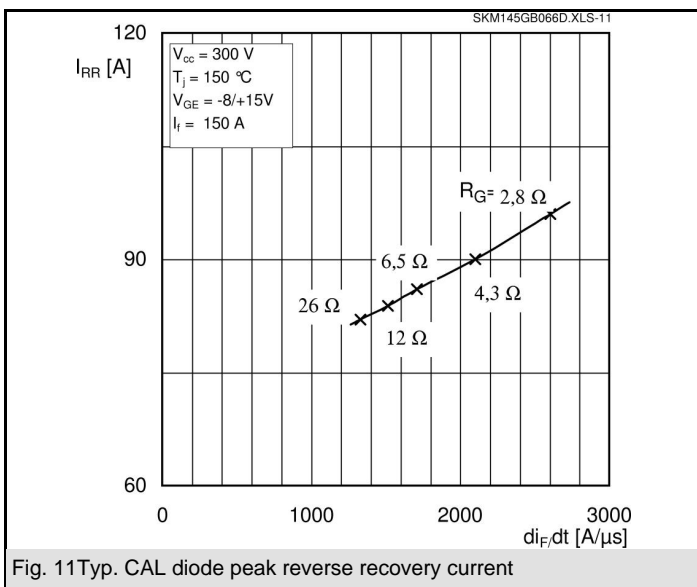
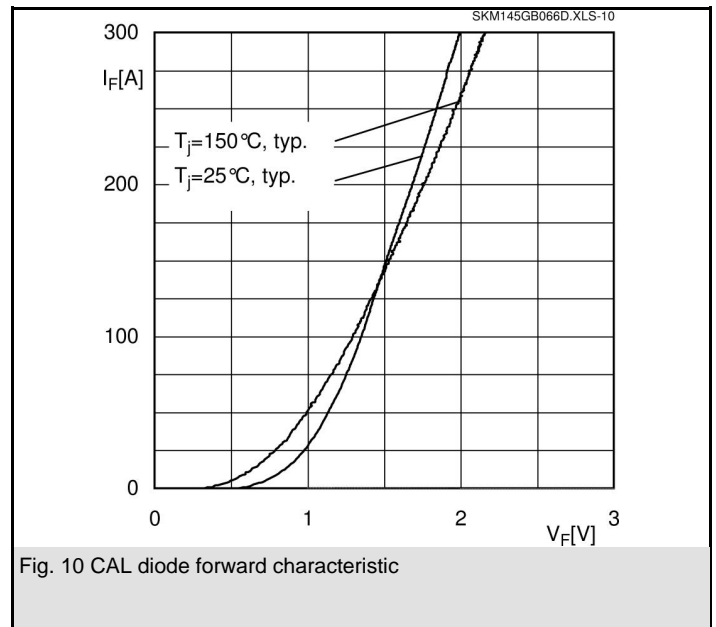
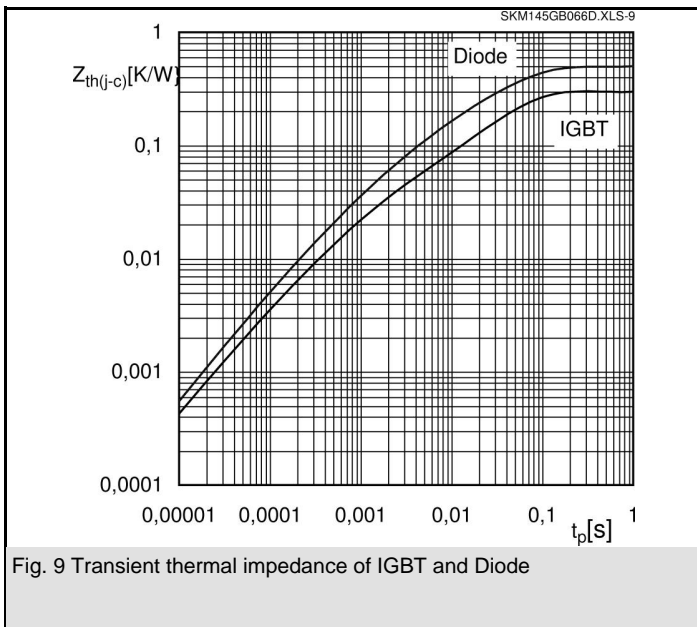
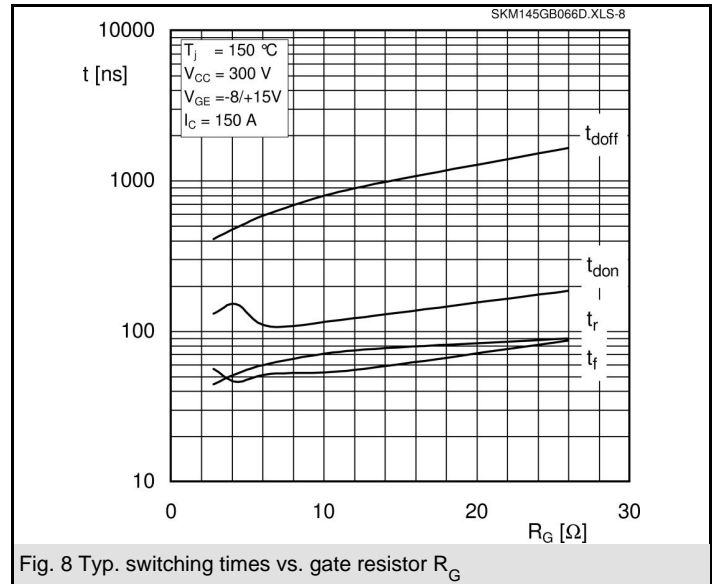
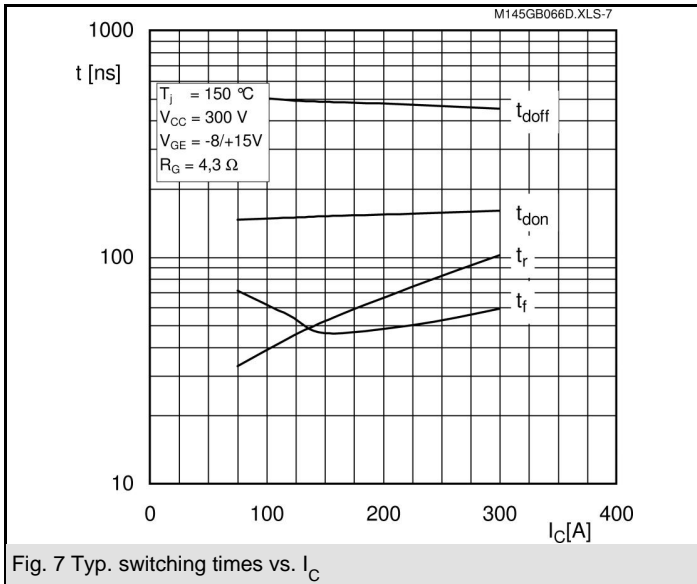
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$Z_{th}$ Symbol	Conditions	Values	Units
<b><math>Z_{th(j-c)I}</math></b>			
$R_{\theta i}$	i = 1	220	mk/W
$R_{\theta i}$	i = 2	60	mk/W
$R_{\theta i}$	i = 3	16,5	mk/W
$R_{\theta i}$	i = 4	3,5	mk/W
$\tau_{\theta i}$	i = 1	0,0447	s
$\tau_{\theta i}$	i = 2	0,0223	s
$\tau_{\theta i}$	i = 3	0,0015	s
$\tau_{\theta i}$	i = 4	0,0002	s
<b><math>Z_{th(j-c)D}</math></b>			
$R_{\theta i}$	i = 1	330	mk/W
$R_{\theta i}$	i = 2	137	mk/W
$R_{\theta i}$	i = 3	28	mk/W
$R_{\theta i}$	i = 4	5	mk/W
$\tau_{\theta i}$	i = 1	0,05	s
$\tau_{\theta i}$	i = 2	0,0129	s
$\tau_{\theta i}$	i = 3	0,002	s
$\tau_{\theta i}$	i = 4	0,0002	s



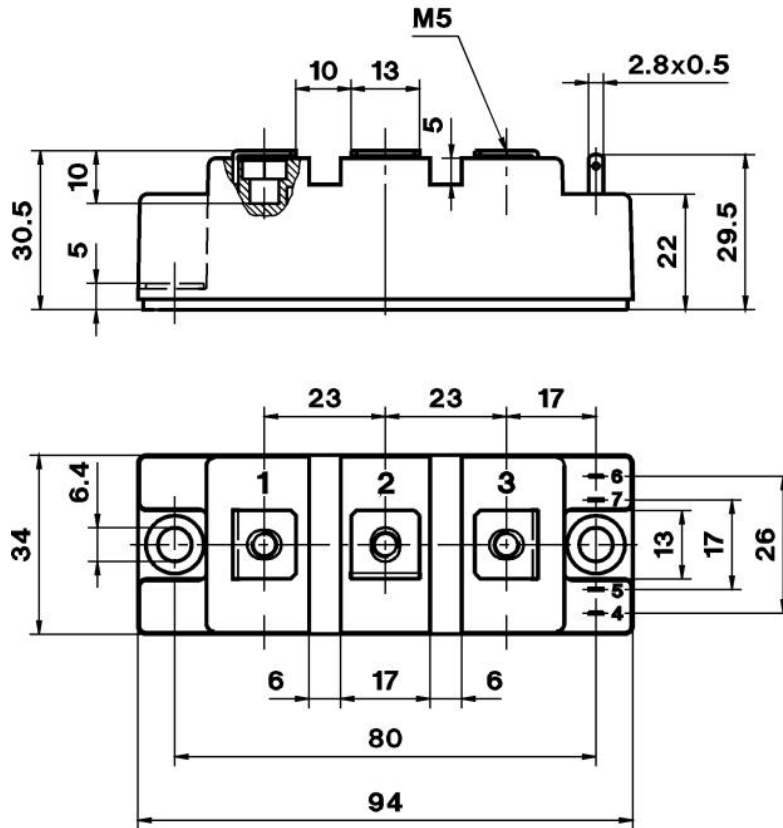
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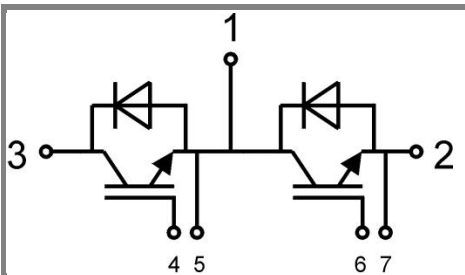


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CASED61



Case D 61



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Case D61