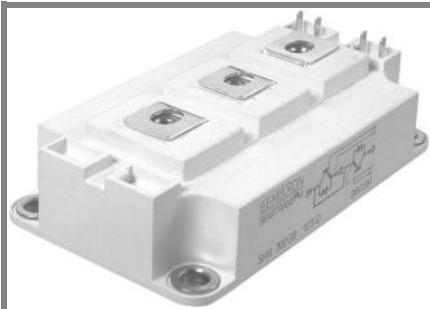


# SKM 400GB12T4



**SEMITRANS® 3**

## IGBT4 Modules

**SKM 400GB12T4**

**SKM 400GAL12T4**

**SKM 400GAR12T4**

### Features

- IGBT4 = 4. Generation (Trench) IGBT
- $V_{CEsat}$  with positive temperature coefficient
- High short circuit capability, self limiting to  $6 \times I_{CNOM}$
- Electronic welders at  $f_{sw}$  up to 20 kHz

### Typical Applications

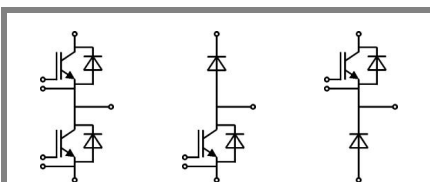
- AC inverter drives
- UPS
- Electronic welders at  $f_{sw}$  up to 20 kHz

### 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  $T_j \leq 150^\circ$

Absolute Maximum Ratings		$T_c = 25^\circ\text{C}$ , unless otherwise specified		
Symbol	Conditions	Values		Units
<b>IGBT</b>				
$V_{CES}$	$T_j = 25^\circ\text{C}$	1200		V
$I_C$	$T_j = 175^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	610	A
		$T_{case} = 80^\circ\text{C}$	475	A
$I_{CRM}$	$I_{CRM} = 3 \times I_{CNOM}$	1200		A
$V_{GES}$		$\pm 20$		V
$t_{psc}$	$V_{CC} = 800\text{ V}; V_{GE} \leq 15\text{ V}; T_j = 150^\circ\text{C}$ $V_{CES} < 1200\text{ V}$	10		$\mu\text{s}$
<b>Inverse Diode</b>				
$I_F$	$T_j = 175^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	440	A
		$T_{case} = 80^\circ\text{C}$	330	A
$I_{FRM}$	$I_{FRM} = 3 \times I_{FNOM}$	1200		A
<b>Module</b>				
$I_{t(RMS)}$		500		A
$T_{vj}$		-40 ... +175		$^\circ\text{C}$
$T_{stg}$		-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	
<b>IGBT</b>						
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 16\text{ mA}$	5	5,8	6,5	V	
$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$	$T_j = 25^\circ\text{C}$			mA	
$V_{CE0}$		$T_j = 25^\circ\text{C}$		0,8	0,9	V
		$T_j = 150^\circ\text{C}$		0,7	0,8	V
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$		2,5	2,8	$\text{m}\Omega$
		$T_j = 150^\circ\text{C}$		3,8	4	$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 400\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$		1,8	2	V
		$T_j = 150^\circ\text{C}_{chiplev.}$		2,2	2,4	V
$C_{ies}$	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$		24,8	nF	
$C_{oes}$				1,64	nF	
$C_{res}$				1,4	nF	
$Q_G$	$V_{GE} = -8\text{ V} / +15\text{ V}$			2250	nC	
$R_{Gint}$	$T_j = 25^\circ\text{C}$			1,9	$\Omega$	
$t_{d(on)}$	$R_{Gon} = 1\ \Omega$ $di/dt = 9700\text{ A}/\mu\text{s}$	$V_{CC} = 600\text{ V}$ $I_C = 400\text{ A}$	$T_j = 150^\circ\text{C}$		220	ns
$t_r$					47	ns
$E_{on}$					33	mJ
$t_{d(off)}$	$R_{Goff} = 1\ \Omega$ $di/dt = 4300\text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$ $V_{GE} = -8\text{ V}$			505	ns
$t_f$					78	ns
$E_{off}$					42	mJ
$R_{th(j-c)}$	per IGBT			0,072	K/W	

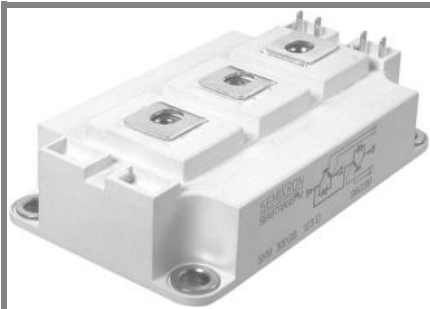


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GAL

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# SKM 400GB12T4



**SEMITRANS® 3**

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**SKM 400GAL12T4**

**SKM 400GAR12T4**

### Features

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### Typical Applications

- AC inverter drives
- UPS
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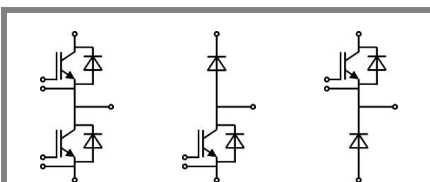
### Remarks

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Characteristics			min.	typ.	max.	Units
Symbol	Conditions					
<b>Inverse Diode</b>						
$V_F = V_{EC}$	$I_{Fnom} = 400 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$		2,2	2,5	V
		$T_j = 150^\circ\text{C}_{chiplev.}$		2,1	2,45	V
$V_{F0}$		$T_j = 25^\circ\text{C}$		1,3	1,5	V
		$T_j = 150^\circ\text{C}$		0,9	1,1	V
$r_F$		$T_j = 25^\circ\text{C}$		2,25	2,5	mΩ
		$T_j = 150^\circ\text{C}$		3	3,4	mΩ
$I_{RRM}$	$I_F = 400 \text{ A}$	$T_j = 150^\circ\text{C}$		450		A
$Q_{rr}$	$di/dt = 8800 \text{ A}/\mu\text{s}$			68		μC
$E_{rr}$	$V_{GE} = -8\text{V}$			30,5		mJ
$R_{th(j-c)}$	per diode				0,14	K/W
<b>Freewheeling Diode</b>						
$V_F = V_{EC}$	$I_{Fnom} = \text{A}; V_{GE} = \text{V}$	$T_j = ^\circ\text{C}_{chiplev.}$				V
$V_{F0}$		$T_j = ^\circ\text{C}$				V
$r_F$		$T_j = ^\circ\text{C}$				V
$I_{RRM}$	$I_F = \text{A}$	$T_j = ^\circ\text{C}$				A
$Q_{rr}$						μC
$E_{rr}$						mJ
	per diode					K/W
<b>Module</b>						
$L_{CE}$				15	20	nH
$R_{CC+EE'}$	res., terminal-chip	$T_{case} = 25^\circ\text{C}$			0,35	mΩ
		$T_{case} = 125^\circ\text{C}$			0,5	mΩ
$R_{th(c-s)}$	per module			0,02	0,038	K/W
$M_s$	to heat sink M6			3	5	Nm
$M_t$	to terminals M6			2,5	5	Nm
w					325	g

This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

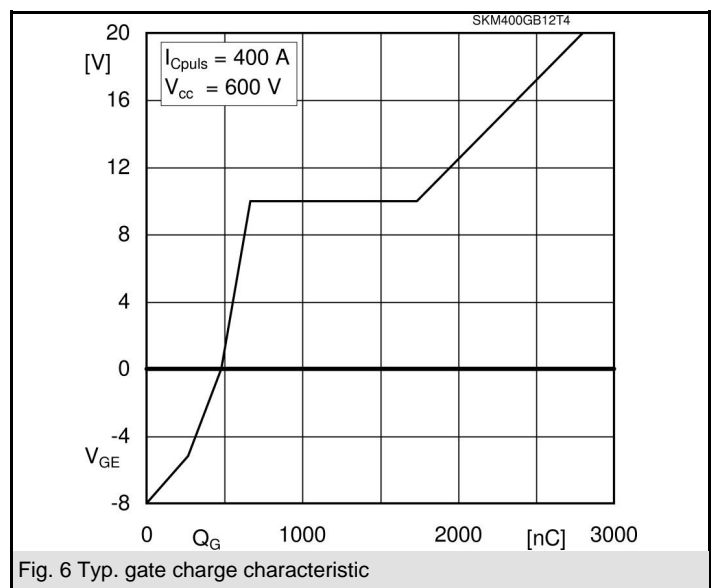
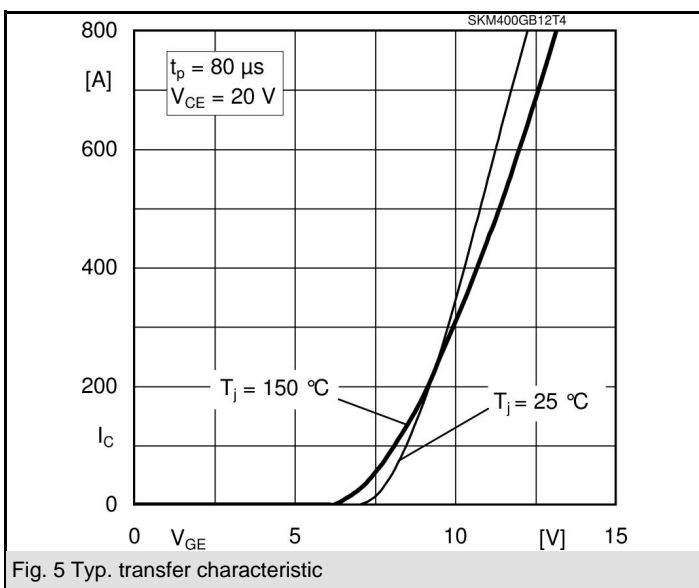
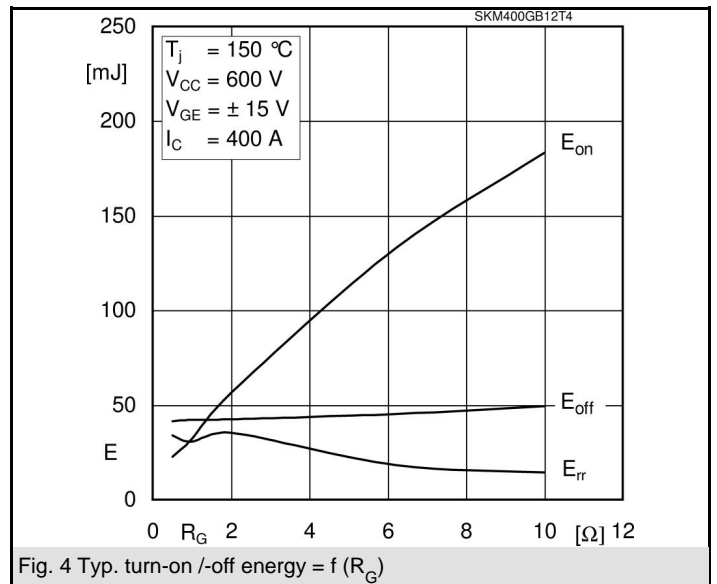
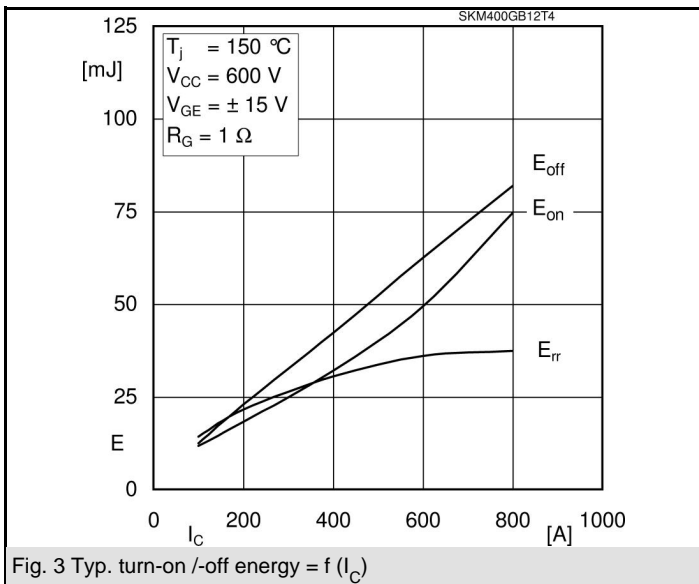
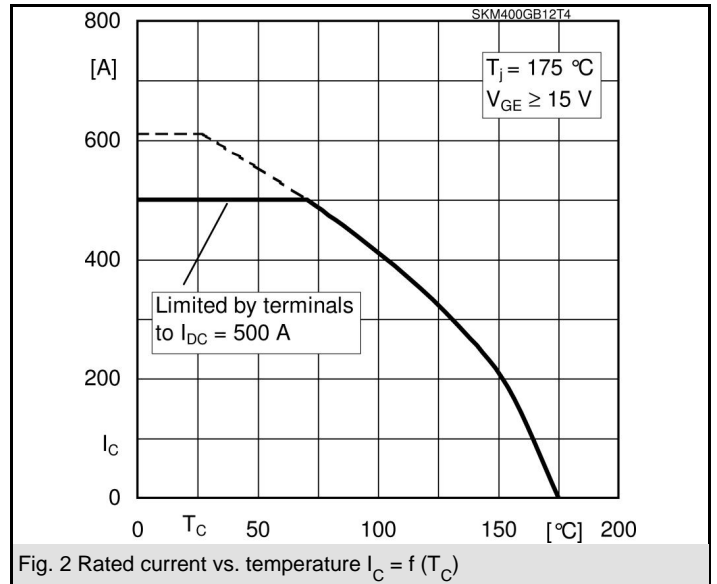
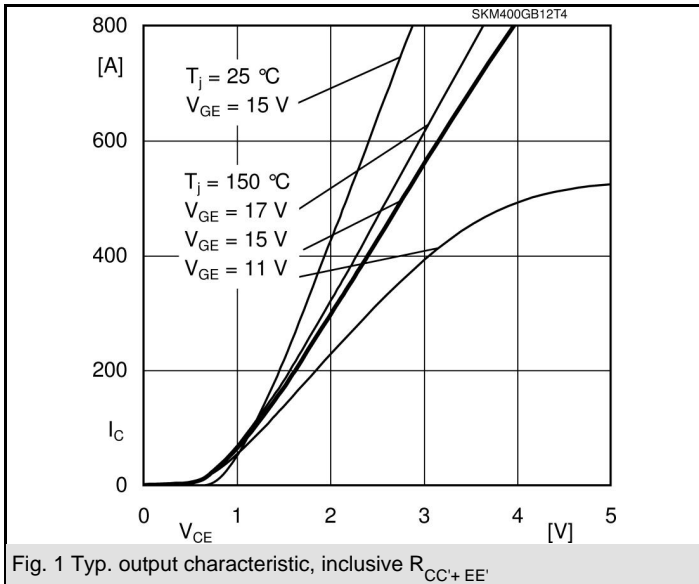
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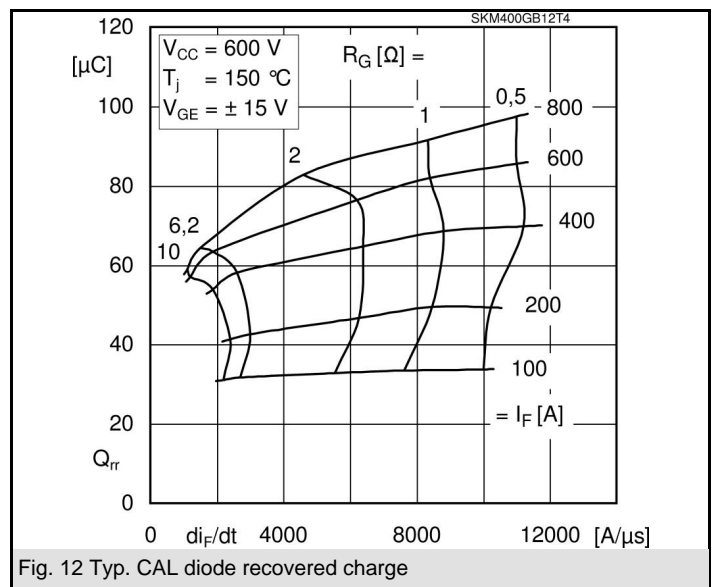
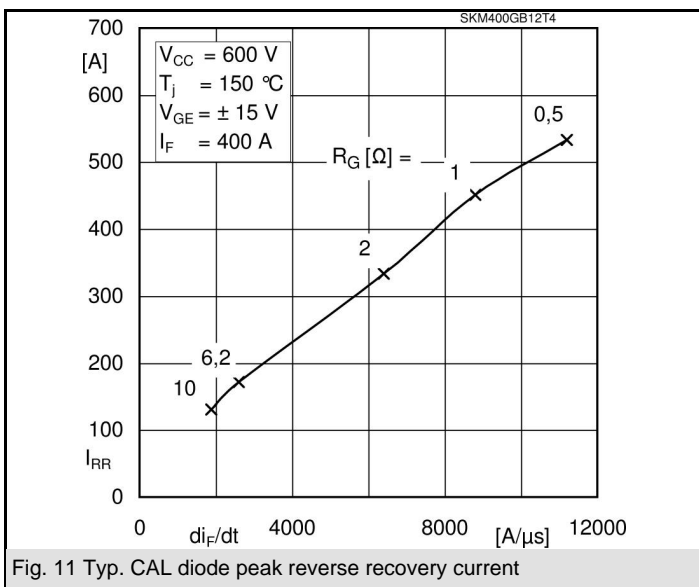
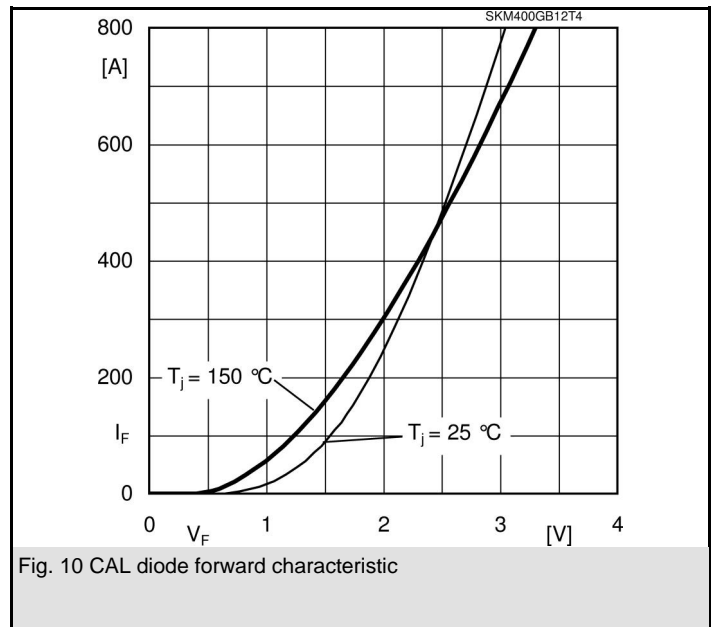
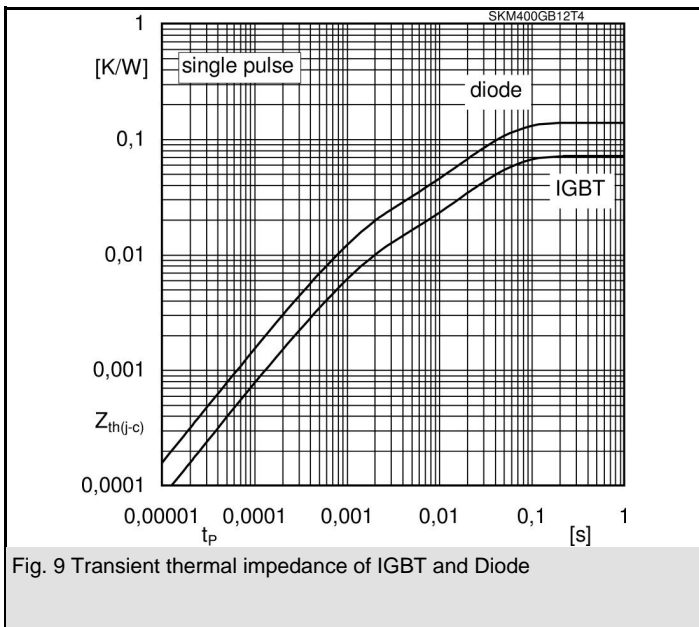
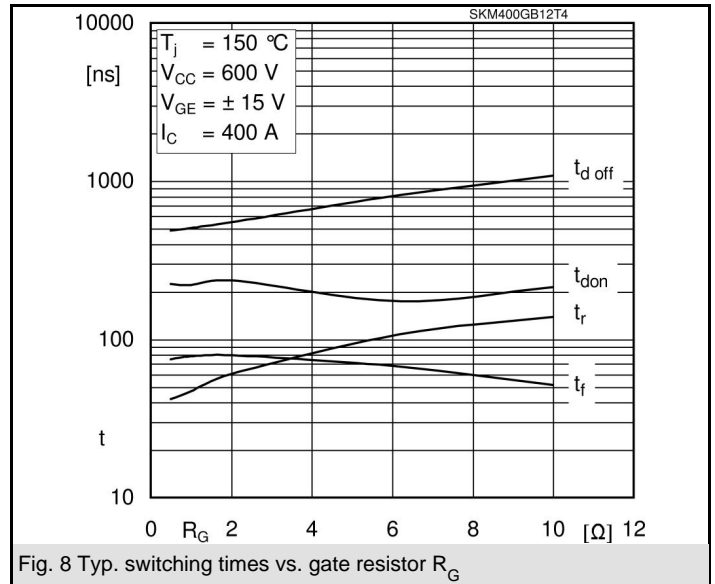
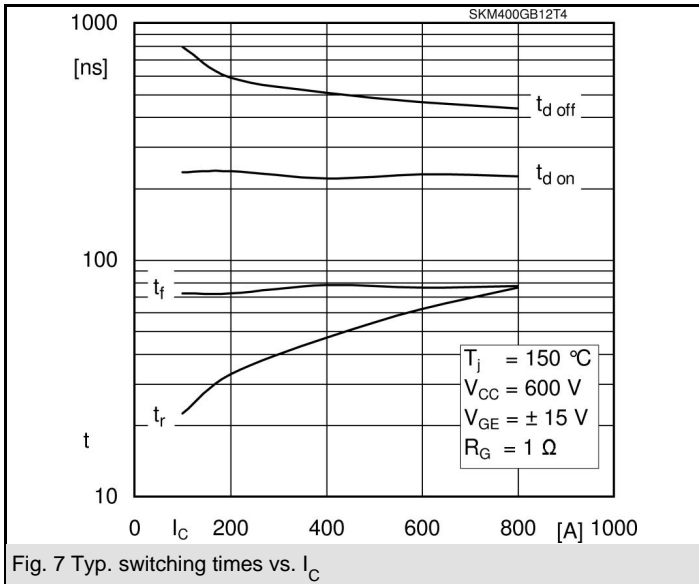


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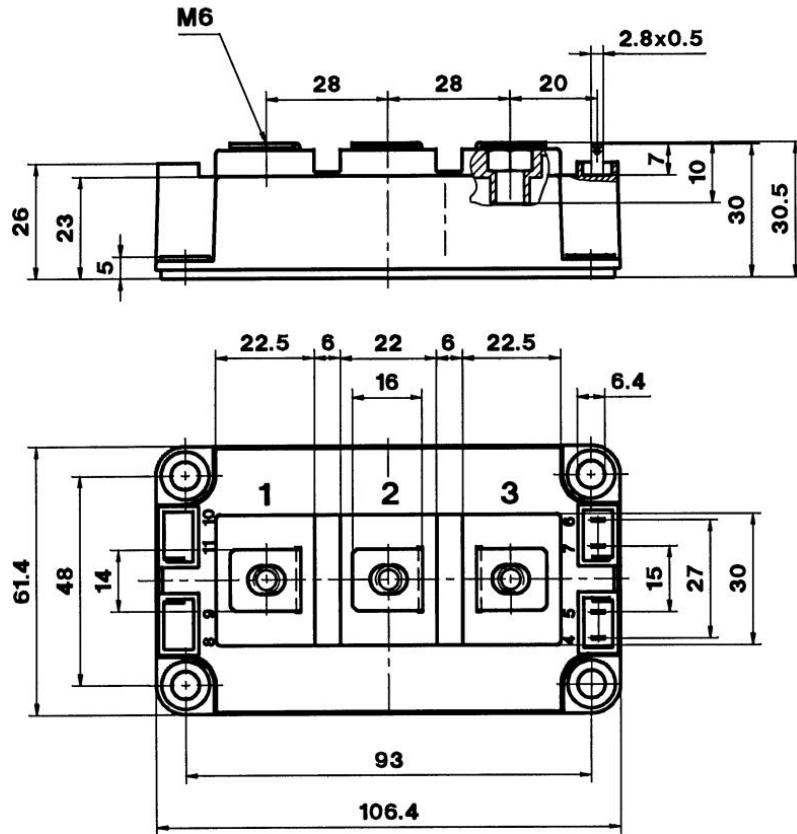


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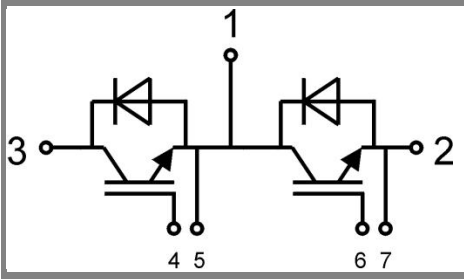
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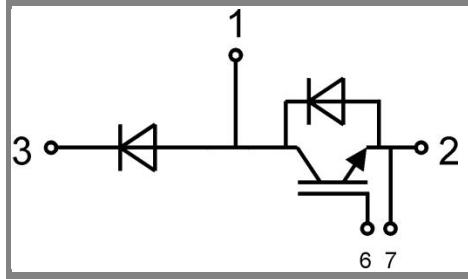
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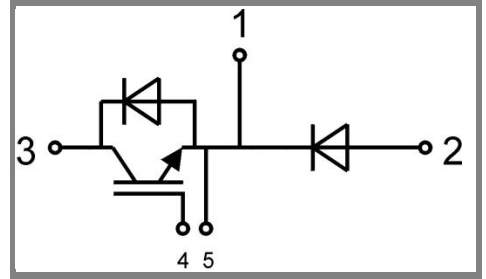
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