

# SKM900GA12E4



SEMITRANS® 4

## IGBT4 Modules

### SKM900GA12E4

#### Target Data

#### Features

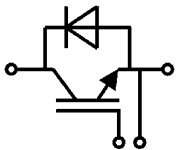
- $V_{CE(sat)}$  with positive temperature coefficient
- High short circuit capability, self limiting to 6 x  $I_{Cnom}$
- Fast & soft inverse CAL diodes
- Large clearance (10 mm) and creepage distances (20 mm)
- Isolated copper baseplate using DBC Technology (Direct Copper Bonding)
- UL recognized, file no. E63532

#### 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  $T_j = 150^\circ$



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## Absolute Maximum Ratings

Symbol	Conditions	Values	Unit	
<b>IGBT</b>				
$V_{CES}$	$T_j = 25^\circ\text{C}$	1200	V	
$I_C$	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	1311	A
		$T_c = 80^\circ\text{C}$	1007	A
$I_{Cnom}$		900	A	
$I_{CRM}$	$I_{CRM} = 3 \times I_{Cnom}$	2700	A	
$V_{GES}$		-20 ... 20	V	
$t_{psc}$	$V_{CC} = 800\text{ V}$ $V_{GE} \leq 15\text{ V}$ $V_{CES} \leq 1200\text{ V}$	$T_j = 150^\circ\text{C}$	10	$\mu\text{s}$
$T_j$		-40 ... 175	$^\circ\text{C}$	
<b>Inverse diode</b>				
$I_F$	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	871	A
		$T_c = 80^\circ\text{C}$	651	A
$I_{Fnom}$		900	A	
$I_{FRM}$	$I_{FRM} = 3 \times I_{Fnom}$	2700	A	
$I_{FSM}$	$t_p = 10\text{ ms}$ , $\sin 180^\circ$ , $T_j = 25^\circ\text{C}$	3520	A	
$T_j$		-40 ... 175	$^\circ\text{C}$	
<b>Module</b>				
$I_{t(RMS)}$	$80^\circ\text{C}$	500	A	
$T_{stg}$		-40 ... 125	$^\circ\text{C}$	
$V_{isol}$	AC sinus 50Hz, $t = 1\text{ min}$	4000	V	

## Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
<b>IGBT</b>					
$V_{CE(sat)}$	$I_C = 900\text{ A}$ $V_{GE} = 15\text{ V}$ chipllevel	$T_j = 25^\circ\text{C}$	1.8	2.1	V
		$T_j = 150^\circ\text{C}$	2.2	2.4	V
$V_{CE0}$		$T_j = 25^\circ\text{C}$	0.8	0.9	V
		$T_j = 150^\circ\text{C}$	0.7	0.8	V
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	1.1	1.3	$\text{m}\Omega$
		$T_j = 150^\circ\text{C}$	1.7	1.8	$\text{m}\Omega$
$V_{GE(th)}$	$V_{GE} = V_{CE}$ , $I_C = 32.8\text{ mA}$	5	5.8	6.5	V
$I_{CES}$	$V_{GE} = 0\text{ V}$ $V_{CE} = 1200\text{ V}$	$T_j = 25^\circ\text{C}$	0.1	0.3	mA
		$T_j = 150^\circ\text{C}$			mA
$C_{ies}$	$V_{CE} = 25\text{ V}$		54.4		nF
$C_{oes}$	$V_{GE} = 0\text{ V}$		3.52		nF
$C_{res}$			3		nF
$Q_G$	$V_{GE} = -8\text{ V} \dots +15\text{ V}$		5100		nC
$R_{Gint}$	$T_j = 25^\circ\text{C}$		0.9		$\Omega$
$t_{d(on)}$	$V_{CC} = 600\text{ V}$ $I_C = 900\text{ A}$	$T_j = 150^\circ\text{C}$	200		ns
$t_r$	$V_{GE} = \pm 15\text{ V}$	$T_j = 150^\circ\text{C}$	100		ns
$E_{on}$	$R_{G on} = 0.5\ \Omega$	$T_j = 150^\circ\text{C}$	80		mJ
$t_{d(off)}$	$R_{G off} = 0.5\ \Omega$	$T_j = 150^\circ\text{C}$	620		ns
$t_f$	$di/dt_{on} = 9000\text{ A}/\mu\text{s}$ $di/dt_{off} = 4500\text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$	110		ns
$E_{off}$		$T_j = 150^\circ\text{C}$	115		mJ
$R_{th(j-c)}$	per IGBT			0.035	K/W

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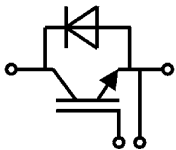
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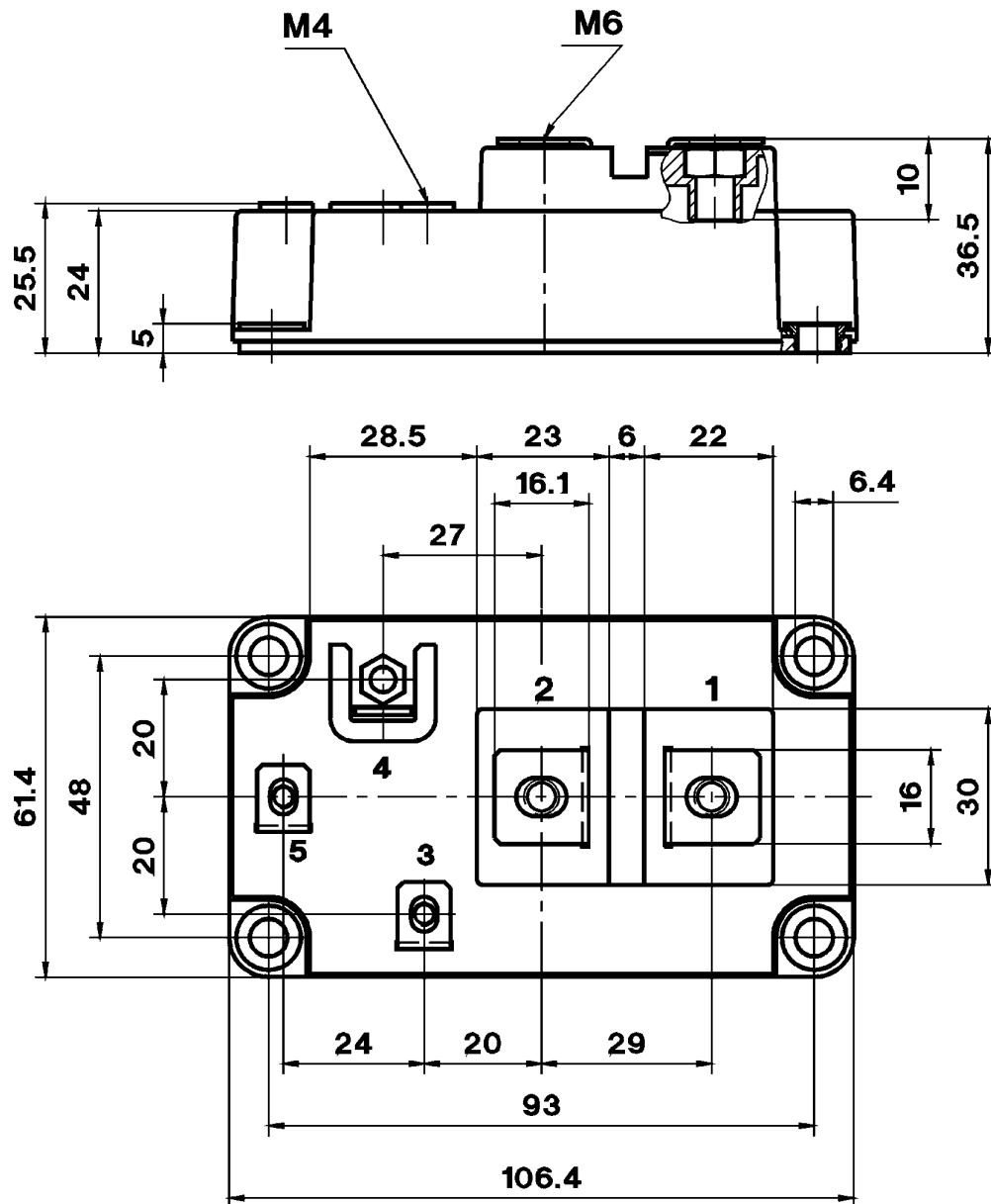
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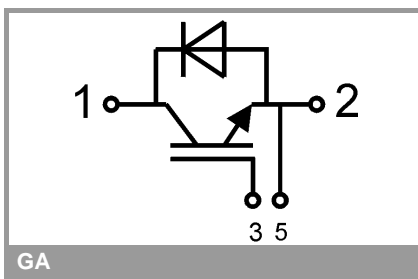
Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
<b>Inverse diode</b>						
$V_F = V_{EC}$	$I_F = 900 \text{ A}$	$T_j = 25^\circ\text{C}$		2.31	2.65	V
	$V_{GE} = 0 \text{ V}$	$T_j = 150^\circ\text{C}$		2.31	2.64	V
	chip					
$V_{F0}$		$T_j = 25^\circ\text{C}$		1.3	1.5	V
		$T_j = 150^\circ\text{C}$		0.9	1.1	V
$r_F$		$T_j = 25^\circ\text{C}$		1.1	1.3	m $\Omega$
		$T_j = 150^\circ\text{C}$		1.6	1.7	m $\Omega$
$I_{RRM}$	$I_F = 900 \text{ A}$	$T_j = 150^\circ\text{C}$		850		A
$Q_{rr}$	$di/dt_{off} = 9000 \text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$		140		$\mu\text{C}$
$E_{rr}$	$V_{GE} = \pm 15 \text{ V}$	$T_j = 150^\circ\text{C}$		65		mJ
	$V_{CC} = 600 \text{ V}$					
$R_{th(j-c)}$	per diode				0.07	K/W
<b>Module</b>						
$L_{CE}$				15	20	nH
$R_{CC+EE'}$	terminal-chip	$T_c = 25^\circ\text{C}$		0.18		m $\Omega$
		$T_c = 125^\circ\text{C}$		0.22		m $\Omega$
$R_{th(c-s)}$	per module			0.02	0.038	K/W
$M_s$	to heat sink M6		3		5	Nm
$M_t$		to terminals M6, M4	2.5		5	Nm
w					330	g



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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.