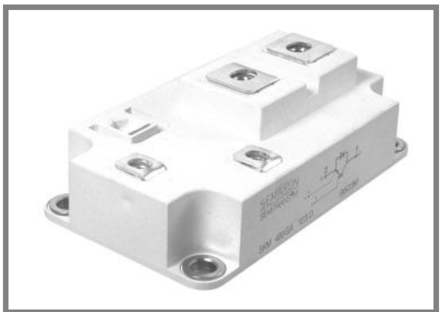
SKM 500GA123D



SEMITRANS® 4

IGBT Modules

SKM 500GA123D

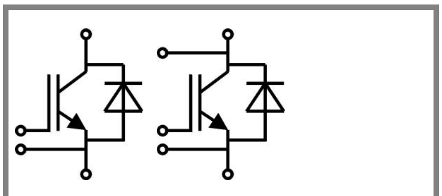
SKM 500GA123DS

Features

- MOS input (voltage controlled)
- N channel, homgeneous Si
- Low inductance case
- Very low tail current with low temperature dependence
- High short circuit capability, self limiting to 6 x I_{cnom}
- Latch-up free
- Fast & soft CAL diodes
- Isolated copper baseplate using DBC Direct Copper Bonding Technology
- Large clearance (12 mm) and creepage distances (20 mm)

Typical Applications

- AC inverter drives
- UPS



Absolute Maximum Ratings — T_c = 25 °C, unless otherwise specified

Symbol	Conditions		Values	Units
IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	T_j = 150 °C	T_{case} = 25 °C	500	A
		T_{case} = 80 °C	420	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		800	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 600 V; $V_{GE} \leq$ 20 V; V_{CES} < 1200 V	T_j = 125 °C	10	µs
Inverse Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	500	A
		T_{case} = 80 °C	350	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		800	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	3600	A
Module				
$I_{t(RMS)}$			500	A
T_{vj}			- 40 ...+ 150	°C
T_{stg}			- 40 ...+ 125	°C
V_{isol}	AC, 1 min.		2500	V

Characteristics — T_c = 25 °C, unless otherwise specified

Symbol	Conditions		min.	typ.	max.	Units
IGBT						
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 16 mA		4,5	5,5	6,5	V
I_{CES}	V_{GE} = 0 V, V_{CE} = V_{CES}	T_j = 25 °C		0,1	0,3	mA
V_{CE0}		T_j = 25 °C		1,4	1,6	V
		T_j = 125 °C		1,6	1,8	V
r_{CE}	V_{GE} = 15 V	T_j = 25°C		2,75	3,5	mΩ
		T_j = 125°C		3,75	4,75	mΩ
$V_{CE(sat)}$	I_{Cnom} = 400 A, V_{GE} = 15 V	T_j = °$C_{chiplev.}$		2,5	3	V
C_{ies}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		26	40	nF
C_{oes}				4	5,2	nF
C_{res}				2	2,6	nF
R_{Gint}	T_j = °C			1,25		Ω
$t_{d(on)}$	R_{Gon} = 3,3 Ω	V_{CC} = 600V		250	600	ns
t_r		I_{Cnom}= 400A		170	340	ns
E_{on}		T_j = 125 °C		45		mJ
$t_{d(off)}$	R_{Goff} = 3,3 Ω	V_{GE} = ± 15V		900	1100	ns
t_f				100	125	ns
E_{off}						mJ
$R_{th(j-c)}$	per IGBT				0,041	K/W

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Typical Applications

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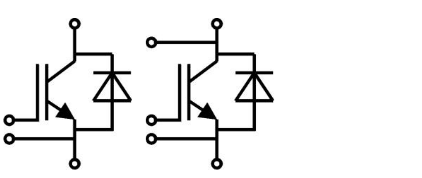
- UPS

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 400 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		2	2,5	V
		T_j = 125 °$C_{chiplev.}$		1,8		V
V_{F0}		T_j = 25 °C		1,1	1,2	V
		T_j = 125 °C				V
r_F		T_j = 25 °C		2,3	3,3	mΩ
		T_j = 125 °C				mΩ
I_{RRM}	I_{Fnom} = 400 A	T_j = 25 °C		90		A
Q_{rr}	di/dt = 2000 A/µs			15		µC
E_{rr}	V_{GE} = 0 V; V_{CC} = 600 V					mJ
$R_{th(j-c)D}$	per diode				0,09	K/W
Freewheeling Diode						
$V_F = V_{EC}$	I_{Fnom} = A; V_{GE} = V	T_j = °$C_{chiplev.}$				V
V_{F0}		T_j = 25 °C				V
		T_j = 125 °C				V
r_F		T_j = 25 °C				V
		T_j = 125 °C				V
I_{RRM}	I_{Fnom} = A	T_j = °C				A
Q_{rr}						µC
E_{rr}	V_{GE} = 0 V; V_{CC} = 600 V					mJ
	per diode					K/W
Module						
L_{CE}				15	20	nH
$R_{CC'+EE'}$	res., terminal-chip	T_{case}= 25 °C		0,18		mΩ
		T_{case}= 125 °C		0,22		mΩ
$R_{th(c-s)}$	per module				0,038	K/W
M_s	to heat sink M6		3		5	Nm
M_t	to terminals M6 (M4)		2,5 (1,1)		5 (2)	Nm
w					330	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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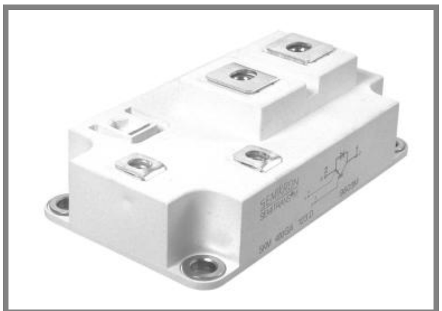

SEMITRANS® 4

Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	i = 1	29	mk/W
R_i	i = 2	10	mk/W
R_i	i = 3	1,8	mk/W
R_i	i = 4	0,2	mk/W
tau_i	i = 1	0,04	s
tau_i	i = 2	0,0189	s
tau_i	i = 3	0,0017	s
tau_i	i = 4	0,001	s
$Z_{th(j-c)D}$			
R_i	i = 1	60	mk/W
R_i	i = 2	23	mk/W
R_i	i = 3	6,2	mk/W
R_i	i = 4	0,8	mk/W
tau_i	i = 1	0,0366	s
tau_i	i = 2	0,042	s
tau_i	i = 3	0,0009	s
tau_i	i = 4	0,002	s

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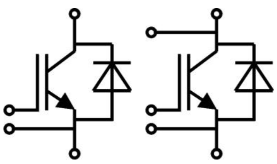

GA GA...S

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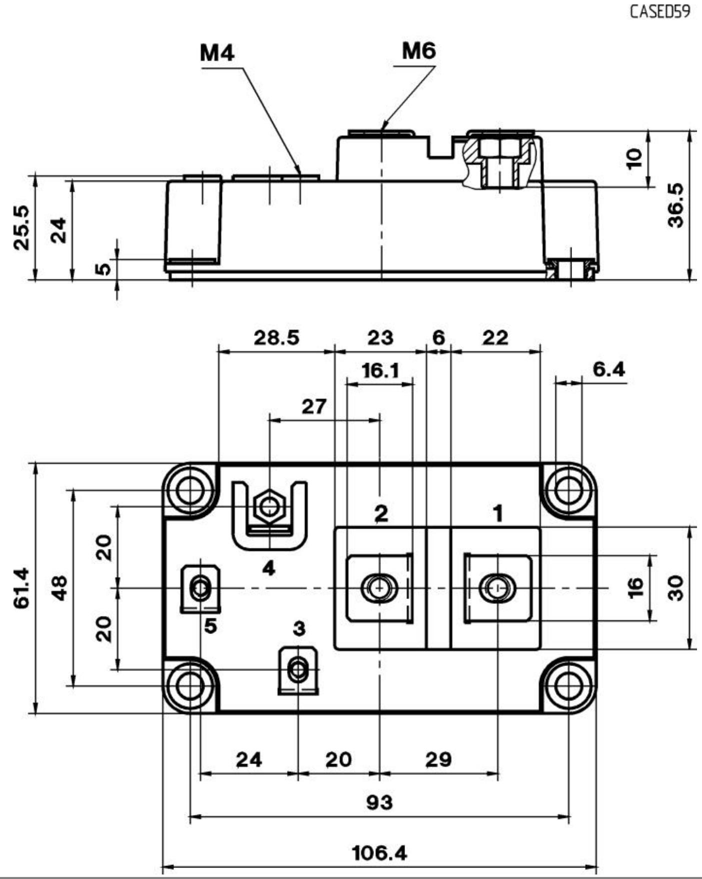
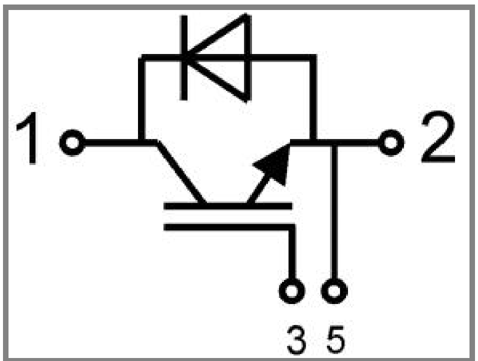


Case D 60



GA Case D 60