

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.



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Absolute Maximum Ratings		$T_{case} = 25^\circ\text{C}$, unless otherwise specified		
Symbol	Conditions	Values	Units	
IGBT				
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}		± 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	μs	
Inverse Diode				
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
Module				
$I_{t(RMS)}$		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
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}$; $I_C = 2,4\text{mA}$	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 Ω
		$T_j = 150^\circ\text{C}$	5,7	8	m Ω
$V_{CE(sat)}$	$I_{Cnom} = 150\text{A}$; $V_{GE} = 15\text{V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	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		Ω
$t_{d(on)}$	$R_{Gon} = 4,3\ \Omega$	$V_{CC} = 300\text{V}$ $I_{Cnom} = 150\text{A}$	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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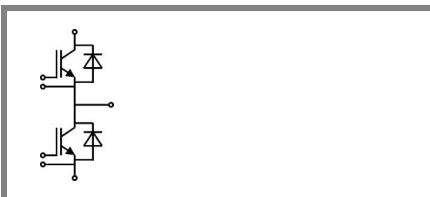
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Characteristics

Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 150\text{ A}$; $V_{GE} = 0\text{ V}$		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
Module					
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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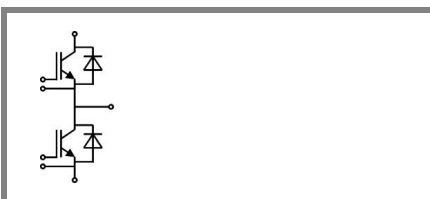
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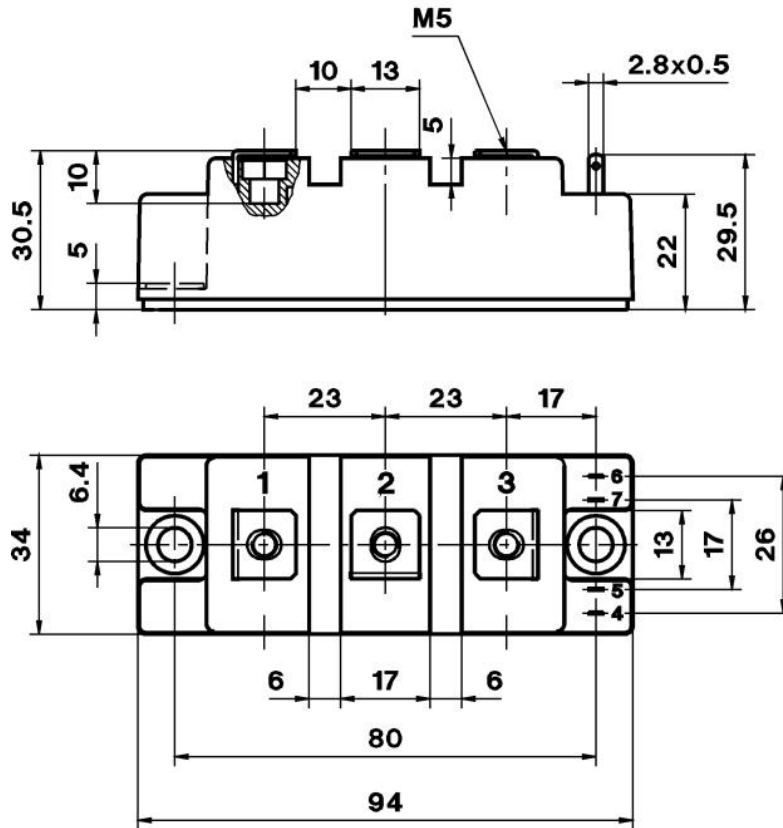
Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
$R_{\theta i}$	$i = 1$	220	mk/W
$R_{\theta i}$	$i = 2$	60	mk/W
$R_{\theta i}$	$i = 3$	16,5	mk/W
$R_{\theta i}$	$i = 4$	3,5	mk/W
$\tau_{\theta i}$	$i = 1$	0,0447	s
$\tau_{\theta i}$	$i = 2$	0,0223	s
$\tau_{\theta i}$	$i = 3$	0,0015	s
$\tau_{\theta i}$	$i = 4$	0,0002	s
$Z_{th(j-c)D}$			
$R_{\theta i}$	$i = 1$	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



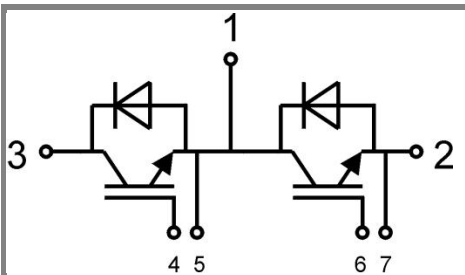
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CASED61



Case D 61



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Case D61