



SEMITRANS™ 2

Trench IGBT Modules

SKM 145GAL176D

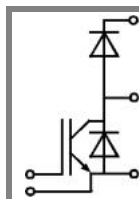
Target Data

Features

- Homogeneous Si
- 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 mains 575 - 750 V AC
- Public transport (auxiliary systems)



GAL

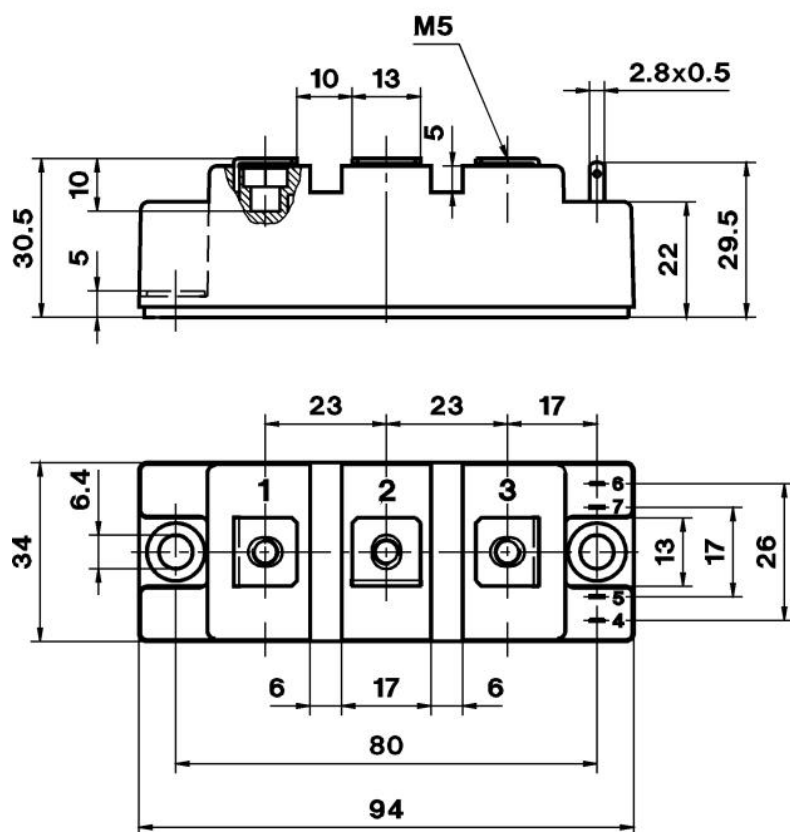
Absolute Maximum Ratings		$T_{case} = 25^\circ\text{C}$, unless otherwise specified	
Symbol	Conditions	Values	Units
IGBT			
V_{CES}		1700	V
I_C	$T_c = 25 (80)^\circ\text{C}$	160 (120)	A
I_{CRM}	$t_p = 1 \text{ ms}$	200	A
V_{GES}		± 20	V
T_{vj} (T_{stg})	$T_{OPERATION} \leq T_{stg}$	- 40 ... +150 (125)	$^\circ\text{C}$
V_{isol}	AC, 1 min.	4000	V
Inverse diode			
I_F	$T_c = 25 (80)^\circ\text{C}$	140 (100)	A
I_{FRM}	$t_p = 1 \text{ ms}$	200	A
I_{FSM}	$t_p = 10 \text{ ms; sin.; } T_j = 150^\circ\text{C}$	1400	A
Freewheeling diode			
I_F	$T_c = 25 (80)^\circ\text{C}$	140 (100)	A
I_{FRM}	$t_p = 1 \text{ ms}$	200	A
I_{FSM}	$t_p = 10 \text{ ms; sin.; } T_j = 150^\circ\text{C}$	1400	A

Characteristics		$T_{case} = 25^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 3,5 \text{ mA}$	5,2	5,8	6,4	V
I_{CES}	$V_{GE} = 0, V_{CE} = V_{CES}, T_j = 25 (125)^\circ\text{C}$		0,1	0,3	mA
$V_{CE(TO)}$	$T_j = 25 (125)^\circ\text{C}$		1 (0,9)	1,2 (1,1)	V
r_{CE}	$V_{GE} = 15 \text{ V}, T_j = 25 (125)^\circ\text{C}$		10 (15)	12,5	m Ω
$V_{CE(sat)}$	$I_{Cnom} = 100 \text{ A}, V_{GE} = 15 \text{ V}$, chip level		2 (2,4)	2,45	V
C_{ies}	under following conditions		7,1		nF
C_{oes}	$V_{GE} = 0, V_{CE} = 25 \text{ V}, f = 1 \text{ MHz}$		0,4		nF
C_{res}			0,3		nF
L_{CE}				30	nH
$R_{CC'+EE'}$	res., terminal-chip $T_c = 25 (125)^\circ\text{C}$		0,75 (1)		m Ω
$t_{d(on)}$	$V_{CC} = 1200 \text{ V}, I_{Cnom} = 100 \text{ A}$				ns
t_r	$R_{Gon} = R_{Goff} = \Omega, T_j = 125^\circ\text{C}$				ns
$t_{d(off)}$	$V_{GE} \pm 15 \text{ V}$				ns
t_f					ns
$E_{on} (E_{off})$					mJ
Inverse diode					
$V_F = V_{EC}$	$I_{Fnom} = 100 \text{ A}; V_{GE} = 0 \text{ V}; T_j = 25 (125)^\circ\text{C}$		1,6 (1,6)	1,9 (1,9)	V
$V_{(TO)}$	$T_j = 25 (125)^\circ\text{C}$		1,1 (0,9)	1,3 (1,1)	V
r_T	$T_j = 25 (125)^\circ\text{C}$		5 (7)	6 (8)	m Ω
I_{RRM}	$I_{Fnom} = 100 \text{ A}; T_j = 125 ()^\circ\text{C}$				A
Q_{rr}	$di/dt = \text{A}/\mu\text{s}$				μC
E_{rr}	$V_{GE} = \text{V}$				mJ
FWD					
$V_F = V_{EC}$	$I_F = 100 \text{ A}; V_{GE} = 0 \text{ V}, T_j = 25 (125)^\circ\text{C}$		1,6 (1,6)	1,9 (1,9)	V
$V_{(TO)}$	$T_j = 25 (125)^\circ\text{C}$		1,1 (0,9)	1,3 (1,1)	V
r_T	$T_j = 25 (125)^\circ\text{C}$		5 (7)	6 (8)	m Ω
I_{RRM}	$I_F = 100 \text{ A}; T_j = 125 ()^\circ\text{C}$				A
Q_{rr}	$di/dt = \text{A}/\mu\text{s}$				μC
E_{rr}	$V_{GE} = \text{V}$				mJ
Thermal characteristics					
$R_{th(j-c)}$	per IGBT			0,18	K/W
$R_{th(j-c)D}$	per Inverse Diode			0,36	K/W
$R_{th(j-c)FD}$	per FWD			0,36	K/W
$R_{th(c-s)}$	per module			0,05	K/W
Mechanical data					
M_s	to heatsink M6	3		5	Nm
M_t	to terminals M5	2,5		5	Nm
w				160	g

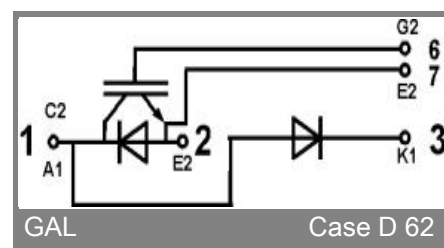
UL Recognized
File no. E 63 532

Dimensions in mm

CASED61



Case D 62



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

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