

SEMiX® 2

Trench IGBT Modules

SEMiX 402GB066HD

SEMiX 402GAL066HD

SEMiX 402GAR066HD

Target Data

Features

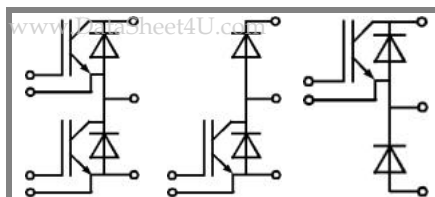
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient

Typical Applications

- Matrix Converter
- Resonant Inverter
- Current Source Inverter

Remarks

- Case temperature limited to $T_C = 125^\circ\text{C}$ max.
- Product reliability results are valid for $T_j = 150^\circ\text{C}$
- SC data: $t_p \leq 6 \mu\text{s}$; $V_{GE} \leq 15 \text{ V}$; $T_j = 150^\circ\text{C}$; $V_{CC} = 360 \text{ V}$



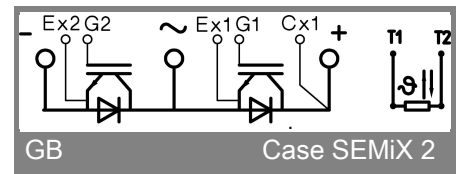
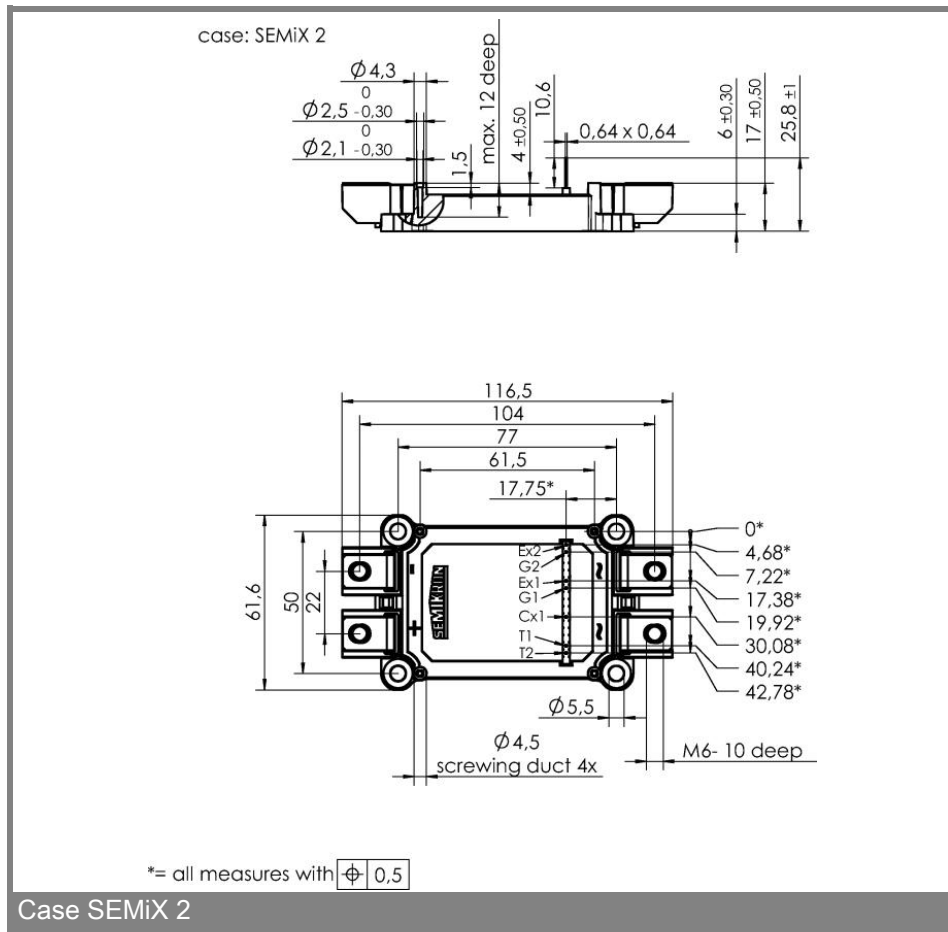
GB

GAL

GAR

Absolute Maximum Ratings $T_{case} = 25^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	Values	Units
IGBT			
V_{CES}		600	V
I_C	$T_c = 25 (80)^\circ\text{C}$, $T_j = 150^\circ\text{C}$	490 (340)	A
I_C	$T_c = 25 (80)^\circ\text{C}$, $T_j = 175^\circ\text{C}$	530 (410)	A
I_{CRM}	$t_p = 1 \text{ ms}$	800	A
V_{GES}		± 20	V
$T_j, (T_{stg})$		- 40 ... + 175 (125)	$^\circ\text{C}$
V_{isol}	AC, 1 min.	4000	V
Inverse diode			
I_F	$T_c = 25 (80)^\circ\text{C}$, $T_j = 150^\circ\text{C}$	380 (250)	A
I_F	$T_c = 25 (80)^\circ\text{C}$, $T_j = 175^\circ\text{C}$	420 (310)	A
I_{FRM}	$t_p = 1 \text{ ms}$	800	A
I_{FSM}	$t_p = 10 \text{ ms}$; sin.; $T_j = 25^\circ\text{C}$	1800	A

Characteristics $T_{case} = 25^\circ\text{C}$, unless otherwise specified				
Symbol	Conditions	min.	typ.	max. Units
IGBT				
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 3,2 \text{ mA}$		5,8	V
I_{CES}	$V_{GE} = 0$, $V_{CE} = V_{CES}$, $T_j = 25 ()^\circ\text{C}$			mA
$V_{CE(TO)}$	$T_j = 25 (150)^\circ\text{C}$		0,9 (0,85)	1 (0,9) V
r_{CE}	$V_{GE} = 15 \text{ V}$, $T_j = 25 (150)^\circ\text{C}$		1,4 (2,15)	2,25 (3) mΩ
$V_{CE(sat)}$	$I_{Cnom} = 400 \text{ A}$, $V_{GE} = 15 \text{ V}$, $T_j = 25 (150)^\circ\text{C}$, chip level		1,45 (1,7)	1,9 (2,1) V
C_{ies}	under following conditions			nF
C_{oes}	$V_{GE} = 0$, $V_{CE} = 25 \text{ V}$, $f = 1 \text{ MHz}$			nF
C_{res}				nF
L_{CE}				nH
$R_{CC+EE'}$	terminal-chip, $T_c = 25 (150)^\circ\text{C}$			mΩ
$t_{d(on)}/t_r$	$V_{CC} = 300 \text{ V}$, $I_{Cnom} = 400 \text{ A}$			ns
$t_{d(off)}/t_f$	$V_{GE} = \pm 15 \text{ V}$			ns
$E_{on} (E_{off})$	$R_{Gon} = R_{Goff} = 8 \Omega$, $T_j = 150^\circ\text{C}$		11 (17)	mJ
Inverse Diode				
$V_F = V_{EC}$	$I_{Fnom} = 400 \text{ A}$; $V_{GE} = 0 \text{ V}$; $T_j = 25 (150)^\circ\text{C}$, chip level		1,4 (1,4)	1,6 V
$V_{(TO)}$	$T_j = 25 (150)^\circ\text{C}$		1 (0,85)	1,1 V
r_T	$T_j = 25 (150)^\circ\text{C}$		1 (1,4)	1,25 mΩ
I_{RRM}	$I_{Fnom} = 400 \text{ A}$; $T_j = 25 (150)^\circ\text{C}$			A
Q_{rr}	$di/dt = \text{A}/\mu\text{s}$			μC
E_{rr}	$V_{GE} = -15 \text{ V}$			mJ
Thermal characteristics				
$R_{th(j-c)}$	per IGBT		0,11	K/W
$R_{th(j-c)D}$	per Inverse Diode		0,2	K/W
$R_{th(j-c)FD}$	per FWD			K/W
$R_{th(c-s)}$	per module		0,045	K/W
Temperature sensor				
R_{25}	$T_c = 25^\circ\text{C}$		5 $\pm 5\%$	kΩ
$B_{25/85}$	$R_2 = R_1 \exp[B(1/T_2 - 1/T_1)]$; $T[K]$; B		3420	K
Mechanical data				
M_s/M_t	to heatsink (M5) / for terminals (M6)	3/2,5	5 / 5	Nm
w			250	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.