


**SKiM<sup>®</sup> 4**

## IGBT Modules

### SKiM 220GD176D H4

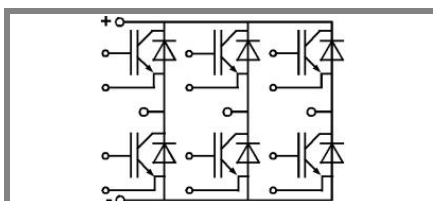
Preliminary Data

#### Features

- Homogenous Si
- Trench = Trenchgate Technology
- $V_{CEsat}$  with positive temperature coefficient
- High short circuit capability, self limiting to  $6x I_C$

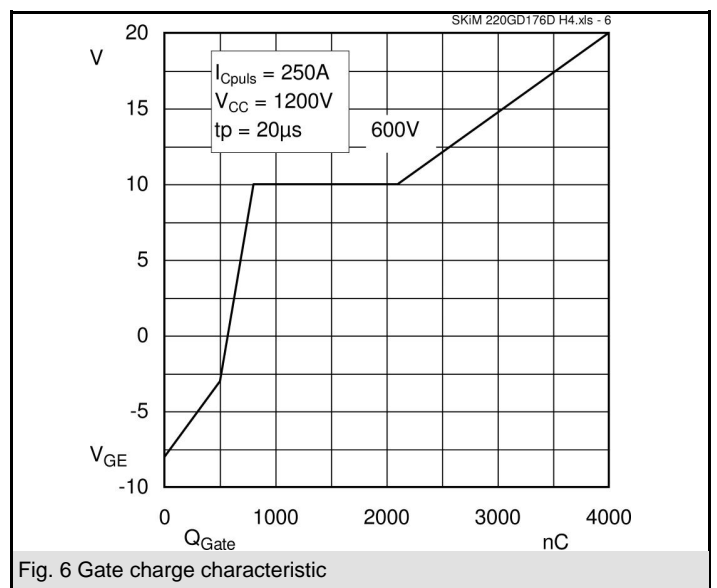
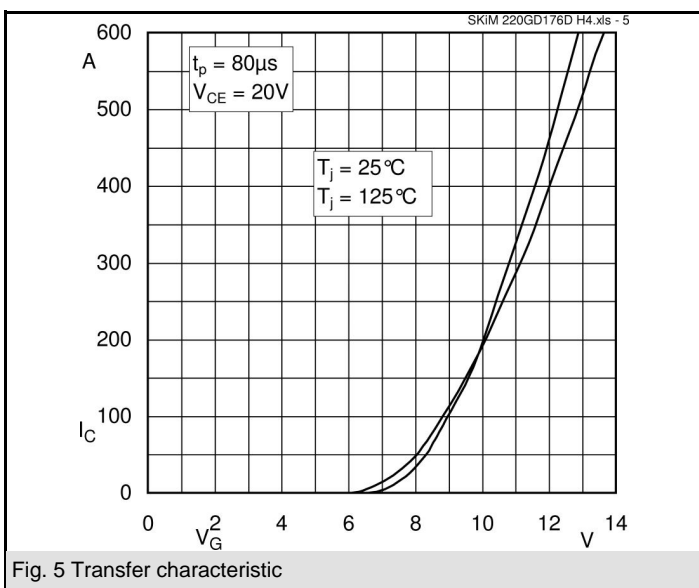
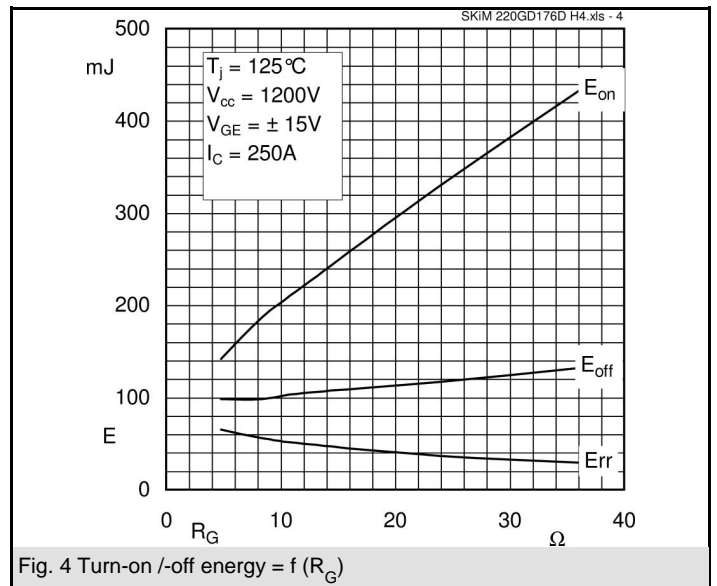
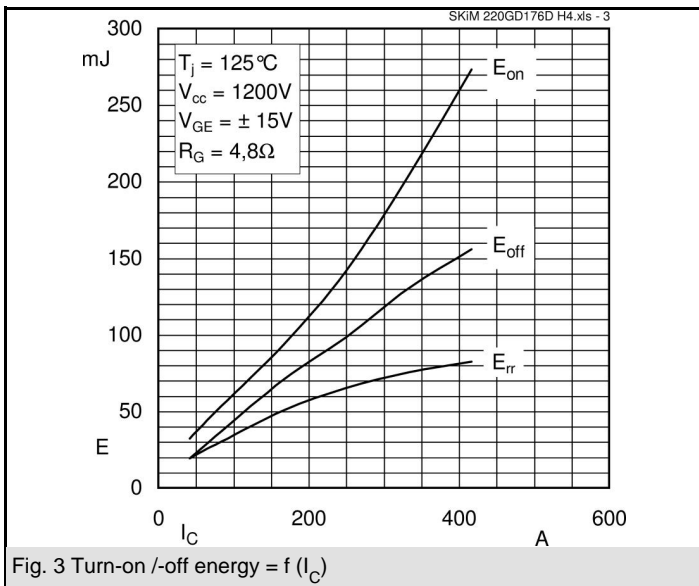
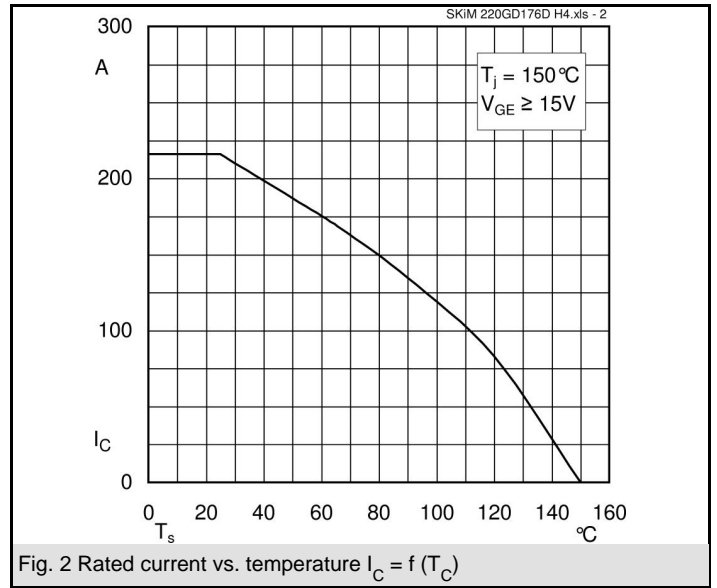
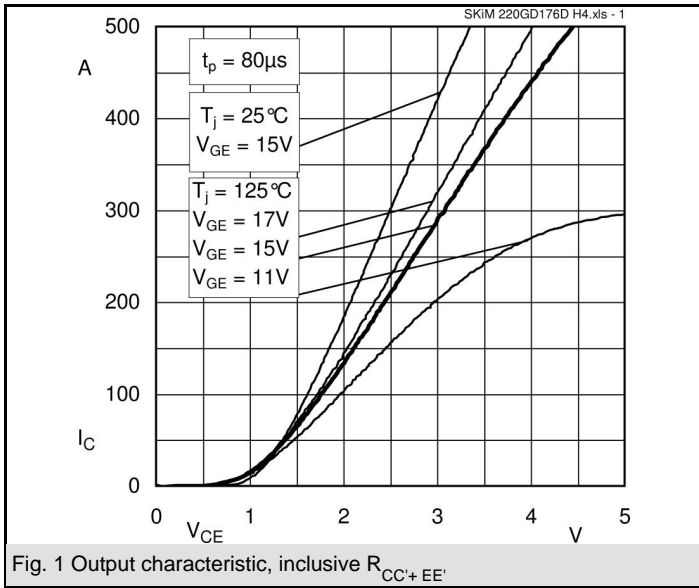
#### Typical Applications\*

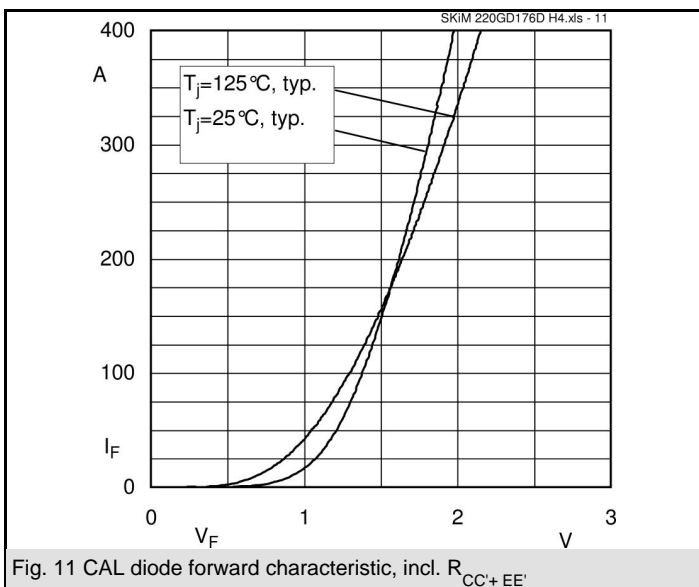
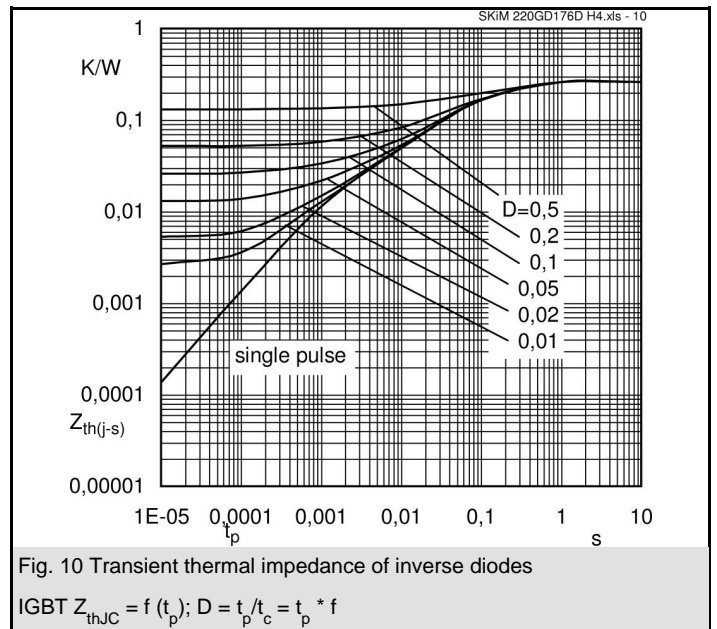
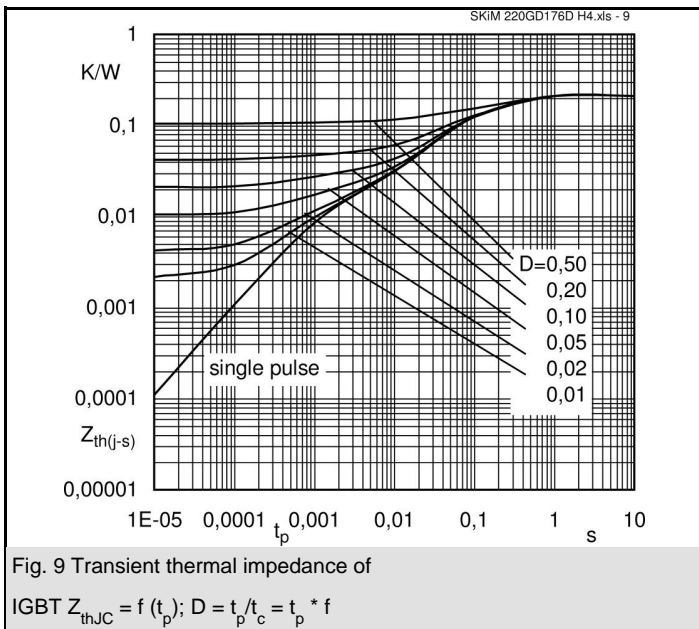
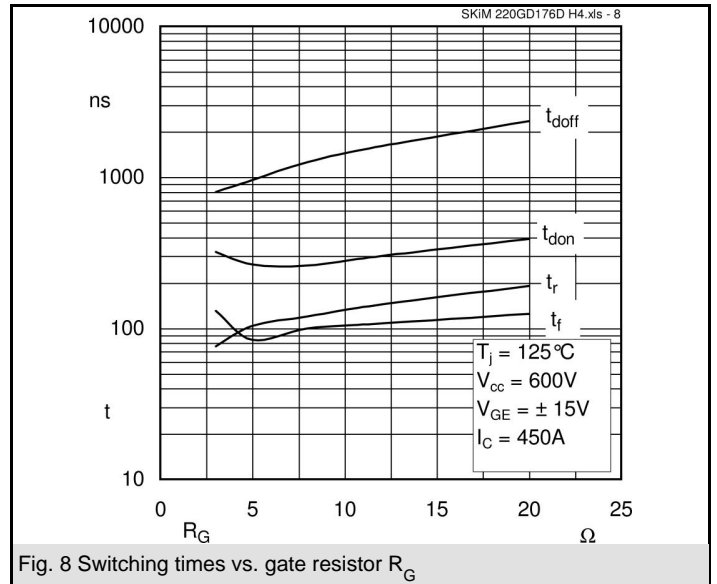
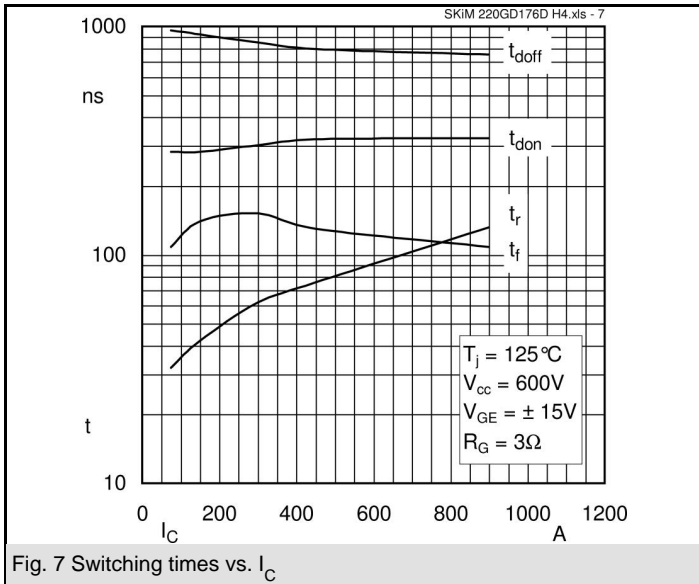
- AC inverter drives mains 575 - 750 V AC
- public transport (auxiliary syst.)

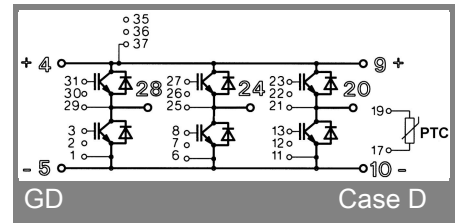
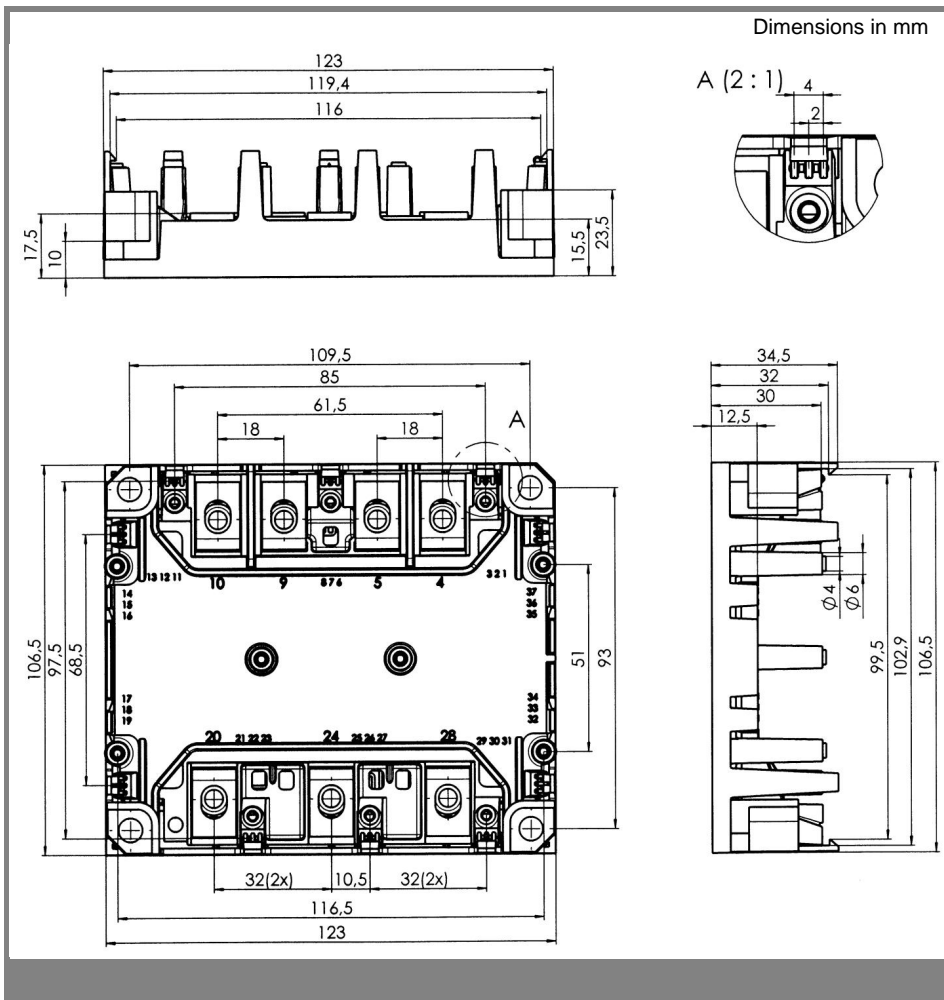

**GD**

Absolute Maximum Ratings		$T_c = 25\text{ }^\circ\text{C}$ , unless otherwise specified	
Symbol	Conditions	Values	Units
<b>IGBT</b>			
$V_{CES}$		1700	V
$I_C$	$T_s = 25\text{ (70) }^\circ\text{C}$	220 (165)	A
$I_{CRM}$	$t_p = 1\text{ ms}$	440	A
$V_{GES}$		$\pm 20$	V
$T_j$ ( $T_{stg}$ )		- 40 ... + 150 (125)	$^\circ\text{C}$
$T_{cop}$	max. case operating temperature	125	$^\circ\text{C}$
$V_{isol}$	AC, 1 min.	4000	V
<b>Inverse diode</b>			
$I_F$	$T_s = 25\text{ (70) }^\circ\text{C}$	220 (165)	A
$I_{FRM}$	$t_p = 1\text{ ms}$	440	A
$I_{FSM}$	$t_p = 10\text{ ms}$ ; sin.; $T_j = 150\text{ }^\circ\text{C}$	2200	A

Characteristics		$T_c = 25\text{ }^\circ\text{C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}$ ; $I_C = 10\text{ mA}$	5,15	5,8	6,45	V
$I_{CES}$	$V_{GE} = 0$ ; $V_{CE} = V_{CES}$ ; $T_j = 25\text{ }^\circ\text{C}$			0,3	mA
$V_{CEO}$	$T_j = 0\text{ }^\circ\text{C}$		1 (0,9)	1,2 (1,1)	V
$r_{CE}$	$T_j = 25\text{ }^\circ\text{C}$		4 (6)	5	m $\Omega$
$V_{CEsat}$	$I_{Cnom} = 250\text{ A}$ ; $V_{GE} = 15\text{ V}$ ; $T_j = 25\text{ (125) }^\circ\text{C}$ on chip level		2 (2,4)	2,45	V
$C_{ies}$	$V_{GE} = 0$ ; $V_{CE} = 25\text{ V}$ ; $f = 1\text{ MHz}$		22		nF
$C_{oes}$	$V_{GE} = 0$ ; $V_{CE} = 25\text{ V}$ ; $f = 1\text{ MHz}$		0,9		nF
$C_{res}$	$V_{GE} = 0$ ; $V_{CE} = 25\text{ V}$ ; $f = 1\text{ MHz}$		0,7		nF
$L_{CE}$				15	nH
$R_{CC'+EE'}$	resistance, terminal-chip $T_c = 25\text{ (125) }^\circ\text{C}$		1,35 (1,75)		m $\Omega$
$t_{d(on)}$	$V_{CC} = 1200\text{ V}$		330		ns
$t_r$	$I_{Cnom} = 250\text{ A}$		55		ns
$t_{d(off)}$	$R_{Gon} = R_{Goff} = 4,8\text{ }^\circ\Omega$		880		ns
$t_f$	$T_j = 125\text{ }^\circ\text{C}$		145		ns
$E_{on} (E_{off})$	$V_{GE} \pm 15\text{ V}$		145 (100)		mJ
$E_{on} (E_{off})$	with SKHI 64; $T_j = 125\text{ }^\circ\text{C}$ $V_{CC} = 1200\text{ V}$ ; $I_C = 250\text{ A}$				mJ
<b>Inverse diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 250\text{ A}$ ; $V_{GE} = 15\text{ V}$ ; $T_j = 25\text{ (125) }^\circ\text{C}$		1,7 (1,8)	1,9 (2)	V
$V_{TO}$	$T_j = 25\text{ (125) }^\circ\text{C}$		1,1 (0,9)	1,3 (1,1)	V
$r_T$	$T_j = 25\text{ (125) }^\circ\text{C}$		3 (4,5)	3 (4,5)	m $\Omega$
$I_{RRM}$	$I_F = 200\text{ A}$ ; $T_j = 125\text{ }^\circ\text{C}$				A
$Q_{rr}$	$V_{GE} = 0\text{ V}$ di/dt = A/ $\mu\text{s}$				$\mu\text{C}$
$E_{rr}$	$R_{Gon} = R_{Goff} = 4,8\text{ }^\circ\Omega$		(65)		mJ
<b>Thermal characteristics</b>					
$R_{th(j-s)}$	per IGBT			0,21	K/W
$R_{th(j-s)}$	per FWD			0,26	K/W
<b>Temperature Sensor</b>					
$R_{TS}$	$T = 25\text{ (100) }^\circ\text{C}$		1 (1,67)		k $\Omega$
tolerance	$T = 25\text{ (100) }^\circ\text{C}$		3 (2)		%
<b>Mechanical data</b>					
$M_1$	to heatsink (M5)	2		3	Nm
$M_2$	for terminals (M6)	4		5	Nm
w				310	g







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.