

# SKiM 270GD128D



SKiM<sup>®</sup> 4

## SPT IGBT Modules

### SKiM 270GD128D

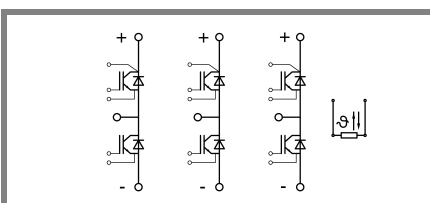
Target Data

#### Features

- N channel, homogenous planar IGBT with n+ buffer layer in SPT (soft punch through) technology
- Isolated by Al<sub>2</sub>O<sub>3</sub> DCB (direct copper bonded) ceramic substrate plate
- Pressure contact technology for thermal contacts
- Spring contact system to attach driver PCB to the auxiliary terminals
- Integrated temperature sensor

#### Typical Applications

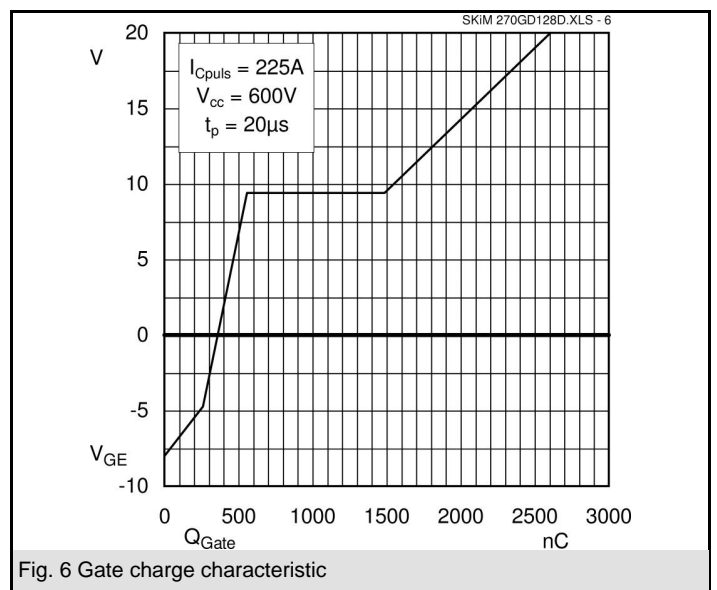
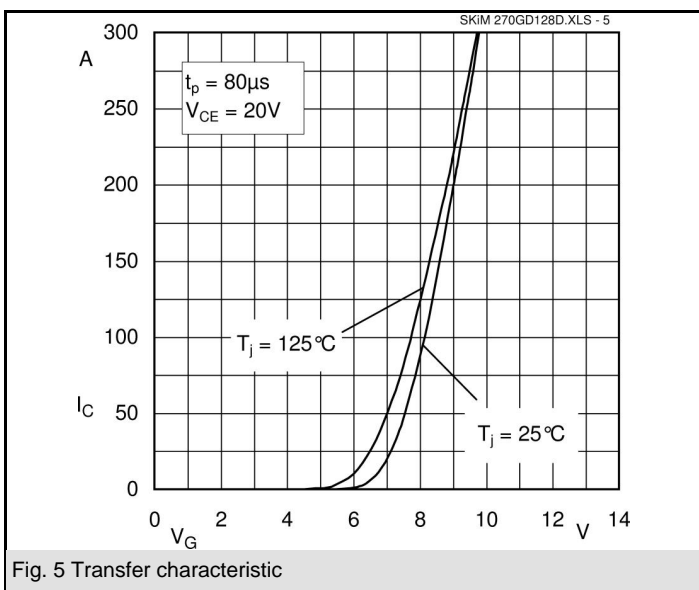
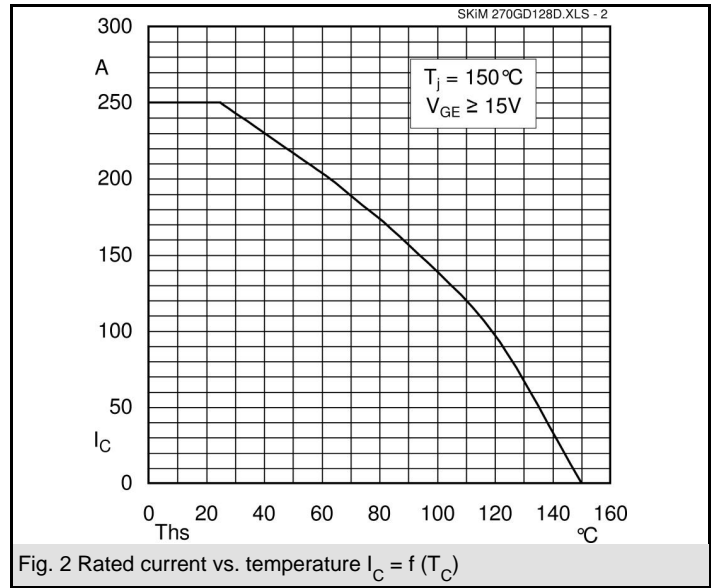
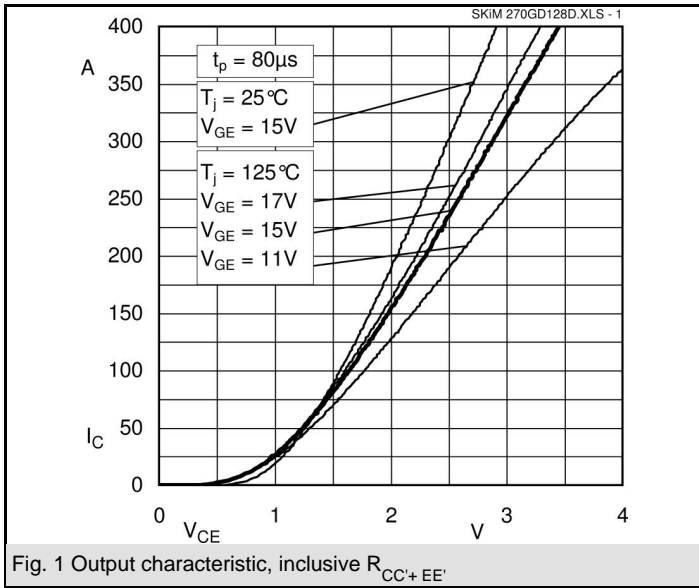
- Switched mode power supplies
- Three phase inverter for AC motor drives



GD

Absolute Maximum Ratings		$T_{case} = 25^{\circ}\text{C}$ , unless otherwise specified	
Symbol	Conditions	Values	Units
<b>IGBT</b>			
$V_{CES}$		1200	V
$I_C$	$T_s = 25 (70) ^{\circ}\text{C}$	250 (190)	A
$I_{CM}$	$T_s = 25 (70) ^{\circ}\text{C}$ , $t_p = 1 \text{ ms}$	500 (380)	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.	2500	V
<b>Inverse diode</b>			
$I_F$	$T_s = 25 (70) ^{\circ}\text{C}$	220 (150)	A
$I_{FM} = -I_{CM}$	$T_s = 25 (70) ^{\circ}\text{C}$ , $t_p = 1 \text{ ms}$	500 (380)	A
$I_{FSM}$	$t_p = 10 \text{ ms}$ ; sin.; $T_j = 150 ^{\circ}\text{C}$		A

Characteristics		$T_{case} = 25^{\circ}\text{C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}$ ; $I_C = 12 \text{ mA}$	4,45	5,5	6,55	V
$I_{CES}$	$V_{GE} = 15$ ; $V_{CE} = V_{CES}$ ; $T_j = 25 ^{\circ}\text{C}$		0,2	0,6	mA
$V_{CEO}$	$T_j = 25 ^{\circ}\text{C}$		1 (0,9)	1,15 (1,05)	V
$r_{CE}$	$T_j = 25 ( ) ^{\circ}\text{C}$		4 (5,3)	5,3 (6,7)	m $\Omega$
$V_{CEsat}$	$I_C = 225 \text{ A}$ ; $V_{GE} = 15 \text{ V}$ ; $T_j = 25 (125) ^{\circ}\text{C}$ on chip level		1,9 (2,1)	2,35 (2,55)	V
$C_{ies}$	$V_{GE} = 0$ ; $V_{CE} = 25 \text{ V}$ ; $f = 1 \text{ MHz}$		18,6		nF
$C_{oes}$	$V_{GE} = 0$ ; $V_{CE} = 25 \text{ V}$ ; $f = 1 \text{ MHz}$		2,2		nF
$C_{res}$	$V_{GE} = 0$ ; $V_{CE} = 25 \text{ V}$ ; $f = 1 \text{ MHz}$		2,1		nF
$L_{CE}$				20	nH
$R_{CC'+EE'}$	resistance, terminal-chip $T_c = 25 (125) ^{\circ}\text{C}$		0,9 (1,1)		m $\Omega$
$t_{d(on)}$	$V_{CC} = 600 \text{ V}$		160		ns
$t_r$	$I_C = 225 \text{ A}$		60		ns
$t_{d(off)}$	$R_{Gon} = R_{Goff} = 4,4 \Omega$		660		ns
$t_f$	$T_j = 125 ^{\circ}\text{C}$		80		ns
$E_{on} (E_{off})$	$V_{GE} \pm 15 \text{ V}$		20,9 (24,1)		mJ
$E_{on} (E_{off})$	with SKHI 65; $T_j = 125 ^{\circ}\text{C}$ $V_{CC} = 600 \text{ V}$ ; $I_C = 225 \text{ A}$				mJ
<b>Inverse diode</b>					
$V_F = V_{EC}$	$I_F = 225 \text{ A}$ ; $V_{GE} = 0 \text{ V}$ ; $T_j = 25 (125) ^{\circ}\text{C}$				V
$V_{TO}$	$T_j = 25 (125) ^{\circ}\text{C}$				V
$r_T$	$T_j = 25 (125) ^{\circ}\text{C}$				m $\Omega$
$I_{RRM}$	$I_F = 225 \text{ A}$ ; $T_j = 125 ^{\circ}\text{C}$				A
$Q_{rr}$	$V_{GE} = 0 \text{ V}$ $di/dt = \text{A}/\mu\text{s}$				$\mu\text{C}$
$E_{rr}$	$R_{Gon} = R_{Goff} = 4,4 \Omega$		14,5		mJ
<b>Thermal characteristics</b>					
$R_{th(j-s)}$	per IGBT			0,18	K/W
$R_{th(j-s)}$	per FWD			0,25	K/W
<b>Temperature Sensor</b>					
$R_{TS}$	$T = 25 (100) ^{\circ}\text{C}$		1 (1,67)		k $\Omega$
tolerance	$T = 25 (100) ^{\circ}\text{C}$		3 (2)		%
<b>Mechanical data</b>					
$M_1$	to heatsink (M5)				Nm
$M_2$	for terminals (M6)	4		5	Nm
w				460	g



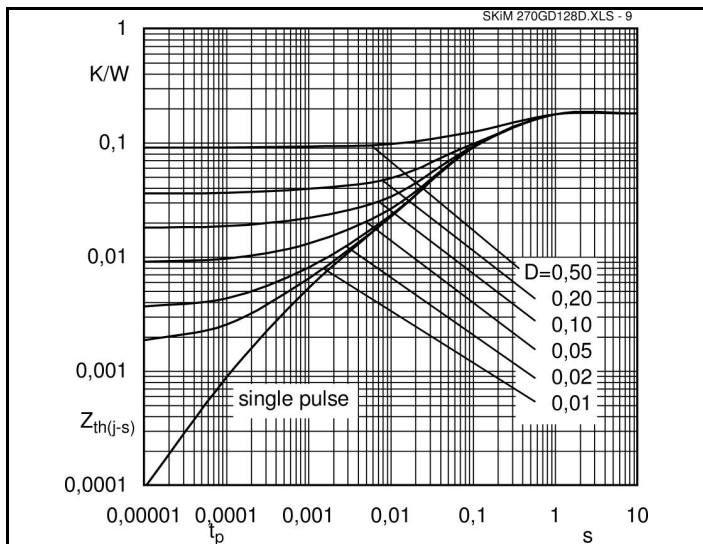


Fig. 9 Transient thermal impedance of

IGBT  $Z_{thJC} = f(t_p); D = t_p/t_c = t_p * f$

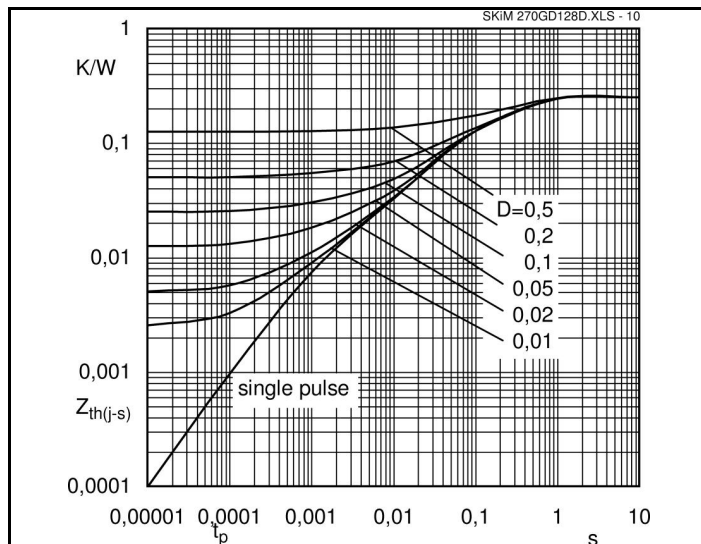


Fig. 10 Transient thermal impedance of inverse diodes

IGBT  $Z_{thJC} = f(t_p); D = t_p/t_c = t_p * f$

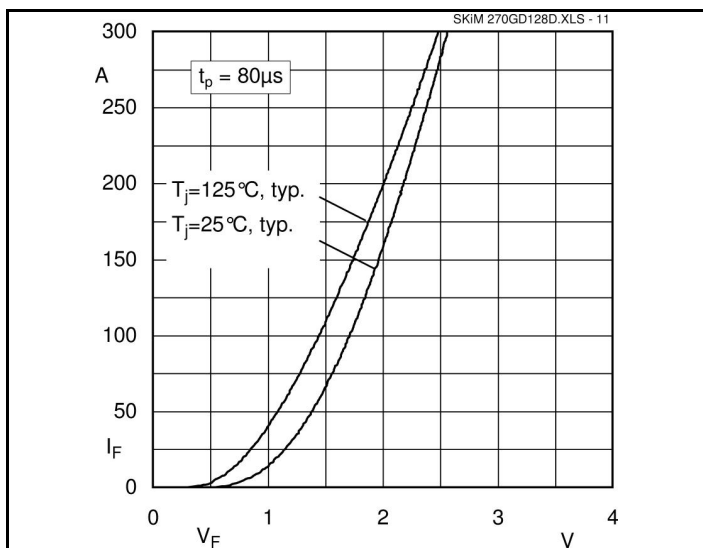
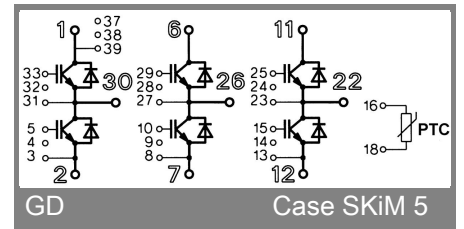
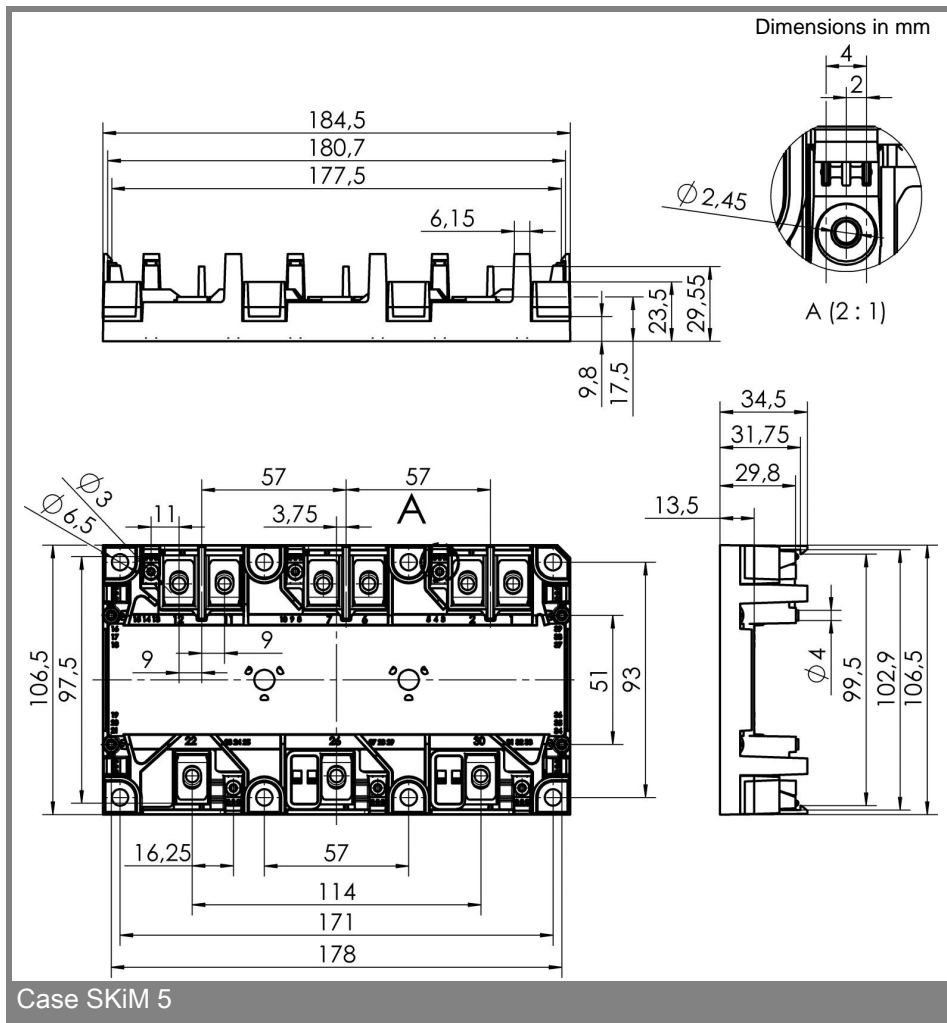


Fig. 11 CAL diode forward characteristic, incl.  $R_{CC+EE}$



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

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