

SEMiX 403GB128Ds



SEMiX® 3s

SPT IGBT Modules

SEMiX 403GB128Ds

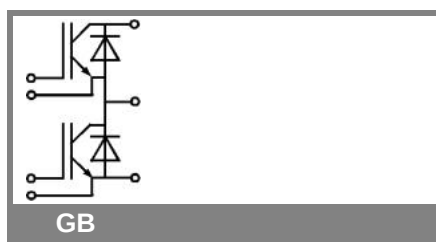
Preliminary Data

Features

- Homogeneous Si
- SPT = Soft-Punch-Through technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability

Typical Applications

- AC inverter drives
- UPS
- Electronic welders f_{sw} up to 20 kHz



Absolute Maximum Ratings		$T_{case} = 25^{\circ}\text{C}$, unless otherwise specified	
Symbol	Conditions	Values	Units
IGBT			
V_{CES}		1200	V
I_C	$T_c = 25\ (80)^{\circ}\text{C}$	420 (300)	A
I_{CRM}	$t_p = 1\ \text{ms}$	450	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	$T_c = 25\ (80)^{\circ}\text{C}$	340 (230)	A
I_{FRM}	$t_p = 1\ \text{ms}$	450	A
I_{FSM}	$t_p = 10\ \text{ms}$; sin.; $T_j = 25^{\circ}\text{C}$	2000	A

Characteristics		$T_{case} = 25^{\circ}\text{C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 9\ \text{mA}$	4,5	5,5	6,5	V
I_{CES}	$V_{GE} = 0$, $V_{CE} = V_{CES}$, $T_j = 25\ (125)^{\circ}\text{C}$			0,3	mA
$V_{CE(TO)}$	$T_j = 25\ (125)^{\circ}\text{C}$		1 (0,9)	1,15 (1,05)	V
r_{CE}	$V_{GE} = 15\ \text{V}$, $T_j = 25\ (125)^{\circ}\text{C}$		4 (5,3)	5,3 (6,7)	m Ω
$V_{CE(sat)}$	$I_{Cnom} = 225\ \text{A}$, $V_{GE} = 15\ \text{V}$, $T_j = 25\ (125)^{\circ}\text{C}$, chip level		1,9 (2,1)	2,35 (2,55)	V
C_{ies}	under following conditions		18,6		nF
C_{oes}	$V_{GE} = 0$, $V_{CE} = 25\ \text{V}$, $f = 1\ \text{MHz}$		2,2		nF
C_{res}			2,1		nF
L_{CE}			20		nH
$R_{CC'+EE'}$	terminal-chip, $T_c = 25\ (125)^{\circ}\text{C}$		0,7 (1)		m Ω
$t_{d(on)}/t_r$	$V_{CC} = 600\ \text{V}$, $I_{Cnom} = 225\ \text{A}$		145 / 60		ns
$t_{d(off)}/t_f$	$V_{GE} = \pm 15\ \text{V}$		575 / 70		ns
$E_{on} (E_{off})$	$R_{Gon} = R_{Goff} = 4\ \Omega$, $T_j = 125^{\circ}\text{C}$		19,5 (23)		mJ
Inverse diode					
$V_F = V_{EC}$	$I_{Fnom} = 225\ \text{A}$; $V_{GE} = 0\ \text{V}$; $T_j = 25\ (125)^{\circ}\text{C}$, chip level		2 (1,8)	2,5 (2,3)	V
$V_{(TO)}$	$T_j = 25\ (125)^{\circ}\text{C}$		1,1	1,2	V
r_T	$T_j = 25\ (125)^{\circ}\text{C}$		4	5,8	m Ω
I_{RRM}	$I_{Fnom} = 225\ \text{A}$; $T_j = 25\ (125)^{\circ}\text{C}$		(260)		A
Q_{rr}	$di/dt = 4950\ \text{A}/\mu\text{s}$		(29)		μC
E_{rr}	$V_{GE} = -15\ \text{V}$		(10)		mJ
Thermal characteristics					
$R_{th(j-c)}$	per IGBT			0,075	K/W
$R_{th(j-c)D}$	per Inverse Diode			0,133	K/W
$R_{th(j-c)FD}$	per FWD				K/W
$R_{th(c-s)}$	per module		0,04		K/W
Temperature sensor					
R_{25}	$T_c = 25^{\circ}\text{C}$		5 $\pm$ 5%		k Ω
$B_{25/85}$	$R_2 = R_1 \exp[B(1/T_2 - 1/T_1)]$; $T[K]$; B		3420		K
Mechanical data					
M_s/M_t	to heatsink (M5) / for terminals (M6)	3/2,5		5 / 5	Nm
w			289		g

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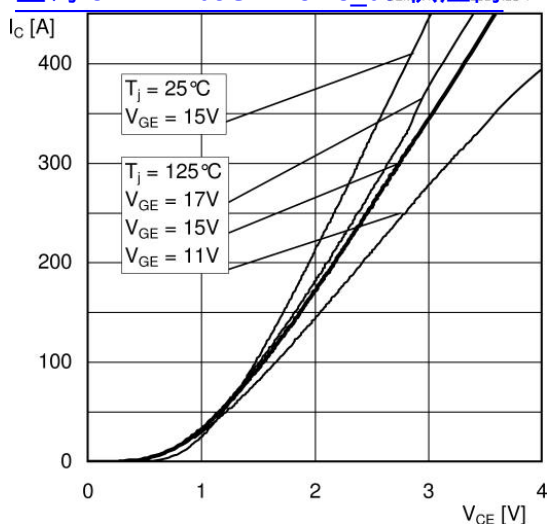


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

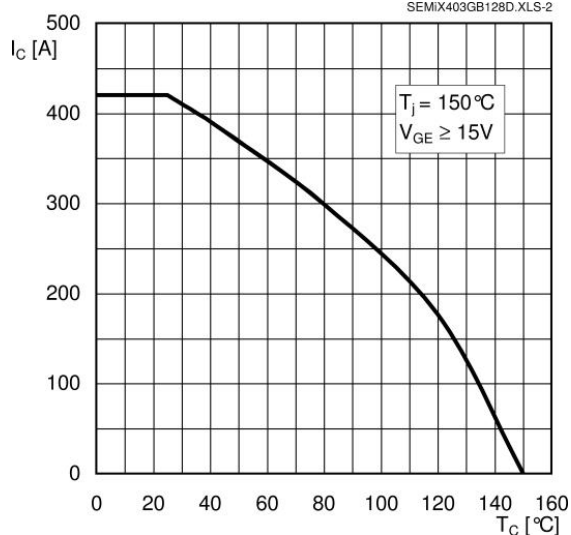


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

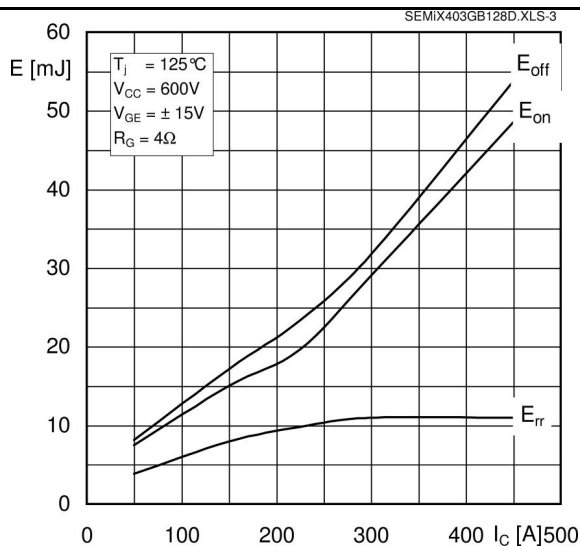


Fig. 3 Typ. turn-on /off energy = $f(I_C)$

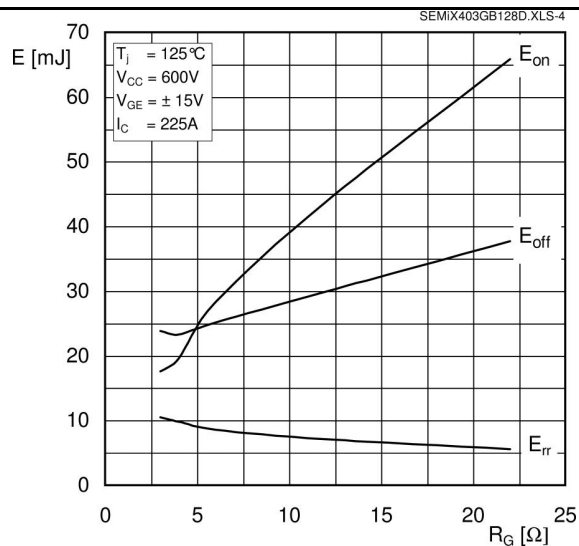


Fig. 4 Typ. turn-on /off energy = $f(R_G)$

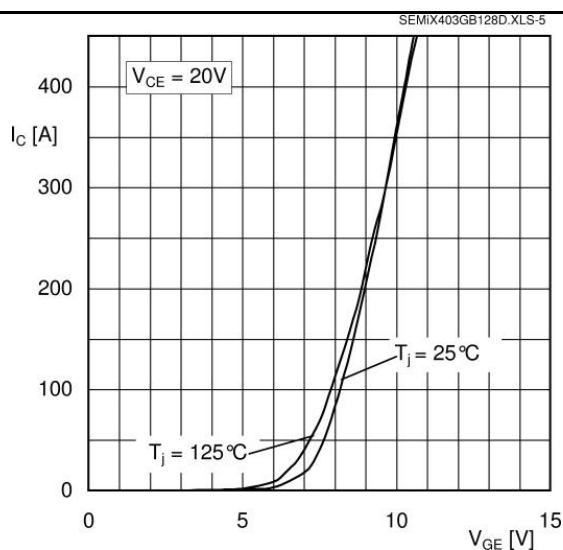


Fig. 5 Typ. transfer characteristic

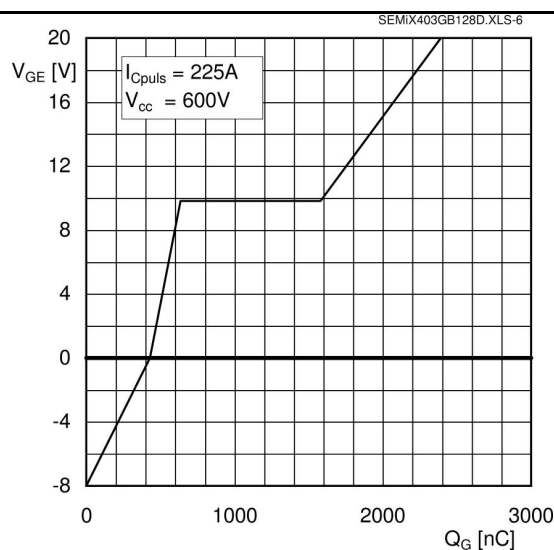
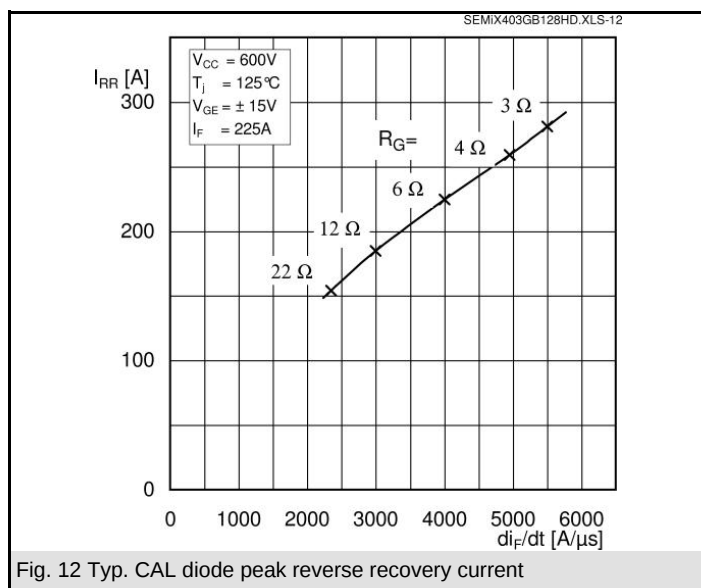
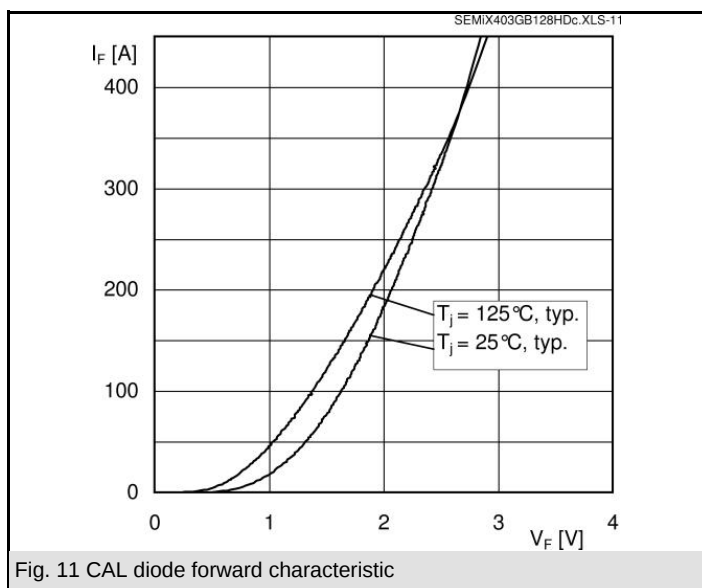
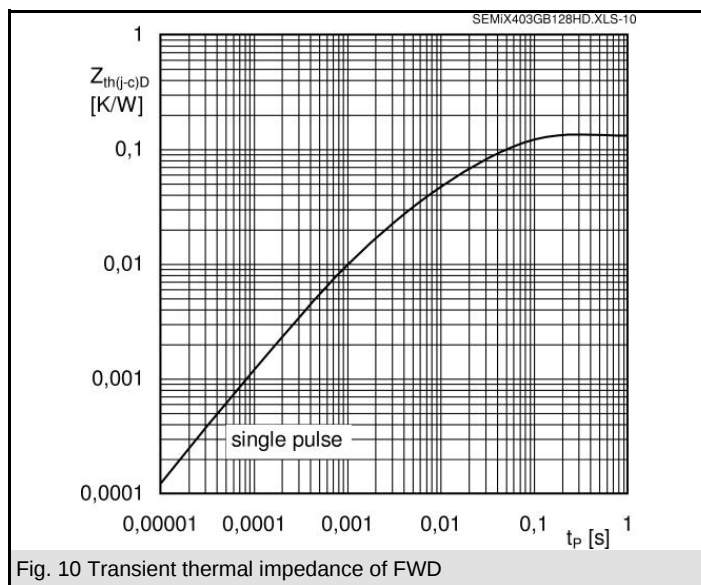
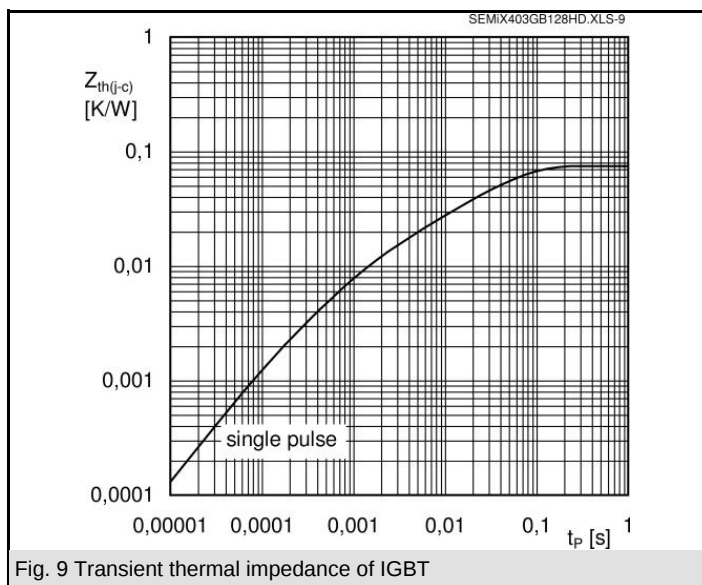
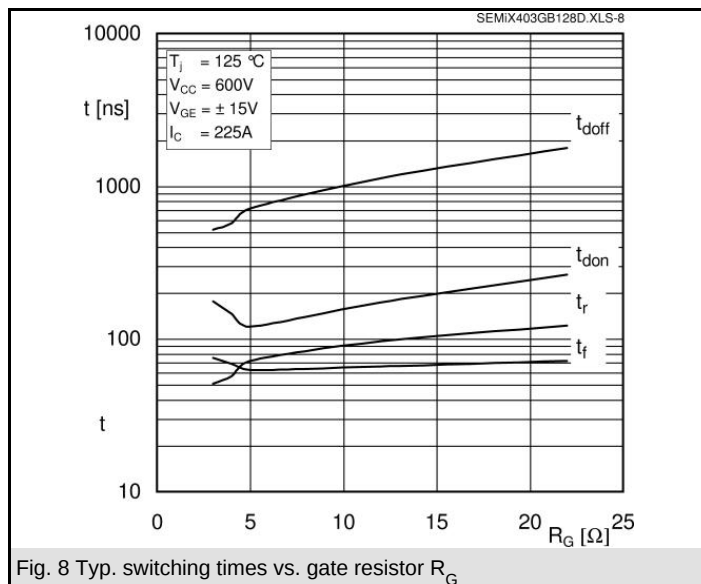
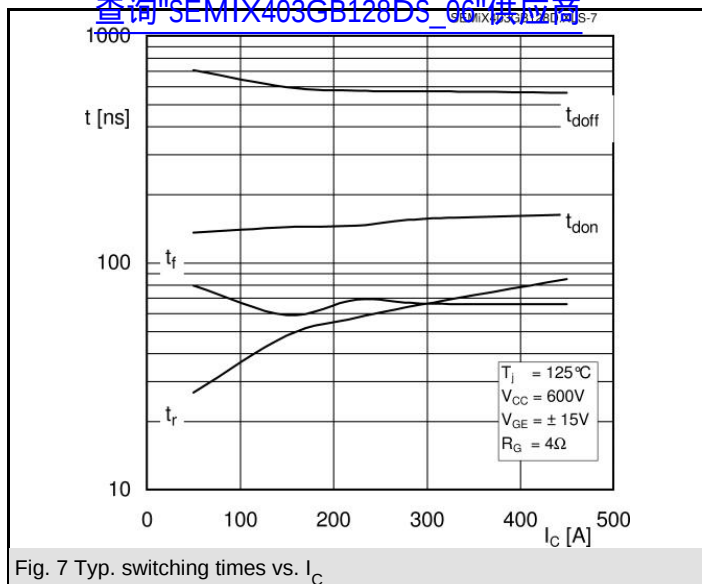
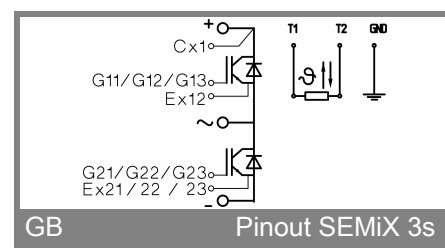
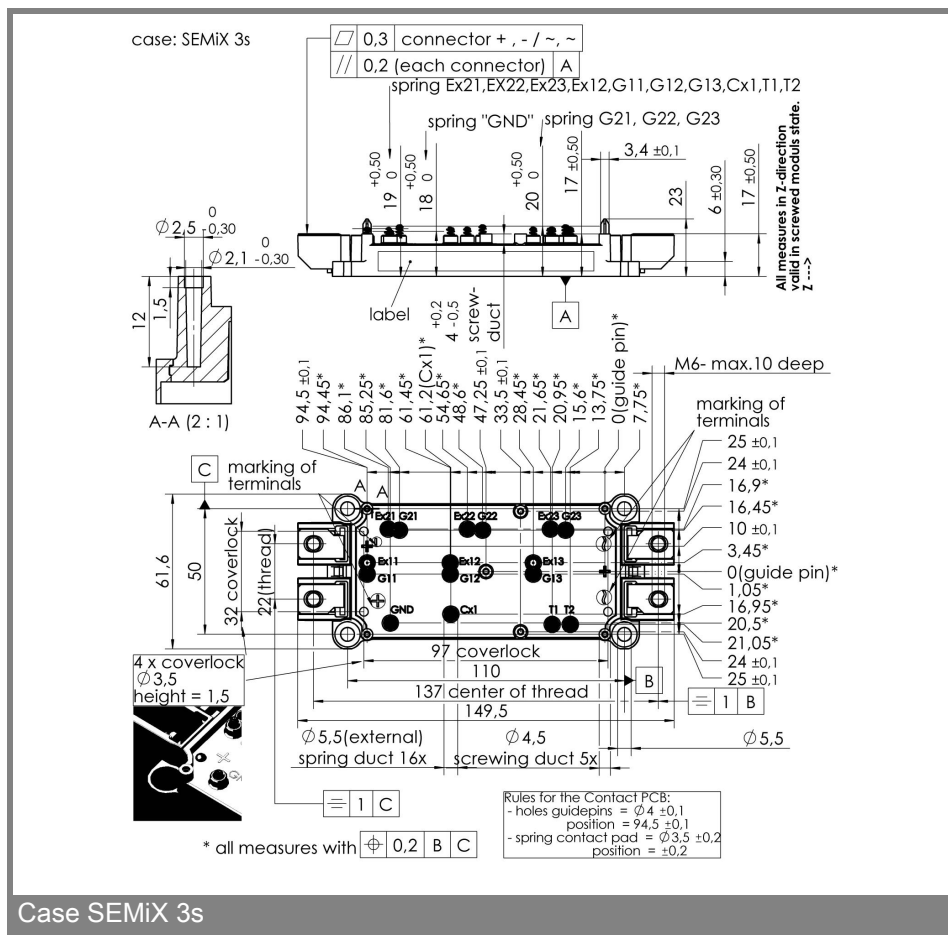
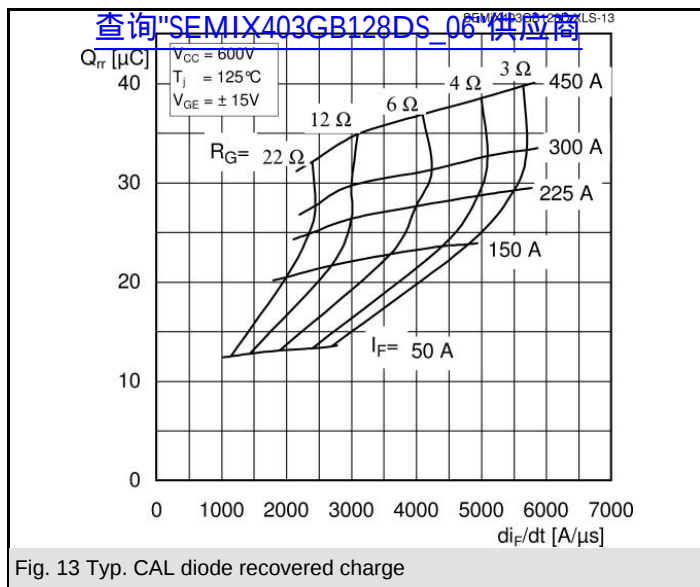


Fig. 6 Typ. gate charge characteristic

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

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