

SEMiX553GB128Ds



SEMiX® 3s

SPT IGBT Modules

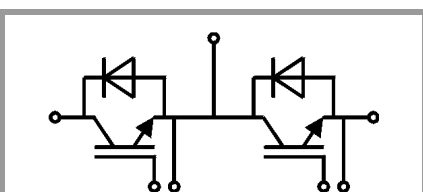
SEMiX553GB128Ds

Features

- Homogeneous Si
- SPT = Soft-Punch-Through technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability
- UL recognised file no. E63532

Typical Applications*

- AC inverter drives
- UPS
- Electronic welders up to 20 kHz



GB

Absolute Maximum Ratings				
Symbol	Conditions	Values	Unit	
IGBT				
V_{CES}		1200	V	
I_C	$T_j = 150\text{ °C}$	$T_c = 25\text{ °C}$	533	A
		$T_c = 80\text{ °C}$	379	A
I_{Cnom}		300	A	
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	600	A	
V_{GES}		-20 ... 20	V	
t_{psc}	$V_{CC} = 600\text{ V}$ $V_{GE} \leq 20\text{ V}$ $V_{CES} \leq 1200\text{ V}$	$T_j = 125\text{ °C}$	10	μs
T_j		-40 ... 150	$^{\circ}\text{C}$	
Inverse diode				
I_F	$T_j = 150\text{ °C}$	$T_c = 25\text{ °C}$	421	A
		$T_c = 80\text{ °C}$	289	A
I_{Fnom}		300	A	
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	600	A	
I_{FSM}	$t_p = 10\text{ ms}$, $\sin 180^{\circ}$, $T_j = 25\text{ °C}$	2300	A	
T_j		-40 ... 150	$^{\circ}\text{C}$	
Module				
$I_{t(RMS)}$		600	A	
T_{stg}		-40 ... 125	$^{\circ}\text{C}$	
V_{isol}	AC sinus 50Hz, $t = 1\text{ min}$	4000	V	

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
IGBT					
$V_{CE(sat)}$	$I_C = 300\text{ A}$ $V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25\text{ °C}$	1.9	2.35	V
		$T_j = 125\text{ °C}$	2.1	2.55	V
V_{CE0}		$T_j = 25\text{ °C}$	1	1.15	V
		$T_j = 125\text{ °C}$	0.9	1.05	V
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}$	3.0	4.0	$\text{m}\Omega$
		$T_j = 125\text{ °C}$	4.0	5.0	$\text{m}\Omega$
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 12\text{ mA}$	4.5	5	6.5	V
I_{CES}	$V_{GE} = 0\text{ V}$ $V_{CE} = 1200\text{ V}$	$T_j = 25\text{ °C}$	0.1	0.3	mA
		$T_j = 125\text{ °C}$			mA
C_{ies}	$V_{CE} = 25\text{ V}$		28.3		nF
C_{oes}	$V_{GE} = 0\text{ V}$		1.86		nF
C_{res}			1.17		nF
Q_G	$V_{GE} = -8\text{ V...} + 15\text{ V}$		2880		nC
R_{Gint}	$T_j = 25\text{ °C}$		1.33		Ω
$t_{d(on)}$	$V_{CC} = 600\text{ V}$	$T_j = 125\text{ °C}$	185		ns
t_r	$I_C = 300\text{ A}$	$T_j = 125\text{ °C}$	65		ns
E_{on}	$R_{Gon} = 3\text{ }\Omega$	$T_j = 125\text{ °C}$	27		mJ
$t_{d(off)}$	$R_{Goff} = 3\text{ }\Omega$	$T_j = 125\text{ °C}$	635		ns
t_f		$T_j = 125\text{ °C}$	80		ns
E_{off}		$T_j = 125\text{ °C}$	33		mJ
$R_{th(j-c)}$	per IGBT			0.061	K/W

SEMiX553GB128Ds



SEMiX® 3s

SPT IGBT Modules

SEMiX553GB128Ds

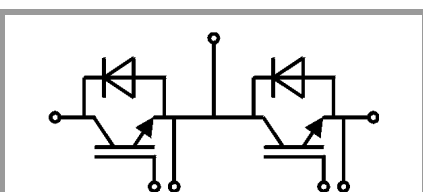
Features

- Homogeneous Si
- SPT = Soft-Punch-Through technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability
- UL recognised file no. E63532

Typical Applications*

- AC inverter drives
- UPS
- Electronic welders up to 20 kHz

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
$V_F = V_{EC}$	$I_F = 300\text{ A}$ $V_{GE} = 0\text{ V}$ chip	$T_j = 25\text{ °C}$		2.0	2.50	V
		$T_j = 125\text{ °C}$		1.8	2.3	V
V_{F0}		$T_j = 25\text{ °C}$	0.75	1.1	1.45	V
		$T_j = 125\text{ °C}$	0.5	0.85	1.2	V
r_F		$T_j = 25\text{ °C}$	2.5	3.0	3.5	mΩ
		$T_j = 125\text{ °C}$	2.7	3.2	3.7	mΩ
I_{RRM}	$I_F = 300\text{ A}$	$T_j = 125\text{ °C}$		325		A
Q_{rr}	$di/dt_{off} = 5400\text{ A}/\mu\text{s}$ $V_{GE} = -15\text{ V}$	$T_j = 125\text{ °C}$		46		μC
E_{rr}	$V_{CC} = 600\text{ V}$	$T_j = 125\text{ °C}$		17		mJ
$R_{th(j-c)}$	per diode				0.11	K/W
Module						
L_{CE}				20		nH
$R_{CC'+EE'}$	res., terminal-chip	$T_C = 25\text{ °C}$		0.7		mΩ
		$T_C = 125\text{ °C}$		1		mΩ
$R_{th(c-s)}$	per module			0.04		K/W
M_s	to heat sink (M5)		3		5	Nm
M_t		to terminals (M6)	2.5		5	Nm
w					300	g
Temperatur Sensor						
R_{100}	$T_c = 100\text{ °C}$ ($R_{25} = 5\text{ k}\Omega$)			$493 \pm 5\%$		Ω
$B_{100/125}$	$R_{(T)} = R_{100} \exp[B_{100/125}(1/T - 1/T_{100})]$; $T[\text{K}]$;			3550 $\pm 2\%$		K



GB

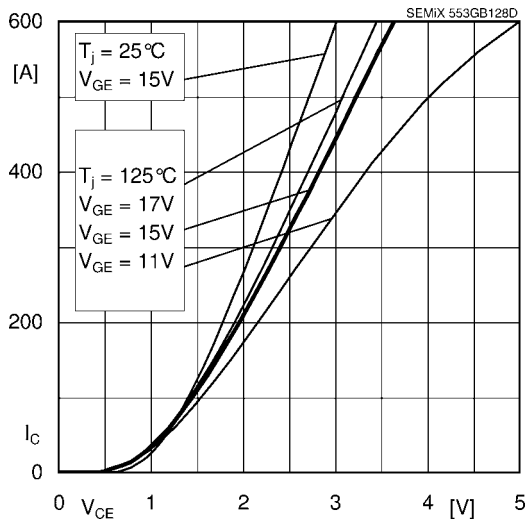


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE'}$

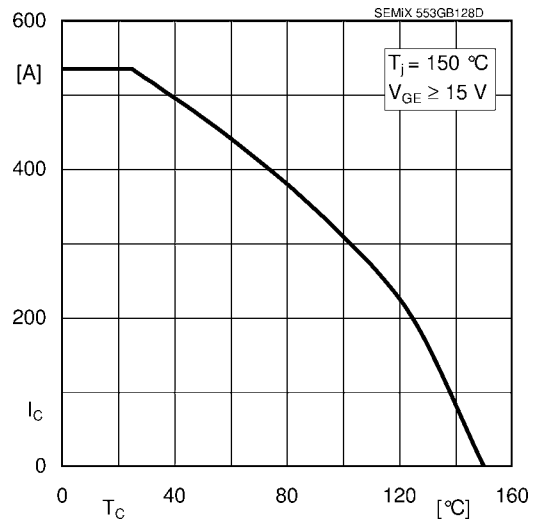


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

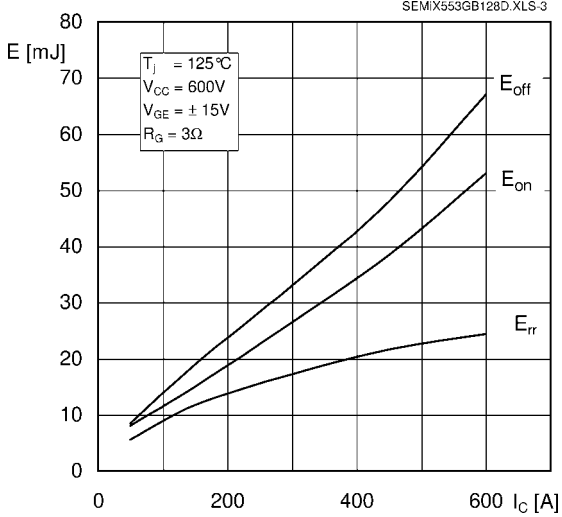


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

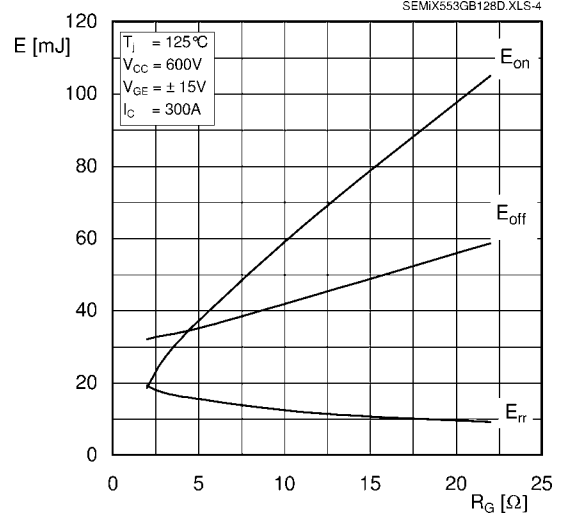


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

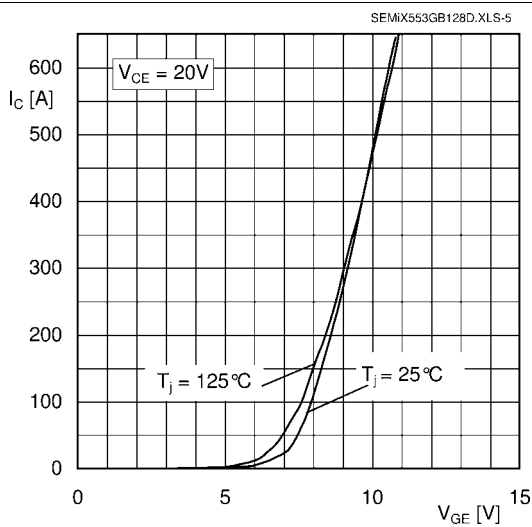


Fig. 5: Typ. transfer characteristic

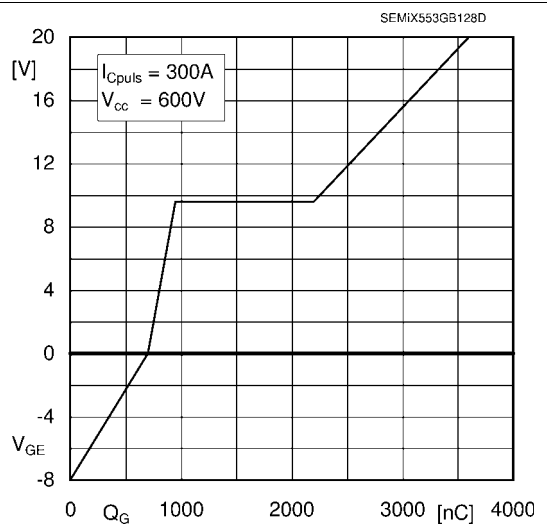


Fig. 6: Typ. gate charge characteristic

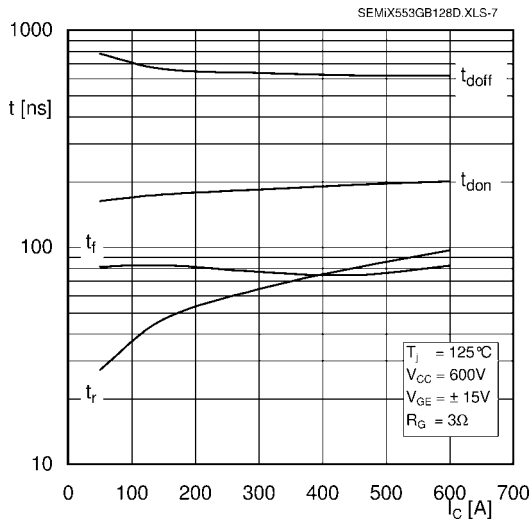


Fig. 7: Typ. switching times vs. I_C

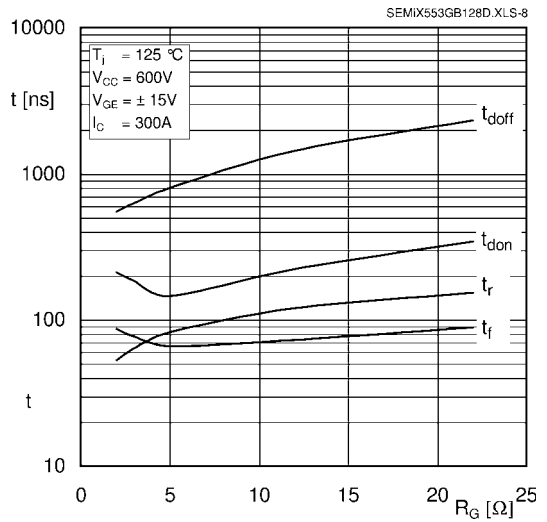


Fig. 8: Typ. switching times vs. gate resistor R_G

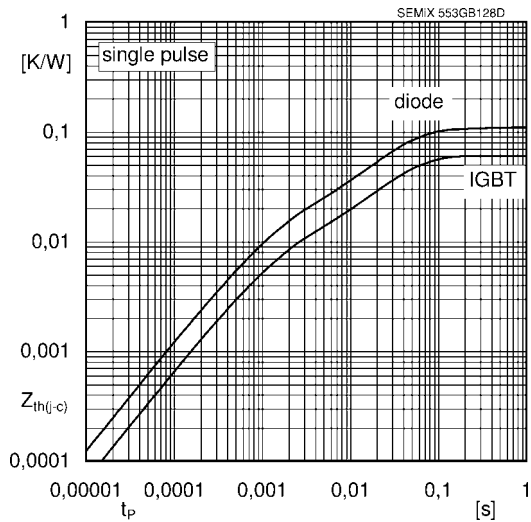


Fig. 9: Typ. transient thermal impedance

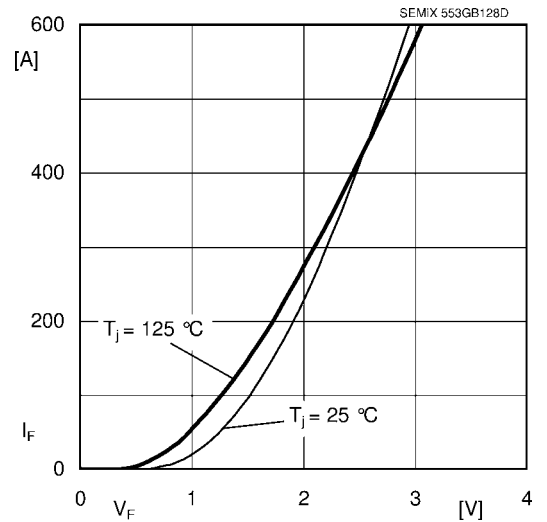


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC+EE'}$

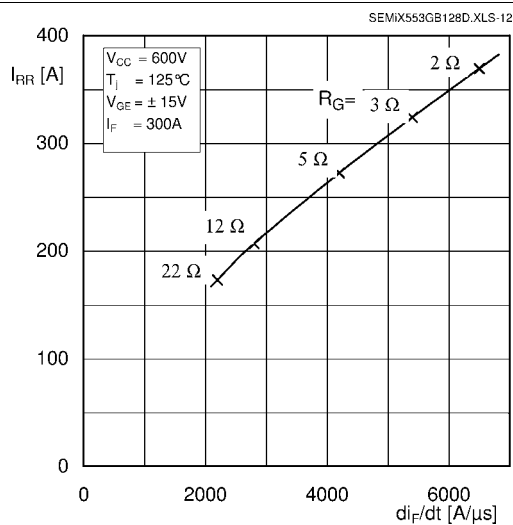


Fig. 11: Typ. CAL diode peak reverse recovery current

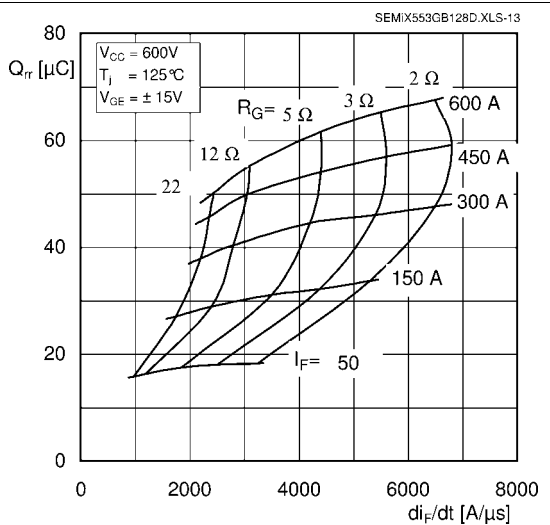
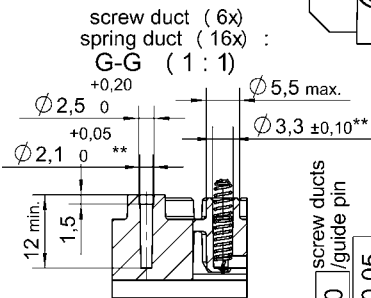
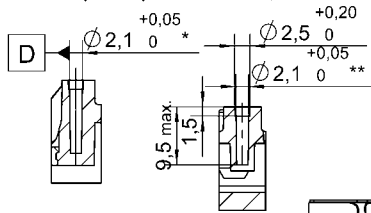


Fig. 12: Typ. CAL diode recovery charge

SEMiX553GB128Ds

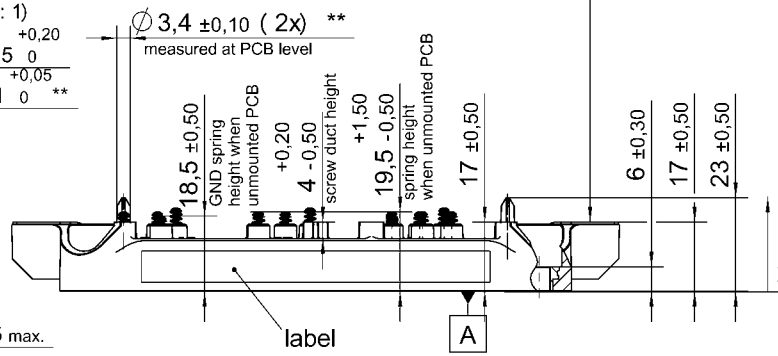
Case: SEMiX 3s

screw duct (left top) : F-F (1:1)
 screw duct (1x centre) : H-H (1:1)

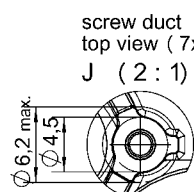
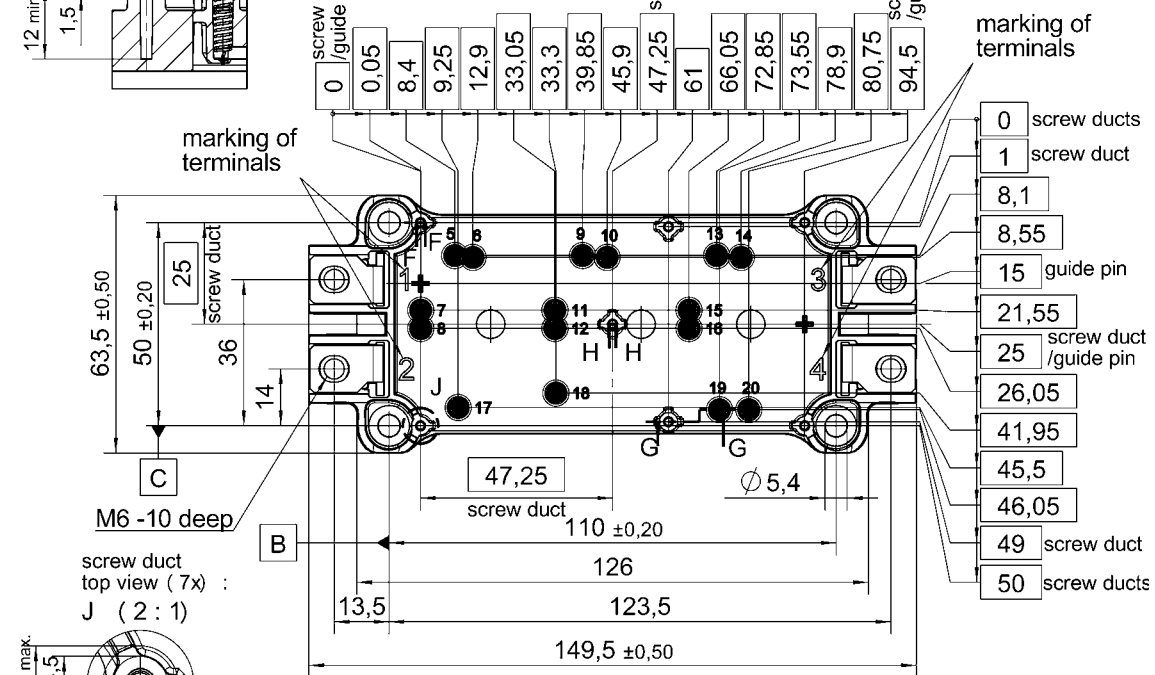


\square	0,3	connector 1-2 / 3-4
\parallel	0,2	each connector A

general tolerance:
 ISO 2768-mK
 ISO 8015

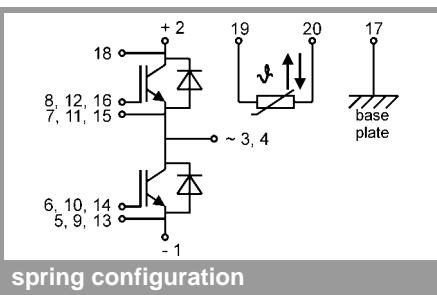


All measures in Z-direction valid when mounted to heat sink



*screw duct left / top with	ϕ	0,2	A	B	C	Rules for the contact PCB: - holes guidepins = $\phi 4 \pm 0,1$ / position tolerance $\pm 0,1$ - holes for screws = $\phi 2,9 \pm 0,1$ / position tolerance $\pm 0,1$ - spring contact pad = $\phi 3,6 \pm 0,1$ / position tolerance $\pm 0,1$
**screw ducts / guide pins / spring ducts with	ϕ	0,2	A	D	C	

SEMiX 3s



spring configuration

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.