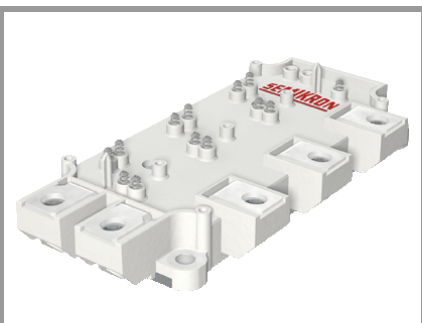


SEMiX101GD128Ds



SEMiX[®]13

SPT IGBT Modules

SEMiX101GD128Ds

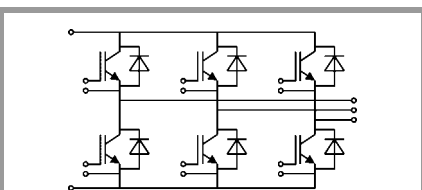
Preliminary Data

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

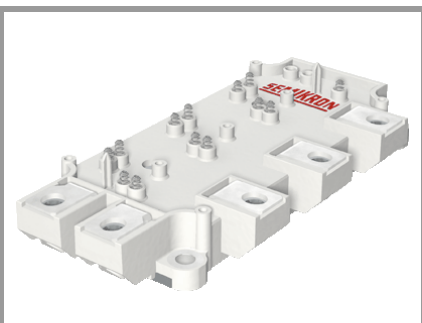


GD

Absolute Maximum Ratings					
Symbol	Conditions		Values	Unit	
IGBT					
V_{CES}			1200	V	
I_C	$T_j = 150\text{ °C}$	$T_c = 25\text{ °C}$	104	A	
		$T_c = 80\text{ °C}$	74	A	
I_{Cnom}			50	A	
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$		100	A	
V_{GES}			-20 ... 20	V	
t_{psc}	$V_{CC} = 600\text{ V}$ $V_{GE} \leq 20\text{ V}$ $T_j = 125\text{ °C}$ $V_{CES} \leq 1200\text{ V}$			10	μs
T_j			-40 ... 150	$^{\circ}\text{C}$	
Inverse diode					
I_F	$T_j = 150\text{ °C}$	$T_c = 25\text{ °C}$	88	A	
		$T_c = 80\text{ °C}$	61	A	
I_{Fnom}			50	A	
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$		100	A	
I_{FSM}	$t_p = 10\text{ ms, sin } 180^{\circ}, T_j = 25\text{ °C}$		550	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						
$V_{CE(sat)}$	$I_C = 50\text{ A}$ $V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25\text{ °C}$		1.9	2.35	V
		$T_j = 125\text{ °C}$		2.10	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}	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}$		18.0	24.0	$\text{m}\Omega$
		$T_j = 125\text{ °C}$		24.0	30.0	$\text{m}\Omega$
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 2\text{ mA}$		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}	$V_{CE} = 25\text{ V}$ $V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$		4.7		nF
C_{oes}		$f = 1\text{ MHz}$		0.29		nF
C_{res}		$f = 1\text{ MHz}$		0.19		nF
Q_G	$V_{GE} = -8\text{ V...} + 15\text{ V}$			480		nC
R_{Gint}	$T_j = 25\text{ °C}$			5.00		Ω
$t_{d(on)}$	$V_{CC} = 600\text{ V}$			115		ns
t_r	$I_C = 50\text{ A}$			30		ns
E_{on}	$T_j = 125\text{ °C}$			5.2		mJ
$t_{d(off)}$	$R_{G on} = 8\text{ }\Omega$ $R_{G off} = 8\text{ }\Omega$			340		ns
t_f				55		ns
E_{off}				5.5		mJ
$R_{th(j-c)}$	per IGBT				0.28	K/W
$R_{th(j-s)}$	per IGBT					K/W

SEMiX101GD128Ds



SEMiX[®]13

SPT IGBT Modules

SEMiX101GD128Ds

Preliminary Data

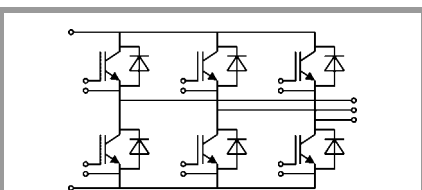
Features

- 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						
$V_F = V_{EC}$	$I_F = 50 \text{ A}$ $V_{GE} = 0 \text{ V}$ chipelevel	$T_j = 25 \text{ }^\circ\text{C}$		2.0	2.5	V
		$T_j = 125 \text{ }^\circ\text{C}$		1.8	2.3	V
V_{F0}		$T_j = 25 \text{ }^\circ\text{C}$	0.75	1.1	1.45	V
		$T_j = 125 \text{ }^\circ\text{C}$	0.5	0.85	1.2	V
r_F		$T_j = 25 \text{ }^\circ\text{C}$	15.0	18.0	21.0	m Ω
		$T_j = 125 \text{ }^\circ\text{C}$	16.0	19.0	22.0	m Ω
I_{RRM}	$I_F = 50 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$		77		A
Q_{rr}	$di/dt_{off} = 2840 \text{ A}/\mu\text{s}$ $V_{GE} = -15 \text{ V}$	$T_j = 125 \text{ }^\circ\text{C}$		7.8		μC
E_{rr}	$V_{CC} = 600 \text{ V}$	$T_j = 125 \text{ }^\circ\text{C}$		2.9		mJ
$R_{th(j-c)}$	per diode				0.46	K/W
$R_{th(j-s)}$	per diode					K/W
Module						
L_{CE}				20		nH
$R_{CC'+EE'}$	res., terminal-chip	$T_C = 25 \text{ }^\circ\text{C}$		0.7		m Ω
		$T_C = 125 \text{ }^\circ\text{C}$		1		m Ω
$R_{th(c-s)}$	per module			0.04		K/W
M_s	to heat sink (M5)		3		5	Nm
M_t		to terminals (M6)	2.5		5	Nm
						Nm
w					350	g
Temperature sensor						
R_{100}	$T_C = 100^\circ\text{C}$ ($R_{25} = 5 \text{ k}\Omega$)			0,493 $\pm 5\%$		k Ω
$B_{100/125}$	$R_{(T)} = R_{100} \exp[B_{100/125}(1/T - 1/T_{100})]$; $T[\text{K}]$;			3550 $\pm 2\%$		K



GD

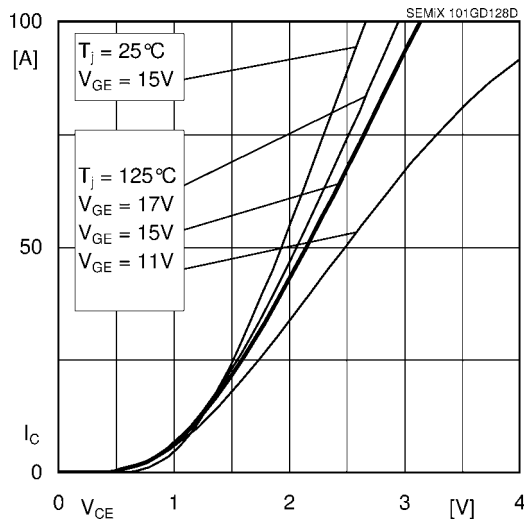


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

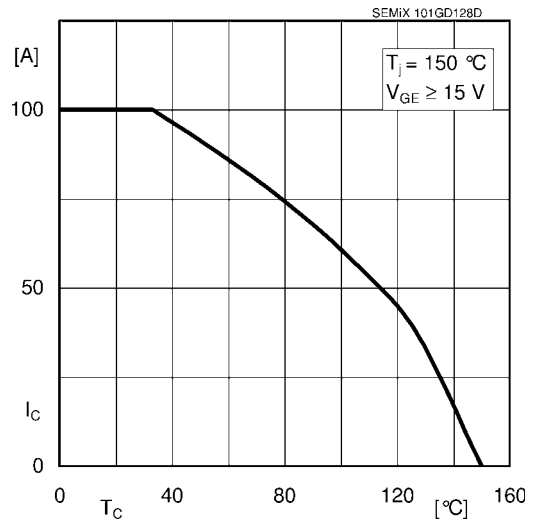


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

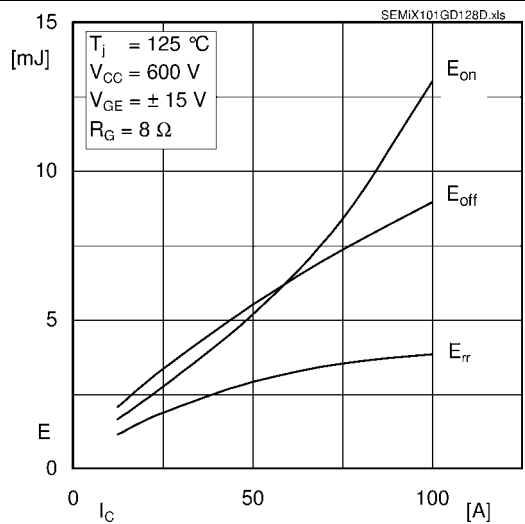


Fig. 3 Typ. turn-on /-off energy = $f(I_C)$

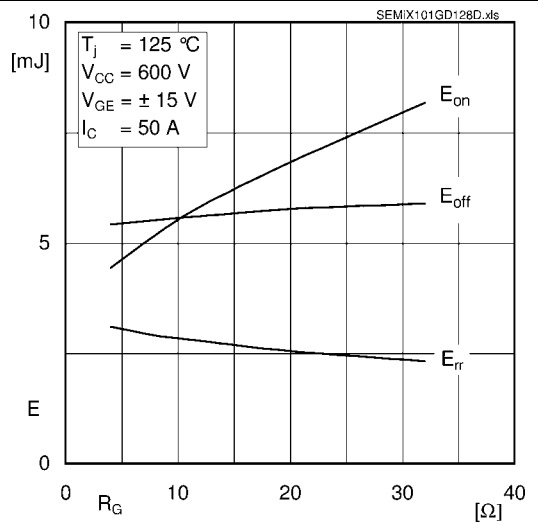


Fig. 4 Typ. turn-on /-off energy = $f(R_G)$

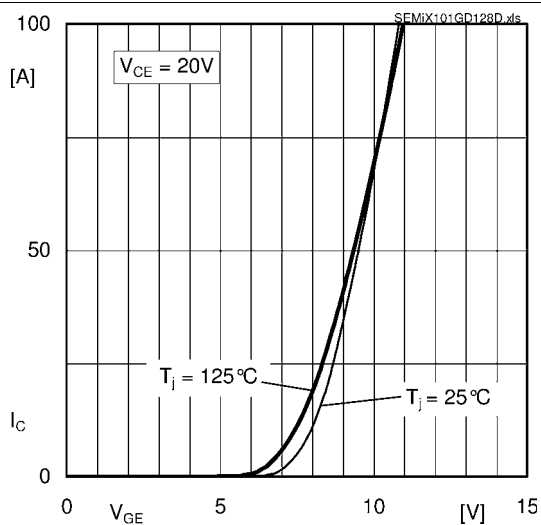


Fig. 5 Typ. transfer characteristic

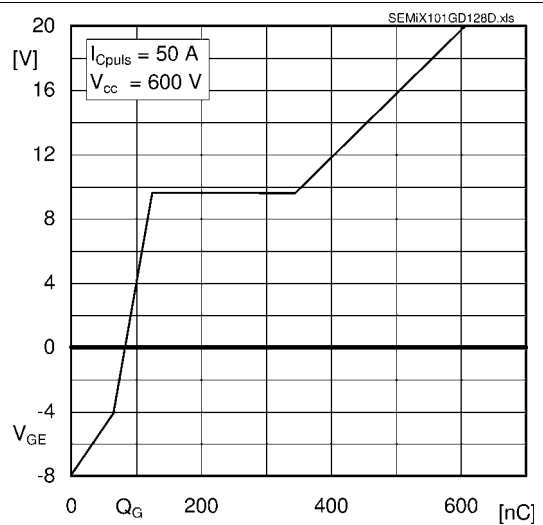


Fig. 6 Typ. gate charge characteristic

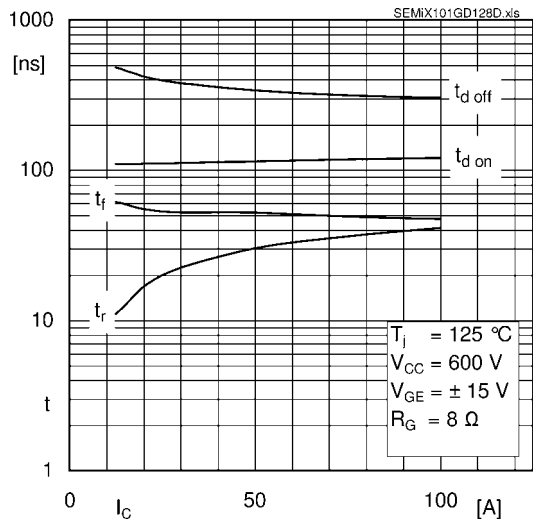


Fig. 7 Typ. switching times vs. I_C

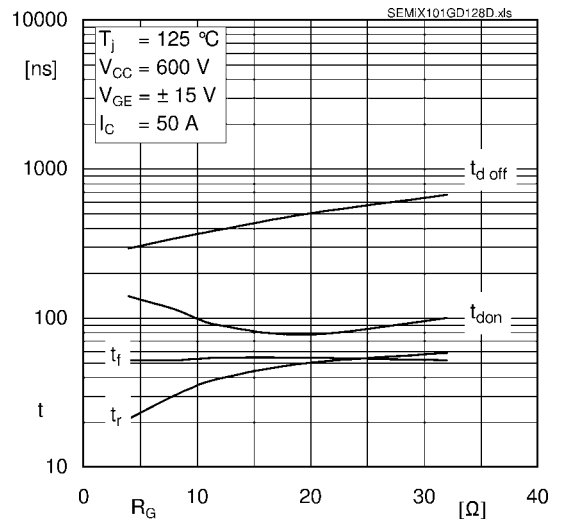


Fig. 8 Typ. switching times vs. gate resistor R_G

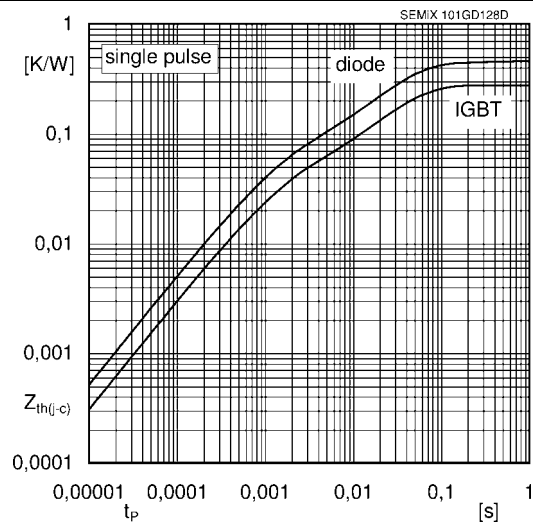


Fig. 9 Typ. transient thermal impedance

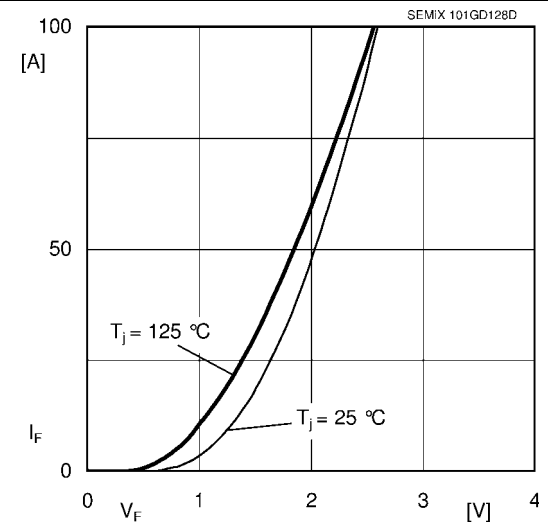


Fig. 10 Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

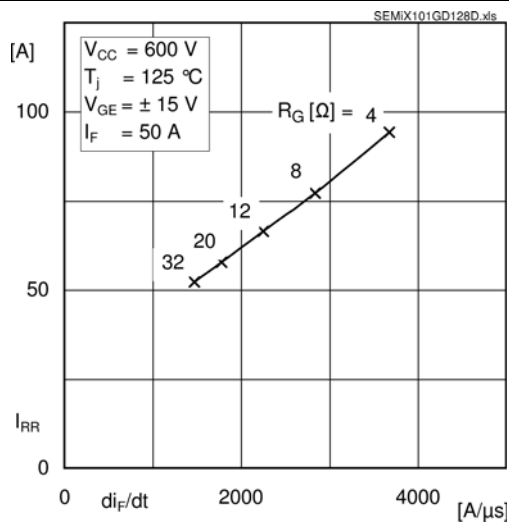


Fig. 11 Typ. CAL diode peak reverse recovery current

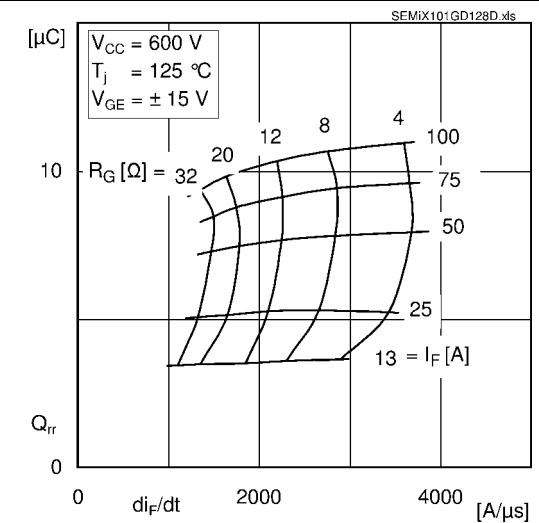
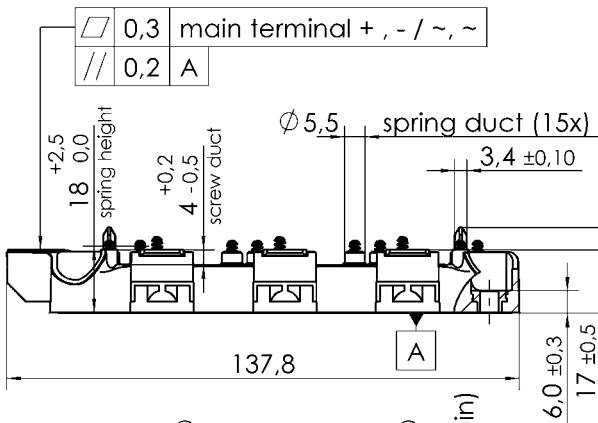
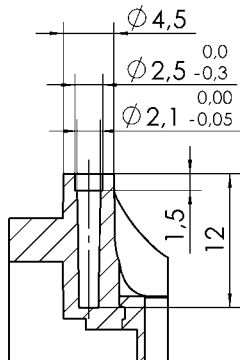


Fig. 12 Typ. CAL diode recovery charge

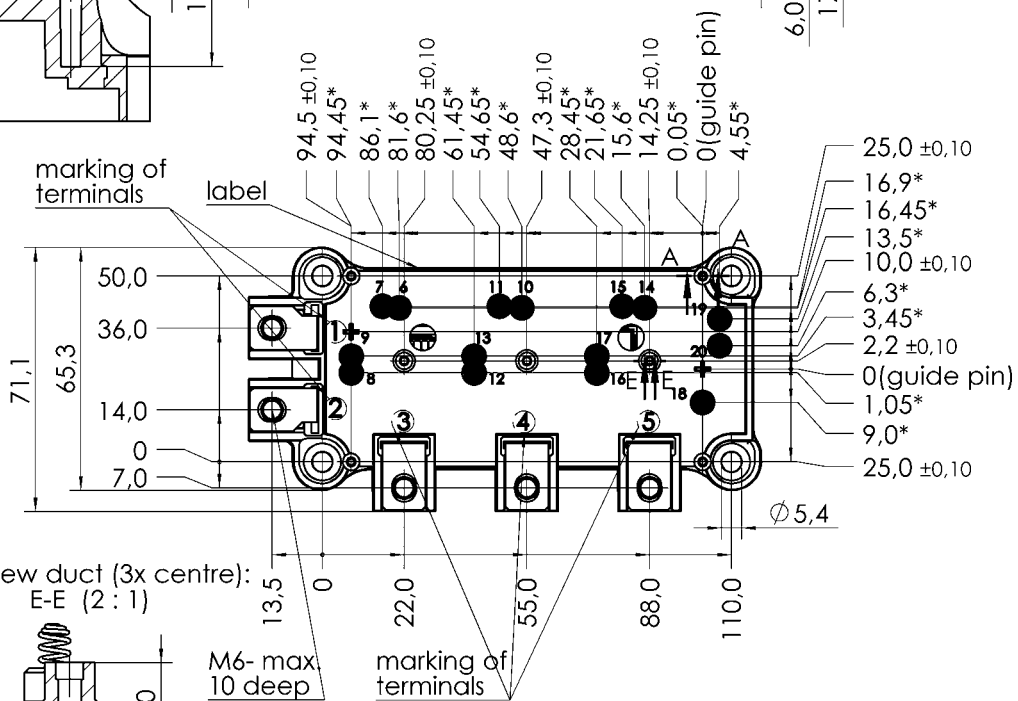
SEMiX101GD128Ds

case: SEMiX 13

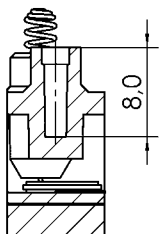
screw duct (4x):
A-A (2:1)



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



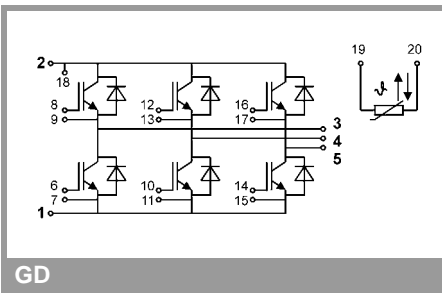
screw duct (3x centre):
E-E (2:1)



* all measures with $\pm 0,2$

Rules for the contact PCB:
- spring landing pad = $\varnothing 3,5 \pm 0,2$
- holes guidepins = $\varnothing 4 \pm 0,1$

SEMIX 13



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

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