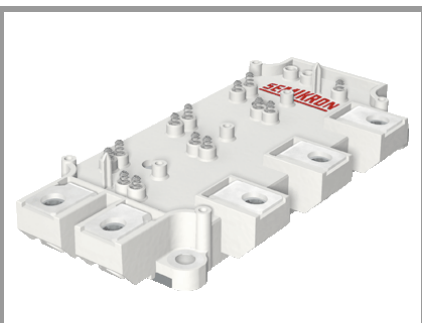


SEMiX101GD128Ds



SEMiX[®]13

SPT IGBT Modules

SEMiX101GD128Ds

Preliminary Data

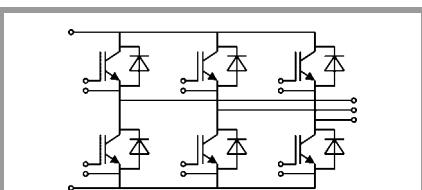
Features

- 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

Remarks

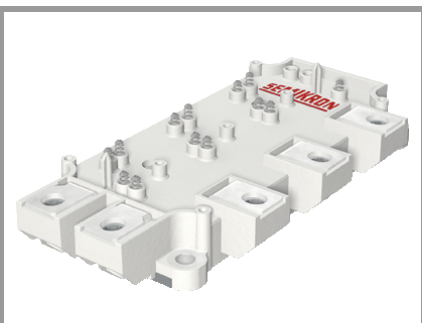


GD

Absolute Maximum Ratings				
Symbol	Conditions	Values	Unit	
IGBT				
V_{CES}		1200	V	
I_C	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	104	A
		$T_c = 80^\circ\text{C}$	74	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	100	A	
V_{GES}		-20 ... 20	V	
t_{psc}	$V_{CC} = 600\text{V}$ $V_{GE} \leq 20\text{V}$ $T_j = 125^\circ\text{C}$ $V_{CES} \leq 1200\text{V}$		10	μs
T_j		-40 ... 150	$^\circ\text{C}$	
Inverse diode				
I_F	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	88	A
		$T_c = 80^\circ\text{C}$	61	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	100	A	
I_{FSM}	$t_p = 10\text{ms}$, half sine wave, $T_j = 25^\circ\text{C}$	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, $t = 60\text{s}$	4000	V	

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
IGBT					
$V_{CE(sat)}$	$I_{Cnom} = 50\text{A}$ $V_{GE} = 15\text{V}$ chiplevel	$T_j = 25^\circ\text{C}$	1.9	2.35	V
		$T_j = 125^\circ\text{C}$	2.10	2.55	V
V_{CE0}		$T_j = 25^\circ\text{C}$	1	1.15	V
		$T_j = 125^\circ\text{C}$	0.9	1.05	V
r_{CE}	$V_{GE} = 15\text{V}$	$T_j = 25^\circ\text{C}$	18.0	24.0	$\text{m}\Omega$
		$T_j = 125^\circ\text{C}$	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}	$V_{GE} = 0\text{V}$ $V_{CE} = 1200\text{V}$	$T_j = 25^\circ\text{C}$	0.1	0.3	mA
		$T_j = 125^\circ\text{C}$			mA
C_{ies}	$V_{CE} = 25\text{V}$		4.7		nF
C_{oes}	$V_{GE} = 0\text{V}$		0.29		nF
C_{res}			0.19		nF
Q_G	$V_{GE} = -8\text{V} \dots +15\text{V}$		480		nC
R_{Gint}	$T_j = 25^\circ\text{C}$		5.00		Ω
$t_{d(on)}$	$V_{CC} = 600\text{V}$		115		ns
t_r	$I_{Cnom} = 50\text{A}$ $T_j = 125^\circ\text{C}$		30		ns
E_{on}	$R_{Gon} = 8\Omega$		5.2		mJ
$t_{d(off)}$	$R_{Goff} = 8\Omega$		340		ns
t_f			55		ns
E_{off}			5.5		mJ
$R_{th(j-c)}$	per IGBT			0.28	K/W

SEMiX101GD128Ds



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SPT IGBT Modules

SEMiX101GD128Ds

Preliminary Data

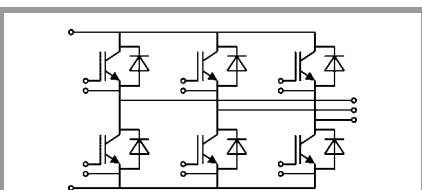
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Typical Applications

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- UPS
- Electronic welders up to 20 kHz

Remarks



GD

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

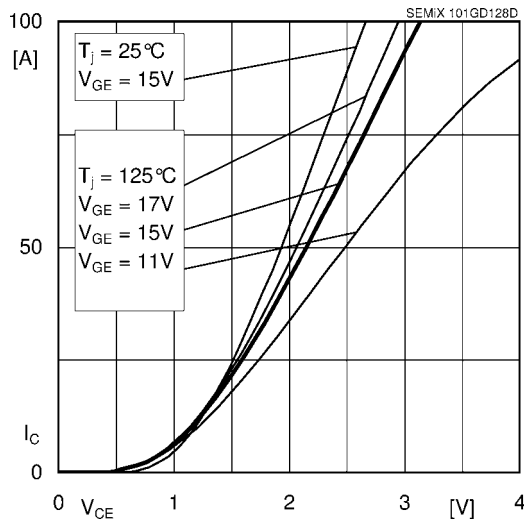


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

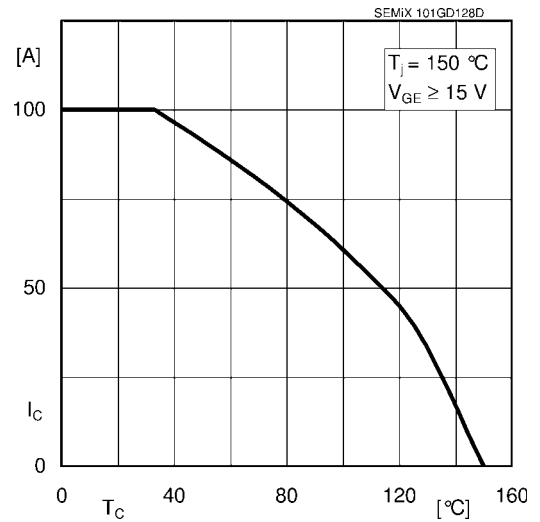


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

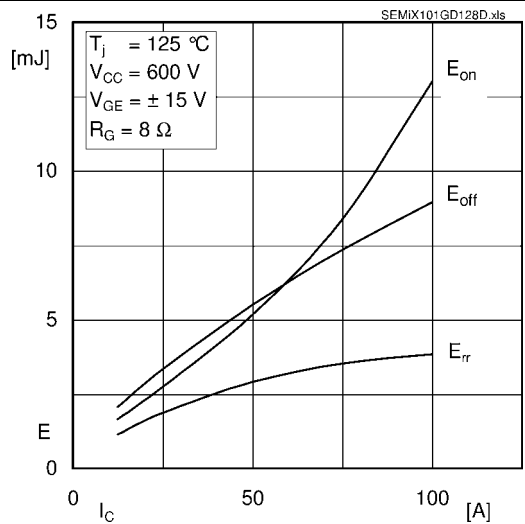


Fig. 3 Typ. turn-on /-off energy = $f(I_C)$

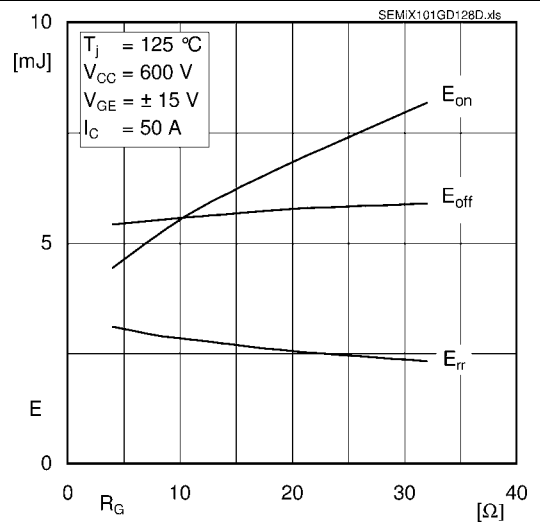


Fig. 4 Typ. turn-on /-off energy = $f(R_G)$

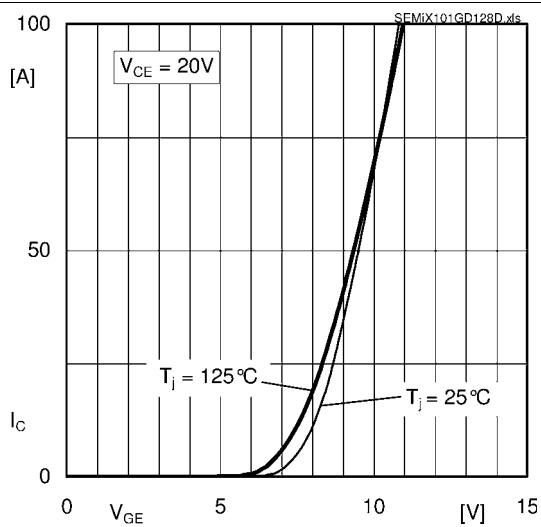


Fig. 5 Typ. transfer characteristic

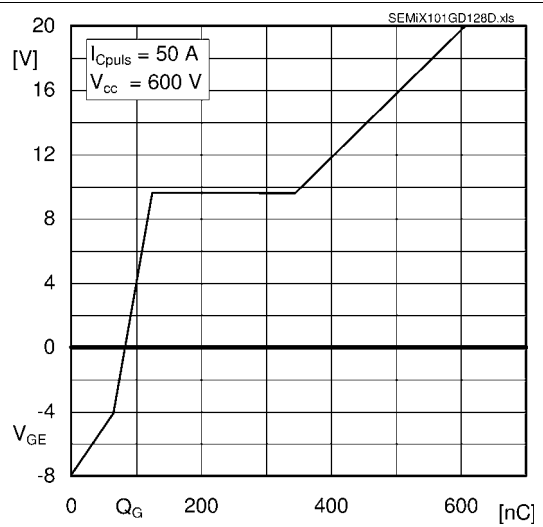


Fig. 6 Typ. gate charge characteristic

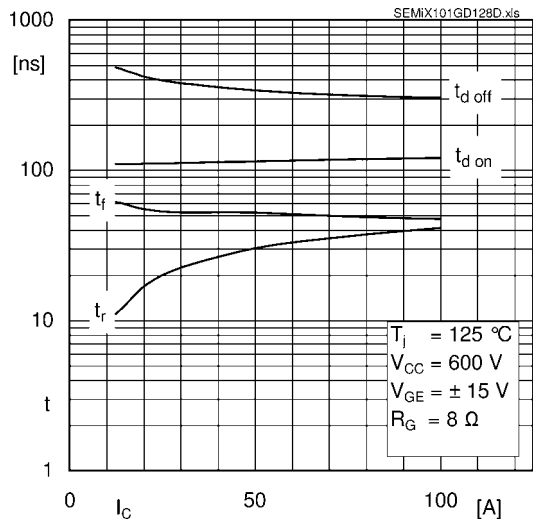


Fig. 7 Typ. switching times vs. I_C

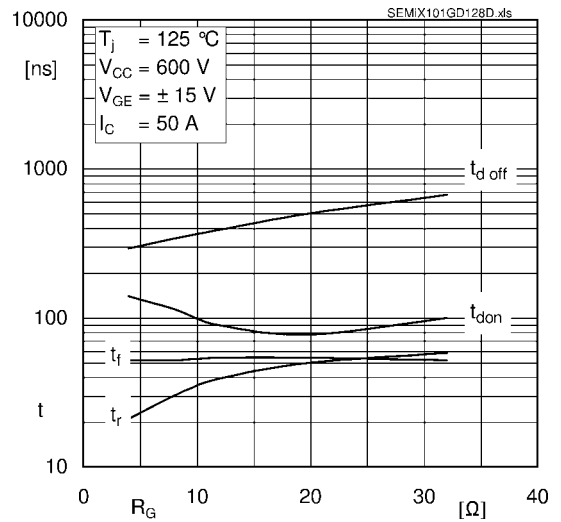


Fig. 8 Typ. switching times vs. gate resistor R_G

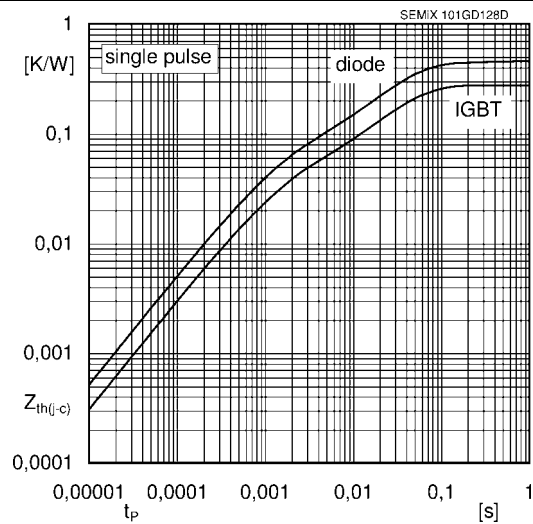


Fig. 9 Typ. transient thermal impedance

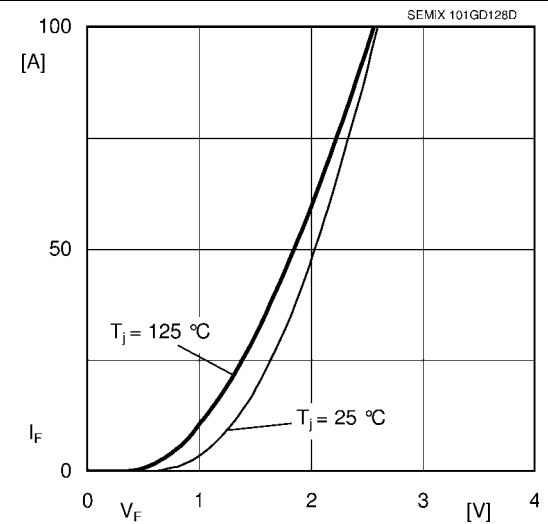


Fig. 10 Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

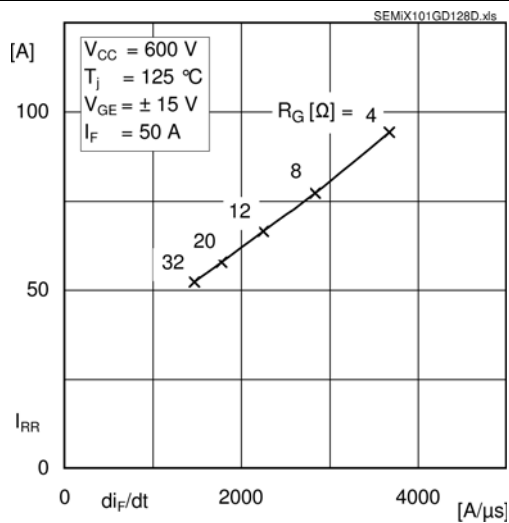


Fig. 11 Typ. CAL diode peak reverse recovery current

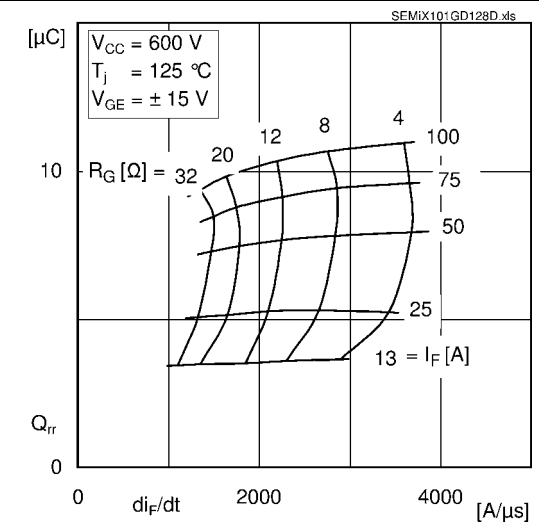
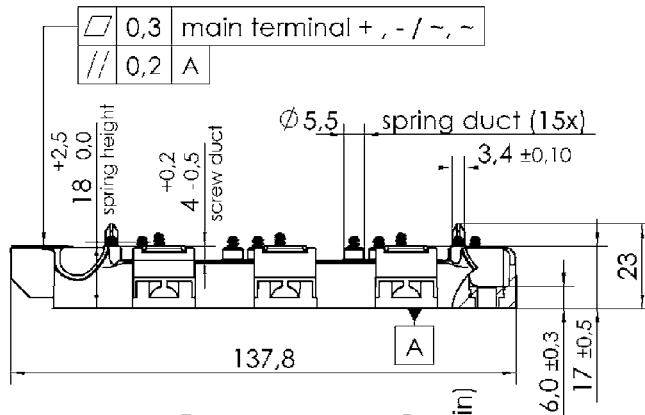
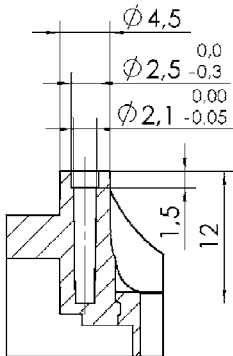


Fig. 12 Typ. CAL diode recovery charge

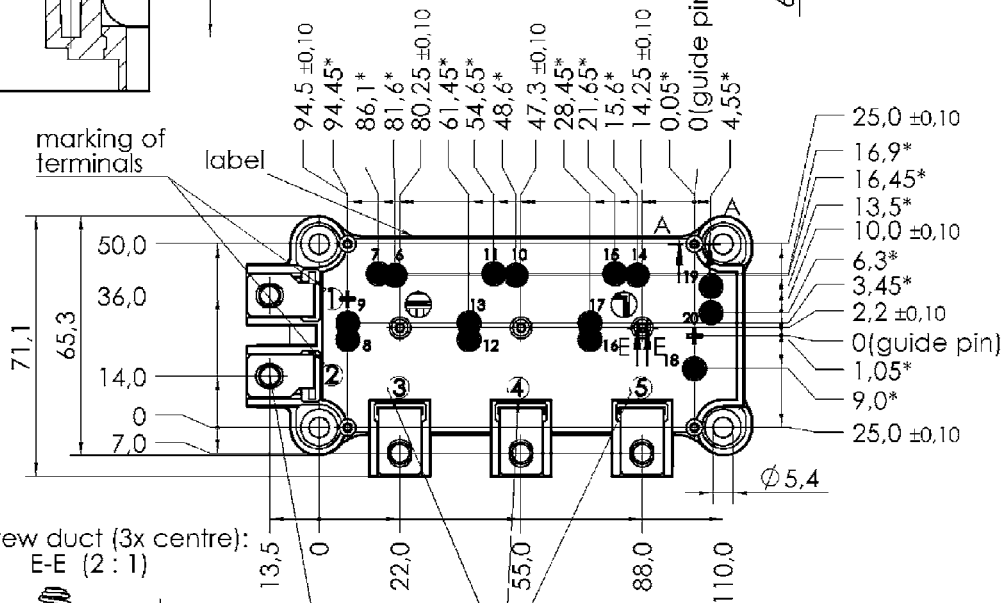
SEMiX101GD128Ds

case: SEMIX 13

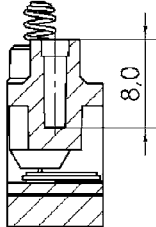
screw duct (4x):
A-A (2:1)



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



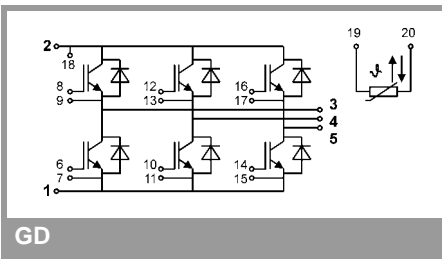
screw duct (3x centre):
E-E (2:1)



* all measures with $\pm 0,2$

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

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

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