



SEMITRANS® 4

SPT IGBT Modules

SKM 300GA128D

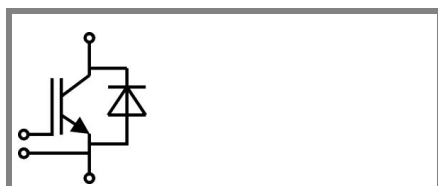
Preliminary Data

Features

- SPT = Soft-Punch-Through technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_C$

Typical Applications

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

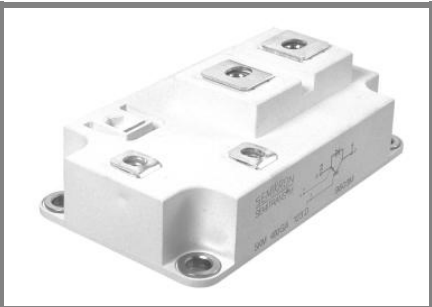


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Absolute Maximum Ratings		T _{case} = 25°C, unless otherwise specified		
Symbol	Conditions		Values	Units
IGBT				
V _{CES}	T _j = 25 °C		1200	V
I _C	T _j = 150 °C	T _c = 25 °C	370	A
		T _c = 80 °C	260	A
I _{CRM}	I _{CRM} =2xI _{Cnom}		400	A
V _{GES}			± 20	V
t _{psc}	V _{CC} = 600 V; V _{GE} ≤ 20 V; T _j = 125 °C V _{CES} < 1200 V		10	µs
Inverse Diode				
I _F	T _j = 150 °C	T _c = 25 °C	300	A
		T _c = 125 °C	210	A
I _{FRM}	I _{FRM} =2xI _{Fnom}		400	A
I _{FSM}	t _p = 10 ms; sin. T _j = 150 °C		2200	A
Module				
I _{t(RMS)}			500	A
T _{vj}			- 40...+ 150	°C
T _{stg}			- 40...+ 125	°C
V _{isol}	AC, 1 min.		4000	V

Characteristics		$T_{case} = 25^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 8\text{ mA}$	4,5	5,5	6,5	V
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$		0,2	0,6	mA
V_{CE0}			$T_j = 25^\circ\text{C}$	1	V
			$T_j = 125^\circ\text{C}$	0,9	V
r_{CE}	$V_{GE} = 15\text{ V}$		$T_j = 25^\circ\text{C}$	4,5	m Ω
			$T_j = 125^\circ\text{C}$	6	m Ω
$V_{CE(sat)}$	$I_{Cnom} = 200\text{ A}, V_{GE} = 15\text{ V}$		$T_j = 25^\circ\text{C}_{chiplev.}$	1,9	V
			$T_j = 125^\circ\text{C}_{chiplev.}$	2,1	V
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$		4,5	nF
C_{oes}				0,35	nF
C_{res}				0,2	nF
Q_G	$V_{GE} -8\text{ V} / +20\text{ V}$		2400		nC
R_{Gint}	$T_j = ^\circ\text{C}$		1,25		Ω
$t_{d(on)}$	$R_{Gon} = 5,1\ \Omega$ $di/dt = 4900\text{ A}/\mu\text{s}$	$V_{CC} = 600\text{ V}$ $I_{Cnom} = 200\text{ A}$	80		ns
t_r			60		ns
E_{on}			22		mJ
$t_{d(off)}$	$R_{Goff} = 5,1\ \Omega$ $di/dt = 2500\text{ A}/\mu\text{s}$	$T_j = 125^\circ\text{C}$ $V_{GE} = -15\text{ V}$ $L_s = 20\text{ nH}$	520		ns
t_f			65		ns
E_{off}			21		mJ
$R_{th(j-c)}$	per IGBT			0,085	K/W

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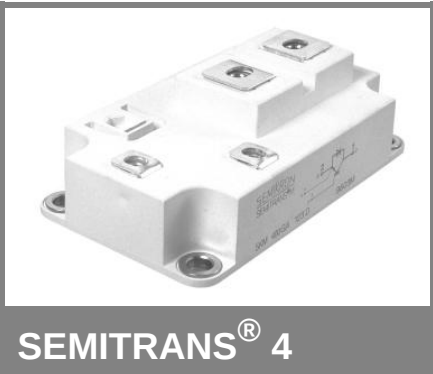
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Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 200\text{ A}$; $V_{GE} = 0\text{ V}$ $T_j = 25\text{ }^{\circ}\text{C}_{chiplev.}$ $T_j = 125\text{ }^{\circ}\text{C}_{chiplev.}$		2 1,8	2,5	V V
V_{F0}	$T_j = 25\text{ }^{\circ}\text{C}$ $T_j = 125\text{ }^{\circ}\text{C}$		1,1	1,2	V V
r_F	$T_j = 25\text{ }^{\circ}\text{C}$ $T_j = 125\text{ }^{\circ}\text{C}$		4,5	6,5	mΩ mΩ
I_{RRM} Q_{rr} E_{rr}	$I_{Fnom} = 200\text{ A}$ $di/dt = 5200\text{ A}/\mu\text{s}$ $V_{GE} = 0\text{ V}$; $V_{CC} = 600\text{ V}$ $T_j = 125\text{ }^{\circ}\text{C}$ $L_S = 20\text{ nH}$		250 35 16,5		A μC mJ
$R_{th(j-c)D}$	per diode			0,15	K/W
Module					
L_{CE}			15	20	nH
$R_{CC'+EE'}$	res., terminal-chip $T_{case} = \text{ }^{\circ}\text{C}$		0,18		mΩ
$R_{th(c-s)}$	per module			0,038	K/W
M_s	to heat sink M6	3		5	Nm
M_t	to terminals M6 (M4)	2,5 (1,1)		5 (2)	Nm
w				330	g

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

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.

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Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)}$			
$R_{\theta j}$	$i = 1$	1,25	mk/W
$R_{\theta j}$	$i = 2$		mk/W
$R_{\theta j}$	$i = 3$		mk/W
$R_{\theta j}$	$i = 4$		mk/W
$\tau_{\theta j}$	$i = 1$		s
$\tau_{\theta j}$	$i = 2$		s
$\tau_{\theta j}$	$i = 3$		s
$\tau_{\theta j}$	$i = 4$		s

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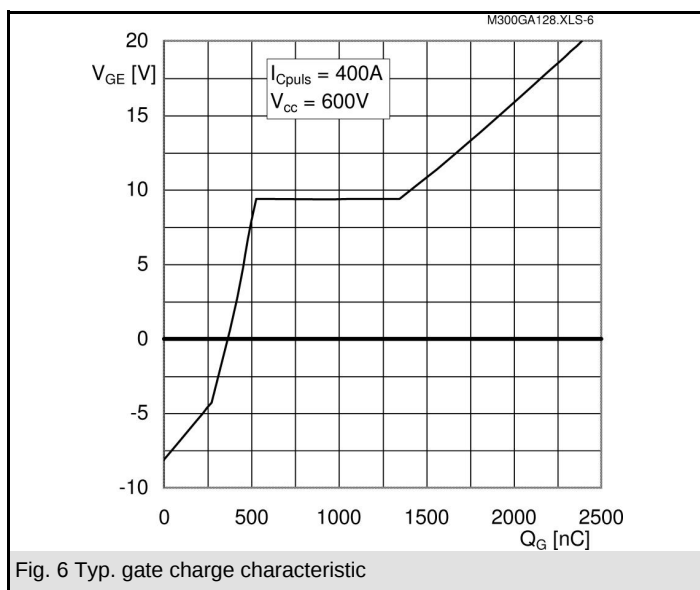
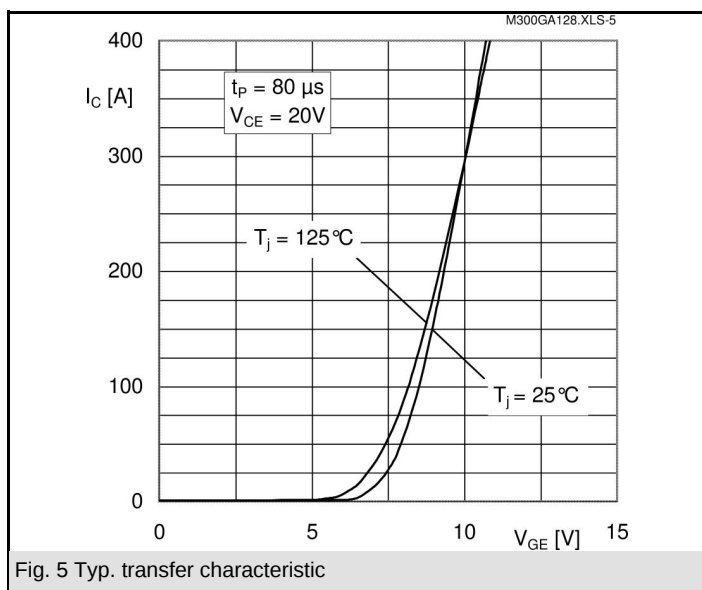
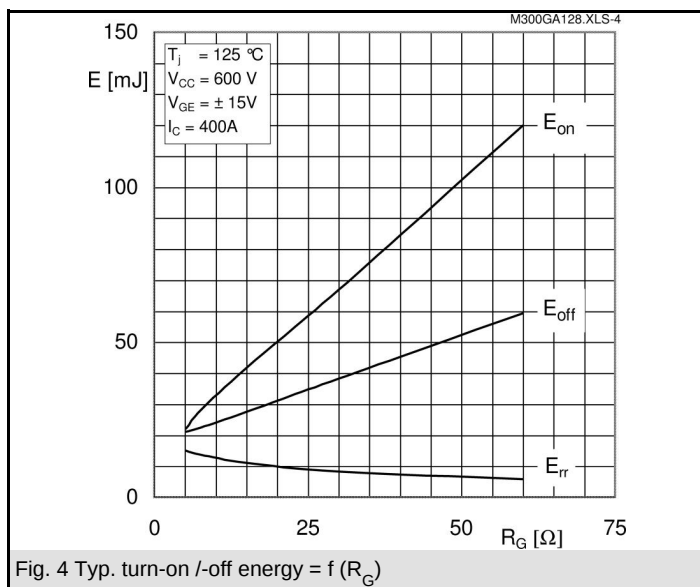
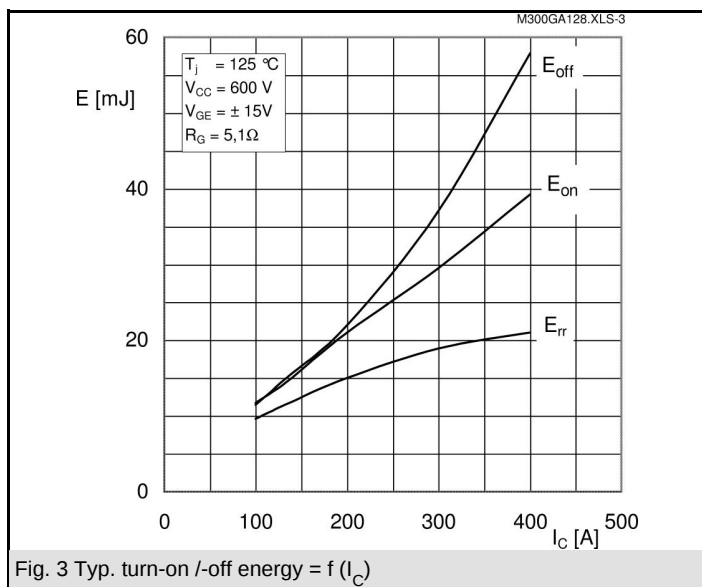
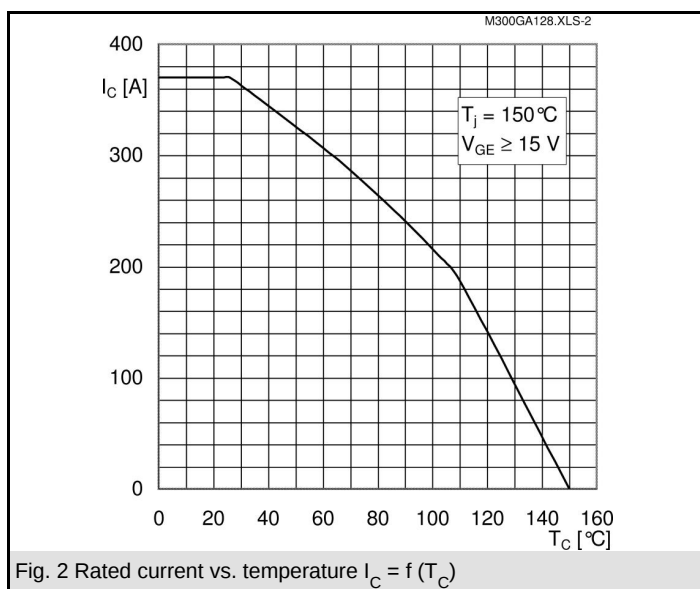
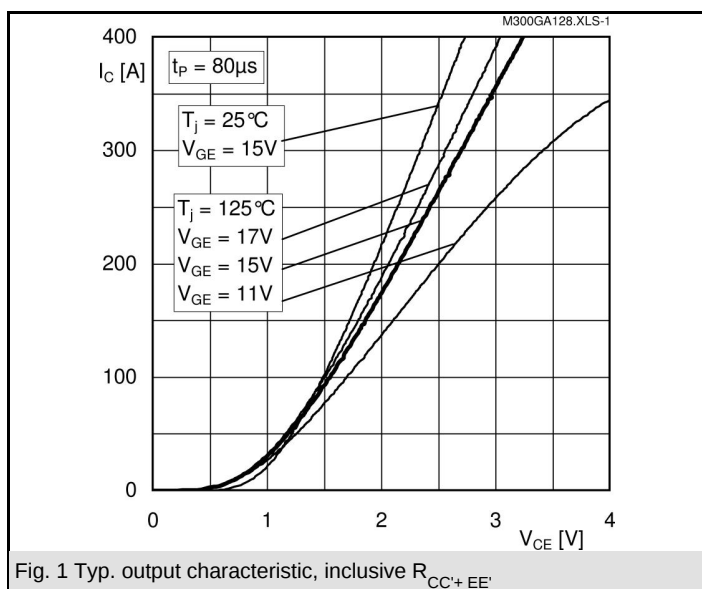
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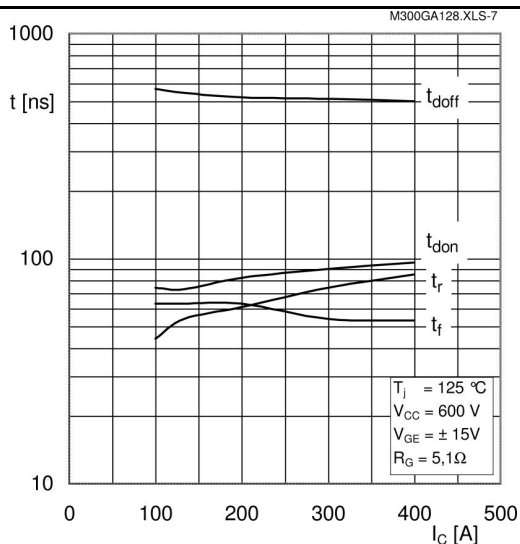


Fig. 7 Typ. switching times vs. I_C

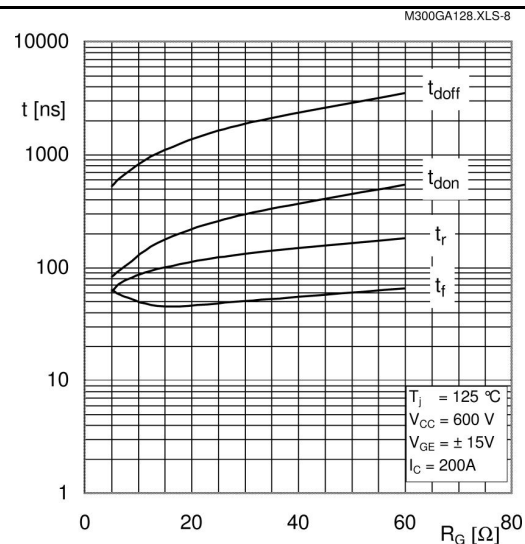


Fig. 8 Typ. switching times vs. gate resistor R_G

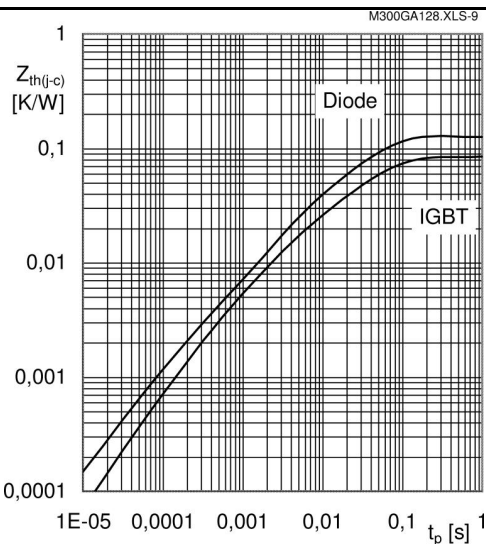


Fig. 9 Transient thermal impedance

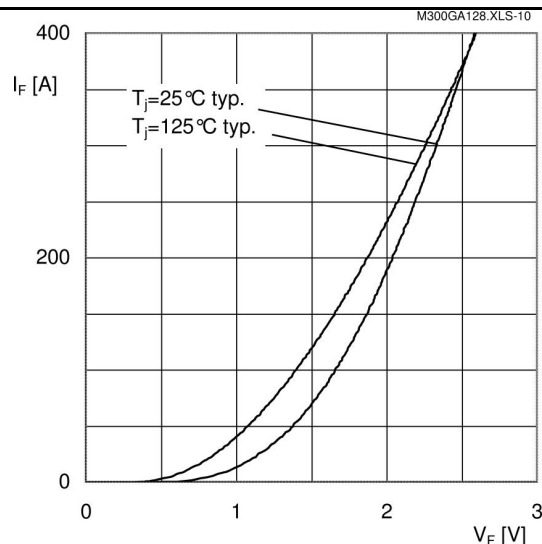


Fig. 10 CAL diode forward characteristic

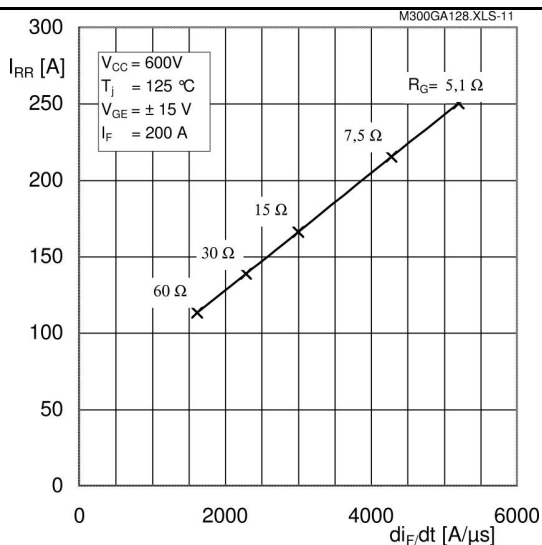


Fig. 11 Typ. CAL diode peak reverse recovery current

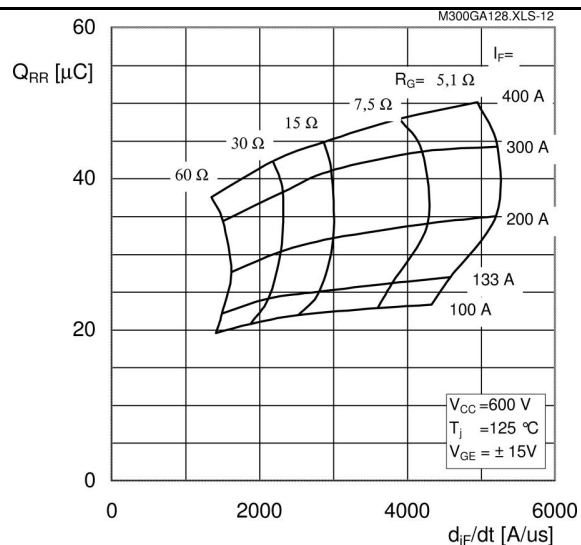


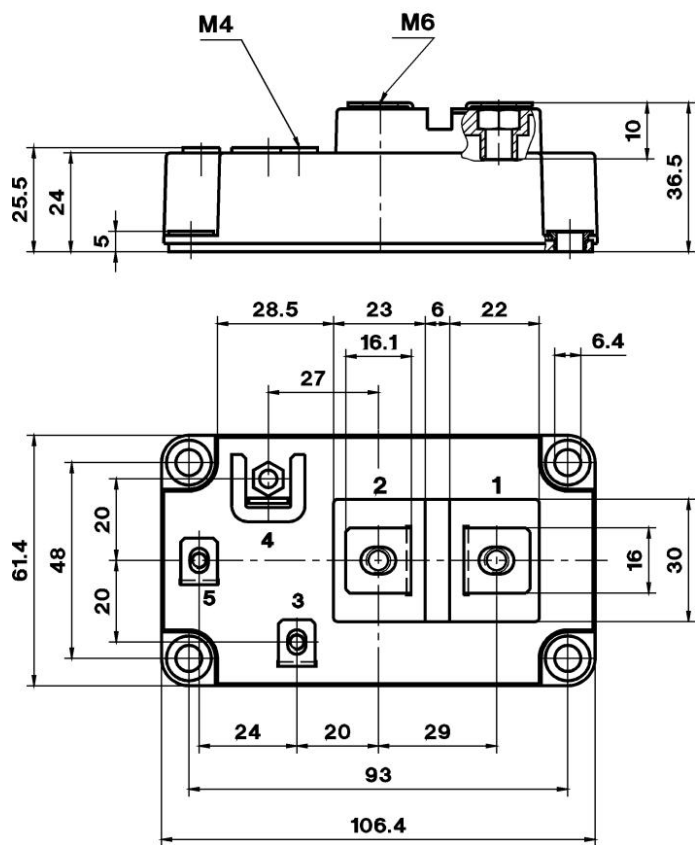
Fig. 12 Typ. CAL diode peak reverse recovery charge

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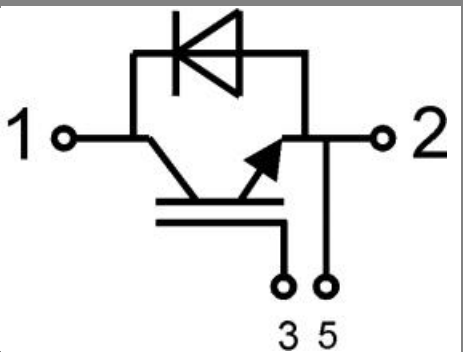
UL Recognized

CASED59

File no. E 63 532



Case D 59



GA Case D 59