



SEMITRANS® 4

SKM600GA12V

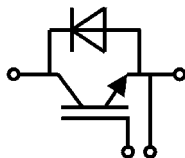
Target Data

Features

- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_{Cnom}$
- Fast & soft inverse CAL diodes
- Large clearance (10 mm) and creepage distances (20 mm)
- Isolated copper baseplate using DBC Technology (Direct Copper Bonding)
- UL recognized, file no. E63532

Typical Applications*

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



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Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT				
V _{CES}	T _j = 25 °C		1200	V
I _C	T _j = 175 °C	T _c = 25 °C	908	A
		T _c = 80 °C	692	A
I _{Cnom}			600	A
I _{CRM}	I _{CRM} = 3xI _{Cnom}		1800	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 720 V V _{GE} ≤ 20 V V _{CES} ≤ 1200 V	T _j = 125 °C	10	µs
T _j			-40 ... 175	°C
Inverse diode				
I _F	T _j = 175 °C	T _c = 25 °C	707	A
		T _c = 80 °C	529	A
I _{Fnom}			600	A
I _{FRM}	I _{FRM} = 3xI _{Fnom}		1800	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 25 °C		3240	A
T _j			-40 ... 175	°C
Module				
I _{t(RMS)}	80 °C		500	A
T _{stg}			-40 ... 125	°C
V _{isol}	AC sinus 50Hz, t = 1 min		4000	V

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT						
V _{CE(sat)}	I _C = 600 A	T _J = 25 °C		1.75	2.20	V
	V _{GE} = 15 V chipelevel	T _J = 150 °C		2.20	2.50	V
V _{CE0}		T _J = 25 °C		0.94	1.04	V
		T _J = 150 °C		0.88	0.98	V
r _{CE}	V _{GE} = 15 V	T _J = 25 °C		1.35	1.93	mΩ
		T _J = 150 °C		2.20	2.53	mΩ
V _{GE(th)}	V _{GE} =V _{CE} , I _C = 24 mA		5.5	6	6.5	V
I _{CES}	V _{GE} = 0 V	T _J = 25 °C		0.1	0.3	mA
	V _{CE} = 1200 V	T _J = 150 °C				mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		36		nF
C _{oes}		f = 1 MHz		3.55		nF
C _{res}		f = 1 MHz		3.536		nF
Q _G	V _{GE} = - 8 V...+ 15 V			6620		nC
R _{Gint}				1.3		Ω
t _{d(on)}	V _{CC} = 600 V	T _J = 150 °C		360		ns
t _r	I _C = 600 A	T _J = 150 °C		82		ns
E _{on}	V _{GE} = ±15 V	T _J = 150 °C		65		mJ
t _{d(off)}	R _{G on} = 2.5 Ω	T _J = 150 °C		980		ns
t _f	R _{G off} = 2.5 Ω	T _J = 150 °C		70		ns
	di/dt _{on} = 8200 A/μs	T _J = 150 °C				
	di/dt _{off} = 7200 A/μs					
E _{off}	du/dt _{off} = 6400 V/μs			59		mJ
R _{th(j-c)}	per IGBT				0.049	K/W



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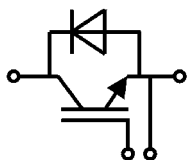
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
V _F = V _{EC}	I _F = 600 A	T _j = 25 °C		2.14	2.46	V
	V _{GE} = 0 V chip	T _j = 150 °C		2.07	2.38	V
V _{F0}		T _j = 25 °C		1.3	1.5	V
		T _j = 150 °C		0.9	1.1	V
r _F		T _j = 25 °C		1.4	1.6	mΩ
		T _j = 150 °C		1.9	2.1	mΩ
I _{RRM}	I _F = 600 A	T _j = 150 °C		700		A
Q _{rr}	di/dt _{off} = 8200 A/μs	T _j = 150 °C		90		μC
E _{rr}	V _{GE} = ±15 V	T _j = 150 °C		38		mJ
	V _{CC} = 600 V					
R _{th(j-c)}	per diode				0.086	K/W
Module						
L _{CE}				15	20	nH
R _{CC'+EE'}	terminal-chip	T _C = 25 °C		0.18		mΩ
		T _C = 125 °C		0.22		mΩ
R _{th(c-s)}	per module			0.02	0.038	K/W
M _s	to heat sink M6		3		5	Nm
M _t		to terminals M6, M4	2.5		5	Nm
						Nm
w						330



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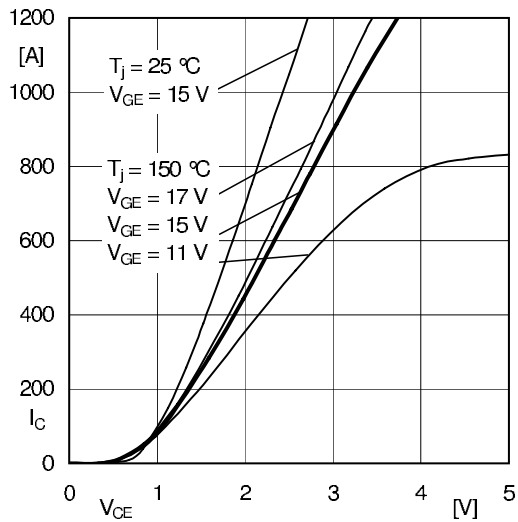


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE'}$

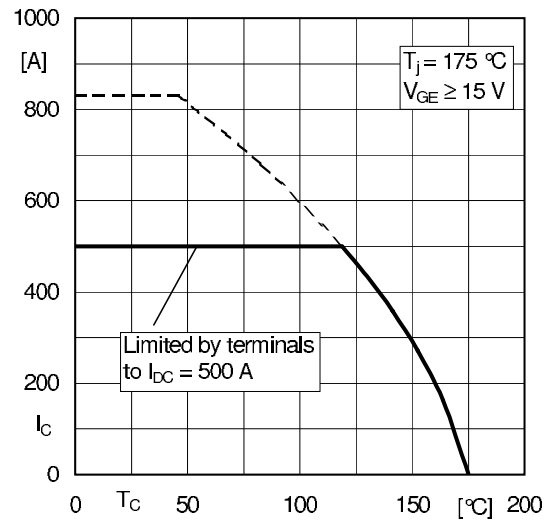


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

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

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

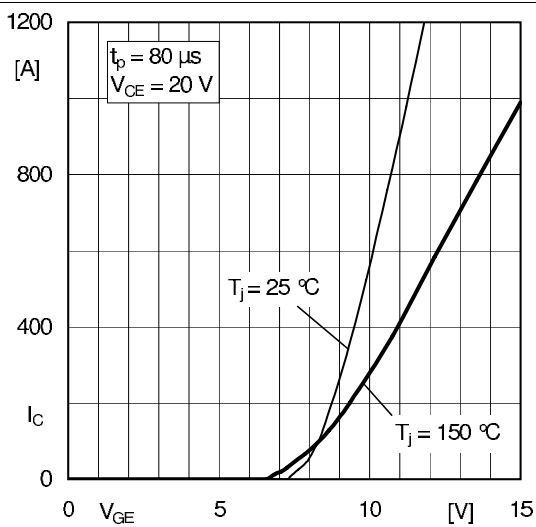


Fig. 5: Typ. transfer characteristic

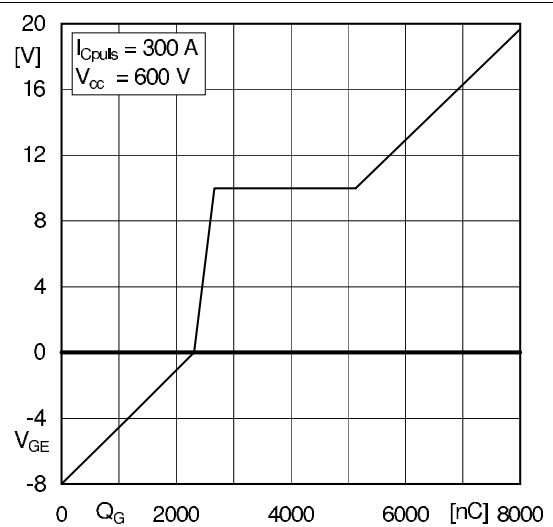


Fig. 6: Typ. gate charge characteristic

Fig. 7: Typ. switching times vs. I_C

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

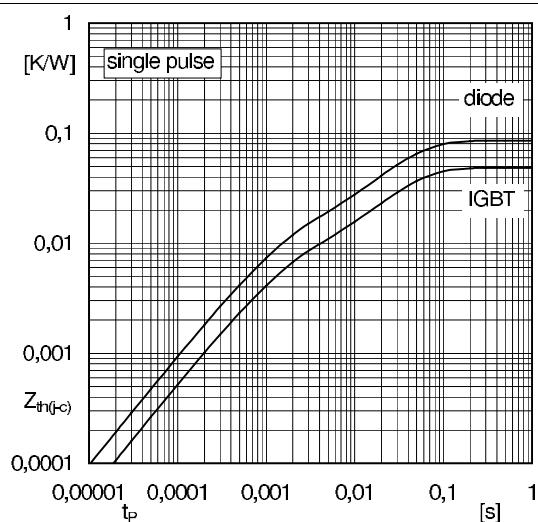


Fig. 9: Transient thermal impedance

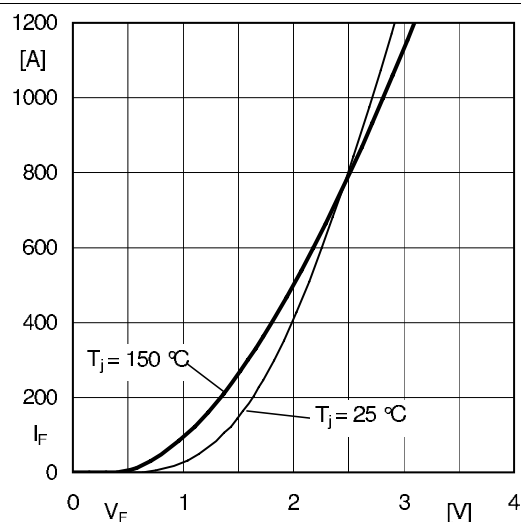
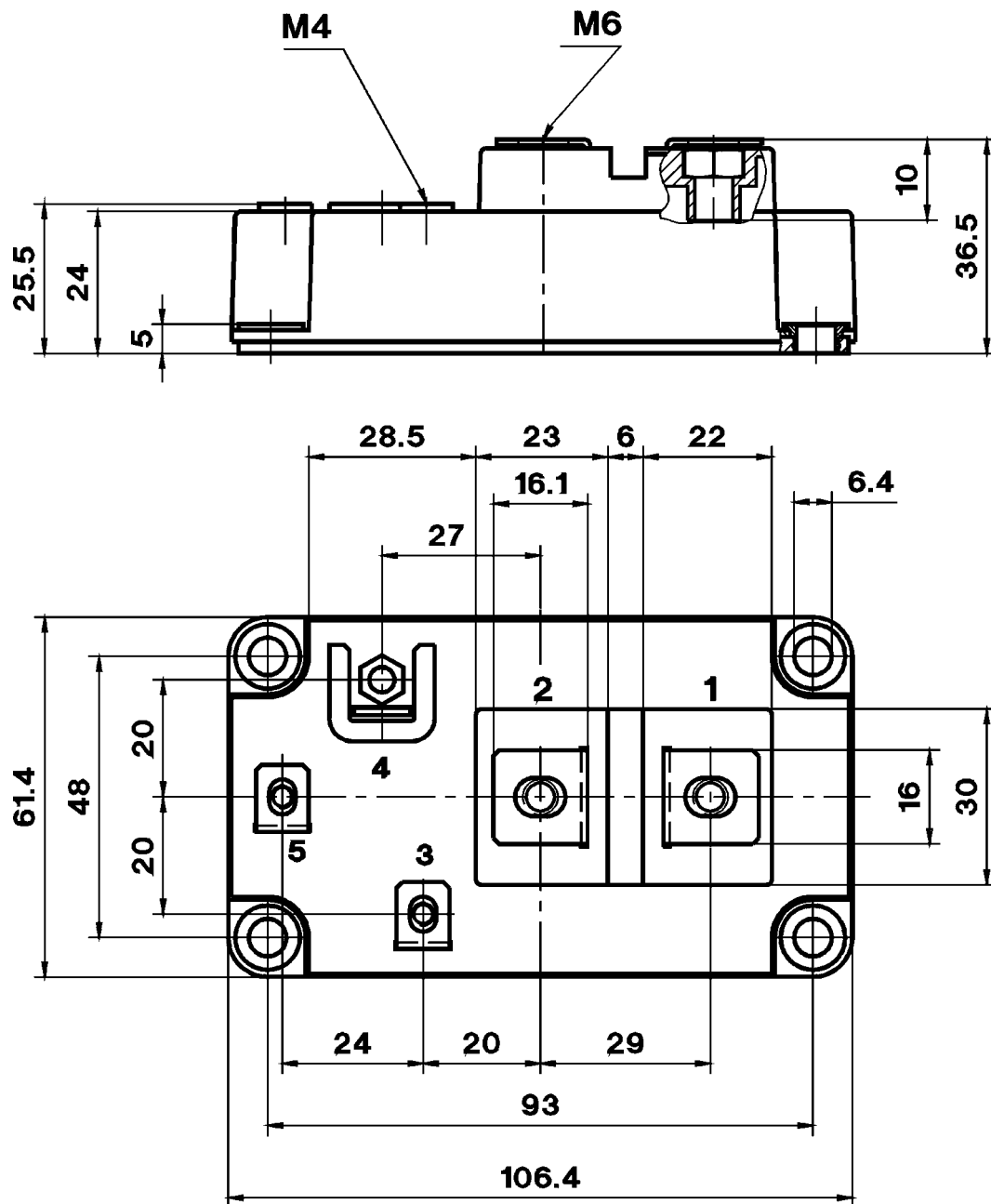


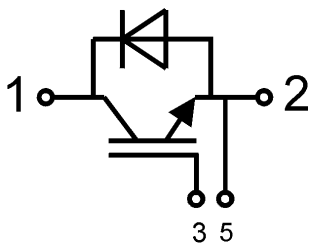
Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

Fig. 11: CAL diode peak reverse recovery current

Fig. 12: Typ. CAL diode peak reverse recovery charge



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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.