

SKM400GB12V



SEMITRANS® 3

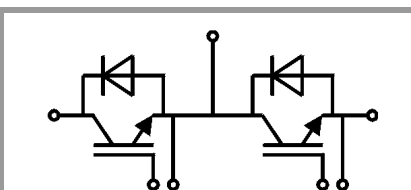
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Features

- $V_{CE(sat)}$ 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 fsw up to 20 kHz



GB

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	612	A
		T _c = 80 °C	467	A
I _{Cnom}			400	A
I _{CRM}	I _{CRM} = 3xI _{Cnom}		1200	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	440	A
		T _c = 80 °C	329	A
I _{Fnom}			400	A
I _{FRM}	I _{FRM} = 3xI _{Fnom}		1200	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 25 °C		1980	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 = 400 A	T _J = 25 °C		1.75	2.20	V
	V _{GE} = 15 V chipllevel	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		2.02	2.90	mΩ
		T _J = 150 °C		3.30	3.80	mΩ
V _{GE(th)}	V _{GE} =V _{CE} , I _C = 16 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		24.04		nF
C _{oes}		f = 1 MHz		2.36		nF
C _{res}		f = 1 MHz		2.356		nF
Q _G	V _{GE} = - 8 V...+ 15 V			4420		nC
R _{Gint}				1.9		Ω
t _{d(on)}	V _{CC} = 600 V	T _J = 150 °C		350		ns
t _r	I _C = 400 A	T _J = 150 °C		60		ns
E _{on}	V _{GE} = ±15 V	T _J = 150 °C		39		mJ
t _{d(off)}	R _{G on} = 3 Ω	T _J = 150 °C		700		ns
t _f	R _{G off} = 3 Ω	T _J = 150 °C		65		ns
	di/dt _{on} = 9800 A/μs	T _J = 150 °C				
	di/dt _{off} = 5000 A/μs					
E _{off}	du/dt _{off} = 7600 V/μs	T _J = 150 °C		42		mJ
R _{th(j-c)}	per IGBT				0.072	K/W



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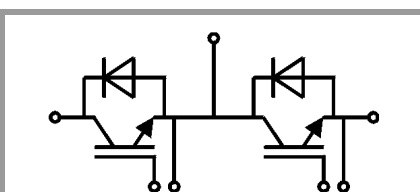
Features

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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
V _F = V _{EC}	I _F = 400 A V _{GE} = 0 V chip	T _j = 25 °C		2.20	2.52	V
		T _j = 150 °C		2.15	2.47	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		2.3	2.5	mΩ
		T _j = 150 °C		3.1	3.4	mΩ
I _{RRM}	I _F = 400 A di/dt _{off} = 9500 A/μs V _{GE} = ±15 V V _{CC} = 600 V	T _j = 150 °C		450		A
Q _{rr}		T _j = 150 °C		58		μC
E _{rr}		T _j = 150 °C				mJ
R _{th(j-c)}	per diode				0.14	K/W
Module						
L _{CE}				15	20	nH
R _{CC'+EE'}	terminal-chip	T _C = 25 °C		0.25		mΩ
		T _C = 125 °C		0.5		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	2.5		5	Nm
						Nm
w					325	g



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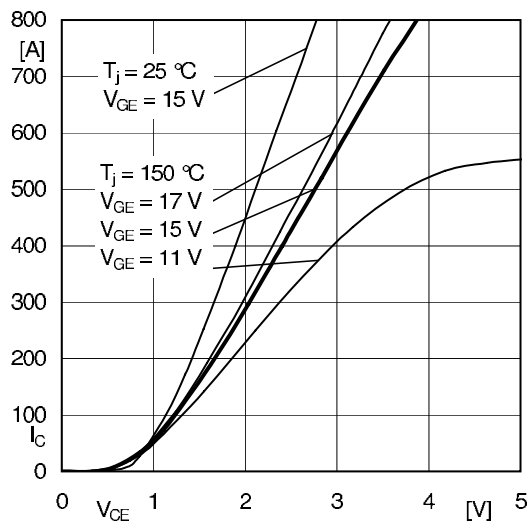


Fig. 1: Typ. output characteristic, inclusive $R_{CC'} + E_{E'}$

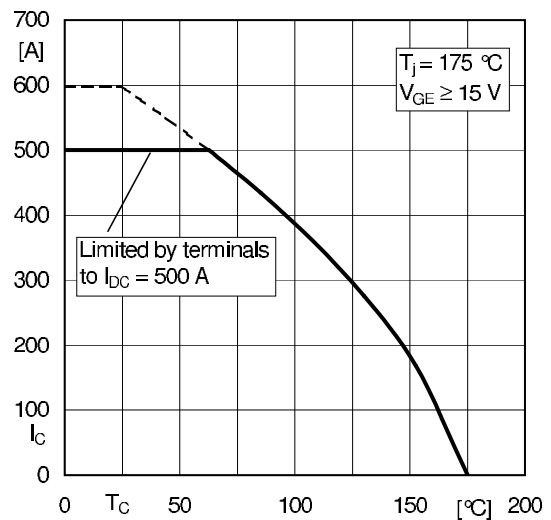


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

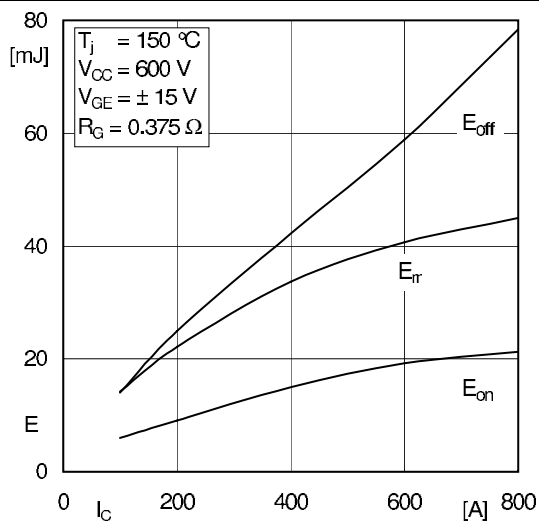


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

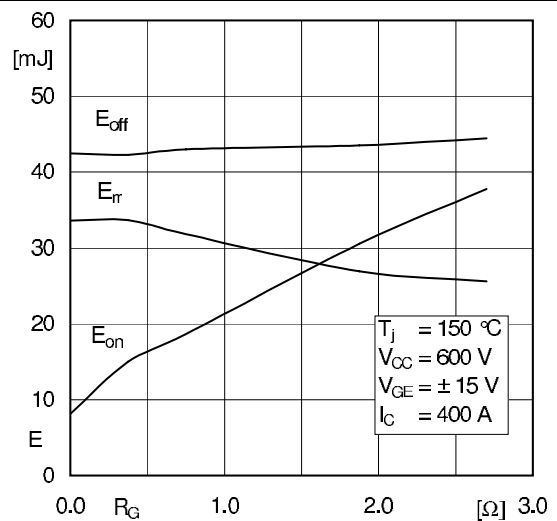


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

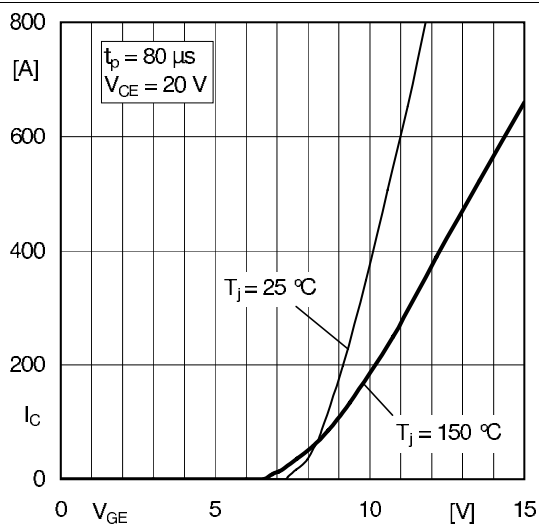


Fig. 5: Typ. transfer characteristic

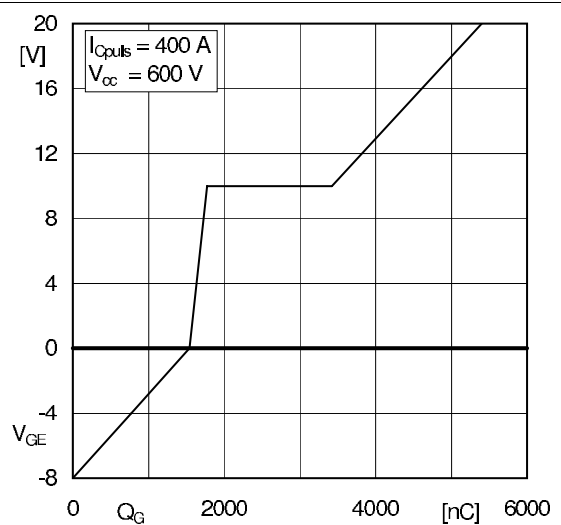
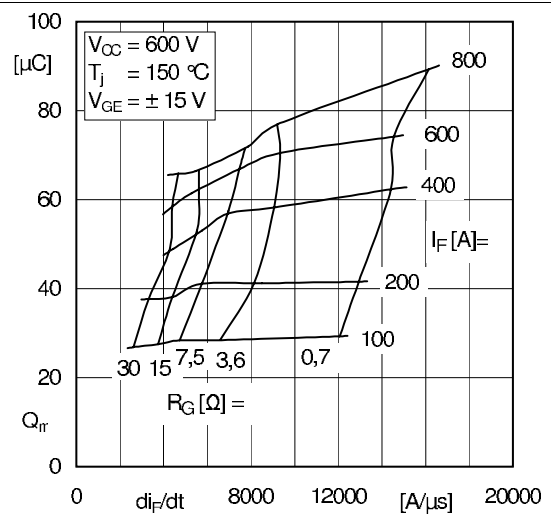
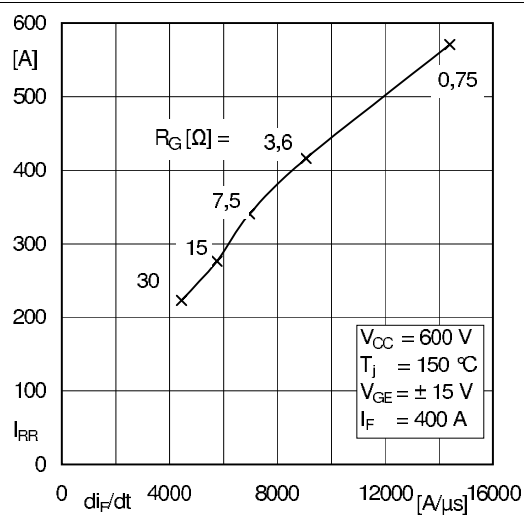
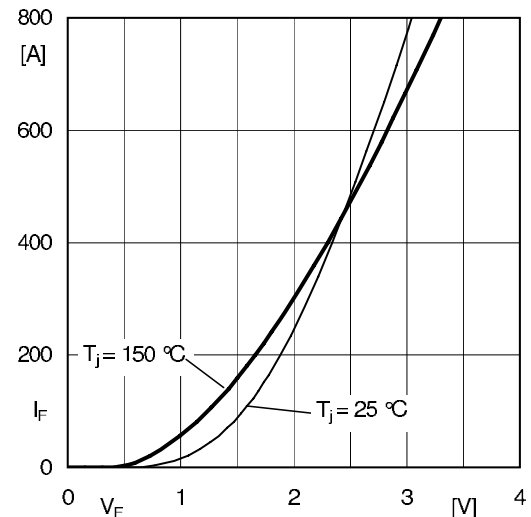
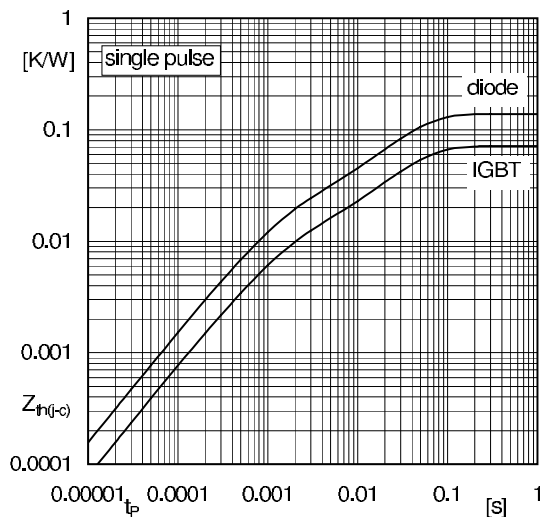
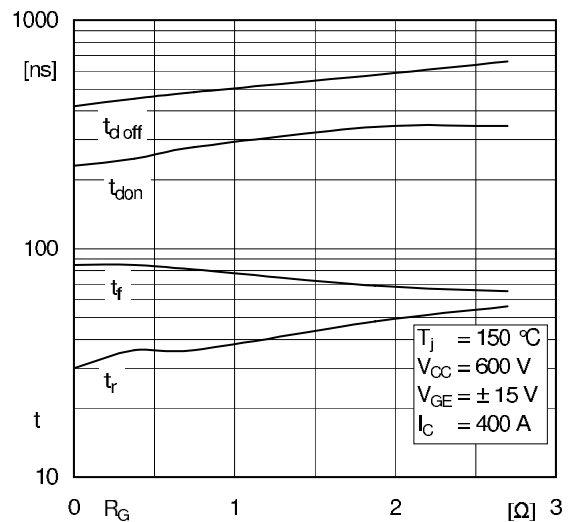
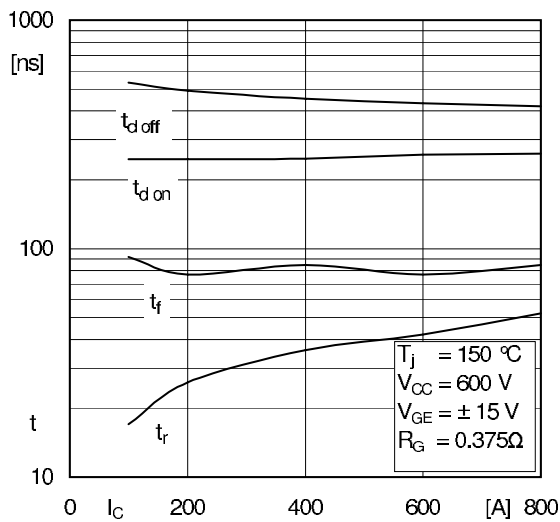
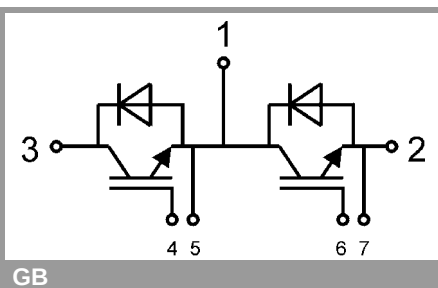


Fig. 6: Typ. gate charge characteristic





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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.