SKM100GB12T4G

SEMITRANS®3

Fast IGBT4 Modules

SKM100GB12T4G

Features

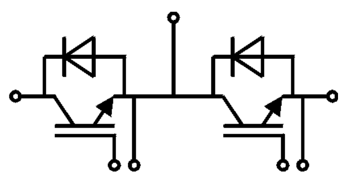
- IGBT4 = 4. Generation (Trench)IGBT
- VCEsat with positive temperature coefficient
- High short circuit capability, self limiting to 6 x I_{CNOM}
- Soft switching 4. Generation CAL diode (CAL4)

Typical Applications

- AC inverter drives
- UPS
- Electronic welders at fsw up to 20 kHz

Remarks

- Case temperature limited to Tc = 125°C max, recomm. Top = -40 ... +150°C, product rel. results valid for Tj = 150°



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Absolute Maximum Ratings				
Symbol	**Conditions**		**Values**	**Unit**
IGBT				
V_{CES}			1200	V
I_C	T_j = 175 °C	T_c = 25 °C	154	A
		T_c = 80 °C	118	A
I_{Cnom}			100	A
I_{CRM}	$I_{CRM} = 3xI_{Cnom}$		300	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 800 V $V_{GE} \leq$ 15 V $V_{CES} \leq$ 1200 V	T_j = 150 °C	10	µs
T_j			-40 ... 175	°C
Inverse diode				
I_F	T_j = 175 °C	T_c = 25 °C	118	A
		T_c = 80 °C	89	A
I_{Fnom}			100	A
I_{FRM}	$I_{FRM} = 3xI_{Fnom}$		300	A
I_{FSM}	t_p = 10 ms, sin 180°, T_j = 25 °C		486	A
T_j			-40 ... 175	°C
Module				
$I_{t(RMS)}$			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 = 100 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.85	2.1	V
		T_j = 150 °C		2.2	2.4	V
V_{CE0}		T_j = 25 °C		0.8	0.9	V
		T_j = 150 °C		0.7	0.8	V
r_{CE}	V_{GE} = 15 V	T_j = 25 °C		10.5	12.0	mΩ
		T_j = 150 °C		15.0	16.0	mΩ
$V_{GE(th)}$	$V_{GE}=V_{CE}$, I_C = 3.4 mA		5	5.8	6.5	V
I_{CES}	V_{GE} = 0 V V_{CE} = 1200 V	T_j = 25 °C		0.1	0.3	mA
		T_j = 150 °C				mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		5.54		nF
C_{oes}		f = 1 MHz		0.41		nF
C_{res}		f = 1 MHz		0.32		nF
Q_G	V_{GE} = - 8 V...+ 15 V			560		nC
R_{Gint}	T_j = 25 °C			2.0		Ω
$t_{d(on)}$	V_{CC} = 600 V I_C = 100 A V_{GE} = ±15 V $R_{G\,on}$ = 1 Ω $R_{G\,off}$ = 1 Ω di/dt_{on} = 3300 A/µs di/dt_{off} = 1300 A/µs	T_j = 150 °C		167		ns
t_r		T_j = 150 °C		37		ns
E_{on}		T_j = 150 °C		16.1		mJ
$t_{d(off)}$		T_j = 150 °C		380		ns
t_f		T_j = 150 °C		78		ns
E_{off}		T_j = 150 °C		8.6		mJ
$R_{th(j-c)}$	per IGBT				0.29	K/W

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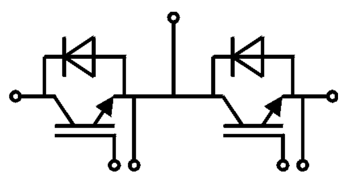

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Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
$V_F = V_{EC}$	I_F = 100 A V_{GE} = 0 V chip	T_j = 25 °C		2.22	2.54	V
		T_j = 150 °C		2.18	2.5	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		9.2	10.4	mΩ
		T_j = 150 °C		12.8	14.0	mΩ
I_{RRM}	I_F = 100 A di/dt_{off} = 1600 A/µs V_{GE} = ±15 V V_{CC} = 600 V	T_j = 150 °C		47		A
Q_{rr}		T_j = 150 °C		17		µC
E_{rr}		T_j = 150 °C		6		mJ
$R_{th(j-c)}$	per diode				0.49	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

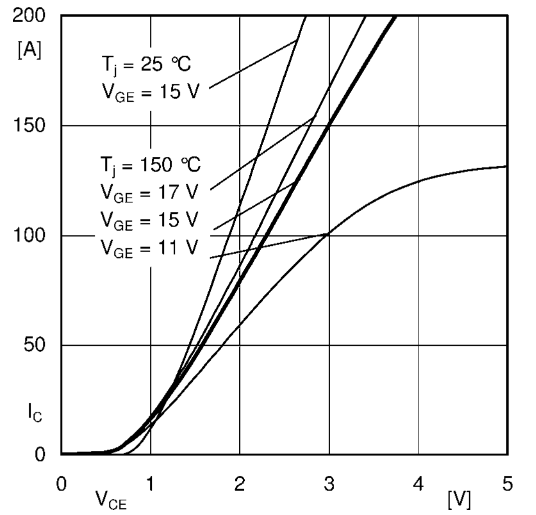


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+ EE'}$

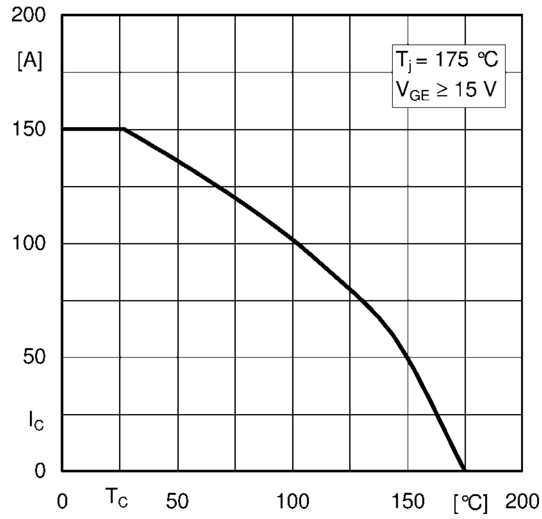


Fig. 2: Rated current vs. temperature $I_C = f (T_C)$

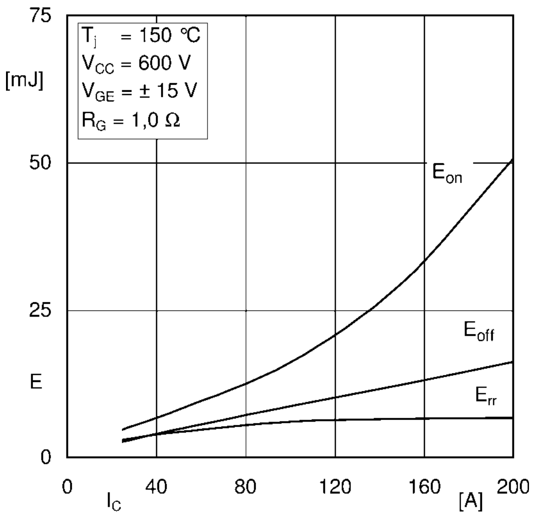


Fig. 3: Typ. turn-on /-off energy = f (I_C)

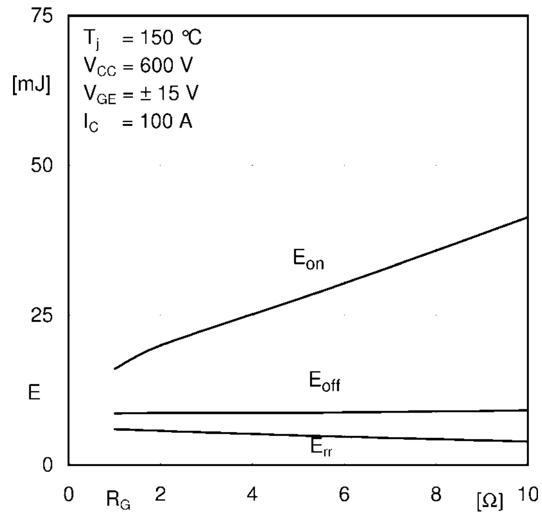


Fig. 4: Typ. turn-on /-off energy = f (R_G)

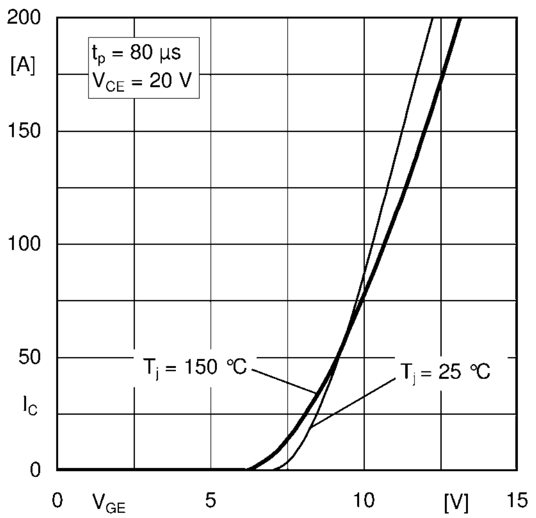


Fig. 5: Typ. transfer characteristic

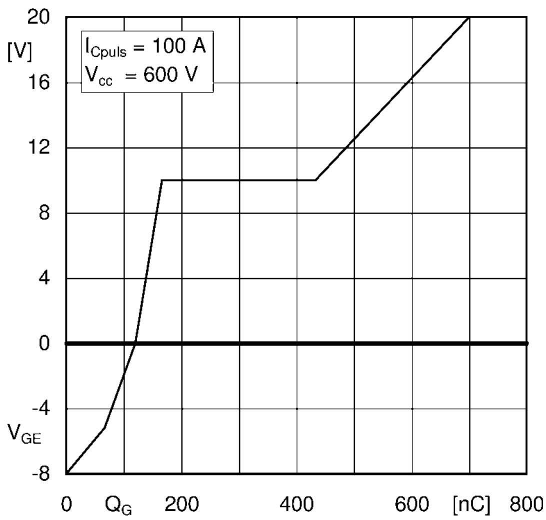


Fig. 6: Typ. gate charge characteristic

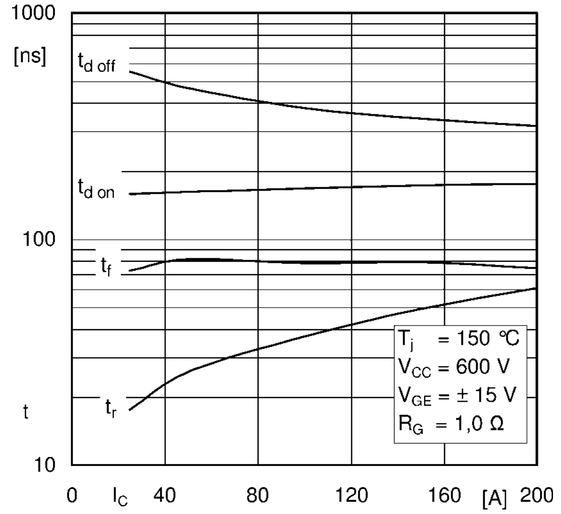


Fig. 7: Typ. switching times vs. I_C

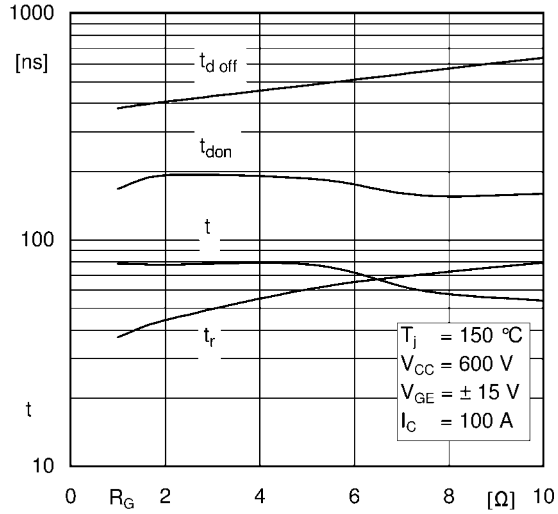


Fig. 8: Typ. switching times vs. gate resistor R_G

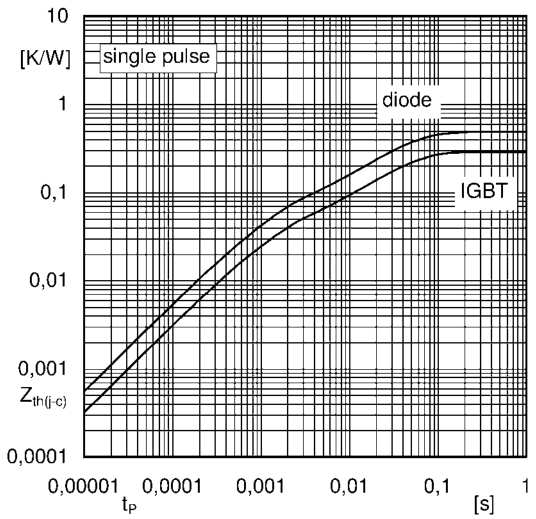


Fig. 9: Transient thermal impedance

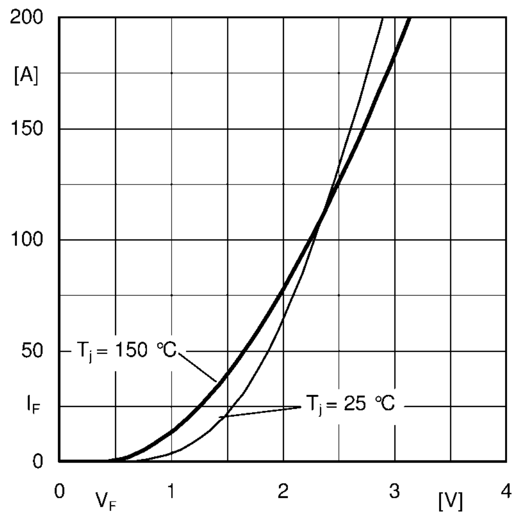


Fig. 10: CAL diode forward characteristic

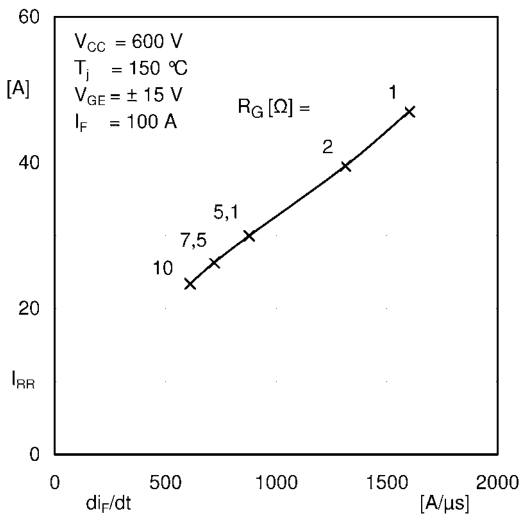


Fig. 11: CAL diode peak reverse recovery current

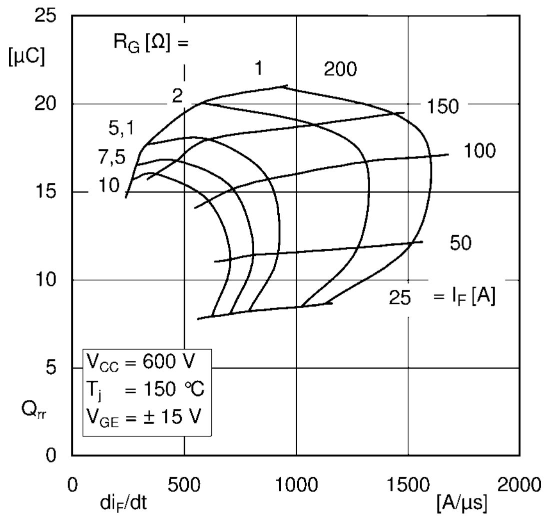
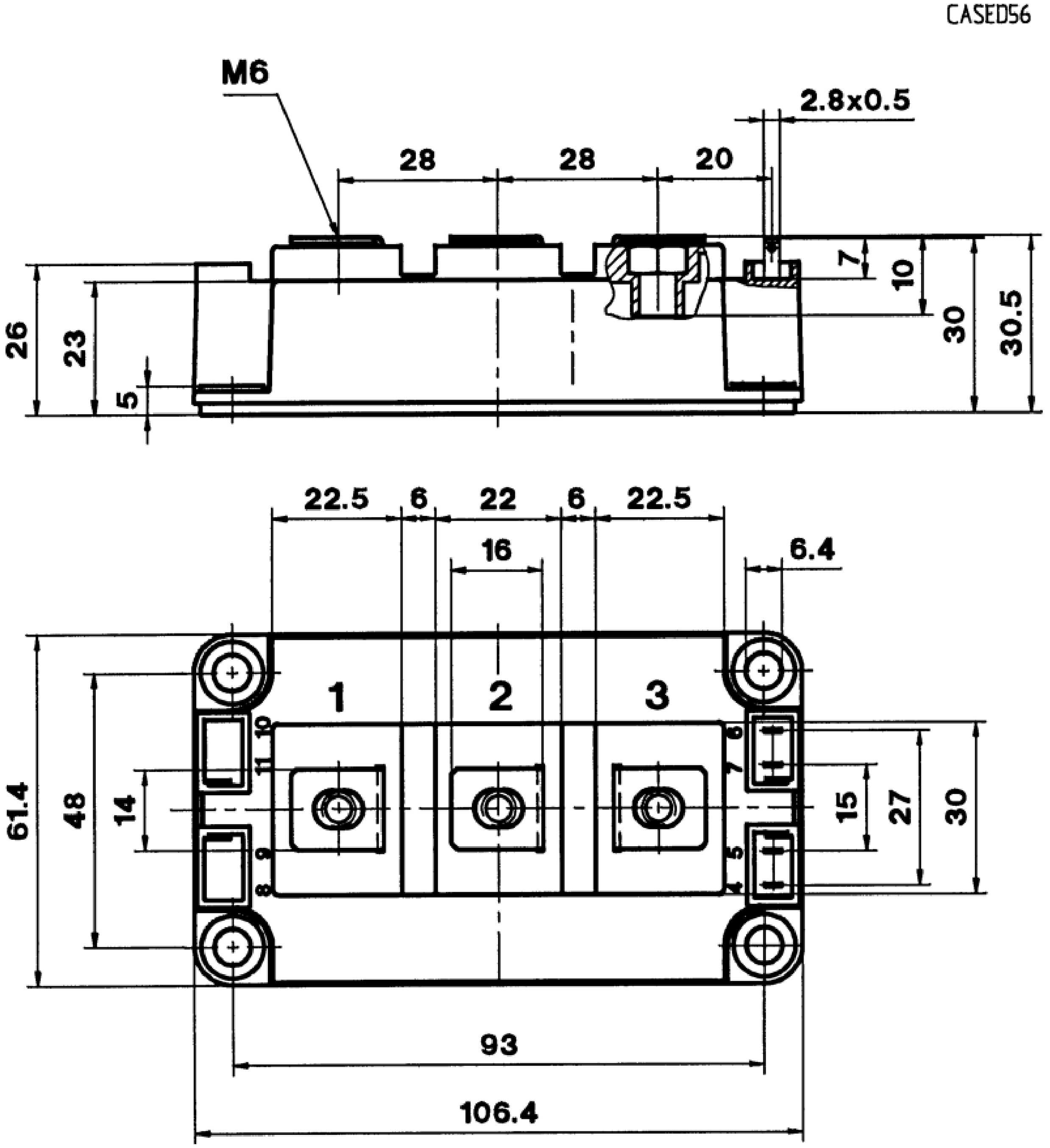


Fig. 12: Typ. CAL diode peak reverse recovery charge



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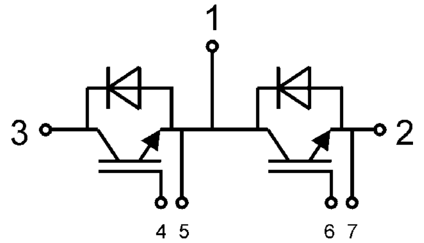

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This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

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