

SKM75GB12T4



SEMITRANS® 2

Fast IGBT4 Modules

SKM75GB12T4

Features

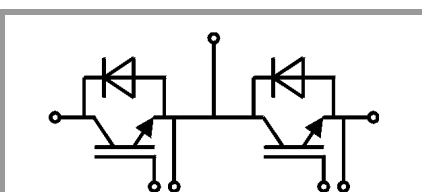
- IGBT4 = 4. generation fast trench IGBT (Infineon)
- CAL4 = Soft switching 4. generation CAL-diode
- Insulated copper baseplate using DBC technology (Direct Bonded Copper)
- Increased power cycling capability
- With integrated gate resistor
- For higher switching frequencies up to 20kHz
- UL recognized, file no. E63532

Typical Applications*

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

Remarks

- Case temperature limited to $T_c = 125^\circ\text{C}$ max.
- Recommended $T_{op} = -40 \dots +150^\circ\text{C}$
- Product reliability results valid for $T_j = 150^\circ\text{C}$



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Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$		1200	V
I_C	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	115	A
		$T_c = 80^\circ\text{C}$	88	A
I_{Cnom}			75	A
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$		225	A
V_{GES}			-20 ... 20	V
t_{psc}	$V_{CC} = 800\text{ V}$	$T_j = 150^\circ\text{C}$	10	μs
	$V_{GE} \leq 15\text{ V}$			
	$V_{CES} \leq 1200\text{ V}$			
T_j			-40 ... 175	$^\circ\text{C}$
Inverse diode				
I_F	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	97	A
		$T_c = 80^\circ\text{C}$	73	A
I_{Fnom}			75	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$		150	A
I_{FSM}	$t_p = 10\text{ ms, sin } 180^\circ, T_j = 25^\circ\text{C}$		430	A
T_j			-40 ... 175	$^\circ\text{C}$
Module				
$I_{t(RMS)}$			200	A
T_{stg}			-40 ... 125	$^\circ\text{C}$
V_{isol}	AC sinus 50 Hz, $t = 1\text{ min}$		4000	V

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT						
$V_{CE(sat)}$	$I_C = 75\text{ A}$	$T_j = 25^\circ\text{C}$	1.85	2.10		V
		$T_j = 150^\circ\text{C}$	2.28	2.45		V
V_{CE0}	chipelevel	$T_j = 25^\circ\text{C}$	0.80	0.90		V
		$T_j = 150^\circ\text{C}$	0.70	0.80		V
r_{CE}	$V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$	14	16		$\text{m}\Omega$
		$T_j = 150^\circ\text{C}$	21	22		$\text{m}\Omega$
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 3\text{ mA}$		5	5.8	6.5	V
I_{CES}	$V_{GE} = 0\text{ V}$ $V_{CE} = 1200\text{ V}$	$T_j = 25^\circ\text{C}$			1	mA
		$T_j = 150^\circ\text{C}$			-	mA
C_{ies}				4.4		nF
C_{oes}	$V_{CE} = 25\text{ V}$	$f = 1\text{ MHz}$		0.29		nF
C_{res}	$V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$		0.24		nF
Q_G	$V_{GE} = -8\text{ V} \dots +15\text{ V}$			425		nC
R_{Gint}	$T_j = 25^\circ\text{C}$			10		Ω
$t_{d(on)}$	$V_{CC} = 600\text{ V}$	$T_j = 150^\circ\text{C}$		150		ns
t_r	$I_C = 75\text{ A}$ $V_{GE} = +15/-15\text{ V}$	$T_j = 150^\circ\text{C}$		39		ns
		$T_j = 150^\circ\text{C}$		11		mJ
E_{on}	$R_{Gon} = 1\ \Omega$	$T_j = 150^\circ\text{C}$				mJ
$t_{d(off)}$	$R_{Goff} = 1\ \Omega$	$T_j = 150^\circ\text{C}$		370		ns
t_f	$di/dt_{on} = 1600\text{ A}/\mu\text{s}$ $di/dt_{off} = 950\text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$		66		ns
		$T_j = 150^\circ\text{C}$		6.9		mJ
E_{off}						mJ
$R_{th(j-c)}$	per IGBT				0.38	K/W

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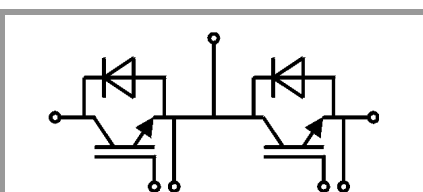
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
$V_F = V_{EC}$	$I_F = 75\text{ A}$ $V_{GE} = 0\text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$		2.17	2.49	V
		$T_j = 150^\circ\text{C}$		2.11	2.42	V
V_{F0}	chipelevel	$T_j = 25^\circ\text{C}$		1.30	1.50	V
		$T_j = 150^\circ\text{C}$		0.90	1.10	V
r_F	chipelevel	$T_j = 25^\circ\text{C}$		12	13	m Ω
		$T_j = 150^\circ\text{C}$		16	18	m Ω
I_{RRM}	$I_F = 75\text{ A}$	$T_j = 150^\circ\text{C}$		37		A
Q_{rr}	$di/dt_{off} = 990\text{ A}/\mu\text{s}$ $V_{GE} = \pm 15\text{ V}$	$T_j = 150^\circ\text{C}$		12.6		μC
E_{rr}	$V_{CC} = 600\text{ V}$	$T_j = 150^\circ\text{C}$		4.7		mJ
$R_{th(j-c)}$	per diode				0.58	K/W
Module						
L_{CE}				30		nH
R_{CC+EE}	measured per switch	$T_c = 25^\circ\text{C}$		0.65		m Ω
		$T_c = 125^\circ\text{C}$		1.09		m Ω
$R_{th(c-s)}$	calculated without thermal coupling ($\lambda_{grease} = 0.81\text{ W}/(\text{m}^2\text{K})$)			0.04	0.05	K/W
M_s	to heat sink M6		3		5	Nm
M_t						Nm
	to terminals M5		2.5		5	Nm
w					160	g



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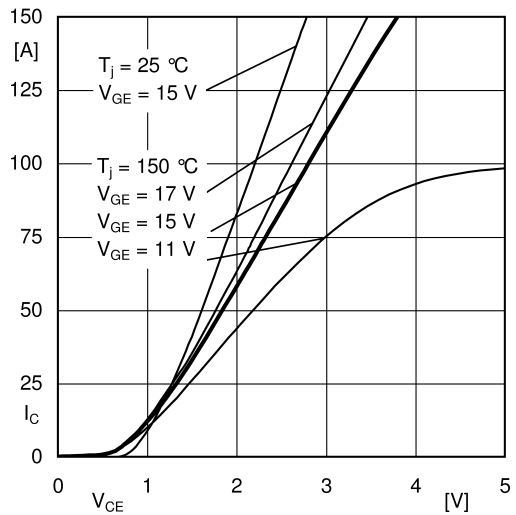


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE'}$

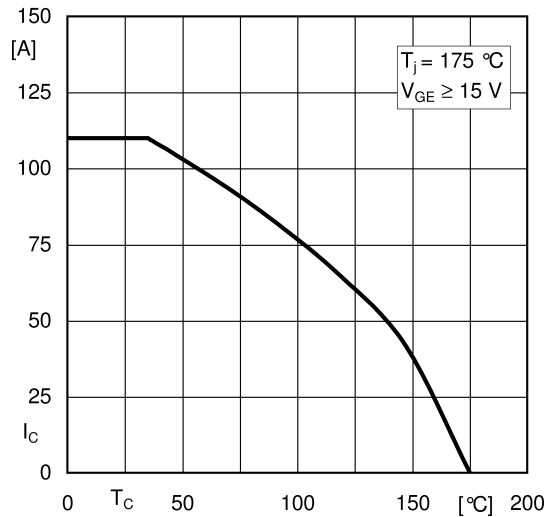


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

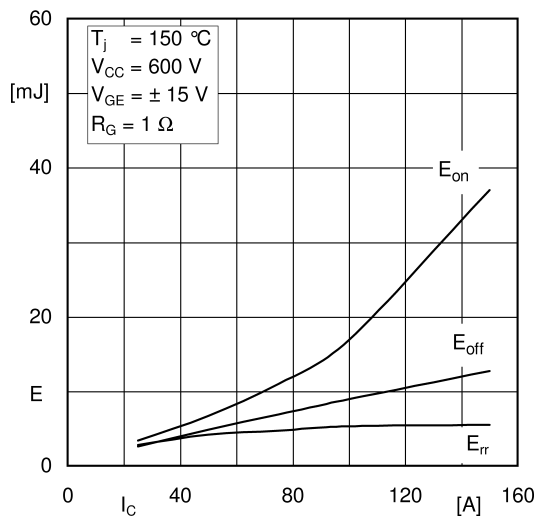


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

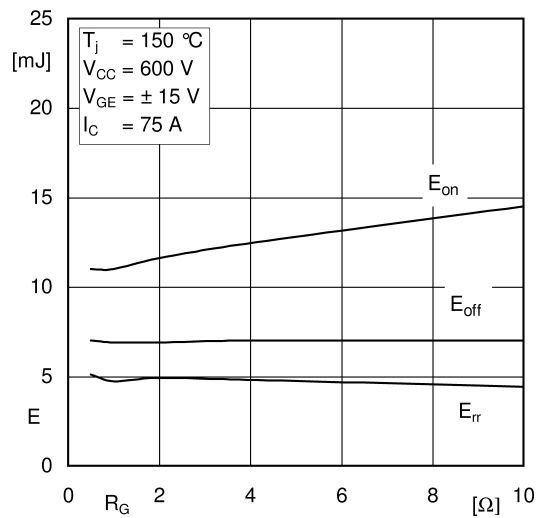


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

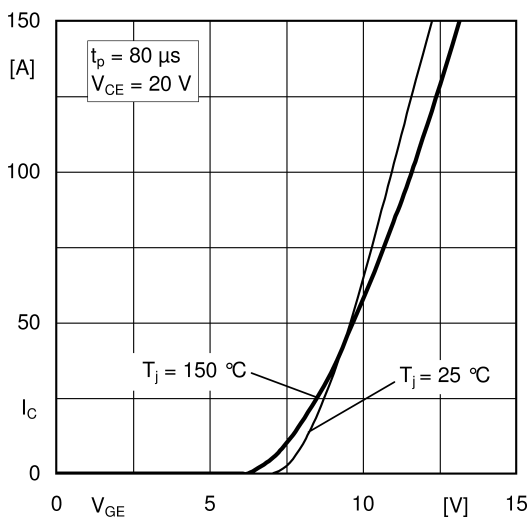


Fig. 5: Typ. transfer characteristic

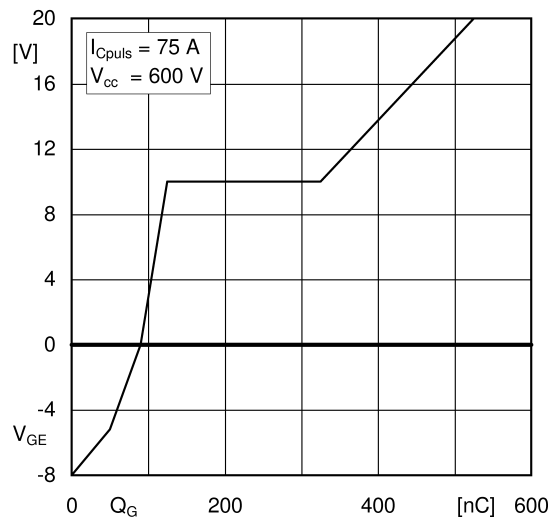


Fig. 6: Typ. gate charge characteristic

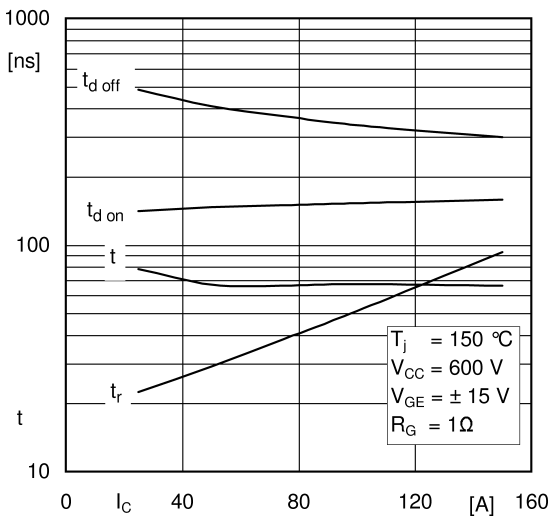


Fig. 7: Typ. switching times vs. I_C

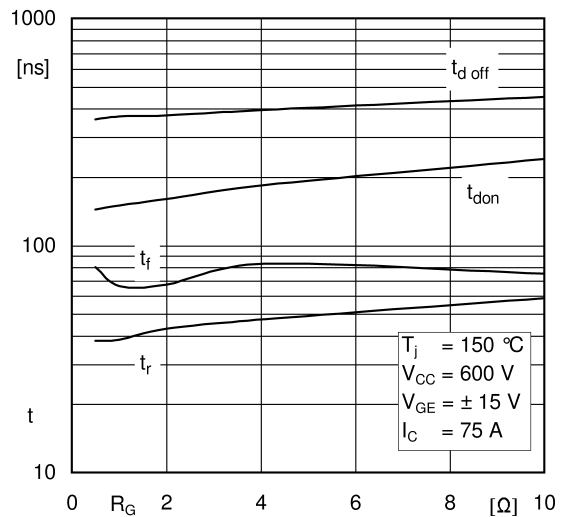


Fig. 8: Typ. switching times vs. gate resistor R_G

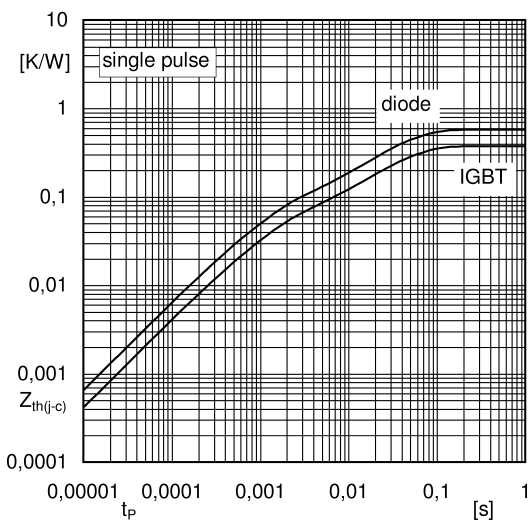


Fig. 9: Transient thermal impedance

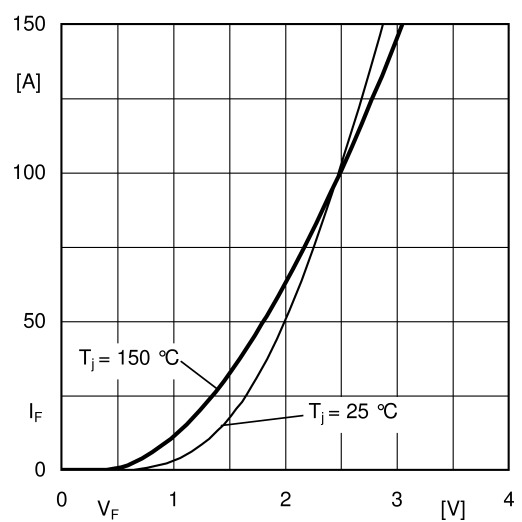


Fig. 10: Typ. CAL diode forward charact., incl. R_{CC+EE}

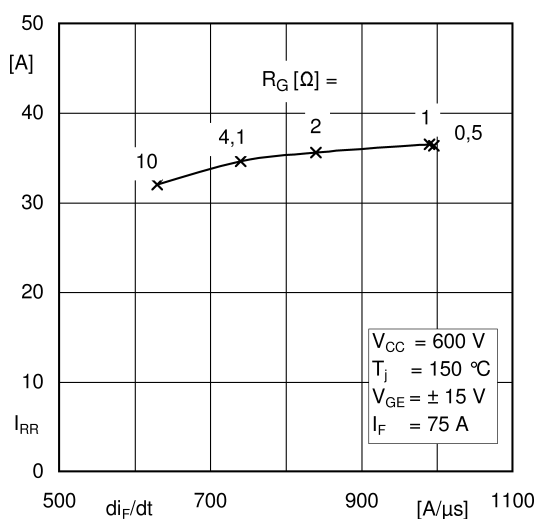


Fig. 11: CAL diode peak reverse recovery current

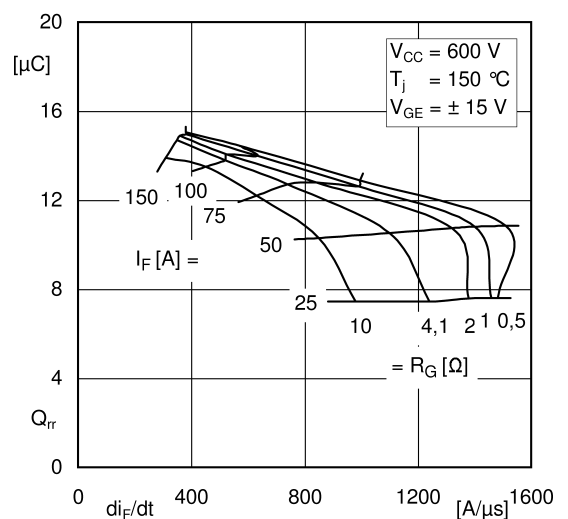
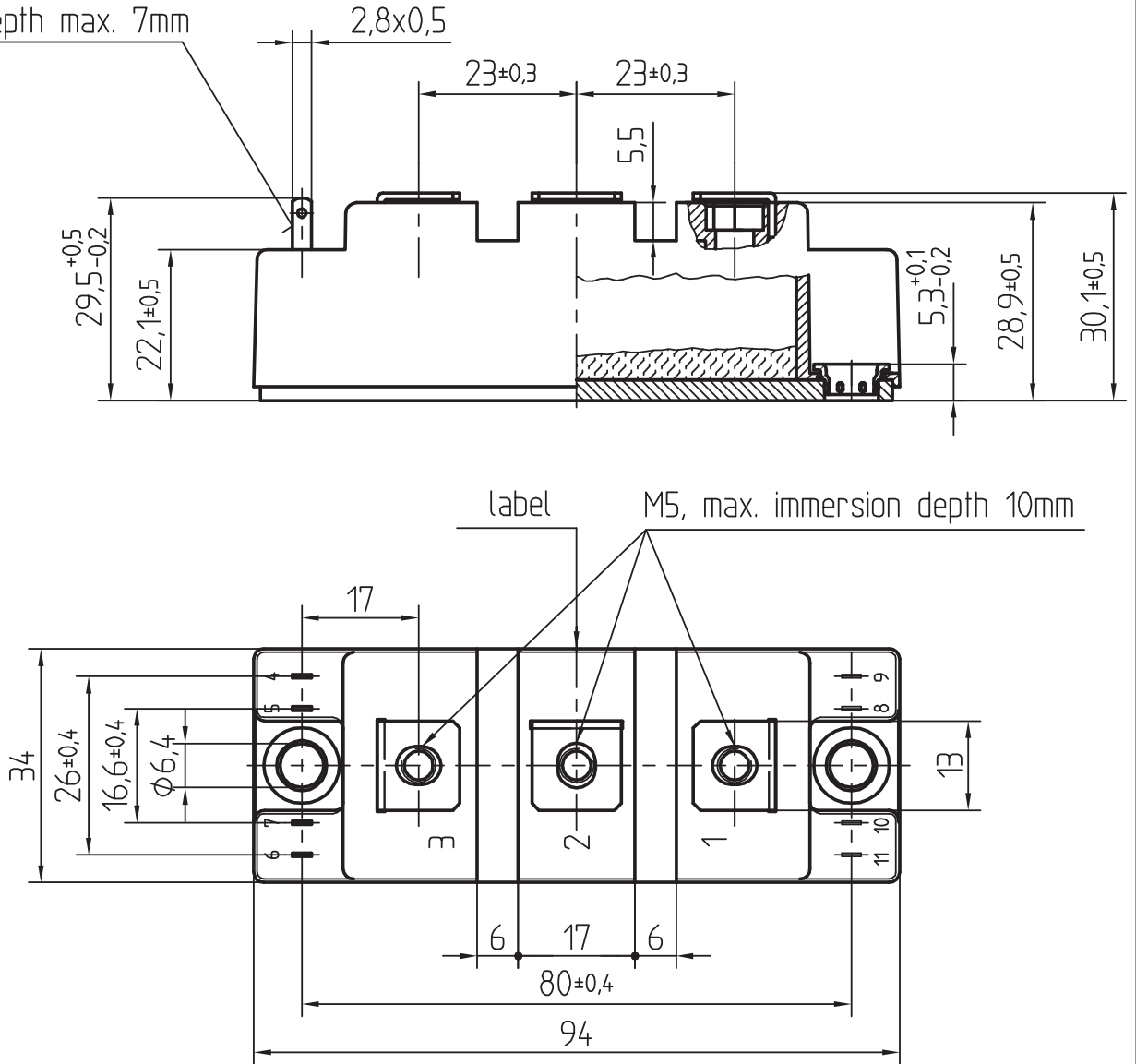


Fig. 12: Typ. CAL diode peak reverse recovery charge

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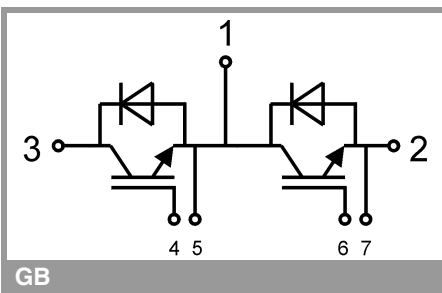
Dimensions in mm

Plug in depth max. 7mm



General tolerance +/- 0,5 mm

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

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