



SEMITRANS® 2

SKM50GB12V

Target Data

Features

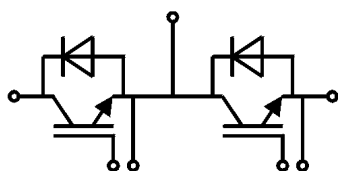
- V-IGBT = 6. Generation Trench V-IGBT (Fuji)
- CAL4 = Soft switching 4. Generation CAL-diode
- Insulated copper baseplate using DBC technology (Direct Copper Bonding)
- Increased power cycling capability
- With integrated gate resistor
- UL recognized, file no. E63532
- Lowest switching losses at High di/dt

Typical Applications*

- AC inverter drives
- UPS
- Electronic welders

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 $T_j = 150^\circ\text{C}$



GB

Absolute Maximum Ratings

Symbol	Conditions	Values	Unit
IGBT			
V_{CES}	$T_j = 25^\circ\text{C}$	1200	V
I_C	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	77
		$T_c = 80^\circ\text{C}$	59
I_{Cnom}		50	A
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$	150	A
V_{GES}		-20 ... 20	V
t_{psc}	$V_{CC} = 720\text{ V}$ $V_{GE} \leq 15\text{ V}$ $V_{CES} \leq 1200\text{ V}$	$T_j = 125^\circ\text{C}$	10
T_j		-40 ... 175	$^\circ\text{C}$
Inverse diode			
I_F	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	65
		$T_c = 80^\circ\text{C}$	49
I_{Fnom}		50	A
I_{FRM}	$I_{FRM} = 3 \times I_{Fnom}$	150	A
I_{FSM}	$t_p = 10\text{ ms, sin } 180^\circ, T_j = 25^\circ\text{C}$	270	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					
$V_{CE(sat)}$	$I_C = 50\text{ A}$ $V_{GE} = 15\text{ V}$ chipelevel			$T_j = 25^\circ\text{C}$	1.84
				$T_j = 150^\circ\text{C}$	2.29
V_{CE0}	chipelevel			$T_j = 25^\circ\text{C}$	0.94
				$T_j = 150^\circ\text{C}$	1.04
r_{CE}	$V_{GE} = 15\text{ V}$ chipelevel			$T_j = 25^\circ\text{C}$	18
				$T_j = 150^\circ\text{C}$	25
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 1.7\text{ mA}$	5.5	6	6.5	V
I_{CES}	$V_{GE} = 0\text{ V}$ $V_{CE} = 1200\text{ V}$			$T_j = 25^\circ\text{C}$	0.3
				$T_j = 150^\circ\text{C}$	-
C_{ies}	$V_{CE} = 25\text{ V}$ $V_{GE} = 0\text{ V}$			$f = 1\text{ MHz}$	3.0
C_{oes}				$f = 1\text{ MHz}$	0.30
C_{res}				$f = 1\text{ MHz}$	0.30
Q_G	$V_{GE} = -8\text{ V} \dots +15\text{ V}$		550		nC
R_{Gint}	$T_j = 25^\circ\text{C}$		4.0		Ω
$t_{d(on)}$	$V_{CC} = 600\text{ V}$ $I_C = 50\text{ A}$			$T_j = 150^\circ\text{C}$	276
t_r	$V_{GE} = +15/-15\text{ V}$			$T_j = 150^\circ\text{C}$	35
E_{on}	$R_{G on} = 13\text{ }\Omega$			$T_j = 150^\circ\text{C}$	4.9
$t_{d(off)}$	$R_{G off} = 13\text{ }\Omega$			$T_j = 150^\circ\text{C}$	403
t_f				$T_j = 150^\circ\text{C}$	62
E_{off}				$T_j = 150^\circ\text{C}$	4.5
$R_{th(j-c)}$	per IGBT				0.53
					K/W



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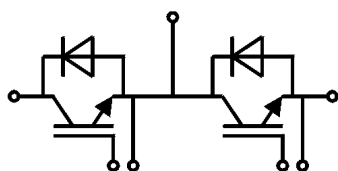
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Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
Inverse diode					
$V_F = V_{EC}$	$I_F = 50\text{ A}$ $V_{GE} = 0\text{ V}$ chiplevel		$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	2.22 2.54	V
V_{F0}	chiplevel		$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	1.30 0.90	V
r_F	chiplevel		$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	18 26	mΩ
I_{RRM}	$I_F = 50\text{ A}$		$T_j = 150^\circ\text{C}$	35	A
Q_{rr}	$di/dt_{off} = 1380\text{ A}/\mu\text{s}$ $V_{GE} = \pm 15\text{ V}$		$T_j = 150^\circ\text{C}$	8.7	μC
E_{rr}	$V_{CC} = 600\text{ V}$		$T_j = 150^\circ\text{C}$	2.8	mJ
$R_{th(j-c)}$	per diode			0.84	K/W
Module					
L_{CE}				30	nH
$R_{CC'+EE'}$	measured per switch	$T_c = 25^\circ\text{C}$ $T_c = 125^\circ\text{C}$		0.65 1.09	mΩ
$R_{th(c-s)}$	per module			0.04 0.05	K/W
M_s	to heat sink M6		3	5	Nm
M_t		to terminals M5	2.5	5	Nm
					Nm
w				160	g



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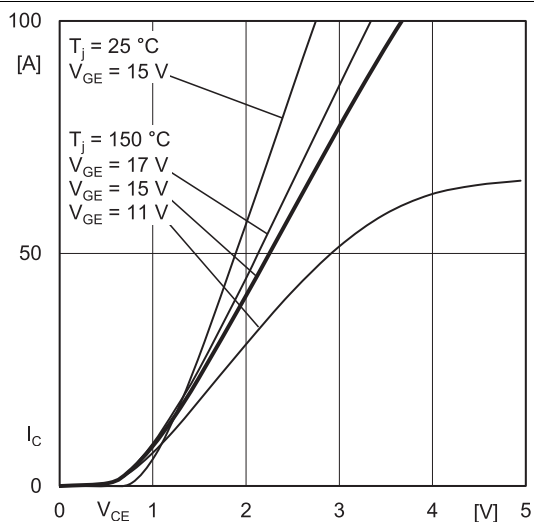


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE'}$

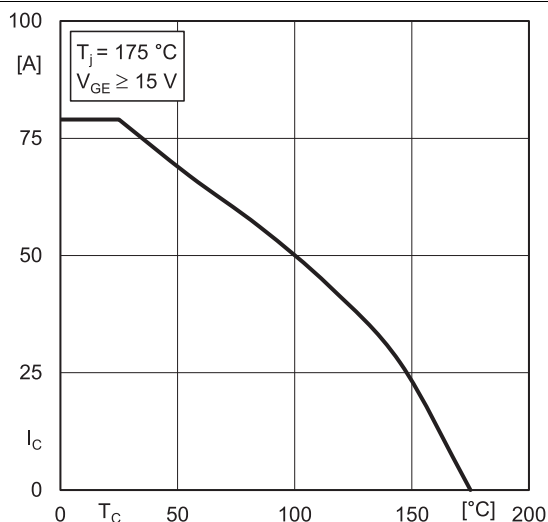


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

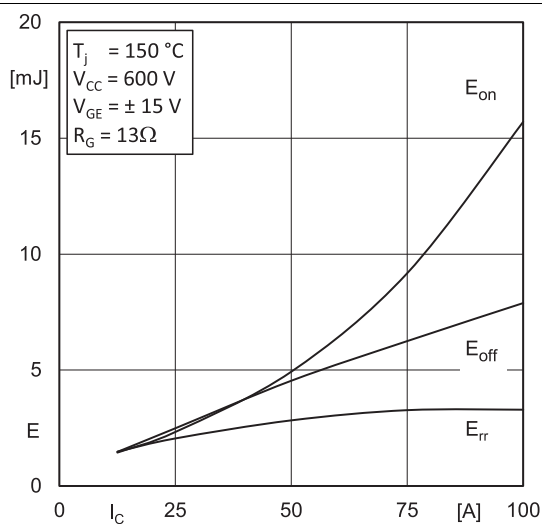


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

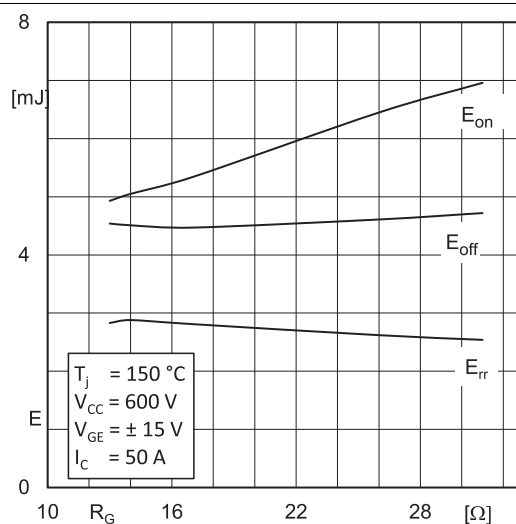


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

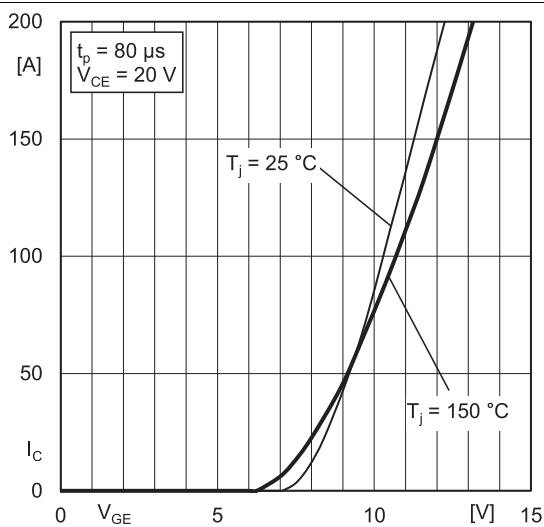


Fig. 5: Typ. transfer characteristic

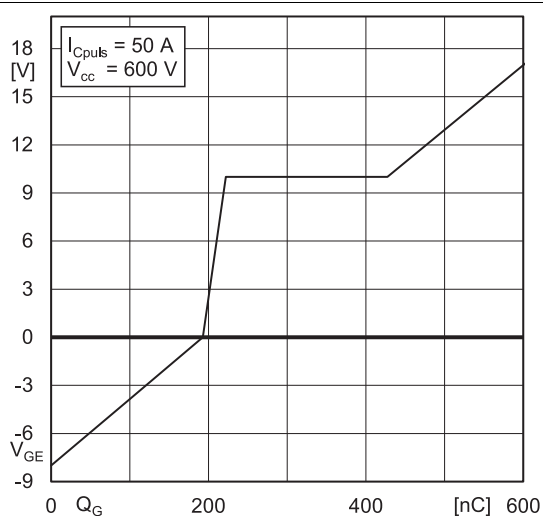
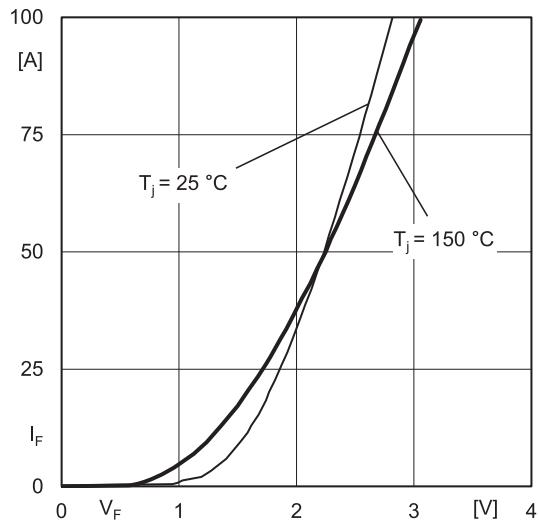
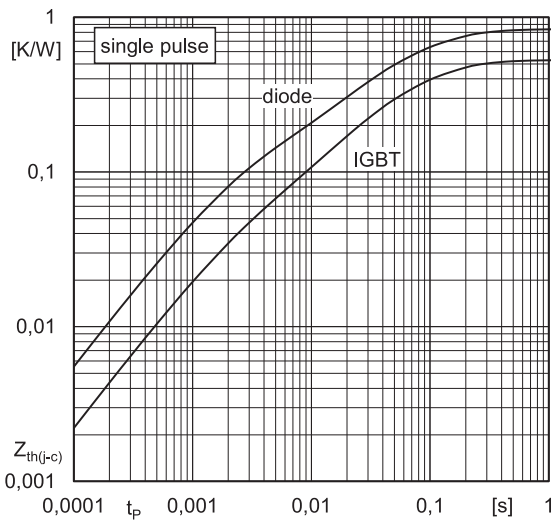
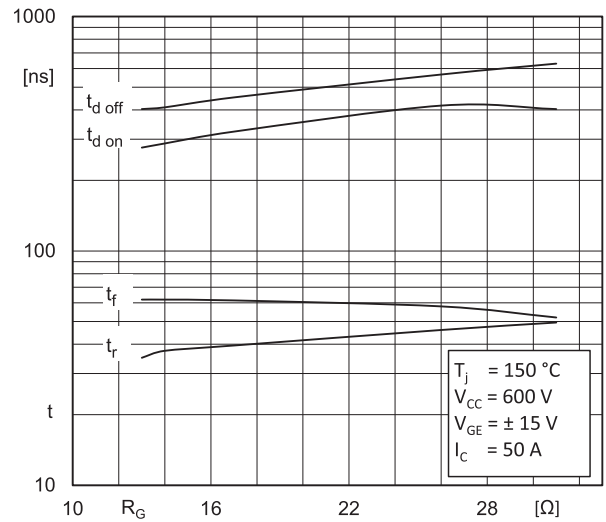
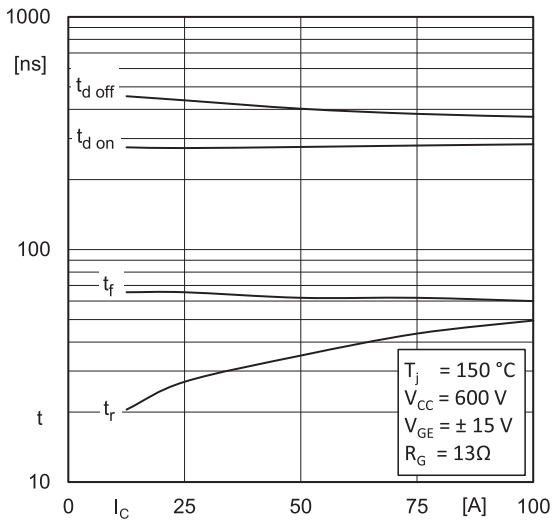
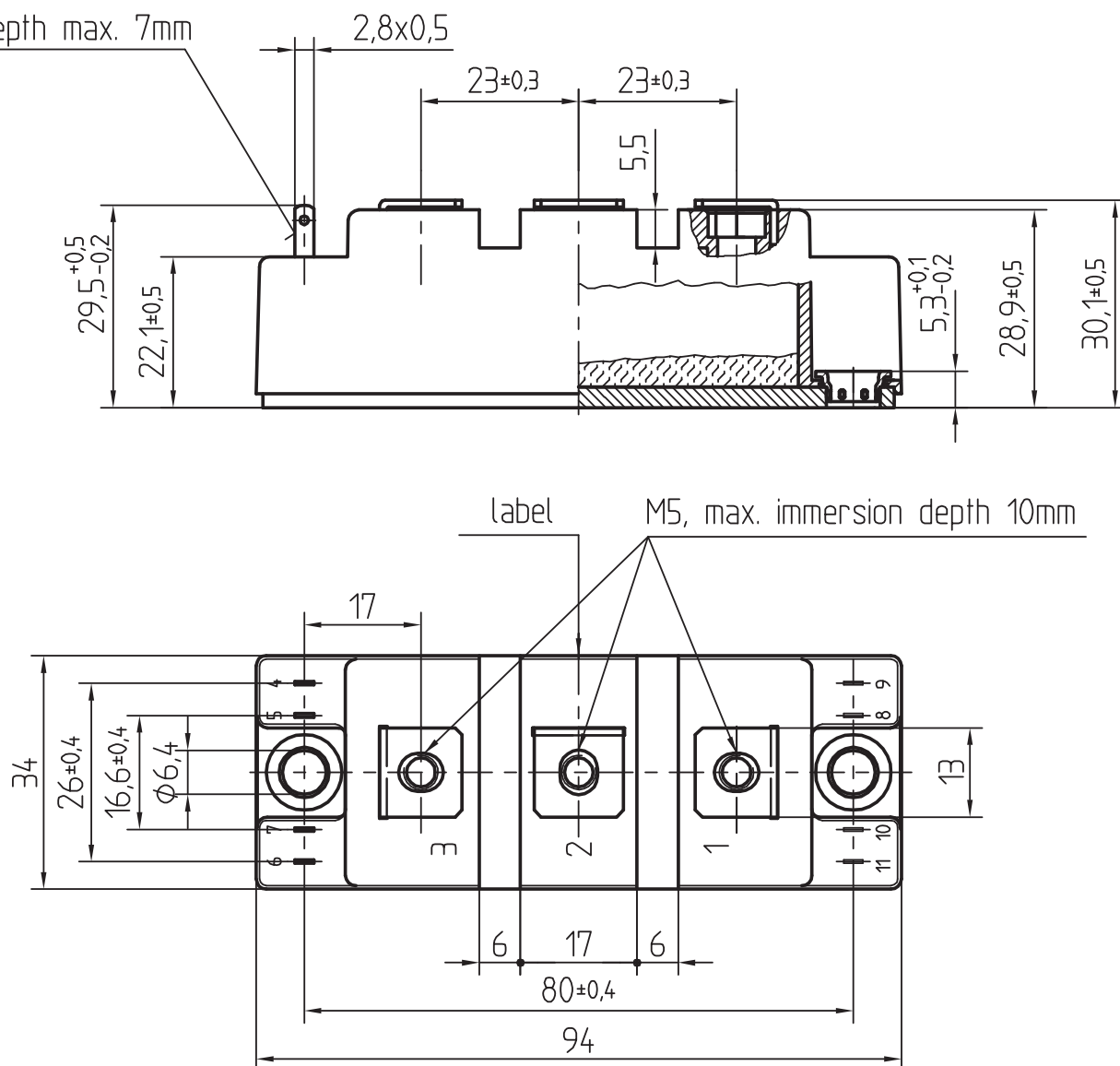


Fig. 6: Typ. gate charge characteristic



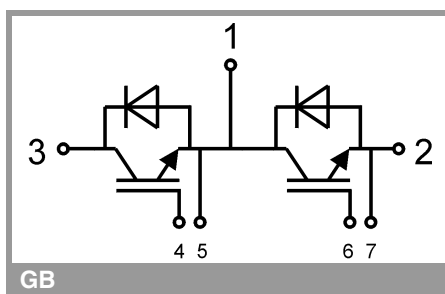
Dimensions in mm

Plug in depth max. 7mm



General tolerance $\pm 0,5$ mm

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

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