SEMITRANS® 6

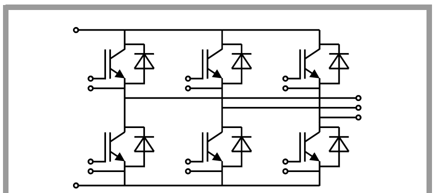
SKM50GD125D

Features

- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability, self limiting to 6 x Icnom
- 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*

- Three phase inverters for AC motor speed control
- Pulse frequencies also above 15 kHz
- DC servo and robot drives



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Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	T_j = 150 °C	T_c = 25 °C	73	A
		T_c = 80 °C	50	A
I_{Cnom}			50	A
I_{CRM}	I_{CRM} = 2xI_{Cnom}		100	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 600 V $V_{GE} \leq$ 15 V $V_{CES} \leq$ 1200 V	T_j = 125 °C	10	µs
T_j			-55 ... 150	°C
Inverse diode				
I_F	T_j = 150 °C	T_c = 25 °C	77	A
		T_c = 80 °C	53	A
I_{Fnom}			55	A
I_{FRM}	I_{FRM} = 2xI_{Fnom}		110	A
I_{FSM}	t_p = 10 ms, sin 180°, T_j = 25 °C		720	A
T_j			-40 ... 150	°C
Module				
$I_{t(RMS)}$	$T_{terminal}$ = 80 °C		100	A
T_{stg}			-40 ... 125	°C
V_{isol}	AC sinus 50 Hz, t = 1 min		4000	V

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
IGBT						
$V_{CE(sat)}$	I_C = 50 A V_{GE} = 15 V chiplevel	T_j = 25 °C		3.20	3.70	V
		T_j = 125 °C		3.60	4.20	V
V_{CE0}	chiplevel	T_j = 25 °C		1.5	1.75	V
		T_j = 125 °C		1.7	1.95	V
r_{CE}	V_{GE} = 15 V chiplevel	T_j = 25 °C		34.00	39.00	mΩ
		T_j = 125 °C		38.00	45.00	mΩ
$V_{GE(th)}$	V_{GE}=V_{CE}, I_C = 2 mA		4.5	5.5	6.5	V
I_{CES}	V_{GE} = 0 V V_{CE} = 1200 V	T_j = 25 °C		0.1	0.3	mA
						mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		3.3		nF
C_{oes}		f = 1 MHz		0.50		nF
C_{res}		f = 1 MHz		0.22		nF
Q_G	V_{GE} = - 8 V...+ 20 V			442		nC
R_{Gint}	T_j = 25 °C			0.00		Ω
$t_{d(on)}$	V_{CC} = 600 V I_C = 50 A V_{GE} = ±15 V $R_{G\,on}$ = 8 Ω $R_{G\,off}$ = 8 Ω	T_j = 125 °C		25		ns
t_r		T_j = 125 °C		19		ns
E_{on}		T_j = 125 °C		8		mJ
$t_{d(off)}$		T_j = 125 °C		184		ns
t_f		T_j = 125 °C		8		ns
E_{off}		T_j = 125 °C		3.2		mJ
$R_{th(j-c)}$	per IGBT				0.32	K/W

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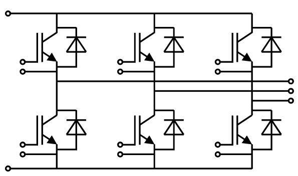
Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Inverse diode						
$V_F = V_{EC}$	I_F = 55 A V_{GE} = 0 V chiplevel	T_j = 25 °C		2.00	2.50	V
		T_j = 125 °C		1.80	2.30	V
V_{F0}	chiplevel	T_j = 25 °C		1.1	1.45	V
		T_j = 125 °C		0.85	1.2	V
r_F	chiplevel	T_j = 25 °C		16.4	19.1	mΩ
		T_j = 125 °C		17.3	20.0	mΩ
I_{RRM}	I_F = 50 A di/dt_{off} = 3200 A/µs V_{GE} = ±15 V V_{CC} = 600 V	T_j = 125 °C		75		A
Q_{rr}		T_j = 125 °C		7		µC
E_{rr}		T_j = 125 °C		2.1		mJ
$R_{th(j-c)}$	per diode				0.6	K/W
Module						
L_{CE}					60	nH
$R_{CC'+EE'}$	terminal-chip	T_C = 25 °C				mΩ
		T_C = 125 °C				mΩ
$R_{th(c-s)}$	per module				0.05	K/W
M_s	to heat sink M6		4		5	Nm
M_t						Nm
						Nm
w					175	g



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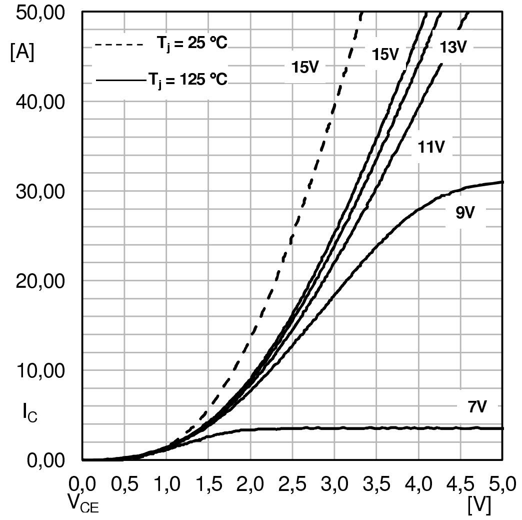


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+ EE'}$

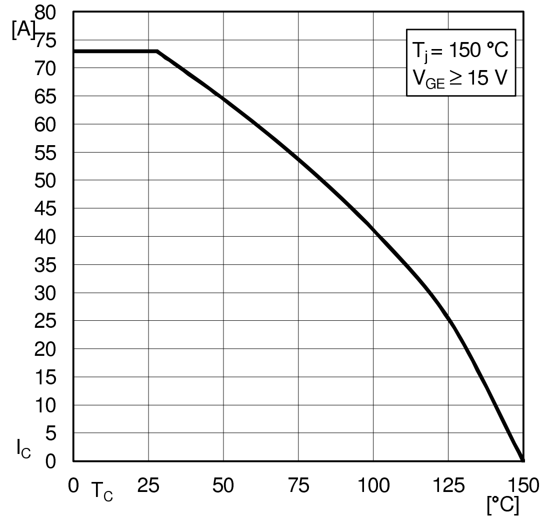


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

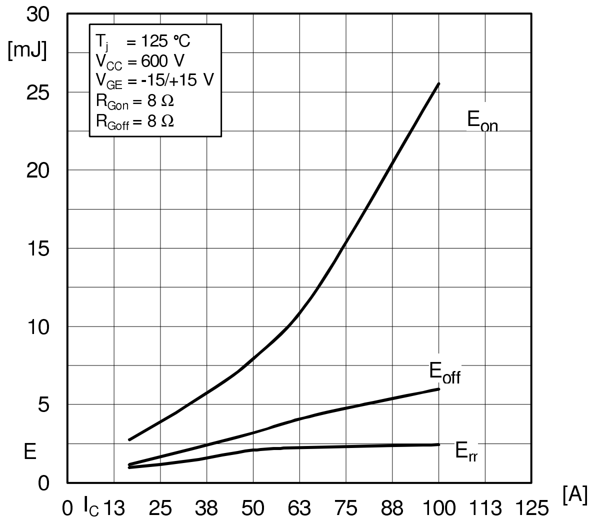


Fig. 3: Typ. turn-on /-off energy = f (I_C)

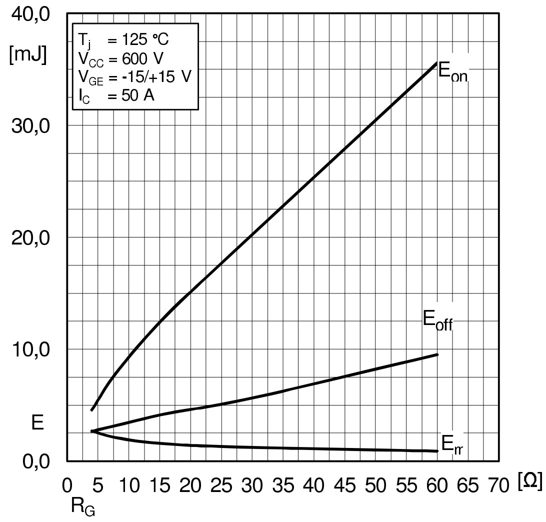


Fig. 4: Typ. turn-on /-off energy = f (R_G)

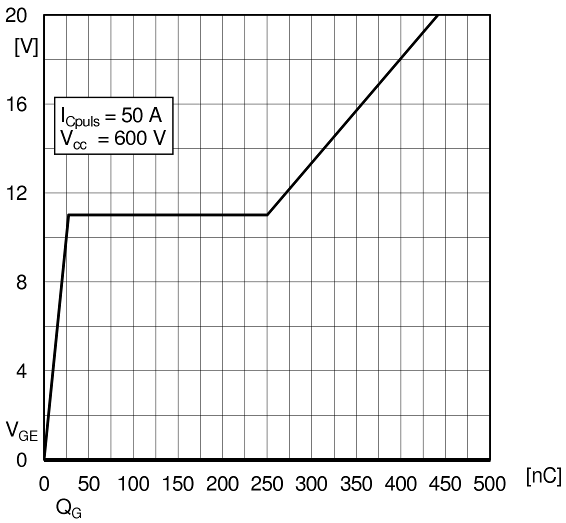


Fig. 6: Typ. gate charge characteristic

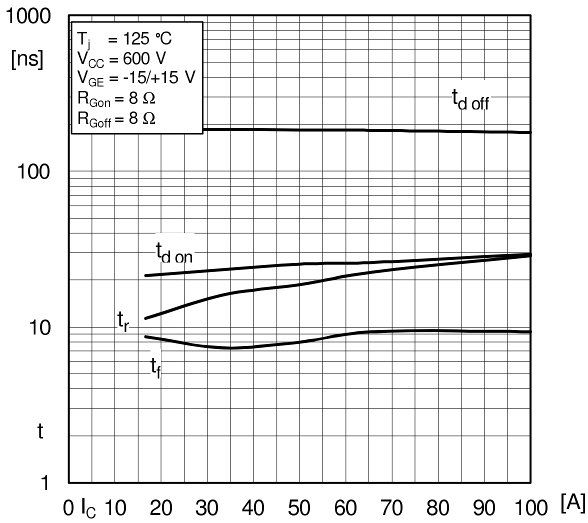


Fig. 7: Typ. switching times vs. I_C

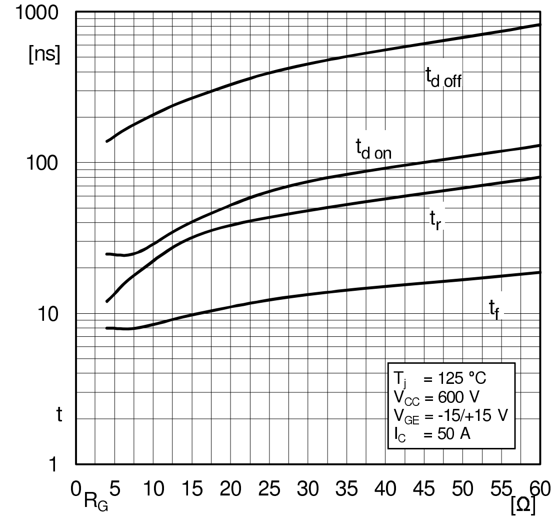


Fig. 8: Typ. switching times vs. gate resistor R_G

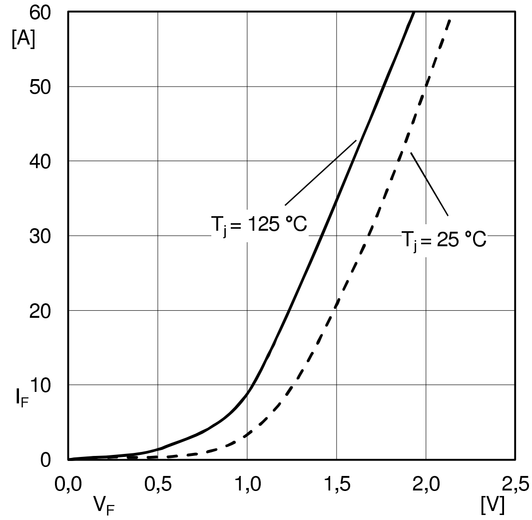
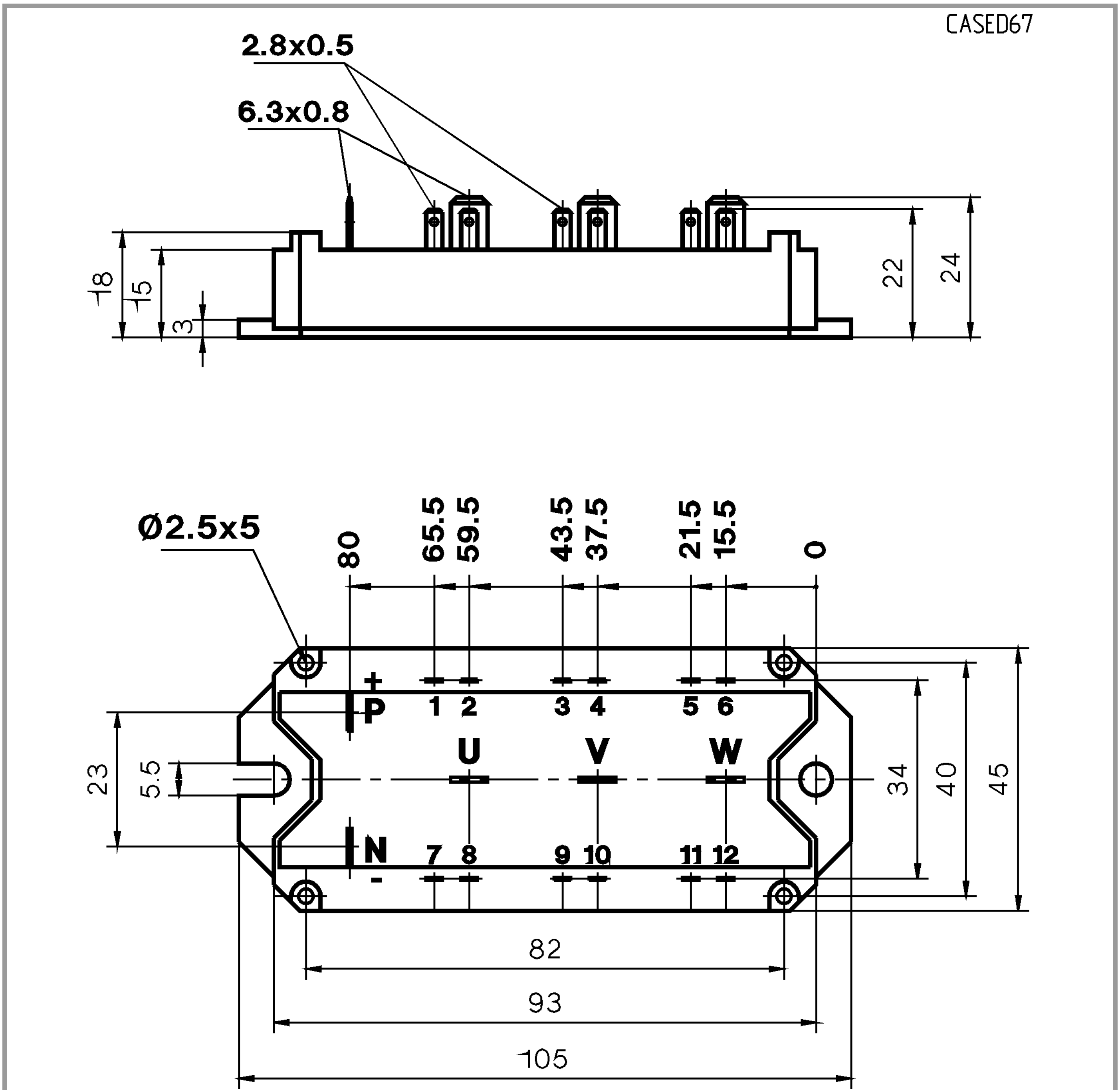


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$



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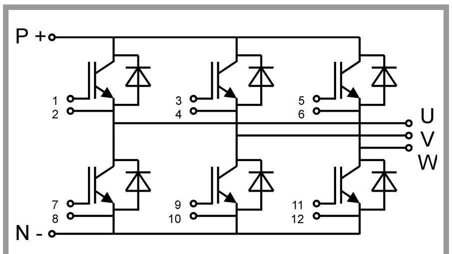

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This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX

* 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 staff.