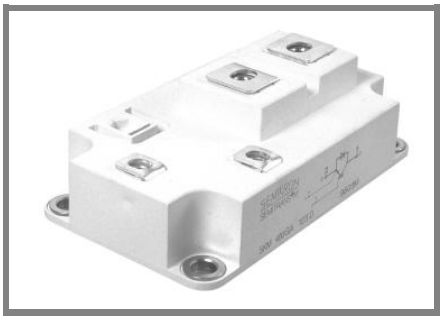
SKM 300GA123D



SEMITRANS® 4

IGBT Modules

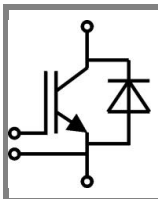
SKM 300GA123D

Features

- MOS input (voltage controlled)
- N channel, Homogeneous Si
- Low inductance case
- Very low tail current with low temperature dependence
- High short circuit capability, self limiting to 6 x I_{cnom}
- Latch-up free
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Direct Copper Bonding Technology
- Large clearance (12 mm) and creepage distances (20 mm)

Typical Applications

- Switching (not for linear use)

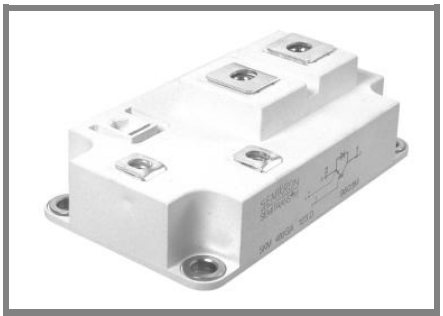


GA

Absolute Maximum Ratings	T_c = 25 °C, unless otherwise specified			
Symbol	**Conditions**		**Values**	**Units**
IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	T_j = 150 °C	T_{case} = 25 °C	300	A
		T_{case} = 80 °C	220	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		400	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 600 V; $V_{GE} \leq$ 20 V; V_{CES} < 1200 V	T_j = 125 °C	10	µs
Inverse Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	300	A
		T_{case} = 80 °C	200	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		400	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	2200	A
Module				
$I_{t(RMS)}$			500	A
T_{vj}			- 40 ... + 150 (125)	°C
T_{stg}			- 40...+ 125	°C
V_{isol}	AC, 1 min.		2500	V

Characteristics	T_c = 25 °C, unless otherwise specified					
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
IGBT						
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 8 mA		4,5	5,5	6,5	V
I_{CES}	V_{GE} = 0 V, V_{CE} = V_{CES}	T_j = 25 °C		0,1	0,3	mA
V_{CE0}		T_j = 25 °C		1,4	1,6	V
		T_j = 125 °C		1,6	1,8	V
r_{CE}	V_{GE} = 15 V	T_j = 25°C		5,5	7	mΩ
		T_j = 125°C		7,5	9,5	mΩ
$V_{CE(sat)}$	I_{Cnom} = 200 A, V_{GE} = 15 V	T_j = °$C_{chiplev.}$		2,5	3	V
C_{ies}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		15	19	nF
C_{oes}				2	2,6	nF
C_{res}				1	1,3	nF
Q_G	V_{GE} = -8V - +20V			2000		nC
R_{Gint}	T_j = °C			1,25		Ω
$t_{d(on)}$	R_{Gon} = 4,7 Ω	V_{CC} = 600V		250	400	ns
t_r				90	160	ns
E_{on}		I_{Cnom}= 200A		26		mJ
$t_{d(off)}$	R_{Goff} = 4,7 Ω	T_j = 125 °C		550	700	ns
t_f				70	100	ns
E_{off}				22		mJ
$R_{th(j-c)}$	per IGBT				0,075	K/W

SKM 300GA123D



SEMITRANS® 4

IGBT Modules

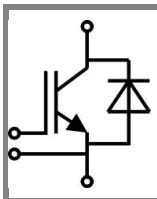
SKM 300GA123D

Features

- MOS input (voltage controlled)
- N channel, Homogeneous Si
- Low inductance case
- Very low tail current with low temperature dependence
- High short circuit capability, self limiting to 6 x I_{cnom}
- Latch-up free
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Cirect Copper Bonding Technology
- Large clearance (12 mm) and creepage distances (20 mm)

Typical Applications

- Switching (not for linear use)



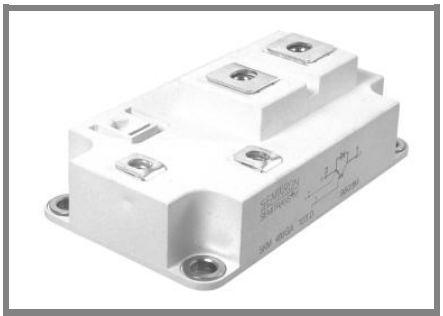
GA

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 200 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		2	2,5	V
		T_j = 125 °$C_{chiplev.}$		1,8		V
V_{F0}		T_j = 25 °C				V
		T_j = 125 °C				V
r_F		T_j = 25 °C				mΩ
		T_j = 125 °C				mΩ
I_{RRM}	I_{Fnom} = 200 A	T_j = 25 °C		80		A
Q_{rr}				11		µC
E_{rr}	V_{GE} = 0 V; V_{CC} = 600 V					mJ
$R_{th(j-c)D}$	per diode				0,15	K/W
Module						
L_{CE}				15	20	nH
$R_{CC'+EE'}$	res., terminal-chip	T_{case}= 25 °C		0,18		mΩ
		T_{case}= 125 °C		0,22		mΩ
$R_{th(c-s)}$	per module				0,038	K/W
M_s	to heat sink M6		3		5	Nm
M_t	to terminals M6 (M4)		2,5 (1,1)		5 (2)	Nm
w					330	g

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

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.

SKM 300GA123D



SEMITRANS® 4

IGBT Modules

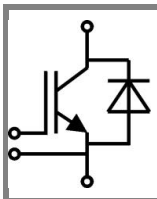
SKM 300GA123D

Features

- MOS input (voltage controlled)
- N channel, Homogeneous Si
- Low inductance case
- Very low tail current with low temperature dependence
- High short circuit capability, self limiting to 6 x I_{cnom}
- Latch-up free
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Cirect Copper Bonding Technology
- Large clearance (12 mm) and creepage distances (20 mm)

Typical Applications

- Switching (not for linear use)



GA

Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	i = 1	53	mk/W
R_i	i = 2	18,5	mk/W
R_i	i = 3	3,1	mk/W
R_i	i = 4	0,4	mk/W
tau_i	i = 1	0,04	s
tau_i	i = 2	0,0189	s
tau_i	i = 3	0,0017	s
tau_i	i = 4	0,003	s
$Z_{th(j-c)D}$			
R_i	i = 1	85	mk/W
R_i	i = 2	30	mk/W
R_i	i = 3	8,8	mk/W
R_i	i = 4	1,2	mk/W
tau_i	i = 1	0,04	s
tau_i	i = 2	0,0044	s
tau_i	i = 3	0,0078	s
tau_i	i = 4	0,005	s

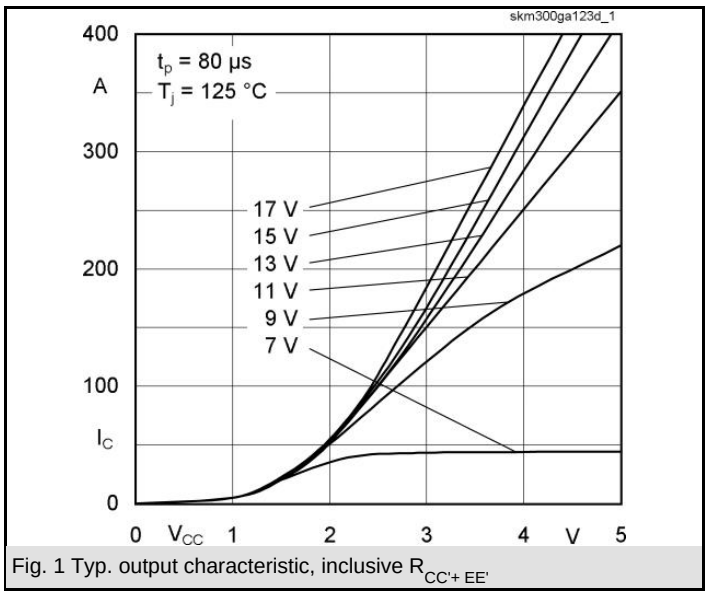


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

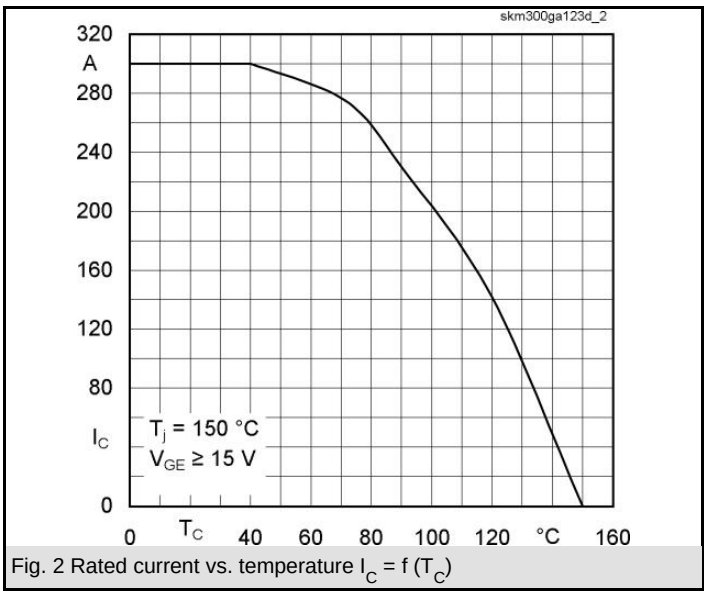


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

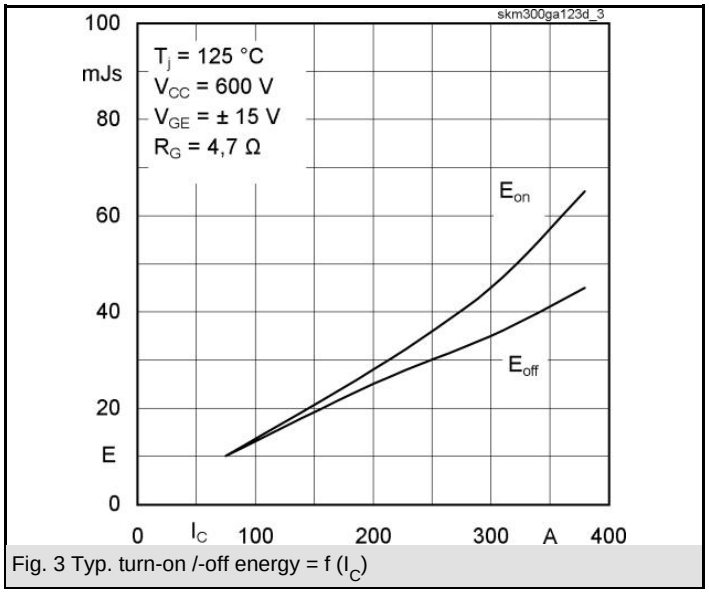


Fig. 3 Typ. turn-on /-off energy = f (I_C)

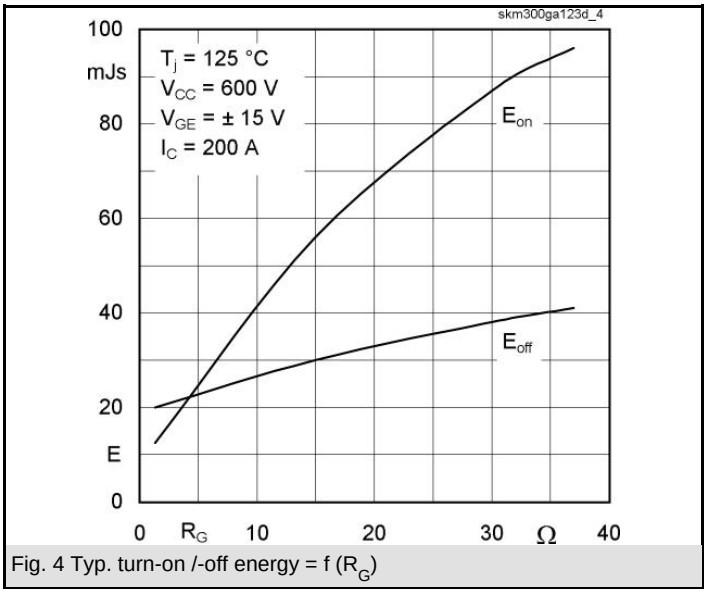


Fig. 4 Typ. turn-on /-off energy = f (R_G)

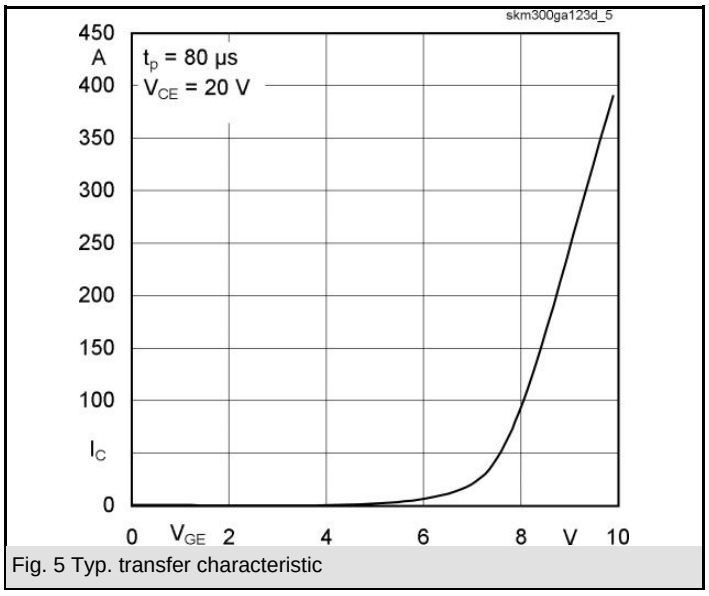


Fig. 5 Typ. transfer characteristic

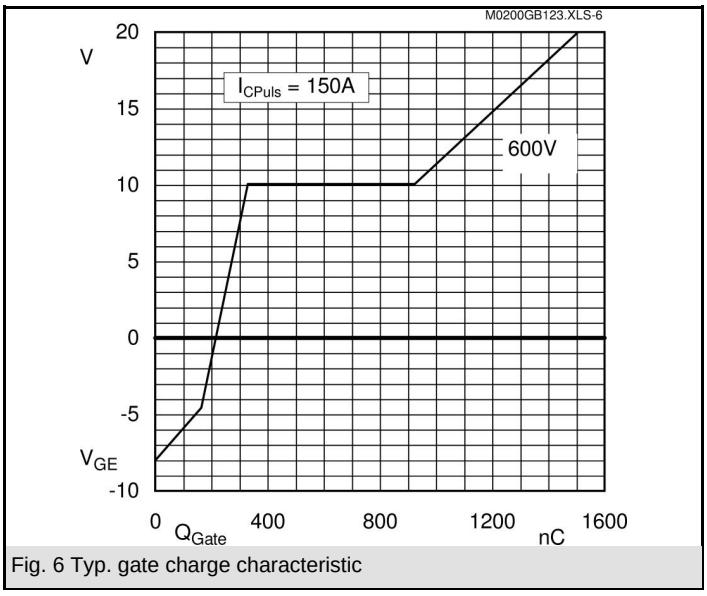


Fig. 6 Typ. gate charge characteristic

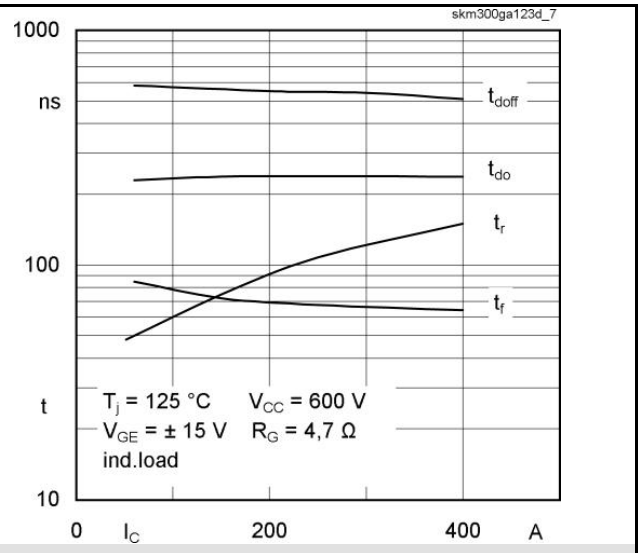


Fig. 7 Typ. switching times vs. I_C

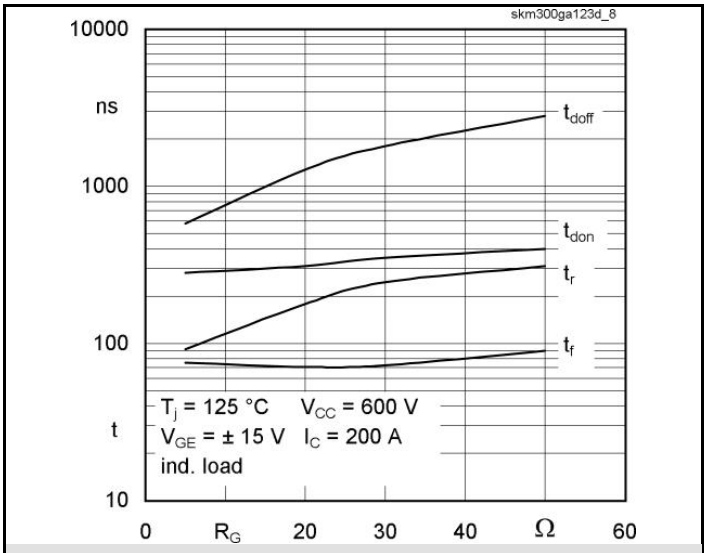


Fig. 8 Typ. switching times vs. gate resistor R_G

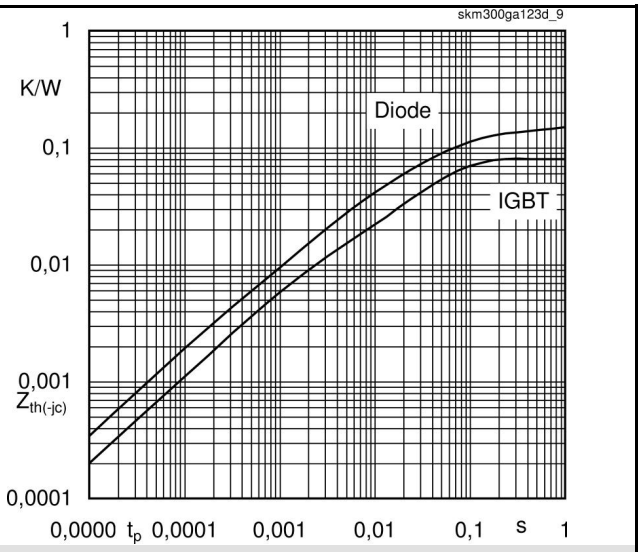


Fig. 9 Transient thermal impedance

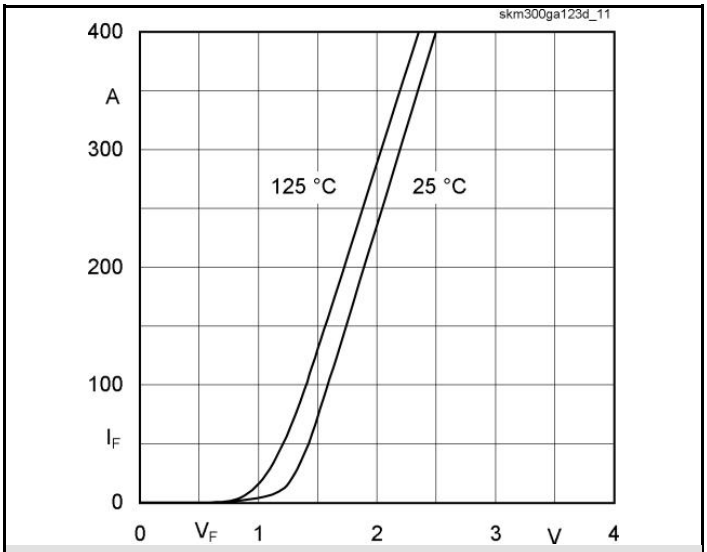


Fig. 10 CAL diode forward characteristic

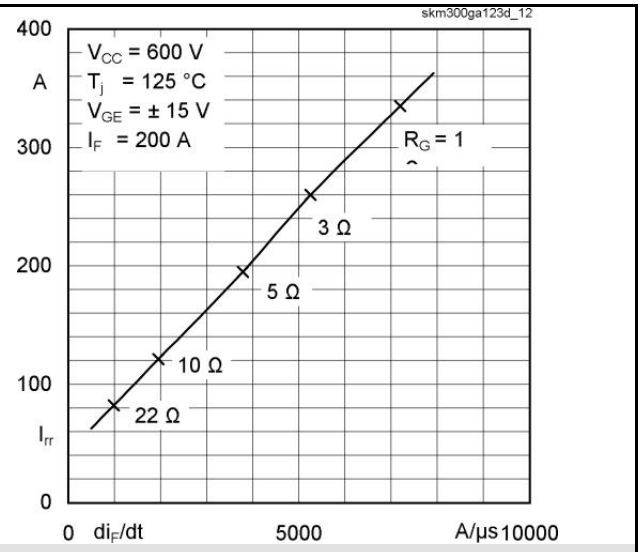


Fig. 11 Typ. CAL diode peak reverse recovery current

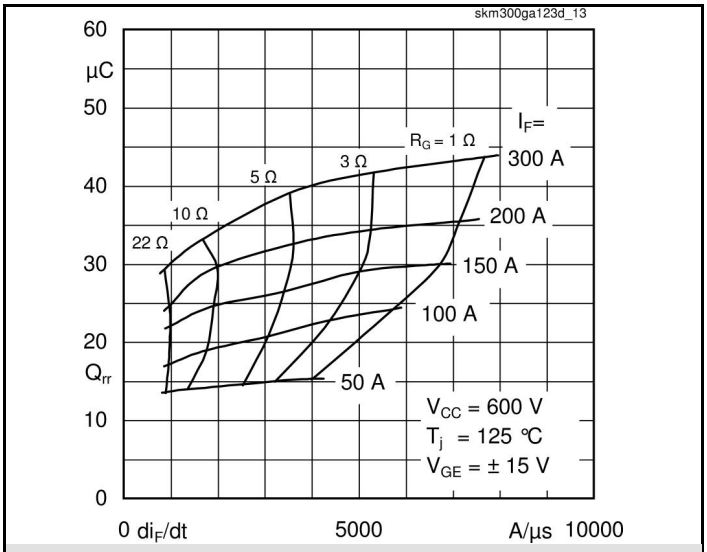
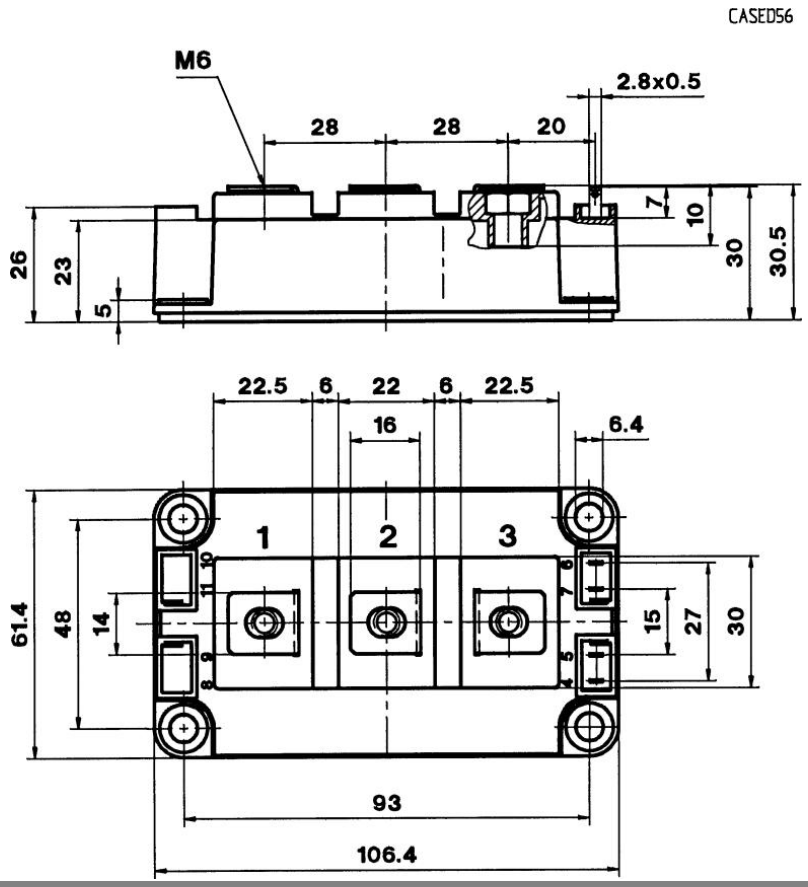


Fig. 12 Typ. CAL diode peak reverse recovery charge

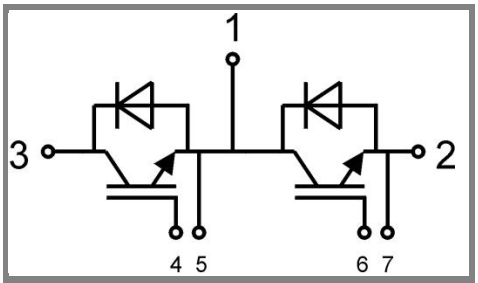
SKM 300GA123D

UL Recognized
File no. E 63 532

Dimensions in mm



Case D 59



GA Case D 59

