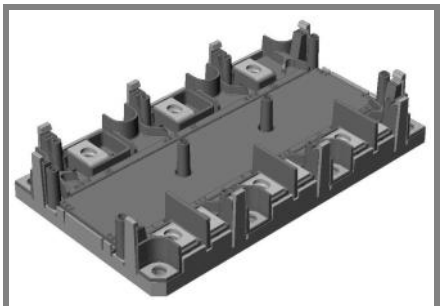
SKiM455GD12T4D1



SKiM® 5

Trench IGBT modules

SKiM455GD12T4D1

Preliminary Data

Features

- IGBT 4 = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability

Typical Applications*

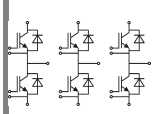
- High Reliability AC inverter drives
- UPS

Remarks

- Case temperature limited to T_c = 125°C max
- $T_{j,max}$ of the diode is limited to 150°C

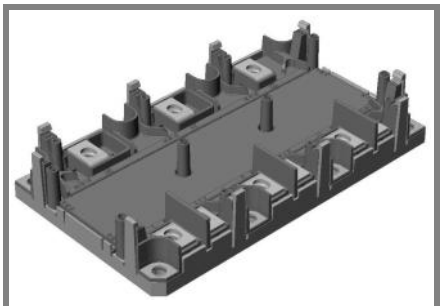
Absolute Maximum Ratings	T_c = 25 °C, unless otherwise specified			
Symbol	**Conditions**		**Values**	**Units**
IGBT				
V_{CES}	T_j = °C		1200	V
I_C	T_j = 150 °C	$T_{heatsink}$ = 25 °C	400	A
		$T_{heatsink}$ = 70 °C	305	A
I_{CRM}	I_{CRM} = 3xI_{CNOM}		1350	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 800 V; $V_{GE} \leq$ 15 V; V_{CES} < 1200 V	T_j = 150 °C	10	µs
Inverse Diode				
I_F	T_j = 150 °C	$T_{heatsink}$ = 25 °C	295	A
		$T_{heatsink}$ = 70 °C	215	A
I_{FRM}	I_{FRM} = 2 x I_{FNOM}		600	A
Module				
$I_{t(RMS)}$				A
T_{vj}			-40 ... +150	°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 = 18 mA		5	5,8	6,5	V
I_{CES}	V_{GE} = 0 V, V_{CE} = V_{CES}	T_j = 25 °C			5,0	mA
V_{CE0}		T_j = 25 °C		0,8	0,9	V
		T_j = 125 °C		0,7	0,8	V
r_{CE}	V_{GE} = 15 V	T_j = 25°C		2,2	2,4	mΩ
		T_j = 125°C		3,1	3,3	mΩ
$V_{CE(sat)}$	I_{Cnom} = 450 A, V_{GE} = 15 V	T_j = 25°C$_{chiplev.}$		1,8	2	V
		T_j = 125°C$_{chiplev.}$		2,1	2,3	V
C_{ies}				27,9		nF
C_{oes}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		1,7		nF
C_{res}				1,5		nF
Q_G	V_{GE} = -8V/+15V			2600		nC
R_{Gint}	T_j = 25 °C			1,7		Ω
$t_{d(on)}$				265		ns
t_r	R_{Gon} = 1 Ω	V_{CC} = 600V		60		ns
E_{on}	di/dt = 8200 A/µs	I_C= 450A		34		mJ
$t_{d(off)}$	R_{Goff} = 1 Ω	T_j = 125 °C		470		ns
t_f	di/dt = 5300 A/µs	V_{GE} = ± 15V		65		ns
E_{off}				40		mJ
$R_{th(j-s)}$	per IGBT			0,14		K/W



GD

SKiM455GD12T4D1



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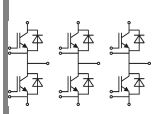


GD

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 450 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		2,3	2,8	V
		T_j = 125 °$C_{chiplev.}$		2,2	2,7	V
V_{F0}		T_j = 25 °C		1,2	1,6	V
		T_j = 125 °C		0,9	1,3	V
r_F		T_j = 25 °C		2,3	2,7	mΩ
		T_j = 125 °C		2,8	3,1	mΩ
I_{RRM}	I_F = 450 A	T_j = 125 °C		500		A
Q_{rr}	di/dt = 9000 A/µs			64,5		µC
E_{rr}	V_{GE} = -15V			27,8		mJ
$R_{th(j-s)}$	per diode			0,19		K/W
Module						
L_{CE}					20	nH
$R_{CC'+EE'}$	res., terminal-chip	T_{case}= 25 °C		0,9		mΩ
		T_{case}= 125 °C		1,1		mΩ
M_s	to heat sink M5					Nm
M_t	to terminals M6		4		5	Nm
w					460	g
Temperature sensor						
R_{TS}	T = 25 (100)°C			1 (1,67)		kΩ
Tolerance	T = 25 (100)°C			3 (2)		%

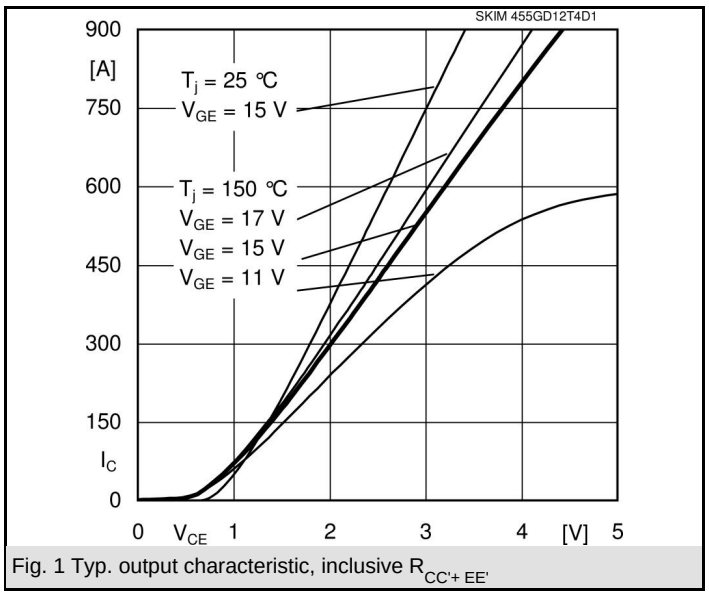


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

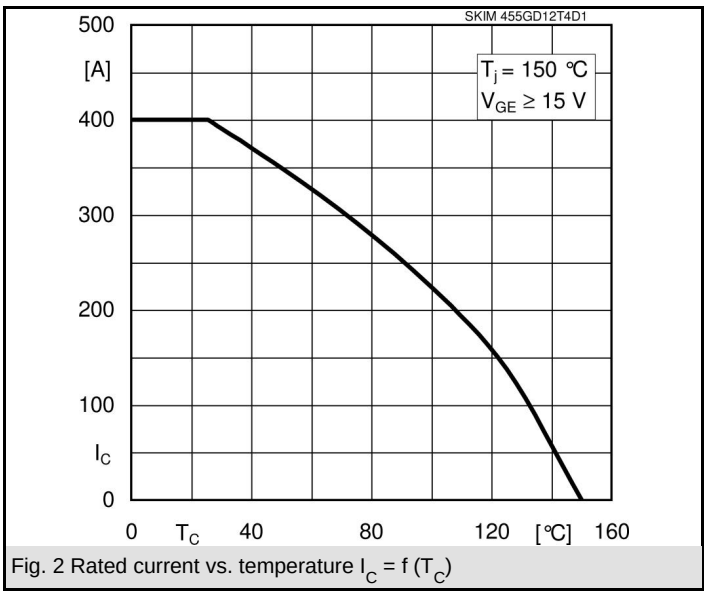


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

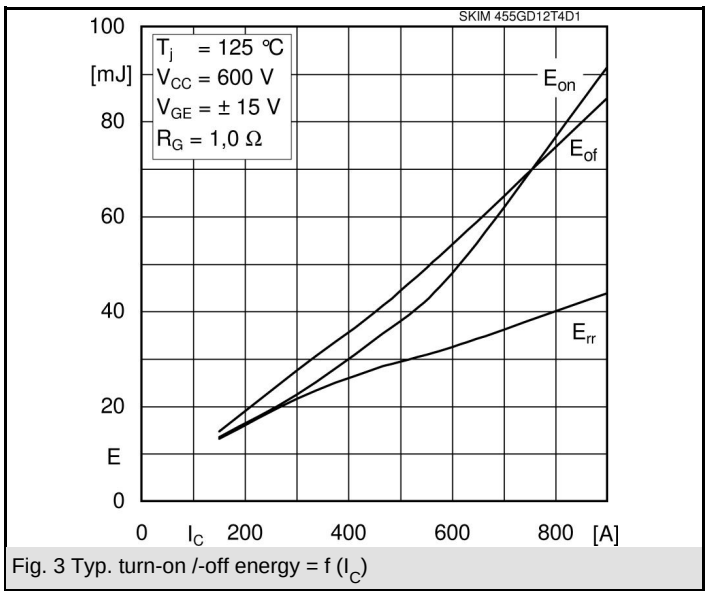


Fig. 3 Typ. turn-on /-off energy = f (I_C)

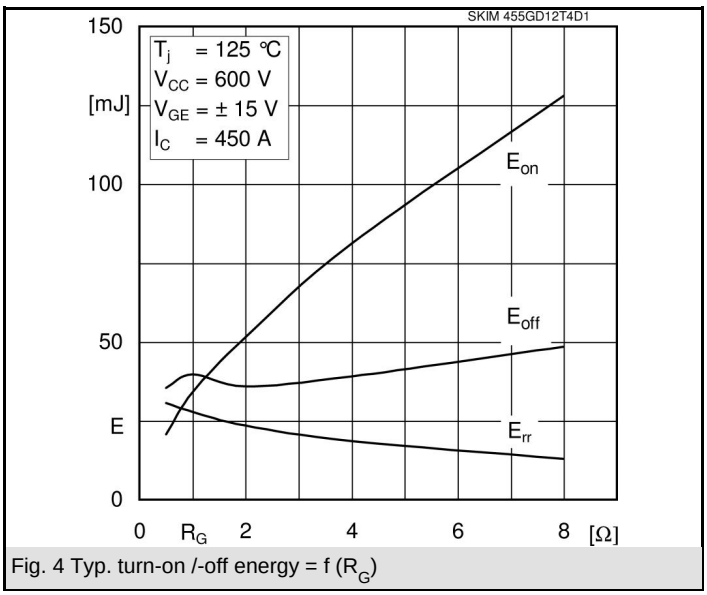


Fig. 4 Typ. turn-on /-off energy = f (R_G)

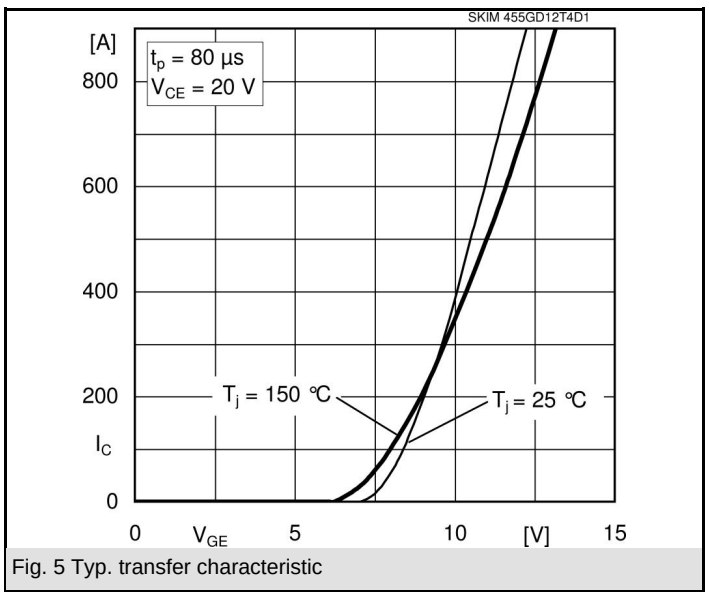


Fig. 5 Typ. transfer characteristic

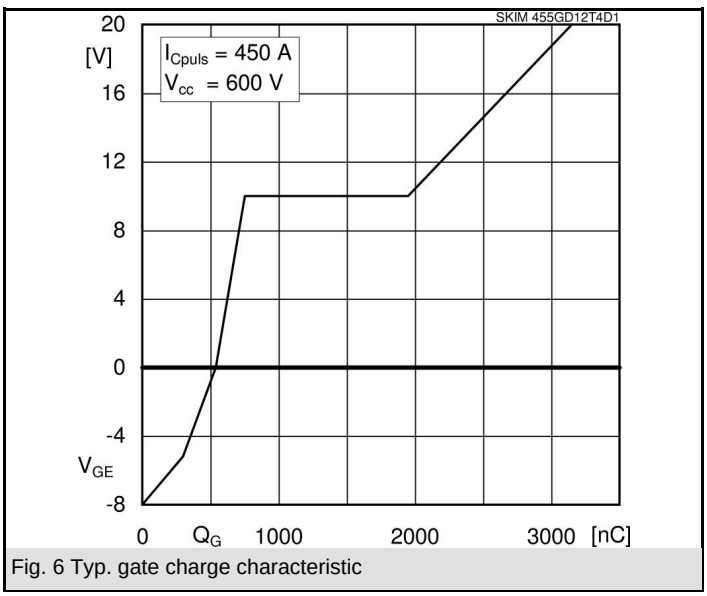


Fig. 6 Typ. gate charge characteristic

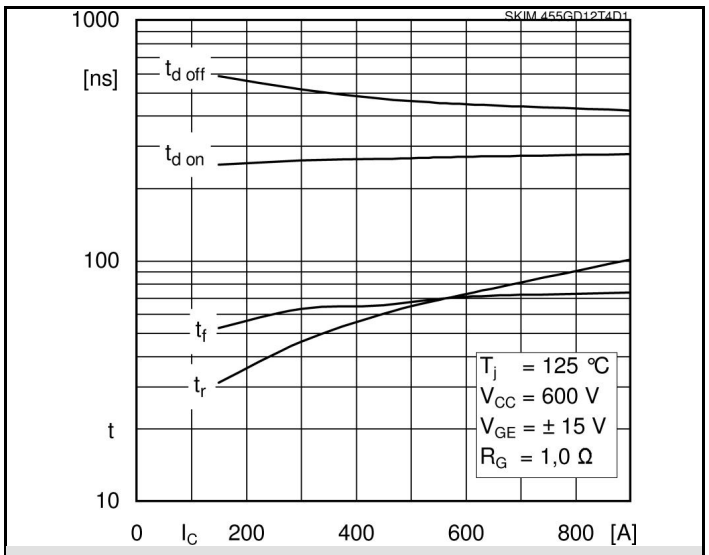


Fig. 7 Typ. switching times vs. I_C

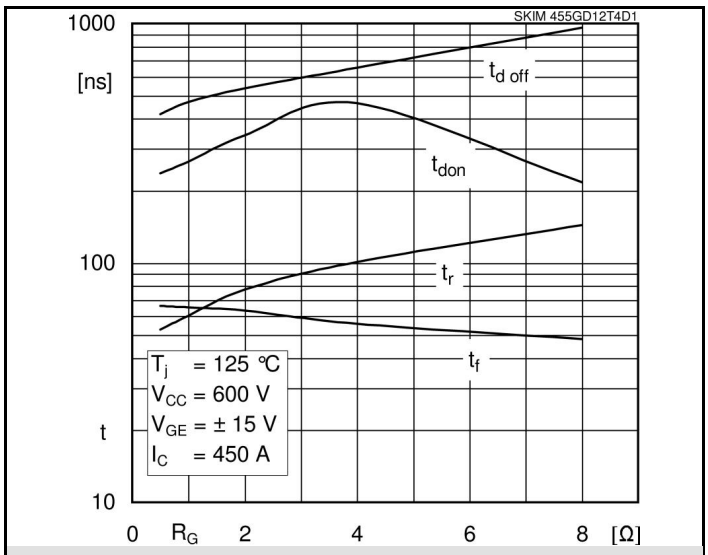


Fig. 8 Typ. switching times vs. gate resistor R_G

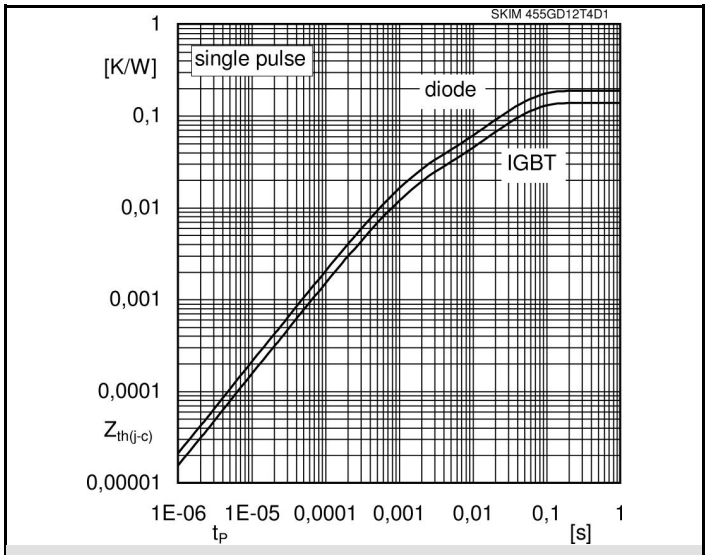


Fig. 9 Transient thermal impedance

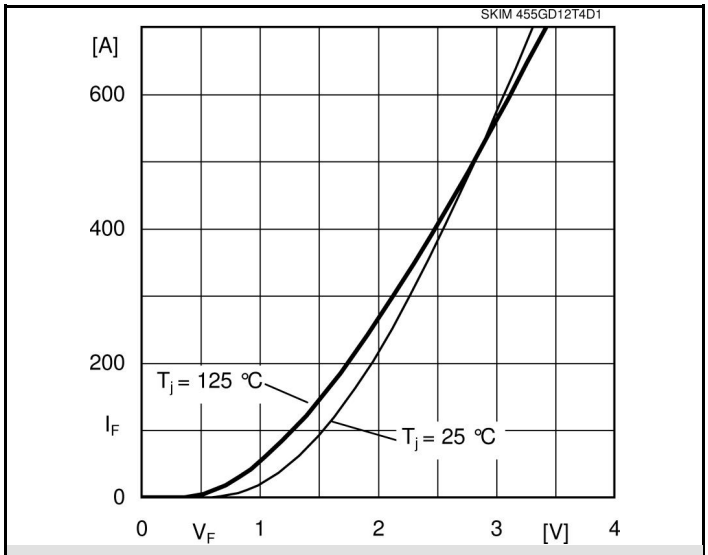


Fig. 10 CAL diode forward characteristic

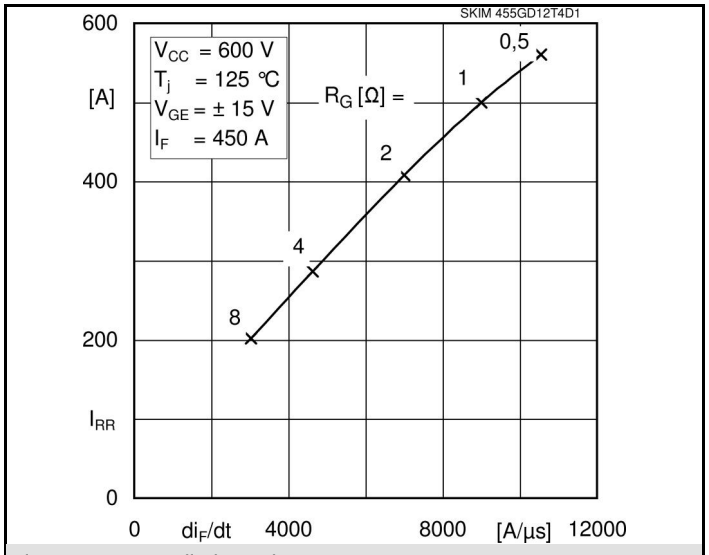


Fig. 11 Typ. CAL diode peak reverse recovery current

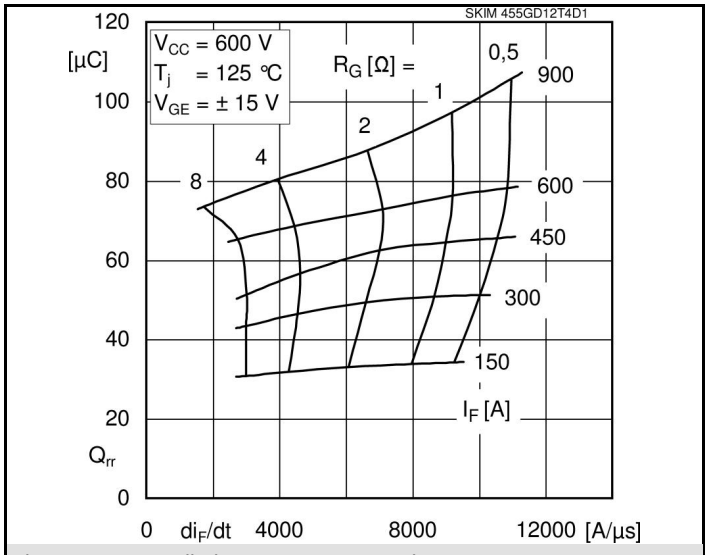
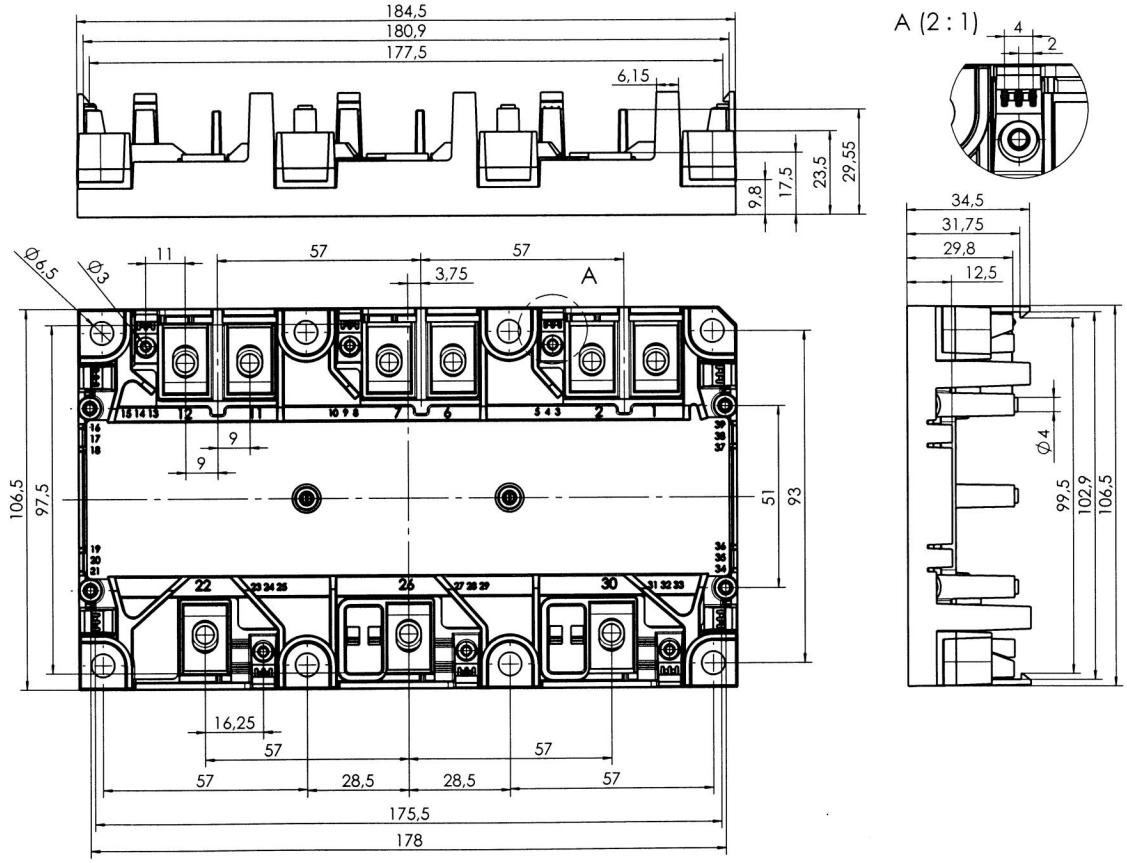
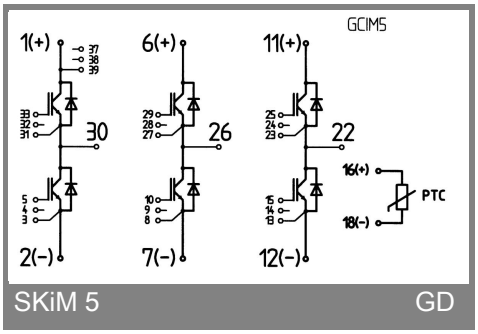


Fig. 12 Typ. CAL diode reverse recovery charge

UL recognized file no. E 63 532





SKiM 5 GD

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

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