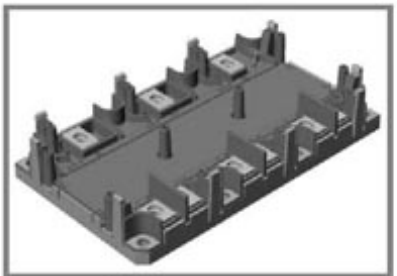
SKiM455GD12T4D1



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

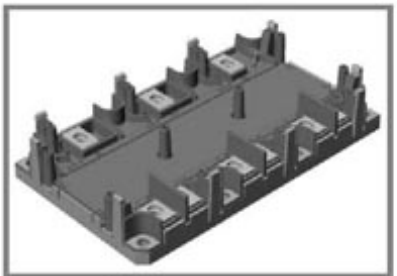
- Case temperature limited to T_c = 125°C max
- $T_{j,max}$ of the diode is limited to 150°C

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} ≤ 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			0,3	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



SKiM® 5

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SKiM455GD12T4D1

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Features

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Remarks

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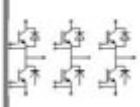
- $T_{j,max}$ of the diode is limited to 150°C

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)		%

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 personal.



GD

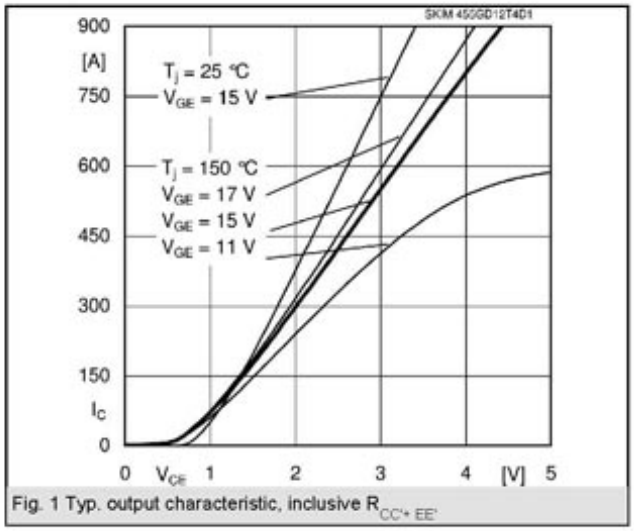


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

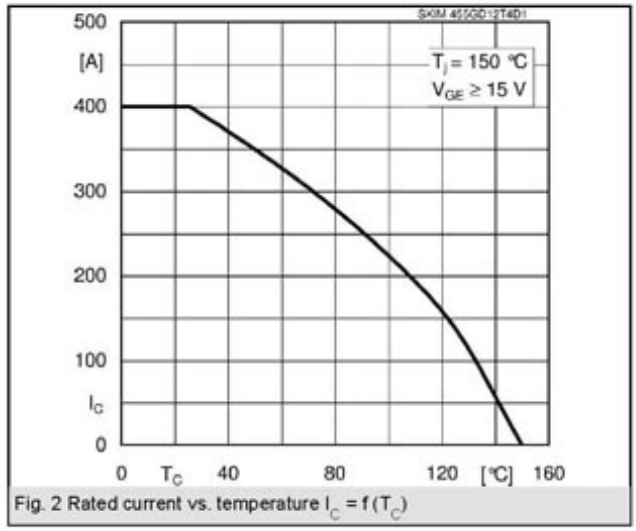


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

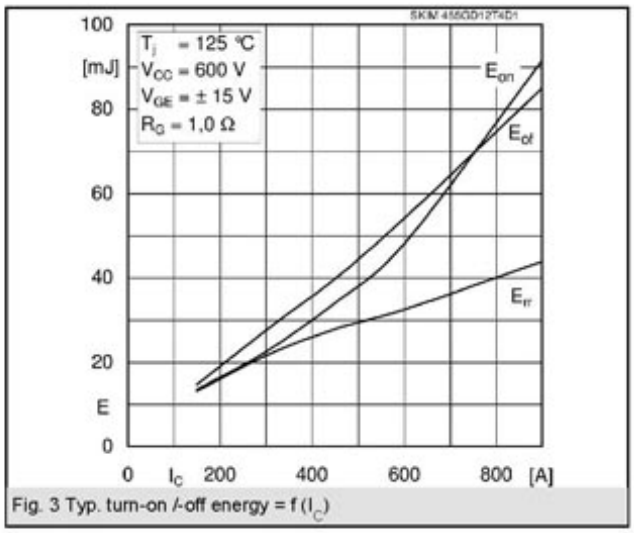


Fig. 3 Typ. turn-on /-off energy = f (I_C)

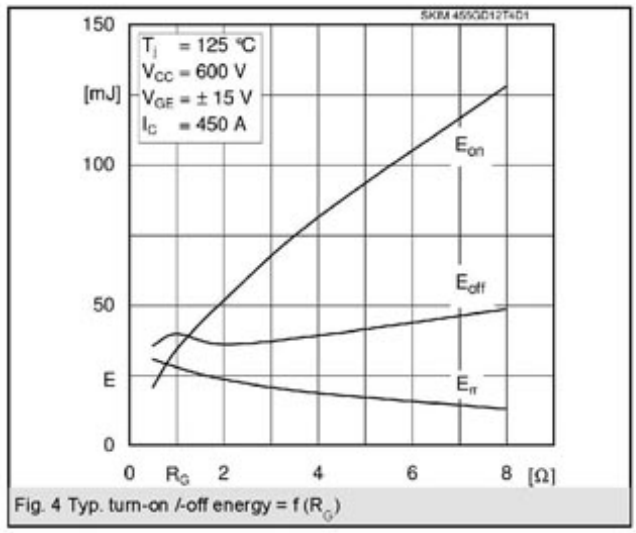


Fig. 4 Typ. turn-on /-off energy = f (R_G)

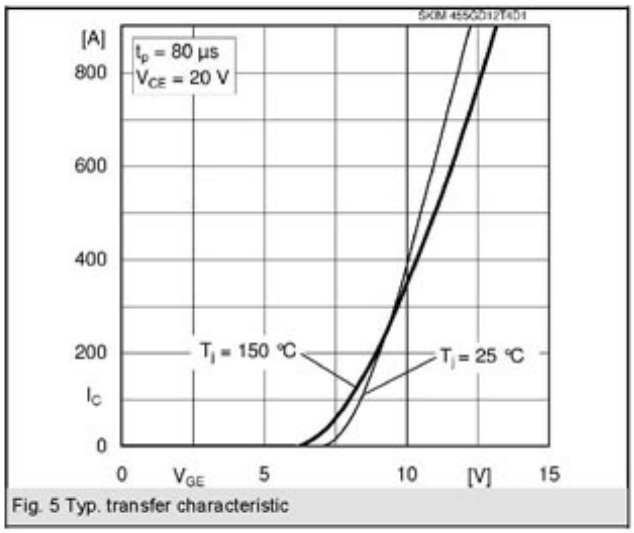


Fig. 5 Typ. transfer characteristic

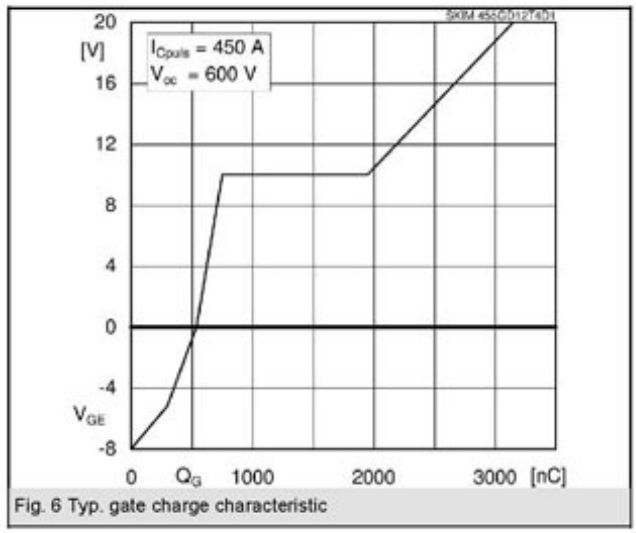


Fig. 6 Typ. gate charge characteristic

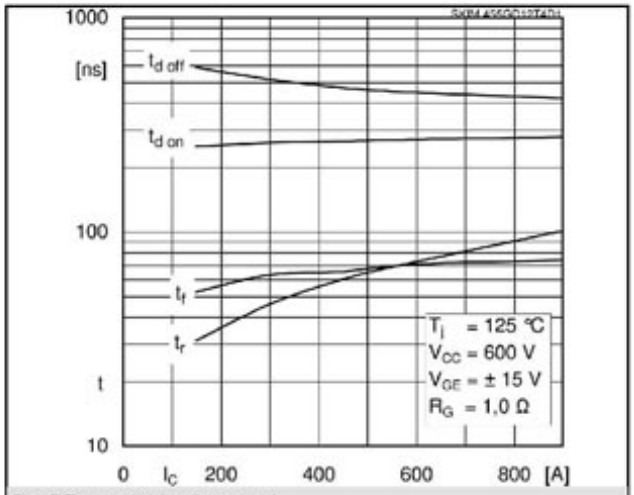


Fig. 7 Typ. switching times vs. I_C

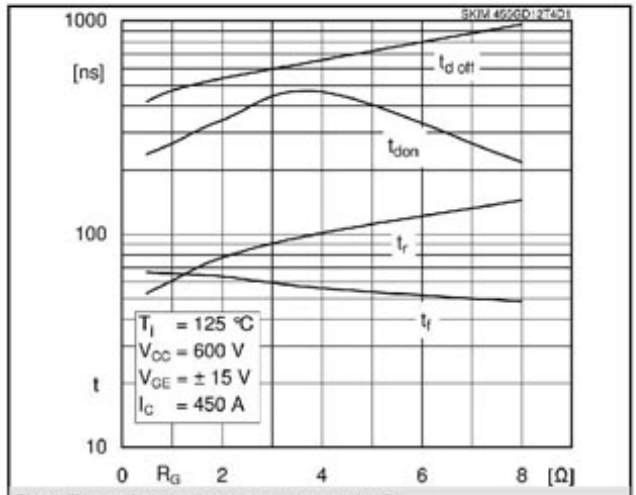


Fig. 8 Typ. switching times vs. gate resistor R_G

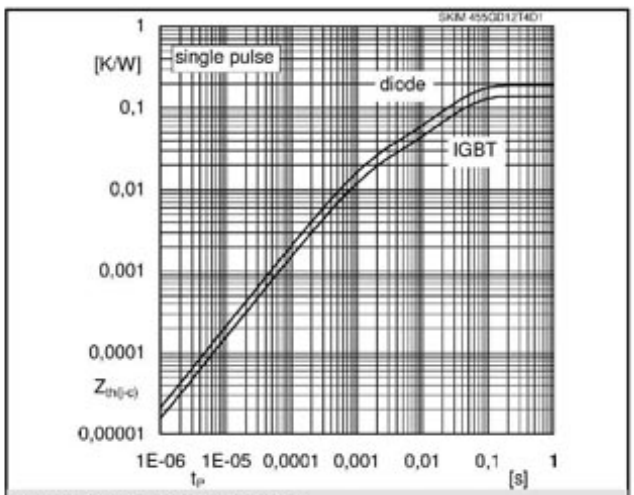


Fig. 9 Transient thermal impedance

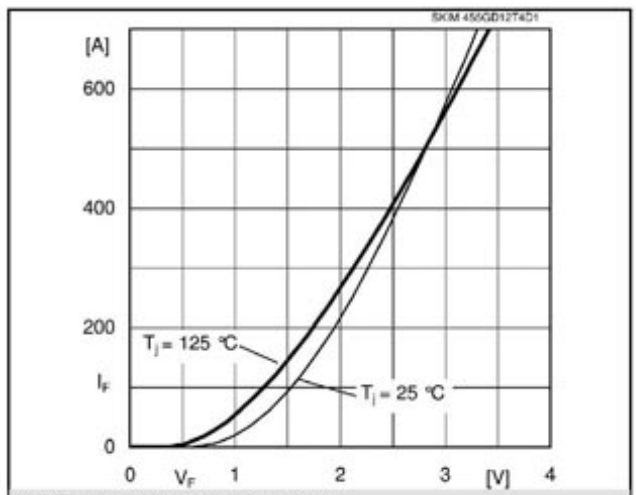


Fig. 10 CAL diode forward characteristic

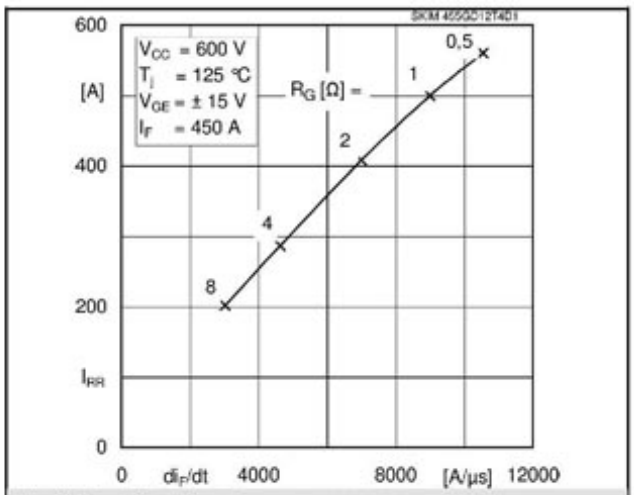


Fig. 11 Typ. CAL diode peak reverse recovery current

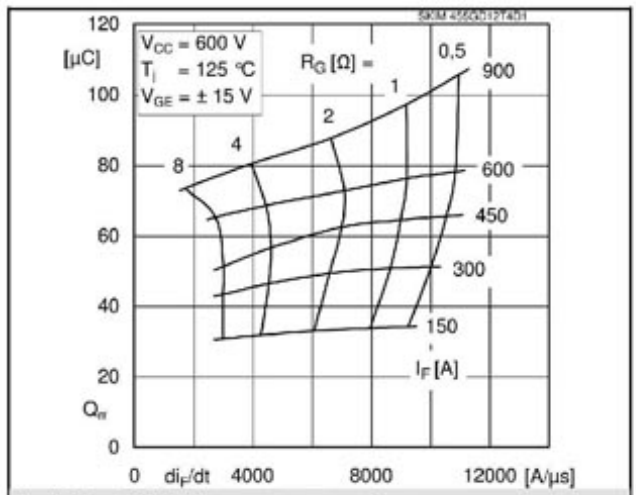


Fig. 12 Typ. CAL diode reverse recovery charge

UL recognized file

no. E 63 532