



SKiM[®] 4

Trench IGBT Modules

SKiM 304GD12T4D

Preliminary Data

Features

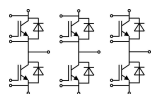
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability

Typical Applications*

- Automotive inverter
- AC inverter drives

Absolute Maximum Ratings		$T_{case} = 25^{\circ}C$, unless otherwise specified		
Symbol	Conditions	Values	Units	
IGBT				
V_{CES}	$T_j = 25^{\circ}C$	1200	V	
I_C	$T_j = 150^{\circ}C$	$T_s = 25^{\circ}C$	285	A
		$T_s = 70^{\circ}C$	215	A
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$	900	A	
V_{GES}		± 20	V	
t_{psc}	$V_{CC} = 800 V$; $V_{GE} \leq 15 V$; $T_j = 150^{\circ}C$ $V_{CES} < 1200 V$	10	μs	
Inverse Diode				
I_F	$T_j = 150^{\circ}C$	$T_s = 25^{\circ}C$	220	A
		$T_s = 70^{\circ}C$	160	A
I_{FRM}		400	A	
Module				
$I_{t(RMS)}$		400	A	
T_{vj}		- 40 + 150	$^{\circ}C$	
T_{stg}		- 40 + 125	$^{\circ}C$	
V_{isol}	AC, 1 min.	2500	V	

Characteristics		$T_{case} = 25^{\circ}C$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 12 mA$	5	5,8	6,5	V
I_{CES}	$V_{GE} = 0 V$, $V_{CE} = V_{CES}$			0,3	mA
V_{CE0}		$T_j = 25^{\circ}C$	0,8	0,9	V
		$T_j = 125^{\circ}C$	0,72	0,82	V
r_{CE}	$V_{GE} = 15 V$	$T_j = 25^{\circ}C$	3,3	3,7	m Ω
		$T_j = 125^{\circ}C$	4,7	5	m Ω
$V_{CE(sat)}$	$I_{Cnom} = 300 A$, $V_{GE} = 15 V$	$T_j = 25^{\circ}C_{chiplev.}$	1,8	2	V
		$T_j = 125^{\circ}C_{chiplev.}$	2,1	2,3	V
C_{ies}	$V_{CE} = 25$, $V_{GE} = 0 V$	$f = 1 MHz$	19		nF
C_{oes}			1,2		nF
C_{res}			1		nF
Q_G	$V_{GE} = -15V...+15V$	1700		nC	
$t_{d(on)}$	$R_{Gon} = 1 \Omega$ $di/dt = 9250 A/\mu s$	$V_{CC} = 600V$ $I_C = 300A$	225		ns
t_r			40		ns
E_{on}			21		mJ
$t_{d(off)}$	$R_{Goff} = 1 \Omega$ $di/dt = 4060 A/\mu s$	$T_j = 125^{\circ}C$ $V_{GE} = -15V/+15V$	435		ns
			60		ns
E_{off}		23		mJ	
$R_{th(j-s)}$	per IGBT	0,19		K/W	



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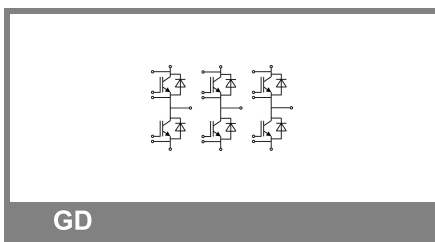
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Typical Applications*

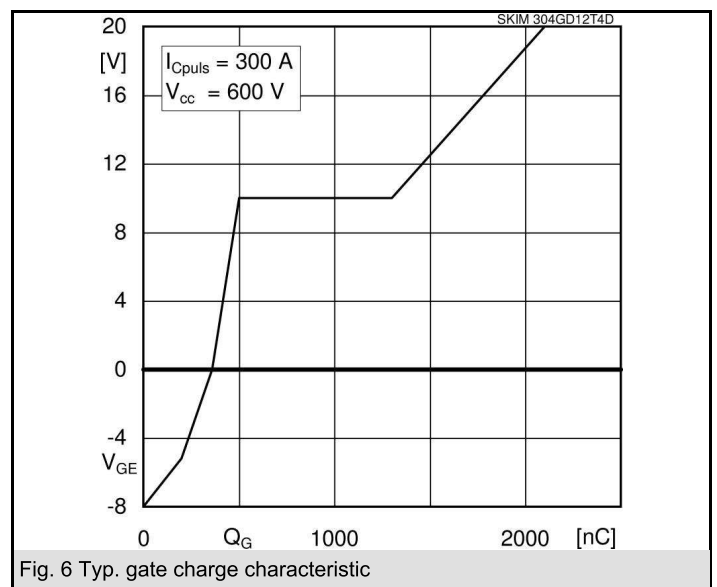
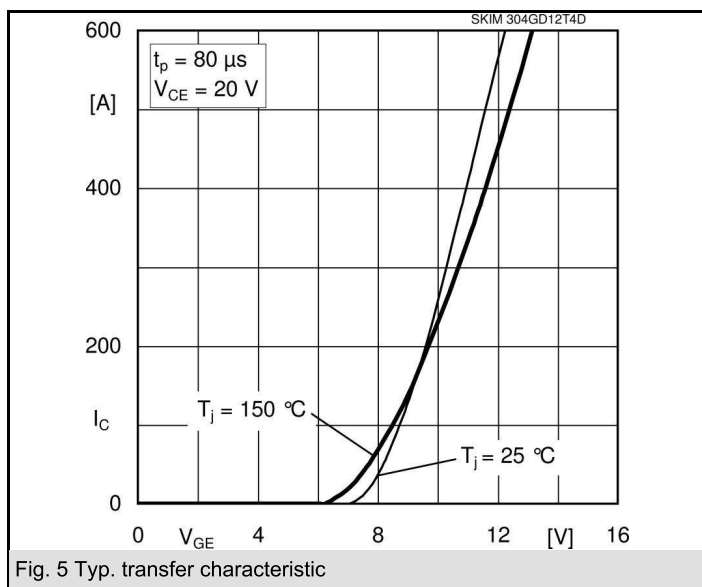
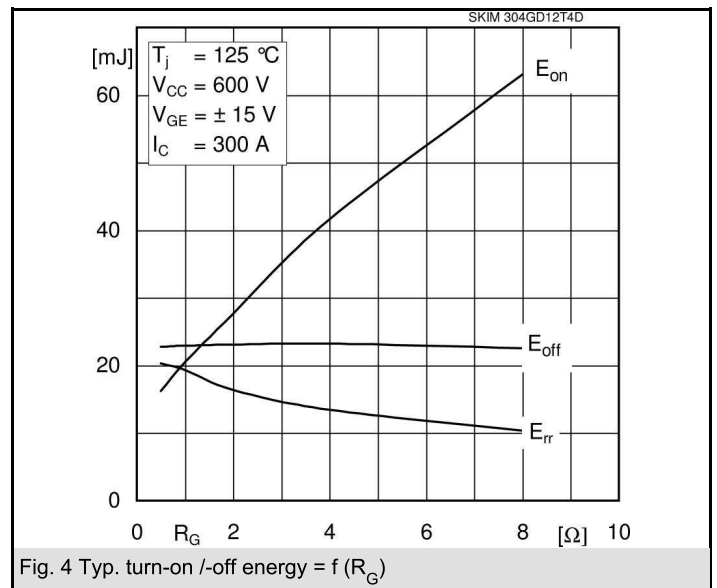
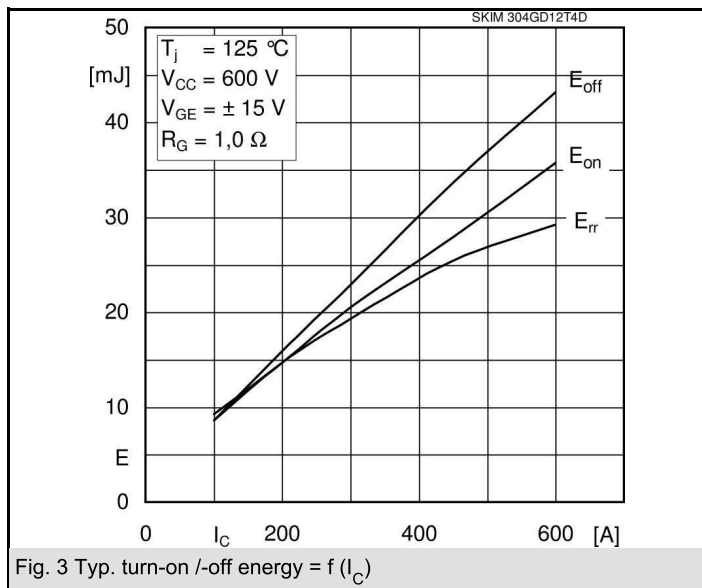
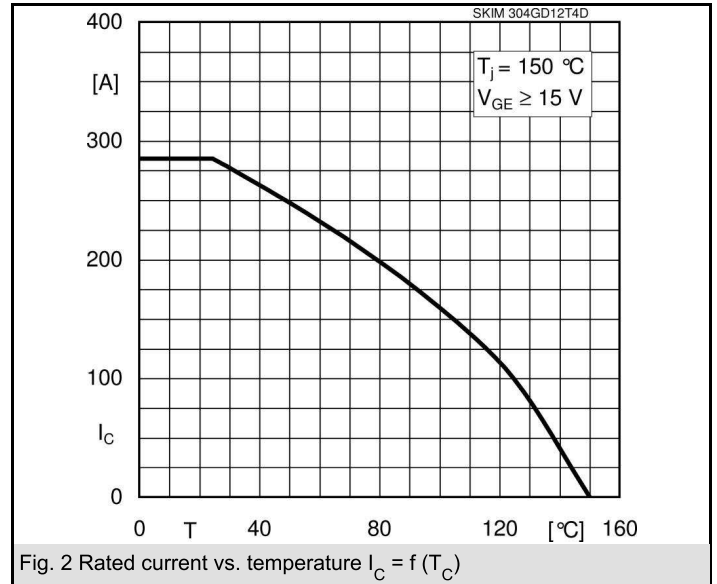
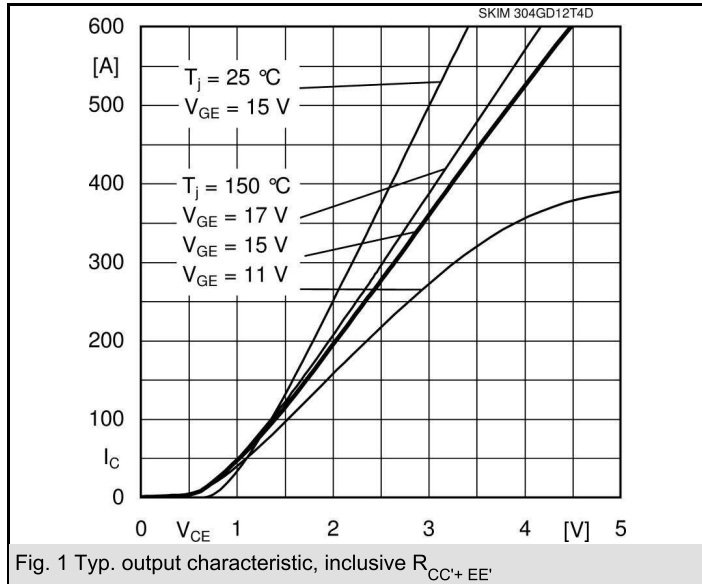
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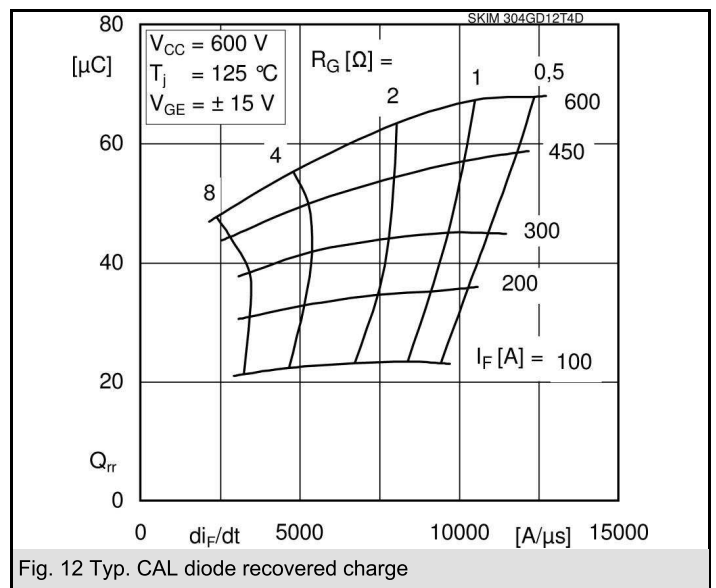
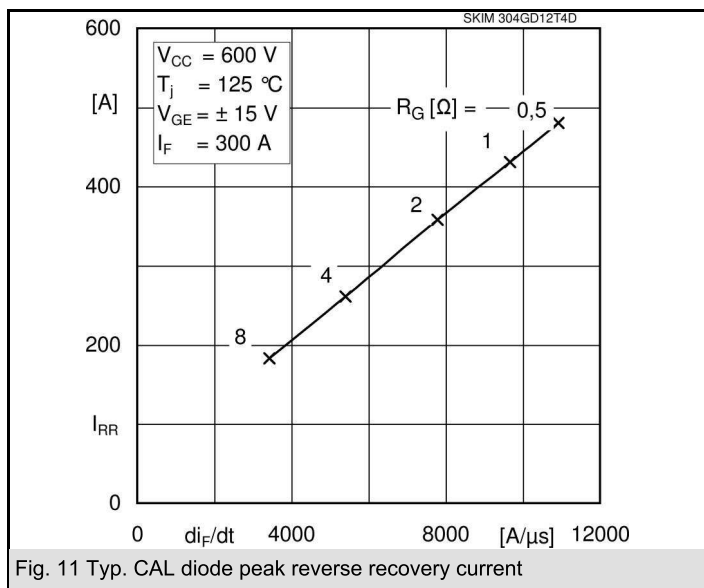
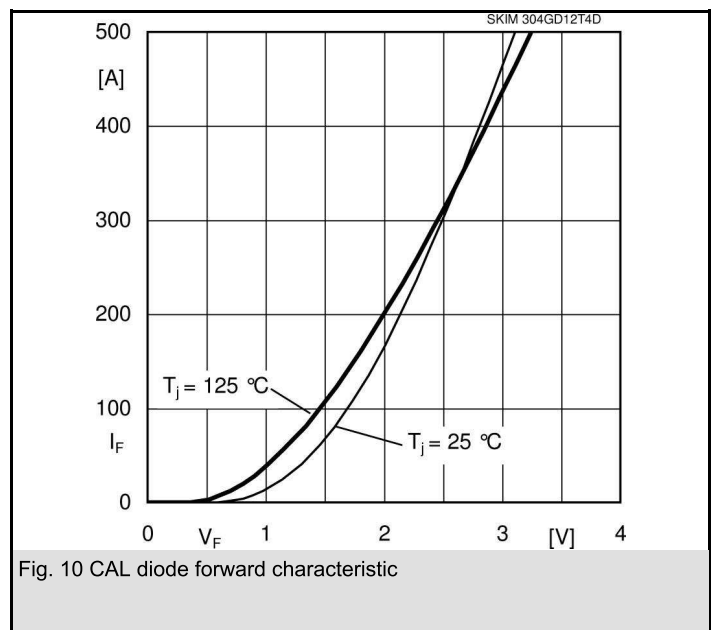
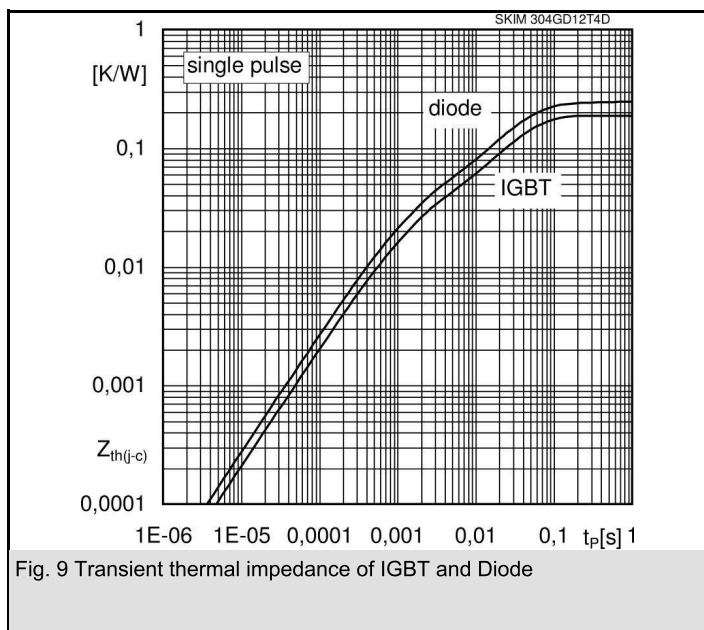
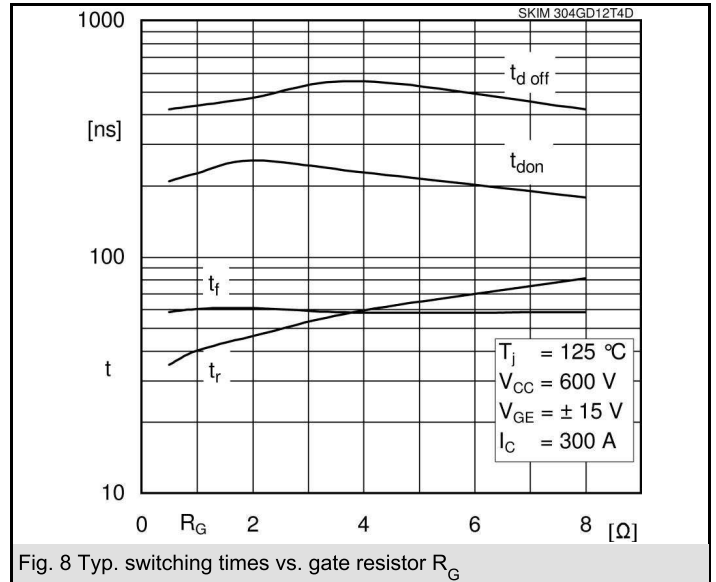
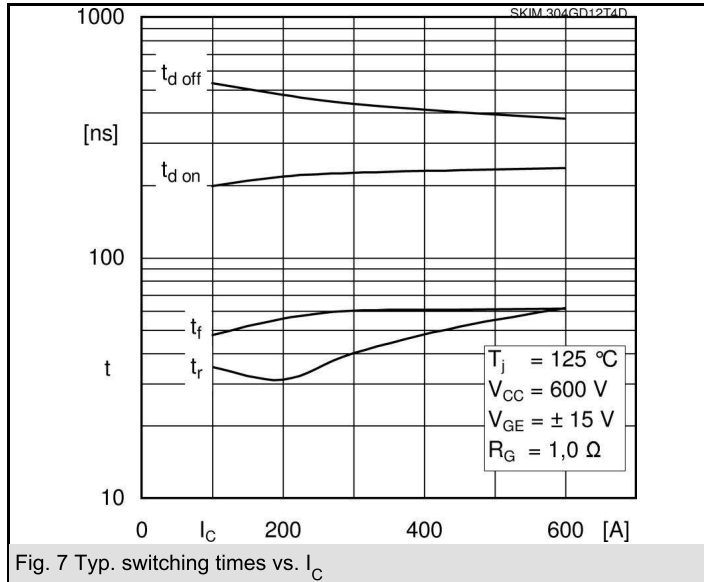


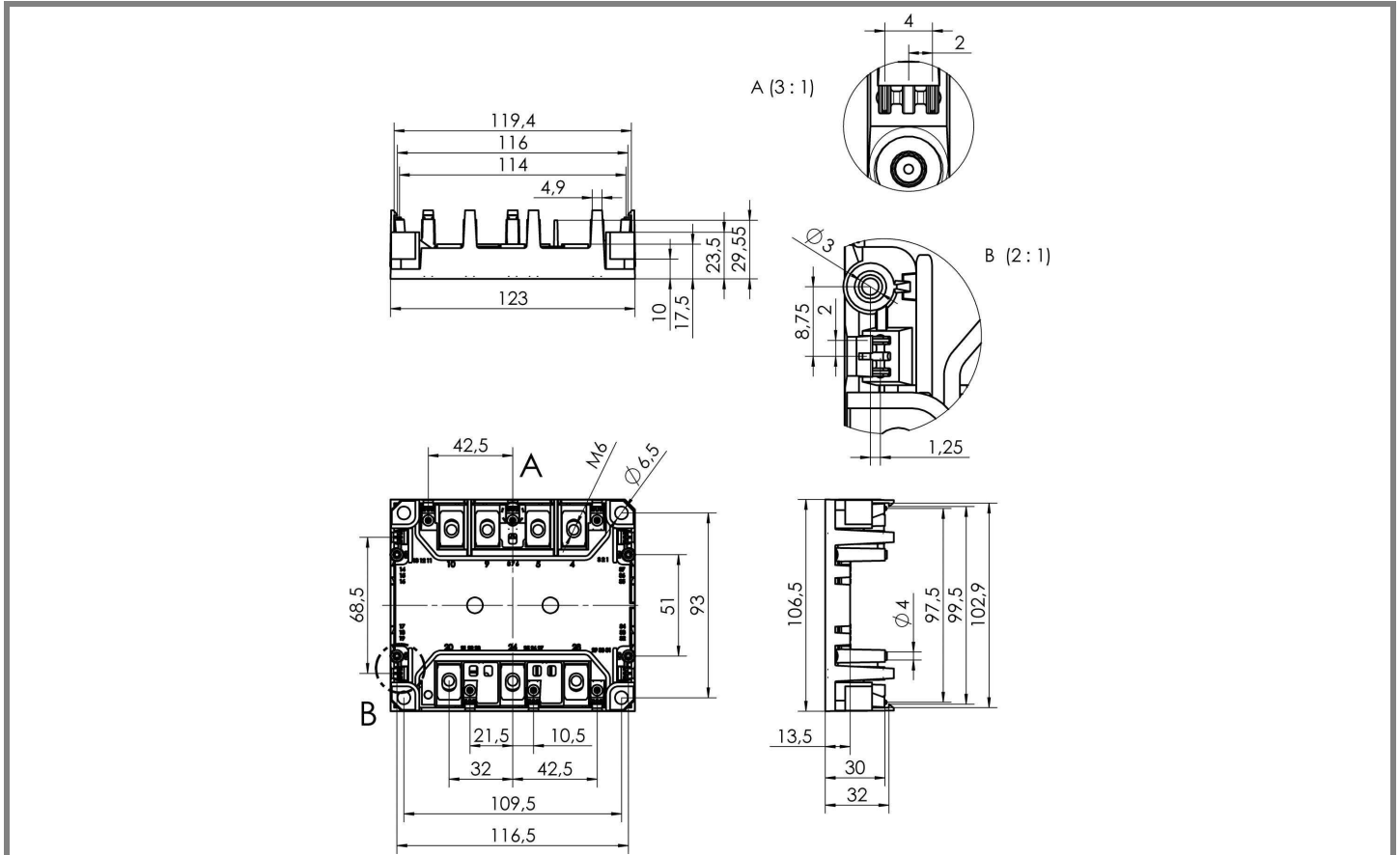
Characteristics				min.	typ.	max.	Units
Symbol	Conditions						
Inverse Diode							
$V_F = V_{EC}$	$I_{Fnom} = 300 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$		2,3	2,8		V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$		2,2	2,7		V
V_{F0}		$T_j = 25 \text{ }^\circ\text{C}$		1,2	1,6		V
		$T_j = 125 \text{ }^\circ\text{C}$		0,9	1,3		V
r_F		$T_j = 25 \text{ }^\circ\text{C}$		3,5	4		m Ω
		$T_j = 125 \text{ }^\circ\text{C}$		4,2	4,7		m Ω
I_{RRM}	$I_F = 300 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$		430			A
Q_{rr}				45			μC
E_{rr}	$V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$			19,3			mJ
$R_{th(j-s)D}$	per diode				0,25		K/W
Module							
L_{CE}					20		nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25 \text{ }^\circ\text{C}$		1,35			m Ω
		$T_{case} = 125 \text{ }^\circ\text{C}$		1,75			m Ω
M_s	to heat sink M4						Nm
M_t	to terminals M6			4	5		Nm
w					310		g
Temperature sensor							
R_{100}	$T_c = 100 \text{ }^\circ\text{C}$ ($R_{25} = 1,0 \text{ k}\Omega$)			1,67			k Ω
$B_{100/125}$	$R(T) = R_{100} \cdot \exp[B_{100/125} \cdot (1/T - 1/373)]$; $T[\text{K}]$						K

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.







Case SKiM 4

