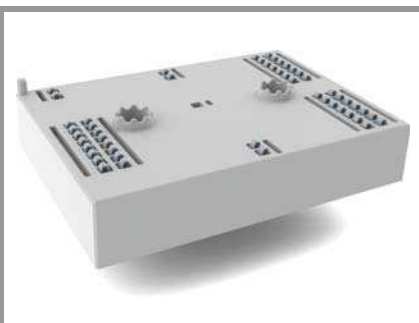


SKiiP38GB12E4V1



MiniSKiiP® 3 Dual

SKiiP38GB12E4V1

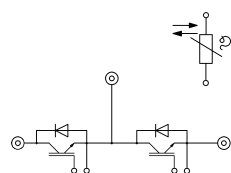
Features

- Trench 4 IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised: File no. E63532
- NTC T-Sensor

Remarks

Max. case temperature limited to $T_{C\text{max}} = 125^\circ\text{C}$

Product reliability results valid for $T_j \leq 150^\circ\text{C}$ (recommended $T_{j,op} = -40 \dots +150^\circ\text{C}$)



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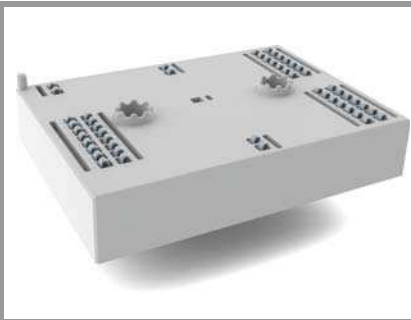
Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
Inverter - IGBT				
V _{CES}	T _j = 25 °C		1200	V
I _C	T _j = 175 °C	T _s = 25 °C	329	A
		T _s = 70 °C	266	A
I _{Cnom}			300	A
I _{CRM}	I _{CRM} = 3 x I _{Cnom}		900	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 800 V V _{GE} ≤ 15 V V _{CES} ≤ 1200 V	T _j = 150 °C	10	μs
T _j			-40 ... 175	°C
Inverse - Diode				
I _F	T _j = 175 °C	T _s = 25 °C	267	A
		T _s = 70 °C	211	A
I _{Fnom}			300	A
I _{FRM}	I _{FRM} = 3 x I _{Fnom}		900	A
I _{FSM}	10 ms, sin 180°, T _j = 150 °C		1485	A
T _j			-40 ... 175	°C
Module				
I _{t(RMS)}	T _{terminal} = 80 °C, 20 A per spring		280	A
T _{stg}			-40 ... 125	°C
V _{isol}	AC sinus 50 Hz, t = 1 min		2500	V

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
Inverter - IGBT					
$V_{CE(sat)}$	$I_C = 300\text{ A}$ $V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$	1.85	2.10	V
		$T_j = 150^\circ\text{C}$	2.25	2.45	V
V_{CE0}	chipelevel	$T_j = 25^\circ\text{C}$	0.8	0.9	V
		$T_j = 150^\circ\text{C}$	0.7	0.8	V
r_{CE}	$V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$	3.5	4	m Ω
		$T_j = 150^\circ\text{C}$	5.2	5.5	m Ω
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 12\text{ mA}$	5	5.8	6.5	V
I_{CES}	$V_{GE} = 0\text{ V}$ $V_{CE} = 1200\text{ V}$	$T_j = 25^\circ\text{C}$	0.1	0.3	mA
					mA
C_{ies}	$V_{CE} = 25\text{ V}$ $V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	17.60		nF
C_{oes}		$f = 1\text{ MHz}$	1.16		nF
C_{res}		$f = 1\text{ MHz}$	0.94		nF
Q_G	- 8 V ... + 15 V		1700		nC
R_{Gint}	$T_j = 25^\circ\text{C}$		2.5		Ω
$t_{d(on)}$	$V_{CC} = 600\text{ V}$	$T_j = 150^\circ\text{C}$	180		ns
t_r	$I_C = 300\text{ A}$ $R_{G on} = 2\text{ }\Omega$	$T_j = 150^\circ\text{C}$	51		ns
		$T_j = 150^\circ\text{C}$	19.1		mJ
E_{on}	$R_{G off} = 2\text{ }\Omega$	$T_j = 150^\circ\text{C}$	19.1		mJ
$t_{d(off)}$	$di/dt_{on} = 6995\text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$	455		ns
t_f	$di/dt_{off} = 3030\text{ A}/\mu\text{s}$ $du/dt = 5280\text{ V}/\mu\text{s}$	$T_j = 150^\circ\text{C}$	96		ns
		$T_j = 150^\circ\text{C}$	34.6		mJ
E_{off}	$V_{GE} = +15/-15\text{ V}$ $L_s = 25\text{ nH}$	$T_j = 150^\circ\text{C}$	34.6		mJ
$R_{th(j-s)}$	per IGBT, $\lambda_{paste} = 0.8\text{ W/K}\cdot\text{m}$		0.17		K/W

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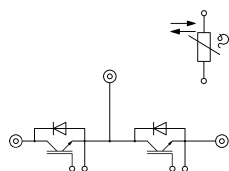
Features

- Trench 4 IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised: File no. E63532
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Remarks

Max. case temperature limited to $T_C = 125^\circ\text{C}$
 Product reliability results valid for
 $T_J \leq 150^\circ\text{C}$ (recommended
 $T_{J,op} = -40 \dots +150^\circ\text{C}$)

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse - Diode						
V _F = V _{EC}	I _F = 300 A	T _j = 25 °C		2.2	2.5	V
	V _{GE} = 0 V chipllevel	T _j = 150 °C		2.2	2.5	V
V _{F0}	chipllevel	T _j = 25 °C		1.3	1.5	V
		T _j = 150 °C		0.9	1.1	V
r _F	chipllevel	T _j = 25 °C		3	3.4	mΩ
		T _j = 150 °C		4.2	4.6	mΩ
I _{RRM}	I _F = 300 A	T _j = 150 °C		353		A
Q _{rr}	di/dt _{off} = 7005 A/μs	T _j = 150 °C		49		μC
E _{rr}	V _{GE} = -15 V	T _j = 150 °C		21.5		mJ
	V _{CC} = 600 V					
R _{th(j-s)}	per Diode, λ _{paste} =0.8 W/K*m			0.26		K/W
Module						
L _{CE}				15		nH
M _s	to heat sink		2		2.5	Nm
w				76		g
Temperature Sensor						
R ₁₀₀	T _c =100°C (R ₂₅ =5 kΩ)			493 ± 5%		Ω
B _{25/85}	R(T)=R ₂₅ *exp[B _{25/85} *(1/T-1/298)], [T]=K			3420		K



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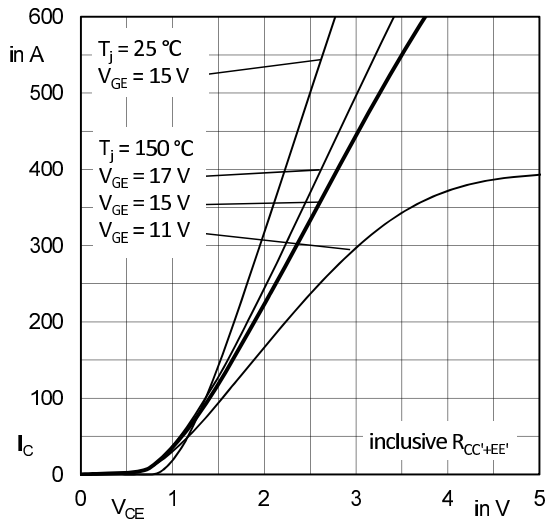


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE'}$

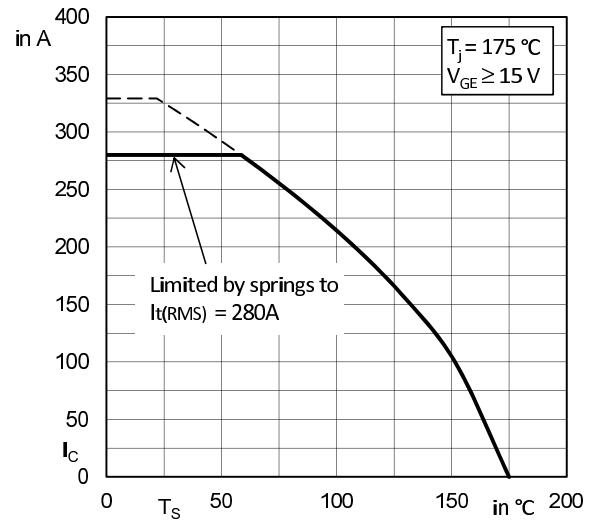


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

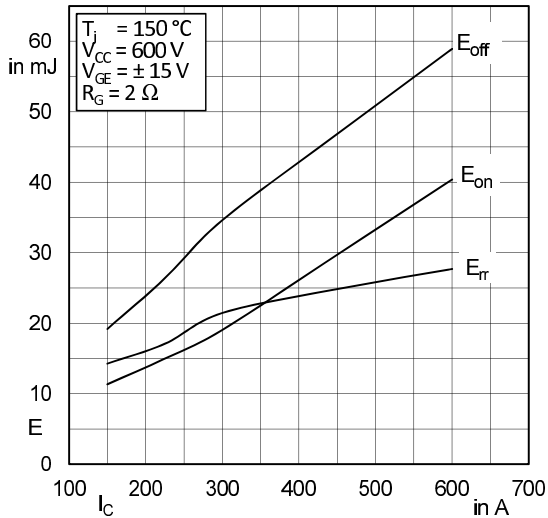


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

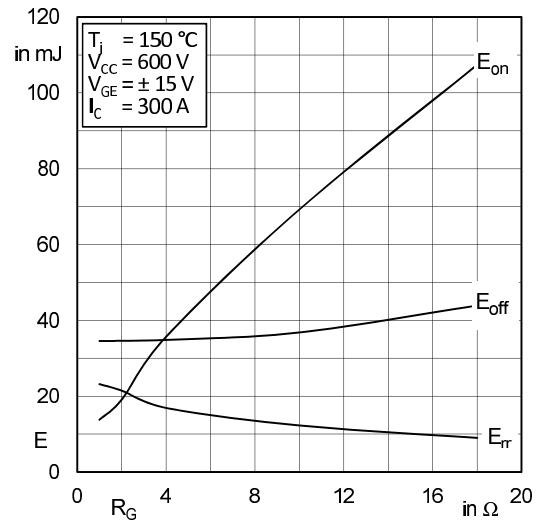


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

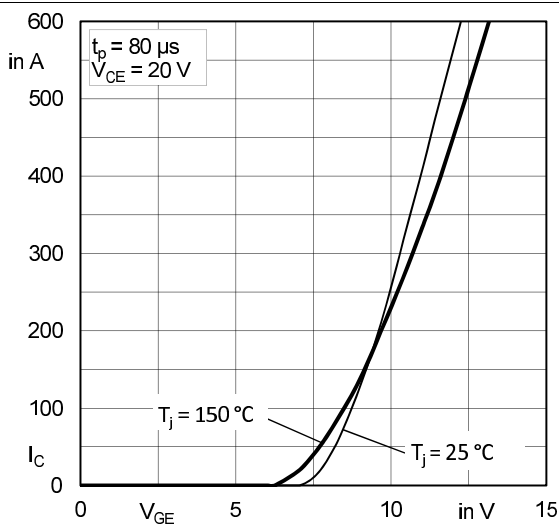


Fig. 5: Typ. transfer characteristic

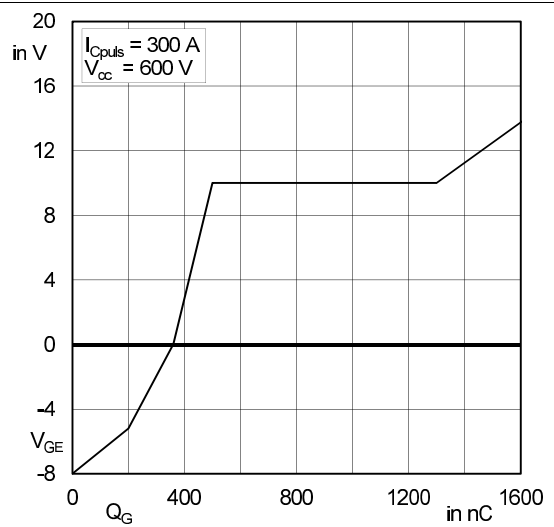
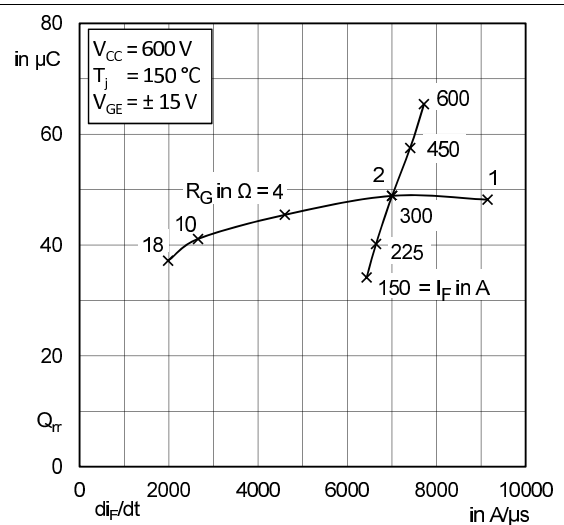
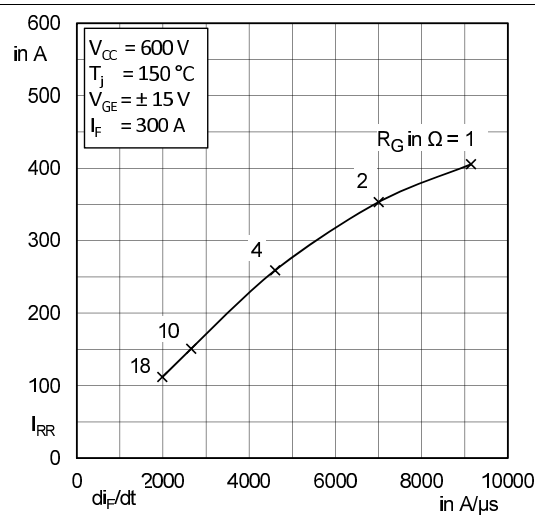
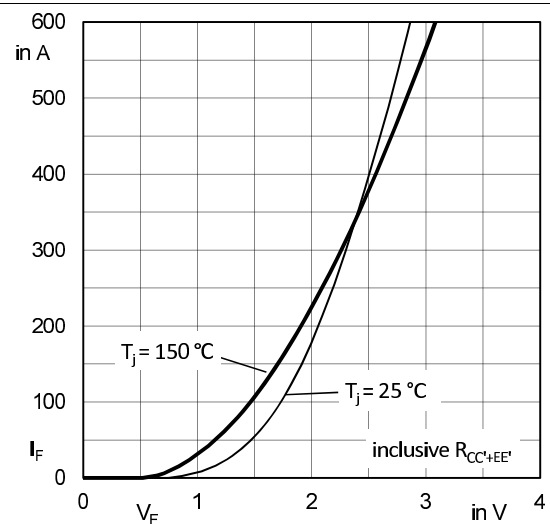
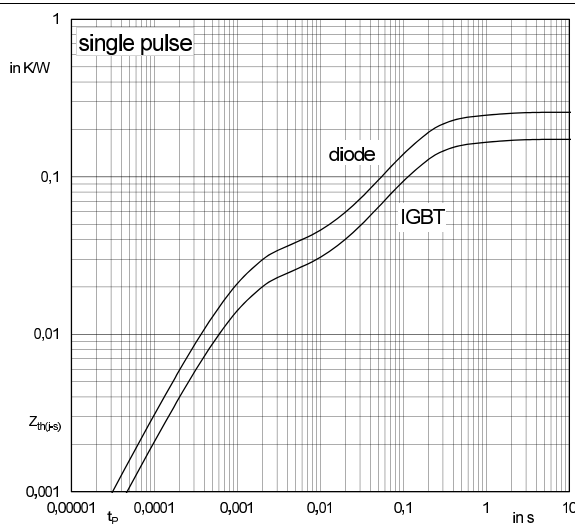
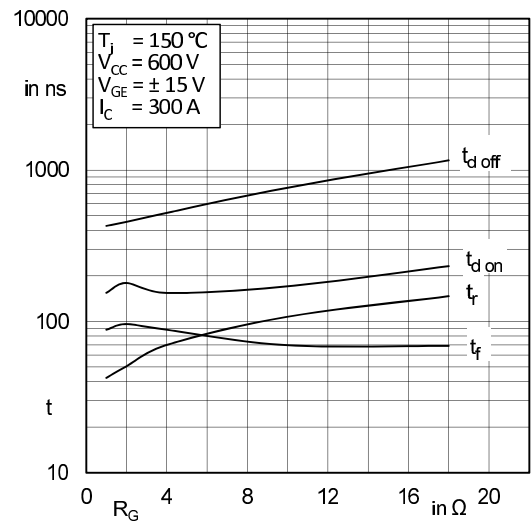
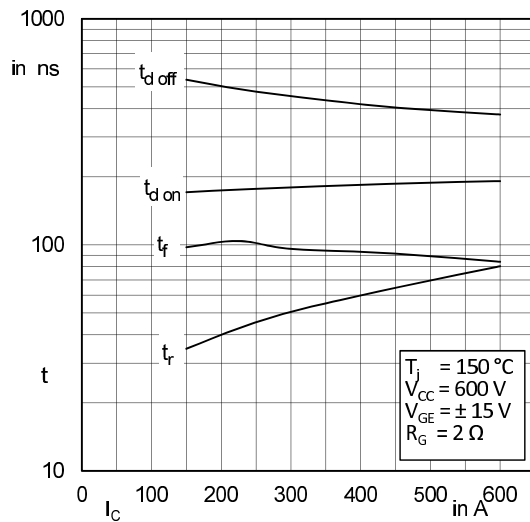
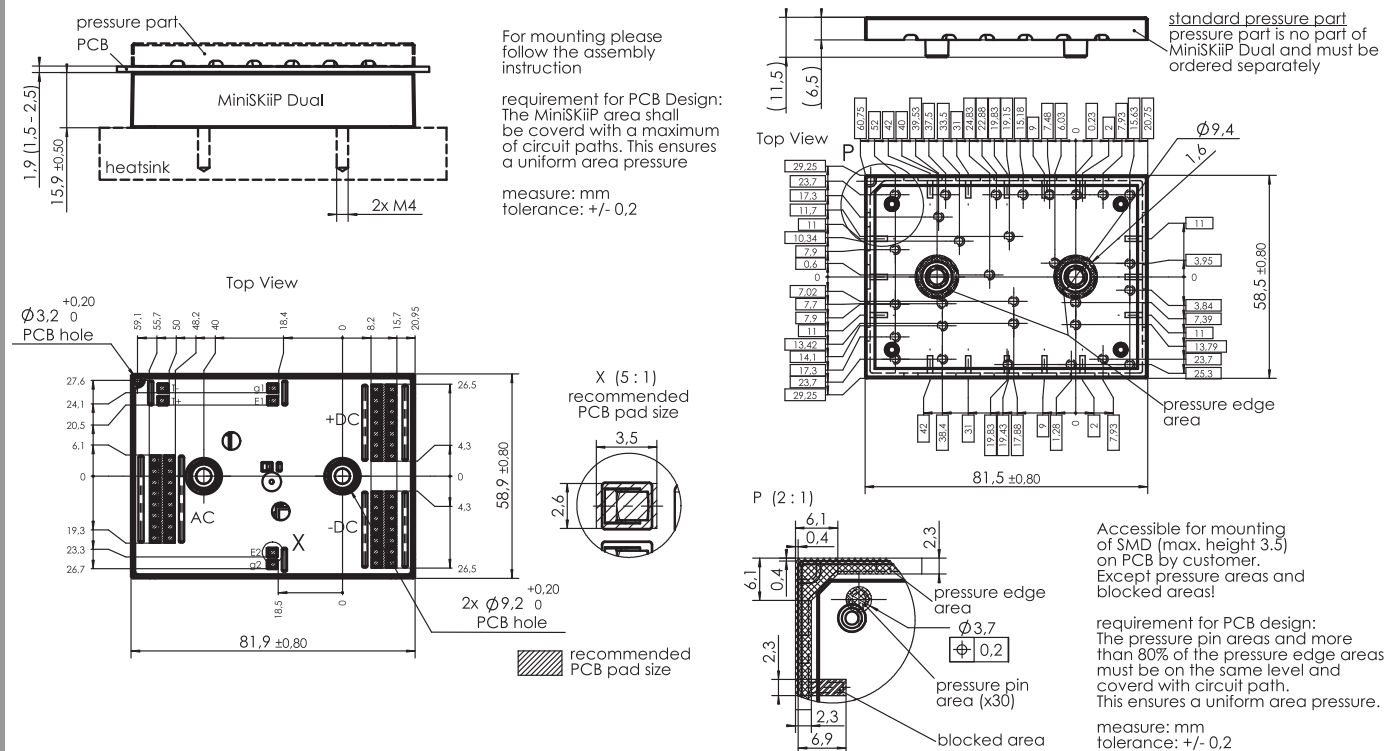
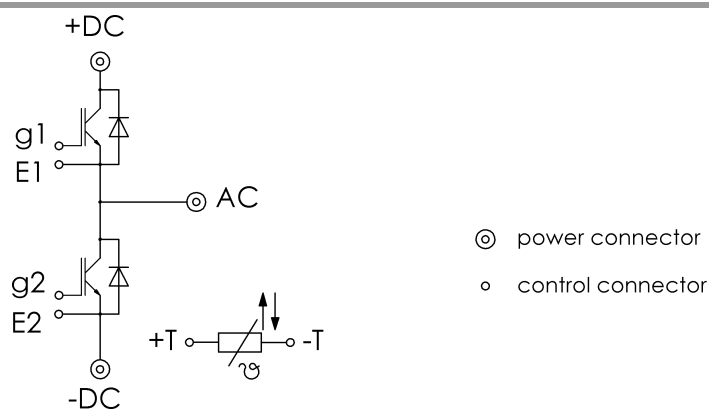


Fig. 6: Typ. gate charge characteristic





pinout, dimensions



pinout

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.