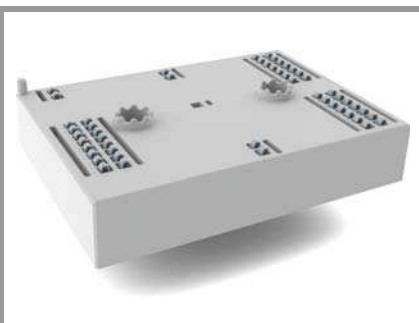


SKiiP 36GB17E4V1



MiniSKiiP® 3 Dual

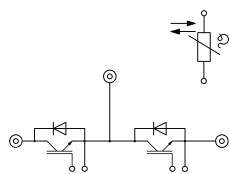
SKiiP 36GB17E4V1

Features

- Trench 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 $T_C=125^\circ\text{C}$
- 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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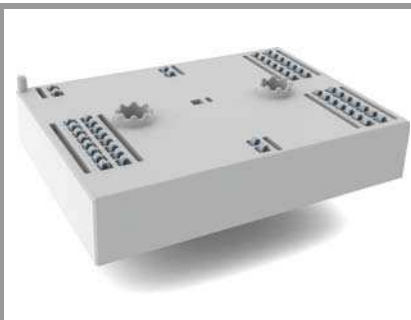
Absolute Maximum Ratings

Symbol	Conditions	Values	Unit
Inverter - IGBT			
V_{CES}	$T_j = 25^\circ\text{C}$	1700	V
I_C	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	224
		$T_s = 70^\circ\text{C}$	182
I_{Cnom}		200	A
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$	600	A
V_{GES}		-20 ... 20	V
t_{psc}	$V_{CC} = 1000\text{ V}$ $V_{GE} \leq 15\text{ V}$ $V_{CES} \leq 1700\text{ V}$	$T_j = 150^\circ\text{C}$	10
T_j		-40 ... 175	$^\circ\text{C}$
Inverse - Diode			
I_F	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	193
		$T_s = 70^\circ\text{C}$	152
I_{Fnom}		200	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	400	A
I_{FSM}	10 ms, sin 180°, $T_j = 150^\circ\text{C}$	1044	A
T_j		-40 ... 175	$^\circ\text{C}$
Module			
$I_{t(RMS)}$	$T_{terminal} = 80^\circ\text{C}$, 20 A per spring	280	A
T_{stg}		-40 ... 125	$^\circ\text{C}$
V_{isol}	AC sinus 50 Hz, $t = 1\text{ min}$	2500	V

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
Inverter - IGBT					
$V_{CE(sat)}$	$I_C = 200\text{ A}$ $V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$	1.90	2.20	V
		$T_j = 150^\circ\text{C}$	2.30	2.60	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	$T_j = 25^\circ\text{C}$	5.5	6.5	m Ω
		$T_j = 150^\circ\text{C}$	8	9	m Ω
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 8\text{ mA}$	5.2	5.8	6.4	V
I_{CES}	$V_{GE} = 0\text{ V}$ $V_{CE} = 1700\text{ V}$	$T_j = 25^\circ\text{C}$	0.1	0.3	mA
					mA
C_{ies}	$V_{CE} = 25\text{ V}$	$f = 1\text{ MHz}$	18.00		nF
C_{oes}	$V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	0.68		nF
C_{res}		$f = 1\text{ MHz}$	0.58		nF
Q_G	- 8 V... + 15 V		1600		nC
R_{Gint}	$T_j = 25^\circ\text{C}$		3.8		Ω
$t_{d(on)}$	$V_{CC} = 900\text{ V}$		250		ns
t_r	$I_C = 200\text{ A}$		46		ns
E_{on}	$R_{G on} = 2\text{ }\Omega$		37		mJ
$t_{d(off)}$	$R_{G off} = 2\text{ }\Omega$		652		ns
t_f	$di/dt_{on} = 5844\text{ A}/\mu\text{s}$		177		ns
E_{off}	$du/dt = 5134\text{ V}/\mu\text{s}$				
	$V_{GE} = +15/-15\text{ V}$ $L_s = 25\text{ nH}$		66		mJ
$R_{th(j-s)}$	per IGBT, $\lambda_{paste} = 0.8\text{ W/K}\cdot\text{m}$		0.23		K/W

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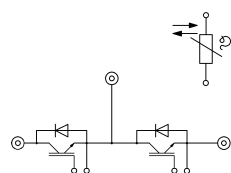
Features

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- Max. case temperature limited to $T_C=125^{\circ}\text{C}$
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse - Diode						
V _F = V _{EC}	I _F = 200 A	T _j = 25 °C		2	2.4	V
	V _{GE} = 0 V chiplevel	T _j = 150 °C		2.2	2.6	V
V _{F0}	chiplevel	T _j = 25 °C		1.3	1.6	V
		T _j = 150 °C		1.1	1.2	V
r _F	chiplevel	T _j = 25 °C		3.4	4.2	mΩ
		T _j = 150 °C		5.4	6.8	mΩ
I _{RRM}	I _F = 200 A			353		A
Q _{rr}	di/dt _{off} = 6748 A/μs			70		μC
E _{rr}	V _{GE} = -15 V			47		mJ
	V _{CC} = 900 V					
R _{th(j-s)}	per Diode, λ _{paste} =0.8 W/K*m			0.32		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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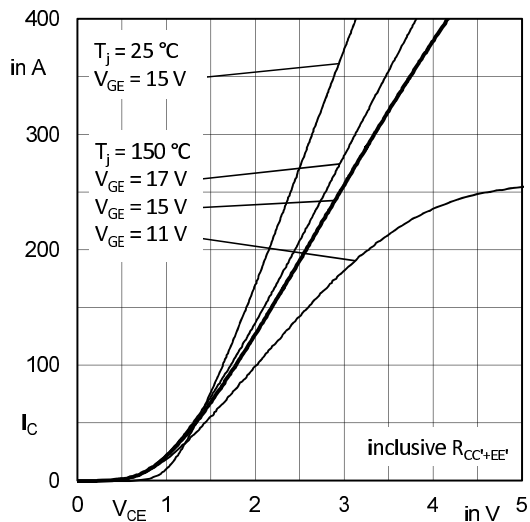


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE'}$

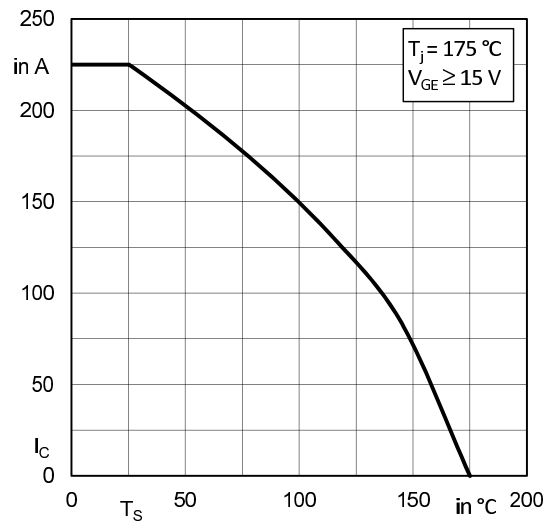


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

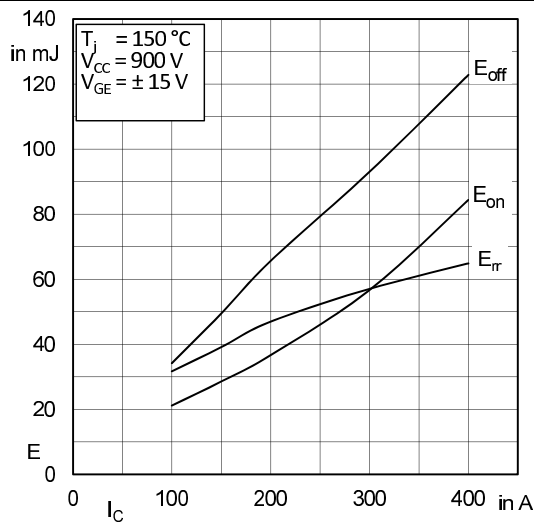


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

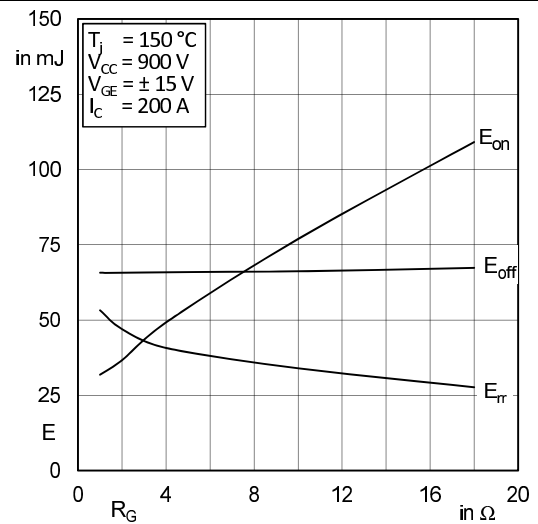


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

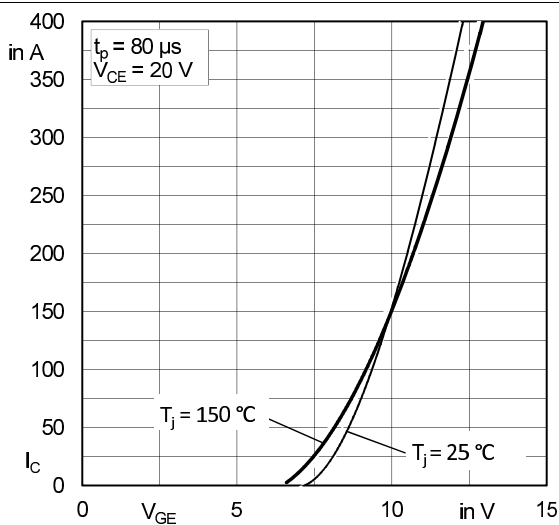


Fig. 5: Typ. transfer characteristic

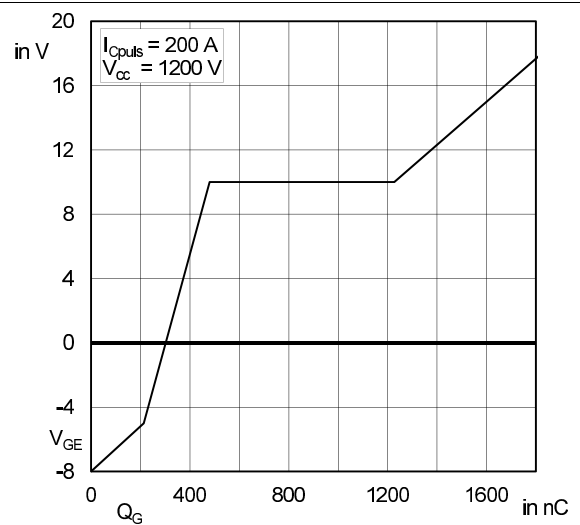


Fig. 6: Typ. gate charge characteristic

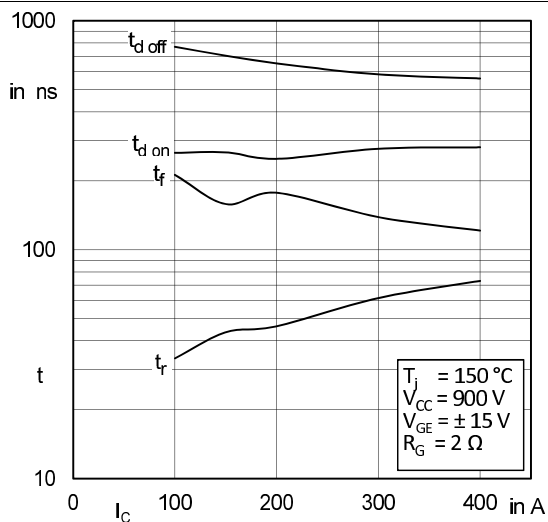


Fig. 7: Typ. switching times vs. I_C

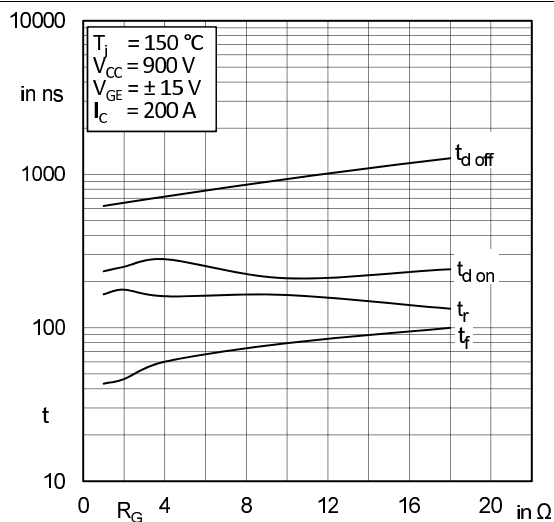


Fig. 8: Typ. switching times vs. gate resistor R_G

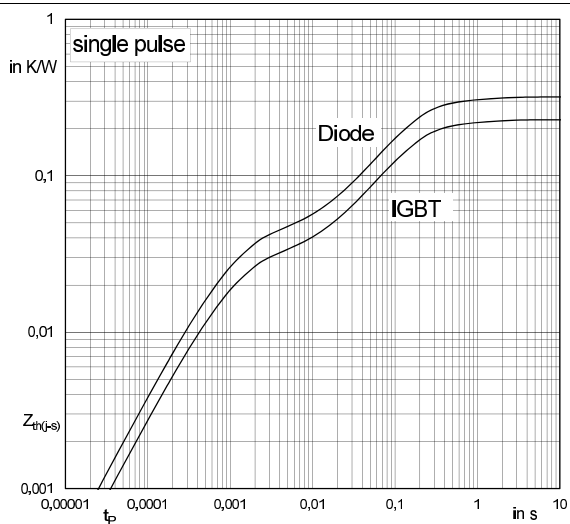


Fig. 9: Transient thermal impedance of IGBT and Diode

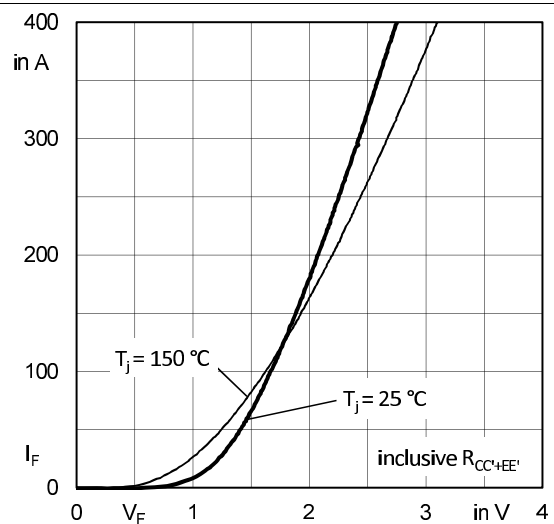


Fig. 10: CAL diode forward characteristic

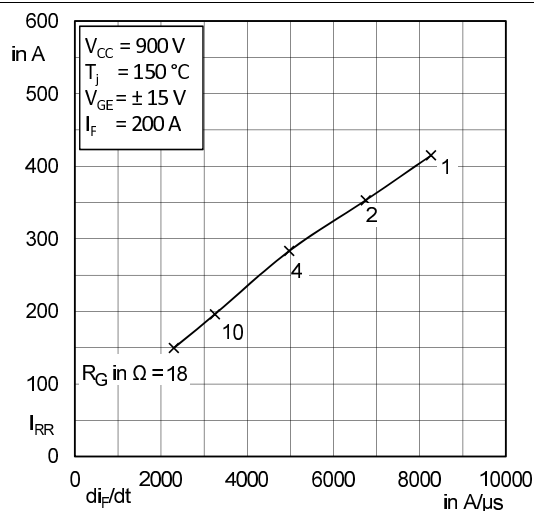


Fig. 11: Typ. CAL diode peak reverse recovery current

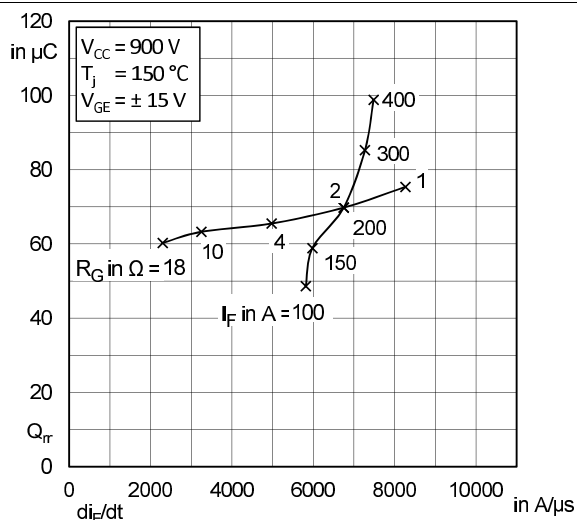
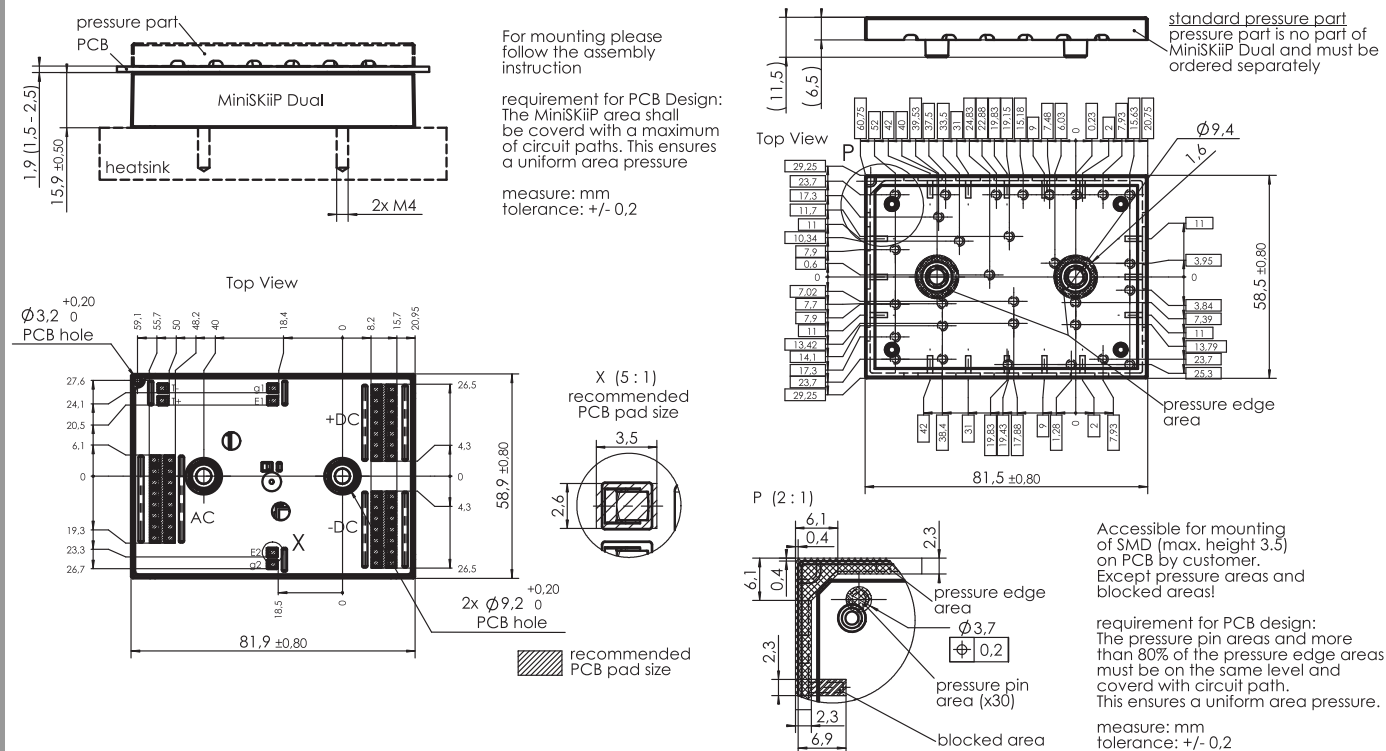
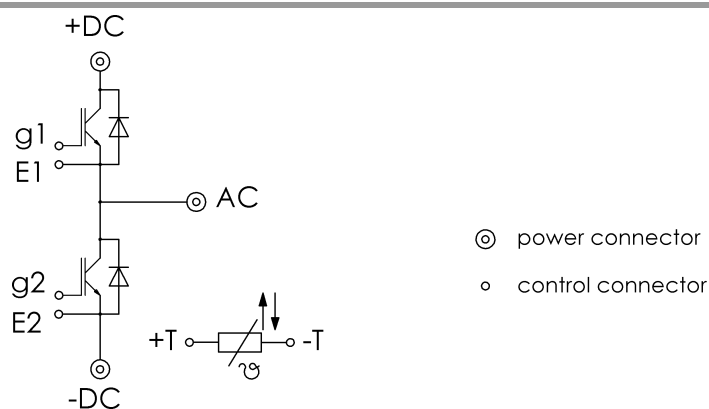


Fig. 12: Typ. CAL diode recovery charge



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.