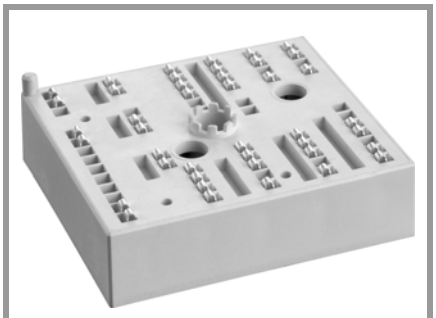
SKiiP 25AC12T4V25



MiniSKiiP® 2

Sixpack

SKiiP 25AC12T4V25

Features*

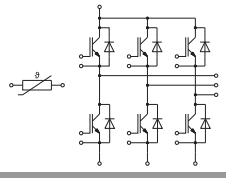
- Trench 4 IGBTs
- Robust and soft switching freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognized: File no. E63532

Typical Applications

- Inverter up to 26 kVA
- Typical motor power 15 kW

Remarks

- V_{CEsat} , V_F= chip level value
- Case temp. limited to T_C = 125°C max. (for baseplateless modules $T_C = T_S$)
- product rel. results valid for $T_j \leq 150$ (recomm. T_{op} = -40 … +150°C)
- Dynamic test results for V_{cc} = 600V, $R_{Gon/off}$ = 12Ω, I_c = 50A, V_{GE} = ±15V: E_{on} = 5.6mJ, E_{off} = 6.1mJ, E_{rr} = 3.3mJ, di/dt_{on} = 1440A/µs, t_{don} = 58ns, t_r = 43ns, di/dt_{off} = 600A/µs, t_{doff} = 370ns, t_f = 65ns



AC

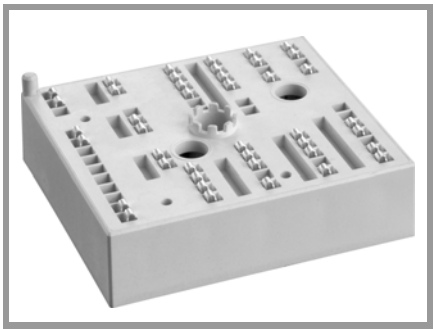
Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
Inverter - IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	λ_{paste}=0.8 W/(mK)	T_s = 25 °C	68	A
	T_j = 175 °C	T_s = 70 °C	55	A
I_C	λ_{paste}=2.5 W/(mK)	T_s = 25 °C	t.b.d.	A
	T_j = 175 °C	T_s = 70 °C	t.b.d.	A
I_{Cnom}			50	A
I_{CRM}			150	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 800 V $V_{GE} \leq$ 15 V $V_{CES} \leq$ 1200 V	T_j = 150 °C	10	µs
T_j			-40 ... 175	°C
Inverse - Diode				
V_{RRM}	T_j = 25 °C		1200	V
I_F	λ_{paste}=0.8 W/(mK)	T_s = 25 °C	60	A
	T_j = 175 °C	T_s = 70 °C	48	A
I_F	λ_{paste}=2.5 W/(mK)	T_s = 25 °C	t.b.d.	A
	T_j = 175 °C	T_s = 70 °C	t.b.d.	A
I_{FRM}			100	A
I_{FSM}	t_p = 10 ms, sin 180°, T_j = 150 °C		270	A
T_j			-40 ... 175	°C
Module				
$I_{t(RMS)}$	$T_{terminal}$ = 80 °C, 20 A per spring		60	A
T_{stg}	module without TIM		-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 = 50 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.85	2.10	V
		T_j = 150 °C		2.20	2.40	V
V_{CE0}	chiplevel	T_j = 25 °C		0.80	0.90	V
		T_j = 150 °C		0.70	0.80	V
r_{CE}	V_{GE} = 15 V chiplevel	T_j = 25 °C		21	24	mΩ
		T_j = 150 °C		30	32	mΩ
$V_{GE(th)}$	$V_{GE} = V_{CE}$, I_C = 1.7 mA		5	5.8	6.5	V
I_{CES}	V_{GE} = 0 V, V_{CE} = 1200 V, T_j = 25 °C				1	mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		2.77		nF
C_{oes}		f = 1 MHz		0.21		nF
C_{res}		f = 1 MHz		0.16		nF
Q_G	V_{GE} = - 8 V...+ 15 V			283		nC
R_{Gint}	T_j = 25 °C			4.0		Ω
$t_{d(on)}$	V_{CC} = 800 V I_C = 22 A $R_{G\ on}$ = 12 Ω $R_{G\ off}$ = 1 Ω di/dt_{on} = 1640 A/µs di/dt_{off} = 320 A/µs V_{GE} = +15/0 V	T_j = 150 °C		45		ns
t_r		T_j = 150 °C		19		ns
E_{on}		T_j = 150 °C		3.4		mJ
$t_{d(off)}$		T_j = 150 °C		480		ns
t_f		T_j = 150 °C		44		ns
E_{off}		T_j = 150 °C		3.1		mJ
$R_{th(j-s)}$	per IGBT, λ_{paste}=0.8 W/(mK)			0.71		K/W
$R_{th(j-s)}$	per IGBT, λ_{paste}=2.5 W/(mK)			t.b.d.		K/W

SKiiP 25AC12T4V25



MiniSKiiP® 2

Sixpack

SKiiP 25AC12T4V25

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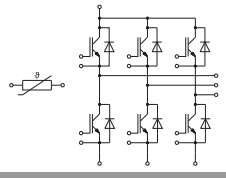


AC

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Inverse - Diode						
$V_F = V_{EC}$	I_F = 50 A V_{GE} = 0 V chiplevel	T_j = 25 °C		2.22	2.54	V
		T_j = 150 °C		2.18	2.50	V
V_{F0}	chiplevel	T_j = 25 °C		1.30	1.50	V
		T_j = 150 °C		0.90	1.10	V
r_F	chiplevel	T_j = 25 °C		18	21	mΩ
		T_j = 150 °C		26	28	mΩ
I_{RRM}	I_F = 22 A di/dt_{off} = 1680 A/µs V_{GE} = +15/0 V V_{CC} = 800 V	T_j = 150 °C		0		A
Q_{rr}		T_j = 150 °C		5.5		µC
E_{rr}		T_j = 150 °C		2.9		mJ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/(mK)			0.95		K/W
$R_{th(j-s)}$	per Diode, λ_{paste}=2.5 W/(mK)			t.b.d.		K/W
Module						
L_{CE}				-		nH
M_s	to heat sink		2		2.5	Nm
w				55		g
Temperature Sensor						
R_{100}	T_r=100°C (R_{25}=1000Ω)			1670 ± 3%		Ω
$R_{(T)}$	$R_{(T)}$=1000Ω[1+A(T-25°C)+B(T-25°C)^2] , A = 7.635*10^{-3}°C^{-1}, B = 1.731*10^{-5}°C^{-2}					

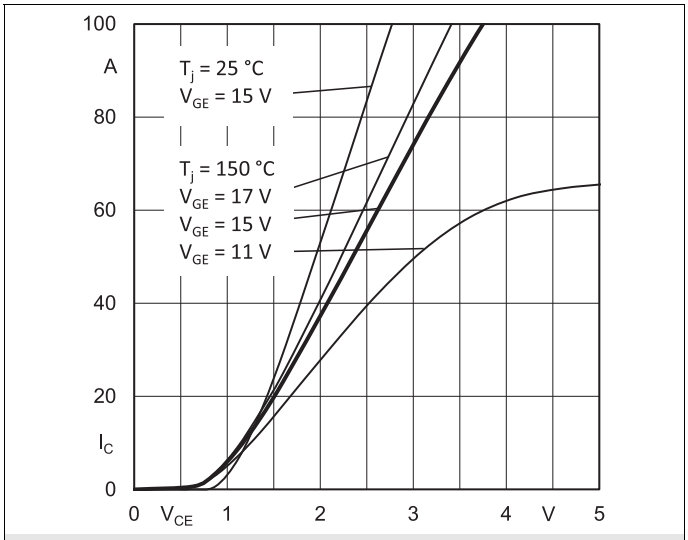


Fig. 1: Typ. output characteristic

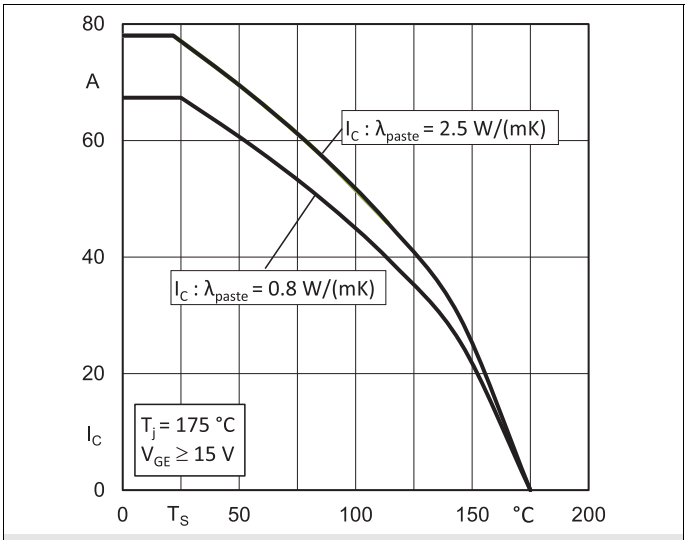


Fig. 2: Rated current vs. temperature Ic = f (Ts)

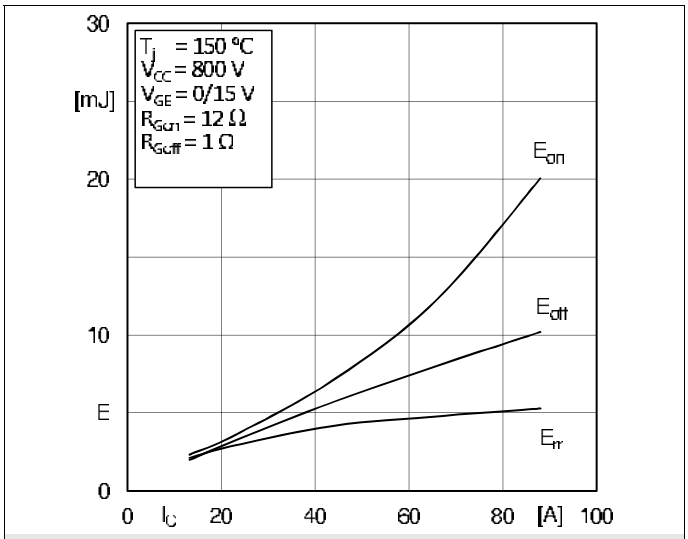


Fig. 3: Typ. turn-on /-off energy = f (I_C)

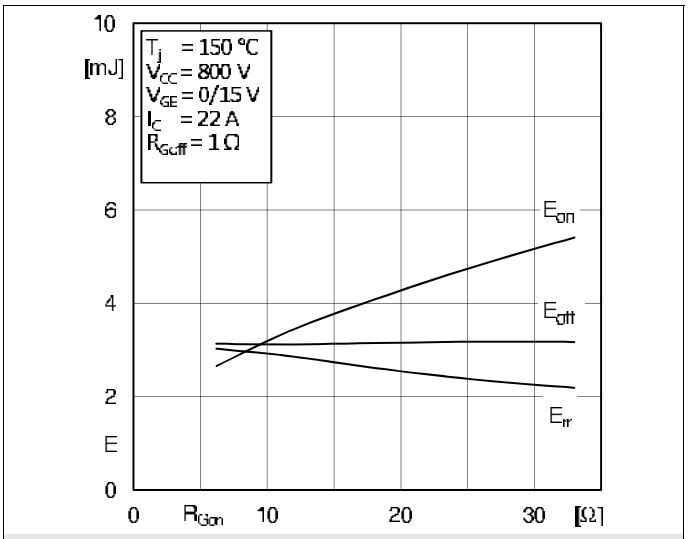


Fig. 4: Typ. turn-on /-off energy = f (R_G)

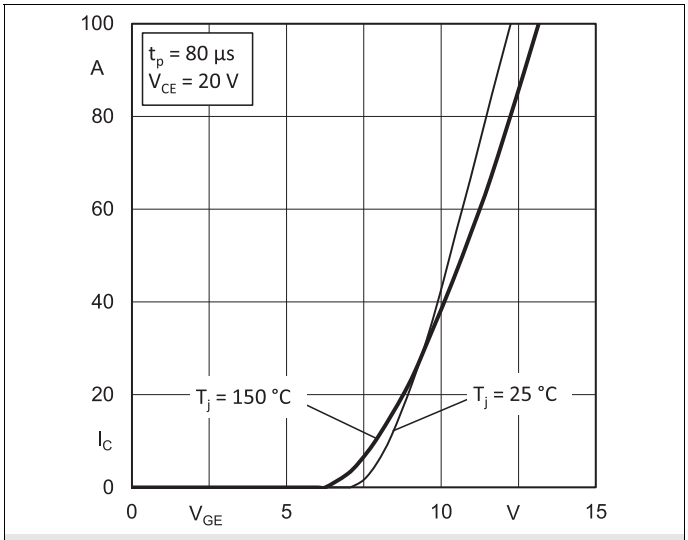


Fig. 5: Typ. transfer characteristic

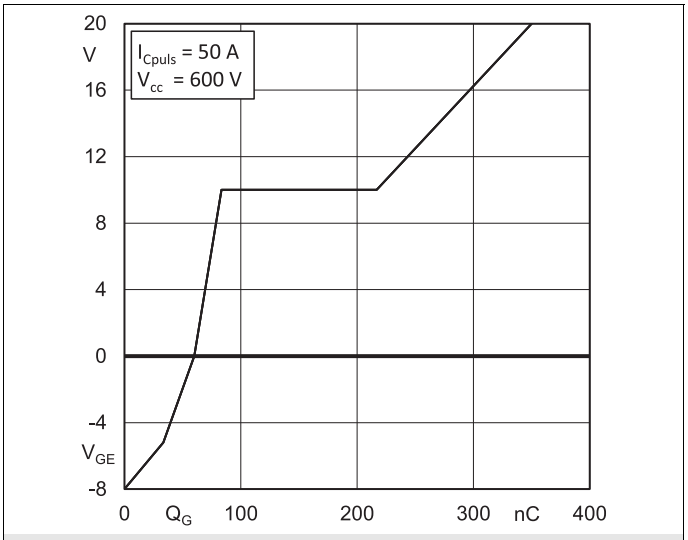


Fig. 6: Typ. gate charge characteristic

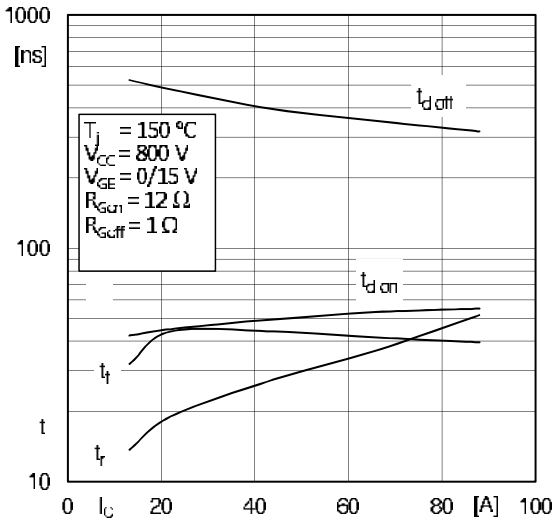


Fig. 7: Typ. switching times vs. I_C

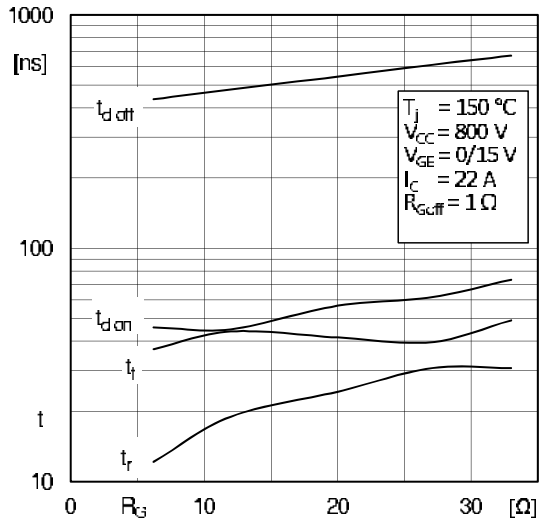


Fig. 8: Typ. switching times vs. gate resistor R_G

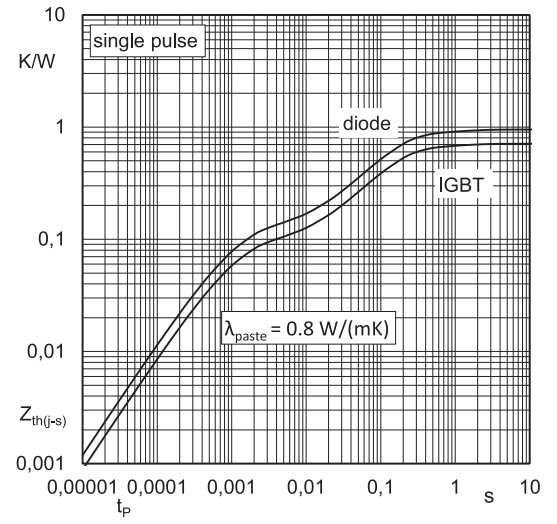


Fig. 9: Typ. transient thermal impedance

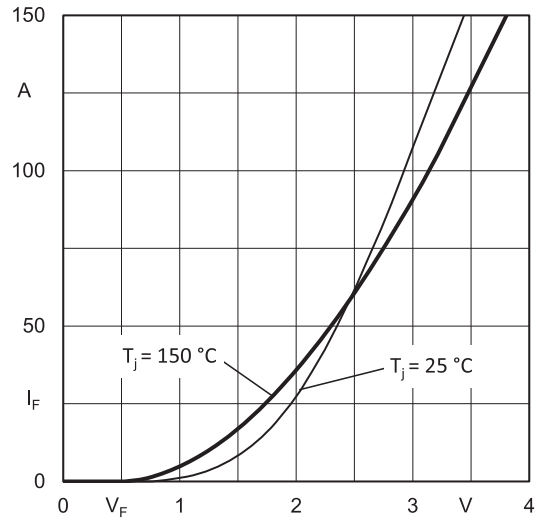


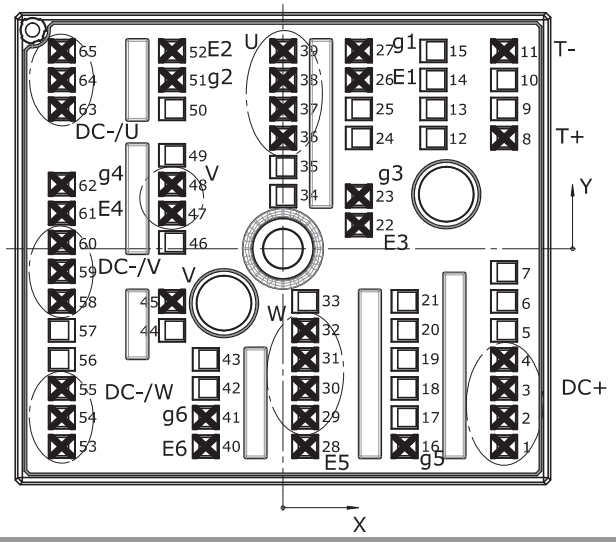
Fig. 10: Typ. CAL diode forward characteristic

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

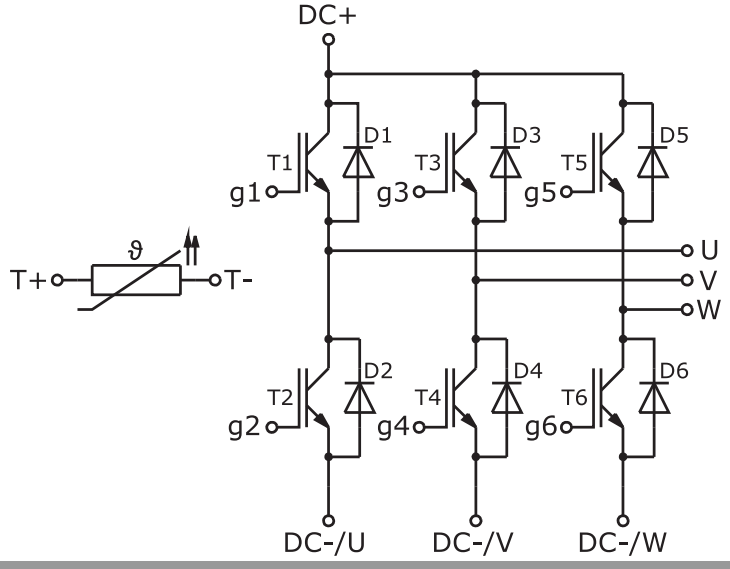
Fig. 12: Typ. CAL diode recovery charge

Pin out											
Pin	*X*	*Y*	*Function*	*Pin*	*X*	*Y*	*Function*	*Pin*	*X*	*Y*	*Function*
1	24,38	-21,80	DC+	23	8,38	5,80	g3	45	-12,23	-5,80	V
2	24,38	-18,60	DC+	24	8,38	12,20		46	-12,23	0,70	
3	24,38	-15,40	DC+	25	8,38	15,40		47	-12,23	3,90	V
4	24,38	-12,20	DC+	26	8,38	18,60	E1	48	-12,23	7,10	V
5	24,38	-9,00		27	8,38	21,80	g1	49	-12,23	10,30	
6	24,38	-5,80		28	2,46	-21,80	E5	50	-12,23	15,40	
7	24,38	-2,60		29	2,46	-18,60	W	51	-12,23	18,60	g2
8	24,38	12,20	T+	30	2,46	-15,40	W	52	-12,23	21,80	E2
9	24,38	15,40		31	2,46	-12,20	W	53	-24,38	-21,80	DC-/W
10	24,38	18,60		32	2,46	-9,00	W	54	-24,38	-18,60	DC-/W
11	24,38	21,80	T-	33	2,46	-5,80		55	-24,38	-15,40	DC-/W
12	16,58	12,20		34	0,03	5,80		56	-24,38	-12,20	
13	16,58	15,40		35	0,03	9,00		57	-24,38	-9,00	
14	16,58	18,60		36	0,03	12,20	U	58	-24,38	-5,80	DC-/V
15	16,58	21,80		37	0,03	15,40	U	59	-24,38	-2,50	DC-/V
16	13,42	-21,80	g5	38	0,03	18,60	U	60	-24,38	0,70	DC-/V
17	13,42	-18,60		39	0,03	21,80	U	61	-24,38	3,90	E4
18	13,42	-15,40		40	-8,51	-21,80	E6	62	-24,38	7,10	g4
19	13,42	-12,20		41	-8,51	-18,60	g6	63	-24,38	15,40	DC-/U
20	13,42	-9,00		42	-8,51	-15,40		64	-24,38	18,60	DC-/U
21	13,42	-5,80		43	-8,51	-12,20		65	-24,38	21,80	DC-/U
22	8,38	2,60	E3	44	-12,23	-9,00					

all values in mm



Pinout and Dimensions



Pinout

This is an electrostatic discharge sensitive device (ESDS) due to international standard IEC 61340.

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