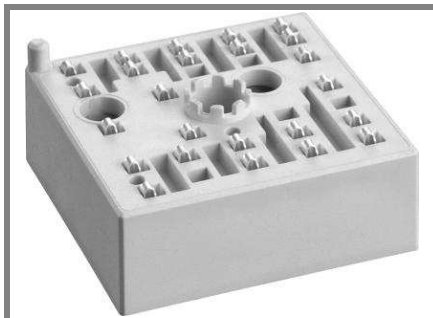


# SKiiP 12HEB066V1



MiniSKiiP<sup>®</sup>1

1-phase half controlled bridge rectifier + brake chopper + 3-phase bridge inverter

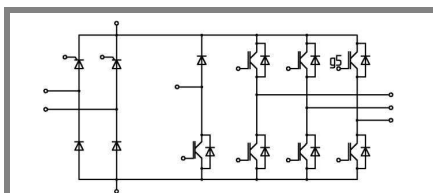
SKiiP 12HEB066V1

## Features

- Trench IGBTs
- Robust and soft freewheeling diode in CAL technology
- Highly reliable spring contacts for electrical connection
- UL recognised file no. E63532

## Remarks

- Case temperature limited to  $T_C = 125^\circ\text{C}$  max.
- Product reliability results are valid for  $T_j = 150^\circ\text{C}$
- SC data:  $t_p \leq 6 \text{ s}$ ;  $V_{GE} \leq 15 \text{ V}$ ;  $T_j = 150^\circ\text{C}$ ;  $V_{CC} = 360 \text{ V}$
- $V_{CEsat}$ ,  $V_F$ ,  $V_T$  = chip level value

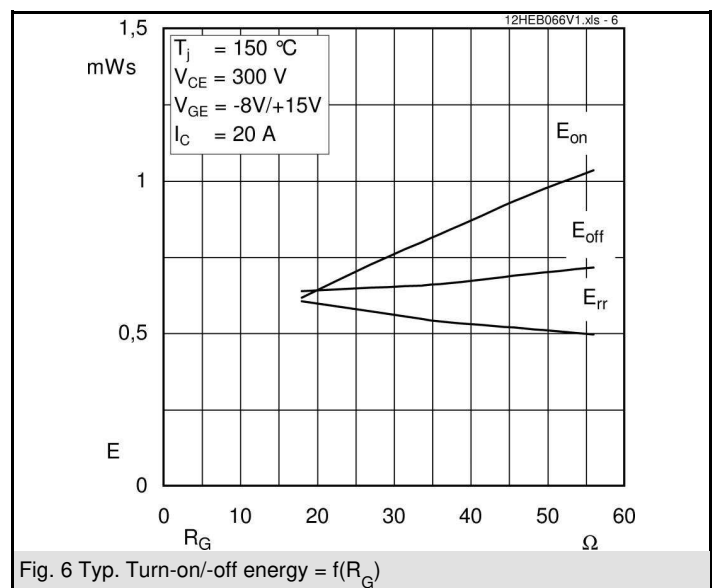
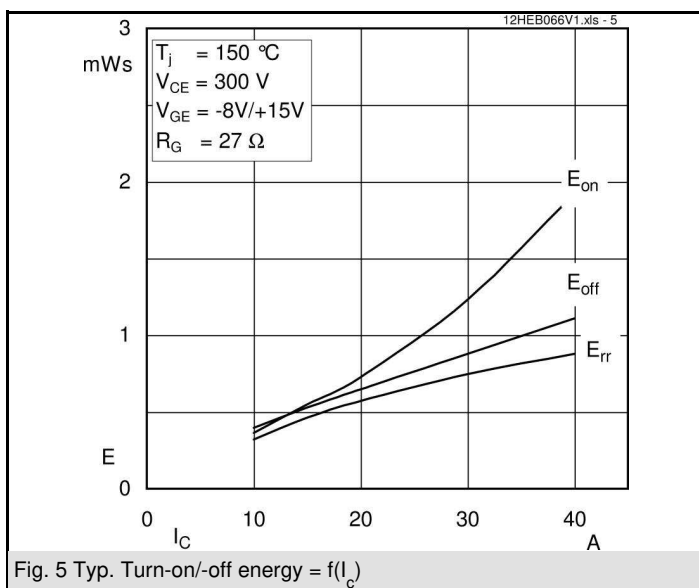
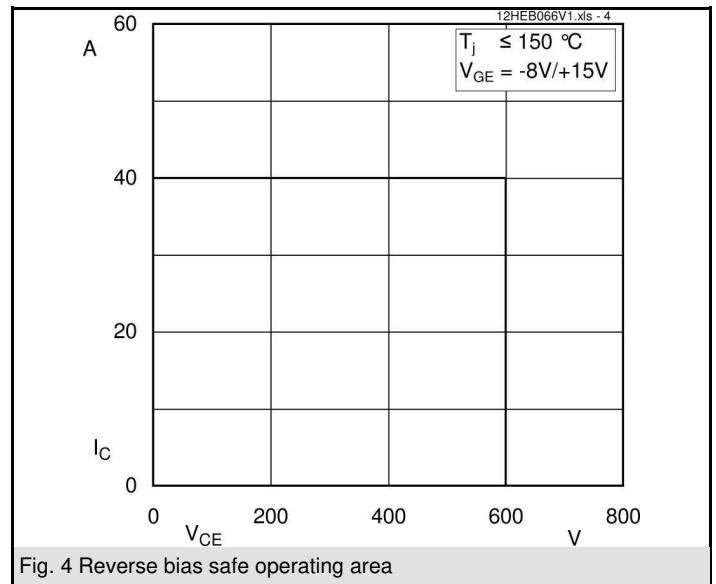
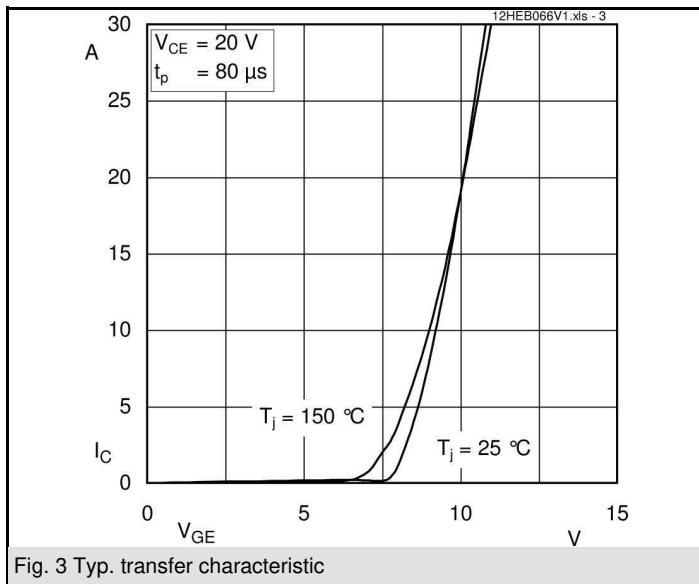
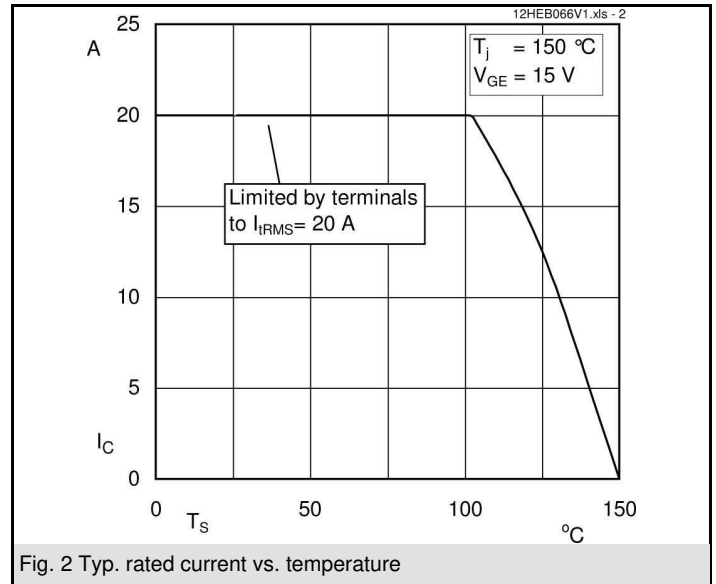
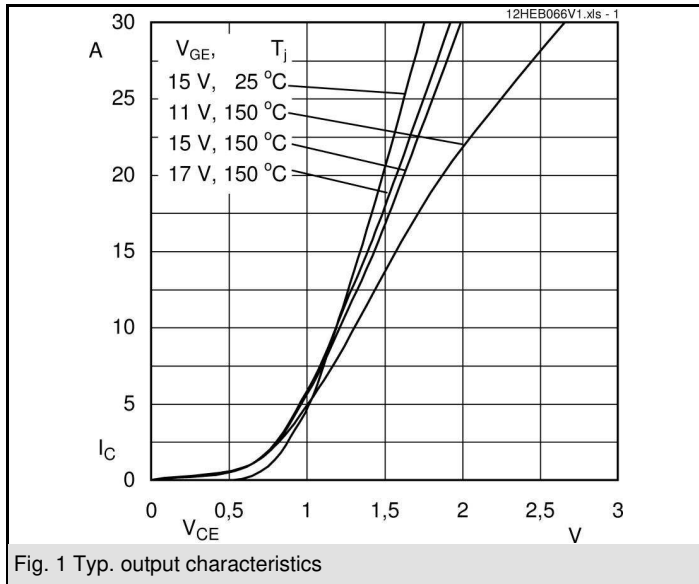


HEB

Absolute Maximum Ratings		$T_S = 25^\circ\text{C}$ , unless otherwise specified	
Symbol	Conditions	Values	Units
<b>IGBT - Inverter, Chopper</b>			
$V_{CES}$		600	V
$I_C$	$T_S = 25 (70)^\circ\text{C}$ , $T_j = 150^\circ\text{C}$	30 (21)	A
$I_C$	$T_S = 25 (70)^\circ\text{C}$ , $T_j = 175^\circ\text{C}$	33 (25)	A
$I_{CRM}$	$t_p = 1 \text{ ms}$	40	A
$V_{GES}$		$\pm 20$	V
$T_j$		-40...+175	$^\circ\text{C}$
<b>Diode - Inverter, Chopper</b>			
$I_F$	$T_S = 25 (70)^\circ\text{C}$ , $T_j = 150^\circ\text{C}$	33 (22)	A
$I_F$	$T_S = 25 (70)^\circ\text{C}$ , $T_j = 175^\circ\text{C}$	39 (29)	A
$I_{FRM}$	$t_p = 1 \text{ ms}$	40	A
$T_j$		-40...+175	$^\circ\text{C}$
<b>Diode / Thyristor - Rectifier</b>			
$V_{RRM}$		800	V
$I_F / I_T$	$T_S = 70$	46 / 45	A
$I_{FSM} / I_{TSM}$	$t_p = 10 \text{ ms}$ , $\sin 180^\circ$ , $T_j = 25^\circ\text{C}$	370 / 340	A
$i^2t$	$t_p = 10 \text{ ms}$ , $\sin 180^\circ$ , $T_j = 25^\circ\text{C}$	575	$\text{A}^2\text{s}$
$T_j$	Diode	-40...+150	$^\circ\text{C}$
$T_j$	Thyristor	-40...+125	$^\circ\text{C}$
$I_{tRMS}$	per power terminal (20 A / spring)	20	A
$T_{stg}$	$T_{op} \leq T_{stg}$	-40...+125	$^\circ\text{C}$
$V_{isol}$	AC, 1 min.	2500	V

Characteristics		$T_S = 25^\circ\text{C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT - Inverter, Chopper</b>					
$V_{CEsat}$	$I_{Cnom} = 20 \text{ A}$ , $T_j = 25 (150)^\circ\text{C}$	1,1	1,45 (1,65)	1,85 (2,05)	V
$V_{GE(th)}$	$V_{GE} = V_{CE}$ , $I_C = 1 \text{ mA}$		5,8		V
$V_{CE(TO)}$	$T_j = 25 (150)^\circ\text{C}$		0,9 (0,85)	1 (0,9)	V
$r_T$	$T_j = 25 (150)^\circ\text{C}$		30 (42,5)	45 (60)	m $\Omega$
$C_{res}$	$V_{CE} = 25 \text{ V}$ , $V_{GE} = 0 \text{ V}$ , $f = 1 \text{ MHz}$		1,13		nF
$C_{oes}$	$V_{CE} = 25 \text{ V}$ , $V_{GE} = 0 \text{ V}$ , $f = 1 \text{ MHz}$		0,25		nF
$C_{res}$	$V_{CE} = 25 \text{ V}$ , $V_{GE} = 0 \text{ V}$ , $f = 1 \text{ MHz}$		0,18		nF
$R_{CC+EE'}$	spring contact-chip $T_S = 25 (150)^\circ\text{C}$				m $\Omega$
$R_{th(j-s)}$	per IGBT		1,6		K/W
$t_{d(on)}$	under following conditions		30		ns
$t_r$	$V_{CC} = 300 \text{ V}$ , $V_{GE} = -8\text{V}/+15\text{V}$		25		ns
$t_{d(off)}$	$I_{Cnom} = 20 \text{ A}$ , $T_j = 150^\circ\text{C}$		265		ns
$t_f$	$R_{Gon} = R_{Goff} = 27 \Omega$		50		ns
$E_{on} (E_{off})$	inductive load		0,8 (0,7)		mJ
<b>Diode - Inverter, Chopper</b>					
$V_F = V_{EC}$	$I_{Fnom} = 30 \text{ A}$ , $T_j = 25 (150)^\circ\text{C}$		1,5 (1,5)	1,7 (1,7)	V
$V_{(TO)}$	$T_j = 25 (150)^\circ\text{C}$		1 (0,9)	1,1 (1)	V
$r_T$	$T_j = 25 (150)^\circ\text{C}$		16,7 (20)	20 (23,3)	m $\Omega$
$R_{th(j-s)}$	per diode		2,1		K/W
$I_{RRM}$	under following conditions		25,1		A
$Q_{rr}$	$I_{Fnom} = 20 \text{ A}$ , $V_R = 300 \text{ V}$		2,6		C
$E_{rr}$	$V_{GE} = 0 \text{ V}$ , $T_j = 150^\circ\text{C}$		0,6		mJ
	$di_F/dt = 980 \text{ A/s}$				

Characteristics		$T_S = 25^\circ\text{C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>Diode - Rectifier</b>					
$V_F$	$I_{Fnom} = 25\text{ A}, T_j = 25^\circ\text{C}$		1,1		V
$V_{(TO)}$	$T_j = 150^\circ\text{C}$		0,8		V
$r_T$	$T_j = 150^\circ\text{C}$		13		m $\Omega$
$R_{th(j-s)}$	per diode		1,25		K/W
<b>Thyristor - Rectifier</b>					
$V_T$	$I_{Fnom} = 25\text{ A}, T_j = 25\text{ (125)}^\circ\text{C}$			(1,6)	V
$V_{T(TO)}$	$T_j = 125^\circ\text{C}$			1,1	V
$r_T$	$T_j = 125^\circ\text{C}$			20	m $\Omega$
$V_{GT}$	$T_j = 25^\circ\text{C}$			2	V
$I_{GT}$	$T_j = 25^\circ\text{C}$			100	mA
$I_H$	$T_j = 25^\circ\text{C}$		80	150	mA
$I_L$	$T_j = 25^\circ\text{C}$		150	300	mA
$dv/dt_{(cr)}$	$T_j = 125^\circ\text{C}$	500			V/ s
$di/dt_{(cr)}$	$T_j = 125^\circ\text{C}$			100	A/ s
$R_{th(j-s)}$	per thyristor		1,25		K/W
<b>Temperature Sensor</b>					
$R_{ts}$	3 %, $T_r = 25\text{ (100)}^\circ\text{C}$		1000(1670)		$\Omega$
<b>Mechanical Data</b>					
w			35		g
$M_s$	Mounting torque	2		2,5	Nm



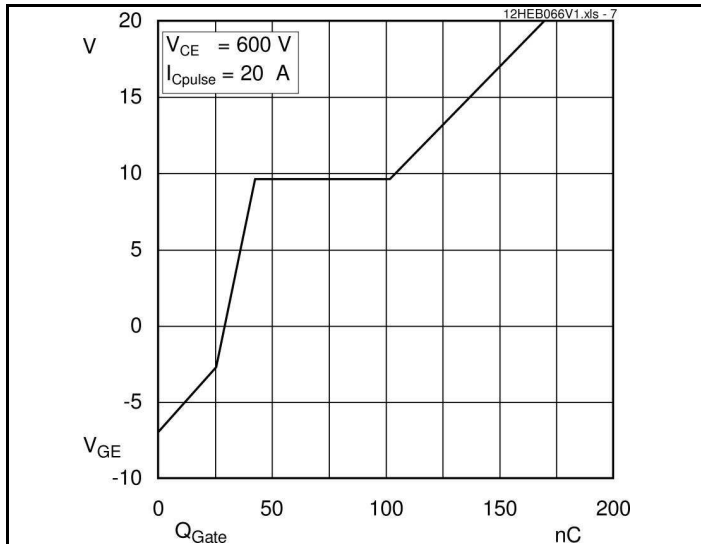


Fig. 7 Typ. gate charge characteristic

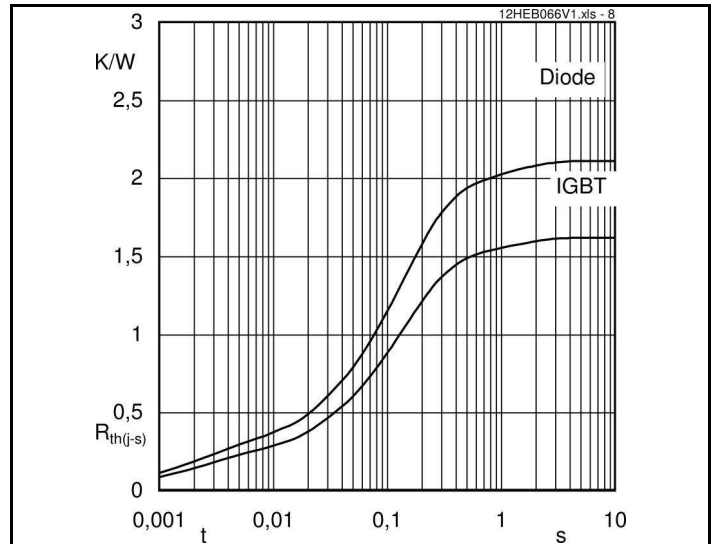


Fig. 8 Typ. thermal impedance

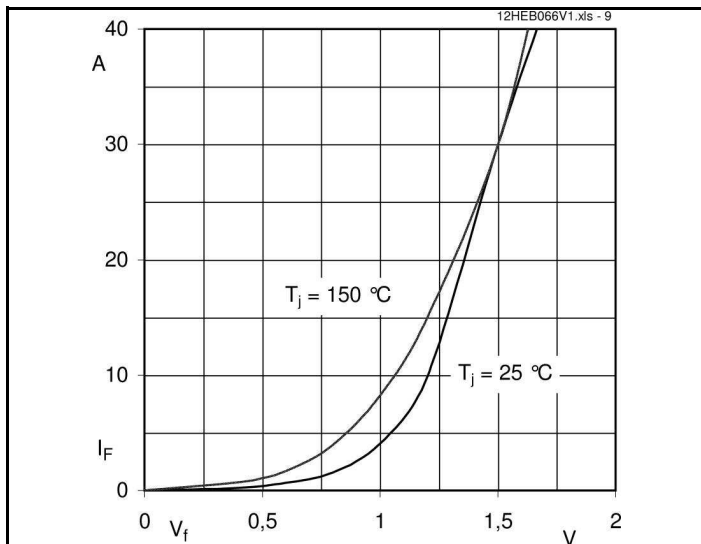


Fig. 9 Typ. freewheeling diode forward characteristic

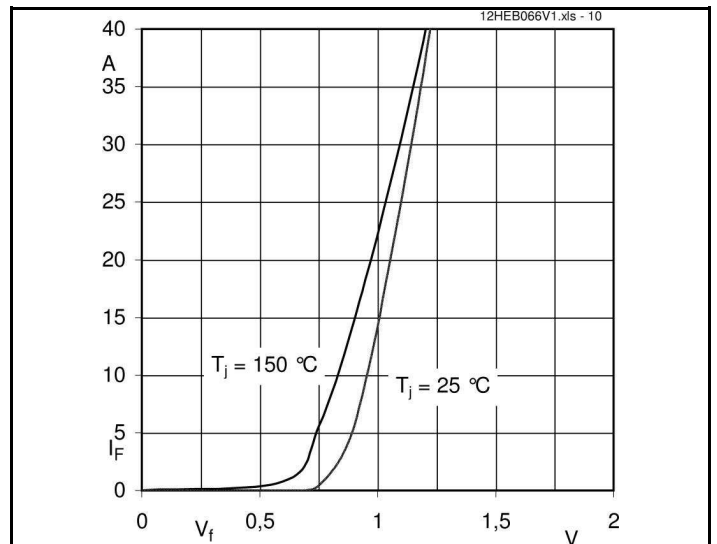


Fig. 10 Typ. input bridge forward characteristic (rect. diode)

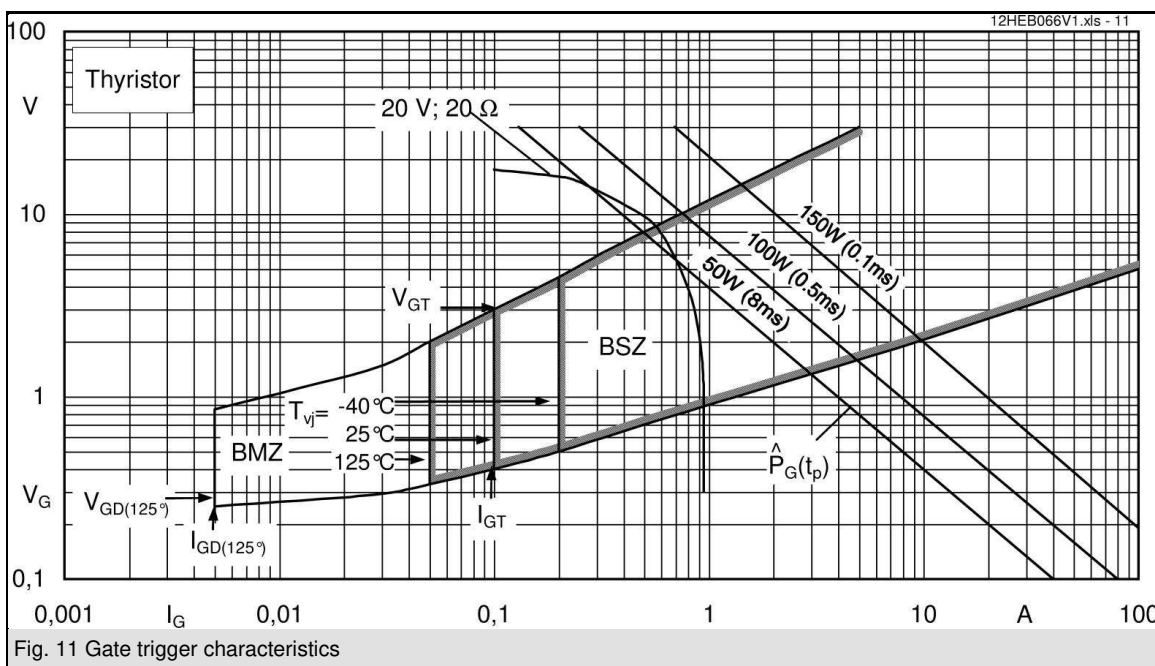


Fig. 11 Gate trigger characteristics



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