

SKiiP 12HEB066V1



MiniSKiiP® 1

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

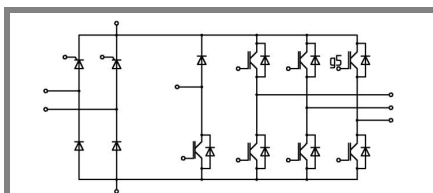
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Features

- 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: $t_p \leq 6 \mu\text{s}$; $V_{GE} \leq 15 \text{ V}$; $T_j = 150^\circ\text{C}$; $V_{CC} = 360 \text{ V}$
- V_{CEsat} , V_F , V_T = chip level value

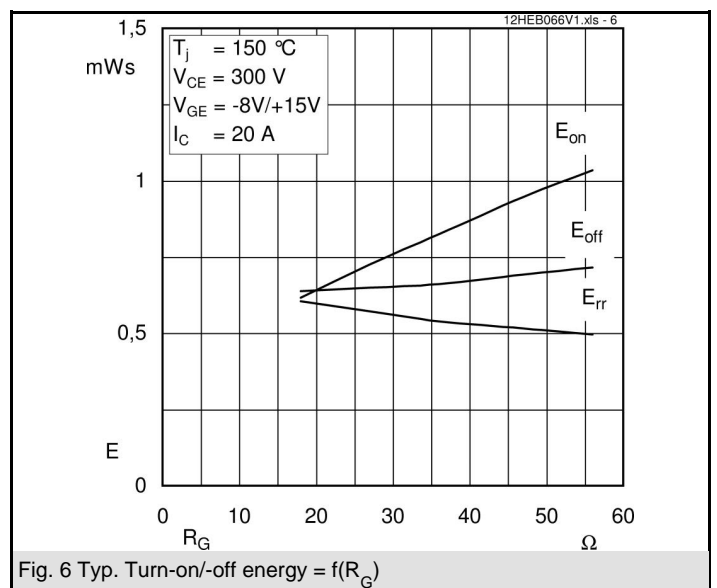
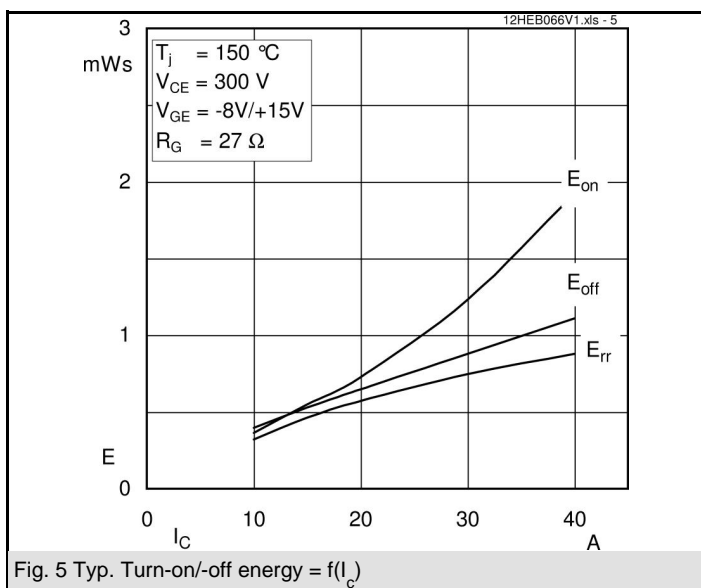
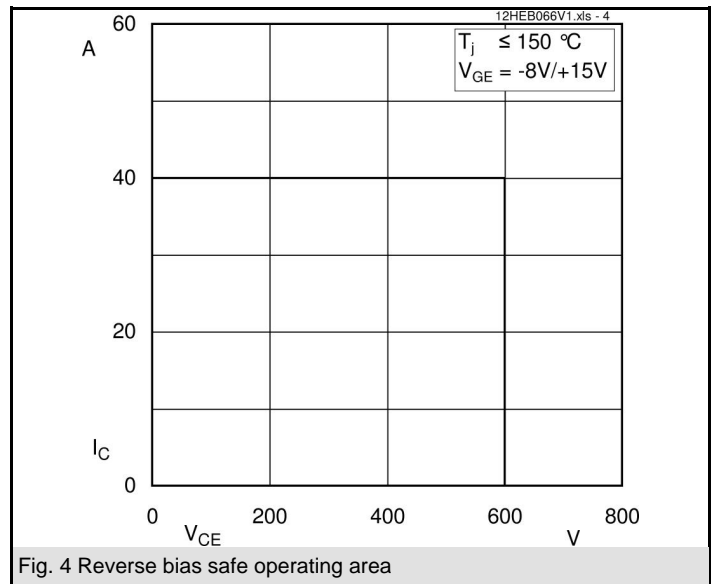
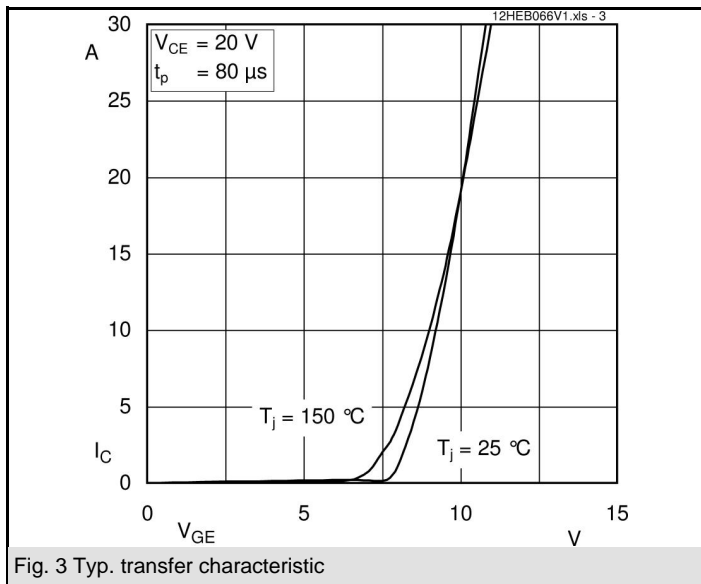
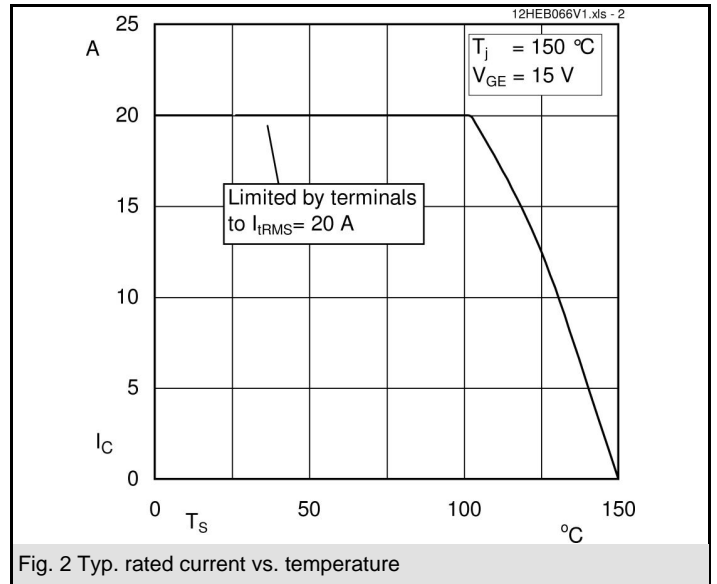
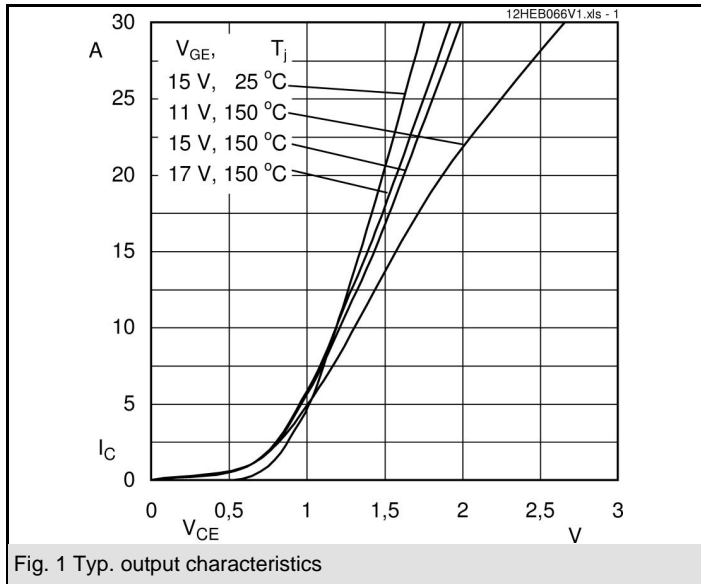


HEB

Absolute Maximum Ratings		$T_S = 25^\circ\text{C}$, unless otherwise specified	
Symbol	Conditions	Values	Units
IGBT - Inverter, Chopper			
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}		± 20	V
T_j		-40...+175	$^\circ\text{C}$
Diode - Inverter, Chopper			
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	$^\circ\text{C}$
Diode / Thyristor - Rectifier			
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	A^2s
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
IGBT - Inverter, Chopper					
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 Ω
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 Ω
$R_{th(j-s)}$	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
Diode - Inverter, Chopper					
$V_F = V_{EC}$	$I_{Fnom} = 30 \text{ A}$, $T_j = 25 (150)^\circ\text{C}$		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 Ω
$R_{th(j-s)}$	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		μC
E_{rr}	$V_{GE} = 0 \text{ V}$, $T_j = 150^\circ\text{C}$		0,6		mJ
	$di_F/dt = 980 \text{ A}/\mu\text{s}$				

Characteristics		$T_S = 25^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
Diode - Rectifier					
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 Ω
$R_{th(j-s)}$	per diode		1,25		K/W
Thyristor - Rectifier					
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 Ω
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/ μs
$di/dt_{(cr)}$	$T_j = 125^\circ\text{C}$			100	A/ μs
$R_{th(j-s)}$	per thyristor		1,25		K/W
Temperature Sensor					
R_{ts}	3 %, $T_r = 25\text{ (100)}^\circ\text{C}$		1000(1670)		Ω
Mechanical Data					
w			35		g
M_s	Mounting torque	2		2,5	Nm



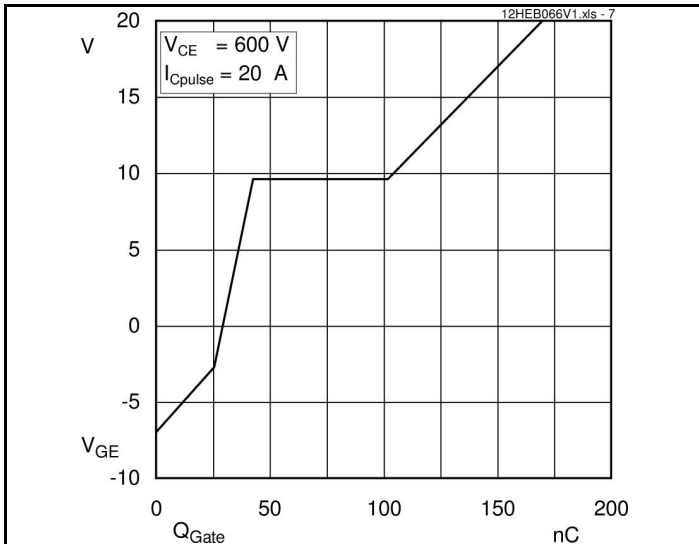


Fig. 7 Typ. gate charge characteristic

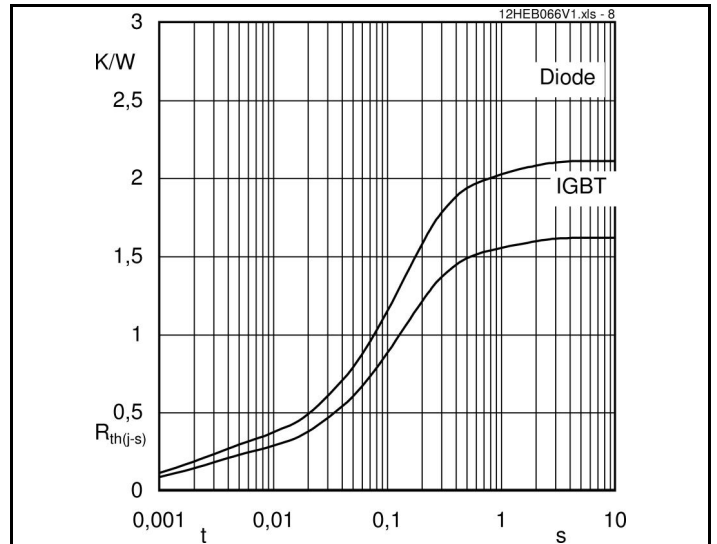


Fig. 8 Typ. thermal impedance

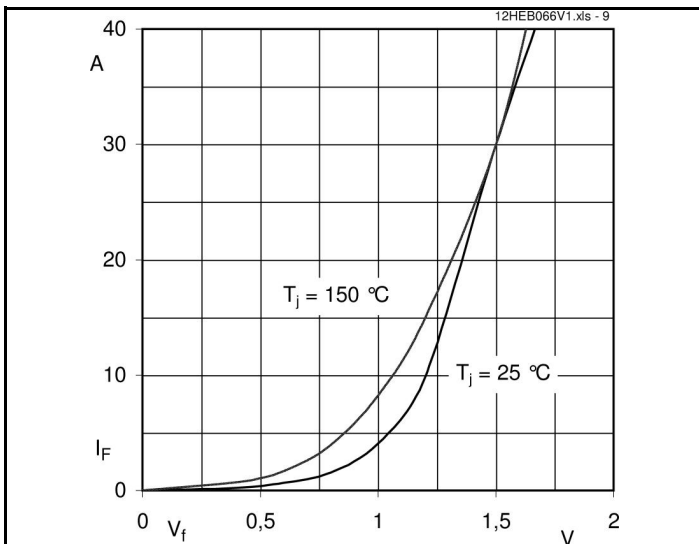


Fig. 9 Typ. freewheeling diode forward characteristic

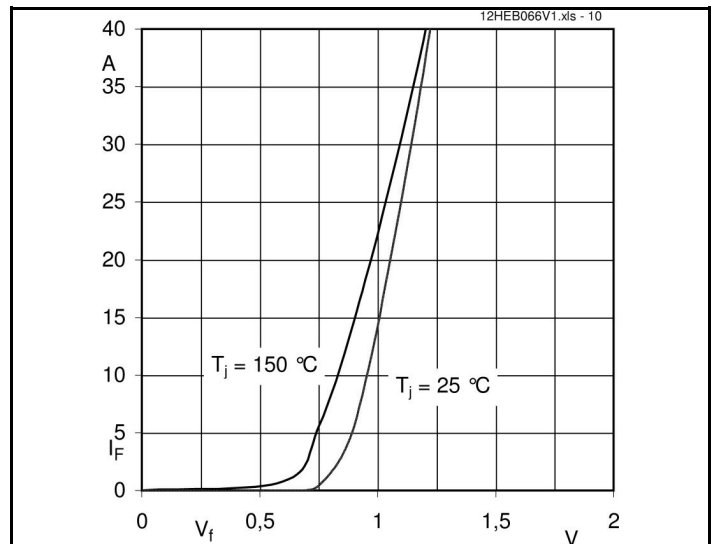


Fig. 10 Typ. input bridge forward characteristic (rect. diode)

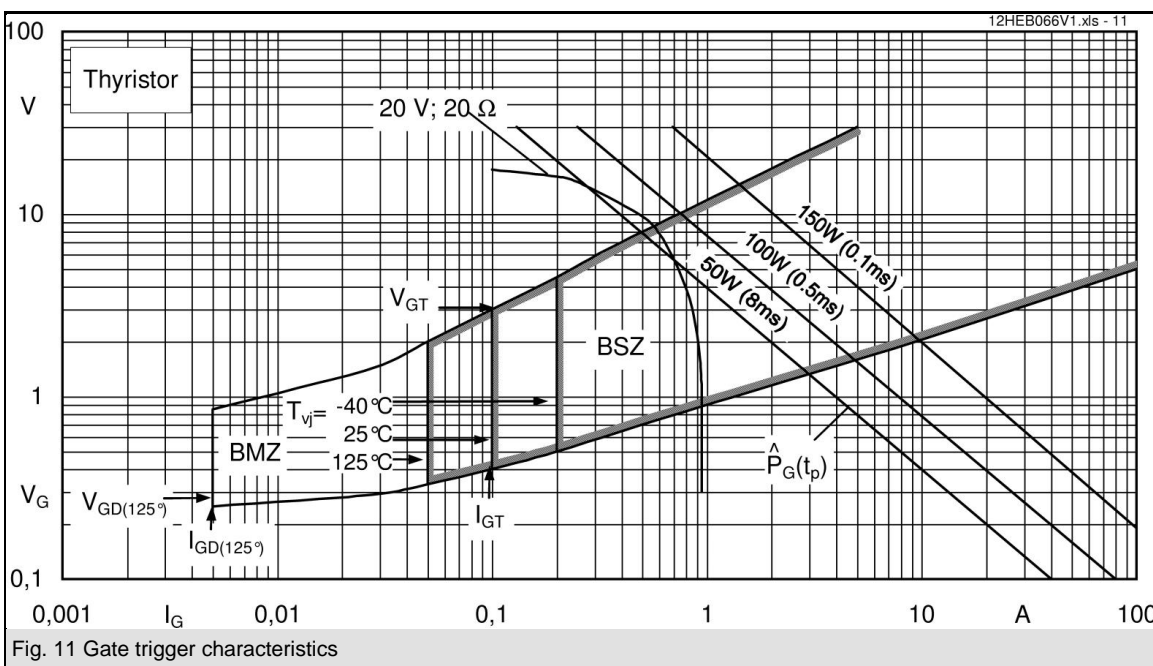


Fig. 11 Gate trigger characteristics

