

Rectifier Module for Power Factor Correction

PSBI 9/06

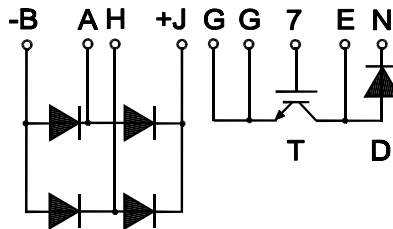
$I_{FAV25} = 15A$
 $V_{RRM} = 1200 V$
 $I_{C25} = 37A$
 $V_{CES} = 600 V$

Preliminary Data Sheet

Fast Single Phase Rectifier
 Ultra Fast Boost Chopper

Typical Rectified Mains Power

$P_n = 900 W$ at $V_n = 110 V$
 $P_n = 2100 W$ at $V_n = 240 V$
 at $V_{DC} = 400 V$, $f_T = 75 kHz$,
 $T_C = 80^\circ C$



Input Rectifier Bridge

Symbol	Test Conditions	Maximum Ratings
V_{RRM}		1200 V
I_{FAV25}	$T_C = 25^\circ C$; 180° sine	15 A
I_{FAV80}	$T_C = 80^\circ C$; 180° sine	10 A
I_{FSM}	$T_{VJ} = 25^\circ C$ t = 10 ms (50 Hz), sine	75 A

Symbol	Test Conditions	Characteristic Value		
		typ.	max.	
I_R	$V_R = V_{RRM}$, $T_{VJ} = 25^\circ C$ $T_{VJ} = 125^\circ C$		0.05	mA
V_F	$I_F = 10A$, $T_{VJ} = 25^\circ C$ $T_{VJ} = 125^\circ C$	1.4	1.8	V
t_{rr}	$V_R = 100 V$, $I_F = 10 A$ -di/dt = 5 A/μs	1		μs
R_{thJC}	per diode		2.5	K/W
R_{thJS}	with heat transfer paste	tbd		K/W

Chopper T

Symbol	Test Conditions	Maximum Ratings
V_{CES}	$T_{VJ} = 25^\circ C$ to $150^\circ C$	600 V
V_{GES}	continuous	±20 V
I_{C25}	$T_C = 25^\circ C$;	37 A
I_{C80}	$T_C = 80^\circ C$;	25 A
RBSOA	$V_{CE} = 600 V$, $R_G = 10 \Omega$, $T_{VJ} = 125^\circ C$ Clamped inductive load, $L = 100 \mu H$	$I_{CM} = 100 A$ $V_{CEK} \leq V_{CES}$
t_{sc}	$V_{CE} = 600 V$, $R_G = 10 \Omega$, $V_{GE} = \pm 15 V$ $T_{VJ} = 125^\circ C$, non-repetitive	10 μs

Features

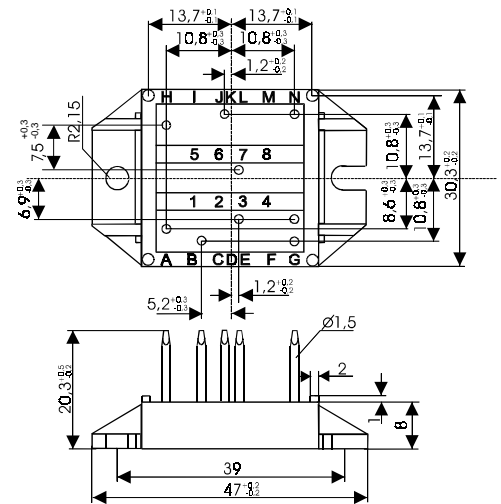
- Package with DCB ceramic base plate and soldering pins for PCB mounting
- Isolation voltage over 3000 V~
- Planar glasspassivated chips
- high level of integration- only one power semiconductor module required for the whole PFC rectifier
- standard PFC control ICs usable
- fast rectifier diodes for enhanced EMC behaviour
- NPT IGBT with low saturation voltage, ultra fast switching capability, high RBSOA and short circuit ruggedness
- internally series connected HiPerFRED free wheeling diode For fast and soft reverse recovery at high switching frequency
- leads suitable for PC board soldering
- UL registered, E 148688

Applications

- single phase rectification with power factor correction (PFC)
- low harmonic content of mains current
- mains current and voltage in phase
- wide input voltage range, controlled output voltage

Symbol	Test Conditions	Characteristic Value		
		typ.	max.	
I_{CES}	$V_{CE} = V_{CES}, V_{GE} = 0 V, T_{VJ} = 25^{\circ}C$		0.04	mA
		$T_{VJ} = 125^{\circ}C$	1	mA
I_{GES}	$V_{CE} = 0 V, V_{GE} = \pm 20 V$		100	nA
$V_{CE(sat)}$	$I_C = 10A, V_{GE} = 15 V, T_{VJ} = 25^{\circ}C$		1.5	V
		$T_{VJ} = 125^{\circ}C$	1.6	V
$V_{GE(th)}$	$I_C = 1mA, V_{GE} = V_{CE}$	min. 3	5	V
$t_{d(on)}$		30		ns
t_r	Inductive load, $T_{VJ} = 125^{\circ}C$	50		ns
$t_{d(off)}$	$V_{CE} = 400 V, I_C = 10A$	320		ns
t_f	$R_G = 10 \Omega, V_{GE} = \pm 15 V$	70		ns
E_{on}		0.60		mJ
E_{off}		0.31		mJ
C_{ies}	$V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz$	1600		pF
Q_{Gon}	$V_{CE} = 480 V, V_{GE} = 15 V, I_C = 10A$	140		nC
R_{thJC}			0.96	K/W
R_{thJS}	with heat transfer paste	tbd		K/W

Package style and outline
Dimensions in mm (1mm = 0.0394")



Chopper D

Symbol	Test Conditions	Maximum Ratings	
V_{RRM}		600	V
I_{F25}	$T_C = 25^{\circ}C; 180^{\circ}$ sine	35	A
I_{F80}	$T_C = 80^{\circ}C; 180^{\circ}$ sine	22	A

Symbol	Test Conditions	Characteristic Value		
		typ.	max.	
I_R	$V_R = V_{RRM}, T_{VJ} = 25^{\circ}C$		0.1	mA
		$T_{VJ} = 125^{\circ}C$	0.1	mA
V_F	$I_F = 10A, T_{VJ} = 25^{\circ}C$		2.2	V
		$T_{VJ} = 125^{\circ}C$		2.4
I_{RM}	$I_F = 10A, -di_f/dt = 400 A/\mu s, T_{VJ} = 125^{\circ}C$	tbd		A
t_{rr}	$V_R = 400 V$	tbd		μs
R_{thJC}			1.15	K/W
R_{thJS}	with heat transfer paste	tbd		K/W

Module

Symbol	Test Conditions	Maximum Ratings	
T_{VJ}		-40...+150	$^{\circ}C$
T_{stg}		-40...+125	$^{\circ}C$
V_{ISOL}	$I_{ISOL} \leq 1 mA, 50/60 Hz, t = 1 min$	3000	V~
M_D	Mounting torque (M4)	1.5-1.8	Nm

Symbol	Test Conditions	Characteristic Value		
		typ.	min.	
d_S, d_A	pin to heatsink		11.2	mm
Weight		16		g