Rectifier Module for Power Factor Correction

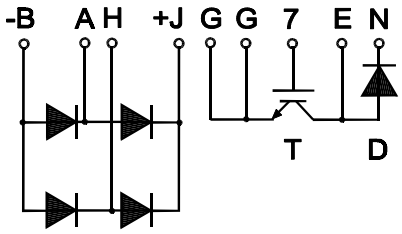
PSBI 9/06

Preliminary Data Sheet

Fast Single Phase Rectifier
Ultra Fast Boost Chopper

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

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°C





Input Rectifier Bridge

Symbol	Test Conditions			Maximum Ratings	
V_{RRM}				1200	V
I_{FAV25}	T_C = 25°C;	180° sine		15	A
I_{FAV80}	T_C = 80°C;	180° sine		10	A
I_{FSM}	T_{VJ} = 25°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°C		0.05	mA
		T_{VJ} = 125°C	0.5		mA
V_F	I_F = 10A,	T_{VJ} = 25°C	1.4	1.8	V
		T_{VJ} = 125°C	1.6		V
t_{rr}	V_R = 100 V, I_F = 10 A		1		µs
	-di/dt = 5 A/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°C to 150°C	600	V
V_{GES}	continous	±20	V
I_{C25}	T_C = 25°C;	37	A
I_{C80}	T_C = 80°C;	25	A
RBSOA	V_{CE} = 600 V, R_G = 10 Ω, T_{VJ} = 125°C	I_{CM} = 100	A
	Clamped inductive load, L= 100 µH	$V_{CEK} \leq V_{CES}$	
t_{SC}	V_{CE} = 600 V, R_G = 10 Ω, V_{GE} = ±15 V		
	T_{VJ} = 125°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

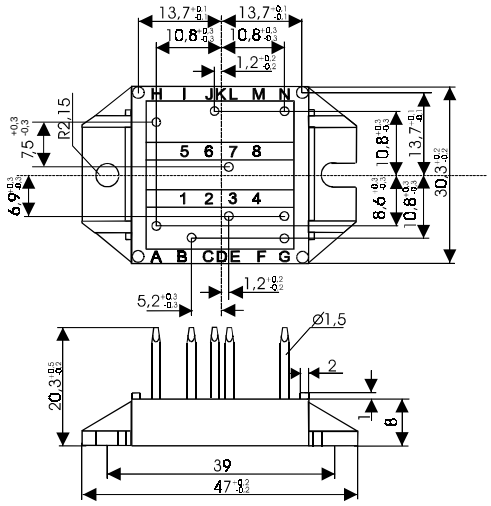
- single phase rectification with power factor correction (PFC)
- low harmonic content of mains current
- mains current and voltage in phase
- wide input voltage range, controlled output voltage

POWERSEM GmbH, Walpersdorfer Str. 53
91126 D- Schwabach
Phone: 09122 - 9764-0 Fax.: 09122 - 9764-20

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Symbol	Test Conditions		Characteristic Value		
			typ.	max.	
I_{CES}	$V_{CE} = V_{CES}$, $V_{GE} = 0$ V,	$T_{VJ} = 25°C$		0.04	mA
		$T_{VJ} = 125°C$	1		mA
I_{GES}	$V_{CE} = 0$ V, $V_{GE} = \pm 20$ V			100	nA
$V_{CE(sat)}$	$I_C = 10$A, $V_{GE} = 15$ V	$T_{VJ} = 25°C$	1.5	1.8	V
		$T_{VJ} = 125°C$	1.6		V
$V_{GE(th)}$	$I_C = 1$mA, $V_{GE} = V_{CE}$		min. 3	5	V
$t_{d(on)}$			30		ns
t_r	Inductive load, $T_{VJ} = 125°C$		50		ns
$t_{d(off)}$	$V_{CE} = 400$ V, $I_C = 10$A		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, $I_C = 10$A		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}	$T_C = 25°C$;	180° sine	35	A
I_{F80}	$T_C = 80°C$;	180° sine	22	A

Symbol	Test Conditions		Characteristic Value		
			typ.	max.	
I_R	$V_R = V_{RRM}$,	$T_{VJ} = 25°C$		0.1	mA
		$T_{VJ} = 125°C$	0.1		mA
V_F	$I_F = 10$A,	$T_{VJ} = 25°C$	2.2	3.2	V
		$T_{VJ} = 125°C$		2.4	V
I_{RM}	$I_F = 10$A, $-di_F/dt = 400$ A/µs, $T_{VJ} = 125°C$		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	°C
T_{stg}		-40...+125	°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

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