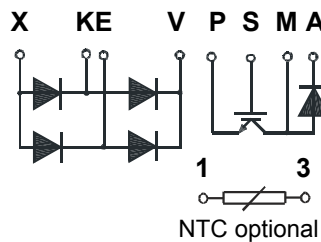


Rectifier Module for Power Factor Correction

PSBI 33/06

Fast Single Phase Rectifier Ultra Fast Boost Chopper

Preliminary Data Sheet



I_{C25} = 44 A
 V_{CES} = 600 V
 I_{FAV25} = 15 A
 V_{RRM} = 1200 V



for exact pin configuration see final development

IGBT

Symbol	Test Conditions	Maximum Ratings
V_{CES}	$T_{VJ} = 25\text{ °C to }150\text{ °C}$	600 V
V_{GES}	continuous	± 20 V
I_{C25}	$T_C = 25\text{ °C}$	44 A
I_{C80}	$T_S = 80\text{ °C}$	30 A
RBSOA	$V_{CE} = 600\text{ V}, R_G = 10\text{ }\Omega, T_{VJ} = 125\text{ °C}$ clamped inductive load, $L = 100\text{ }\mu\text{H}$	$I_{CM} = 100$ A $V_{CEK} \leq V_{CES}$
t_{SC}	$V_{CE} = 600\text{ V}, V_{GE} = \pm 15\text{ V}, R_G = 10\text{ }\Omega,$ $T_{VJ} = 125\text{ °C},$ non-repetitive	10 μs

Symbol	Test Conditions	Characteristic Values
$T_{VJ} = 25\text{ °C},$ unless otherwise specified		
$V_{CE(sat)}$	$V_{GE} = 15\text{ V}, I_C = 10\text{ A}, T_{VJ} = 25\text{ °C}$	max. 1.8 V
$V_{CE(sat)}$	$V_{GE} = 15\text{ V}, I_C = 10\text{ A}, T_{VJ} = 25\text{ °C}$	typ. 1.5 V
$V_{CE(sat)}$	$T_{VJ} = 125\text{ °C}$	typ. 1.6 V
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 1\text{ mA}$	min. 3 V
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 1\text{ mA}$	max. 5 V
I_{CES}	$V_{CE} = V_{CES}, V_{GE} = 0\text{ V}, T_{VJ} = 25\text{ °C}$	max. 0.04 mA
I_{CES}	$T_{VJ} = 125\text{ °C}$	typ. 1 mA
I_{GES}	$V_{CE} = 0\text{ V}, V_{GE} = \pm 20\text{ V}$	max. 100 nA
$t_{d(on)}$	} inductive load, $T_{VJ} = 125\text{ °C}$ $V_{CE} = 400\text{ V}, I_C = 10\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 10\text{ }\Omega$	typ. 31 ns
t_r		typ. 50 ns
$t_{d(off)}$		typ. 291 ns
t_f		typ. 70 ns
E_{on}		typ. 0.60 mJ
E_{off}	typ. 0.31 mJ	
C_{ies}	$V_{CE} = 25\text{ V}, f = 1\text{ MHz}, V_{GE} = 0\text{ V}$	typ. 1600 pF
Q_{Gon}	$V_{CE} = 480\text{ V}, I_C = 10\text{ A}, V_{GE} = 15\text{ V}$	typ. 140 nC
R_{thJC}		max. 0.96 K/W
R_{thJH}		max. tbd K/W

Module

Symbol	Test Conditions	Maximum Ratings
T_{VJ}		-40...+150 °C
T_{JM}		150 °C
T_{stg}		-40...+150 °C
V_{isol}	50/60 Hz $t = 1\text{ min}$	3000 V~
	$l_{isol} \leq 1\text{ mA}$ $t = 1\text{ s}$	3600 V~
M_d	Mounting torque (M 4)	1.5-2.0 Nm
Weight	typ.	24 g

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

Caution: These Devices are sensitive to electrostatic discharge. Users should observe proper ESD handling precautions.

Data according to IEC 60747 refer to a single diode unless otherwise stated

Fast Recovery Diode

Symbol	Test Conditions	Maximum Ratings	
V_{RRM}	$T_{VJ} = 25\text{ °C to }150\text{ °C}$	600	V
I_{F25}	$T_C = 25\text{ °C}$	30	A
I_{F80}	$T_C = 80\text{ °C}$	19	A

Package style and outline
under development

Symbol	Test Conditions	Characteristic Values			
$T_{VJ} = 25\text{ °C}$, unless otherwise specified					
V_F	$I_F = 10\text{ A}$,	$T_{VJ} = 25\text{ °C}$	max.	3.2	V
		$T_{VJ} = 25\text{ °C}$	typ.	2.2	V
		$T_{VJ} = 125\text{ °C}$	max.	2.4	V
I_R	$V_R = V_{RRM}$,	$T_{VJ} = 25\text{ °C}$	max.	0.1	mA
		$T_{VJ} = 125\text{ °C}$	typ.	0.1	mA
I_{RM}	$I_F = 10\text{ A}$, $di_F/dt = -400\text{ A}/\mu\text{s}$, $T_{VJ} = 125\text{ °C}$		tbd		A
t_{Tr}	$V_R = 400\text{ V}$		tbd		ns
R_{thJC}			max.	1.15	K/W
R_{thJH}	with heat transfer paste		tbd		K/W

Rectifier Diodes

Symbol	Test Conditions	Maximum Ratings	
V_{RRM}		1200	V
I_{FAV25}	$T_C = 25\text{ °C}$, sine 180°	33	A
I_{FAV80}	$T_C = 80\text{ °C}$, sine 180°	22	A
I_{FSM}	$T_{VJ} = 25\text{ °C}$, $T = 10\text{ ms}$ (50Hz)	60	A

Symbol	Test Conditions	Characteristic Values			
$T_{VJ} = 25\text{ °C}$, unless otherwise specified					
V_F	$I_F = 10\text{ A}$,	$T_{VJ} = 25\text{ °C}$	max.	1.8	V
		$T_{VJ} = 25\text{ °C}$	typ.	1.4	V
		$T_{VJ} = 125\text{ °C}$	typ.	1.6	V
I_R	$V_R = V_{RRM}$,	$T_{VJ} = 25\text{ °C}$	max.	0.05	mA
		$T_{VJ} = 125\text{ °C}$	typ.	0.5	mA
t_{Tr}	$V_R = 100\text{ V}$, $I_F = 10\text{ A}$, $-di/dt = 5\text{ A}/\mu\text{s}$	typ.	1		μs
R_{thJC}	per diode		max.	2.5	K/W
R_{thJH}	with heat transfer paste		tbd		K/W

Module

Symbol	Test Conditions	Characteristic Values	
d_s	Creeping distance on surface	11.2	mm
d_A	Creeping distance in air	5	mm
a	Max. allowable acceleration	50	m/s^2
R_{25}	NTC @ 25 °C	5.000	Ω