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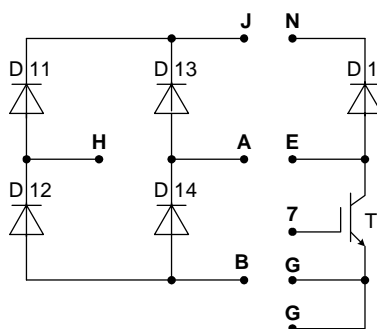
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**IXYS** Advanced Technical Information **VUI 9-06N7**

# Rectifier Module for Power Factor Correction

Fast Single Phase Rectifier  
 Ultra Fast Boost Chopper

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



### Typical Rectified Mains Power

$P_n = 900\text{ W}$  at  $V_n = 110\text{ V}$

$P_n = 2100\text{ W}$  at  $V_n = 240\text{ V}$

at  $V_{DC} = 400\text{ V}$ ,  $f_T = 75\text{ kHz}$ ,  $T_C = 80^\circ\text{C}$

**Input Rectifier Bridge D11 - D14**

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

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

### Application

- 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

### Features

- high level of integration - only one power semiconductor module required for the whole PFC rectifier
- standard PFC control ICs useable
- 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
- package with insulated DCB base and soldering pins for PCB mounting

**Chopper T**

Symbol	Conditions	Maximum Ratings	
$V_{CES}$	$T_{VJ} = 25^{\circ}\text{C}$ to $150^{\circ}\text{C}$	600	V
$V_{GES}$	Continuous	$\pm 20$	V
$I_{C25}$	$T_C = 25^{\circ}\text{C}$	37	A
$I_{C80}$	$T_C = 80^{\circ}\text{C}$	25	A
<b>RBSOA</b>	$V_{CE} = 600\text{ V}$ ; $R_G = 10\ \Omega$ ; $T_{VJ} = 125^{\circ}\text{C}$ Clamped inductive load; $L = 100\ \mu\text{H}$	$I_{CM} = 100$ $V_{CEK} \leq V_{CES}$	A
$t_{SC}$	$V_{CE} = 600\text{ V}$ ; $V_{GE} = \pm 15\text{ V}$ ; $R_G = 10\ \Omega$ ; $T_{VJ} = 125^{\circ}\text{C}$ ; non-repetitive	10	$\mu\text{s}$

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

**Chopper D1**

Symbol	Conditions	Maximum Ratings	
$V_{RRM}$	$T_{VJ} = 25^{\circ}\text{C}$ to $150^{\circ}\text{C}$	600	V
$I_{F25}$	$T_C = 25^{\circ}\text{C}$	35	A
$I_{F80}$	$T_C = 80^{\circ}\text{C}$	22	A

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

**IXYS** **VUI 9-06N7**

**Module**

Symbol	Conditions	Maximum Ratings	
$T_{VJ}$		-40...+150	°C
$T_{stg}$		-40...+125	°C
$V_{ISOL}$	$I_{ISOL} \leq 1 \text{ mA}; 50/60 \text{ Hz}; t = 1 \text{ min}$	3000	V~
$M_d$	Mounting torque (M4)	1.5 - 2.0	Nm

Symbol	Conditions	Characteristic Values		
		$(T_{VJ} = 25^\circ\text{C}, \text{ unless otherwise specified})$		
		min.	typ.	max.
$d_s$	Creepage distance on surface	tbd		mm
$d_A$	Strike distance through air	tbd		mm
<b>Weight</b>	typ.		18	g

Dimensions in mm (1 mm = 0.0394")

