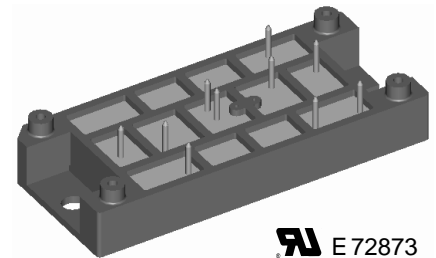
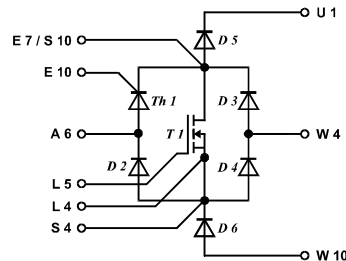


# Rectifier Module for Three Phase Power Factor Correction

$V_{DSS} = 500\text{ V}$   
 $I_{D25} = 130\text{ A}$   
 $R_{DS(on)} = 36\text{ m}\Omega$

## Preliminary data

$V_{RRM}$ (FAST Diode) V	$V_{RRM, DRM}$ (Diode, Thyr.) V	$V_{DSS}$ (MOSFET) V	Type
<b>600</b>	<b>500</b>	<b>500</b>	<b>VUM 85-05A</b>



E 72873

Symbol	Conditions	Maximum Ratings	
<b>MOSFET T 1</b>			
$V_{DSS}$	$T_{VJ} = 25^{\circ}\text{C}$ to $150^{\circ}\text{C}$	500	V
$V_{DGR}$	$T_{VJ} = 25^{\circ}\text{C}$ to $150^{\circ}\text{C}$ ; $R_G = 1\text{ M}\Omega$	500	V
$V_{GSM}$	Transient	$\pm 30$	V
$V_{GS}$	Continuous	$\pm 20$	V
$I_D$	$T_C = 100^{\circ}\text{C}$ , $T_{VJ} = 125^{\circ}\text{C}$	60	A
$I_{D25}$	$T_C = 25^{\circ}\text{C}$ , $T_{VJ} = 150^{\circ}\text{C}$	130	A
$I_{DM}$	$T_C = 25^{\circ}\text{C}$ , $T_{VJ} = 150^{\circ}\text{C}$	520	A
$E_{AR}$	$T_C = 25^{\circ}\text{C}$	60	mJ
$P_{tot}$	$T_C = 25^{\circ}\text{C}$	1380	W
<b>Single Phase Bridge Th1, D2, D3, D4</b>			
$V_{RRM}, V_{DRM}$		500	V
$I_{DAV}$	$T_{VJ} = 150^{\circ}\text{C}$ , $T_C = 100^{\circ}\text{C}$	47	A
$I_{FSM}, I_{TSM}$	$T_{VJ} = 45^{\circ}\text{C}$ , $t = 10\text{ ms}$ (50 Hz)	320	A
	$t = 8.3\text{ ms}$ (60 Hz)	340	A
	$T_{VJ} = 150^{\circ}\text{C}$ , $t = 10\text{ ms}$ (50 Hz)	280	A
	$t = 8.3\text{ ms}$ (60 Hz)	300	A
$P_{tot}$	$T_C = 25^{\circ}\text{C}$ ; per diode	90	W
<b>Fast Diodes D5, D6</b>			
$V_{RRM}$		600	V
$I_{FAV}$	$T_{VJ} = 150^{\circ}\text{C}$ , $T_C = 100^{\circ}\text{C}$ , rectangular $\delta = 0.5$	31	A
$I_{FSM}$	$T_{VJ} = 45^{\circ}\text{C}$ , $t = 10\text{ ms}$ (50 Hz)	250	A
$P_{tot}$	$T_C = 25^{\circ}\text{C}$	95	W
<b>Module</b>			
$T_{VJ}$		-40...+150	$^{\circ}\text{C}$
$T_{JM}$		150	$^{\circ}\text{C}$
$T_{stg}$		-40...+125	$^{\circ}\text{C}$
$V_{ISOL}$	$I_{ISOL} \leq 1\text{ mA}$	50/60 Hz	3600 V~
$M_d$	Mounting torque (M5)		2-2.5/18-22 Nm/lb.in.
<b>Weight</b>		80	g

## Features

- Package with DCB ceramic base plate
- Soldering connections for PCB mounting
- Isolation voltage 3600 V~
- Low  $R_{DS(on)}$  HDMOS™ process
- Low package inductance for high speed switching
- Ultrafast diodes
- Kelvin source for easy drive
- UL recognized

## Applications

- Three phase PFC by Kolar circuit
- Three phase input rectifier with power factor correction consisting of three modules VUM 85-05
- For power supplies, UPS, SMPS, drives, welding etc.

## Advantages

- Reduced harmonic content of input currents corresponding to standards
- Rectifier generates maximum DC power with a given AC fuse
- Wide input voltage range
- No external isolation
- Easy to mount with two screws
- Suitable for wave soldering
- High temperature and power cycling capability

Symbol	Conditions	Characteristic Values ( $T_{VJ} = 25^{\circ}\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
<b>MOSFET T 1</b>				
$V_{GS(th)}$	$V_{DS} = \pm 20\text{ V}$ , $I_D = 30\text{ mA}$	2	3	4 V
$I_{GSS}$	$V_{GS} = \pm 20\text{ V}$ , $V_{DS} = 0\text{ V}$			$\pm 1.5\ \mu\text{A}$
$I_{DSS}$	$V_{DS} = V_{DSS}$ , $V_{GS} = 0\text{ V}$		0.5	1.4 mA
	$V_{DS} = 0.8 \cdot V_{DSS}$ , $V_{GS} = 0\text{ V}$ , $T_{VJ} = 125^{\circ}\text{C}$		1	7 mA
$R_{DS(on)}$	$I_D = \frac{1}{2} I_{D25}$ , $V_{GS} = 10\text{ V}$ , pulse test $t \leq 300\ \mu\text{s}$ , $d \leq 2\%$			36 m $\Omega$
$g_{fs}$	$V_{DS} = 10\text{ V}$ , $I_D = \frac{1}{2} I_{D25}$ , $t = < 300\ \mu\text{s}$	75	145	S
$t_{d(on)}$	$V_{DS} = \frac{1}{2} V_{DSS}$ , $I_D = \frac{1}{2} I_{D25}$ , $V_{GS} = 15\text{ V}$ $R_G = 1\ \Omega$ , $L = 100\ \mu\text{H}$ , $T_{VJ} = 125^{\circ}\text{C}$		16	25 ns
$t_r$			33	45 ns
$t_{d(off)}$			65	80 ns
$t_f$			30	40 ns
$C_{iss}$	$V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$ , $V_{GS} = 0\text{ V}$		30	nF
$C_{oss}$			3	nF
$C_{rss}$			1	nF
$Q_g$	$V_{DS} = \frac{1}{2} V_{DSS}$ , $I_D = \frac{1}{2} I_{D25}$ , $V_{GS} = 15\text{ V}$		945	1120 nC
$Q_{gs}$			195	280 nC
$Q_g$			435	595 nC
$R_{thJC}$			0.05	0.09 K/W
$R_{thCH}$				K/W
<b>Single Phase Bridge Th1, D2, D3, D4</b>				
$V_F, V_T$	$I_F, I_T = 45\text{ A}$ , $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$			1.50 V 1.55 V
$I_{RRM}, I_{DRM}$	$V_D, V_R = V_{DRM}, V_{RRM}$ , $T_{VJ} = 25^{\circ}\text{C}$		0.5	1.4 mA
	$V_D, V_R = 0.8 \cdot V_{DRM}, V_{RRM}$ , $T_{VJ} = 125^{\circ}\text{C}$		1	7 mA
$V_{T0}$	For power-loss calculations only			0.85 V
$r_T$	$T_{VJ} = 150^{\circ}\text{C}$			14 m $\Omega$
$V_{GT}$	$V_D = 6\text{ V}$			1.5 V
$I_{GT}$				100 mA
$V_{GD}$	$V_D = \frac{2}{3} V_{DRM}$ , $T_{VJ} = 150^{\circ}\text{C}$			0.2 V
$I_{GD}$				5 mA
$V_{RGM}$				10 V
$I_H$	$V_D = 6\text{ V}$ , $R_{GK} = \infty$			200 mA
$I_L$	$I_G = 0.45\text{ A}$ , $di_G/dt = 0.45\text{ A}/\mu\text{s}$ , $t_p = 10\ \mu\text{s}$			450 mA
$(di/dt)_{cr}$	$I_G = 0.45\text{ A}$ , $di_G/dt = 0.45\text{ A}/\mu\text{s}$ , $t_p = 200\ \mu\text{s}$ , $f = 50\text{ Hz}$ $V_D = \frac{2}{3} V_{DRM}$ , $T_{VJ} = 150^{\circ}\text{C}$ , $I_T = 45\text{ A}$ , repetitive			150 A/ $\mu\text{s}$
	$I_G = 0.45\text{ A}$ , $di_G/dt = 0.45\text{ A}/\mu\text{s}$ , $t_p = 200\ \mu\text{s}$ , $f = 50\text{ Hz}$ $V_D = \frac{2}{3} V_{DRM}$ , $T_{VJ} = 150^{\circ}\text{C}$ , $I_T = I_{DAV}$ , non-repetitive			500 A/ $\mu\text{s}$
$t_{gd}$	$I_G = 0.45\text{ A}$ , $di_G/dt = 0.45\text{ A}/\mu\text{s}$ , $V_D = \frac{1}{2} V_{DRM}$			2 $\mu\text{s}$
$t_q$	$I_T = 20\text{ A}$ , $di/dt = -10\text{ A}/\mu\text{s}$ , $V_R = 100\text{ V}$ , $V_D = \frac{2}{3} V_{DRM}$ $t_p = 200\ \mu\text{s}$ , $dv/dt = 15\text{ V}/\mu\text{s}$ , $T_{VJ} = 150^{\circ}\text{C}$		150	$\mu\text{s}$
$P_{GM}$	$I_T = I_{d(AV)}$ , $T_{VJ} = 150^{\circ}\text{C}$		$t_p = 30\ \mu\text{s}$	10 W
			$t_p = 300\ \mu\text{s}$	5 W
$P_{GAVM}$				0.5 W
$R_{thJC}$	DC per diode / thyristor			1.3 K/W
$R_{thCH}$	DC per diode / thyristor		0.4	K/W

Symbol	Conditions	Characteristic Values		
		(T <sub>VJ</sub> = 25°C, unless otherwise specified)		
		min.	typ.	max.
<b>Fast Diodes D 5, D 6</b>				
V <sub>F</sub>	I <sub>F</sub> = 30 A; T <sub>VJ</sub> = 25°C T <sub>VJ</sub> = 125°C			2.70 V 1.85 V
I <sub>R</sub>	V <sub>R</sub> = 600 V, T <sub>VJ</sub> = 25°C T <sub>VJ</sub> = 125°C			0.5 mA 1 mA
V <sub>T0</sub>	For power-loss calculations only			1.23 V
r <sub>T</sub>	T <sub>VJ</sub> = 150°C			9.8 mΩ
I <sub>RM</sub>	I <sub>F</sub> = 50 A; di/dt = 100 A/μs V <sub>R</sub> = 100 V, T <sub>VJ</sub> = 100°C		3	3.5 A
t <sub>rr</sub>	I <sub>F</sub> = 1 A, V <sub>R</sub> = 30 V, di/dt = 200 A/μs		25	30 ns
R <sub>thJC</sub>	DC per diode			1.3 K/W
R <sub>thCH</sub>	DC per diode		0.4	K/W

**Dimensions in mm (1 mm = 0.0394")**

