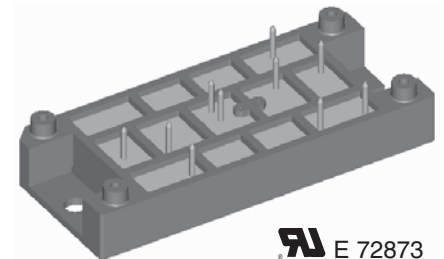
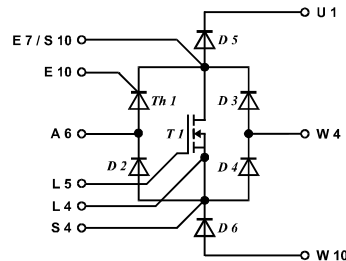


Rectifier Module for Three Phase Power Factor Correction

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

Preliminary data

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



Symbol	Conditions	Maximum Ratings	
MOSFET T 1			
V_{DSS}	$T_{VJ} = 25^\circ\text{C}$ to 150°C	500	V
V_{DGR}	$T_{VJ} = 25^\circ\text{C}$ to 150°C ; $R_G = 1 \text{ M}\Omega$	500	V
V_{GSM}	Transient	± 30	V
V_{GS}	Continuous	± 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
Single Phase Bridge Th1, D2, D3, D4			
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
Fast Diodes D5, D6			
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
Module			
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.
Weight		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.
MOSFET T 1				
$V_{GS(th)}$	$V_{DS} = \pm 20\text{ V}$, $I_D = 30\text{ mA}$	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}	$V_{DS} = V_{DSS}$, $V_{GS} = 0\text{ V}$ $V_{DS} = 0,8 \cdot V_{DSS}$, $V_{GS} = 0\text{ V}$, $T_{VJ} = 125^{\circ}\text{C}$		0.5	1.4 mA
			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 Ω
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
$Q_{g(on)}$	$V_{DS} = \frac{1}{2} V_{DSS}$, $I_D = \frac{1}{2} I_{D25}$, $V_{GS} = 10\text{ V}$		945	1120 nC
Q_{gs}			195	280 nC
Q_{gd}			435	595 nC
R_{thJC}			0.09	K/W
R_{thCH}		0.05		K/W
Single Phase Bridge Th1, D2, D3, D4				
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}	$V_D, V_R = V_{DRM}, V_{RRM}$, $T_{VJ} = 25^{\circ}\text{C}$ $V_D, V_R = 0,8 \cdot V_{DRM}, V_{RRM}$, $T_{VJ} = 125^{\circ}\text{C}$		0.5	1.4 mA
			1	7 mA
V_{T0}	For power-loss calculations only			0.85 V
r_T	$T_{VJ} = 150^{\circ}\text{C}$			14 m Ω
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/ μs
	$I_G = 0.45\text{ A}$, $di_G/dt = 0.45\text{ A}/\mu\text{s}$, $t_p = 200\ \mu\text{s}$, $f = 50\text{ Hz}$ $V_D = \frac{2}{3} V_{DRM}$, $T_{VJ} = 150^{\circ}\text{C}$, $I_T = I_{DAV}$, non-repetitive			500 A/ μs
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 μs
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		μs
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 _{VJ} = 25°C, unless otherwise specified)		
		min.	typ.	max.
Fast Diodes D 5, D 6				
V _F	I _F = 30 A; T _{VJ} = 25°C T _{VJ} = 125°C			2.70 V 1.85 V
I _R	V _R = 600 V, T _{VJ} = 25°C T _{VJ} = 125°C			0.5 mA 1 mA
V _{T0}	For power-loss calculations only			1.23 V
r _T	T _{VJ} = 150°C			9.8 mΩ
I _{RM}	I _F = 50 A; di/dt = 100 A/μs V _R = 100 V, T _{VJ} = 100°C		3	3.5 A
t _{rr}	I _F = 1 A, V _R = 30 V, di/dt = 200 A/μs		25	30 ns
R _{thJC}	DC per diode			1.3 K/W
R _{thCH}	DC per diode		0.4	K/W

Dimensions in mm (1 mm = 0.0394")

