RAFAY AAMIR GULL **BSEE19047**

Rectifier

Single Phase Center

Tap Full Wave Rectifier

For R load

and PDC

only

Single Phase Half Wave

Rectifier

POWER ELECTRONICS A3

Single Phase Full Wave

Six Phase Star

Rectifier

Three Phase Bridge Rectifier

Circuit Diagram	$\begin{vmatrix} v_{D} - v_{D} \\ v_{D} - v_{D} \end{vmatrix}$ $\begin{vmatrix} v_{D} - v_{D} \\ v_{D} \end{vmatrix}$ $\begin{vmatrix} v_{D} - v_{D} \\ v_{D} \end{vmatrix}$ $\begin{vmatrix} v_{D} - v_{D} \\ v_{D} \end{vmatrix}$	$ \begin{vmatrix} + v_{\rm D1} - & & & \\ D_1 & & & & \\ V_{\rm p} & & & & \\ v_{\rm s} & & & & \\ - & & & & & \\ - & & & & & \\ - & & & &$	$\begin{bmatrix} v_p \\ v_s \\ - \end{bmatrix} \begin{bmatrix} v_s \\ - \end{bmatrix} \begin{bmatrix} v_b \\ - $	$v_2 = V_m \sin \omega t$ $v_3 = V_m \sin \omega t$ $v_4 = V_m \sin \omega t$ $v_2 = V_m \sin \omega t$ $v_2 = V_m \sin \omega t$ $v_3 = V_m \sin \omega t$ $v_4 = V_m \sin \omega t$ $v_4 = V_m \sin \omega t$ $v_5 = V_m \sin \omega t$ $v_6 = V_m \sin \omega t$ $v_7 = V_m \sin \omega t$ $v_8 = V_m \sin \omega t$ $v_9 = V_m $	Primary Secondary i_{cl} D_1 D_3 D_5 P_1 P_2 P_3 P_4 P_5 P_5 P_6 P_7 P_8 P
Voltage and Current waveforms of Diode and load	$V_{m}sinot$ $V_{$	$V_{m} \stackrel{v_{s}}{\stackrel{v_{s}}{=}} V_{m} \sin \omega t$ $V_{m} \stackrel{v_{D}}{\stackrel{v_{D}}{=}} 0$ $V_{D1} = 0$ $V_{D2} = 0$	V_{m} V_{m} V_{m} V_{m} V_{D}	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Diodes on v_{cb} v_{ab} v_{ac} v_{ba} v_{ba} v_{ca} v_{ba}
VDC, IDC	$Vdc = \frac{Vm}{2\pi} \left(1 - \cos(wt) \right)$	Vdc = 0.6366Vm	Voc = .637V _{max} .	$Vdc = Vm\frac{q}{\pi}\sin\left(\frac{\pi}{q}\right)$	Vdc = 1.654Vm

 $I = \frac{Vdc}{R} P_{dc} = V_{dc} I_{dc} \qquad I = \frac{Vdc}{R} P_{dc} = V_{dc} I_{dc} \qquad I_{dc} = \frac{1}{2\pi} \int_{0}^{2\pi} i_s(t) d(\omega t) P_{dc} = V_{dc} I_{dc} \qquad I = \frac{Vdc}{R} P_{dc} = V_{dc} I_{dc} \qquad I = \frac{\sqrt{3} Vm}{R}$

Vrms , Irms and Prms	$V_{rms} = \frac{V_m}{2} I_{rms} = \frac{I_m}{2}$ $Prms = (Vrms)(Irms)$	$\frac{V_m}{\sqrt{2}} I_{\text{rms}} = \frac{V_{\text{rms}}}{R}$ $Prms = (Vrms)(Irms)$	$V_{\rm rms} = \frac{V_m}{\sqrt{2}}$ $I_{rms} = \frac{I_m}{2}$ $V_{\rm rms} = V_{\rm rms} * I_{\rm rms}$	$Vrms = Vm\sqrt{rac{3}{\pi}\left(rac{\pi}{6} + rac{\sin\left(rac{\pi}{3} ight)}{2} ight)}$ $I_{ m rms} = rac{V_{ m rms}}{R}$	Vrms = 1.6554Vm Irms = 1.6554Vm/R
Efficiency	$\eta = \frac{P_{dc}}{P_{ac}}$	$\eta = (0.6366V_m)^2/(0.707V_m)^2$	$\eta = \frac{P_{dc}}{P_{ac}}$	$\eta = \frac{P_{dc}}{P_{ac}}$	$\eta = (0.6366V_m)^2/(0.707V_m)^2$
Form Factor (FF)	Form Factor = $\frac{V_{rms}}{V_{avg}} = \frac{V_m/2}{V_m/\pi} = \frac{\pi}{2} = 1.57$	$FF = 0.707 V_m / 0.6366 V_m$	FF = Irms/ Iavg	$FF = 0.707 V_m / 0.6366 V_m$	$FF = 0.707 V_m / 0.6366 V_m$
Ripple Factor (RF)	$RF = \sqrt{FF^2 - 1} = 1.21$	$RF = \sqrt{FF^2 - 1}$	$RF = \sqrt{FF^2 - 1}$	$RF = \sqrt{FF^2 - 1}$	$RF = \sqrt{FF^2 - 1}$
Total Harmonic Distortion (THD)	$THD = \frac{1}{V_{o1}} \left(\sum_{n=2,3,\dots}^{\infty} {V_{on}}^2 \right)^{1/2}$	HF = $\left(\frac{I_s^2 - I_{s1}^2}{I_{s1}^2}\right)^{1/2} = \left[\left(\frac{I_s}{I_{s1}}\right)^2 - 1\right]^{1/2}$	HF = $\left(\frac{I_s^2 - I_{s1}^2}{I_{s1}^2}\right)^{1/2} = \left[\left(\frac{I_s}{I_{s1}}\right)^2 - 1\right]^{1/2}$	HF = $\left(\frac{I_s^2 - I_{s1}^2}{I_{s1}^2}\right)^{1/2} = \left[\left(\frac{I_s}{I_{s1}}\right)^2 - 1\right]^{1/2}$	HF = $\left(\frac{I_s^2 - I_{s1}^2}{I_{s1}^2}\right)^{1/2} = \left[\left(\frac{I_s}{I_{s1}}\right)^2 - 1\right]^{1/2}$
Power Factor (PF)	PF < 1	$PF = \frac{P_{ac}}{VA}$	P/(Vrms*Irms)	PF = Pac/3Vsls	PF = Pac/3Vsls
Peak Inverse Voltage	$PIV = V_m = \sqrt{2} V_{rms}$	$PIV = 2V_m.$	$V_{\rm rms} = \frac{V_m}{\sqrt{2}}$	$\sqrt{3} Vm$	$\sqrt{3} Vm$
Output Voltage ripple frequency	150 Hz	120 Hz 0.637V _{max}	6f (where f is the frequency of AC supply)	0.637V _{max}	$0.637V_{\text{max}}$