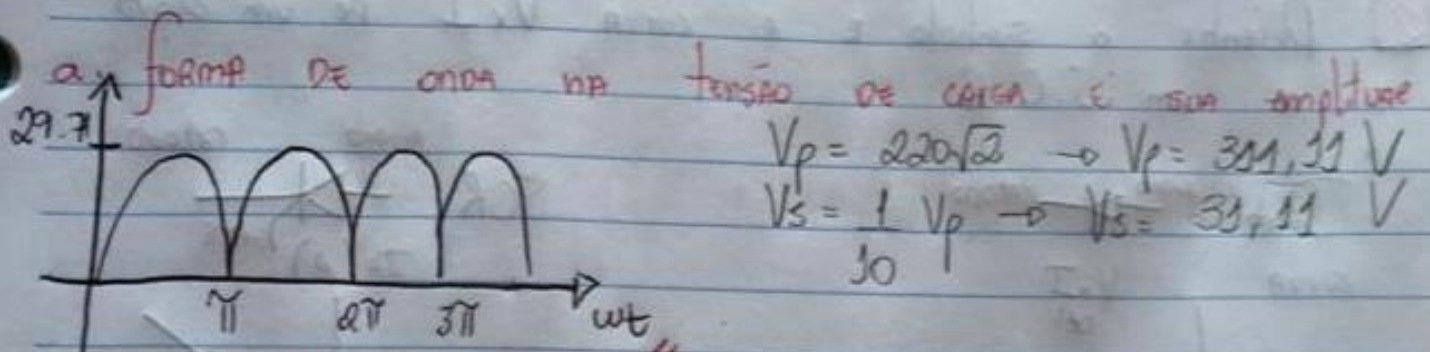


Retificador Monofásico Não Controlado

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PARA CADA 30 espina tem um, ele indica a tensão de pico no secundário



$$V_{rp} = V_s - 2,07 \rightarrow V_{rp} = 31,11 - 1,4$$

$$V_{rp} = 29,71 \text{ V}$$

B. A tensão média e eficaz na carga

$$V_{medio} = \frac{2 V_{rp}}{\pi} \therefore V_{medio} = \frac{2 \cdot 29,71}{\pi} \Rightarrow 18,91 \text{ V}$$

$$V_{rms} = \frac{V_{rp}}{\sqrt{2}} \rightarrow \frac{29,71}{\sqrt{2}} = V_{rms} = 21 \text{ V}$$

C. A corrente média e eficaz na carga

$$I_{medio} = \frac{V_{medio}}{R} = \frac{18,91}{10} = 1,891 \text{ A}$$

$$I_{rms} = \frac{V_{rms}}{R} = \frac{21}{10} = 2,1 \text{ A}$$

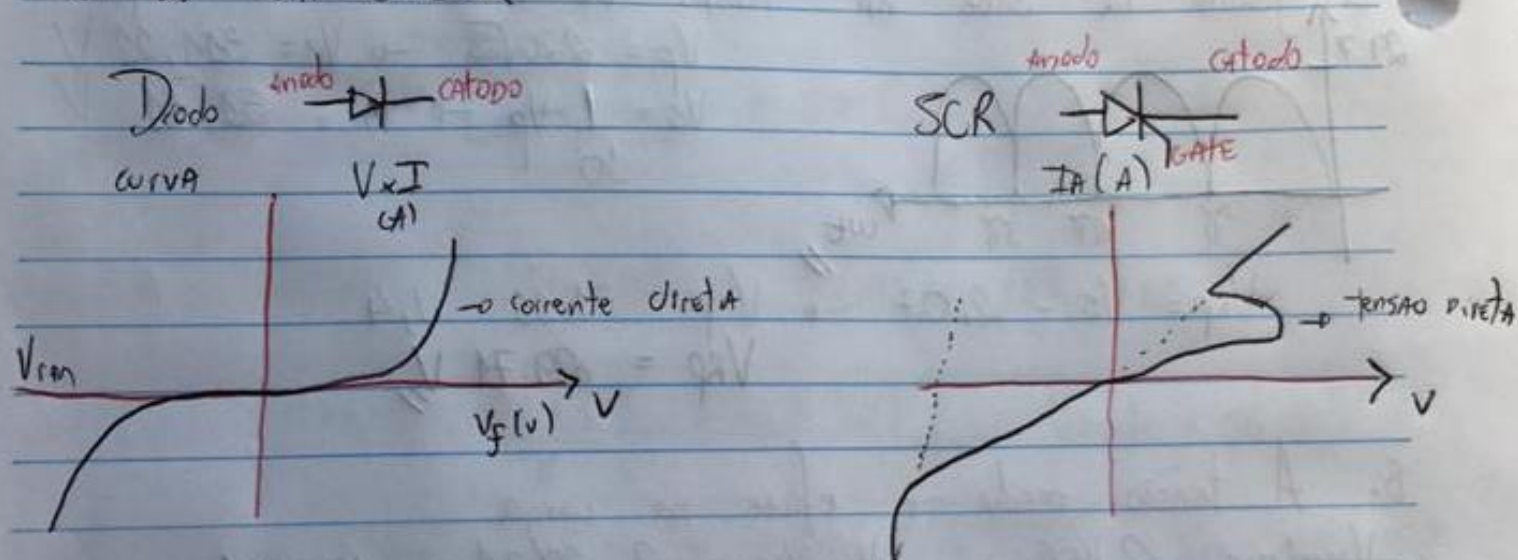
d. As especificações do Diodo

* Precisa saber qual é a tensão reversa máxima e qual a corrente MAX.

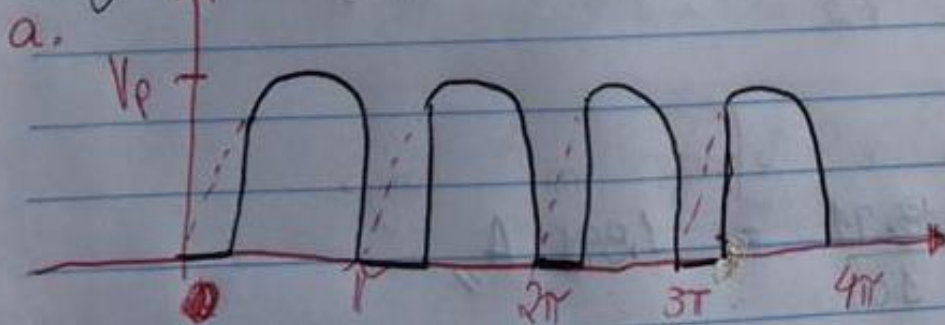
$$V_{piv} \geq V_{ap} \rightarrow V_{piv} \geq 29.71 \text{ V}$$

$$I_{diado} \geq I_{Rp} \rightarrow I_{diado} \geq 2.9713 \text{ A}$$

2 Desenhe o símbolo e a curva $V \times I$ de um diodo e de um S.C.R



3 A forma de onda da tensão na carga p / um ângulo de disparo de 45° .



$$V_{\text{MEDIO CARGA}} [0^\circ] \quad | \quad V_{\text{RMS CARGA}} \quad 177.6 - 2 = 177.6$$

$$B. \left(\frac{V_{p10}}{\pi} \right) \cdot \left[1 + \cos(2) \right] \quad | \quad \frac{V_{p10}}{\sqrt{2}} \cdot \left[1 - \frac{2}{\pi} + \frac{\sin(2 \cdot 2)}{2\pi} \right]^{1/2}$$

$$V_{\text{MEDIO CARGA}} = \frac{177.6}{\pi} [1 + 1] \quad V_{\text{MEDIO}} = 113.34 \text{ V}$$

$$V_{\text{RMS CARGA}} = \frac{177.6}{\sqrt{2}} \cdot \left[1 - \frac{0}{\pi} + \frac{\sin(0)}{2\pi} \right]^{1/2} \quad V_{\text{RMS}} = 125.5 \text{ V}$$

$[30^\circ]$

$$V_{\text{MEDIO}} = \frac{177.6}{\pi} [1 + \cos(\pi/6)] \rightarrow V_{\text{MEDIO}} = 105.4 \text{ V}$$

$$V_{\text{RMS}} = \frac{177.6}{\sqrt{2}} \left[1 - \frac{\pi/6}{\pi} + \frac{\sin(2 \cdot \pi/6)}{2\pi} \right]^{1/2} \quad V_{\text{RMS}} = 123.7 \text{ V}$$

$$[45^\circ] \quad V_{\text{MEDIO}} = 96.5 \text{ V} \quad V_{\text{RMS}} = 119.7 \text{ V}$$

$$[90^\circ] \quad V_{\text{MEDIO}} = \frac{177.6}{\pi} [1 + \cos(\pi/2)] \quad V_{\text{MEDIO}} = 56.5 \text{ V}$$

$$V_{\text{RMS}} = \frac{177.6}{\sqrt{2}} \left[1 - \frac{\pi/2}{\pi} + \frac{\sin(2 \cdot \pi/2)}{2\pi} \right]^{1/2} \quad V_{\text{RMS}} = 88.8 \text{ V}$$

$$[120^\circ] \quad V_{\text{MEDIO}} = \frac{177.6}{\pi} [1 + \cos(2\pi/3)] \quad V_{\text{MEDIO}} = 28.26 \text{ V}$$

$$V_{\text{RMS}} = \frac{177.6}{\sqrt{2}} \left[1 - \frac{2\pi/3}{\pi} + \frac{\sin(2 \cdot 2\pi/3)}{2\pi} \right]^{1/2} \quad V_{\text{RMS}} = 55.527 \text{ V}$$

(C) $[0^\circ]$

$$P = \frac{V_{\text{RMS}}^2}{R} \rightarrow P(2=0) = \frac{125.5^2}{30} \rightarrow P = 525.7 \text{ W}$$

[30°]

$$P = \frac{123.76^2}{30} \rightarrow P(\alpha = 30^\circ) = 510.54 \text{ W}$$

[45°]

$$P = \frac{119.74^2}{30} \rightarrow P(\alpha = 45^\circ) = 477.9 \text{ W}$$

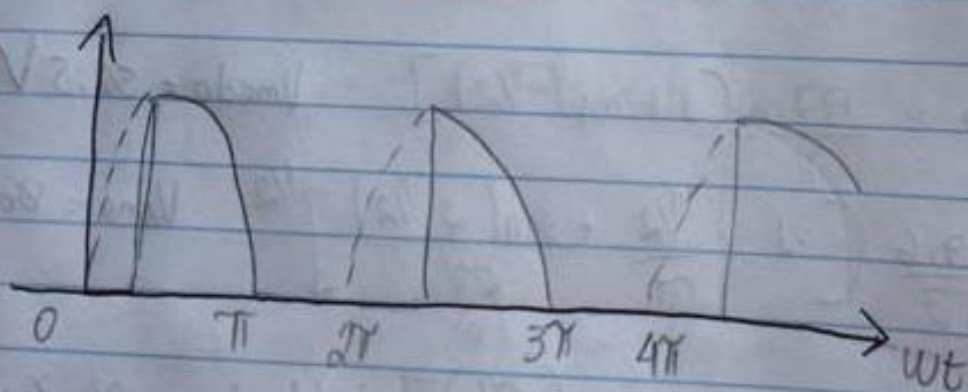
[90°]

$$P = \frac{88.8^2}{30} \rightarrow P(\alpha = 90^\circ) = 262.8 \text{ W}$$

[120°]

$$P = \frac{55.527^2}{2} \rightarrow P(\alpha = 120^\circ) = 102.7 \text{ W}$$

4a



b [0°]

$$V_{\text{media}} = \frac{V_p}{2\pi} [1 + \cos(\alpha)] \rightarrow V_{\text{media}} = \frac{89 [1 + \cos(0)]}{2\pi}$$

$$V_{\text{RMS}} = \frac{V_p}{\sqrt{2}} \left[\frac{1 - \frac{\alpha}{2} + \frac{\sin(2\alpha)}{4\pi}}{2\pi} \right]^{1/2} \rightarrow V_{\text{RMS}} = \frac{89}{\sqrt{2}} \left[\frac{1 - 0 + \frac{\sin(0)}{4\pi}}{2\pi} \right]^{1/2}$$

$$V_{\text{media}} = 28.3 \text{ V}$$

$$V_{\text{RMS}} = 44.5 \text{ V}$$

[45°]

$$\frac{89}{2\pi} [1 + \cos(\pi/4)] \rightarrow V_{media} = 24.18 \text{ V}$$

$$\frac{89}{\sqrt{2}} \left[\frac{1}{2} - \frac{(\pi/4)}{2\pi} + \frac{\sin(2 \cdot \pi/4)}{4\pi} \right]^{1/2} V_{rms} = 42.43 \text{ V}$$

[90°]

$$\frac{89}{2\pi} [1 + \cos(\pi/2)] \rightarrow V_{media} = 14.165 \text{ V}$$

$$\frac{89}{\sqrt{2}} \left[\frac{1}{2} - \frac{\pi/2}{2\pi} + \frac{\sin(2\pi/2)}{4\pi} \right]^{1/2} V_{rms} = 31.4 \text{ V}$$

[120°]

$$\frac{89}{2\pi} [1 + \cos(2\pi/3)] \rightarrow V_{media} = 7.08 \text{ V}$$

$$\frac{89}{\sqrt{2}} \left[\frac{1}{2} - \frac{2\pi/3}{2\pi} + \frac{\sin(2\pi/3 \cdot 2)}{4\pi} \right]^{1/2} V_{rms} = 19.6 \text{ V}$$

[170°]

$$\frac{89}{2\pi} [1 + \cos(17\pi/18)] \rightarrow V_{media} = 0.215 \text{ V}$$

$$\frac{89}{\sqrt{2}} \left[\frac{1}{2} - \frac{17\pi/18}{2\pi} + \frac{\sin(2 \cdot \frac{17\pi}{18})}{4\pi} \right]^{1/2} V_{rms} = 1.49 \text{ V}$$

c) $[0^\circ]$ $P(\alpha=0^\circ) = \frac{V_{rms}^2}{R} = \frac{445^2}{50} = 39.6 \text{ W}$

$[45^\circ]$ $P(\alpha=45^\circ) = \frac{42.431^2}{50} \rightarrow P(\alpha=45^\circ) = 36.007 \text{ W}$

$[90^\circ]$ $\frac{31.466^2}{50} = 19.8 \text{ W}$ $[120^\circ]$ $\frac{19.676^2}{50} = 7.74 \text{ W}$

$[170^\circ]$ $\frac{1.4902^2}{50} \rightarrow 0.044 \text{ W}$

d. 0° é o ângulo de Disparo que possui a max. potência. $P[0^\circ] = 39.6 \text{ W}$