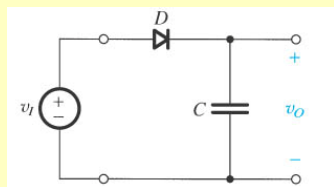


Diode Applications: Peak Detector

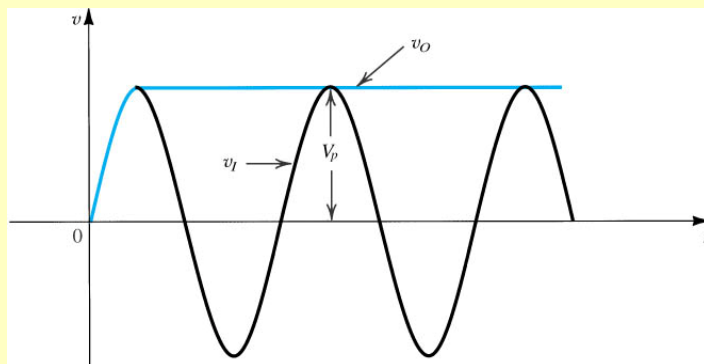
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Peak Detector



Ideal behavior



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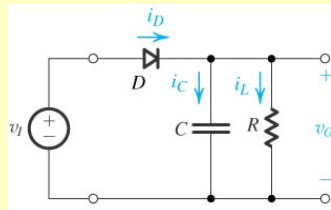
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Diode Applications: Peak Detector

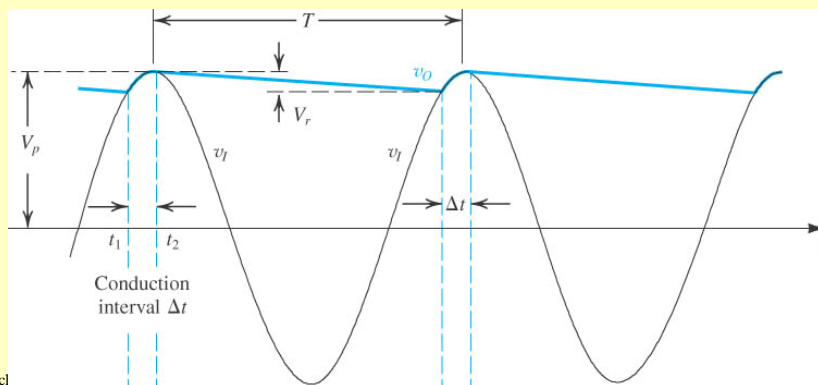
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Peak Detector (cont)

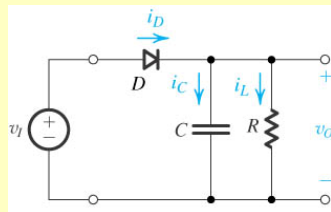


Practical behavior

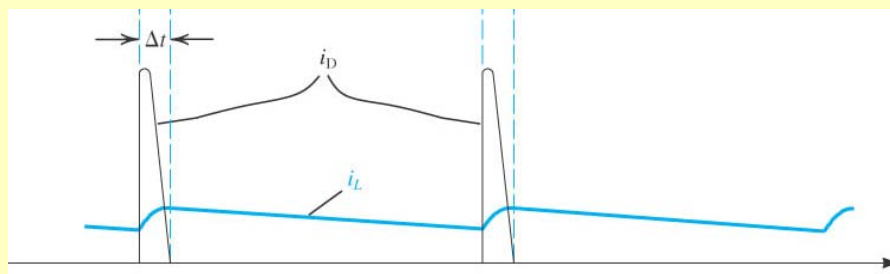


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Peak Detector (cont)



Practical behavior



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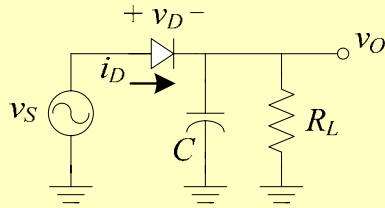
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Diode Applications: Peak Detector

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Peak Detector – Transient Calculations



$$v_S = V_p \sin(2\pi ft)$$

$$\omega = 2\pi f$$

$$\tau = R_L C$$

(Assuming an ideal diode)

$$I_{Dmax} = \omega C V_p$$

Coarse formulas (F1):

$$V_r = \frac{V_p}{f\tau}$$

$$I_{Dpeak} = \omega C \sqrt{2V_p V_r}$$

More accurate formulas (F2):

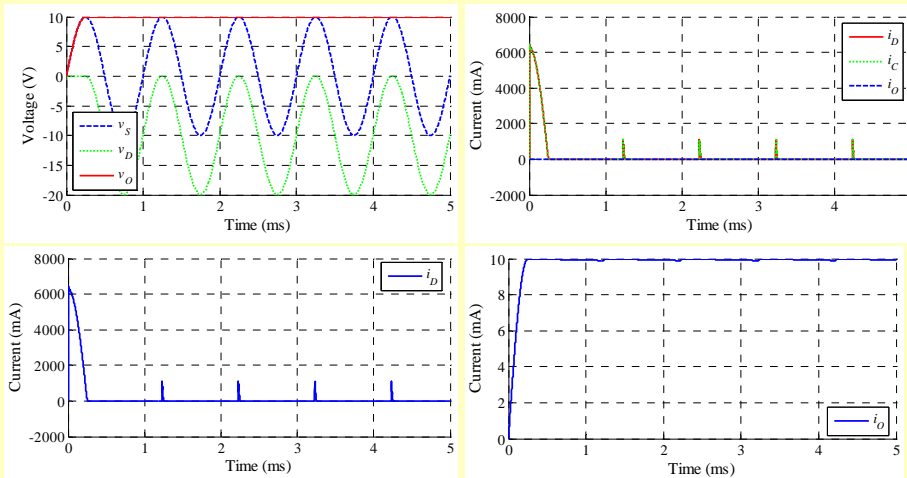
$$V_r = \frac{V_p}{(2\tau\omega)^2} [\sqrt{2 + 8\pi\tau\omega} - \sqrt{2}]^2$$

$$I_{Dpeak} = \omega C \sqrt{2V_p V_r - V_r^2} + \frac{V_p - V_r}{R_L}$$

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Peak Detector – Using Ideal Diode (Exp. 1)



$v_S = 10V \sin(2\pi ft)$
 $f = 1\text{KHz}$
 $R_L = 1\text{K}\Omega$
 $C = 100\mu\text{F}$

$I_{Dmax} = 6.28\text{A}$

	(F1)	(F2)
V_r	0.1V	0.098V
I_{Dpeak}	888.58mA	886.38mA

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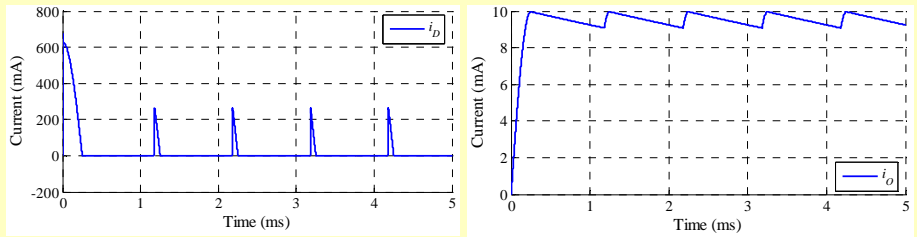
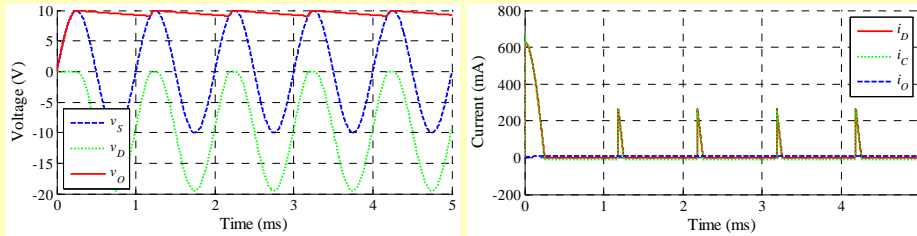
6

Diode Applications: Peak Detector

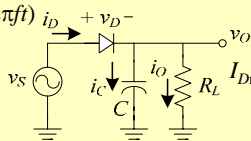
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Peak Detector – Using Ideal Diode (Exp. 2)



$v_S = 10V \sin(2\pi ft)$
 $f = 1\text{KHz}$
 $R_L = 1\text{K}\Omega$
 $C = 10\mu\text{F}$



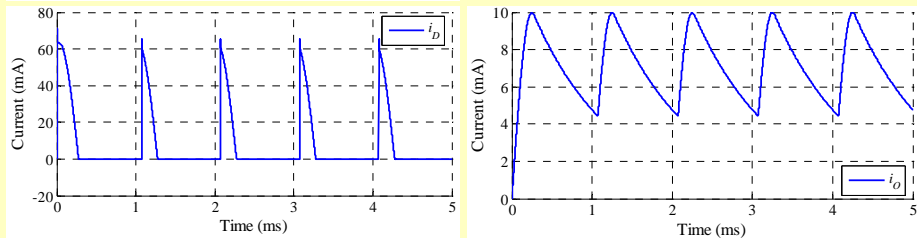
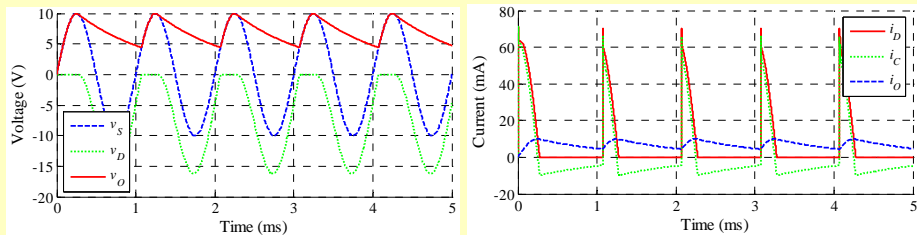
$I_{Dmax} = 0.628A$

	(F1)	(F2)
V_r	1V	0.931V
I_{Dpeak}	280.99mA	273.85mA

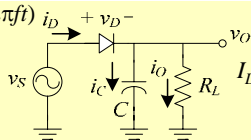
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Peak Detector – Using Ideal Diode (Exp. 3)



$v_S = 10V \sin(2\pi ft)$
 $f = 1\text{KHz}$
 $R_L = 1\text{K}\Omega$
 $C = 1\mu\text{F}$



$I_{Dmax} = 62.8mA$

	(F1)	(F2)
V_r	10V	7.98V
I_{Dpeak}	88.86mA	63.56mA

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