

## Buck Converter Using $\mu$ PC494

Table of component models used in the DesignKit

Code	Classification	Part No.	Manufacturer	SPEC
IC1	SWITCHING REGULATOR CONTROL CIRCUIT	$\mu$ PC494	NEC Electronics Corporation	
Q1	Bipolar Junction Transistor	2SA1680	Toshiba	$V_{CE0}=-50V, I_C=-2A$
D1	Schottky Barrier Diode	XBS104V14R	TOREX SEMICONDUCTOR	40V, 1A (IFSM=20A)
Lo	Choke coil	8RHB	TOKO	330uF ,0.54A
Co	Aluminum Electrolytic Capacitor	RJJ-35V221MG5-T20	ELNA Co.,Ltd.	220uF ,35V

Simulation files are stored in folders, as shown in list below.

### Simulations

### Folder name

- |   |            |
|---|------------|
| 1. Transient simulation (@ $V_{IN}=12V, R_L=10\Omega$ ).....        | Transient  |
| 2. Efficiency (@ $V_{IN}=12V, R_L=10\Omega$ ).....                  | Efficiency |
| 3. Step-load response (@ $V_{IN}=12V, I_{OUT}=250mA / 500mA$ )..... | Step-load  |
| 4. Power switch devices losses (Q1 and D1).....                     | Losses     |
| 5. Output inductor.....   | Lout       |
| 6. Output capacitor.....  | Cout       |
| 7. Voltage control feedback loop.....                               | Feedback   |

※ Please copy the folder named “Simulations” to your PC. Library files (.lib) are added already.

## Design document: **Buck Converter Using $\mu$ PC494**

### Contents

1. Buck Converter using  $\mu$ PC494:  $V_{IN}=12V$ ,  $V_{OUT}=5V@0.5A$ 
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  - 1.3 Output ripple voltage
  - 1.4 Efficiency
  - 1.5 Step-load response
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  - 2.2 Basic operation waveforms
3. Switching Transistor Q1
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  - 3.3 Transistor Q1 losses
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  - 4.4 Schottky barrier diode Standard model
5. Output Inductor Value
6. Output Capacitor
7. Voltage Control Feedback Loop