# XC8101 Series

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ETR2501-006b

## High Side Load Switch with Low Supply Current

## ■ GENERAL DESCRIPTION

The XC8101 series is a low supply current load switch IC with ON/OFF control and output current protection which integrates P-channel MOSFET. The XC8101 is suited for power distribution switch. With connecting to the output pin of step-down DC/DC converters, the CE pin controls ON/OFF for each distribution switch to deliver power per requirements and maximize total power efficiency. As result, the XC8101 helps extend battery life and product operation time. The XC8101 is available in an ultra small package USP-4 and does not require any external capacitors so that it can provide small power unit design and board space saving. When low signal is input to the CE pin, the XC8101 enters stand-by mode. Even where a load capacitor is connected to the output pin during in the stand-by mode, the internal switch between the $V_{OUT}$ and $V_{SS}$ of the XC8101 enables the electric charge in the load capacitor to be discharged. Because of this discharge function, the $V_{OUT}$ pin voltage falls quickly to $V_{SS}$ level.

The XC8101 contains an over current protection with foldback current circuitry which operates as over current protection and short circuit protection for the output pin.

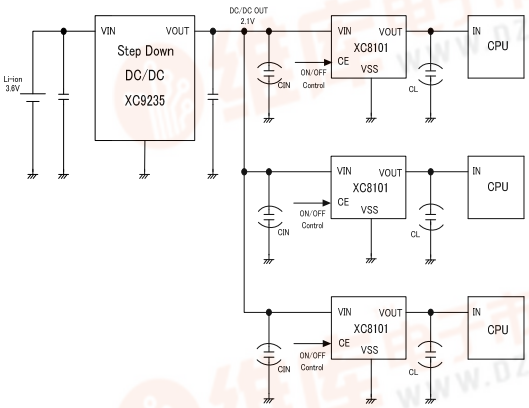
## ■APPLICATIONS

- Mobile phones, Smart phones
- Digital still cameras, Digital video cameras
- Portable games
- Portable equipment

## ■FEATURES

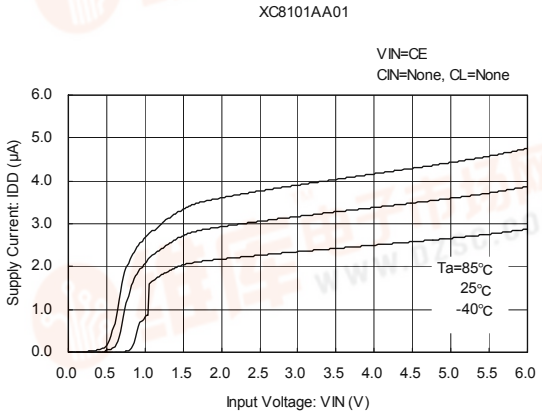
| | |
|---|---|
| On Resistance | : 0.75Ω@ $V_{IN}$=2.9V (TYP.) |
| | : 1.15Ω@ $V_{IN}$=1.8V (TYP.) |
| Output Current | : 200mA |
| | <Current Limit =300mA (TYP.)> |
| Input Voltage Range | : 1.8V～6.0V |
| Power Consumption | : 3.0μA@ $V_{IN}$=1.8V |
| Stand-by Current | : 0.1μA |
| Protection Circuit | : Current limit, 300mA (TYP.) |
| | : Short-circuit Protection, Short current= 30mA (TYP.) |
| ON/OFF Function | : High Active Enable |
| High-Speed Discharge Function | |
| Operating Temperature Range | : -40℃～85℃ |
| Packages | : USP-4, SSOT-24, SOT-25 |
| Environmentally Friendly | : EU RoHS Compliant, Pb Free |

## ■TYPICAL APPLICATION CIRCUIT




## ■ TYPICAL PERFORMANCE CHARACTERISTICS

●Supply Current vs. Input Voltage



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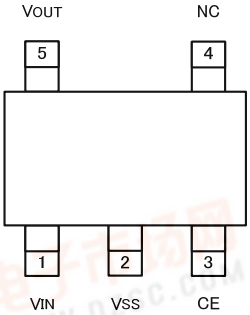
## ■PIN CONFIGURATION




## ■PIN ASSIGNMENT

| PIN NUMBER | | | PIN NAME | FUNCTIONS |
|---|---|---|---|---|
| USP-4 | SOT-25 | SSOT-24 | | |
| 4 | 1 | 4 | $V_{IN}$ | Power Input |
| 1 | 5 | 3 | $V_{OUT}$ | Output |
| 2 | 2 | 2 | $V_{SS}$ | Ground |
| 3 | 3 | 1 | CE | ON/OFF Control |
| - | 4 | - | NC | No Connection |

## ■PRODUCT CLASSIFICATION

●Ordering Information

XC8101①②③④⑤⑥-⑦ (*1)

| DESIGNATOR | DESCRIPTION | SYMBOL | DESCRIPTION |
|---|---|---|---|
| ① | CE pin logic | A | High active enable |
| ② | $C_L$ Discharge Function | A | Output capacitor ($C_L$) auto-discharge function integrated |
| ③④ | Internal Standard Number | 01 | Fixed |
| ⑤⑥-⑦ | Packages Taping Type (*2) | GR-G | USP-4 |
| | | MR-G | SOT-25 |
| | | NR-G | SSOT-24 |

| SERIES | CE | IC OPERATIONAL STATUS ON/OFF |
|---|---|---|
| XC8101AA01 | High | ON |
| | Low | OFF |



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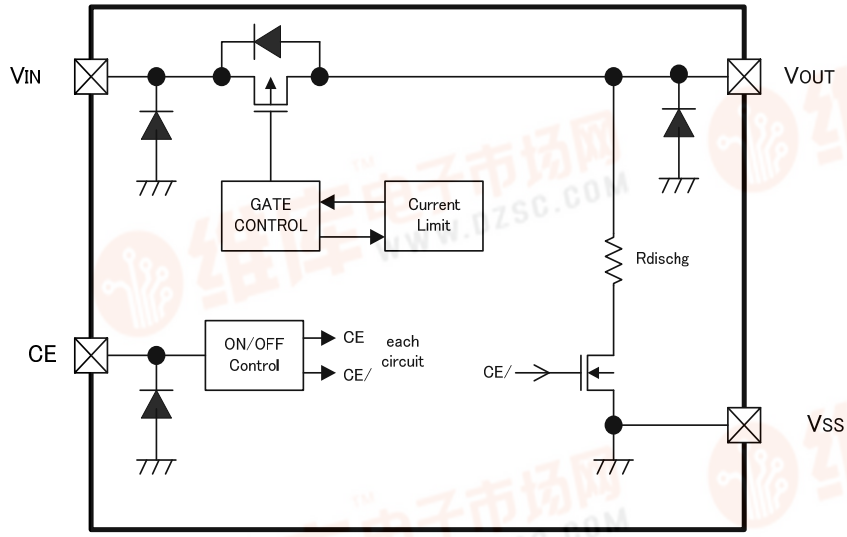
## ■BLOCK DIAGRAM

●XC8101AA Series




## ■ABSOLUTE MAXIMUM RATINGS

Ta=25℃

| PARAMETER | | SYMBOL | RATINGS | UNITS |
|---|---|---|---|---|
| Input Voltage | | $V_{IN}$ | $V_{SS}$-0.3～+6.5 | V |
| Output Current | | $I_{OUT}$ | 450 * | mA |
| Output Voltage | | $V_{OUT}$ | $V_{SS}$-0.3～$V_{IN}$ | V |
| CE Input Voltage | | $V_{CE}$ | $V_{SS}$-0.3～+6.5 | V |
| Power Dissipation | USP-4 | Pd | 120 | mW |
| | SOT-25 | | 250 | |
| | SSOT-24 | | 150 | |
| Operating Temperature Range | | Topr | -40～+85 | ℃ |
| Storage Temperature Range | | Tstg | -55～+125 | ℃ |



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| PARAMETER | SYMBOL | CONDITIONS | MIN. | TYP. | MAX. |
|---|---|---|---|---|---|


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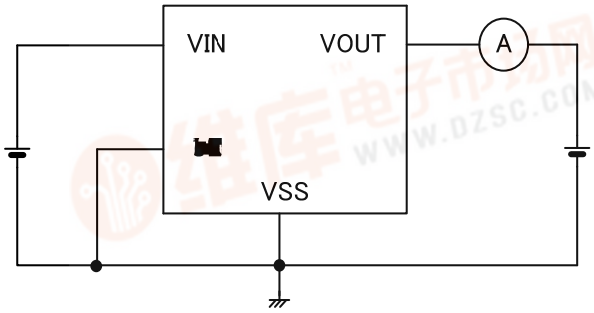
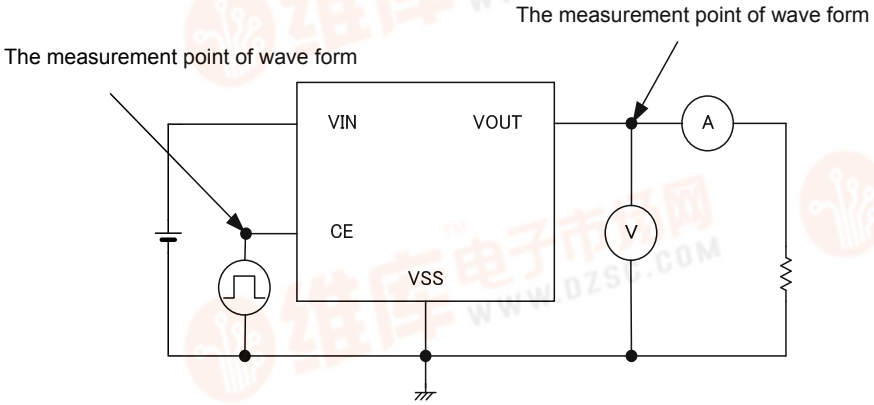
## ■TEST CIRCUITS (Continued)

Circuit ④




Circuit ⑤



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<CE Pin>
The XC8101 enables an output P-channel MOSFET switch and the IC internal circuitry to turn off by the signal to the CE pin. In the shutdown mode, the $V_{OUT}$ pin will be pulled down to the $V_{SS}$ by the $C_L$ auto-discharge function.
The output voltage becomes unstable when the CE pin is opened. If the input voltage to the CE pin is within the specified threshold voltages, the logic is fixed and the XC8101 will operate normally. However, supply current may increase as a result of the shoot-through current of internal circuitry when the medium level voltage is input to the CE pin.

＜Input Capacitor＞
The XC8101 works well without an output capacitor（$C_L$）. However, an output capacitor such as a bypass capacitor is tied up to the output side of the IC, input voltage ringing may occur when the IC is turned on. In order to reduce the ringing, an input capacitor with the value of 1μF or more is requested to attach between $V_{IN}$ pin and $V_{SS}$ pin. The capacitor should be tied and placed as close as the IC.

<CL Auto-Discharge Function>
The XC8101A contains a $C_L$ auto-discharge resistor and an N-channel transistor between the $V_{OUT}$ pin and the $V_{SS}$ pin. The XC8101A quickly discharge the electric charge in the output capacitor ($C_L$) when a low signal to the CE pin is input to turn off a whole IC circuit. . The $C_L$ auto-discharge resistance is set at 900Ω（$V_{OUT}$=eai(har..7(dthe@T6 0 0 6 38649 5122.8604 Tm0 T22 Tc0 Tw(IN



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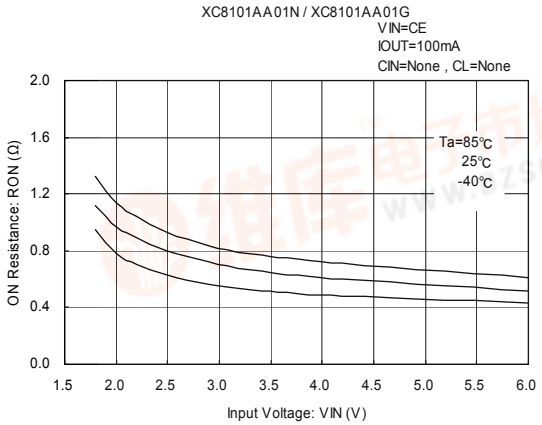
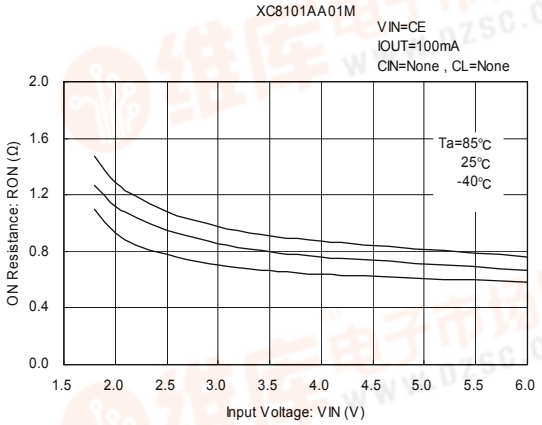
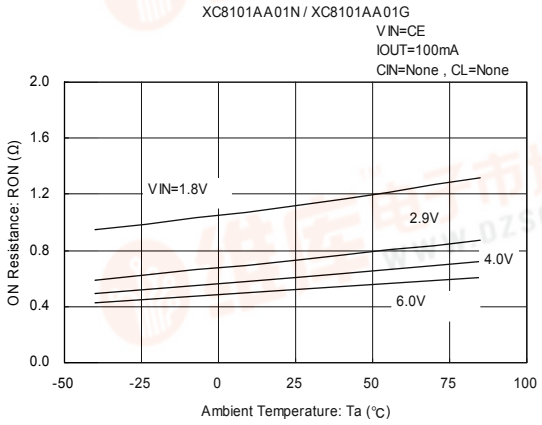
## ■TYPICAL PERFORMANCE CHARACTERISTICS

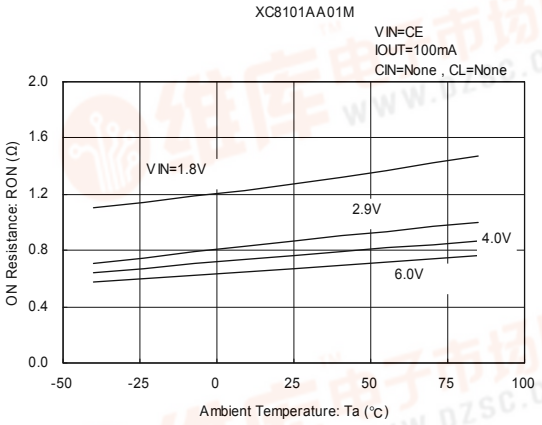
(1) ON Resistance vs. Input Voltage



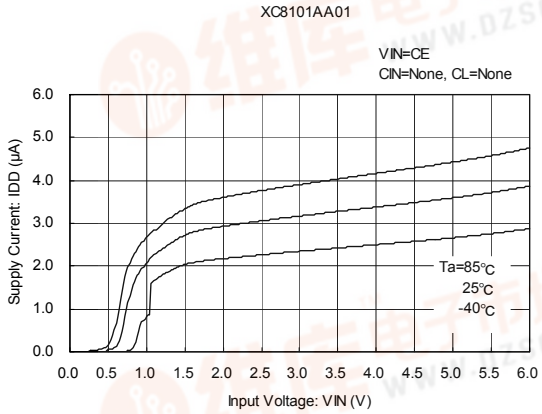




(2) ON Resistance vs. Ambient Temperature




(3) Supply Current vs. Input Voltage

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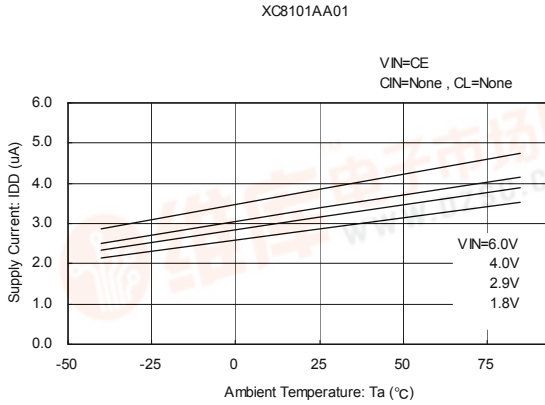




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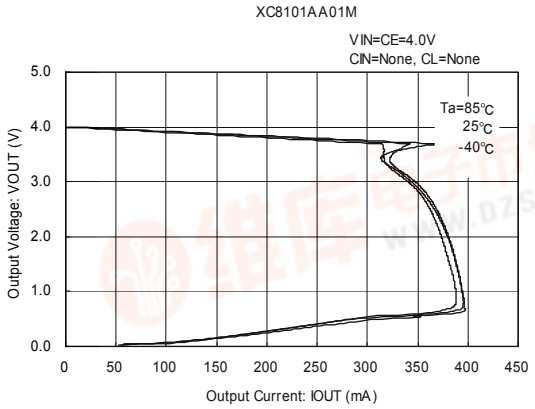




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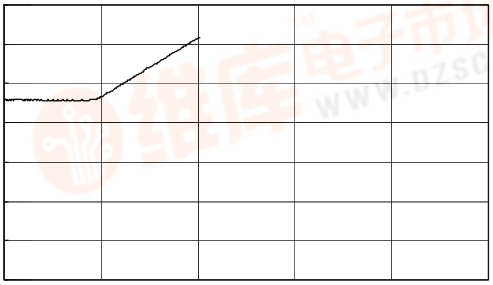



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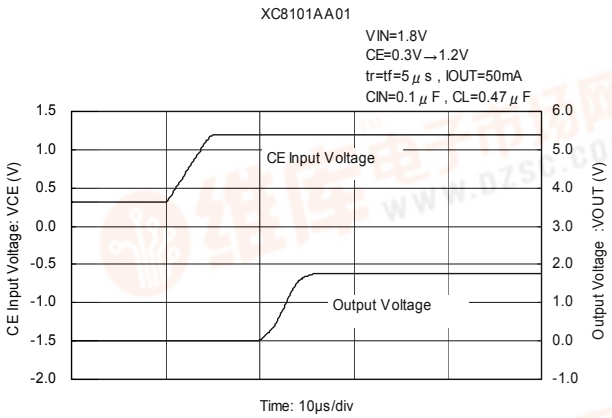


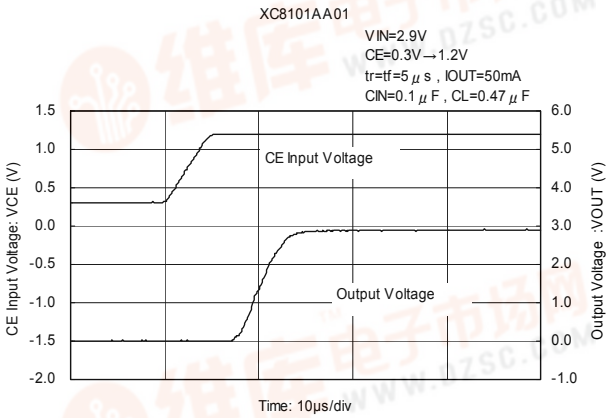


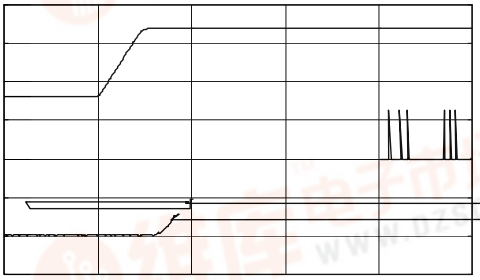

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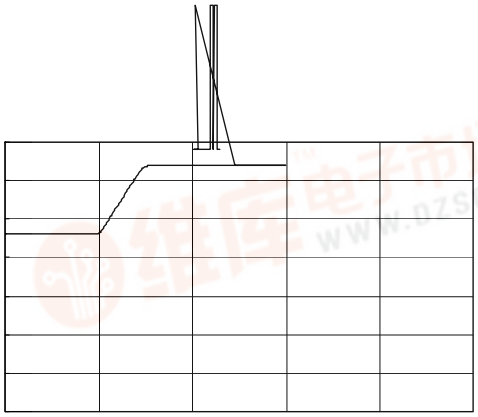



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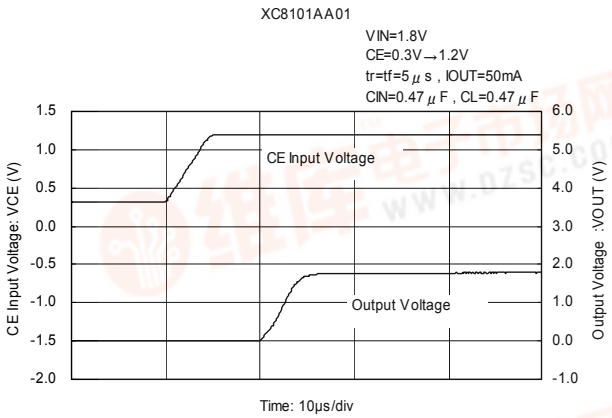


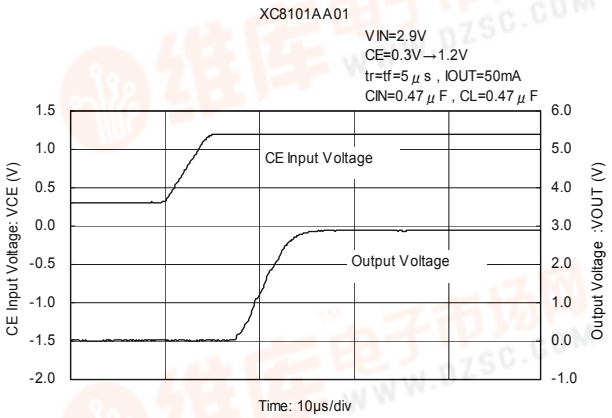


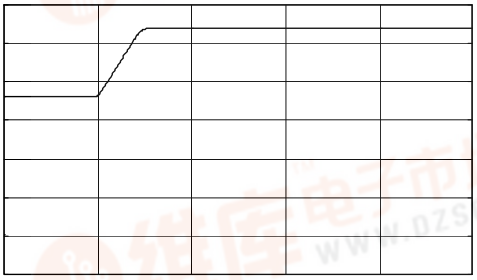



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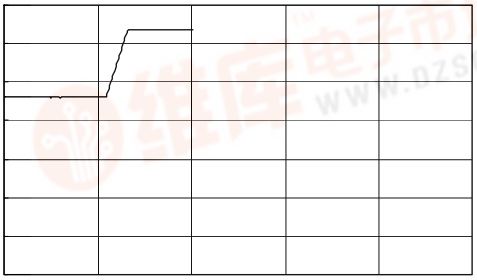



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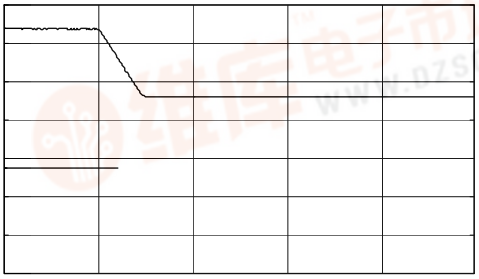

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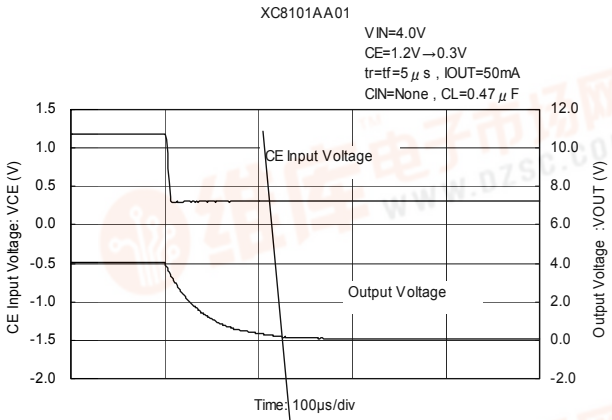


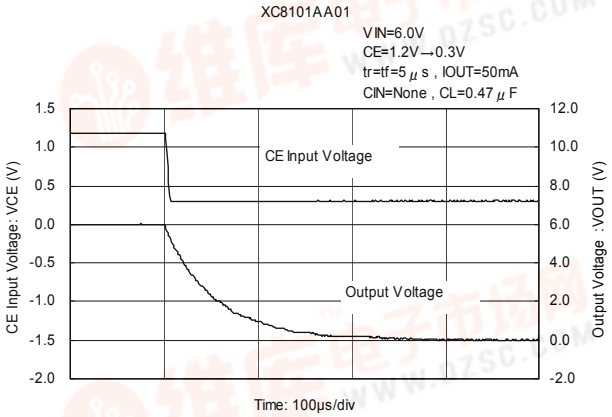


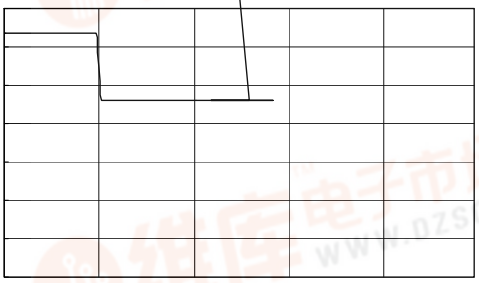



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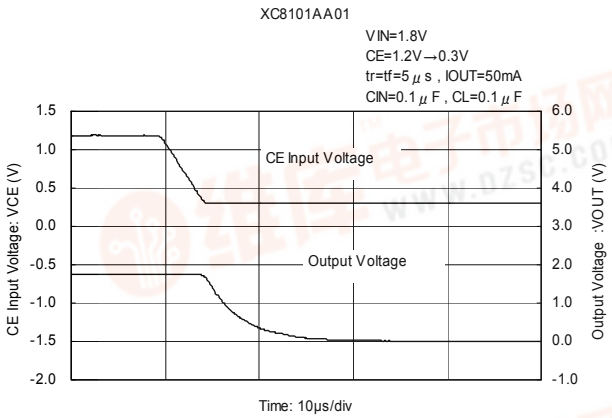


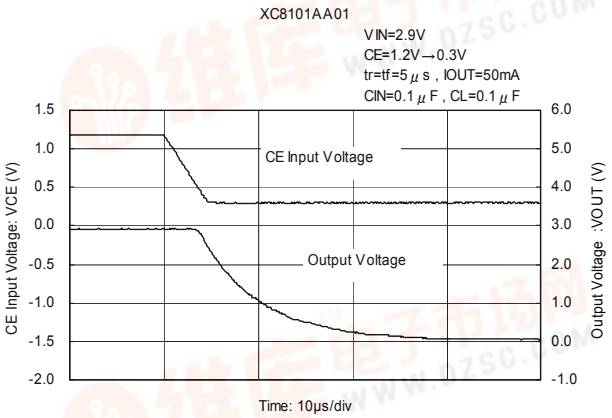


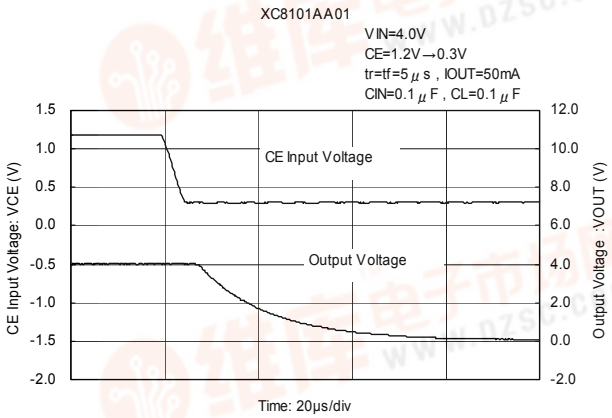


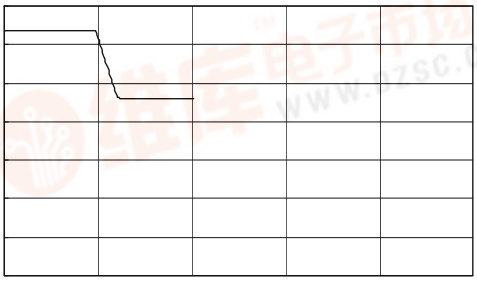



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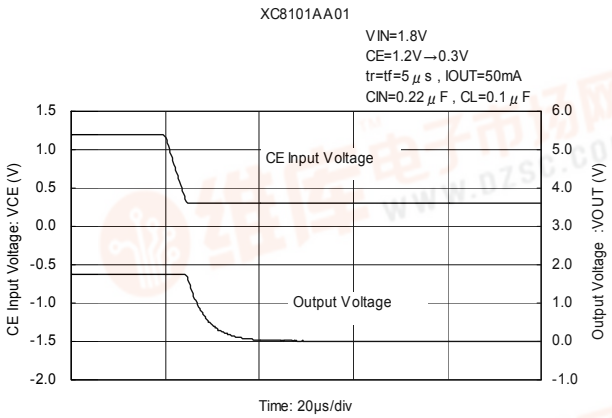


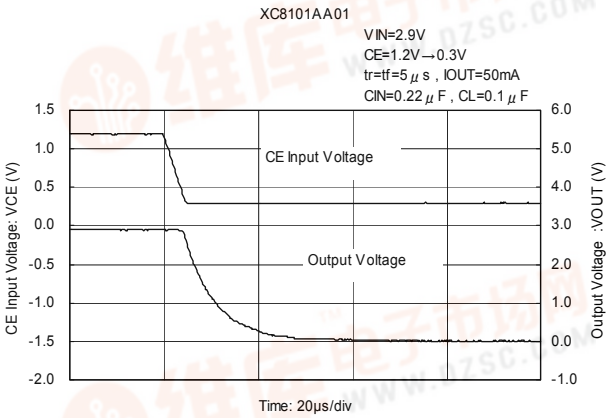


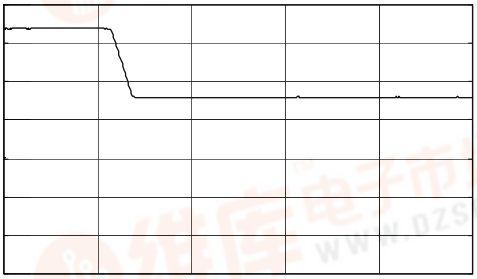



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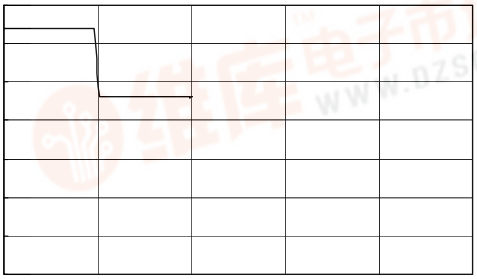



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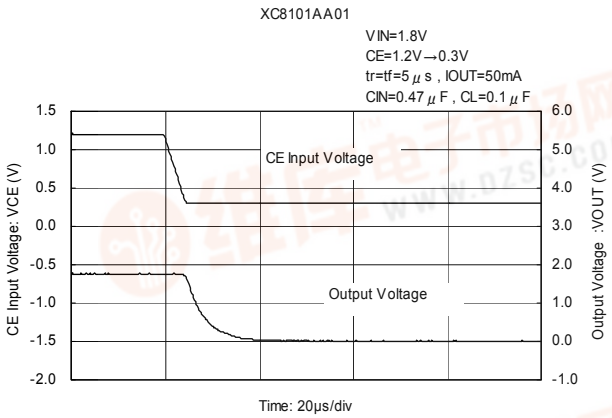


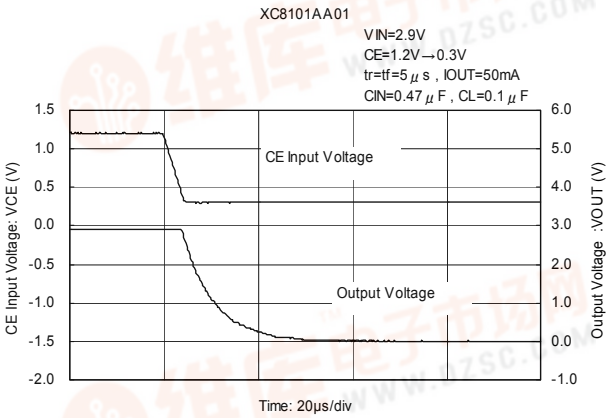


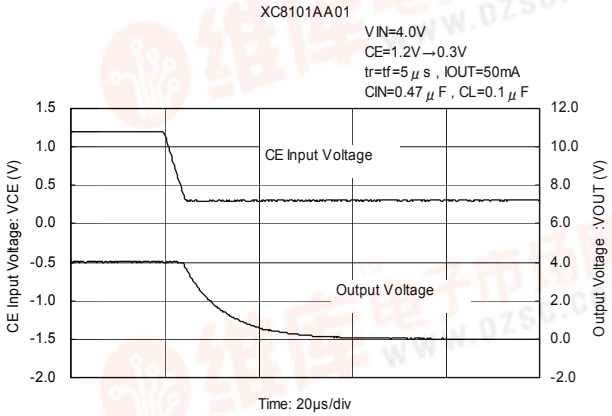


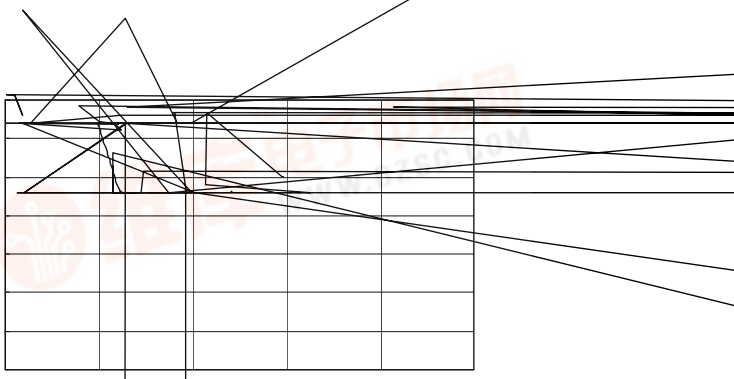



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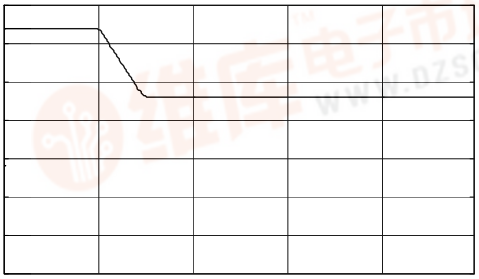

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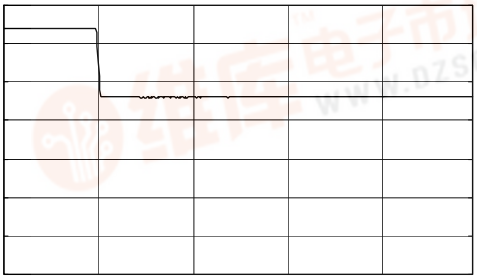



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