

CMOS IC Application Note

S-19190 Series Usage Guidelines

Rev.1.0_01

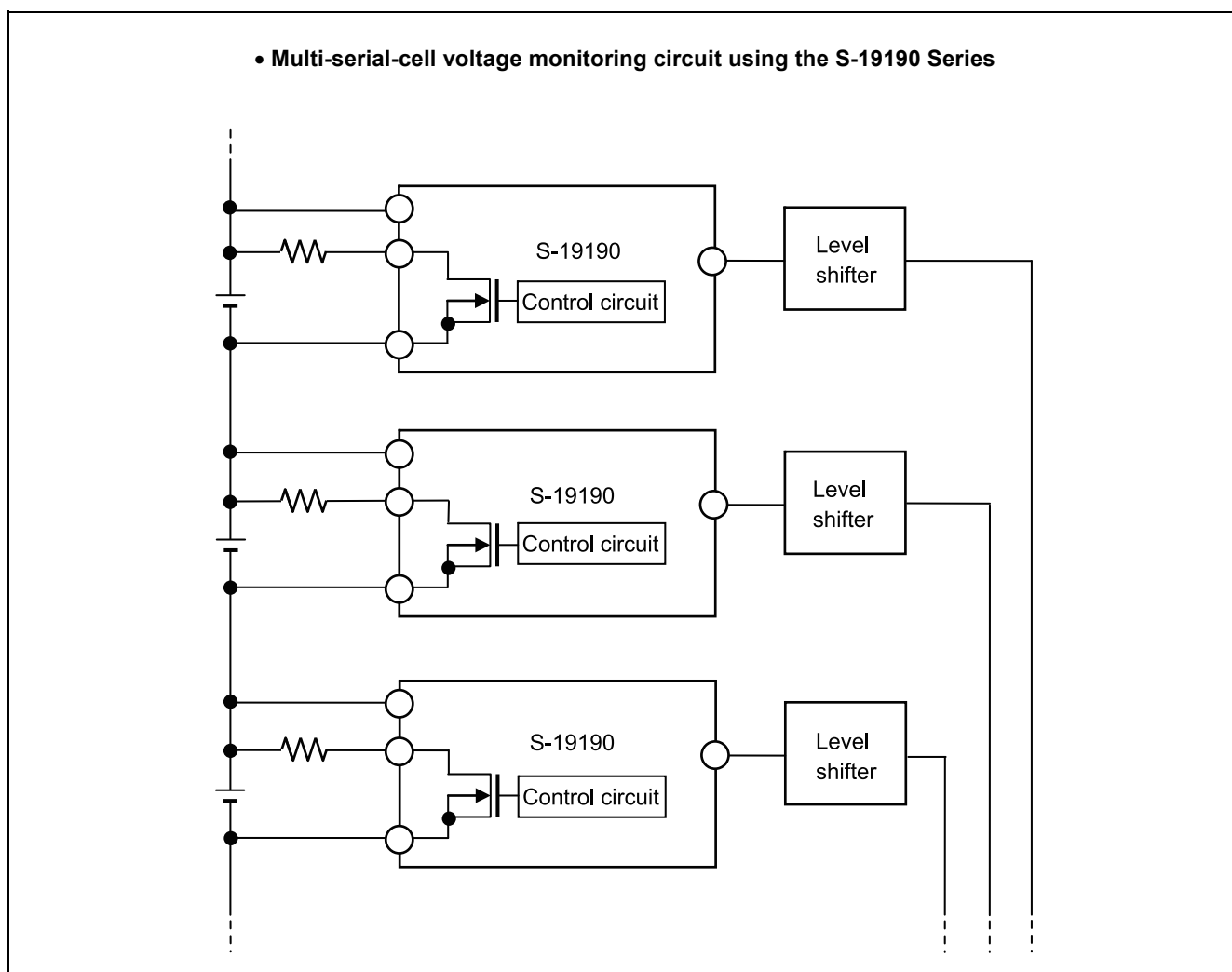
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The S-19190 Series is a voltage monitoring IC with a cell balancing function and includes a high-accuracy voltage detection circuit and a delay circuit.

This application note is a guideline on the typical connection examples when using the S-19190 Series for applications. Refer to the datasheet for details and spec of this IC.

It is possible to configure the following applications with the S-19190 Series.

- Multi-serial-cell voltage monitoring circuit with cell balancing function



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1. Voltage monitoring circuit using the S-19190 Series

1. 1 Connection example of voltage monitoring circuit with cell balancing function

Figure 1 shows an example of the S-19190 Series voltage monitoring circuit with a cell balancing function.

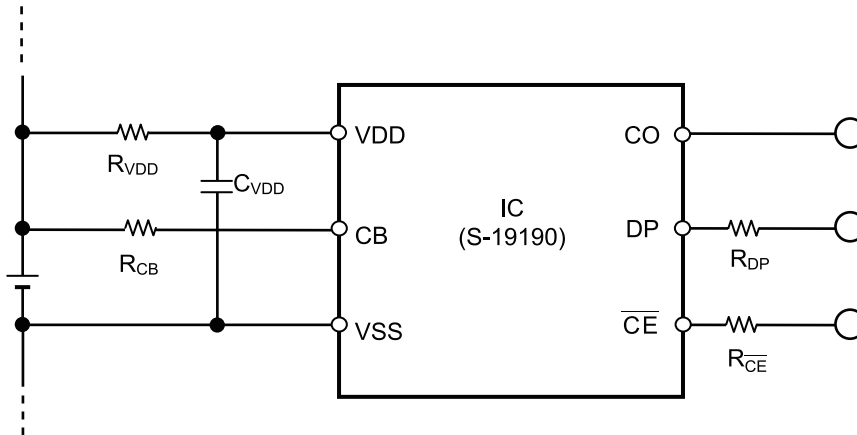


Figure 1

Table 1

Symbol	Typical	Unit	Components Name	Maker	Remark
IC	–	–	S-19190	ABLIC Inc.	Necessary
R_{VDD}	330	Ω	MCR03EZP	ROHM CO., LTD.	Recommended
R_{CB}	–	–	–	–	User setting
R_{DP}	1	$k\Omega$	MCR03EZP	ROHM CO., LTD.	Recommended
$R_{\overline{CE}}$	1	$k\Omega$	MCR03EZP	ROHM CO., LTD.	Recommended
C_{VDD}	0.1	μF	GCM188	Murata Manufacturing Co., Ltd.	Recommended

Caution 1. The above constants may be changed without notice.

2. The example of connection shown above and the constant do not guarantee proper operation. Perform thorough evaluation using the actual application to set the constant.

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2. Example of application circuit

2. 1 Voltage monitoring circuit connection example with an external MOS FET added to increase cell balancing current

Figure 2 shows a connection example with an external MOS FET added to the S-19190 Series to increase cell balancing current.

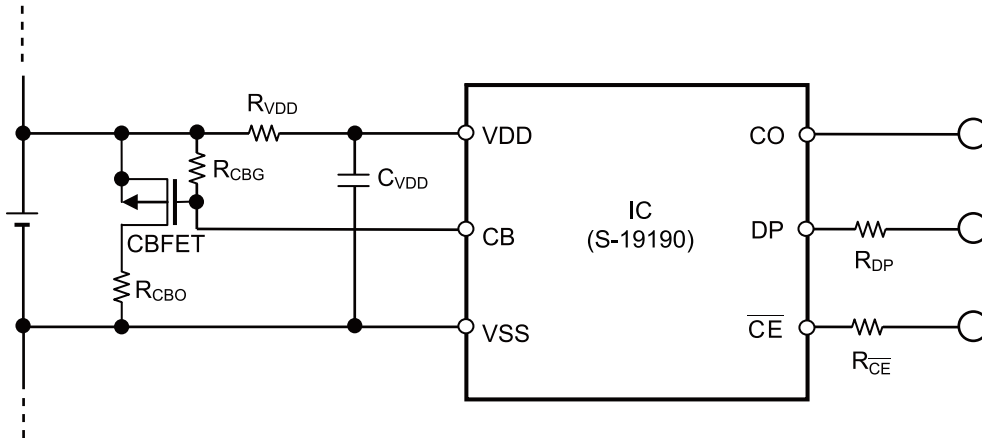


Figure 2

Table 2

Symbol	Typical	Unit	Components Name	Maker	Remark
IC	–	–	S-19190	ABLIC Inc.	Necessary
R_{VDD}	330	Ω	MCR03EZP	ROHM CO., LTD.	Recommended
R_{DP}	1	$k\Omega$	MCR03EZP	ROHM CO., LTD.	Recommended
$R_{\overline{CE}}$	1	$k\Omega$	MCR03EZP	ROHM CO., LTD.	Recommended
C_{VDD}	0.1	μF	GCM188	Murata Manufacturing Co., Ltd.	Recommended
R_{CBG}^{*1}	1	$M\Omega$	MCR03EZP	ROHM CO., LTD.	Recommended
R_{CBO}^{*2}	–	–	–	–	User setting
$CBFET^{*2}$	–	–	–	–	User setting

*1. Set R_{CBG} to a large value so that it can turn on CBFET.

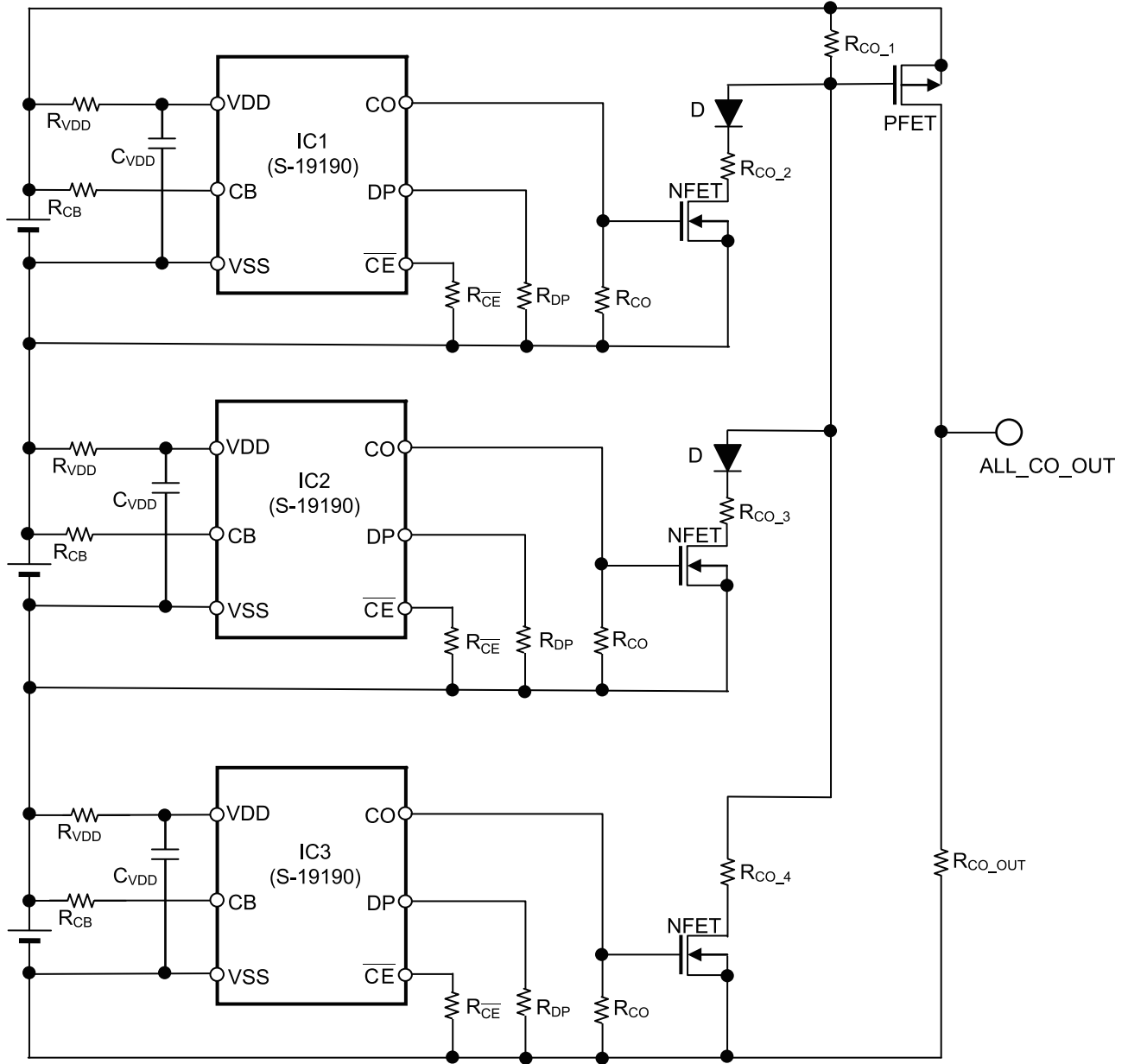
*2. The cell balancing current can be adjusted by R_{CBO} . Set the resistance of CBFET to a value smaller than R_{CBO} .

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2. The example of connection shown above and the constant do not guarantee proper operation. Perform thorough evaluation using the actual application to set the constant.

2. 2 Connection example of 3-serial cell voltage monitoring circuit with cell balancing function

Figure 3 shows an example of the S-19190 Series 3-serial cell voltage monitoring circuit with a cell balancing function.



Remark Refer to "3. External components list" for constants of external components.

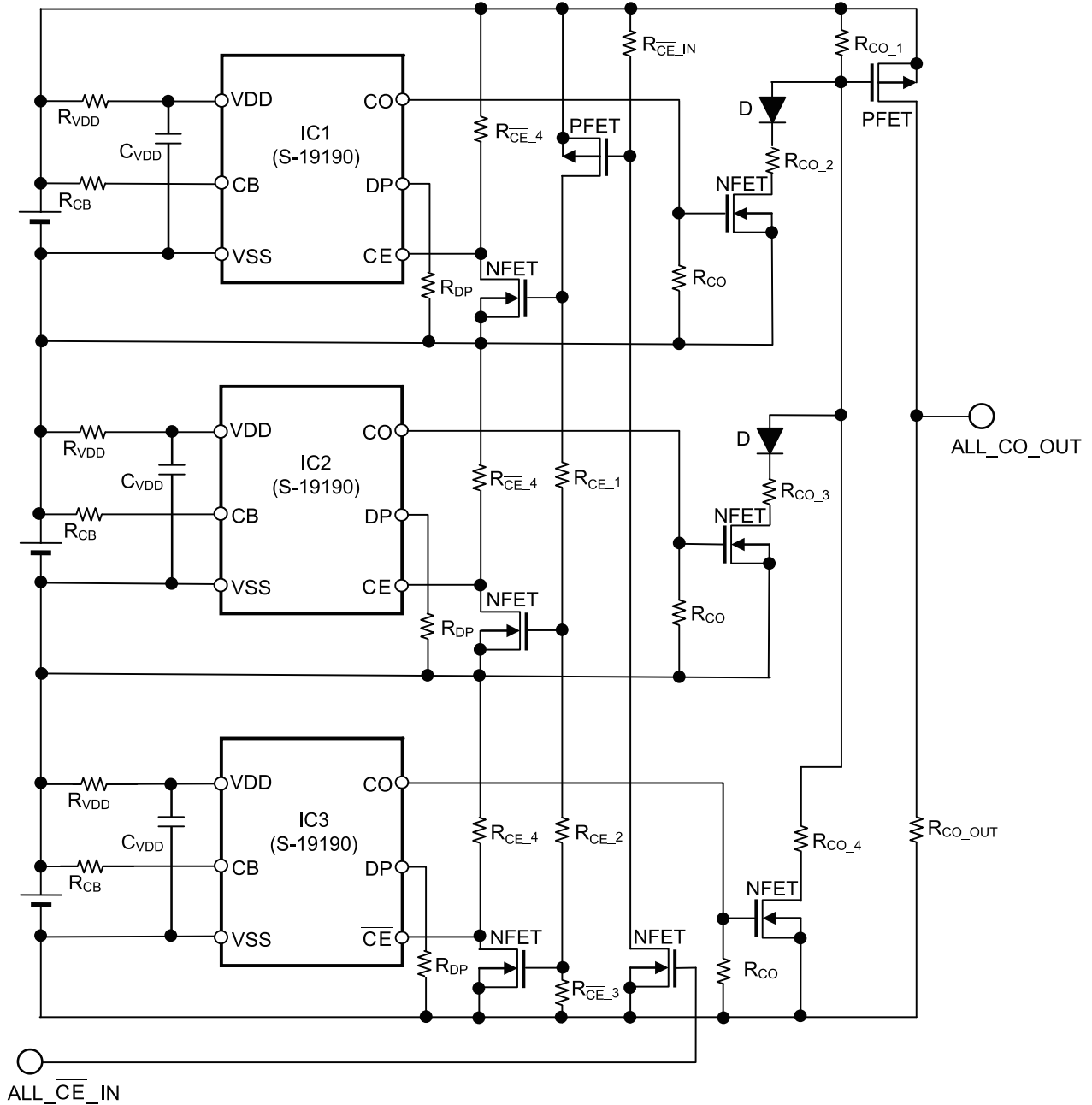
Figure 3

- Caution 1. The above constants may be changed without notice.
 2. The example of connection shown above and the constant do not guarantee proper operation. Perform thorough evaluation using the actual application to set the constant.

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2.3 Connection example of 3-serial cell voltage monitoring circuit with power saving mode control function and cell balancing function

Figure 4 shows an example of the S-19190 Series 3-serial cell voltage monitoring circuit with a power saving mode control function and a cell balancing function.



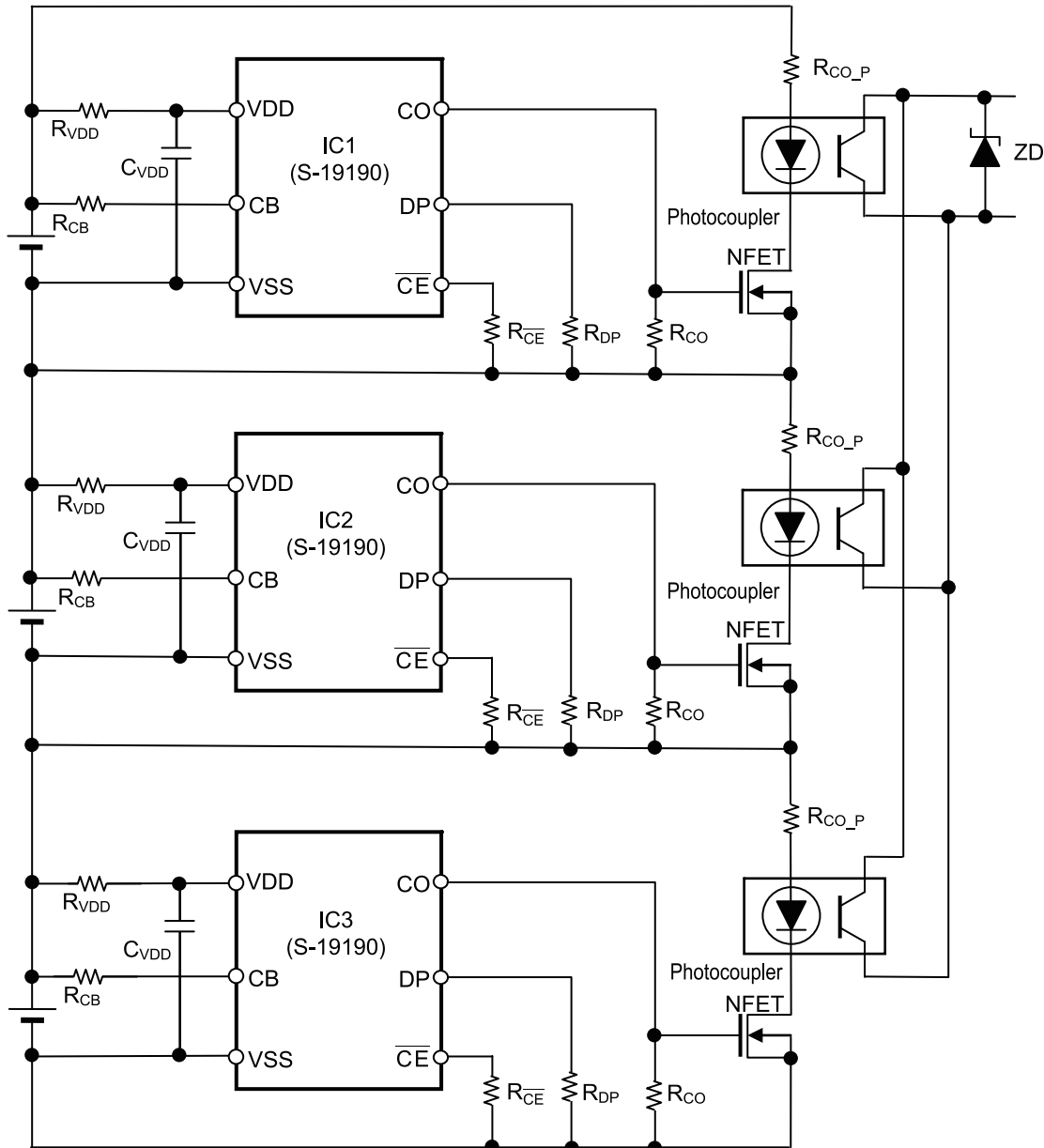
Remark Refer to "3. External components list" for constants of external components.

Figure 4

- Caution 1.** The above constants may be changed without notice.
2. The example of connection shown above and the constant do not guarantee proper operation. Perform thorough evaluation using the actual application to set the constant.

2. 4 Connection example of 3-serial cell voltage monitoring circuit with cell balancing function when using a photocoupler

Figure 5 shows an example of the S-19190 Series 3-serial cell voltage monitoring circuit with a cell balancing function when using a photocoupler.



Remark Refer to "3. External components list" for constants of external components.

Figure 5

- Caution 1.** The above constants may be changed without notice.
2. The example of connection shown above and the constant do not guarantee proper operation. Perform thorough evaluation using the actual application to set the constant.

S-19190 Series Usage Guidelines**3. External components list**

Table 3 shows external components in the connection examples in Figure 3 to Figure 5.

Table 3

Symbol	Typical	Unit	Components Name	Maker	Remark
IC1 to IC3	–	–	S-19190	ABLIC Inc.	Necessary
R_{VDD}	330	Ω	MCR03EZP	ROHM CO., LTD.	Recommended
R_{CB}	–	–	–	–	User setting
R_{DP}	1	$k\Omega$	MCR03EZP	ROHM CO., LTD.	Recommended
R_{CE}	1	$k\Omega$	MCR03EZP	ROHM CO., LTD.	Recommended
R_{CE_IN}	1	$M\Omega$	MCR03EZP	ROHM CO., LTD.	Recommended
R_{CE_1}	1	$M\Omega$	MCR03EZP	ROHM CO., LTD.	Recommended
R_{CE_2}	1	$M\Omega$	MCR03EZP	ROHM CO., LTD.	Recommended
R_{CE_3}	1	$M\Omega$	MCR03EZP	ROHM CO., LTD.	Recommended
R_{CE_4}	10	$k\Omega$	MCR03EZP	ROHM CO., LTD.	Recommended
C_{VDD}	0.1	μF	GCM188	Murata Manufacturing Co., Ltd.	Recommended
NFET	–	–	2SK1590C(0)	Renesas Electronics Corporation	Recommended
PFET	–	–	2SJ210C(0)	Renesas Electronics Corporation	Recommended
R_{CO}	1	$M\Omega$	MCR03EZP	ROHM CO., LTD.	Recommended
R_{CO_1}	1	$M\Omega$	MCR03EZP	ROHM CO., LTD.	Recommended
R_{CO_2}	0	Ω	MCR03EZP	ROHM CO., LTD.	Recommended
R_{CO_3}	1	$M\Omega$	MCR03EZP	ROHM CO., LTD.	Recommended
R_{CO_4}	2	$M\Omega$	MCR03EZP	ROHM CO., LTD.	Recommended
R_{CO_P}	–	–	–	–	User setting
D	–	–	1SS355VMFH	ROHM CO., LTD.	Recommended
R_{CO_OUT}	1	$M\Omega$	MCR03EZP	ROHM CO., LTD.	Recommended
Photocoupler	–	–	–	–	–
ZD	–	–	–	–	–

Caution 1. The above constants may be changed without notice.

2. The example of connection shown above and the constant do not guarantee proper operation. Perform thorough evaluation using the actual application to set the constant.
3. Select external components considering its pressure when configuring a series voltage monitoring circuit with 5 cells or more.

4. Precaution

- The usage described in this application note is typical example with our IC.
Perform evaluation fully before use.
- When designing for mass production using an application circuit described herein, the product deviation and temperature characteristics of the external components should be taken into consideration. ABLIC Inc. shall not bear any responsibility for patent infringements related to products using the circuits described herein.
- ABLIC Inc. claims no responsibility for any disputes arising out of or in connection with any infringement by products including this IC of patents owned by a third party.

5. Related source

Refer to the following datasheet for details of the S-19190 Series.

S-19190 Series Datasheet

The information described in this application note and the datasheet is subject to change without notice.

Contact our sales office for details.

Regarding the newest version of the datasheet, select product category and product name on our website, and download the PDF file.

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