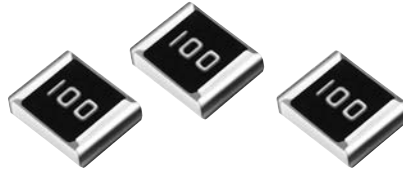


# Product Change Notification

## CHIP RESISTORS



REVISED August 11, 2016

REVISED July 11, 2019

## **Bourns® Model CRA, CRE and CRF Series High Power Current Sense Chip Resistors**

### *TCR and Resistance Value Range Improvements*

The *Temperature Coefficient of Resistance (TCR)* value of the Bourns® Model [CRA](#), [CRE](#), and [CRF](#) Series Chip Resistors has been improved from  $\pm 275$ ,  $\pm 100$ , or  $\pm 75$  ppm/°C to  $\pm 50$  ppm/°C, uniformly. This improvement impacts all sizes and resistance values of the Model CRA, CRE, and CRF metal strip chip resistor series. The TCR code “Z” ( $\pm 50$  ppm/°C) should be used in all part numbers. The table on pages 2 and 3 shows these changes.

The available resistance range of the CRF Series 0805 size has also been extended from 0.005 - 0.02 ohms to 0.003 - 0.02 ohms.

In summary, the product's TCR has been improved to  $\pm 50$  ppm/°C for all sizes and resistance values. This change has no impact to the fit and form of the product. Electrical performance is improved and quality and reliability criteria have been tightened.

Implementation dates are as follows:

*Bourns will begin phasing in this process: **December, 2016***

*First date code applying the above changes: **1648***

If you have any questions or need additional information, please feel free to contact [Customer Service/ Inside Sales](#).

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| Part Number        | Description                        | Part Number | Description                        |
|--------------------|------------------------------------|-------------|------------------------------------|
| CRA2512-FZ-R010ELF | ResMetalStrip 2512 R010 1% 3W TC75 | No change   | ResMetalStrip 2512 R010 1% 3W TC50 |
| CRA2512-FZ-R015ELF | ResMetalStrip 2512 R015 1% 3W TC75 | No change   | ResMetalStrip 2512 R015 1% 3W TC50 |
| CRA2512-FZ-R018ELF | ResMetalStrip 2512 R018 1% 3W TC75 | No change   | ResMetalStrip 2512 R018 1% 3W TC50 |
| CRA2512-FZ-R020ELF | ResMetalStrip 2512 R020 1% 3W TC75 | No change   | ResMetalStrip 2512 R020 1% 3W TC50 |
| CRA2512-FZ-R025ELF | ResMetalStrip 2512 R025 1% 3W TC75 | No change   | ResMetalStrip 2512 R025 1% 3W TC50 |
| CRA2512-FZ-R030ELF | ResMetalStrip 2512 R030 1% 3W TC75 | No change   | ResMetalStrip 2512 R030 1% 3W TC50 |
| CRA2512-FZ-R040ELF | ResMetalStrip 2512 R040 1% 3W TC75 | No change   | ResMetalStrip 2512 R040 1% 3W TC50 |
| CRA2512-FZ-R050ELF | ResMetalStrip 2512 R050 1% 3W TC75 | No change   | ResMetalStrip 2512 R050 1% 3W TC50 |
| CRA2512-FZ-R060ELF | ResMetalStrip 2512 R060 1% 3W TC75 | No change   | ResMetalStrip 2512 R060 1% 3W TC50 |
| CRA2512-FZ-R070ELF | ResMetalStrip 2512 R070 1% 3W TC75 | No change   | ResMetalStrip 2512 R070 1% 3W TC50 |
| CRA2512-FZ-R075ELF | ResMetalStrip 2512 R075 1% 3W TC75 | No change   | ResMetalStrip 2512 R075 1% 3W TC50 |
| CRA2512-FZ-R080ELF | ResMetalStrip 2512 R080 1% 3W TC75 | No change   | ResMetalStrip 2512 R080 1% 3W TC50 |
| CRA2512-FZ-R100ELF | ResMetalStrip 2512 R100 1% 3W TC75 | No change   | ResMetalStrip 2512 R100 1% 3W TC50 |
| CRA2512-JZ-R010ELF | ResMetalStrip 2512 R010 5% 3W TC75 | No change   | ResMetalStrip 2512 R010 5% 3W TC50 |
| CRA2512-JZ-R017ELF | ResMetalStrip 2512 R017 5% 3W TC75 | No change   | ResMetalStrip 2512 R017 5% 3W TC50 |
| CRA2512-JZ-R020ELF | ResMetalStrip 2512 R020 5% 3W TC75 | No change   | ResMetalStrip 2512 R020 5% 3W TC50 |
| CRA2512-JZ-R025ELF | ResMetalStrip 2512 R025 5% 3W TC75 | No change   | ResMetalStrip 2512 R025 5% 3W TC50 |
| CRA2512-JZ-R030ELF | ResMetalStrip 2512 R030 5% 3W TC75 | No change   | ResMetalStrip 2512 R030 5% 3W TC50 |
| CRA2512-JZ-R034ELF | ResMetalStrip 2512 R034 5% 3W TC75 | No change   | ResMetalStrip 2512 R034 5% 3W TC50 |
| CRA2512-JZ-R040ELF | ResMetalStrip 2512 R040 5% 3W TC75 | No change   | ResMetalStrip 2512 R040 5% 3W TC50 |
| CRA2512-JZ-R045ELF | ResMetalStrip 2512 R045 5% 3W TC75 | No change   | ResMetalStrip 2512 R045 5% 3W TC50 |
| CRA2512-JZ-R050ELF | ResMetalStrip 2512 R050 5% 3W TC75 | No change   | ResMetalStrip 2512 R050 5% 3W TC50 |
| CRA2512-JZ-R055ELF | ResMetalStrip 2512 R055 5% 3W TC75 | No change   | ResMetalStrip 2512 R055 5% 3W TC50 |
| CRA2512-JZ-R060ELF | ResMetalStrip 2512 R060 5% 3W TC75 | No change   | ResMetalStrip 2512 R060 5% 3W TC50 |
| CRA2512-JZ-R065ELF | ResMetalStrip 2512 R065 5% 3W TC75 | No change   | ResMetalStrip 2512 R065 5% 3W TC50 |
| CRA2512-JZ-R070ELF | ResMetalStrip 2512 R070 5% 3W TC75 | No change   | ResMetalStrip 2512 R070 5% 3W TC50 |
| CRA2512-JZ-R075ELF | ResMetalStrip 2512 R075 5% 3W TC75 | No change   | ResMetalStrip 2512 R075 5% 3W TC50 |
| CRA2512-JZ-R080ELF | ResMetalStrip 2512 R080 5% 3W TC75 | No change   | ResMetalStrip 2512 R080 5% 3W TC50 |
| CRA2512-JZ-R085ELF | ResMetalStrip 2512 R085 5% 3W TC75 | No change   | ResMetalStrip 2512 R085 5% 3W TC50 |
| CRA2512-JZ-R095ELF | ResMetalStrip 2512 R095 5% 3W TC75 | No change   | ResMetalStrip 2512 R095 5% 3W TC50 |
| CRA2512-JZ-R100ELF | ResMetalStrip 2512 R100 5% 3W TC75 | No change   | ResMetalStrip 2512 R100 5% 3W TC50 |
| CRE2512-FZ-R001E-2 | ResMetalStrip 2512 R001 1% 2W TC75 | No change   | ResMetalStrip 2512 R001 1% 2W TC50 |
| CRE2512-FZ-R001E-3 | ResMetalStrip 2512 R001 1% 3W TC75 | No change   | ResMetalStrip 2512 R001 1% 3W TC50 |
| CRE2512-FZ-R002E-2 | ResMetalStrip 2512 R002 1% 2W TC75 | No change   | ResMetalStrip 2512 R002 1% 2W TC50 |
| CRE2512-FZ-R002E-3 | ResMetalStrip 2512 R002 1% 3W TC75 | No change   | ResMetalStrip 2512 R002 1% 3W TC50 |
| CRE2512-FZ-R003E-2 | ResMetalStrip 2512 R003 1% 2W TC75 | No change   | ResMetalStrip 2512 R003 1% 2W TC50 |
| CRE2512-FZ-R003E-3 | ResMetalStrip 2512 R003 1% 3W TC75 | No change   | ResMetalStrip 2512 R003 1% 3W TC50 |
| CRE2512-FZ-R004E-2 | ResMetalStrip 2512 R004 1% 2W TC75 | No change   | ResMetalStrip 2512 R004 1% 2W TC50 |
| CRE2512-FZ-R004E-3 | ResMetalStrip 2512 R004 1% 3W TC75 | No change   | ResMetalStrip 2512 R004 1% 3W TC50 |
| CRE2512-FZ-R005E-2 | ResMetalStrip 2512 R005 1% 2W TC75 | No change   | ResMetalStrip 2512 R005 1% 2W TC50 |
| CRE2512-FZ-R005E-3 | ResMetalStrip 2512 R005 1% 3W TC75 | No change   | ResMetalStrip 2512 R005 1% 3W TC50 |
| CRE2512-FZ-R006E-2 | ResMetalStrip 2512 R006 1% 2W TC75 | No change   | ResMetalStrip 2512 R006 1% 2W TC50 |
| CRE2512-FZ-R006E-3 | ResMetalStrip 2512 R006 1% 3W TC75 | No change   | ResMetalStrip 2512 R006 1% 3W TC50 |
| CRE2512-FZ-R007E-2 | ResMetalStrip 2512 R007 1% 2W TC75 | No change   | ResMetalStrip 2512 R007 1% 2W TC50 |
| CRE2512-FZ-R007E-3 | ResMetalStrip 2512 R007 1% 3W TC75 | No change   | ResMetalStrip 2512 R007 1% 3W TC50 |
| CRE2512-FZ-R008E-2 | ResMetalStrip 2512 R008 1% 2W TC75 | No change   | ResMetalStrip 2512 R008 1% 2W TC50 |
| CRE2512-FZ-R008E-3 | ResMetalStrip 2512 R008 1% 3W TC75 | No change   | ResMetalStrip 2512 R008 1% 3W TC50 |

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| Part Number        | Description                            | Part Number        | Description                           |
|--------------------|--|--------------------|---------------------------------------|
| CRE2512-FZ-R009E-2 | ResMetalStrip 2512 R009 1% 2W TC75     | No change          | ResMetalStrip 2512 R009 1% 2W TC50    |
| CRE2512-FZ-R009E-3 | ResMetalStrip 2512 R009 1% 3W TC75     | No change          | ResMetalStrip 2512 R009 1% 3W TC50    |
| CRF0805-FX-R005ELF | ResMetalStrip 0805 R005 1% 500mW TC100 | CRF0805-FZ-R005ELF | ResMetalStrip 0805 R005 1% 500mW TC50 |
| CRF0805-FX-R009ELF | ResMetalStrip 0805 R009 1% 500mW TC100 | CRF0805-FZ-R009ELF | ResMetalStrip 0805 R009 1% 500mW TC50 |
| CRF0805-FX-R010ELF | ResMetalStrip 0805 R010 1% 500mW TC100 | CRF0805-FZ-R010ELF | ResMetalStrip 0805 R010 1% 500mW TC50 |
| CRF0805-FX-R020ELF | ResMetalStrip 0805 R020 1% 500mW TC100 | CRF0805-FZ-R020ELF | ResMetalStrip 0805 R020 1% 500mW TC50 |
| CRF1206-FX-R002ELF | ResMetalStrip 1206 R002 1% 1W TC100    | CRF1206-FZ-R002ELF | ResMetalStrip 1206 R002 1% 1W TC50    |
| CRF1206-FX-R010ELF | ResMetalStrip 1206 R010 1% 1W TC100    | CRF1206-FZ-R010ELF | ResMetalStrip 1206 R010 1% 1W TC50    |
| CRF1206-FZ-R010ELF | ResMetalStrip 1206 R010 1% 1W TC75     | No change          | ResMetalStrip 1206 R010 1% 1W TC50    |
| CRF1206-FZ-R012ELF | ResMetalStrip 1206 R012 1% 1W TC75     | No change          | ResMetalStrip 1206 R012 1% 1W TC50    |
| CRF1206-FZ-R020ELF | ResMetalStrip 1206 R020 1% 1W TC75     | No change          | ResMetalStrip 1206 R020 1% 1W TC50    |
| CRF1206-FZ-R025ELF | ResMetalStrip 1206 R025 1% 1W TC75     | No change          | ResMetalStrip 1206 R025 1% 1W TC50    |
| CRF2512-FV-R001ELF | ResMetalStrip 2512 R001 1% 2W TC275    | CRF2512-FZ-R001ELF | ResMetalStrip 2512 R001 1% 2W TC50    |
| CRF2512-FV-R002ELF | ResMetalStrip 2512 R002 1% 2W TC275    | CRF2512-FZ-R002ELF | ResMetalStrip 2512 R002 1% 2W TC50    |
| CRF2512-FV-R007ELF | ResMetalStrip 2512 R007 1% 2W TC275    | CRF2512-FZ-R007ELF | ResMetalStrip 2512 R007 1% 2W TC50    |
| CRF2512-FV-R010ELF | ResMetalStrip 2512 R010 1% 2W TC275    | CRF2512-FZ-R010ELF | ResMetalStrip 2512 R010 1% 2W TC50    |
| CRF2512-FX-R002ELF | ResMetalStrip 2512 R002 1% 2W TC100    | CRF2512-FZ-R002ELF | ResMetalStrip 2512 R002 1% 2W TC50    |
| CRF2512-FX-R003ELF | ResMetalStrip 2512 R003 1% 2W TC100    | CRF2512-FZ-R003ELF | ResMetalStrip 2512 R003 1% 2W TC50    |
| CRF2512-FX-R004ELF | ResMetalStrip 2512 R004 1% 2W TC100    | CRF2512-FZ-R004ELF | ResMetalStrip 2512 R004 1% 2W TC50    |
| CRF2512-FX-R005ELF | ResMetalStrip 2512 R005 1% 2W TC100    | CRF2512-FZ-R005ELF | ResMetalStrip 2512 R005 1% 2W TC50    |
| CRF2512-FX-R006ELF | ResMetalStrip 2512 R006 1% 2W TC100    | CRF2512-FZ-R006ELF | ResMetalStrip 2512 R006 1% 2W TC50    |
| CRF2512-FX-R007ELF | ResMetalStrip 2512 R007 1% 2W TC100    | CRF2512-FZ-R007ELF | ResMetalStrip 2512 R007 1% 2W TC50    |
| CRF2512-FX-R008ELF | ResMetalStrip 2512 R008 1% 2W TC100    | CRF2512-FZ-R008ELF | ResMetalStrip 2512 R008 1% 2W TC50    |
| CRF2512-FX-R010ELF | ResMetalStrip 2512 R010 1% 2W TC100    | CRF2512-FZ-R010ELF | ResMetalStrip 2512 R010 1% 2W TC50    |
| CRF2512-FX-R012ELF | ResMetalStrip 2512 R012 1% 1W TC100    | CRF2512-FZ-R012ELF | ResMetalStrip 2512 R012 1% 1W TC50    |
| CRF2512-FX-R015ELF | ResMetalStrip 2512 R015 1% 1W TC100    | CRF2512-FZ-R015ELF | ResMetalStrip 2512 R015 1% 1W TC50    |
| CRF2512-FZ-R012ELF | ResMetalStrip 2512 R012 1% 1W TC75     | No change          | ResMetalStrip 2512 R012 1% 1W TC50    |
| CRF2512-FZ-R015ELF | ResMetalStrip 2512 R015 1% 1W TC75     | No change          | ResMetalStrip 2512 R015 1% 1W TC50    |
| CRF2512-FZ-R018ELF | ResMetalStrip 2512 R018 1% 1W TC75     | No change          | ResMetalStrip 2512 R018 1% 1W TC50    |
| CRF2512-FZ-R020ELF | ResMetalStrip 2512 R020 1% 1W TC75     | No change          | ResMetalStrip 2512 R020 1% 1W TC50    |
| CRF2512-FZ-R025ELF | ResMetalStrip 2512 R025 1% 1W TC75     | No change          | ResMetalStrip 2512 R025 1% 1W TC50    |
| CRF2512-FZ-R030ELF | ResMetalStrip 2512 R030 1% 1W TC75     | No change          | ResMetalStrip 2512 R030 1% 1W TC50    |
| CRF2512-FZ-R033ELF | ResMetalStrip 2512 R033 1% 1W TC75     | No change          | ResMetalStrip 2512 R033 1% 1W TC50    |
| CRF2512-FZ-R033SLF | ResMetalStrip 2512 R033 1% 1W TC75     | No change          | ResMetalStrip 2512 R033 1% 1W TC50    |
| CRF2512-FZ-R035ELF | ResMetalStrip 2512 R035 1% 1W TC75     | No change          | ResMetalStrip 2512 R035 1% 1W TC50    |
| CRF2512-FZ-R040ELF | ResMetalStrip 2512 R040 1% 1W TC75     | No change          | ResMetalStrip 2512 R040 1% 1W TC50    |
| CRF2512-FZ-R050ELF | ResMetalStrip 2512 R050 1% 1W TC75     | No change          | ResMetalStrip 2512 R050 1% 1W TC50    |
| CRF2512-JV-R001ELF | ResMetalStrip 2512 R001 5% 2W TC275    | CRF2512-JZ-R001ELF | ResMetalStrip 2512 R001 5% 2W TC50    |
| CRF2512-JV-R002ELF | ResMetalStrip 2512 R002 5% 2W TC100    | CRF2512-JZ-R002ELF | ResMetalStrip 2512 R002 5% 2W TC50    |
| CRF2512-JX-R003ELF | ResMetalStrip 2512 R003 5% 2W TC100    | CRF2512-JZ-R003ELF | ResMetalStrip 2512 R003 5% 2W TC50    |
| CRF2512-JX-R005ELF | ResMetalStrip 2512 R005 5% 2W TC100    | CRF2512-JZ-R005ELF | ResMetalStrip 2512 R005 5% 2W TC50    |
| CRF2512-JX-R007ELF | ResMetalStrip 2512 R007 5% 2W TC100    | CRF2512-JZ-R007ELF | ResMetalStrip 2512 R007 5% 2W TC50    |
| CRF2512-JX-R010ELF | ResMetalStrip 2512 R010 5% 2W TC100    | CRF2512-JZ-R010ELF | ResMetalStrip 2512 R010 5% 2W TC50    |
| CRF2512-JZ-R020ELF | ResMetalStrip 2512 R020 5% 1W TC75     | No change          | ResMetalStrip 2512 R020 5% 1W TC50    |
| CRF2512-JZ-R030ELF | ResMetalStrip 2512 R030 5% 1W TC75     | No change          | ResMetalStrip 2512 R030 5% 1W TC50    |
| CRF2512-JZ-R033ELF | ResMetalStrip 2512 R033 5% 1W TC75     | No change          | ResMetalStrip 2512 R033 5% 1W TC50    |