



Case studies of problem solving by Hybrid Type

- Rubycon

➤ PROBLEM

Size and Cost reduction of the inverter unit.

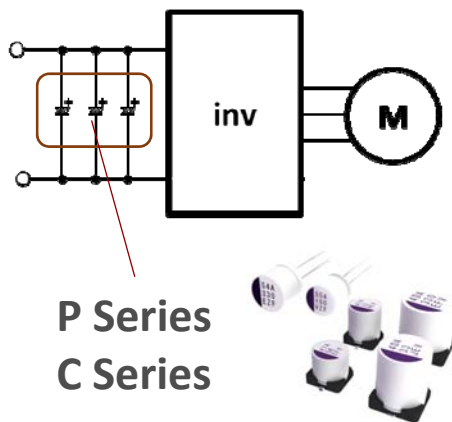
☞ DC link requires capacitors with excellent ripple current performance to realize further Size and Cost reduction for Automotive application like Motor Drive etc.

✎ SOLUTION



can contributor for...

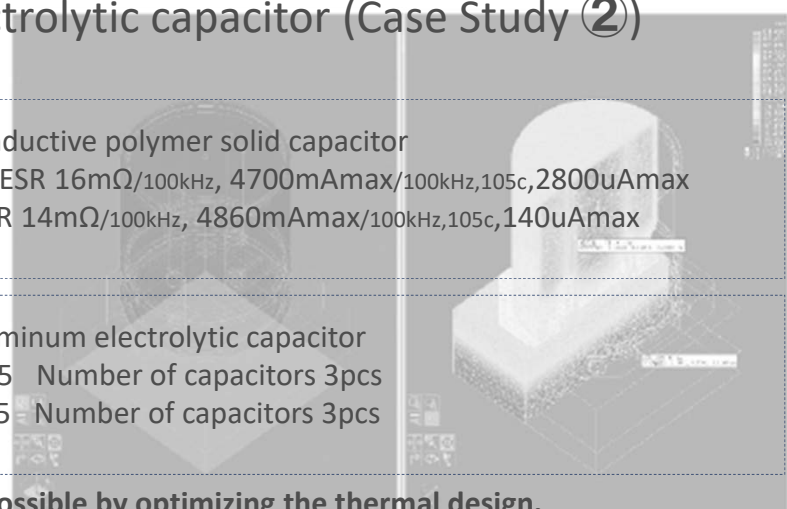
- More compact and highly reliable inverter unit design compared to conductive polymer solid capacitor. (Case Study ①)
- -90% Size reduction compared to aluminum electrolytic capacitor (Case Study ②)



(Case study①) Replacement of conductive polymer solid capacitor
 CONDUCTIVE POLYMER SOLID CAPACITORS
 ••• 25WV,560uF,10x12,ESR 16mΩ/100kHz, 4700mAmax/100kHz,105c,2800uAmax
PZ-CAP ••• 25WV,560uF,10x11,ESR 14mΩ/100kHz, 4860mAmax/100kHz,105c,140uAmax
 <PJV Series>

(Case study②) Replacement of aluminum electrolytic capacitor
 Al E-CAP ••• 35WV,3300uF,18x25 Number of capacitors 3pcs
PZ-CAP ••• 35WV,270uF,10x10.5 Number of capacitors 3pcs
 <PSV Series>

In addition, further Size reduction is possible by optimizing the thermal design.
 Please consult us about capacitor's thermal model & thermal simulation.



(Replacement of Hard-to-Find Ceramic capacitors (MLCC).)

➤ PROBLEM

Oscillation due to low temperature and aging

☞ If the circuit constant of DC / DC converter fluctuates, the negative feedback control becomes unstable and abnormal oscillation may occur. Therefore, capacitors with stable circuit constants in any environment are required.

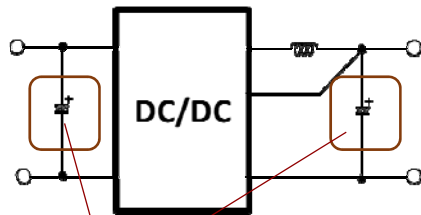
✎ SOLUTION



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More compact and highly reliable power supply design without oscillation.
(It enables to replace ceramics capacitor (MLCC)*.)

*Depends on required operating frequency and required response frequency.

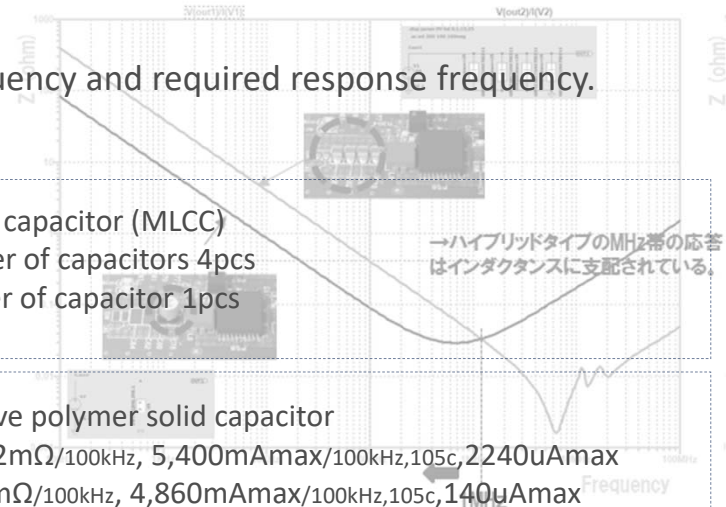


P Series
C Series



(Case study①) Replacement of ceramics capacitor (MLCC)
MLCC ... 50WV, 4.7uF, 2012 Number of capacitors 4pcs
PZ-CAP ... 50WV, 22uF, 6.3x6.1 Number of capacitor 1pcs
<PFV Series>

(Case study②) Replacement of conductive polymer solid capacitor
CONDUCTIVE POLYMER SOLID CAPACITORS ... 20WV, 560uF, 10x13, ESR 12mΩ/100kHz, 5,400mAmax/100kHz, 105c, 2240uAmax
PZ-CAP ... 25WV, 560uF, 10x11, ESR 14mΩ/100kHz, 4,860mAmax/100kHz, 105c, 140uAmax
<PZJ Series> 5,800mAmax/100kHz, 90c



(Replacement of Hard-to-Find Ceramic capacitors (MLCC).)

➤ PROBLEM

Size, Cost and Short-Circuit failure mode

☞ USB-PD 20V-5A (100W) requires capacitors with excellent capacitance and ripple current for DC / DC output.

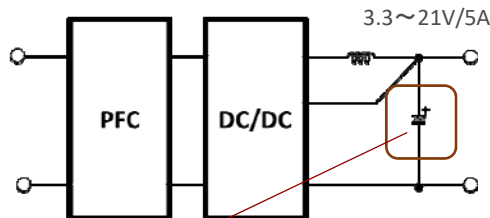
✎ SOLUTION



can contributor for...

More compact and highly reliable power supply design without oscillation.
(It enables to replace ceramics capacitor (MLCC)*.)

*Depends on required operating frequency and required response frequency.



P Series
C Series



(Case study①) Replacement of conductive polymer solid capacitor
 CONDUCTIVE POLYMER SOLID CAPACITORS
 • 25WV,560uF,10x12,ESR 16mΩ/100kHz, 4700mAmax/100kHz,105c,2800uAmax
PZ-CAP • 25WV,560uF,10x11,ESR 14mΩ/100kHz, 4860mAmax/100kHz,105c,140uAmax
 <PZJ Series>

(Case study②) Replacement of conductive polymer solid capacitor
 CONDUCTIVE POLYMER SOLID CAPACITORS
 • 20WV,560uF,10x13,ESR 12mΩ/100kHz, 5,400mAmax/100kHz,105c,2240uAmax
PZ-CAP • 25WV,560uF,10x11,ESR 14mΩ/100kHz, 4,860mAmax/100kHz,105c,140uAmax
 <PZJ Series>
 5,800mAmax/100kHz,90c

➤ **PROBLEM**

Size and Cost reduction of the inverter unit.

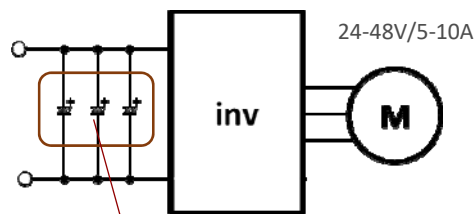
☞ Market demand for high-power range over 200W(24~48V) is increasing thanks to improving performance of batteries and motor units. Therefore, capacitors with excellent ripple current performance and lightweight is required.

 **SOLUTION**



can contributor for...

More compact and highly reliable inverter unit design compared to conductive polymer solid capacitor.



P Series
C Series



(Case study①)

PZ-cap · 35WV,270uF,10x10.5,ESR 20mΩ/100kHz, 4700mAmax/100kHz,100c,94.5uAmax
<PFV Series>

(Case study②)

PZ-cap · 35WV,270uF,10x9,ESR 20mΩ/100kHz, 4,700mAmax/100kHz,100c,94.5uAmax
<PZF Series>

(Case study③)

PZ-cap · 50WV,120uF,10x10.5,ESR 28mΩ/100kHz, 3,760mAmax/100kHz,90c,60uAmax
<PFV Series>

In addition, further Size reduction is possible by optimizing the thermal design.
Please consult us about capacitor's thermal model & thermal simulation.

(Replacement of Hard-to-Find Ceramic capacitors (MLCC).)

➤ PROBLEM

Size, Cost and Short-Circuit failure mode

☞ 5G base stations require capacitors with excellent ripple current performance and low temperature characteristics for DC / DC input / output.

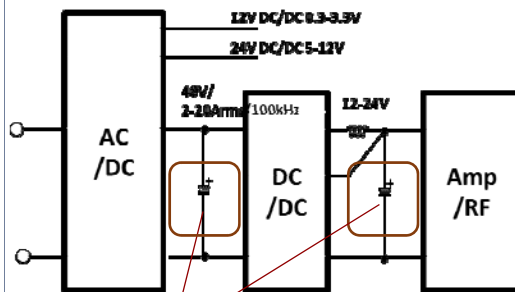
✎ SOLUTION



can contributor for...

More compact and highly reliable power supply design without oscillation. (It enables to replace ceramics capacitor (MLCC)*.)

*Depends on required operating frequency and required response frequency.



P Series
C Series



(Case study①) DC/DC input: Replacement of ceramics capacitor

MLCC ▪ 100WV, 2.2uF, Number of capacitor 3 to 4pcs

PZ-CAP ▪ 80WV, 22uF, 8x10.5, ESR 35mΩ/100kHz, -40c, 2,580mAmax/100kHz, 100c
<PFV Series>

(Case study②) DC/DC output: Replacement of conductive polymer solid capacitor.

CONDUCTIVE POLYMER SOLID CAPACITORS ▪ 50WV, 180uF, 10x13, ESR 19mΩ/100kHz, 3,000mAmax/100kHz, 125c, 270uAmax

PZ-CAP ▪ 50WV, 180uF, 10x13, ESR 22mΩ/100kHz, 2,800mAmax/100kHz, 125c, 90uAmax
<PJV Series>

(Replacement of Hard-to-Find Ceramic capacitors (MLCC).)

➤ **PROBLEM**

Size, Cost and Short-Circuit failure mode

☞ Server power supply requires capacitors with excellent ripple current performance and low temperature characteristics for the DC / DC input / output.

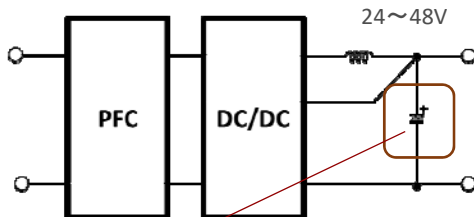
 **SOLUTION**



can contributor for...

More compact and highly reliable power supply design without oscillation.
(It enables to replace ceramics capacitor (MLCC)*.)

*Depends on required operating frequency and required response frequency.



P Series
C Series



(Case study①) DC/DC 24V Output

PZ-CAP • 35WV,270uF,10x9,ESR 20mΩ/100kHz,-40c, 4,550mAmax/100kHz,100c
<PZE Series>

(Case study②) DC/DC 48V Output : Replacement of ceramics capacitor

MLCC • 100WV,2.2uF, Number of capacitors 3 to 4pcs
PZ-CAP • 80WV,22uF,8x10.5,ESR 35mΩ/100kHz,-40c, 2,580mAmax/100kHz,100c
<PFV Series>

TERIMA KASIH

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THANK YOU!

Please refer to the homepage → <https://www.rubycon.com/>