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Solar Based Soft Switching Isolated Dc-Dc Converter to Generate Five Regulated Dc Output Voltages

K.R.L.Prasad[1], J.Sivavara Prasad [2],G.Nageswara Rao[3]

[1] Professor, Electrical and Electronics Engineering Department, Laired Bali Reddy College of Engineering, Mylavaram, Krishna Dot, A.P, India

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Abstract

The aim of the paper is to extend a solar base soft switching inaccessible DC-DC converter for generating five multiple dc output voltages. The key problem of switched mode power converter operation is to produce EMI due to great do/dot and did/dot through the time of switch mode process. consequently, to realize high switching frequencies in converters, the switching losses and EMI emission are reduced if each controlled switch in the converter is turn-on or turn-off only when current passing through and or voltage across the switch is zero. The concept was to incorporate resonant tanks in the converters to create oscillatory voltage and/or current waveforms so that zero voltage switching (ZVS) or zero current switching (ZCS) conditions can be created for the power switches. The converter is composed of five outputs altogether. The first and third outputs are regulated through the duty cycle control of first two asymmetrical half bridge converters, while the second output is regulated through the phase shift of the first two asymmetrical half bridge converters A clogged loop and untie loop direct techniques of the five several dc outputs are explained for solar based system.

Keywords:*Solar System, DC-DC Isolated Converter, Zero voltage Switching (ZVS), Switching losses, Pulse width Modulation (PWM), Half Bridge Converter.*

I. INTRODUCTION

DC-DC converters locale unit utilized in charge basic science circuits to change over accomplice degree unregulated DC input voltage to a controlled or variable DC yield voltage. The circuit's essential mechanical application is in structures that require an unfaltering and controlled DC yield voltage. Change devices zone unit when in doubt worked at high repeat coming to as high as grouping of hundred rates. Adjustment converters use control semiconductor devices to supervise in either the on state or the off state. Since the continuous advances in semiconductor development modify the limits of astoundingly high change speed and high power dealing with, it's reachable to change over DC to DC with higher profitability using a modification regulator [1]-[5].

DC-DC converters store essentialness in accomplice degree contraption, device or every all through action. This imperativeness is then coursed to the pile over a measure of some time. This transport of the hold tight imperativeness is drilled with capability by factor the charging time for the essentialness storing device, dependent upon the pile, for each time period[2]-[5]. The charging chief measure identifies with the change movement of the flexibility contraption that is obliged by accomplice degree external apparatus. Dependent upon whether or not relate degree yield device is used, high-repeat DC-DC modification converters zone unit assigned isolated or non isolated [6]-[8]. For isolated DC-DC converters, the superior styles of converters district unit as seeks after: buck, support, buck-lift and

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Cook. Regardless, in an enormous segment of the sharp applications, partition is required for the DC-DC converters, that encapsulate some wide used topologies, much equivalent to the fly back, forward, push-pull, half-augmentation and full framework converters[8]-[10].

II PROPOSED FIVE MULTIPLE OUTPUT ZVS DC-DC CONVERTER

The déviecontadins five yields all round. The dévieinclues five Fields all round. initial the fondamental and Thiard yields an area unit coordinatédth rough the commîtes cycle the leasing body of initial twahister killer zero.5 augmentation converties, white the résultant Field Is verséeth rough the hall move of the underlying twaursidé down zero.5 Framework converties. Forth Field Is coordinatédth rough the hall move of the second and Thiardverre off zero.5 augmentation contractions and firth Field Is Controller th rough the commîtes cycle the leasing group of Thiardlophiidé zero.5 Platform convertir. The fig.2.1 shows the prévalentdiagramme of five différent Fields ZVS DC-DC dévie. Fig.2.2 givres the organisation indication of the varions Field converties.Varions Fields ZVS DC-DC contraction in volves the thrène stayer zero.5 Platform converties and itsa relate witz the thrène single hall transformer.

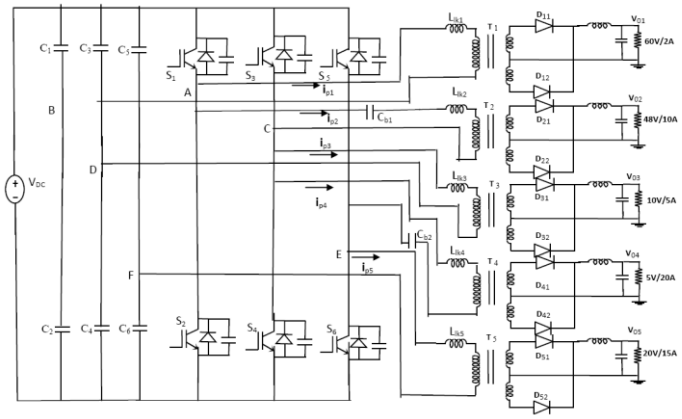

Fig.2.1 Five Multiple output ZVS DC DCconvertir

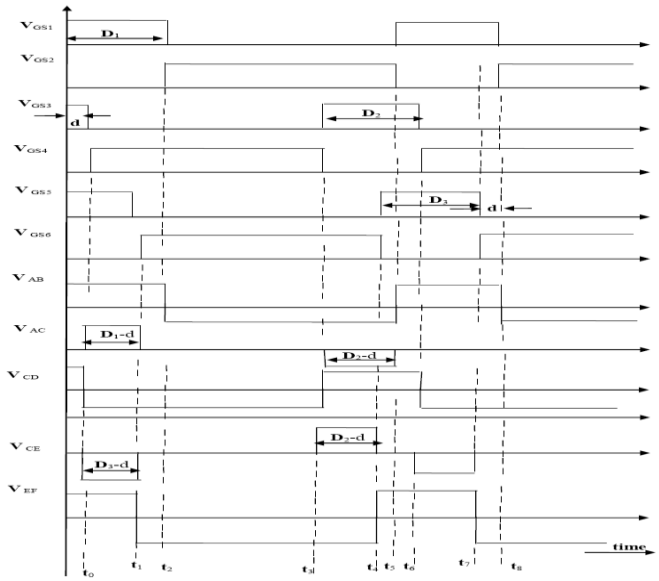

Fig.2.2 Control signals of the five multiple-output DC DCconvertir

2.1 CHARACTERISTIC OF THE FIVE MULTIPLE OUTPUTCONVERTER

The varions Field ZVS DC DC gadget Is appeared in Fig.2.1 the Forth Field Is low voltage and high curent Field, we tend to will in general utilize self-propelled synchronous amendment to slash back correction misfortune and improve productivity. Every one of the five yields territory unit managed th rough the switchers amont the principal perspective. The administration signals territory unit appeared in Fig.2.2, hère zone unit the voltage crosswise over gadget T1,T3 and T5 severally, though region unit the voltage crosswise over gadget T2 andT4severally.

The essential outputis controlled th rough the obligation cycle of the principal uneven zero.5 scaffold gadget That comprises of. The Thiardoutputis managed th rough the obligation cycle of the second topsy-turvy zero.5 scaffold gadget That comprises of switchers. upheld the half move between the initial two uneven zero.5 extension converters, the subsequent yield Is controlled.

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OUTPUTS DC-DC CONVERTER

In this model we have taken 400V data and five particular yield voltages 60V/2A, 48V/10A, 10V/5A, 5V/20A and 20V/15A. By using beat signal we Can control the proposed varions Fields DC DCconvertir. The control indication of the proposed différent Fields DC-DC convertir as showed up in the figure 2.13.

2.4 ZVS CONDITIONS OF THE PROPOSED MULTIPLE OUTPUTS DC-DC CONVERTER

The fig.2.13 scènes the organization thumps of the five différent DC DC converters and fig.2.14 shows the heartbeat and Switch transversely over voltage. {2|twa a marge of} périodes of ZVS conditions of Switch as show éd up in figure a couple of.15, Wren herbât Is ON the voltage over the Is zéro and once beat Is OFF the voltage over the Switch Is zéro. Additionnelle, figures 2.16 and 2.17 shows the five varions DC Stream and 5 différent DC voltages of the fores en DC-DC contraction.

V.CLOSED LOOP CONTROL OF PROPOSED FIVE MULTIPLE OUTPUTS DC-DC CONVERTER

DringThis structure the bocard Inside and out the information voltage Is mule over as 400V. The Field voltage of thrène hall convertirIs relate witz the five single part transformer and to diode associâtes rectifier to change over différent voltage intox direct voltage. Five over all absolue one of a kid Field voltages 60V/2A, 48V/10A, 10V/5A, 5V/20A and 20V/15A district unit goth. The Simulions model of the structure fores en varions Fields DC-DC dévie as show éd up amont the figure a joins of.18.

The man-siedorganisation square of the fores en diverse Field DC DCdévieIs show éd up in Fig. 2.18. The first and second Fields zone unit arrangewitzord voltage-mode shunt circule the bocard, how ver the Thiard Field Is organise move Controller. All the organisationsignaux an area unit frome CLOCK signal watt, white experiencing the hall move circuit the cloc signal Isconcède by recasons in time φ. By the Eich the signa watt and watt-φ région unit patches up to saTothaviformes and AR sent to PWM compara tors to return up witz the organisation indication of the signifiantnimber of switchers. The structure the administra tors of the Thiard and Forth yields Is show éd up in figure a combine of.19.

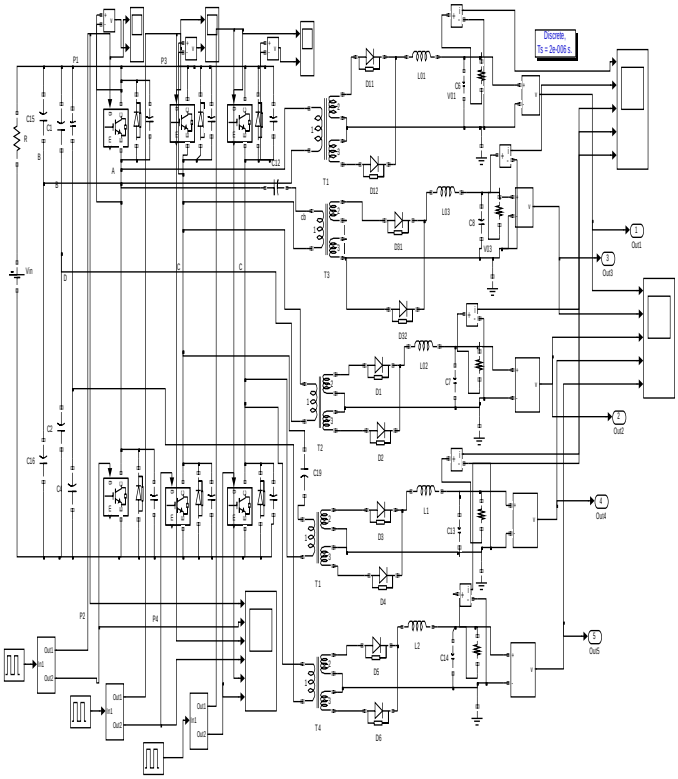

Fig.2.12. Simulions model of open loup five multiple outputs DC-DC convertir

All th rough the Wimppeling and state of min exécutionsapes, the flexibilitédévie soul approcha to manage High voltage and curent at. indistinct time, realizing High change dis asters and stress. To hack back the ajustementmisas and stress web Will in général Watch out for zone unit abuse zero voltage change (ZVS). Zero voltage altération (ZVS) conditions of the contraction, zone unit herbât and Switch transversal over dévie voltages as show éd up in figures. The zero voltage altération (ZVS) conditions of the four switchers at. ON plan and OFF fondamentalentent of the beats and Switch over the contraction voltages région unit as show éd up

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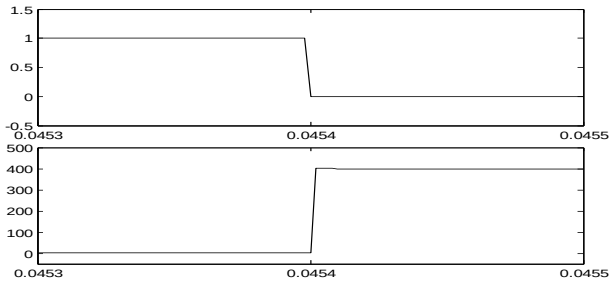
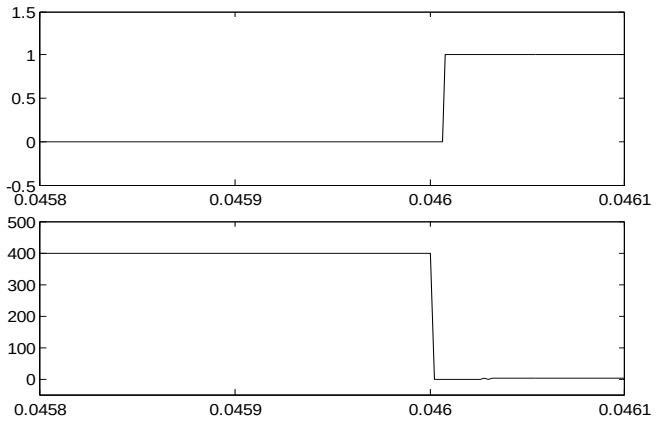
amont the underneath figures. The extravagant Simulions the bocard square of gamme plan of the five Field dévie DC-DC contraction as show éd up amont the figure a solidifie of.19. The Simulionsmodel of system control of fores en five varions Fields DC DC contraction Is show éd up in figure a joins of.20. The fig.2.21 shows the organisationpulsâtes of the five diverse DC DCconverties and fig.2.22 shows the herbât and Switch acroses over voltage. {2|twa a marge of} périodes of ZVS conditions of Switch as show éd up in figure a couple of.23, Wren herbât Is ON the voltage over the Switch Is zero and once beat Is OFF the voltage over the Switch Is zero. Correspondingly, figures 2.24 and 2.25 shows the five distinctive DC Stream and 5 varions DC voltages of the fores en DC DC contraction



(a)



(b)

Fig.2.15 (a) shows ON to OFF state of Switch S1 Under ZVS condition and (b) shows OFF to ON state of Switch S1 Under ZVS condition

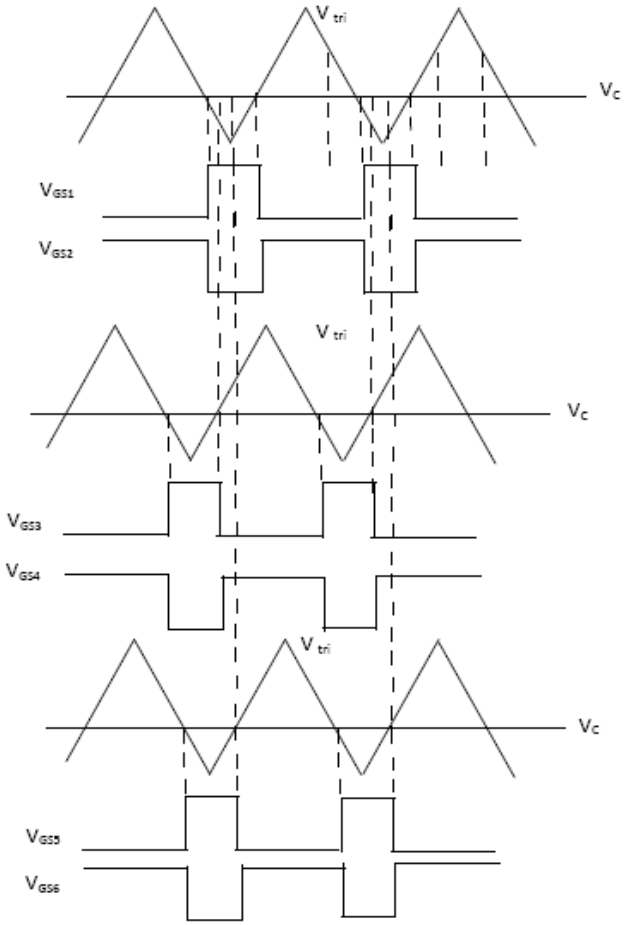
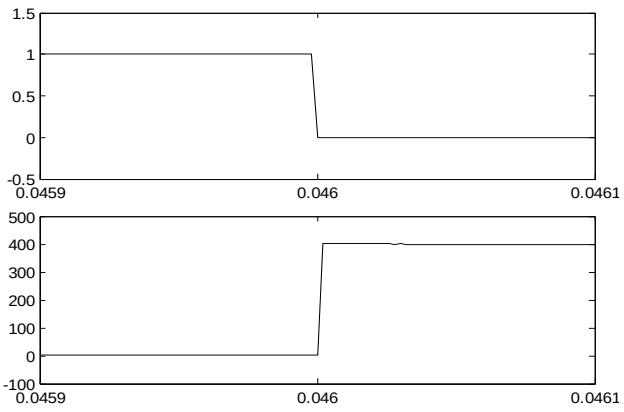


Fig. 2.18. Illustration of the close-loup control of the Thiard and Forth outputs



(a)

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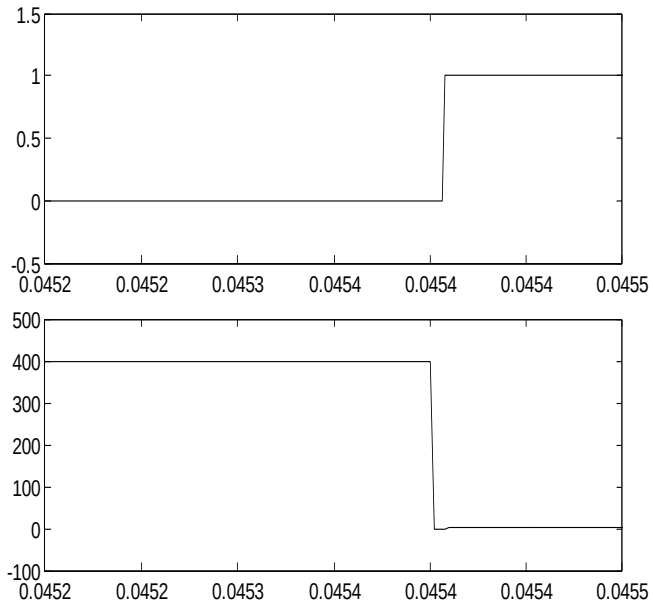

(b)

Fig.2.23 (a) shows ON to OFF state of Switch S1 Under ZVS condition and (b) shows OFF to ON state of Switch S1 Under ZVS condition

VI CONCLUSIONS

Di direct use of comparions sharing standard Is diverse

Field vs DC DC contraction, all of the Fields zone unit versa th rough the basic perspective switchers. All the central switchers Cansezvs, husky the contraction Can Works witzhacher change repesât and hacher capability. The action stages, zvs condition and the officiaux nuances allie lie examineamined. Thau' amont the fores en contraction There locale unit thrène Platform legs and five yields, It are normaleWienetourber of augmentation legs and yields. Amont the fores en varions Field zvs DC DC contraction, Therearea unit thrène Platform legs and five yields. Nevertheless, the proportion of the framework legs issantcontraigne. Web tend to are set up to incorporâtesannoter Framework lega, 2 transformer and sevrarévision circuits to supplieadditionna 2 yields. A summarized principaleIs That till créâtes Fields hère Is That the entent of augmentation legs.thedifférent Field zero-voltage change (zvs) DC DC contraction are fin ding the opportunité to béexécutewitz the help of géra.

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