

23rd ASP-DAC 2018

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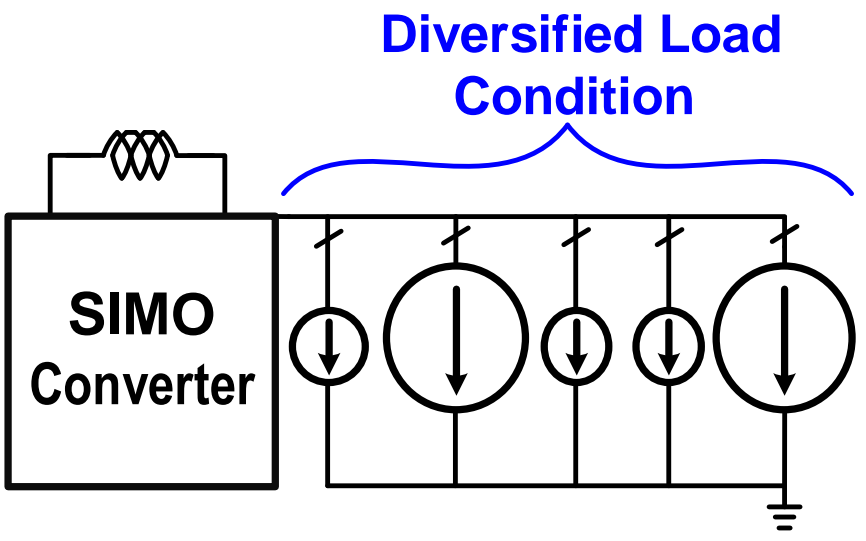
A Reconfigurable SIMO System with 10-Output Dual-Bus DC-DC Converter using the Load Balancing Function in Group Allocator for Diversified Load Condition

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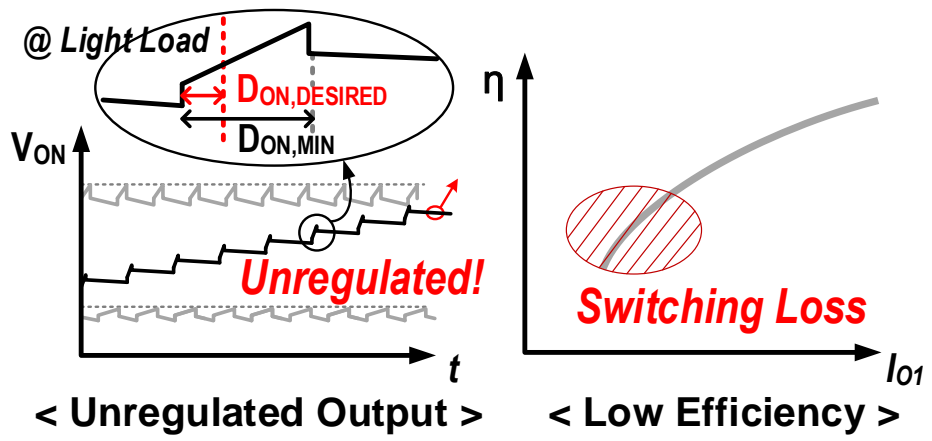
January 24 , 2018



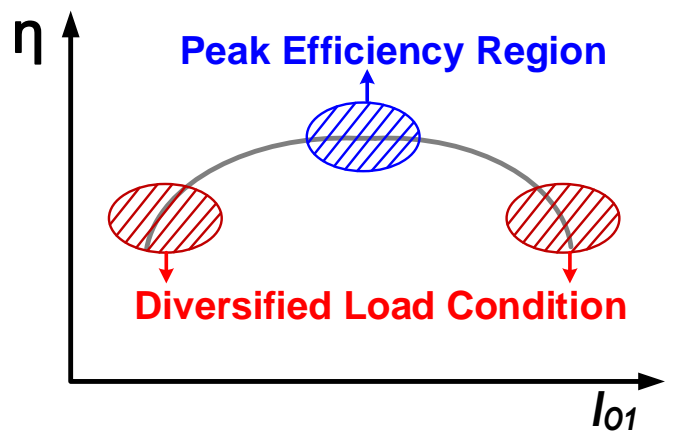
Issues in Diversified Load Condition



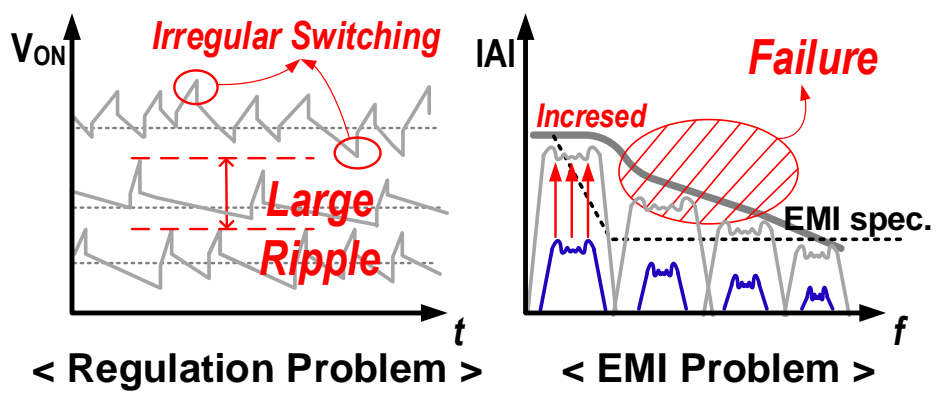
Fixed Freq. Control w/ Light Loads



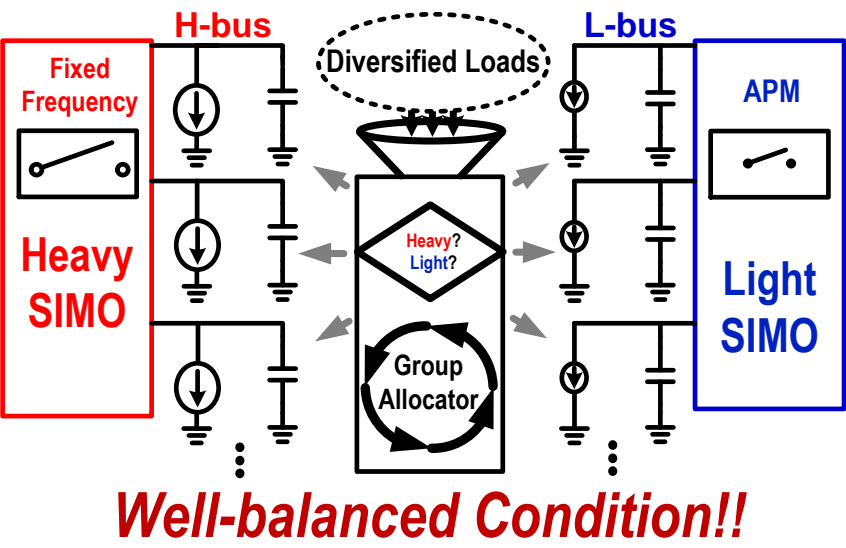
Efficiency of SIMO Converter



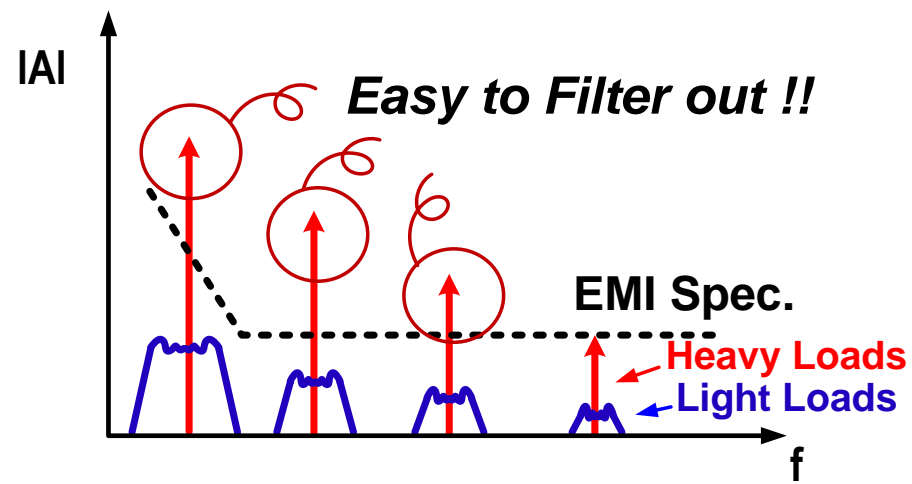
APM Control or Pulse Skip w/ Heavy Loads



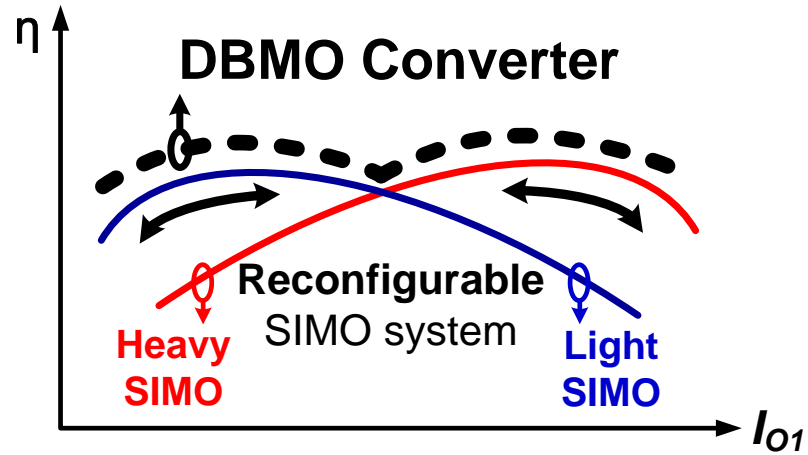
Proposed DBMO Converter



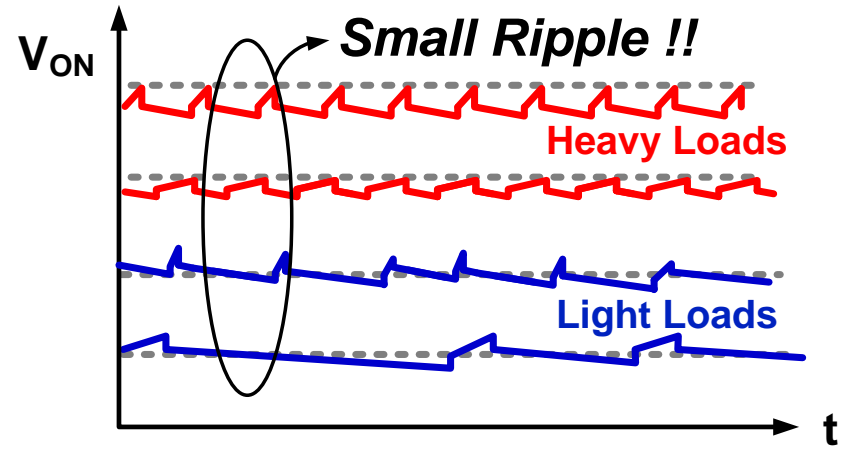
Well-defined Spectrum Satisfied to EMI Spec.



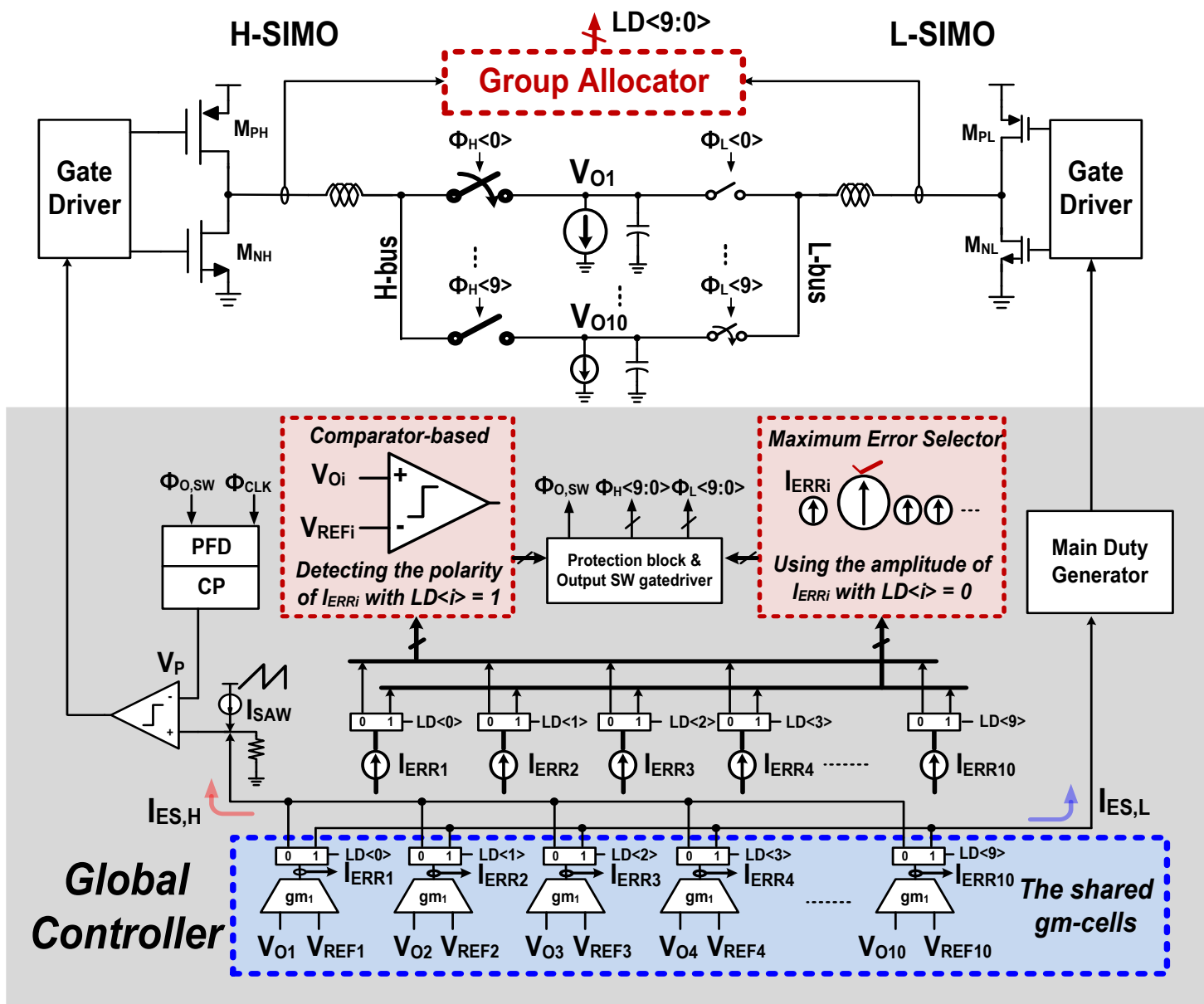
High Efficiency in Wide Load Range



Small Ripple & Well-regulation Performance

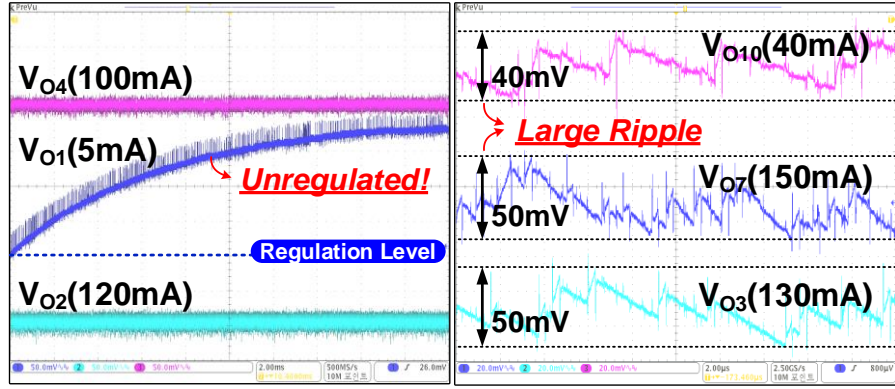


Overall Structure of DBMO Converter

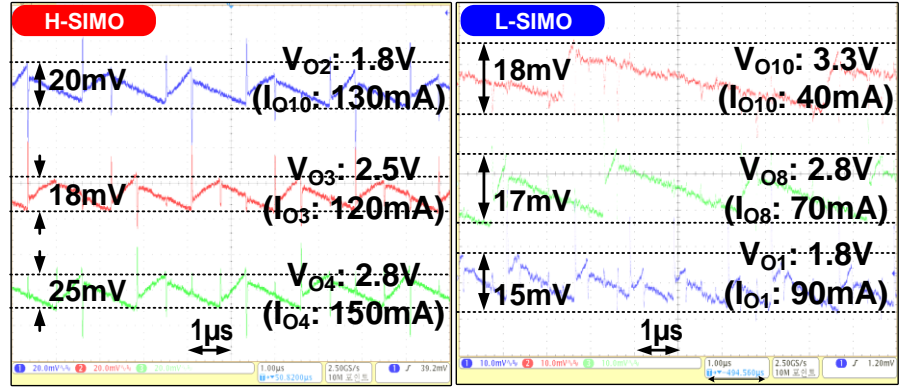


Measurement Results

Conventional SIMO Converter

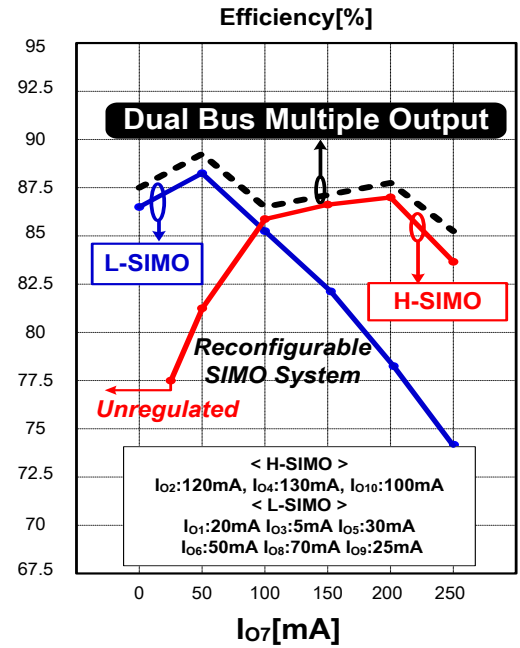


Proposed DBMO Converter



	[1] ISSCC2010	[2] ISSCC2014	[5] ISSCC2012	This Work	
				H-SIMO	L-SIMO
Process	65nm	0.35µm	0.35µm	0.18µm	
Topology	6 Buck outputs	4 Buck outputs	5 Buck outputs	10 DBMO outputs	
Supply Voltage(V)	5.0	2.7 - 5.0	3.4 - 4.3	5.0	
Frequency	2MHz	1MHz	1.2MHz	1MHz	
Voltage Ripple	< 25mV	< 30mV	< 40mV	< 25mV	
Load Balancing Function	-	-	-	Supportable 0-100mA: L-bus 100mA-300mA:H-bus	
Allowable Load Range	-	-	-	0mA - 300mA	
Load Independency in Efficiency	Low	Low	Low	High	
Reliability	Low	Low	Low	High	
Switching Noise Dispersion	-	-	-	Yes	
Max. Output Power(W)	2.16	1.2	2.232	2.83	

Efficiency



Chip Micrograph

