

Switch-Mode Voltage Regulator Selection Guide

Micrel Advantange

- Best efficiency
- Highest speed
- Smallest solution size

Buck Regulators (Internal Switches)

Device	V _{IN} Range	V _{OUT}	I _{SW} ⁽¹⁾ (Avg)(Max)	Frequency	Package(s)	Comments
MIC4721	2.7V to 5.5V	Adj. to 1V	1.5A	2MHz	MSOP-10	Ultra-Fast Response Internal Compensation.
MIC4722	2.7V to 5.5V	Adj. to 1V	3A	2.7MHz	MLF-12 (3x3mm)	Ultra-Fast, Ultra-Small.
MIC4723	2.7V to 5.5V	Adj. to 1V	3A	2MHz	MLF-12 (3x3mm), eMSOP-10	Ultra-Fast, Ultra-Small.
MIC2207	2.7V to 5.5V	Adj. to 1V	3A	2MHz	MLF-12 (3x3mm)	Ultra-Fast, Ultra-Small.
MIC2208	2.7V to 5.5V	Adj. to 1V	3A	1MHz	MLF-12 (3x3mm)	External Compensation.
MIC4720	2.7V to 5.5V	Adj. to 1V	2A	2MHz	MLF-12 (3x3mm), eMSOP-10	Ultra-Fast, Ultra-Small.
MIC4680	4V to 34V	3.3V, 5V, Adj.	1.3A	200kHz	SOIC-8	
MIC4681	4V to 30V	Adj.	2A Peak	200kHz	SOIC-8	
MIC4682	4V to 34V	Adj.	2A	200kHz	SOIC-8	10% Precision Adjustable Current Limit.
MIC4684	4V to 30V	Adj.	2A	200kHz	SOIC-8	
MIC4685	4V to 30V	Adj.	3A	200kHz	SPAK-7	33% Smaller Than TO-263 (D2PAK).
MIC4686	4V to 30V	Adj.	3A	200kHz	eSOIC-8	Thermally Enhanced SOIC Package.
MIC4690	4V to 30V	Adj.	1.3A	500kHz	SOIC-8	500kHz: Small Inductor.
MIC4574	4V to 24V	3.3V, 5V, Adj.	0.5A	200kHz	PDIP-8, SOIC-14	
MIC4575	4V to 24V	3.3V, 5V, Adj.	1A	200kHz	TO220-5, TO263-5	
MIC4576	4V to 36V	3.3V, 5V, Adj.	3A	200kHz	TO220-5, TO263-5	
LM2574	4V to 40V	3.3V, 5V, 12V, Adj.	0.5A	52kHz	PDIP-8	
LM2575	4V to 40V	3.3V, 5V, 12V, Adj.	1A	52kHz	TO220-5, TO263-5, PDIP-16, SOIC-24	
LM2576	4V to 40V	3.3V, 5V, 12V, Adj.	3A	52kHz	TO220-5, TO263-5	

1. I_{SW} (Avg) refers to the average current flowing through the switch.

Synchronous Buck Regulators (Internal Switches)

MIC2177	4.5V to 16.5V	3.3V, 5V, Adj.	2.5A	200kHz	WSOIC-20	Auto-Skip Mode.
MIC2178	4.5V to 16.5V	3.3V, 5V, Adj.	2.5A	200kHz	WSOIC-20	Manual-Select Skip Mode.
MIC2179	4.5V to 16.5V	3.3V, 5V, Adj.	1.5A	200kHz	SSOP-20	
MIC2202	2.3V to 5.5V	Adj. to 0.5V	0.6A	2MHz	MSOP-10, MLF-10 (3x3mm)	1μF Ceramic Stable.
MIC2203	2.3V to 5.5V	Adj. to 0.5V	0.3A	1MHz	MSOP-10, MLF-10 (3x3mm)	1μF Ceramic Stable.
MIC2204	2.3V to 5.5V	Adj. to 1V	0.6A	2MHz	MSOP-10, MLF-10 (3x3mm)	
MIC2205	2.7V to 5.5V	Adj.	0.6A	2MHz	MLF-10 (3x3mm)	LowQ [®] LDO Mode: 18μA.
MIC2245	2.7V to 5.5V	Adj.	0.5A	4MHz	MLF-10 (3x3mm)	LowQ [®] LDO Mode: 20μA.
MIC2285A	2.7V to 5.5V	Adj.	0.6A	8MHz	MLF-10 (3x3mm)	Operation w/0.47μH Chip Inductor.
MIC2206	2.7V to 5.5V	1.8/1.0V, 1.2/1.0V, 1.47/1.1V, 1.45/1.15V	0.6A/0.6A	2MHz	MLF-10 (3x3mm)	Voltage Scaling in LowQ [®] Mode.
MIC2224	2.7V to 5.5V	Adj.	0.6A	2MHz	MLF-10 (3x3mm)	DAC Controlled Output with Bypass.
MIC22400 New!	2.6V to 5.5V	Adj. to 0.7V	4A	800kHz to 4MHz	MLF-20 (3x4mm), eTSSOP-20	Sequencing/Tracking Easy Compensation.
MIC22600	2.6V to 5.5V	Adj. to 0.7V	6A	1MHz	MLF-24	Sequencing/Tracking Easy Compensation.
MIC23050	2.7V to 5.5V	1.2V, 1.5V, 1.8V, 2.5V	0.5A	4MHz	MLF [®] (2x2mm)	PWM Buck Regulator with Hyper-Light Load™.
MIC23051	2.7V to 5.5V	1.2V (1.0V), 1.25V (0.95V),	0.5A	4MHz	MLF [®] (2x2mm)	PWM Buck Regulator with Hyper-Light Load™ and Voltage Scaling.
			1.4V (1.15V), 1.8V (1.0V),			

Synchronous Buck Regulators (Internal Switches + Internal Inductor)

MIC33050 New!	2.7V to 5.5V	1.2V, 1.5V, 1.8V, 2.5V	0.5A	4MHz	MLF-12 (3x3mm)	4MHz Operation with Internal Chip Inductor.
MIC3385	2.7V to 5.5V	Adj., 1.5V	0.6A	8MHz	MLF-14 (3x3.5mm)	8MHz Operation with Internal Chip Inductor, Hyper-Light Load™.

Dual Synchronous Buck Regulators (Internal Switches + Internal Inductor)

MIC2238 New!	2.5V to 5.5V	1.2/1.8V, 1.2/1.5V, 1.2/2.5V, 1.2/3.3V, 1.0/1.5V, 1.0/1.8V, 1.0/2.5V, Adj./Adj.	800/800mA	2.5MHz	MLF-12 (3x3mm)	POR/PG Pin. Trickle Mode™ at Light Load.
MIC23250 New!	2.7V to 5.5V	1.2/1.8V, 1.0/1.2V, 1.2/1.5V, 1.2/2.5V 1.2/3.3V, Adj./Adj.	400/400mA	4MHz	MLF-10 (2x2mm)	PWM Buck Regulators with Hyper-Light Load™.

Switch-Mode Voltage Regulator Selection Guide

Buck Controllers (External Switches)

Device	V _{IN} Range	V _{OUT}	I _{SW} ⁽¹⁾ (Avg)(Max)	Efficiency (Typ)	I _Q (Typ)	Shutdown I _Q (Typ)	Frequency	Package(s)	Comments
MIC2184	2.9V to 16V	Adj.	External P-FET, 1A to 10A	90%	600µA	0.5µA	200/400kHz	SOIC-16, QSOP-16	Can also be configured as Buck-Boost
MIC2194	2.9V to 14V	Adj.	External P-FET, 1A to 10A	90%	1mA	0.5µA	400kHz	SOIC-8	

Synchronous Buck Controllers (External Switches)

Device	V _{IN} Range	V _{OUT}	I _{SW} ⁽¹⁾ (Avg)(Max)	Efficiency (Typ)	I _Q (Typ)	Shutdown I _Q (Typ)	Frequency	Package(s)	Comments
MIC2130	8V to 40V	Adj. to 0.7V	External FETs, 15A				150/400kHz	MLF-16, eTSSOP-16	
MIC2131	8V to 40V	Adj. to 0.7V	External FETs, 15A				150/400kHz	MLF-16, eTSSOP-16	Low EMI Frequency Dithering.
MIC2168	3V to 14.5V	Adj. to 0.8V	External N-FETs, 10A	95%	1mA	50µA	1MHz	MSOP-10	Small and Fast.
MIC2168A	3V to 14.5V	Adj. to 0.8V	External N-FETs, 10A	95%	1mA	50µA	1MHz	MSOP-10	Small and Fast, Enable Function.
MIC2169	3V to 14.5V	Adj. to 0.8V	External N-FETs, 15A	95%	1mA	50µA	500kHz	MSOP-10	Small and Super Efficient.
MIC2169A	3V to 14.5V	Adj. to 0.8V	External N-FETs, 15A				500kHz	MSOP-10	Small and Super Efficient; Enable Function.
MIC2159	3V to 14.5V	Adj. to 0.8V	External N-FETs, 20A				400kHz	EPAD-MSOP-10	Higher Current, Enable Function.
MIC2182	4.5V to 32V	3.3V, 5V, Adj.	External N-FETs, 2.5A to 20A	90%+	600µA	2µA	300kHz	SOIC-16, TSSOP-16	
MIC2183	2.9V to 14V	Adj. to 1.25V	External N- and P-FET, 1A to 10A	95%+	600µA	0.5µA	400/200kHz	MSOP-16, QSOP-16	100% Max. Duty Cycle.
MIC2193	2.9V to 14V	Adj.	External N- and P-FET, 1A to 10A	93%+	1mA	–	400kHz	SOIC-8	100% Max. Duty Cycle.
MIC2198	4.5V to 32V	Adj. To 0.8V	External N-FETs, 1A to 20A	95%+	3.5mA	0.1µA	500kHz	MLF-12 (4x4mm)	
MIC2199	4.5V to 32V	Adj. To 0.8V	External N-FETs, 1A to 20A	95%+	1.6mA	0.1µA	300kHz	MLF-12 (4x4mm)	

1. I_{SW} (Avg) refers to the average current flowing through the switch.

Boost Regulators (Internal Switches)

Device	V _{IN} Range	V _{OUT}	I _{SW} (Typ)	Frequency	Package(s)	Comments
MIC2141	2.5V to 14V	Adj. to 22V	0.1A	330kHz	SOT-23-5	Dynamically Adjustable V _{OUT} for LCD Bias.
MIC2142	2.2V to 16V	Adj. to 22V	0.1A	330kHz	SOT-23-5	
MIC2145	2.4V to 16V	Adj. to 16V	1A	450kHz	MSOP-8, MLF-10 (3x3mm)	
MIC2171	3V to 40V	Adj. to 60V	4A	100kHz	TO-220-5, TO-263-5	High-Current, High-Voltage.
MIC2172	3V to 40V	Adj. to 60V	2.5A	100kHz	SOIC-8, DIP-8	Sync Pin., High-Current, High-Voltage.
MIC3287	2.8V to 5.5V	Adj. to 24V	0.35A	1.2MHz	TSOT-23-5, TSOT-23-6, MLF-8 (2x2mm)	White LED Driver.
MIC2287	2.5V to 10V	Adj. to 34V	0.75A	1.2MHz	TSOT-23-5, MLF-8 (2x2mm)	White LED Driver.
MIC2287C	2.5V to 10V	Adj. to 34V	0.75A	1.2MHz	TSOT-23-5, MLF-8 (2x2mm)	White LED Driver.
MIC2288	2.5V to 10V	Adj. to 34V	1.2A	1.2MHz	TSOT-23-5, MLF-8 (2x2mm)	OLED Driver, High Accuracy, OVP.
MIC2289	2.5V to 10V	Adj. to 34V	0.75A	1.2MHz	MLF-8 (2x2mm)	Internal Schottky White LED Driver, OVP.
MIC2570	1.3V to 15V	2.85V, 3.3V, 5V, Adj. to 33V	1.1A	20kHz	SOIC-8	Low Input Voltage.
MIC2571	0.9V to 15V	2.85V, 3.3V, 5V, Adj. to 33V	1.1A	20kHz	SOIC-8	Low Input Voltage.
MIC2290	2.5V to 10V	Adj. to 34V	0.75A	1.2MHz	MLF-8 (2x2mm)	Internal Schottky, OVP.
MIC2291	2.5V to 10V	Adj. to 34V	1.2A	1.2MHz	TSOT23-5, MLF-8 (2x2mm)	Photo Flash LED Driver, OVP.
MIC2292	2.5V to 10V	Adj. to 34V	0.5A	1.6MHz	MLF-8 (2x2mm)	High-Frequency White LED Driver w/Internal Schottky Diode, OVP.
MIC2293	2.5V to 10V	Adj. to 34V	0.5A	2MHz	MLF-8 (2x2mm)	High-Frequency White LED Driver w/Internal Schottky Diode, OVP.
MIC2295	2.5V to 10V	Adj. to 34V	1.2A	1.2MHz	TSOT-23-5, MLF-8 (2x2mm)	High-Current, High-Efficiency, OVP.
MIC2296	2.5V to 10V	Adj. to 34V	1.7A	0.6MHz	TSOT-23-5, MLF-8 (2x2mm)	High-Current, High-Efficiency, OVP.
MIC2297	2.5V to 10V	Adj. to 40V	1.2A	0.6MHz	MLF-10 (2x2mm)	High Voltage White LED Driver, OVP.
MIC2298	2.5V to 10V	Adj. to 15V	4.75A	1.0MHz	MLF-12 (3x3mm)	High Power Photo Flash LED Driver with Torch Mode, OVP.
MIC2299 New!	2.5V to 10V	Adj. to 30V	4.75A	2.0MHz	MLF-12 (3x3mm)	High Power Photo Flash LED Driver with Torch Mode.
MIC2601 New!	4.5V to 20V	Adj. to 40V	1.2A	1MHz	MLF-8 (2x2mm)	Enable Pin/SS/ Low Shutdown Current.
MIC3172	3V to 40V	Adj. to 34V	2.25A	100kHz	SOIC-8, PDIP-8	Enable Pin.
MIC3289	2.5V to 6.5V	Adj. to 24V	0.5A	1.2MHz	TSOT-23-6, MLF-8 (2x2mm)	Single Wire Digital Brightness Control w/Internal Schottky Diode.

Boost Controllers (External Switches)

Device	V _{IN} Range	V _{OUT}	Output Current	Efficiency (Typ)	I _Q (Typ)	Shutdown I _Q (Typ)	Frequency	Package(s)	Comments
MIC2186	2.9V to 14V	Adj.	External N-FET, 1A to 10A	90%	600μA	0.5μA	100/200/400kHz	SOIC-, QSOP-16	
MIC2196	2.9V to 14V	Adj.	External N-FET, 1A to 10A	90%	1mA	0.5μA	400kHz	SOIC-8	Boost, SEPIC, Cuk Configurations.

Synchronous Boost Controllers (External Switches)

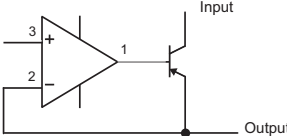
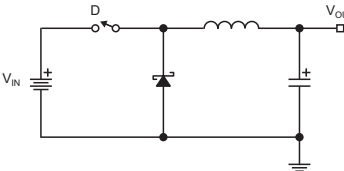
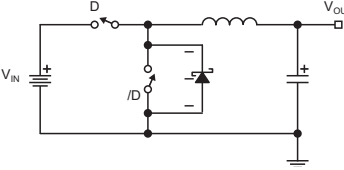
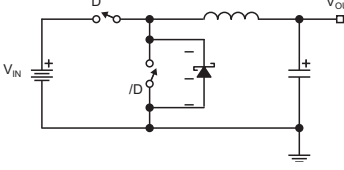
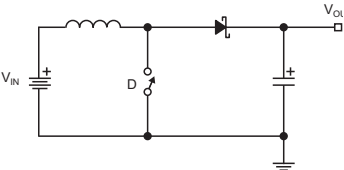
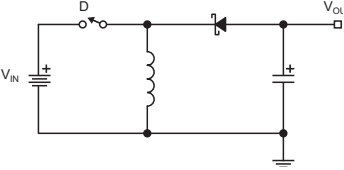
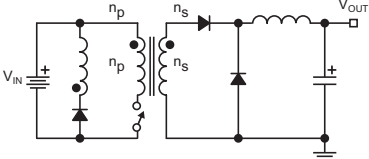
MIC2185	2.9V to 14V	Adj.	External N-FET/P-FET, 1A to 10A	95%	600μA	0.5μA	400kHz	SOIC-8	High Efficiency.
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Flyback/Forward Converter/Push-Pull Controllers for Isolated Applications (External Switches)

Device	V _{IN} Range	Gate Drive	V _{START}	V _{STOP}	Start-Up Current (Max)	Duty Cycle (Max)	Topology	Frequency	Package(s)	Comments
MIC9130	9V to 180V	1A	9V	–	–	50%	Forward/Flyback	Adj. to 1.5MHz	SOIC-, QSOP-16	Fast. Built-in 180V Start-up Circuitry.
MIC9131	9V to 180V	1A	9V	–	–	75%	Forward/Flyback	Adj. to 1MHz	SOIC-, QSOP-16	Fast. Built-in 180V Start-up Circuitry.
MIC3808	8.3V to 15V	0.5A	12.5V	8.3V	130μA	50%	Push-Pull	Adj. to 1MHz	SOIC-, MSOP-8	High-Output Current.
MIC3809	4.1V to 15V	0.5A	4.3V	4.1V	130μA	50%	Push-Pull	Adj. to 1MHz	SOIC-, MSOP-8	High-Output Current.
MIC3838	8.3V to 15V	0.5A	12.5V	8.3V	130μA	50%	Push-Pull	Adj. to 1MHz	MSOP-10	Can Implement Volt-Second Clamp.
MIC3839	4.1V to 15V	0.5A	4.3V	4.1V	130μA	50%	Push-Pull	Adj. to 1MHz	MSOP-10	Can Implement Volt-Second Clamp.
MIC38C42	15.5V to 20V	0.5A	14.5V	9.0V	200μA	96%	Forward/Flyback	Adj. to 500kHz	PDIP-8, -14, SOIC-8, -14, MSOP-8	
MIC38C43	9V to 20V	0.5A	8.4V	7.6V	200μA	96%	Forward/Flyback	Adj. to 500kHz	PDIP-8, -14, SOIC-8, -14, MSOP-8	
MIC38C44	15.5V to 20V	0.5A	14.5V	9.0V	200μA	50%	Forward/Flyback	Adj. to 500kHz	PDIP-8, -14, SOIC-8, -14, MSOP-8	
MIC38C45	9V to 20V	0.5A	8.4V	7.6V	200μA	50%	Forward/Flyback	Adj. to 500kHz	PDIP-8, -14, SOIC-8, -14, MSOP-8	
MIC38HC42	15.5V to 20V	1A	14.5V	9.0V	200μA	96%	Forward/Flyback	Adj. to 500kHz	PDIP-8, -14, SOIC-8, -14	
MIC38HC43	9V to 20V	1A	8.4V	7.6V	200μA	96%	Forward/Flyback	Adj. to 500kHz	PDIP-8, -14, SOIC-8, -14	
MIC38HC44	15.5V to 20V	1A	14.5V	9.0V	200μA	50%	Forward/Flyback	Adj. to 500kHz	PDIP-8, -14, SOIC-8, -14	
MIC38HC45	9V to 20V	1A	8.4V	7.6V	200μA	50%	Forward/Flyback	Adj. to 500kHz	PDIP-8, -14, SOIC-8, -14	
MIC38C42A ⁽¹⁾	15.5V to 20V	0.5A	14.5V	9.0V	200μA	96%	Forward/Flyback	Adj. to 500kHz	SOIC-8, -14	
MIC38C43A ⁽¹⁾	9V to 20V	0.5A	14.5V	9.0V	200μA	96%	Forward/Flyback	Adj. to 500kHz	SOIC-8, -14	
MIC38C44A ⁽¹⁾	15.5V to 20V	0.5A	14.5V	9.0V	200μA	50%	Forward/Flyback	Adj. to 500kHz	SOIC-8, -14	
MIC38C45A ⁽¹⁾	9V to 20V	0.5A	14.5V	9.0V	200μA	50%	Forward/Flyback	Adj. to 500kHz	SOIC-8, -14	

1. Recommended for new designs.

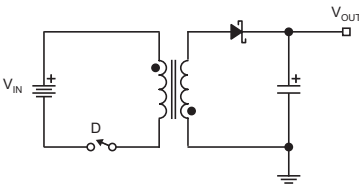
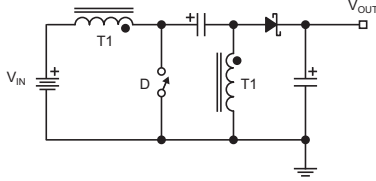
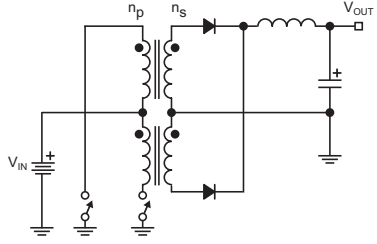
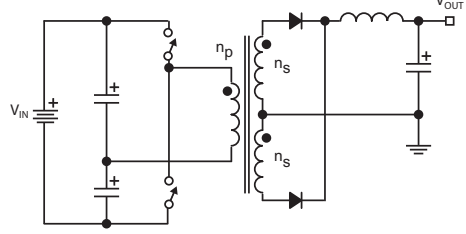
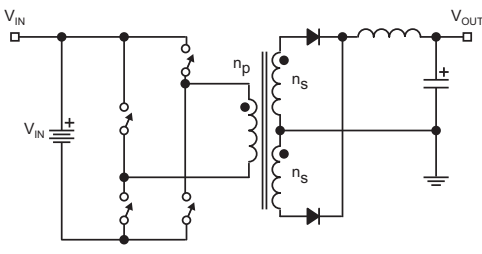
Switch-Mode Voltage Regulator DC-to-DC Topologies

Device	Typical Applications	Pros	Cons	
MIC5203 MIC5205 MIC5219 MIC5245	MIC2940A MIC39100 MIC39150 More...		<p>Linear Regulator Only Steps Down ($V_{OUT} < V_{IN}$)</p> <ul style="list-style-type: none"> - Inexpensive - Very Small - Low Noise/EMI - Ideal for: <ul style="list-style-type: none"> - 3.3V to 2.5V - 2.5V to 1.8V 	<p>Inefficient at high input to output voltage differential Eff = V_{OUT}/V_{IN}</p> <p><i>Note:</i> If a linear regulator gets too hot, then use a buck switching regulator instead.</p>
LM257x MIC457x MIC2207 MIC2208 MIC4680* MIC4681* MIC4682*	MIC4684* MIC4685* MIC4686 MIC4690* MIC4720 MIC4723		<p>Buck Regulator (Internal Switch) Only Steps Down ($V_{OUT} < V_{IN}$)</p> <ul style="list-style-type: none"> - Lowest Peak Current - Only One Switch Voltage Drop - Low-Ripple Current In <ul style="list-style-type: none"> - Output-Filter Capacitor - Simple Inductor - Low Switch-Stress Voltage <p>Eff = +85%</p>	<p>High-Side Switch</p> <p>$I_{SW} (Avg) \approx I_{OUT}$</p> <p>DC $\approx \frac{V_{OUT}}{V_{IN} \times Eff}$</p>
MIC2177* MIC2178* MIC2179* MIC2202* MIC2203* MIC2204*	MIC2205* MIC2206* MIC2224* MIC2245* MIC2285*		<p>Synchronous Buck Regulator (Internal Switch) High Efficiency Step Down</p> <ul style="list-style-type: none"> - Highest Efficiency (+90%) - Pros are same as Buck - High Output Current (Up to 20A) 	<p>Two Switches</p> <p>$I_{SW} (Avg) \approx I_{OUT}$</p> <p>DC $\approx \frac{V_{OUT}}{V_{IN} \times Eff}$</p>
MIC2168 MIC2168A* MIC2169 MIC2169A* MIC2182*	MIC2183 MIC2193* MIC2198* MIC2199* MIC2182*		<p>Synchronous Buck Regulator (External Switch) High Efficiency Step Down</p> <ul style="list-style-type: none"> - Highest Efficiency (+90%) - Pros are same as Buck - High Output Current (Up to 20A) 	<p>Two Switches</p> <p>$I_{SW} (Avg) \approx I_{OUT}$</p> <p>DC $\approx \frac{V_{OUT}}{V_{IN} \times Eff}$</p>
MIC2142* MIC2145* MIC2186* MIC2288	MIC2290 MIC2570* MIC3172* MIC2171* MIC3289*		<p>Boost Only Steps Up ($V_{OUT} > V_{IN}$)</p> <ul style="list-style-type: none"> - Low Peak Current - Low-Side Switch - Simple Inductor - Low Switch-Stress Voltage <p>Eff \approx 85%</p>	<p>Output can't be completely turned off. No short-circuit protection.</p> <p>$I_{SW} (Avg) \approx \frac{V_{OUT} \times I_{OUT}}{V_{IN} \times Eff.}$</p> <p>DC $\approx \frac{V_{OUT} - (V_{IN} \times Eff.)}{V_{OUT}}$</p>
MIC2196* MLM257x MIC457x	MIC4680 MIC4681 MIC4690		<p>Inverter/Buck Boost Negative Output Only</p> <ul style="list-style-type: none"> - Simple Inductor <p>Eff \approx 80%</p>	<p>High-Side Switch High Peak Currents</p> <p>$I_{SW} (Avg) \approx \frac{V_{OUT} \times I_{OUT} + I_{OUT}}{V_{OUT} \times Eff.}$</p> <p>DC $\approx \frac{V_{OUT}}{V_{OUT} + (V_{IN} \times Eff.)}$</p>
MIC38HC4x MIC38C4x			<p>Forward Step Up and Down</p> <ul style="list-style-type: none"> - Isolated Outputs - Low Side Switch - Low Input/Output Ripple <p>Eff \approx 90%</p>	<p>$I_{SW} (Avg) \approx \frac{n_s}{n_p} \times I_{OUT}$</p> <p>DC $\approx \frac{V_{OUT}}{(Eff \times V_{IN})} \times \frac{n_p}{n_s}$</p>

Note:

* = evaluation board is available.

Switch-Mode Voltage Regulator DC-to-DC Topologies

Device	Typical Applications	Pros	Cons	
MIC2171 MIC2186* MIC2196* MIC38C4x	MIC38HC4x MIC9130** (POE) MIC9131*		Flyback Applications (External Switches) Step Up and Down Isolated Output Multiple Outputs Negative Output High Output Voltage – Low-Side Switch Eff ≈ 80%	Transformer instead of Inductor High Peak Current High Switch-Stress Voltage $I_{SW} (Avg) \approx \frac{2 \times V_{OUT} \times I_{OUT}}{V_{IN} \times Eff.}$ DC ≈ Duty Cycle DC ≈ Assume 50%
MIC2142* MIC2145* MIC2171* MIC2172* MIC2186*	MIC2196* MIC2288* MIC2295* MIC2570* MIC3172*		SEPIC Step Up and Down – Low-Side Switch Eff ≈ 80%	High Peak Currents 2 inductors or coupled inductor. High Switch-Stress Voltage $I_{SW} (Avg) \approx \frac{V_{OUT} \times I_{OUT} + I_{OUT}}{V_{OUT} \times Eff.}$ $DC \approx \frac{V_{OUT}}{V_{OUT} + (V_{IN} \times Eff.)}$
MIC3808/9 MIC3838/9			Push-Pull Step Up and Down – Isolated Outputs – Low Side Switches – Low Input/Output Ripple Eff ≈ 94%	$I_{SW} (Avg) \approx \frac{n_s}{n_p} \times I_{OUT}$ $DC \approx \frac{V_{OUT}}{2(Eff \times V_{IN})} \times \frac{n_p}{n_s}$
MIC3808/9 MIC3838/9			Half-Bridge Step Up and Down – Isolated Outputs – Low FET Stress – Low Transformer Leakage Eff ≈ 95%	$I_{SW} (Avg) \approx \frac{n_s}{n_p} \times I_{OUT}$ $DC \approx \frac{V_{OUT}}{2(Eff \times V_{IN})} \times \frac{n_p}{n_s}$
MIC3808/9 MIC3838/9			Full-Bridge Step Up and Down – Isolated Outputs – High Power – Low FET Stress Eff ≈ 95%	$I_{SW} (Avg) \approx \frac{n_s}{n_p} \times I_{OUT}$ $DC \approx \frac{V_{OUT}}{2(Eff \times V_{IN})} \times \frac{n_p}{n_s}$

Note:
* = evaluation board is available.