Synchronous Buck Converters with Enhanced EMI Performance

Standard Rail	Rail Conversions	60V_{IN} AP66xxx	36/40V_{IN} AP64xxx	32V_{IN} AP63xxx	18V_{IN} AP62xxx	5.5V_{IN} AP61xxx
48V →	24V, 12V, 5V, and 3.3V rails	2A, 3A; 0.3A, 0.6A, and 1A in development	–	–	–	–
24V →	12V, 5V, and 3.3V rails		0.6A, 1A, 2A, 3.5A, and 5A; 36V: 2A, 3A, and 7A in development	2A, 3A, and 3.5A	–	–
12V →	5V, 3.3V, and core voltages				1.5A, 2A, 2.5A, 3A, 4A, 5A, 6A, and 8A	–
5V →	3.3V and core voltages					1A, 2A, and 3A; 0.6A, 4A, and 6A in development
3.3V (I/O and core) →	Core voltages	–	–	–	–	

The DIODES Advantage

- **Controlled edge speeds – no ringing**
  Enhanced EMI performance – removing EMI issues
- **Wide supply voltages – up to 60V V_{IN}**
  Supports consumer, industrial, and automotive
- **Wide output voltage range with "LDO" Mode**
  Still regulates as $V_{IN} \rightarrow V_{OUT}$
- **High light-load efficiency variants with low I_Q**
  Meets latest system standby requirements

Key Differentiations

- **Same package and pinout as TI, MPS, and RT**
- **Synchronous rectification →**
  Higher efficiency and saves space/cost of Schottky diode
- **Lower $R_{DS(ON)}$ HS and LS MOSFETs →**
  Lower conducted losses → Higher efficiency
- **Lower quiescent current**
- **Optimized pinouts for easy PCB layout**
  AP63xxxWU supports 1-layer PCB layouts
- **Automotive-compliant versions available:**
  AP66xxxQ, AP64xxxQ, AP63xxxQ, and AP61xxxQ

Synchronous Buck Converters with Enhanced EMI Performance

Max V_{IN}	Part Number		V_{OUT} Range	I_{OUT}	I_Q	V_{FB}	F_{SW}	Key Features								Package(s)	
V	Forced PWM[1]	PFM/ PWM[2]	V	A	µA	V	kHz	Adj. fsw	Ext. Sync	FSS	Bias	LDO Mode	Power Good	Ext. Comp	Adj. Soft Start		
60	**AP66200**		0.8 ~ 50	2	40	0.800	300 ~ 2500	Y	Y	–	Y	Y	Y	Y	Y	U-QFN4040-16 (same pinout)	
	AP66300			3	43												
40	–	**AP64060**	0.8 ~ 26	0.6	90	0.800	2200	–	–	–	–	–	–	–	–	TSOT26	
	–	**AP64100**	0.8 ~ V_{IN}	1	25	0.800	100 ~ 2200	Y	Y	Y	–	Y	–	Y	–	SO-8EP (same pinout)	
	–	**AP64200**		2	25												
	–	**AP64350**		3.5	22												
	–	**AP64500**		5	25												
	–	**AP64351**	0.8 ~ V_{IN}	3.5	22	0.800	570	–	–	Y	–	Y	–	Y	Y	SO-8EP (same pinout)	
	–	**AP64501**		5	25												
	–	**AP64102**	0.8 ~ V_{IN}	1	25	0.800	100 ~ 2200	Y	Y	Y	–	Y	–	–	Y	SO-8EP (same pinout)	
	–	**AP64202**		2	25												
	–	**AP64352**		3.5	22												
	–	**AP64502**		5	25												
32	**AP63201**	**AP63200**	0.8 ~ V_{IN}	2	22	0.800	500	–	–	Y[3]	–	Y	–	–	–	TSOT26 (same pinout)	
	AP63301	**AP63300**		3													
	–	**AP63203**	3.3	2	22	3.3	1100	–	–	Y	–	Y	–	–	–		
	–	**AP63205**	5	2	22	5.0											
	AP63356	**AP63357**	0.8 ~ V_{IN}	3.5	22	0.800	450	–	–	Y	–	Y	Y	Y	–	V-DFN3020-13 (same pinout)	
18	–	AP62150	0.8 ~ 7	1.5	135	0.800	1300	–	–	–	–	–	–	–	–	TSOT26 (same pinout)	SOT563 (same pinout)
	–	AP62250		2.5	155												
	AP62201	AP62200	0.8 ~ 7	2	135	0.800	750	–	–	–	–	–	–	–	–		
	AP62301	AP62300		3	155												
	AP62401	AP62400		4	190	0.800	800	–	–	–	–	–	–	–	–		–
	–	AP62200T	0.763 ~ 7	2	135	0.763	750	–	–	–	–	–	–	–	–		–
	–	AP62300T		3	155												
	AP62500[4]		0.6 ~ 7	5	195	0.600	400/ 800/ 1200	Y	–	–	–	–	Y	–	Y	V-QFN2030-12 (same pinout)	
	AP62600[4]			6	360			Y	–	–	–	–	Y	–	Y		
	AP62800[4]			8	195			Y	–	–	–	–	Y	–	Y		
5.5	**AP61100**		0.6 ~ 3.6	1	15	0.600	2200	–	–	–	–	–	–	–	–	SOT563 (same pinout)	
	AP61102												Y	–			
	AP61201	AP61200	0.6 ~ 3.6	2	19	0.600	1300	–	–	–	–	–	–	–	–		
	AP61203	AP61202						–	–	–	–	–	Y	–	–		
	AP61300		0.6 ~ 3.6	3	19	0.600	2200	–	–	–	–	Y	–	–	–		
	AP61302							–	–	–	–	Y	Y	–	–		

Reduces and controls Inrush currents

Improves dynamic performance

Lets system know if V_{OUT} is within spec and betters system robustness

Special "LDO" mode provides stabilized V_{OUT} as V_{IN} falls

Improves power efficiency at high V_{IN}

Spread spectrum switching frequency (FSS) → better EMI

Allows it to synchronize to external clock or other DC-DC

Low frequency for higher efficiency; higher frequency for smaller inductor

BOLD – Automotive-compliant (Q) versions available
(AEC-Q100 qualified, in IATF 16949 certified manufacturing sites, and supporting PPAP)

1. Forced PWM devices have constant switching frequency regardless of load current → reduced output voltage ripple at light loads.
2. PFM/PWM devices switch from PWM to PFM as load decreases → improved light-load efficiency.
3. AP63200/300 devices have FSS. AP63201/301 devices do not have FSS.
4. AP62500/600/800 devices also have Ultrasonic Mode (USM) → keeps switching above audible frequency range

For further information, please visit: www.diodes.com/contact-us