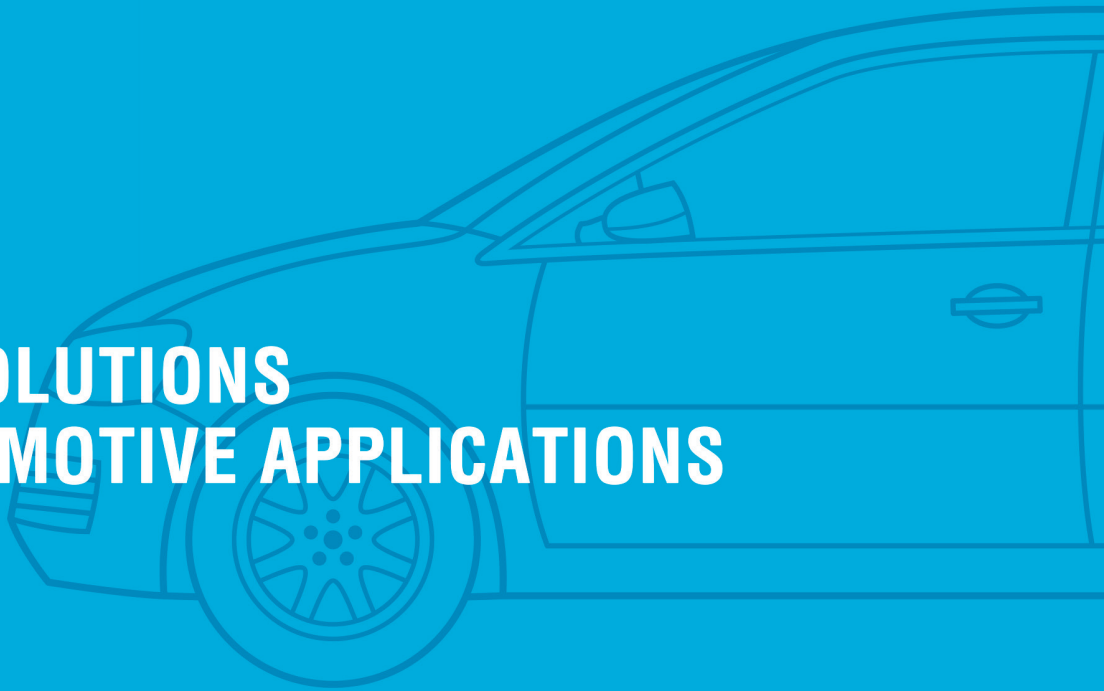
RICHTEK

SG006-02 MAY 2018



RICHTEK
POWER SOLUTIONS FOR AUTOMOTIVE APPLICATIONS

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Designing power solutions for automotive applications requires special care of several conditions that are specific for automotive environment: The very wide operating temperature range, input voltage fluctuations and stringent requirements on EMI/noise generation due to the nearby car radio receiver. Therefore, automotive applications require high reliability and good safety protections. Richtek has launched robust automotive products and design tools that simplify the automotive power design considerably.

Richtek Automotive Power Solutions

Richtek provides a wide range automotive solutions from DC/DC converters, LDOs, power switch, LED drivers, PMICs to USB PD products for the variety of automotive/industrial applications. Featuring input operating voltage up to 40V and output current up to 4A (converter), Richtek automotive products with high performance and reliability in effectively thermal packages have successfully been selected by automotive manufacturers worldwide.

Product Quality

Richtek offers both AEC-Q100 Grade 1, 2 & 3 qualified and automotive/industrial standard products for automotive

applications. Based on AEC-Q100 guidelines, products which meet AEC-Q100 qualification are clearly designated in Richtek product datasheets and marked as Grade 3 operating from -40˚C to 85˚C, Grade 2 operating from -40˚C to 105˚C and Grade 1 operating from -40˚C to 125˚C.

AEC-Q100 is a failure mechanism based stress test for automotive packaged integrated circuits. It was defined by major automotive manufacturers as a common part-qualification.

Wide ranges of automotive power ICs from Richtek in different applications

→ Infotainment: Controller operating panel (HMI) and display, head-up display, head unit, Audio, Video, navigation (AVN) and others.

→ Advanced Driver Assistance Systems: Multi-camera system with central processing (AVM), mmWave radar, rear and front camera, and others.

→ Others including Power Switch, LED lighting, USB PD solutions and so on.

Automotive Design Considerations

Richtek automotive products are defined as two major categories for different applications: products with input voltage up to 6V and input voltage up to 40V.

→ Products connected to the vehicle battery rails require 36V input voltage to support load dump and down to 4.5V for start-stop. The output voltages of systems normally range from 1.8V to 5V. In some cases such as cold-crank where battery rail can drop as low as 3V during cranking of the engine, it is not possible to maintain regulation when input voltage approaches the regulated voltage, and some voltage drop is allowed.

→ Devices for vehicle interface processors in subsystems require input voltage up to 5.5V. The vehicle subsystem monitors temperature, voltage levels, etc.

→ A radio receiver nearby has high sensitivity in electromagnetic fields in its operating bands, and will easily be affected by converter switch noise. Selecting a suitable switching frequency can help to avoid radiating noise in sensitive frequency bands. Richtek provides products with programmable switching frequency, which allows best trade-off between efficiency and component size. Some products with external clock synchronization can be set to avoid sensitive frequency bands and shift the second harmonic out of the tuned frequency band.

→ Richtek also provides products with the low quiescent and low shutdown current, which is ideal for devices in standby mode.

BUCK CONVERTERs

	P/N	V_{IN}	V_{OUT}	I_{OUT}	f_{SW}	Electrical characteristics guarantee range	Key features	Package	Status
AEC-Q100 Grade 2	RT5701	2.5V-5.5V	0.3V-5.5V	4A	3MHz	-40°C to 105°C	• I^2C control • PSM/PWM • 10μA I_Q • Int. Soft-Start, Power Good,100% Duty Cycle, DVS • Remote Sensing	TSSOP-14	Mass production
AEC-Q100 Grade 2	RTQ2134-QA	2.5V-6V	0.3V-1.3V	20A (5A/per phase)	2.1MHz	-40°C to 105°C	• 4+0/2+2/2+1+1 phase output • PSM/PWM • I^2C control, DVS, SR, Soft-Start • WD RST, Remote Sensing	WQFN-30L 4.5x5	Sampling
AEC-Q100 Grade 3	RT2657BQ	2.7V-5.5V	0.6V-5.5V	0.6A	2.25MHz	-40°C to 85°C	• I_{LIM}: 1.5A (typ.) /0.8A (min.) • Forced PWM • 100% Duty Cycle	WDFN-8L 3x3	Mass production
AEC-Q100 Grade 2	RT2101A RT2101B Richtek Designer™	2.95V-6V	0.827V-3.6V	3A (A) 2A (B)	700kHz-2MHz	-40°C to 105°C	• Adj. Soft-Start • Power Good • Ext. Synch.	WQFN-16L 3x3	Mass production
AEC-Q100 Grade 1	RTQ2102A-QA	3V-6V	0.45V-5.5V	1.5A	2.7MHz	-40°C to 125°C	• ACOT™ topology • 30μA I_Q • Power Good, 100% Duty Cycle	WDFN-8L 3x3	Mass production
AEC-Q100 Grade 1	RTQ2103A-QA	3V-6V	0.45V-5.5V	2A	2.7MHz	-40°C to 125°C	• ACOT™ topology • 30μA I_Q • Power Good, 100% Duty Cycle	PSOP-8	Mass production
AEC-Q100 Grade 1	RTQ2130B-QT	3V-36V	5V & 0.8V-28V	0.7A	2.1MHz	-40°C to 125°C	• Forced PWM • Int. Soft-Start • Ext. Comp.	WDFN-8SL 2x3	Mass production
AEC-Q100 Grade 1	RTQ2131B-QA	3V-36V	5V or 0.8V-28V	1A	2.1MHz	-40°C to 125°C	• Forced PWM • Int. Soft-Start • Power Good • Ext. Comp. • Spread spectrum	WDFN-10SL 3x3	Mass production

	P/N	V_{IN}	V_{OUT}	I_{OUT}	f_{SW}	Electrical characteristics guarantee range	Key features	Package	Status
AEC-Q100 Grade 1	RTQ2132B-QT	3V-36V	5V or 0.8V-28V	1.2A	2.1MHz	-40°C to 125°C	• Forced PWM • Ext. Soft-Start • Power Good • Ext. Comp. • Spread spectrum	TSSOP-14	Mass production
AEC-Q100 Grade 1	RTQ2104-QA RTQ2104B-QA	3V-36V	0.8V-24V	3A	2.1MHz	-40°C to 125°C	• PSM at light load • Forced PWM (B) • Power Good & Soft-Start • Int. Comp. • Spread spectrum	PSOP-8	Sampling
AEC-Q100 Grade 1	RTQ2105-QA	3V-36V	0.8V-24V	3A	0.3M-2.1MHz (adj.)	-40°C to 125°C	• Selectable PSM/PWM at light load • Power Good, Ext. Sync., Ext. Comp., Adj. Soft-Start, Adj. Load Line Comp., Adj. I_{LIM}: 2A-6A • CC/CV mode • Low I_Q • Selectable spread spectrum frequency	QFN-24L 4x4 Wettable frank-plated package	Sampling
AEC-Q100 Grade 1	RTQ2106-QA	3V-36V	0.8V-24V	3A	2.1MHz	-40°C to 125°C	• Selectable PSM/PWM at light load • Power Good, Ext. Sync.: 0.3M-2.1MHz, Ext. Comp, Adj. Soft-Start, Adj. I_{LIM}: 2A-6A • Low I_Q • Spread spectrum	TSSOP-14	Sampling
AEC-Q100 Grade 2	RT2875A/B Richtek Designer™	4.5V-36V	0.6V-24V	3A	0.3M-2.1MHz (adj.)	-40°C to 105°C	• Adj. I_{LIM}: 1.5A-6A • Ext. Sync. & Ext. Comp. • Soft-Start and Power Good • Application note	TSSOP-14	Mass production
AEC-Q100 Grade 3	RT2872 Richtek Designer™	4.5V-36V	0.8V-30V	3A	0.3M-1MHz (adj.)	-40°C to 85°C	• Ext. Comp.	PSOP-8	Mass production

LDOs

	P/N	V_{IN}	V_{OUT}	I_{OUT}	Dropout	Electrical characteristics guarantee range	Key features	Package	Status
AEC-Q100 Grade 2	RTQ2516-QT	1.4V-6V	0.5V-5V	2A	0.4V@2A	-40˚C to 105˚C	• EN pin • Ultra-low V_{IN} & low V_{OUT} • Reverse current protection	PSOP-8	Mass production
AEC-Q100 Grade 1	RTQ2510-QA	2.2V-6V	0.8V-5.5V	1A	0.17V@1A	-40˚C to 125˚C	• EN pin • Ultra-high PSRR • 15μVrms/V low noise • Stable with a 4.7μF ceramic cap.	DFN-8L 3x3	Sampling
AEC-Q100 Grade 2	RT2517B	2.2V-6V	1.2V-(Vin-Vdrop)	1A	0.2V@1A	-40˚C to 105˚C	• EN pin • V_{REF}=1.2V ±2%	PSOP-8	Mass production
AEC-Q100 Grade 1	RTQ2511-QA	3.5V-14V	2.5V-9V in 0.1V/step, 3.3V, 5V	200mA	0.4V@0.1A	-40˚C to 125˚C	• EN pin • Ultra-low I_Q: 2μA	DFN-8L 3x3	Sampling
AEC-Q100 Grade 1	RTQ2569-QA	3.5V-36V	2.5V-12V in 0.1V/step, 3.3V, 5V	200mA	0.2V@10mA	-40˚C to 125˚C	• EN pin • Ultra-low I_Q: 2μA	DFN-8L 3x3	Mass production
AEC-Q100 Grade 3	RT2560Q	3.5V-36V	2.5V, 3.3V 5V, 12V	100mA	0.55V@10mA	-40˚C to 85˚C	• Ultra-low I_Q: 2μA	PSOP-8	Mass production

LED DRIVERs

	P/N	V_{IN}	V_{OUT}	LED current	f_{SW}	Electrical characteristics guarantee range	Key features	Package	Status
AEC-Q100 Grade 3	RT8577A	5.5V-40V	Up to 45V	20mA-120mA (4CH)	200k-2.1MHz	-40˚C to 85˚C	• Ext. MOSFET • 4-channel Boost converter LED driver • PWM dimming • ±1.5% channel current matching	WQFN-20L 5x5	Mass production
AEC-Q100 Grade 3	RT8494	4.5V-36V	Up to 90V	Ext. MOSFET	100k-1MHz	-40˚C to 125˚C	• Ext. MOSFET • Buck, Boost, Buck-Boost multi-topology LED driver • Analog/Digital/Analog to Digital dimming • Adj. Soft-Start and Adj. Over-Voltage Protection	SOP-14	Mass production

POWER SWITCH

	P/N	V_{IN}	$I_{LIM(avg.)}$	$R_{DS(ON)}$	Electrical characteristics guarantee range	Key features	Package	Status
AEC-Q100 Grade 3	RT2528	2.5V-5.5V	2A	120mΩ	-40˚C to 85˚C	• Adj. I_{LIM}: 0.5A-2.5A • 120μA low supply current • FAULT pin • High precision ±10% accuracy	PSOP-8	Mass production

DDR TERMINATION REGULATORs

	P/N	V_{IN}	V_{CNTL}	Sink/ source	Electrical characteristics guarantee range	Key features	Package	Status
Automotive Standard*	RT2526Q	3.1V-3.6V	-	2A	-40°C to 85°C	• Support DDRII, DDRIII and low power requirement • Integrated sleep-state controls placing VTT in High-Z in S3 (suspend to RAM) • Remote sensing (VTTSNS) • ±20mV Accuracy for VTT and VTTREF & 10mA reference output	PSOP-8	Mass production
AEC-Q100 Grade 1	RTQ2536-QA	1V-3.5V	2.9V-5.5V	2A	-40°C to 125°C	• Support DDRI, DDRII, DDRIII, DDRIII-L, DDR IV and LPDDRIV applications • Remote sensing • 10mA reference output • High V_{OUT} accuracy at ±30mV and high V_{refout} accuracy at ±2%	WDFN-10SL 3x3	Mass production

PMICs FOR CAR INFOTAINMENT AND AUTOMOTIVE CAMERA MODULES

	P/N	V_{IN}	I_{OUT}	F_{SW}	Electrical characteristics guarantee range	Key features	Package	Status
AEC-Q100 Grade 1	RT2070	Buck 1: 4.5V-15V	2A	2MHz	-40°C to 125°C	• I^2C control to set timing of power on/off, sequence and discharge function, and includes power good indicator. • Sequence controlled by setting the resistances of the SEQ Pin	WQFN-24L 4x4	Mass production
		Buck 2 & 3: 2.7V-5.5V	1A	2MHz				
		LDO: 2.7V-5.5V	0.5A	-				
		Load Switch: 2.7V-5.5V	0.5A	-				
AEC-Q100 Grade 1	RTQ2077S-QT	Buck: 4.5V-15V	0.6A	2MHz	-40°C to 125°C	• Enable control • Power Good	WQFN-16L 3x3	Sampling
		LDO: 2.7V-5.5V	0.3A	-				

PMICs FOR AUTOMOTIVE DISPLAY SOLUTIONS

	P/N	V_{IN}	I_{OUT}	f_{SW}	Electrical characteristics guarantee range	Key features	Package	Status
AEC-Q100 Grade 3	RT5028A	3.3V-5.5V	Ch1: Buck 2.4A	500k-2MHz	-40°C to 85°C	• Integrated PMIC with 4-Ch synchronous Buck converters and 8 LDOs • I²C control for SEQ, PSM/PWM Mode, Output discharge mode, Soft-Start, V_{OUT} level, Protection, & f_{SW} • Spread spectrum • Embedded 32Bytes MTP for factory tuning	WQFN-56L 7x7	Mass production
			Ch2: Buck 2A					
			Ch3: Buck 1.6A					
			Ch4: Buck 2A					
		2.5V-5.5V	Ch5-12: LDO 300mA	-				
AEC-Q100 Grade 2	RTQ5115-QA	3.15V-5.5V	CH1: Buck 2.4A	500k-2MHz	-40°C to 105°C		WQFN-56L 7x7	Mass production
			CH2: Buck 2A					
			CH3: Buck 1.6A					
			CH4: Buck 2A					
		2.5V-5.5V	CH5-12: LDO 300mA	-				
AEC-Q100 Grade 2	RTQ6801-QT	2.5V-5.5V	AVDD: Boost (20V) 3A	-	-40°C to 105°C	• Incorporate one gate shading functions with adjustable falling time • VCOM: 200mA, 45V/μs fast slew rate	WQFN-24L 4x4	Mass production
			VGH/VGL: Charge Pump					
			Rail to Rail VCOM Buffer					

USB TYPE-C POWER DELIVERY AND PWM BUCK-BOOST CONTROLLER

	P/N	V_{IN}	I_{OUT}	F_{SW}	Electrical characteristics guarantee range	Key features	Package	Status
AEC-Q100 Grade 2	RTQ7880-QT	4V-36V	3V-21V	200k-600kHz	-40˚C to 125˚C	• Support USB PD 3.0 PPS • Built-in ARM Cortex™ M0 MCU • Support power up to 100 watts • I²C interface & 10 GPIOs	WQFN-48L 6x6 Wettable frank package	Sampling

MULTIPLE PROTOCOLS USB CHARGING PORT CONTROLLER AND BUCK CONVERTER

		BUCK Converter				Port Controller								
	P/N	V_{IN}	I_{OUT}	F_{SW}	Electrical characteristics guarantee range	Supported cable type	SDP	CDP	DCP Auto	CC1/ CC2	VCONN	POL	Package	Status
AEC-Q100 Grade 1	RTQ2115A-QA	3V-36V	3A	300k-2.1MHz	-40˚C to 125˚C	• Type-A to Micro-B • Type-A to Lightning	•	•	•				WQFN-32L 5x5 Wettable frank package	Sampling
AEC-Q100 Grade 1	RTQ2115C-QA	3V-36V	3.5A	300k-2.1MHz	-40˚C to 125˚C	• Type-C to Type-C • Type-C to Micro-B • Type-C to Lightning	•	•	•	•	•	•	WQFN-40L 6x6 Wettable frank package	Sampling
AEC-Q100 Grade 1	RTQ2116A-QA	3V-36V	3A	300k-2.1MHz	-40˚C to 125˚C	• Type-A to Micro-B • Type-A to Lightning			•				QFN-32L 5x5 Wettable frank package	Sampling
AEC-Q100 Grade 1	RTQ2116C-QA	3V-36V	3.5A	300k-2.1MHz	-40˚C to 125˚C	• Type-C to Type-C • Type-C to Micro-B • Type-C to Lightning			•	•	•		QFN-40L 6x6 Wettable frank package	Sampling

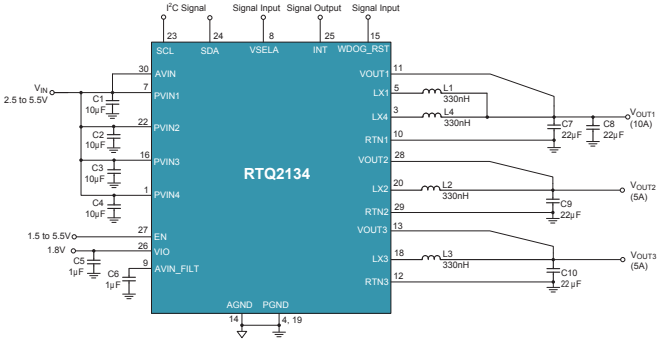
RTQ2134-QA

2.1MHz, 20A, Multi-Phase Buck Converter with I²C Interface

KEY FEATURES

- Input Voltage Range: 2.5V to 6V
- Output Voltage Range (I²C): 0.3V to 1.3V (5mV/Step: 0.3V–1.3V) 4+0/2+2/2+1+1 Phase Output
- Output Remote Sense
- Continuous 5A Output Current Per Phase
- Auto Phase Shielding for Light Load Efficiency
- Fast Transient Response
- Automatic Power Saving Mode
- Independent DVS with Programmable Slew Rate for Each Output
- Programmable Soft-Start Function
- Interrupt Function and Fault Detection
- Watch Dog Function
- Input UVLO, Cycle-by-Cycle Current Limit, OVP, UVP, OTP
- AEC-Q100 Grade 2
- WQFN-30L 4.5x5 (FC) Package

TYPICAL APPLICATION CIRCUIT: 2+1+1 PHASE



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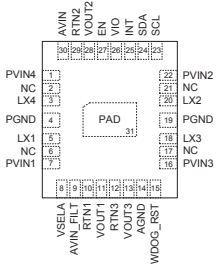


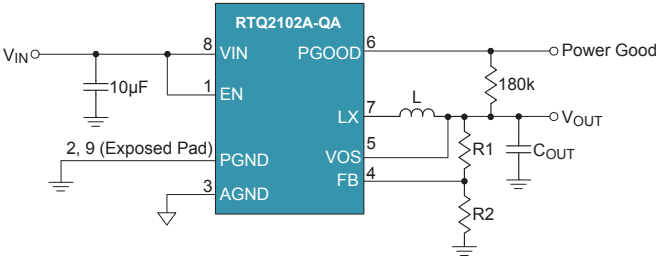
RTQ2102A-QA

1.5A, 6V, Low I_Q ACOT™ Synchronous Buck Converter

KEY FEATURES

- Input Voltage Range: 3V to 6V
- Adjustable Output from 0.45V to 5.5V
- 1.5A Output Current
- Switching Frequency: 2.7MHz (typ.)
- Advanced Constant-On-Time (ACOT™) Topology
- Fast Transient Response
- Robust Loop Stability with Low-ESR COUT
- 30μA (typ.) Low Quiescent Current (V_{EN}=1V, V_{FB}=0.5V, Not Switching)
- Power Good Indicator
- Internal Soft-Start 150μs
- High Light Load Efficiency
- Cycle-by-Cycle Over-Current Limit Protection
- Input Under-Voltage Lockout
- Output Under-Voltage Protection
- Thermal Shutdown Protection
- AEC-Q100 Grade 1
- WDFN-8L 3x3 Package

TYPICAL APPLICATION CIRCUIT



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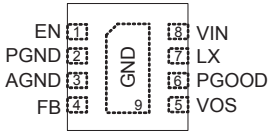


RTQ2130B-QT

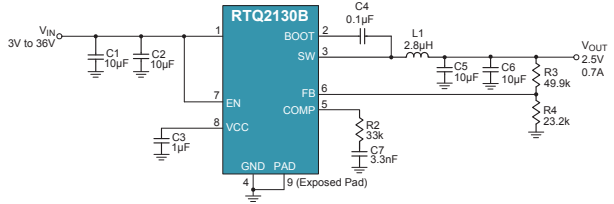
36V, 0.7A, 2.1MHz Synchronous Small Form Factor Buck Converter

KEY FEATURES

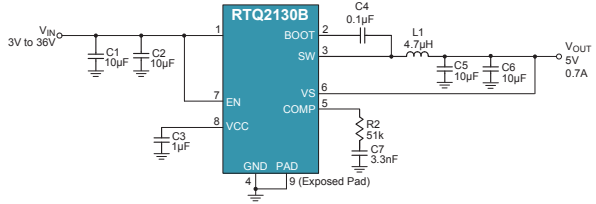
- Input Voltage Range: 3V to 36V
- 0.7A Output Current
- Switching Frequency: 2.1MHz ±10%
- Forced PWM
- Current-Mode Control
- Quiescent Current: <1.3mA (V_{EN}=2V, No Switching)
- Output adjustable from 0.8V to 28V & Fix Output: 5V
- Internal Soft-Start 2ms
- External Compensation
- Adjacent Pin-Short Protection
- Cycle-by-Cycle Over-Current Limit Protection
- Input Under-Voltage Lockout
- Output Under-Voltage Protection (Hiccup Mode)
- Thermal Shutdown Protection
- AEC-Q100 Grade 1
- WDFN-8SL 2x3 Package

TYPICAL APPLICATION CIRCUIT

Adjustable Output Voltage



Fixed 5V Output Voltage



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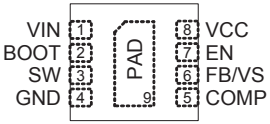


RTQ2105-QA

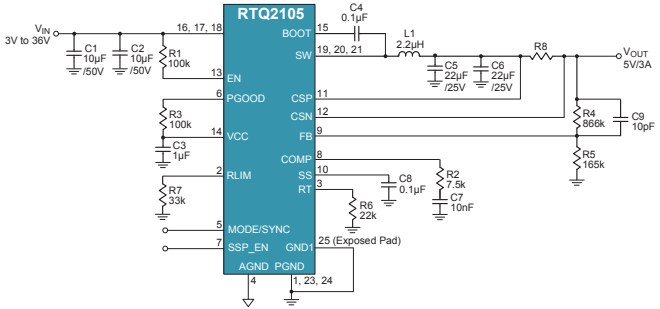
Available in Wettable Flank Package

36V, 3A, Buck Converter

KEY FEATURES

- Input Voltage Range: 3V to 36V
- Output adjustable from 0.8V to 24V
- 3A Output Current
- Current Mode Control
- Low Quiescent Current: 50μA (V_{EN}=2V, No Switching)
- Power Good Indicator
- Adjustable Switching Frequency/Synchronous to External Clock: 300kHz to 2.1MHz
- Adjustable Peak Current Limit: 2A to 6A
- Adjustable Load Line Compensation
- CC/CV Mode Control
- Adjustable Soft-Start
- Selectable PSM/PWM at Light Load
- Selectable Spread Spectrum
- Cycle-by-Cycle Over-Current Limit Protection
- Input Under-Voltage Lockout
- Output Under-Voltage Protection (Hiccup Mode)
- Thermal Shutdown Protection
- AEC-Q100 Grade 1
- WQFN-24SL 4x4 Wettable Flank Package

SIMPLIFIED SCHEMATIC



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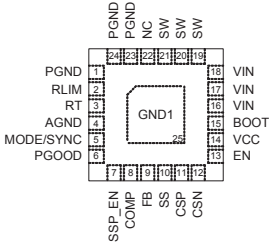


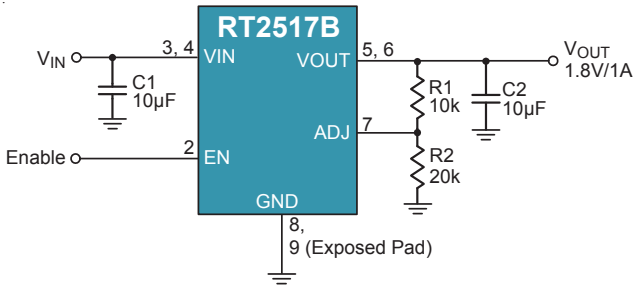
RT2517B

1A, 6V, Ultra-Low Dropout Linear Regulator

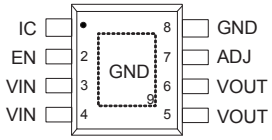
KEY FEATURES

- Input Voltage Range: 2.2V to 6V
- VOUT Range from 1.2V to VIN-VDROP
- Reference Voltage: 1.2V ±2% over -40˚C to 105˚C
- Ultra-Low Dropout Voltage: 200mV at 1A over -40˚C to 105˚C
- Low Quiescent 1.5μA in Shutdown Mode
- Soft Discharge Functionality
- Thermal Shutdown and Current Limit
- AEC-Q100 Grade 2
- PSOP-8 Package

TYPICAL APPLICATION CIRCUIT



PIN CONFIGURATION



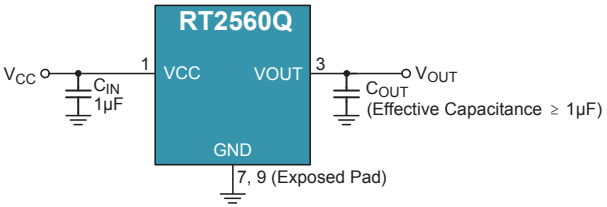
RT2560Q

0.1A, 36V, 2μA I_Q Low Dropout Linear Regulator

KEY FEATURES

- Input Voltage Range: 3.5V to 36V
- 100mA Output Current
- 2μA Quiescent Current
- ±2% Output Accuracy
- Dropout Voltage: 0.55V at 10mA
- Fixed Output Voltage: 2.5V, 3.3V, 5V, 12V
- Stable with Ceramic or Tantalum Capacitor
- Over-Current Limit Protection
- Over-Temperature Protection
- Automotive Standard
- PSOP-8 Package

TYPICAL APPLICATION CIRCUIT



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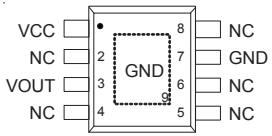


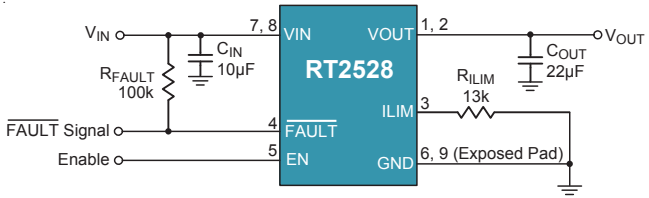
RT2528

120mΩ, 2.5A, 5.5V Power Switch with Adjustable Current Limit

KEY FEATURES

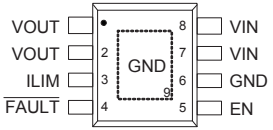
- Input Voltage Range: 2.5V to 5.5V
- Adjustable Current Limit: 0.5A to 2.5A (typ.)
- ±10% Current Limit Accuracy @ 2A over –40°C to 85°C
- 120mΩ P-MOSFET (max.)
- Low Supply Current: 120μA
- Reverse Input-Output Voltage Protection
- Built-in Soft-Start
- AEC-Q100 Grade 3
- PSOP-8 Package

TYPICAL APPLICATION CIRCUIT



Note : R_{ILIM} = 13kΩ for 2A Power Switch Operation

PIN CONFIGURATION



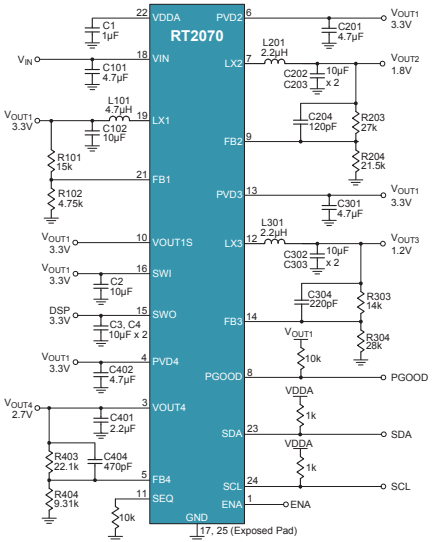
RT2070

3 Channel DC/DC Converters+LDO+LSW PMIC with I²C Interface for Industrial and Automotive Application

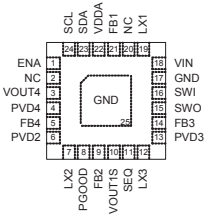
KEY FEATURES

- Input Voltage Operating Range is 4.5V to 15V
- CH1 HV-Step-Down Regulator in: 4.5V to 15V VIN, 2MHz f_{SW}, supporting up to 2A loading with up to 90% efficiency
- CH2/3 LV Step-Down Regulator: 2.7V to 5.5V VIN
- 2MHz f_{SW}, supporting up to 1A loading with up to 90% efficiency
- Linear Regulator: 2.7V to 5.5V VIN, 0.5A max loading
- Load Switch (LSW): 2.7V to 5.5V VIN, 0.5A max loading
- Sequence Can be Controlled by setting the resistances of the SEQ Pin
- AEC-Q100 Grade 1
- WQFN-24L 4x4 Package

TYPICAL APPLICATION CIRCUIT



PIN CONFIGURATION



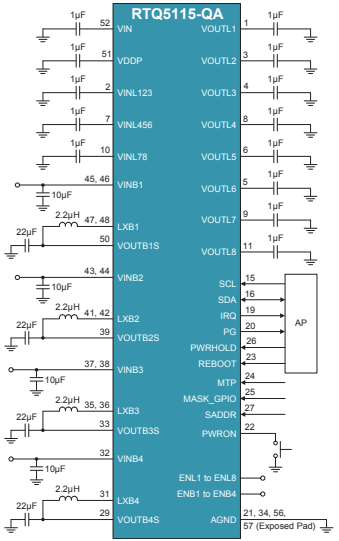
RTQ5115-QA

Integrated PMIC with 4-Channel Synchronous Buck Converters, 8 LDOs, and MTP Non-Volatile Memory for Industrial and Automotive Applications

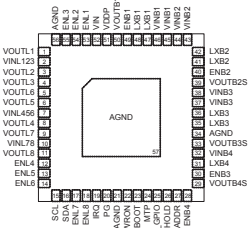
KEY FEATURES

- Input Voltage Range: 3.15V to 5V
- Step-Down Regulator: 3.15V to 5.5V V_{IN}
  - → Max Current 2.4A/2A/1.6A/2A
  - → Programmable Frequency from 500kHz to 2MHz
  - → I²C Programmable Output Level
  - → I²C Programmable Operation Mode (Forced PWM or Auto PSM/PWM)
  - → I²C Programmable Output Discharge Mode (Discharge or Flatting)
- Linear Regulators: 2.5V to 5.5V V_{IN}
  - → Max Current 0.3A
  - → I²C Programmable Output Level
- Embedded 32Bytes MTP for Factory Tuning
  - → External MTP Pin for Write Protection
- Sequence can be controlled by I²C or each EN pins Defined by MASK_GPIO Pin
- OT/UVP/VIN LV/POWRON Press Time Interrupt (IRQ)
  - → I²C Control Interface: Support Fast Mode up to 400kb/s
- AEC-Q100 Grade 2
- WQFN-56L 7x7 Package

TYPICAL APPLICATION CIRCUIT



PIN CONFIGURATION



SAMPLING

RTQ7880-QT

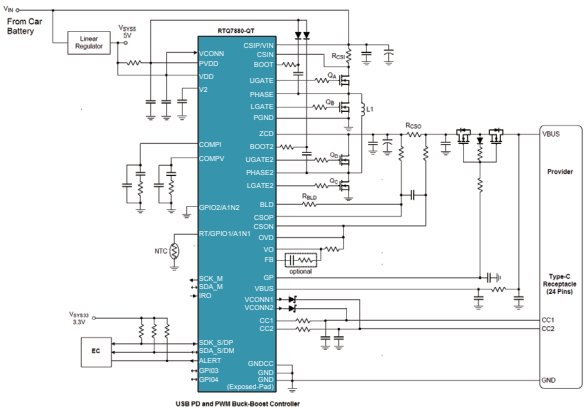
Available in Wettable Flank Package

USB Type-C PD and Buck-Boost PWM Controller

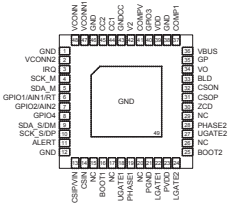
KEY FEATURES

- MCU:
  - → ARM M0 MCU
  - → 16KB ROM, 16KB MTP, 1.5KB SRAM
- Protocol Support:
  - → USB PD2.0/3.0/PPS (20mV, 50mA/step)
  - → QC2.0/3.0
  - → Other proprietary protocols
- Type-C Functions:
  - → Dual Role Port
  - → Vconn Support
- Buck Boost PWM
  - → Vin 4V to 36V; Vout 3V to 21V
  - → Programmable frequency 200kHz to 600kHz
  - → Programmable Constant Current Control
  - → Programmable Cable Compensation
- Power Path Control:
  - → One charge pump gate drive for NMOS
- Interface and GPIO:
  - → CC1/CC2, D+/D-, I^2C (master & slave), GPIOx4
- Protections:
  - → Programmable VBUS OVP, UVP & OTP
  - → Vconn output current limit
- Others:
  - → Vbus quick discharge control
  - → Online update support
  - → 20x current amp for small sense resistor (~10mΩ)
  - → ADC 10-bits
- AEC-Q100 Grade 2
- WQFN-48L 6x6 Wettable Flank Package

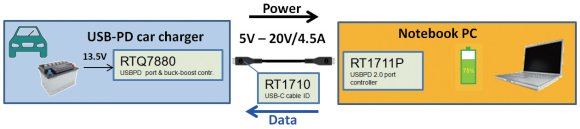
TYPICAL APPLICATION CIRCUIT



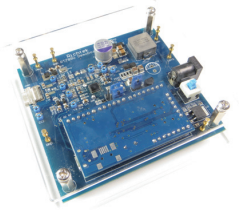
PIN CONFIGURATION



APPLICATION EXAMPLE



RTQ7880 EVALUATION BOARD



The RTQ7880 EVB is capable of providing up to 60W (20V/3A) of output power. The evaluation board includes a Richtek bridge board for connection to a PC, to read the VBUS voltage and current status and control PD functions. The RTQ7880 can be used as stand-alone charger provider, but it can also be used in combination with an Embedded Controller for added data communication with MUX.

SAMPLING

RTQ2115A-QA

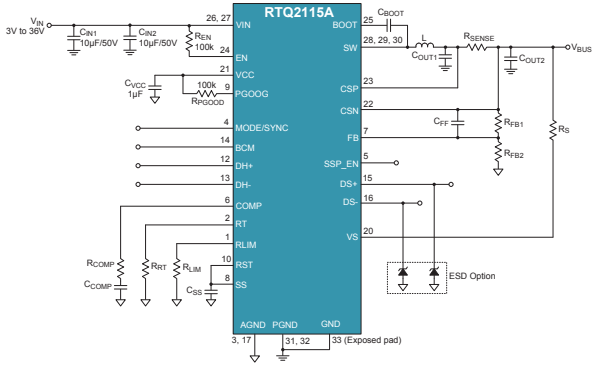
Available in Wettable Flank Package

Charging Port Controller and Integrated 36V 3A Synchronous Buck Converter

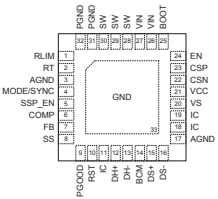
KEY FEATURES

- USB Charging Port Controller
  - → Support D+/D- SDP/CDP/DCP Modes per USB BC1.2
  - → Support D+/D- Shorted Mode per Chinese Telecommunication Industry Standard YD/T 1591-2009
  - → Support Automatic Selection Mode for D+/D- Shorted/Divider 3/1.2V Mode
- 36V 3A Synchronous Buck Converter
  - → 3V to 36V Input Range
  - → 3A Continuous Output Current
  - → CC/CV Mode Control
  - → Adjustable and Synchronizable Switching Frequency 300kHz to 2.1MHz
  - → Selectable PSM/PWM at Light Load
  - → Adjustable Soft-Start
  - → Adjustable USB Power Output Voltage between 5V and 6V with Load Line Compensation
  - → ±2% CC Mode Accuracy Current Limit
  - → Optional Spread-Spectrum Frequency Modulation for EMI Reduction
- Power Good Indicator
- Enable Control
- USB 2.0 480Mbps Data Switches
- Support Mode Change Among SDP/CDP/DCP Auto
- ±8kV HBM on DS+/DS-
- Over-Temperature Protection
- Cycle-by-Cycle Over-Current Limit Protection
- Input Under-Voltage Protection
- Output Over-Voltage Protection
- Adjacent Pin-Short Protection
- DS+/DS- OVP Protection
- DS+/DS-/VS ±8kV HBM ESD
- AEC-Q100 Grade 1
- WQFN-32L 5x5 Wettable Flank Package

TYPICAL APPLICATION CIRCUIT



PIN CONFIGURATION



SAMPLING

RTQ2115C-QA

Available in Wettable Flank Package

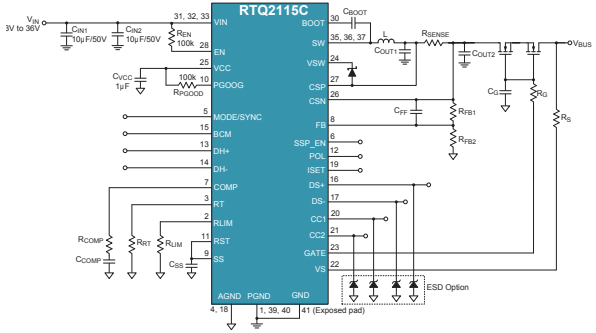
USB Type-C DFP with Charging Port Controller and Integrated 36V 3.5A Synchronous Buck Converter

KEY FEATURES

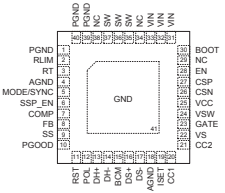
- USB Type-C DFP Controller
  - → Connector Attach/Detach Detection
  - → STD/1.5A/3A Capability Advertisement on CC
  - → Cable Polarity Determination
  - → Vconn with Current Limit
  - → CC Pin OVP Protection
- USB Charging Port Controller
  - → Support D+/D- SDP/CDP/DCP Modes per USB BC1.2
  - → Support D+/D- Shorted Mode per Chinese Telecommunication Industry Standard YD/T 1591-2009
  - → Support Automatic Selection Mode for D+/D- Shorted/Divider 3/1.2V Mode
- 36V 3.5A Synchronous Buck Converter
  - → 3V to 36V Input Range
  - → 3.5A Continuous Output Current
  - → CC/CV Mode Control
  - → Adjustable and Synchronizable Switching Frequency 300kHz to 2.1MHz
  - → Selectable PSM/PWM at Light Load
  - → Adjustable Soft-Start
  - → Adjustable USB Power Output voltage between 5V and 5.5V with Load Line Compensation
  - → ±2% CC Mode Accuracy Current Limit
  - → Optional Spread-Spectrum Frequency Modulation for EMI Reduction
- Power Good Indicator
- Enable Control
- Built-in Gate Driver to Turn on External Power MOSFET on VBUS
- USB 2.0 480Mbps Data Switches
- Auto-Discharge VBUS when CC Pins Detach
- Support Mode Change Among SDP/CDP/DCP Auto
- ±8kV HBM on CC1/CC2/DS+/DS-
- Over-Temperature Protection
- Cycle-by-Cycle Over-Current Limit Protection
- Input Under-Voltage Protection
- Output Over-Voltage Protection
- Adjacent Pin-Short Protection
- CC Pin OVP Protection
- DS+/DS- OVP Protection
- Vconn Current Limit

- CC1/CC2/DS+/DS-/VS ±8kV HBM ESD
- AEC-Q100 Grade 1
- WQFN-40L 6x6 Wettable Flank Package

TYPICAL APPLICATION CIRCUIT



PIN CONFIGURATION



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