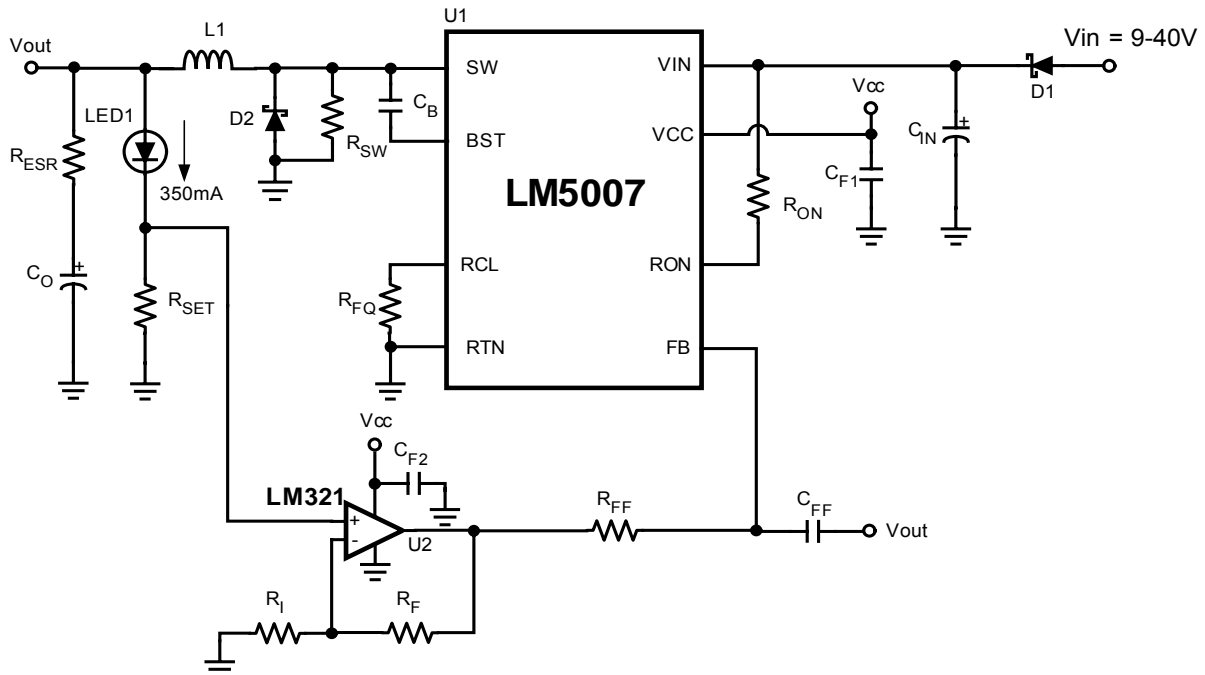


LM5007 Automotive LED Drive



Theory of Operation

This circuit is designed to replace a single-filament incandescent bulb in an automobile tail light, brake light, turn signal, reverse light, or interior light (dome light, map light). It operates at approximately 600kHz, and regulates the current in the LED at 350mA from inputs of 9V to 40V. This makes it suitable for standard passenger cars and trucks with 8V-16V batteries as well as freight trucks, tow trucks, fork lifts, and other vehicles that use a double lead-acid battery system (16V-32V). Diode D1 provides reverse battery protection, and the LM5007 can withstand input voltages of up to 75V. This circuit does not need additional protection from 'load dump' events of up to 75V.

Although not shown, the brightness of the LED can be dimmed with a PWM input by placing a signal-level NFET from the RON pin to ground and driving the gate with the PWM signal. This circuit is also compatible with 100Hz PWM of the input voltage for 'theater dimming' of interior lights.

ID	Part Number	Type	Size	Parameters	Qty	Vendor
U1	LM5007-8	Buck Regulator	MSOP-8	80V, 0.5A	1	NSC
U2	LM321	Op-amp	SOT23-5	1MHz	1	NSC
L1	SLF6028T-470MR59	Inductor	6.0x6.0 x2.8mm	47μH 0.59A	1	TDK
D1,D2	S397D	Schottky Diode	DO-214	60V 1.5A	2	Vishay
Cb	C2012X7R2E103K	Capacitor	0805	10nF, 250V	1	TDK
Cin	C3225X7R2A105M	Capacitor	1210	1μF, 100V	1	TDK
Co	C3216X7R1A106M	Capacitor	1206	10uF 10V	1	TDK
Cf1,Cf2	VJ0805Y104KXXAT	Capacitor	0805	100nF 10%	2	Vishay
Cff	VJ0805Y102KXXAT	Capacitor	0805	1nF, 10%	1	Vishay
Rsw	CRCW0805471J	Resistor	0805	4.7kΩ 5%	1	Vishay

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Resr	CRCW08051R00F	Resistor	0805	1 Ω 1%	1	Vishay
Rset	CRCW0805R20J	Resistor	0805	0.2 Ω 5%	1	Vishay
Ri,Rff	CRCW08051002F	Resistor	0805	10k Ω 1%	2	Vishay
Rf	CRCW08053483F	Resistor	0805	348k Ω 1%	1	Vishay
Rfq	CRCW08052742F	Resistor	0805	27.4k Ω 1%	1	Vishay
Ron	CRCW0805153J	Resistor	0805	150k Ω 5%	1	Vishay