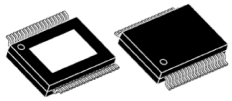
L99VR02XP

Data brief

Dual automotive linear voltage regulator with configurable output voltage (2 x 250 mA current capability)



PowerSSO-36

GAPGCFT00004

Features

Max supply voltage (load dump)	VS_LDO1,2	40 V
Max. output voltage tolerance	ΔV_0	+/-2%
Output current	I_O_LDO1,2	2 x 250 mA
Quiescent current	I_{qn}_LDO1,2	≤ 1µA (1)

1. *Maximum value with regulator disabled, valid per each single output.*

- AEC-Q100 qualified
- Nominal operating DC power supply voltage range from 2.15 V to 28 V
- Outputs protected versus short to battery
- Battery and post regulation operating modes are allowed
- Low dropout voltage
- Low quiescent current consumption
- Dual output voltages
- User-selectable output voltage (0.8 V; 1.2 V; 1.5 V; 1.8 V; 2.5 V; 2.8 V; 3.3 V or 5 V)
- Output voltage precision ±2%
- Enable input for enabling/disabling the voltage regulator
- Output voltage monitoring with reset output
- Negligible ESR effect on output voltage stability for load capacitor
- Programmable autonomous watchdog and reset pulse delay through external capacitors
- Undervoltage-lockout UVLO
- Fast output discharge
- Thermal shutdown and short-circuit protection
- Advanced Thermal warning and overvoltage diagnostic
- Thermal clusters
- Programmable short-circuit output current
- Wide operating temperature range (from T_j= -40 °C to 175 °C)
- Automatic voltage (de)tracking
- Documentation available for customers that need support when dealing with ASIL requirements as per ISO 26262

Product status link
L99VR02XP

Product summary	
Order code	L99VR02XPTR
Package	PowerSSO-36
Packing	Tape and reel

Description

The L99VR02XP is a low dropout dual linear regulator designed for automotive applications available in a PowerSSO-36 package. The LDO delivers an output current up to 2 x 250 mA, and consumes a quiescent current as low as 1 µA (per each output) when the regulator is disabled.

The input is 40 V tolerant to withstand load dump, while the operating input voltage range is between 2.15 V and 28 V. Each of the L99VR02XP outputs can be configured, through SELx pins, to generate a fixed output voltage (0.8 V; 1.2 V; 1.5 V; 1.8 V; 2.5 V; 2.8 V; 3.3 V or 5 V). High output voltage accuracy (±2%) is kept over wide temperature range, line and load variation.

The L99VR02XP features enable, reset, autonomous watchdog, advanced thermal warning, thermal cluster, fast output discharge, automatic voltage (de)tracking and IShort control. The regulator output current is internally limited so the device is protected against short circuit and overload, besides it features over temperature protection; the short current value is configurable by an external resistance. The L99VR02XP can operate both in post regulation, attached to a pre-regulated voltage, or directly connected to the battery.

1 Block diagram and pins description

Figure 1. **Functional block diagram of L99VR02XP**

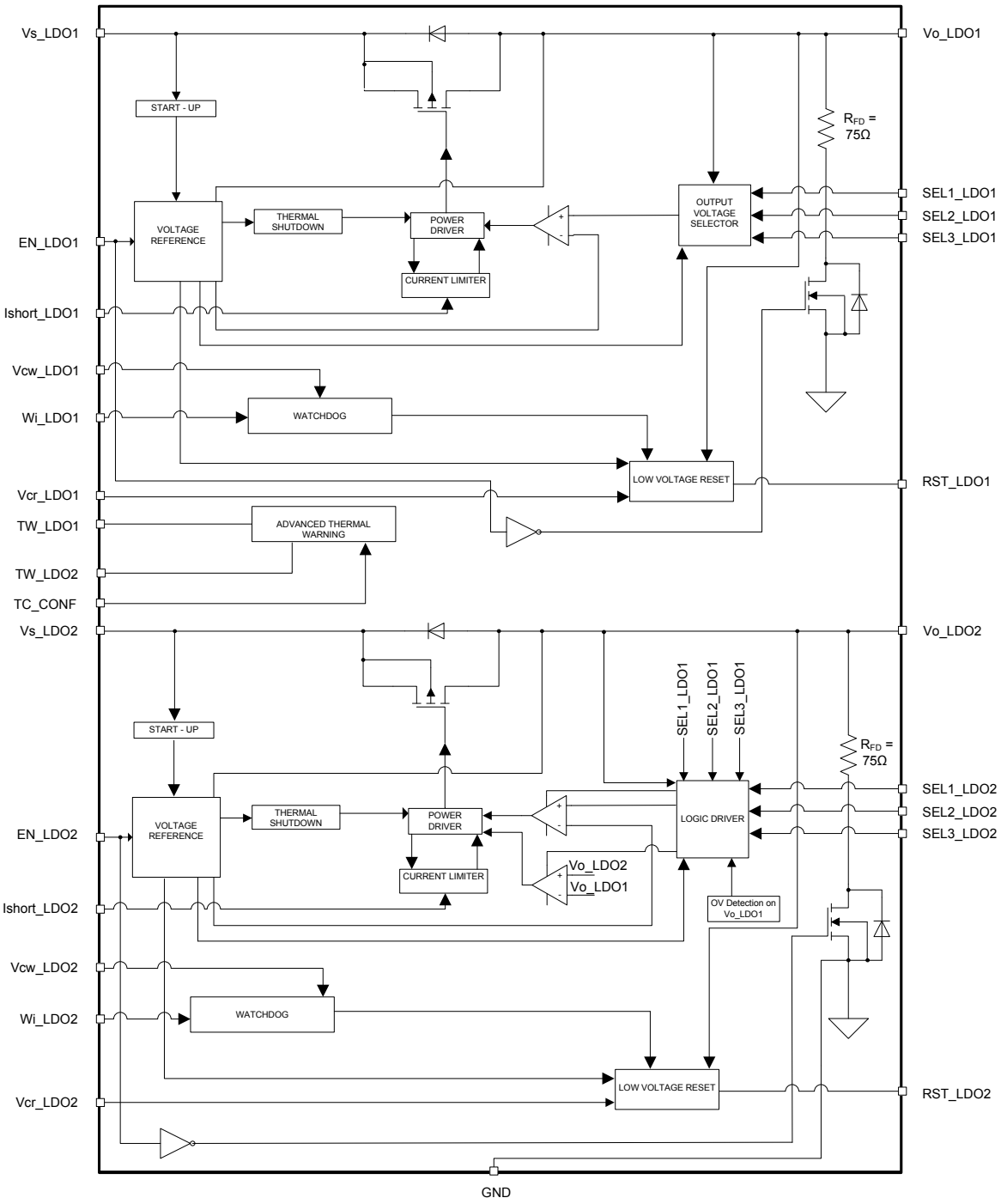
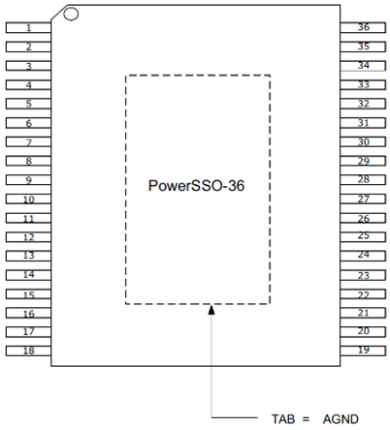


Table 1. Pins description

N°	PowerSSO-36 pin name	Function
1	GND	Ground reference.
2	SEL1_LDO1	Output voltage selectors for LDO1
3	SEL2_LDO1	
4	SEL3_LDO1	
5	NC	
6	VS_LDO1	Supply voltage for LDO1. Block directly to ground with ceramic capacitor ≥4.7uF and a 100 nF capacitator as close as possible to the pin.
7	NC	
8	EN_LDO1	Enable input for LDO1. With the Enable high, regulator, watchdog and reset are operating. With the Enable low, regulator, watchdog and reset are shutdown, while the fast discharge circuit is turned on. Connect the Enable to VS_LDO1 to keep the device always enabled
9	NC	
10	VO_LDO1	Voltage regulator output for LDO1. Block to ground with a capacitor ≥ 3.3 µF (needed for regulator stability).
11	RST_LDO1	Reset output for LDO1. It is pulled down when output voltage goes below VO_th or frequency at Wi_LDO1 is too low. Leave floating if not used.
12	Vcr_LDO1	Reset timing adjust for LDO1. A capacitor between Vcr_LDO1 pin and GND. Sets the reset delay time (Trd). Leave floating if Reset is not used.
13	GND	Ground reference.
14	IShort_LDO1	Programmable short circuit output current input pin for LDO1. A resistor between IShort_LDO1 pin and GND sets the short-circuit output current value.
15	Wi_LDO1	Watchdog refresh input for LDO1. If the square wave frequency at this input pin is too low, a low pulse at RST pin is generated
16	Vcw_LDO1	Watchdog timer adjust for LDO1. A capacitor between Vcw_LDO1 pin and GND sets the time response of the watchdog monitor.
17	TW_LDO1	Advanced Thermal warning output. If the device detects a junction temperature above the warning threshold, the pin is pulled low. If an overvoltage condition occurs, a square wave is provided through the TW TW_LDO1 output. Leave floating if not used.
18	TC_CONF	Thermal shutdown configuration
19	NC	
20	TW_LDO2	Advanced Thermal warning output.

N°	PowerSSO-36 pin name	Function
		If the device detects a junction temperature above the warning threshold, the pin is pulled low. If an overvoltage condition occurs, a square wave is provided through the TW_LDO2 output. Leave floating if not used.
21	Vcw_LDO2	Watchdog timer adjust for LDO2. A capacitor between Vcw_LDO2 pin and GND sets the time response of the watchdog monitor.
22	Wi_LDO2	Watchdog refresh input for LDO2. If the square wave frequency at this input pin is too low, a low pulse at RST pin is generated
23	IShort_LDO2	Programmable short circuit output current input pin for LDO2. A resistor between IShort_LDO2 pin and GND sets the short circuit output current value
24	GND	Ground reference.
25	Vcr_LDO2	Reset timing adjust for LDO2. A capacitor between Vcr_LDO2 pin and GND sets the reset delay time (trd). Leave floating if Reset is not used.
26	RST_LDO2	Reset output for LDO2. It is pulled down when output voltage goes below VO_th or frequency at Wi_LDO2 is too low. Leave floating if not used.
27	VO_LDO2	Voltage regulator output for LDO2. Block to ground with a capacitor ≥ 3.3 µF (needed for regulator stability).
28	NC	
29	EN_LDO2	Enable input for LDO2. With the Enable high, regulator, watchdog and reset are operating. With the Enable low, regulator, watchdog and reset are shutdown, while the fast discharge circuit is turned on. Connect the Enable to VS_LDO2 to keep the device always enabled
30	NC	
31	VS_LDO2	Supply voltage for LDO2. Block directly to ground with ceramic capacitor ≥4.7uF and a 100 nF capacitator as close as possible to the pin.
32	NC	
33	SEL3_LDO2	Output voltage selectors for LDO2
34	SEL2_LDO2	
35	SEL1_LDO2	
36	NC	
TAB		The TAB is connected to ground

Figure 2. **Pins configuration**



Revision history

Table 2. **Document revision history**

Date	Version	Changes
26-Oct-2020	1	Initial release.