RICOH

R1525S033B-EV

200 mA 42 V Input Ultra Low Supply Current VR Evaluation Board

No. EEV-520-S033B-190926

R1525S033B-EV is the evaluation board for R1525 which has the below features, benefits and specifications.

OVERVIEW

The R1525S is a low supply current voltage regulator featuring 200mA output current and up to 42 V input voltage. By providing excellent noise immunity, this device is suitable for the power source for control unit used under the electromagnetic environment.

KEY BENEFITS

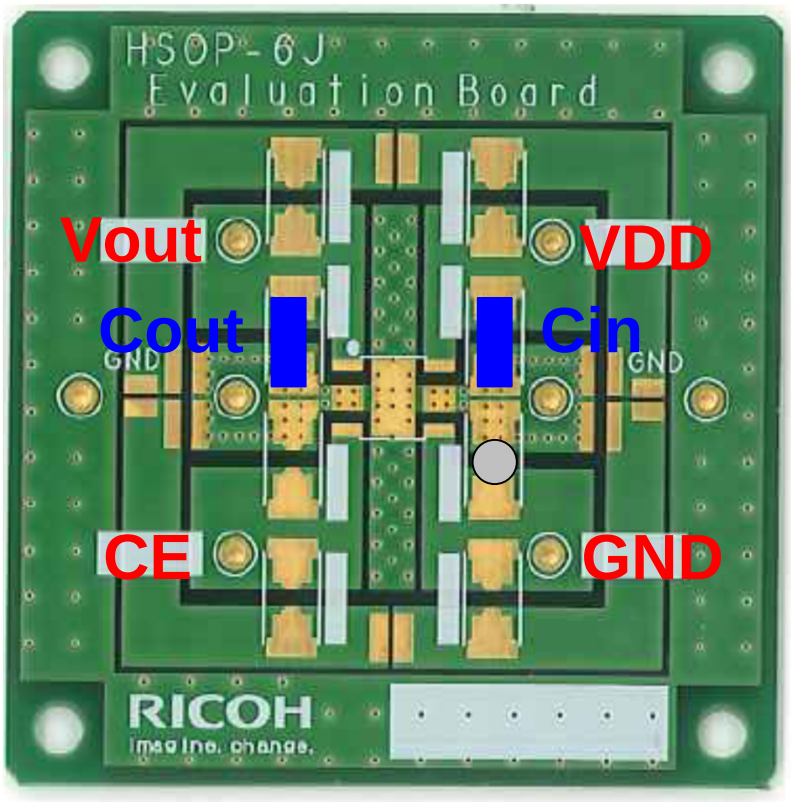
- Achieves low-supply current of 2.2 µA (Typ.) with the LDO at maximum rating 50 V (Peak Inrush Voltage: 60 V).
- Ensures the design margin by the output voltage with high-accuracy of ±0.6% (Ta=25°C).
- Protects the output voltage variations in high-frequency noise band (10 MHz to 1 GHz).

KEY SPECIFICATIONS

- Input Voltage Range: 3.5 V to 42.0 V
- Maximum Rating: 50 V (Peak Inrush Voltage: 60 V@200 ms or less)
- Operating Temperature Range: −40°C to 105°C
- Supply Current: Typ. 2.2 µA (Typ. 0.1 µA at Standby)
- Dropout Voltage: Typ. 0.6 V (I_{OUT} = 200 mA, V_{OUT} = 5.0 V)
- Output Voltage Range: 1.8 V, 2.5 V, 2.8 V, 3.0 V, 3.3 V, 3.4 V, 5.0 V, 5.5 V, 6.0 V, 6.4 V, 8.0 V, 8.5 V, 9.0 V
- Output Voltage Accuracy: ±0.6% (Ta = 25°C)
  ±1.6% (−40°C ≤ Ta ≤ 105°C)
- Input Stability: Typ. 0.01%/V (V_{SET} + 1 V ≤ V_{IN} ≤ 42 V)
- Short-circuit Protection: Limited to Typ. 80 mA
- Overcurrent Protection: Limited to Typ. 350 mA
- Package ····· HSOP-6J
- For more details on R1525 IC, please refer to https://www.e-devices.ricoh.co.jp/en/products/power/vr_ldo/r1525/r1525-ea.pdf.

PCB LAYOUT

R1525S (Package: HSOP-6J) PCB Layout



: Jumper

ABSOLUTE MAXIMUM RATINGS

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
V_{IN}	Input Voltage		−0.3 to 50	V
V_{IN}	Peak Inrush Voltage(1)		60	V
V_{CE}	CE Pin Input Voltage		−0.3 to 50	V
V_{OUT}	Output Voltage		−0.3 to V_{IN} + 0.3 ≤ 50	V
I_{OUT}	Output Current		300	mA
P_D	Power Dissipation(2) (JEDEC STD. 51-7)	HSOP-6J	2700	mW
Tj	Junction Temperature		−40 to 125	°C
Tstg	Storage Temperature Range		−55 to 125	°C

ABSOLUTE MAXIMUM RATINGS

Electronic and mechanical stress momentarily exceeded absolute maximum ratings may cause the permanent damages and may degrade the life time and safety for both device and system using the device in the field. The functional operation at or over these absolute maximum ratings is not assured.

RECOMMENDED OPERATING CONDITIONS

Recommended Operating Conditions

Symbol	Parameter	Rating	Unit
V_{IN}	Input Voltage	3.5 to 42	V
Ta	Operating Temperature Range	−40 to 105	°C

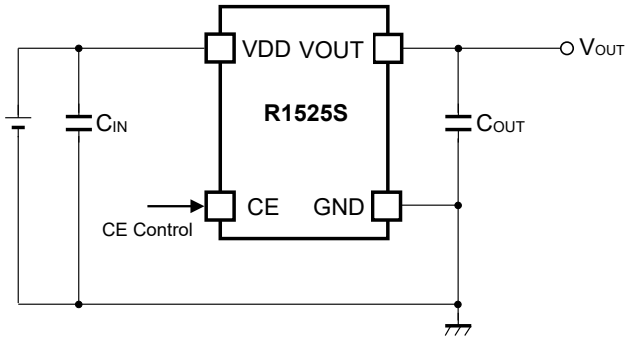
RECOMMENDED OPERATING CONDITONS

All of electronic equipment should be designed that the mounted semiconductor devices operate within the recommended operating conditions. The semiconductor devices cannot operate normally over the recommended operating conditions, even if when they are used over such conditions by momentary electronic noise or surge. And the semiconductor devices may receive serious damage when they continue to operate over the recommended operating conditions.

(1) Duration: 200 ms or less

(2) Refer to *POWER DISSIPATION* for detailed information.

TYPICAL APPLICATION



R1525S Typical Application

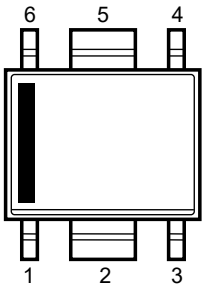
※Although C_{OUT} operates even at 0.1 µF, C_{OUT} = 10 µF is recommended to improve transient characteristics.

Recommended External Components[*1]

Symbol	Value
C_{IN}	0.1 µF
C_{OUT}	10 µF

[*1] The bill of materials will be attached on the shipment of each purchased evaluation board.

PIN DESCRIPTION



HSOP-6J Pin Configuration

HSOP-6J Pin Descriptions

Pin No.	Symbol	Description
1	V_{OUT}	Output Pin
2	GND(1)	Ground Pin
3	CE	Chip Enable Pin (Active-high)
4	GND(1)	Ground Pin
5	GND(1)	Ground Pin
6	V_{DD}	Input Pin

(1) The GND pin must be wired together when it is mounted on board.

TECHNICAL NOTES

Phase Compensation

Phase compensation is provided to secure stable operation even when the load current is varied. For this purpose, make sure to use 0.1 µF or more of a capacitor (C_{OUT}). In case of using a tantalum type capacitor and the ESR (Equivalent Series Resistance) value of the capacitor is large, the output might be unstable. Evaluate the circuit including consideration of frequency characteristics. Connect 0.1 µF or more of a capacitor (C_{IN}) between V_{DD} and GND, and as close as possible to the pins.

PCB Layout

For HSOP-6J package type, wire the following GND pins together: No. 2, No. 4, and No. 5.

Input Transient / Load Transient vs. Output Capacity (C_{OUT})

R1525S performs a stable operation by using 0.1 µF of ceramic capacitor as the output capacitor. However, the variation of output voltage may not meet the demand of the system when input voltage and load current vary. In such cases, the variation of output voltage can be minimized significantly by using 10 µF or higher ceramic capacitor. When using an electrolytic capacitor for the output line, place the electrolytic capacitor outer side of the ceramic capacitor arranged close to the IC.

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RoHS Compliant
Halogen Free

Ricoh is committed to reducing the environmental loading materials in electrical devices with a view to contributing to the protection of human health and the environment.
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