200 mA 36 V Input Ultra Low Supply Current VR

NO.EA-332-160720

OUTLINE

The R1524x is a CMOS-based ultra low supply current voltage regulator featuring 200 mA output current and 36 V input voltage. This device consists of an Output Short-circuit Protection Circuit, an Over-current Protection Circuit, and a Thermal Shutdown Circuit in addition to the basic regulator circuits. The operating temperature range is from −40°C to 105°C, and the maximum input voltage is 36 V. All these features allow the R1524x to become an ideal power source of electric home appliances.

The output voltages are internally fixed at either of the following: 1.8 V, 2.5 V, 2.8 V, 3.0 V, 3.3 V, 3.4 V, 5.0 V, 6.0 V, 8.0 V, 8.5 V and 9.0 V. The output voltage accuracy is ±0.6%.

The packages for this device range from high-density mounting to ultra high wattage. The R1524x is offered in a 5-pin SOT-23-5, a 5-pin SOT-89-5, a 6-pin HSOP-6J, and a 6-pin DFN(PLP)1820-6 package.

FEATURES

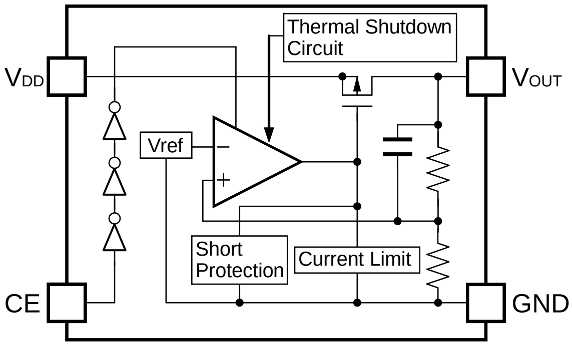
- Input Voltage Range (Maximum Rating) ············ 3.5 V to 36 V (50 V)
- Operating Temperature Range ························ –40°C to 105°C
- Supply Current ··· Typ. 2.2 µA
- Standby Current··· Typ. 0.1 µA
- Dropout Voltage ·· Typ. 0.6 V (I_{OUT} = 200 mA, V_{OUT} = 5.0 V)
- Output Voltage Range ································· 1.8 V / 2.5 V / 2.8 V / 3.0 V / 3.3 V / 3.4 V / 5.0 V / 6.0 V / 8.0 V / 8.5 V / 9.0 V
  *Contact Ricoh sales representatives for other voltages.
- Output Voltage Accuracy······························ ±0.6% (Ta = 25°C)
- Output Voltage Temperature-Drift Coefficient······· Typ. ±60 ppm/°C
- Line Regulation··· Typ. 0.01%/V (V_{SET} + 1 V ≤ V_{IN} ≤ 36 V)
- Built-in Output Short-circuit Protection Circuit ······ Typ. 80 mA
- Built-in Over-current Protection Circuit ··············· Typ. 350 mA
- Built-in Thermal Shutdown Circuit ····················· Thermal Shutdown Temperature: Typ. 160°C
- Ceramic capacitors are recommended
  to be used with this device ··························· C_{OUT} = 0.1 µF or more
- Packages ··· SOT-23-5, SOT-89-5, HSOP-6J, DFN(PLP)1820-6

APPLICATIONS

- Power source for home appliances such as refrigerators, rice cookers, and electric hot-water pot.
- Power source for notebook PCs, digital TVs, cordless phones, and private LAN system.
- Power source for office equipment machines such as copiers, printers, facsimiles, scanners, and projectors.

BLOCK DIAGRAM

R1524xxxxB



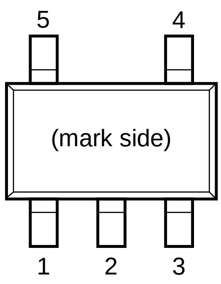
SELECTION GUIDE

The set output voltage and the package type are user-selectable.

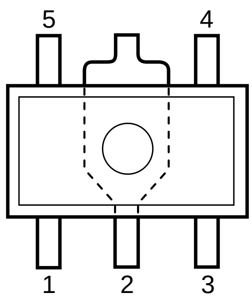
Product Name	Package	Quantity per Reel	Pb Free	Halogen Free
R1524NxxxB-TR-FE	SOT-23-5	3,000 pcs	Yes	Yes
R1524HxxxB-T1-FE	SOT-89-5	1,000 pcs	Yes	Yes
R1524SxxxB-E2-FE	HSOP-6J	1,000 pcs	Yes	Yes
R1524KxxxB-TR	DFN(PLP)1820-6	5,000 pcs	Yes	Yes

xxx: Specify the set output voltage (V_{SET})
1.8 V (018) / 2.5 V (025) / 2.8 V (028) / 3.0 V (030) / 3.3 V (033) / 3.4 V (034) /
5.0 V (050) / 6.0 V (060) / 8.0 V (080) / 8.5 V (085) / 9.0 V (090)
*Contact Ricoh sales representatives for other voltages.

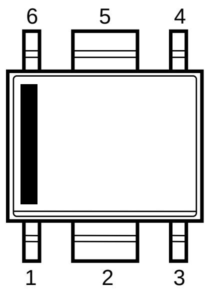
PIN DESCRIPTIONS



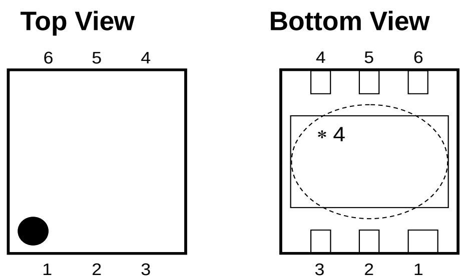
SOT-23-5



SOT-89-5



HSOP-6J



DFN(PLP)1820-6

SOT-23-5

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

[*1] The GND pin must be wired together when it is mounted on board.

SOT-89-5

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

[*2] The GND pin must be wired together when it is mounted on board.

HSOP-6J

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

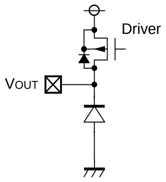
[*3] The GND pin must be wired together when it is mounted on board.

DFN(PLP)1820-6

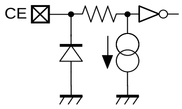
Pin No.	Symbol	Description
1	CE	Chip Enable Pin (Active-high)
2	NC	No Connection
3	GND	Ground Pin
4	V_{DD}	Input Pin
5	NC	No Connection
6	V_{OUT}	Output Pin

[*4] The tab on the bottom of the package enhances thermal performance and is electrically connected to GND (substrate level). It is recommended that the tab be connected to the ground plane on the board, or otherwise be left open.

PIN EQUIVALENT CIRCUIT DIAGRAMS



V_{OUT} Pin



CE Pin

ABSOLUTE MAXIMUM RATINGS

Symbol	Item			Rating	Unit
V_{IN}	Input Voltage			−0.3 to 50	V
V_{IN}	Peak Input Voltage*1			60	V
V_{CE}	Input Voltage (CE Pin)			−0.3 to 50	V
V_{OUT}	Output Voltage			-0.3 to $V_{IN} + 0.3 \leq 50$	V
I_{OUT}	Output Current			300	mA
P_D	Power Dissipation*2	SOT-23-5	Standard Land Pattern	420	mW
		SOT-89-5	Standard Land Pattern	900	
			High Wattage Land Pattern	1300	
		HSOP-6J	Standard Land Pattern	1700	
			Ultra High Wattage Land Pattern	2700	
		DFN(PLP)1820-6	Standard Land Pattern	880	
Ta	Operating Temperature Range			−40 to 105	°C
Tstg	Storage Temperature Range			−55 to 125	°C

*1 Duration time: 200 ms

*2 Refer to *PACKAGE INFORMATION* for detailed information.

ABSOLUTE MAXIMUM RATINGS

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

RECOMMENDED OPERATING CONDITIONS (ELECTRICAL CHARACTERISTICS)

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.

ELECTRICAL CHARACTERISTICS

$C_{IN} = C_{OUT} = 0.1\ \mu F$, unless otherwise noted.

The specifications surrounded by $\boxed{}$ are guaranteed by design engineering at -40°C ≤ Ta ≤ 105°C.

R1524xxxxB (Ta = 25°C)

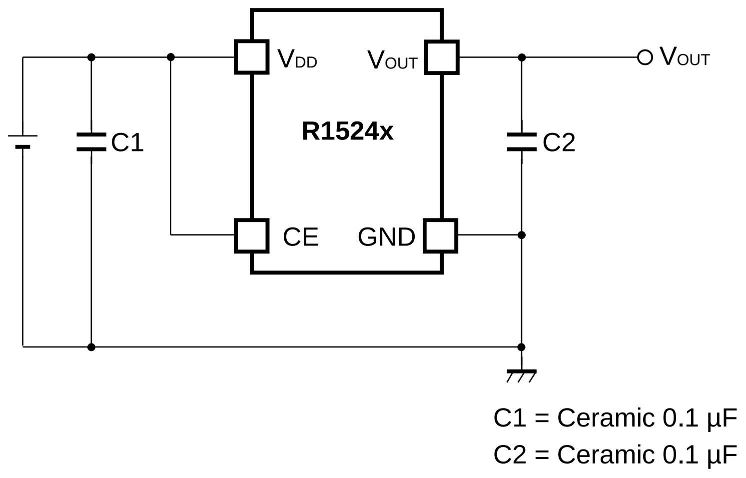
Symbol	Item	Conditions		Min.	Typ.	Max.	Unit
I_{SS}	Supply Current	V_{IN} = 14 V I_{OUT} = 0 mA	V_{SET} ≤ 5.0 V		2.2	$\boxed{6.5}$	μA
			5.0 V < V_{SET}		2.5	$\boxed{6.8}$	
Istandby	Standby Current	V_{IN} = 36 V, V_{CE} = 0 V			0.1	1.0	μA
V_{OUT}	Output Voltage	V_{SET} + 1 V ≤ V_{IN} ≤ 36 V I_{OUT} = 1 mA	Ta = 25°C	×0.994		×1.006	V
			−40°C ≤ Ta ≤ 105°C	$\boxed{\times 0.984}$		$\boxed{\times 1.016}$	
$\Delta V_{OUT}/\Delta I_{OUT}$	Load Regulation	V_{IN} = V_{SET} + 3.0 V 1 mA ≤ I_{OUT} ≤ 200 mA		Refer to the *Product-specific Electrical Characteristics*			
$\Delta V_{OUT}/\Delta V_{IN}$	Line Regulation	V_{SET} + 1 V ≤ V_{IN} ≤ 36 V, I_{OUT} = 1 mA	V_{SET} < 3.3 V	$\boxed{-20}$	5	$\boxed{20}$	mV
			3.3 V ≤ V_{SET}	$\boxed{-0.02}$	0.01	$\boxed{0.02}$	%/V
V_{DIF}	Dropout Voltage	I_{OUT} = 200 mA		Refer to the *Product-specific Electrical Characteristics*			
I_{LIM}	Output Current Limit	V_{IN} = V_{SET} + 3.0 V		$\boxed{220}$	350		mA
I_{SC}	Short Current Limit	V_{OUT} = 0 V		$\boxed{60}$	80		mA
V_{CEH}	CE Input Voltage "H"			$\boxed{2.0}$		36	V
V_{CEL}	CE Input Voltage "L"			0		$\boxed{1.0}$	V
I_{PD}	CE Pull-down Current				0.2	$\boxed{0.6}$	μA
T_{TSD}	Thermal Shutdown Temparature	Junction Temperature			160		°C
T_{TSR}	Thermal Shutdown Released Temperature	Junction Temperature			135		°C

All test items listed under Electrical Characteristics are done under the pulse load condition (Tj ≈ Ta = 25°C).

R1524xxxxB Product-specific Electrical Characteristics (Ta = 25°C)

Product Name	V_{OUT} (V) (Ta = 25°C)			V_{OUT} (V) (−40°C ≤ Ta ≤ 105°C)			$\Delta V_{OUT}/\Delta I_{OUT}$ (mV)			V_{DIF} (V)	
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	TYP.	MAX.
R1524x018B	1.7892	1.80	1.8108	$\boxed{1.7712}$	1.80	$\boxed{1.8288}$	$\boxed{-10}$	10	$\boxed{40}$	1.6	$\boxed{2.5}$
R1524x025B	2.4850	2.50	2.5150	$\boxed{2.4600}$	2.50	$\boxed{2.5400}$				1.2	$\boxed{2.2}$
R1524x028B	2.7832	2.80	2.8168	$\boxed{2.7552}$	2.80	$\boxed{2.8448}$					
R1524x030B	2.9820	3.00	3.0180	$\boxed{2.9520}$	3.00	$\boxed{3.0480}$					
R1524x033B	3.2802	3.30	3.3198	$\boxed{3.2472}$	3.30	$\boxed{3.3528}$				0.8	$\boxed{2.0}$
R1524x034B	3.3796	3.40	3.4204	$\boxed{3.3456}$	3.40	$\boxed{3.4544}$					
R1524x050B	4.9700	5.00	5.0300	$\boxed{4.9200}$	5.00	$\boxed{5.0800}$				0.6	$\boxed{1.7}$
R1524x060B	5.9640	6.00	6.0360	$\boxed{5.9040}$	6.00	$\boxed{6.0960}$	$\boxed{-18}$	18	$\boxed{72}$		
R1524x080B	7.9520	8.00	8.0480	$\boxed{7.8720}$	8.00	$\boxed{8.1280}$				0.5	$\boxed{1.3}$
R1524x085B	8.4490	8.50	8.5510	$\boxed{8.3640}$	8.50	$\boxed{8.6360}$					
R1524x090B	8.9460	9.00	9.0540	$\boxed{8.8560}$	9.00	$\boxed{9.1440}$					

TYPICAL APPLICATIONS



R1524x Typical Applications

TECHNICAL NOTES

Phase Compensation

In the R1524x, 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 (C2).

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 (C1) between V_{DD} and GND, and as close as possible to the pins.

PCB Layout

For SOT-23-5 package type, wire the following GND pins together: No. 1 and No. 2

For SOT-89-5 package type, wire the following GND pins together: No. 2 and No. 4.

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

Thermal Shutdown

R1524x has a built-in thermal shutdown circuit, which stops the regulator operation if the junction temperature of this device increases to 160°C (Typ.) or higher. If the temperature drops to 135°C (Typ.) or lower, the regulator restarts the operation. Unless eliminating the overheating problem, the regulator turns on and off repeatedly and as a result, a pulse shaped output voltage is generated.

PACKAGE INFORMATION

POWER DISSIPATION (SOT-23-5)

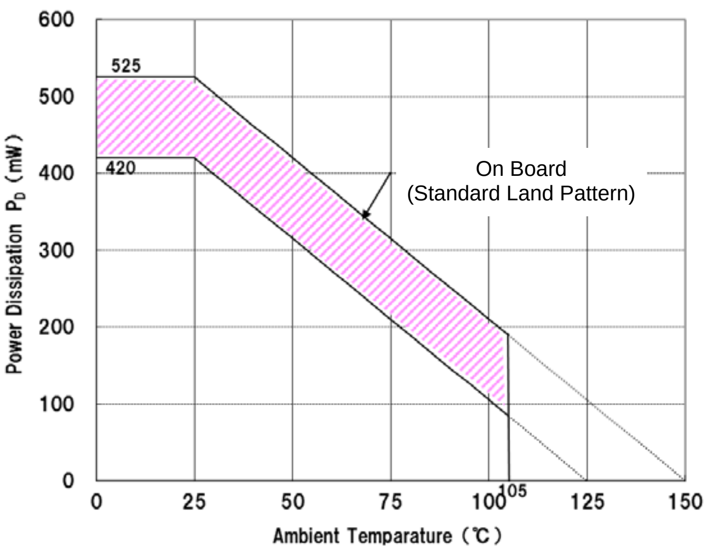
Power Dissipation (P_D) depends on conditions of mounting on board. This specification is based on the measurement at the condition below:

Measurement Conditions

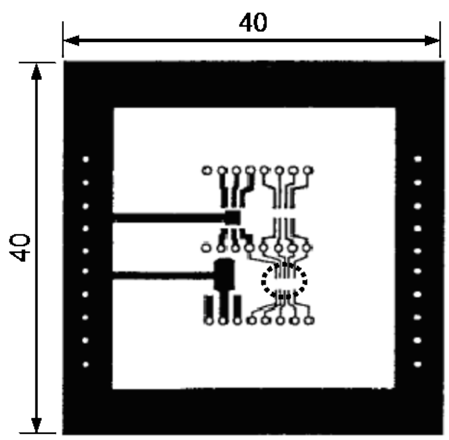
	Standard Test Land Pattern
Environment	Mounting on Board (Wind velocity = 0 m/s)
Board Material	Glass cloth epoxy plastic (Double sided)
Board Dimensions	40 mm x 40 mm x 1.6 mm
Copper Ratio	Top side: Approx. 50%, Back side: Approx. 50%
Through-holes	ϕ 0.5 mm x 44 pcs

Measurement Result (Ta = 25°C, Tjmax = 125°C)

	Standard Test Land Pattern
Power Dissipation	420 mW
Thermal Resistance	θja = (125 - 25°C)/0.42 W = 238°C/W



Ambient Temperature vs. Power Dissipation



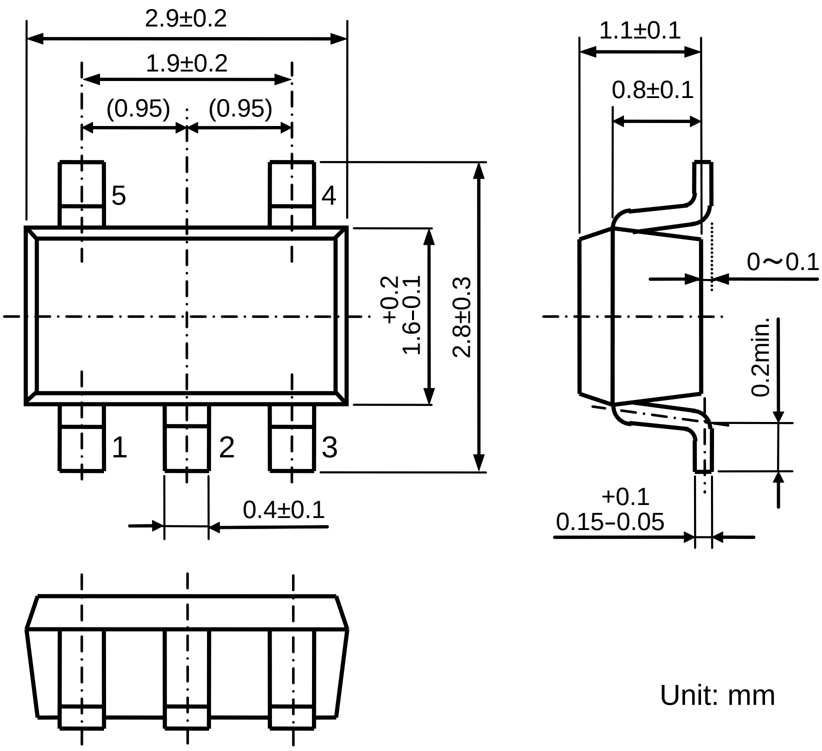
IC Mount Area (Unit: mm)

Measurement Board Pattern

The above graph shows the Power Dissipation of the package based on Tjmax = 125°C and Tjmax = 150°C.
Operating the IC in the shaded area in the graph might have an influence its lifetime.
Operating time must be within the time limit described in the table below, in case of operating in the shaded area.

Operating Time	**Estimated years (Operating four hours/day)**
13,000 hours	9 years

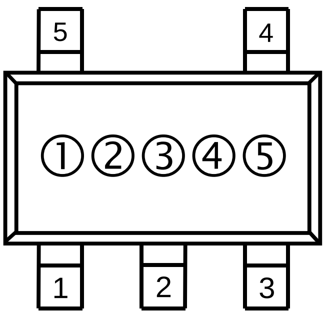
PACKAGE DIMENSIONS (SOT-23-5)



SOT-23-5 Package Dimensions

MARK SPECIFICATION (SOT-23-5)

①②③: Product Code … **Refer to *MARK SPECIFICATION TABLE (SOT-23-5)***
④⑤: Lot Number … Alphanumeric Serial Number



SOT-23-5 Mark Specification

MARK SPECIFICATION TABLE (SOT-23-5)

R1524NxxxB

Product Name	① ② ③	V_{SET}
R1524N018B	C T 7	1.8 V
R1524N025B	C T 8	2.5 V
R1524N028B	C T 9	2.8 V
R1524N030B	C S 0	3.0 V
R1524N033B	C T 0	3.3 V
R1524N034B	C T 1	3.4 V
R1524N050B	C T 2	5.0 V
R1524N060B	C T 3	6.0 V
R1524N080B	C T 4	8.0 V
R1524N085B	C T 5	8.5 V
R1524N090B	C T 6	9.0 V

POWER DISSIPATION (SOT-89-5)

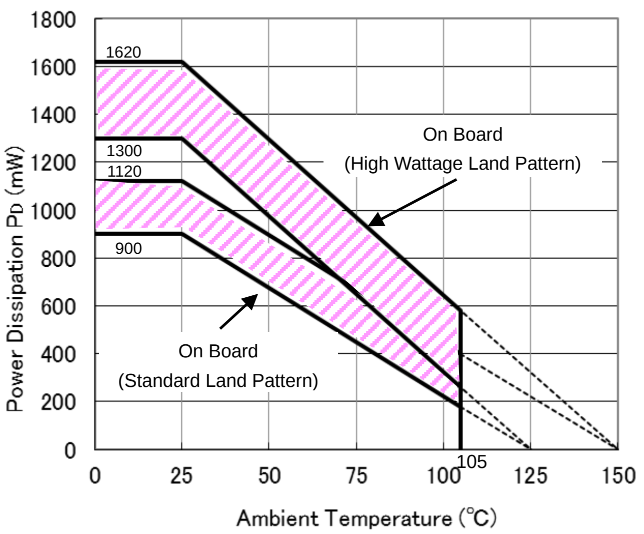
Power Dissipation (P_D) depends on conditions of mounting on board. This specification is based on the measurement at the condition below:

Measurement Conditions

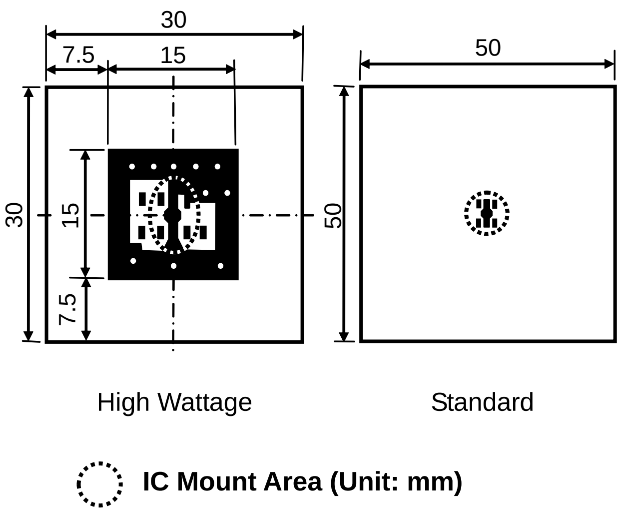
	High Wattage Land Pattern	Standard Land Pattern
Environment	Mounting on Board (Wind velocity = 0 m/s)	Mounting on Board (Wind velocity = 0 m/s)
Board Material	Glass cloth epoxy plastic (Double sided)	Glass cloth epoxy plastic (Double sided)
Board Dimensions	30 mm × 30 mm × 1.6 mm	50 mm × 50 mm × 1.6 mm
Copper Ratio	Top side : Approx. 20% , Back side : Approx. 100%	Top side : Approx. 10% , Back side : Approx. 100%
Through-hole	ϕ0.85 mm × 10 pcs	-

Measurement Result (Ta = 25°C, Tjmax = 125°C)

	High Wattage Land Pattern	Standard Land Pattern
Power Dissipation	1300 mW	900 mW
Thermal Resistance	77°C/W	111°C /W



Power Dissipation vs. Ambient Temperature

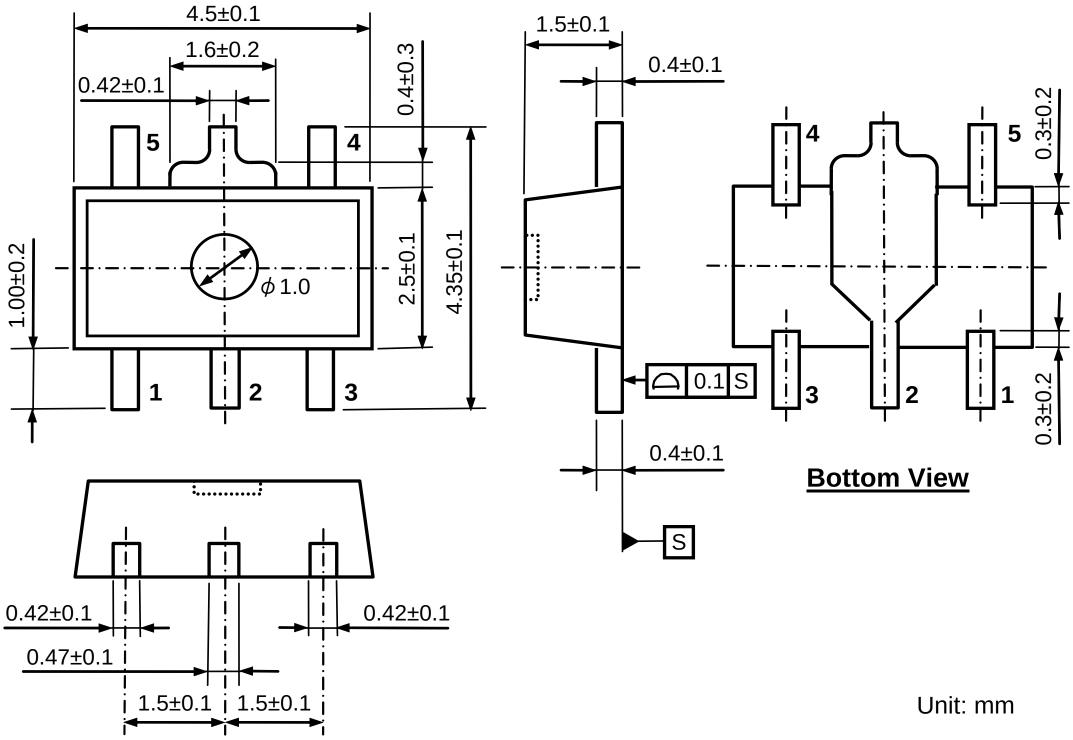


Measurement Board Pattern

The above graph shows the Power Dissipation of the package based on Tjmax = 125°C and Tjmax = 150°C.
Operating the IC in the shaded area in the graph might have an influence its lifetime.
Operating time must be within the time limit described in the table below, in case of operating in the shaded area.

Operating Time	Estimated years (Operating four hours/day)
13,000 hours	9 years

PACKAGE DIMENSIONS (SOT-89-5)

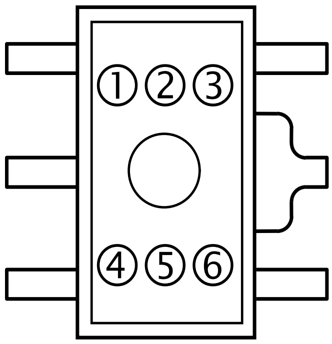


SOT-89-5 Package Dimensions

MARK SPECIFICATION (SOT-89-5)

①②③④: Product Code … **Refer to *MARK SPECIFICATION TABLE (SOT-89-5)***

⑤⑥: Lot Number … Alphanumeric Serial Number



SOT-89-5 Mark Specification

MARK SPECIFICATION TABLE (SOT-89-5)

R1524HxxxB

Product Name	① ② ③ ④	V_{SET}
R1524H018B	J 1 8 B	1.8 V
R1524H025B	J 2 5 B	2.5 V
R1524H028B	J 2 8 B	2.8 V
R1524H030B	J 3 0 B	3.0 V
R1524H033B	J 3 3 B	3.3 V
R1524H034B	J 3 4 B	3.4 V
R1524H050B	J 5 0 B	5.0 V
R1524H060B	J 6 0 B	6.0 V
R1524H080B	J 8 0 B	8.0 V
R1524H085B	J 8 5 B	8.5 V
R1524H090B	J 9 0 B	9.0 V

POWER DISSIPATION (HSOP-6J)

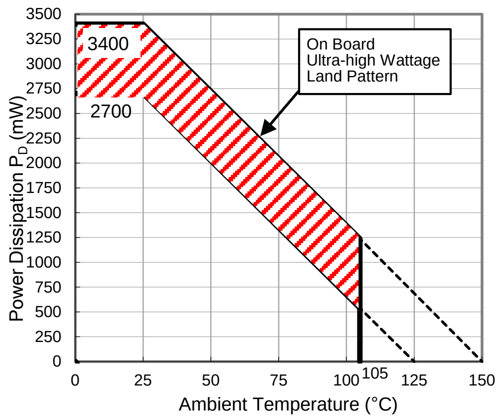
The power dissipation of the package is dependent on PCB material, layout, and environmental conditions. The following conditions are used in this measurement.

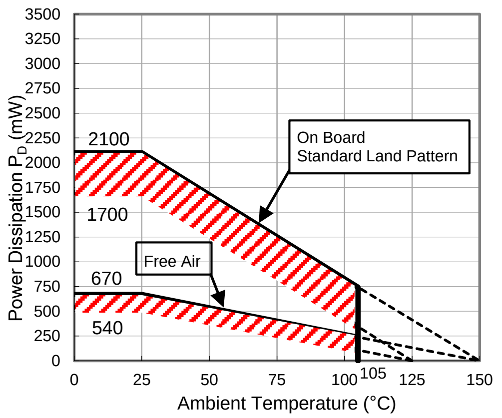
Measurement Conditions

	Ultra-high Wattage Land Pattern	Standard Land Pattern
Environment	Mounting on Board (Wind Velocity = 0 m/s)	Mounting on Board (Wind Velocity = 0 m/s)
Board Material	Glass Cloth Epoxy Plastic (Four-layer Board)	Glass Cloth Epoxy Plastic (Double-sided Board)
Board Dimensions	76.2 mm × 114.3 mm × 0.8 mm	50 mm × 50 mm × 1.6 mm
Copper Ratio	96%	50%
Through-holes	ϕ 0.3 mm × 28 pcs	ϕ 0.5 mm × 24 pcs

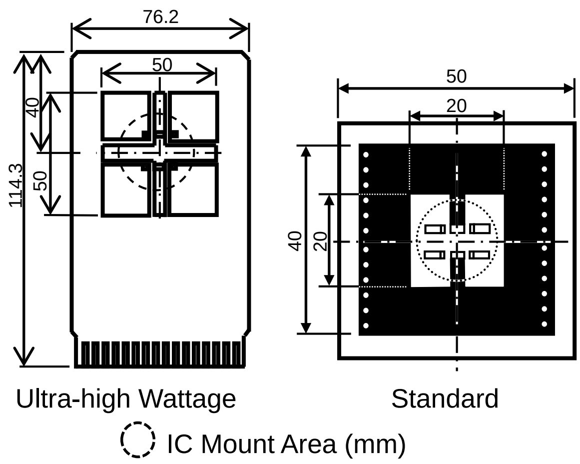
Measurement Result (Ta = 25°C, Tjmax = 125°C)

	Ultra-high Wattage Land Pattern	Standard Land Pattern	Free Air
Power Dissipation	2700 mW	1700 mW	540 mW
Thermal Resistance	37°C/W	59°C/W	185°C/W





Power Dissipation vs. Ambient Temperature

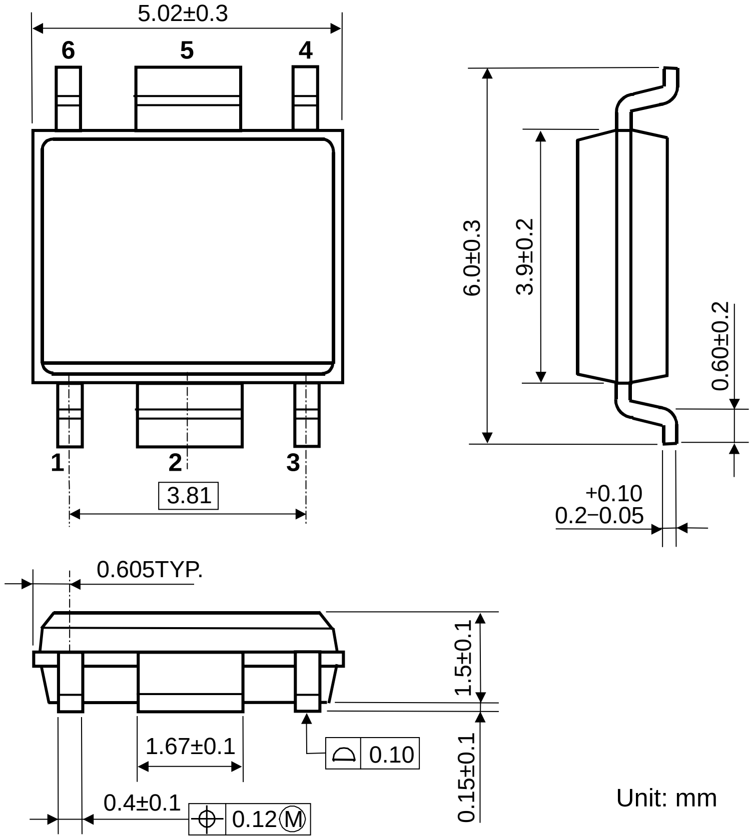


Measurement Board Pattern

The above graph shows the power dissipation of the package at Tjmax = 125°C and Tjmax = 150°C. Operating the device in the hatched range might have a negative influence on its lifetime. The total hours of use and the total years of use must be limited as follows:

Total Hours of Use	Total Years of Use (4 hours/day)
13,000 hours	9 years

PACKAGE DIMENSIONS (HSOP-6J)

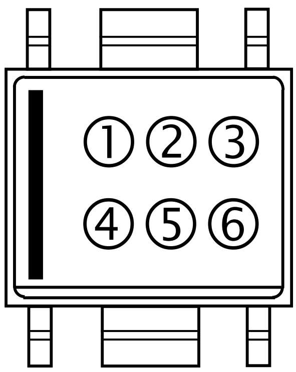


HSOP-6J Package Dimensions

MARK SPECIFICATION (HSOP-6J)

①②③④: Product Code … **Refer to *MARK SPECIFICATION TABLE (HSOP-6J)***

⑤⑥: Lot Number … Alphanumeric Serial Number



HSOP-6J Mark Specification

MARK SPECIFICATION TABLE (HSOP-6J)

R1524SxxxB

Product Name	① ② ③ ④	V_{SET}
R1524S018B	A 1 8 B	1.8 V
R1524S025B	A 2 5 B	2.5 V
R1524S028B	A 2 8 B	2.8 V
R1524S030B	A 3 0 B	3.0 V
R1524S033B	A 3 3 B	3.3 V
R1524S034B	A 3 4 B	3.4 V
R1524S050B	A 5 0 B	5.0 V
R1524S060B	A 6 0 B	6.0 V
R1524S080B	A 8 0 B	8.0 V
R1524S085B	A 8 5 B	8.5 V
R1524S090B	A 9 0 B	9.0 V

POWER DISSIPATION (DFN(PLP)1820-6)

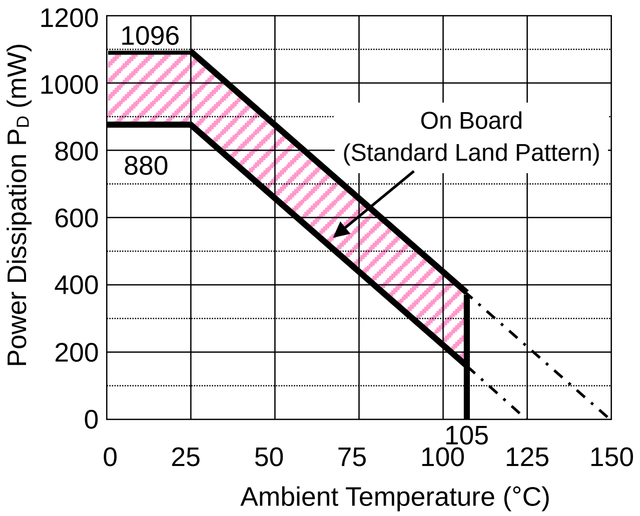
Power Dissipation (P_D) depends on conditions of mounting on board. This specification is based on the measurement at the condition below:

Measurement Conditions

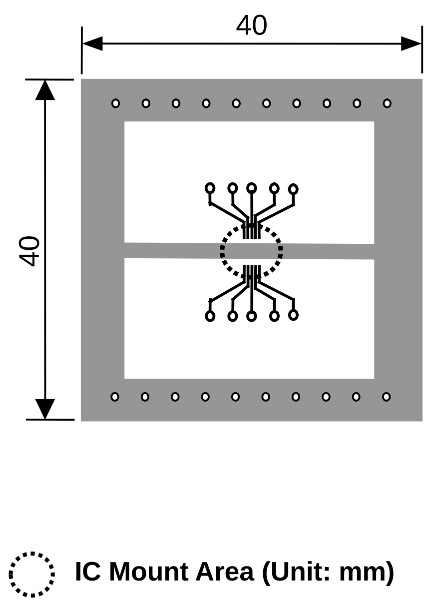
	Standard Land Pattern
Environment	Mounting on Board (Wind velocity = 0 m/s)
Board Material	Glass cloth epoxy plastic (Double sided)
Board Dimensions	40 mm x 40 mm x 1.6 mm
Copper Ratio	Top side: Approx. 50%, Back side: Approx. 50%
Through-hole	ϕ 0.54mm x 30 pcs

Measurement Result (Ta = 25°C, Tjmax = 125°C)

	Standard Land Pattern
Power Dissipation	880 mW
Thermal Resistance	θja = (125-25°C) / 0.88 W = 114°C/W



Power Dissipation vs. Ambient Temperature

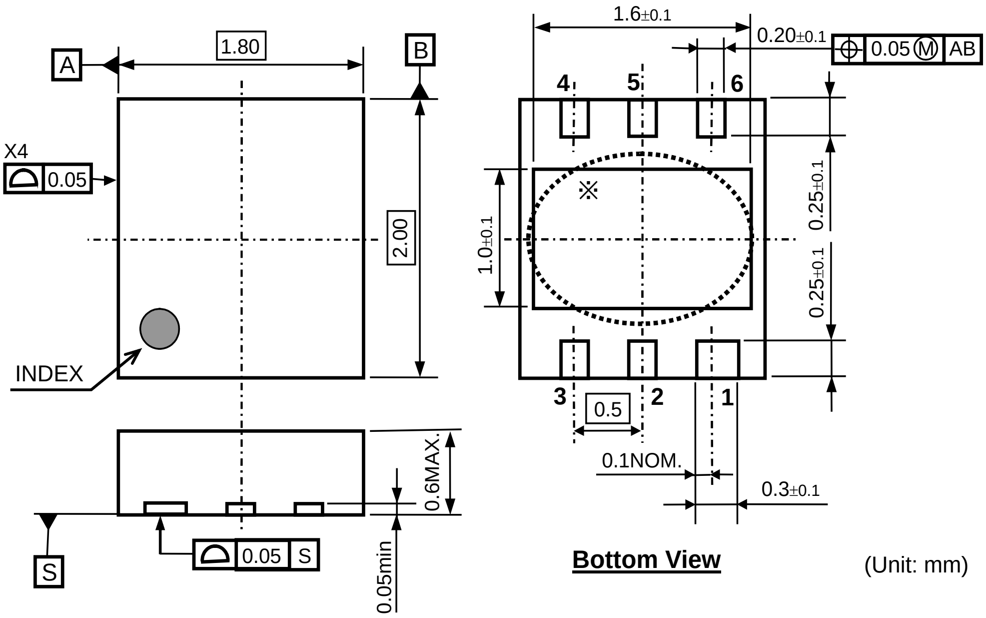


Measurement Board Pattern

The above graph shows the Power Dissipation of the package based on Tjmax = 125°C and Tjmax = 150°C.
Operating the IC in the shaded area in the graph might have an influence its lifetime.
Operating time must be within the time limit described in the table below, in case of operating in the shaded area.

Operating Time	**Estimated years (Operating four hours/day)**
13,000 hours	9 years

PACKAGE DIMENSIONS (DFN(PLP)1820-6)



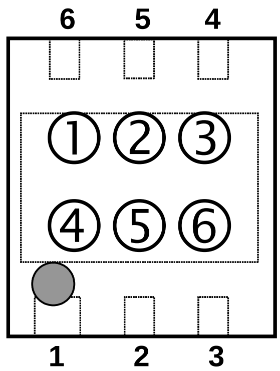
※) The tab on the bottom of the package enhances thermal performance and is electrically connected to GND (substrate level). It is recommended that the tab be connected to the ground plane on the board, or otherwise be left open.

DFN(PLP)1820-6 Package Dimensions

MARK SPECIFICATION (DFN(PLP)1820-6)

①②③④: Product Code … **Refer to *MARK SPECIFICATION TABLE (DFN(PLP)1820-6)***

⑤⑥: Lot Number … Alphanumeric Serial Number



DFN(PLP)1820-6 Mark Specification

MARK SPECIFICATION TABLE (DFN(PLP)1820-6)

R1524KxxxB

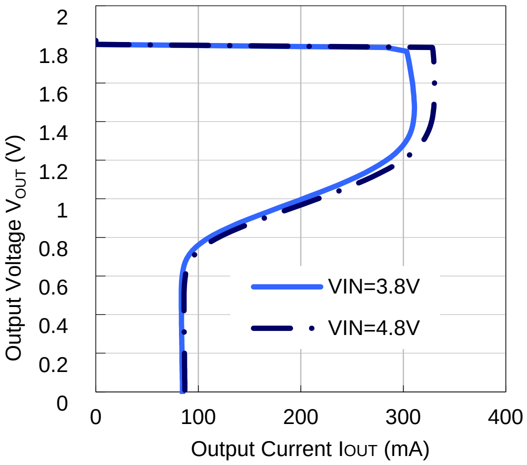
Product Name	① ② ③ ④	V_{SET}
R1524K018B	F A 1 8	1.8 V
R1524K025B	F A 2 5	2.5 V
R1524K028B	F A 2 8	2.8 V
R1524K030B	F A 3 0	3.0 V
R1524K033B	F A 3 3	3.3 V
R1524K034B	F A 3 4	3.4 V
R1524K050B	F A 5 0	5.0 V
R1524K060B	F A 6 0	6.0 V
R1524K080B	F A 8 0	8.0 V
R1524K085B	F A 8 5	8.5 V
R1524K090B	F A 9 0	9.0 V

TYPICAL CHARACTERISTICS

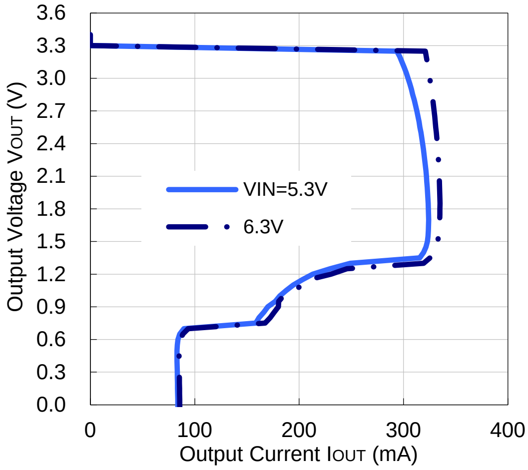
Note: Typical Characteristics are intended to be used as reference data; they are not guaranteed.

1) Output Voltage vs. Output Current (Ta = 25°C)

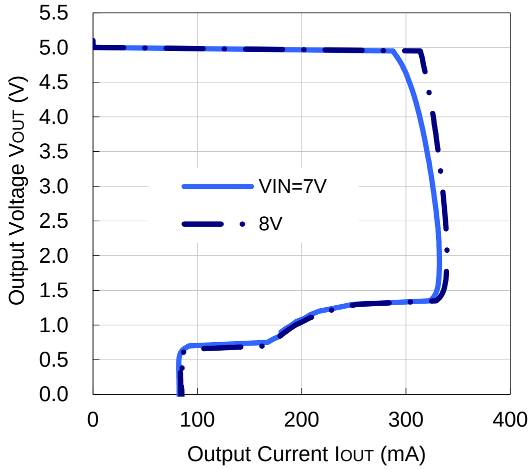
R1524x018B



R1524x033B



R1524x050B



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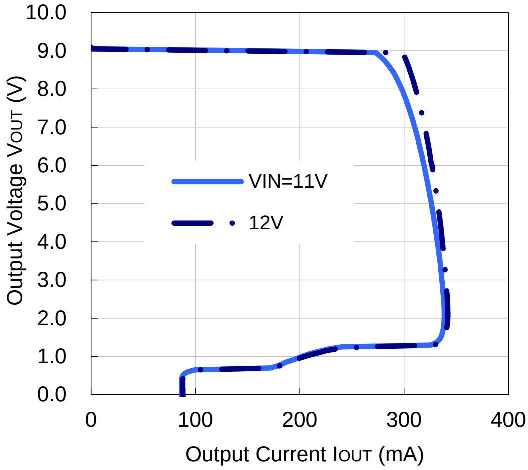
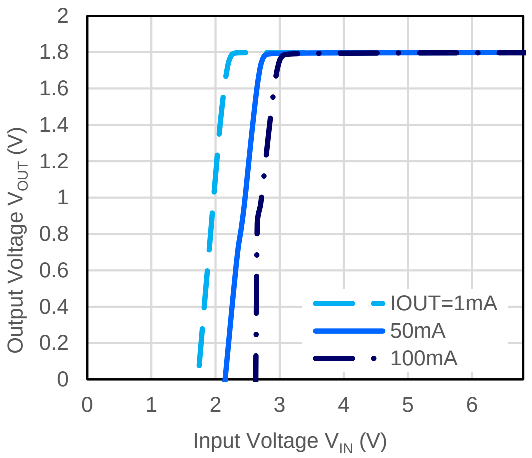


2) Output Voltage vs. Input Voltage (Ta = 25°C)

R1524x018B



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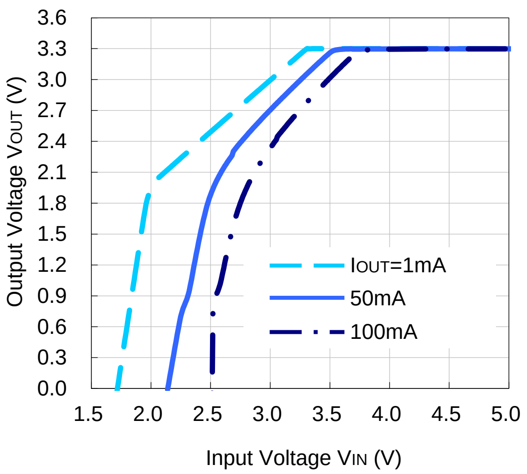

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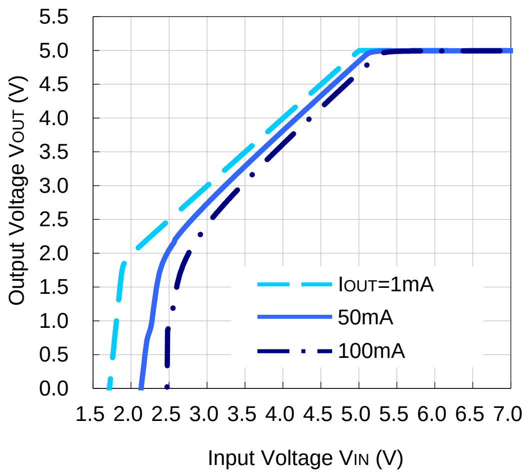

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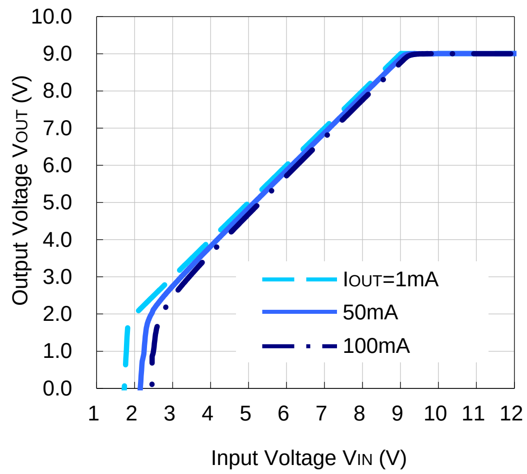
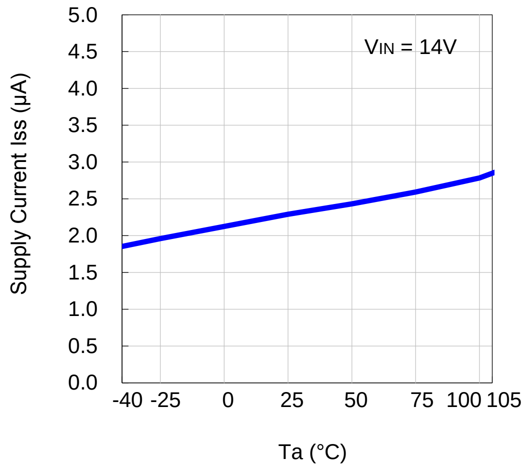


3) Supply Current vs. Temperature

R1524x018B



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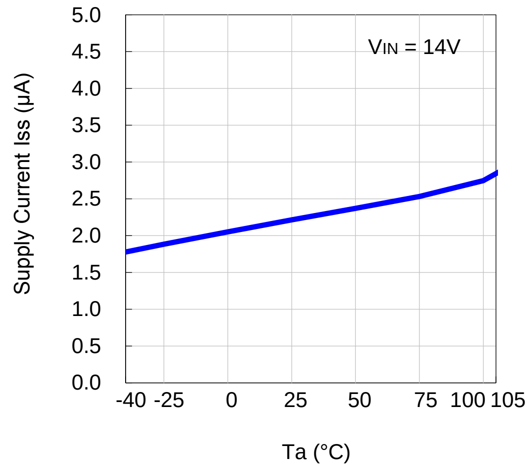

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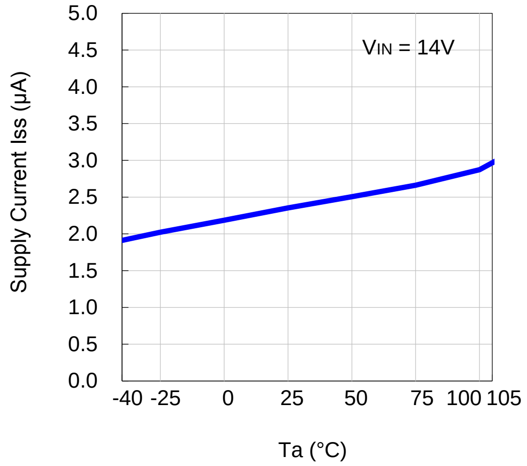

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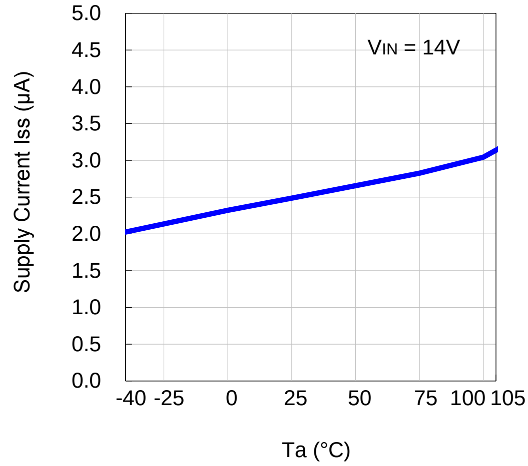
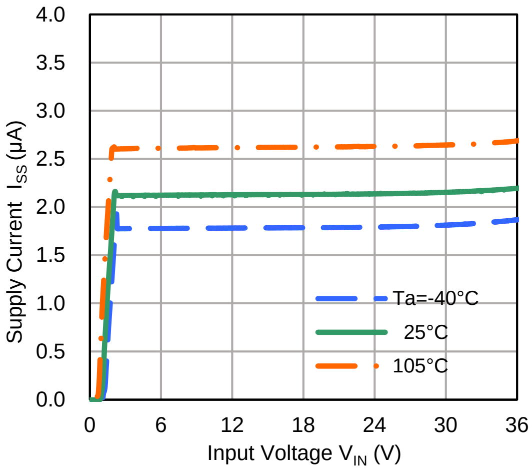


4) Supply Current vs. Input Voltage

R1524x018B



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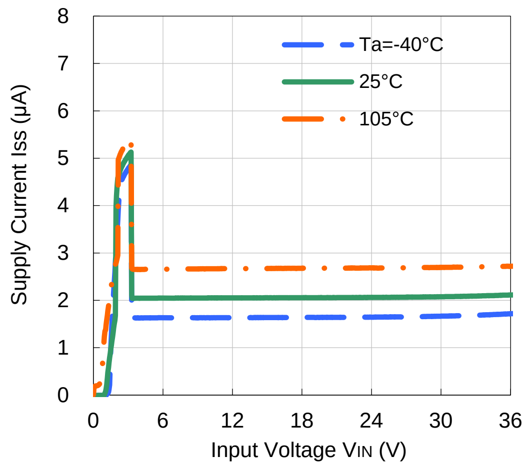
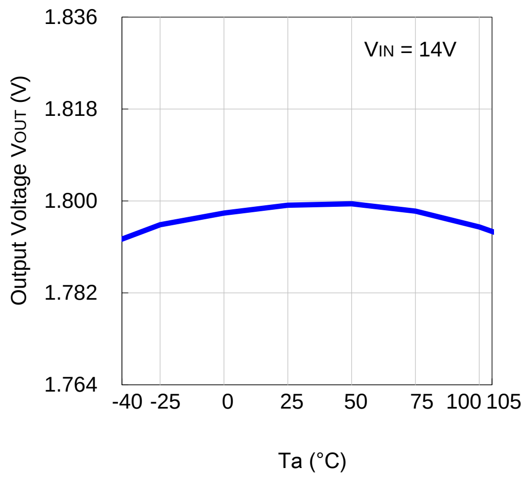


5) Output Voltage vs. Temperature (I_{OUT} = 1 mA)

R1524x018B



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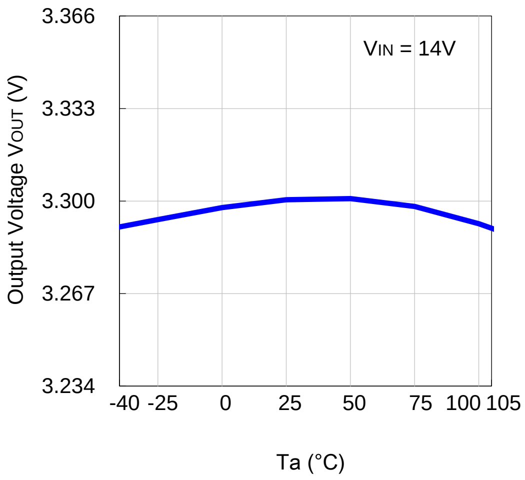

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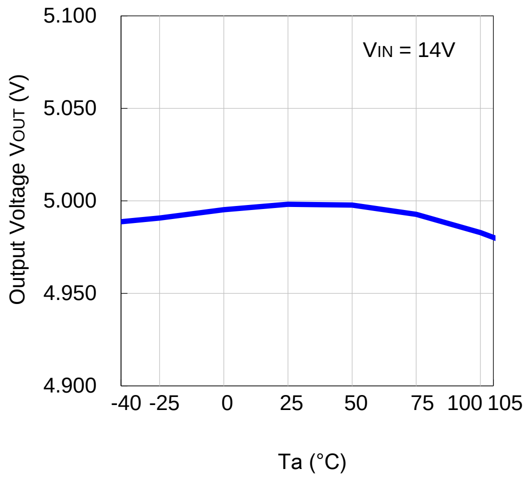

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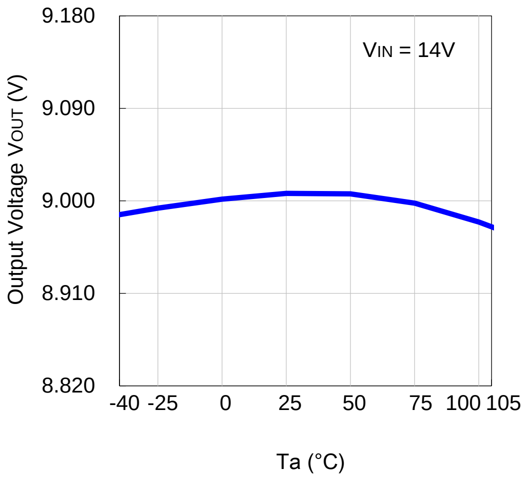
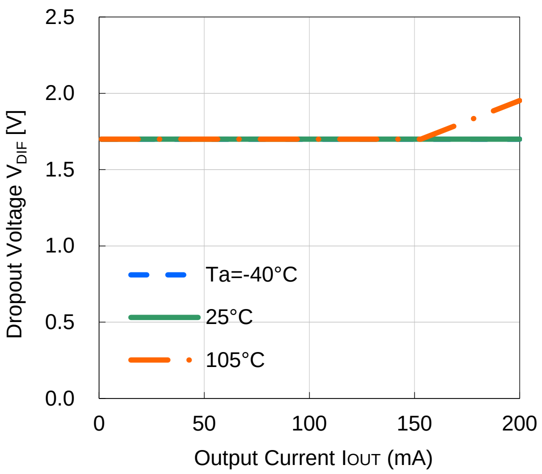


6) Dropout Voltage vs. Output Current

R1524x018B



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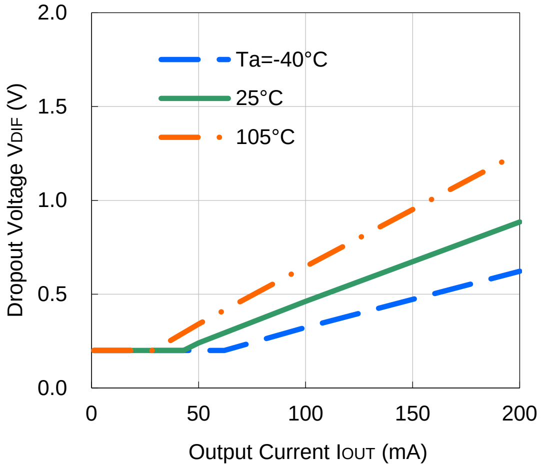

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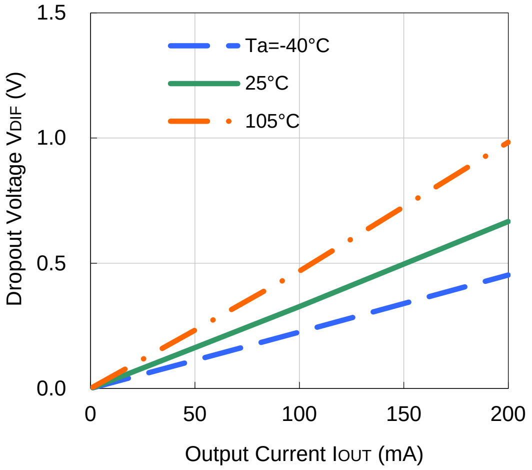

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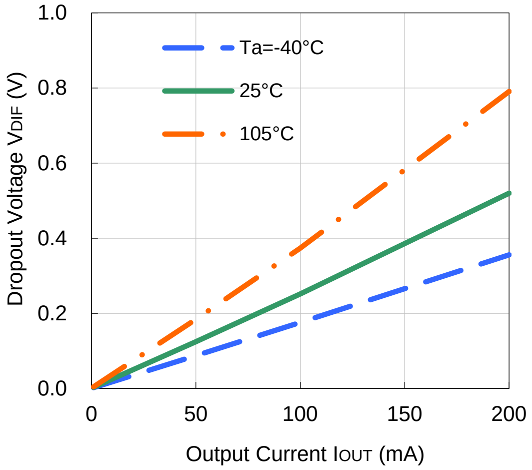
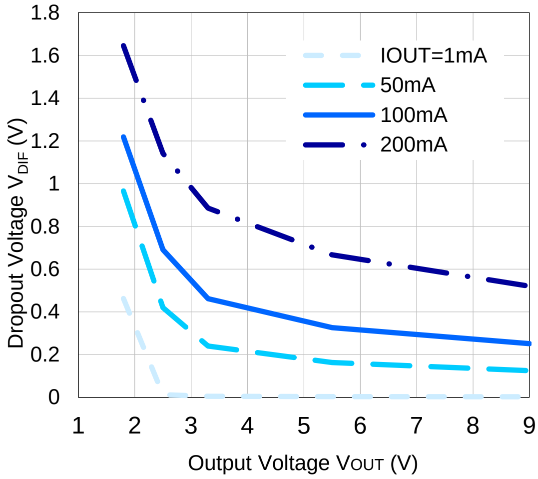


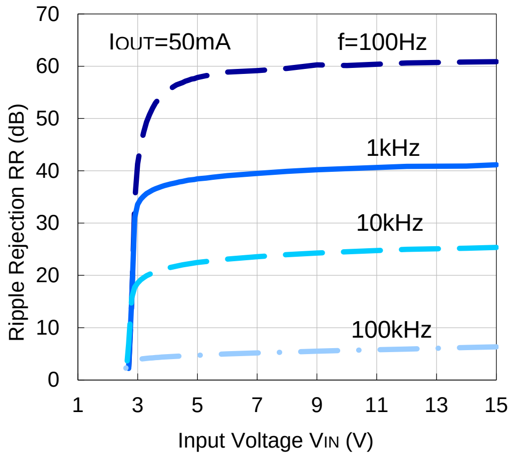
7) Dropout Voltage vs. Output Voltage (Ta = 25°C)



RICOH

8) Ripple Rejection vs. Input Voltage (Ta = 25°C, Ripple = 0.2 Vpp)

R1524x018B



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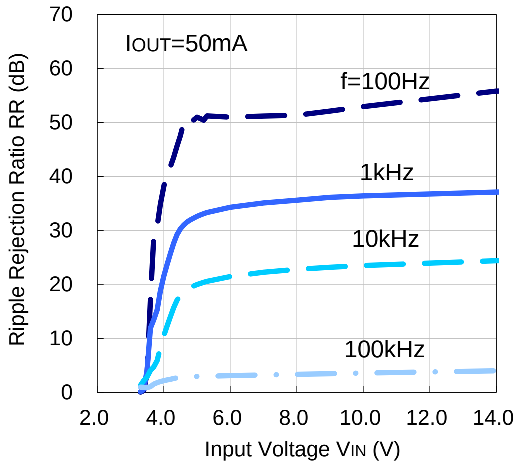

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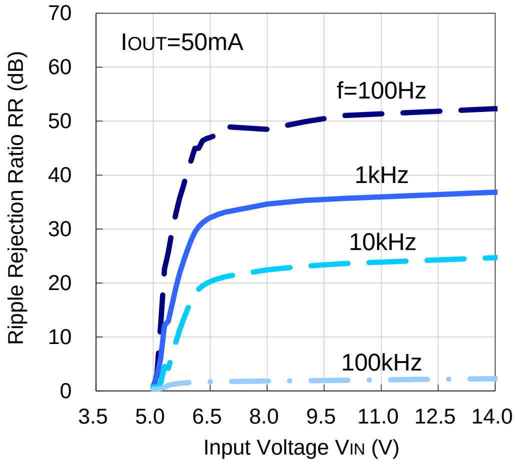

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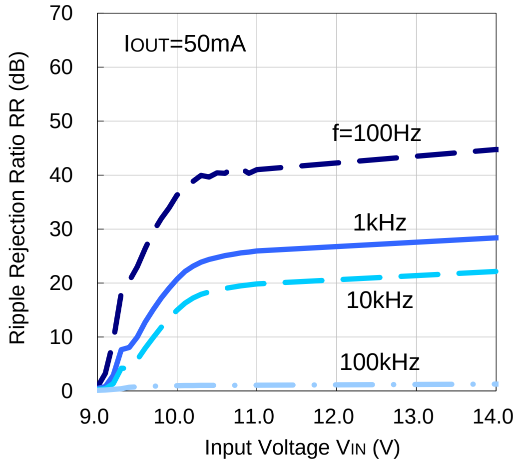
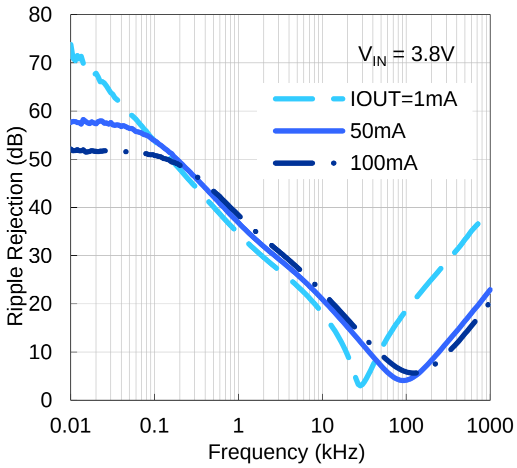
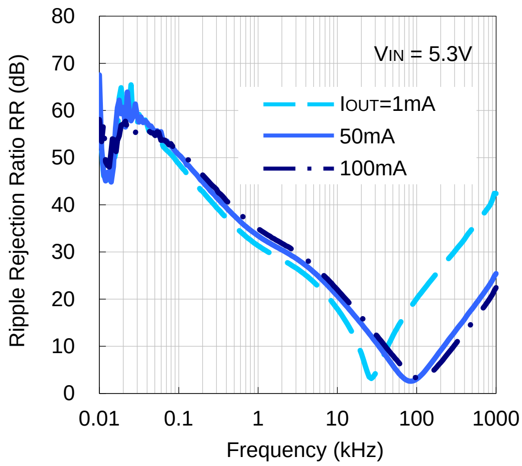


9) Ripple Rejection vs. Frequency (Ta = 25°C, Ripple = 0.2 Vpp)

R1524x018B

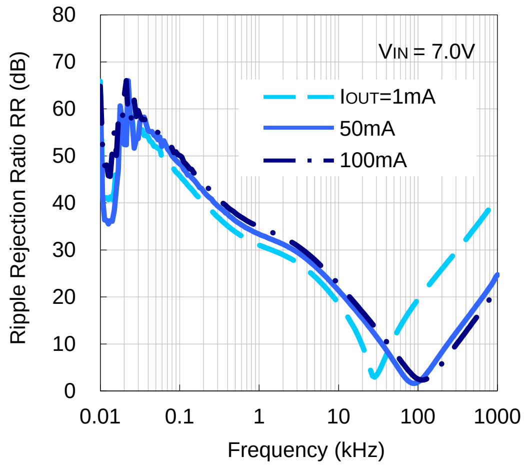


R1524x033B

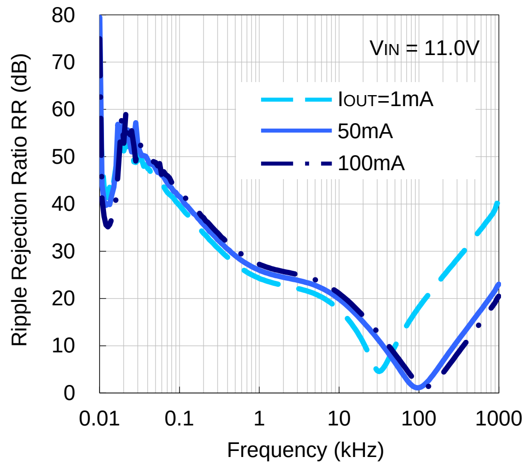


RICOH

R1524x050B

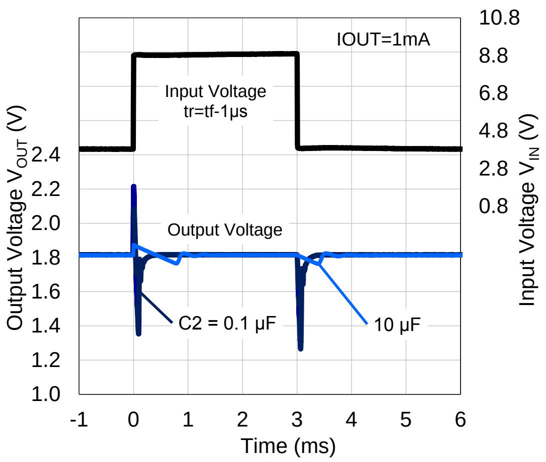


R1524x090B

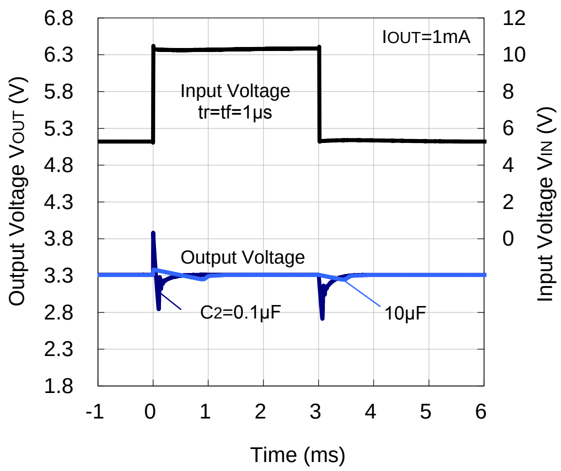


10) Input Transient Response (Ta = 25°C)

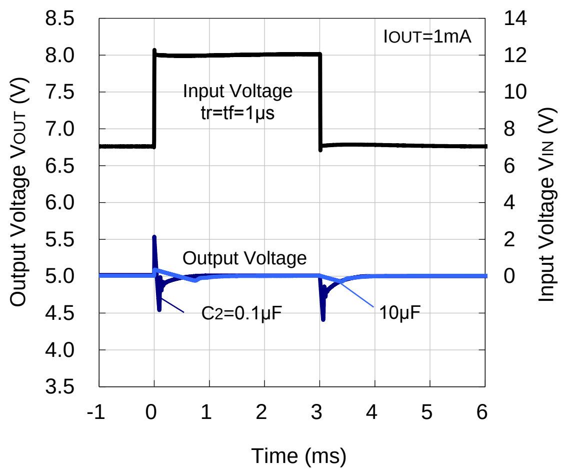
R1524x018B



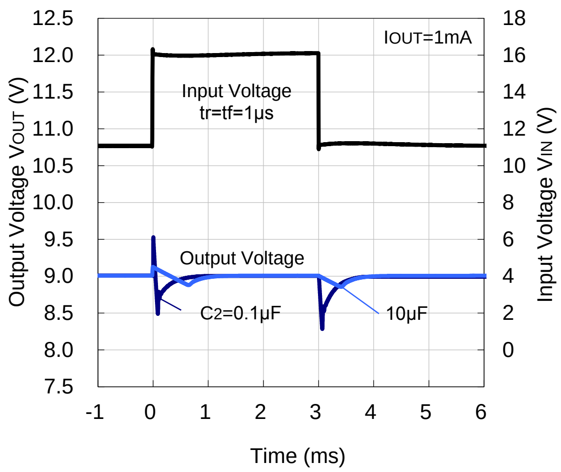
R1524x033B



R1524x050B



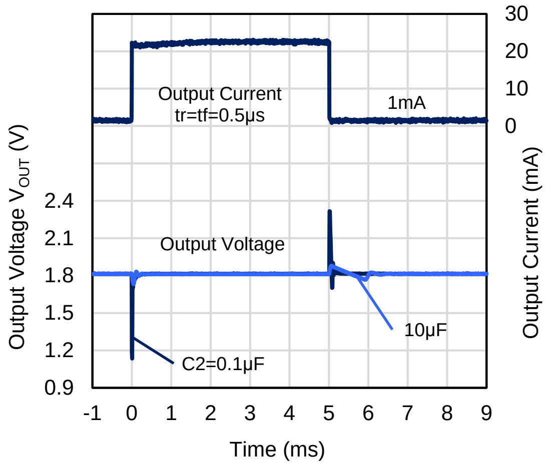
R1524x090B



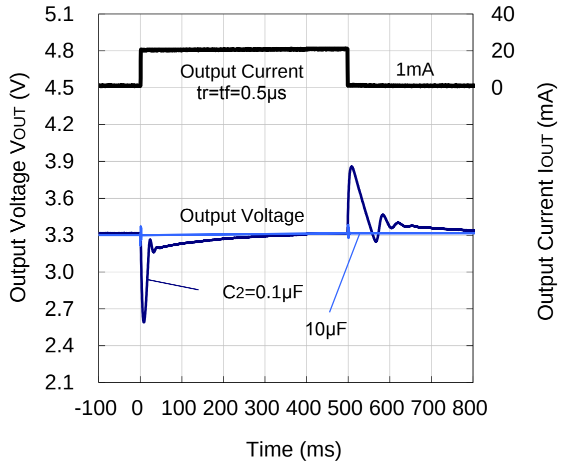
RICOH

11) Load Transient Response (Ta = 25°C)

R1524x018B



R1524x033B



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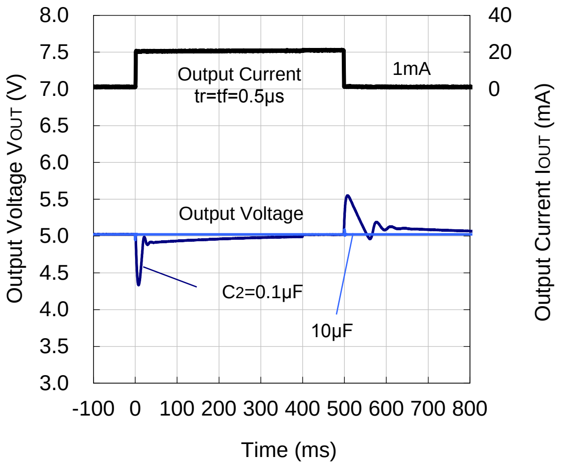

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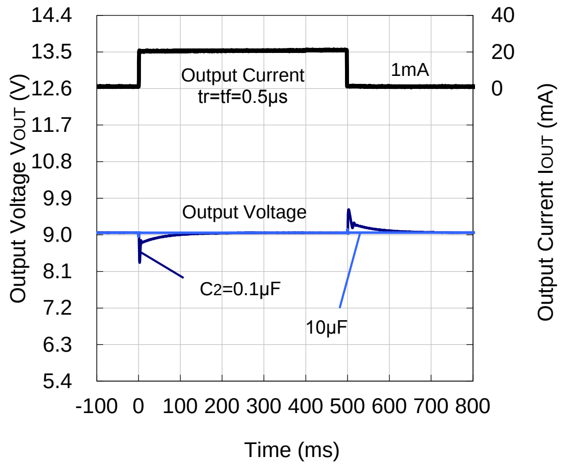
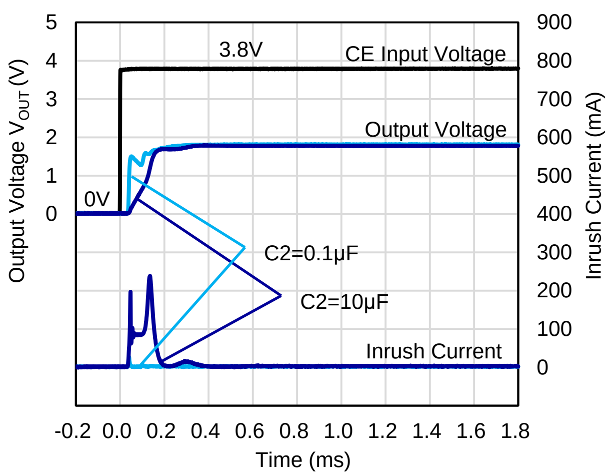
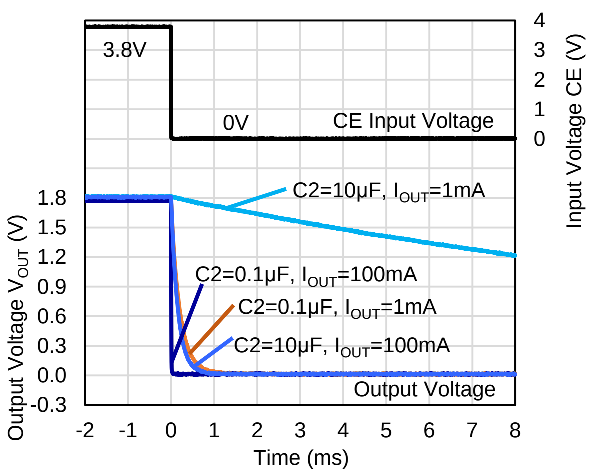


12) CE Transient Response (Ta = 25°C)

R1524x018B





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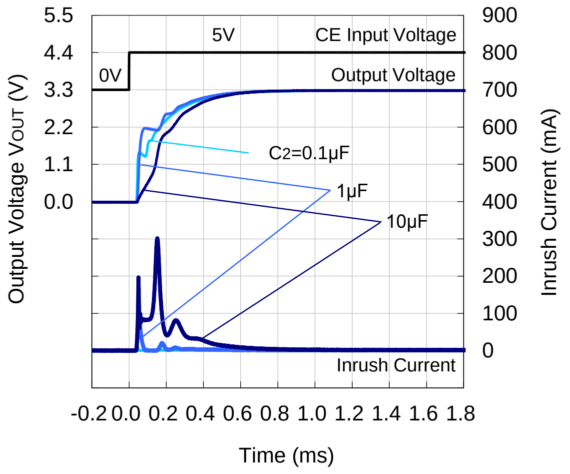

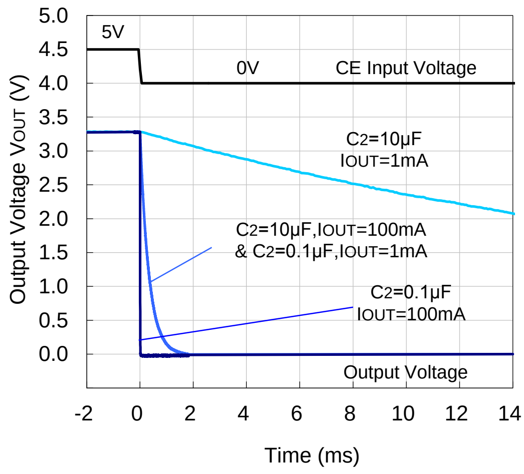

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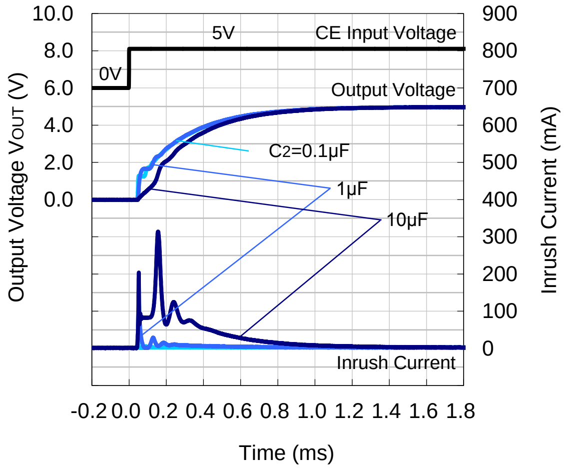
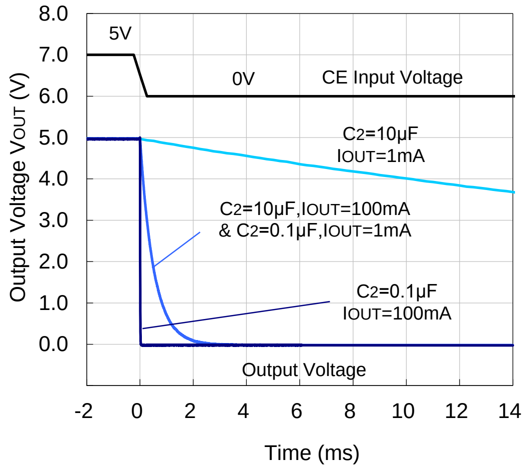
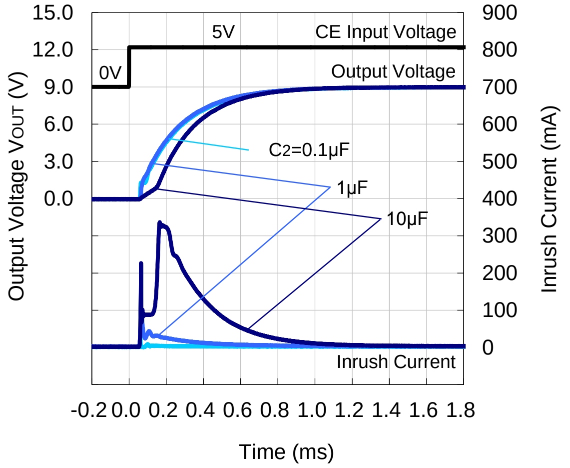
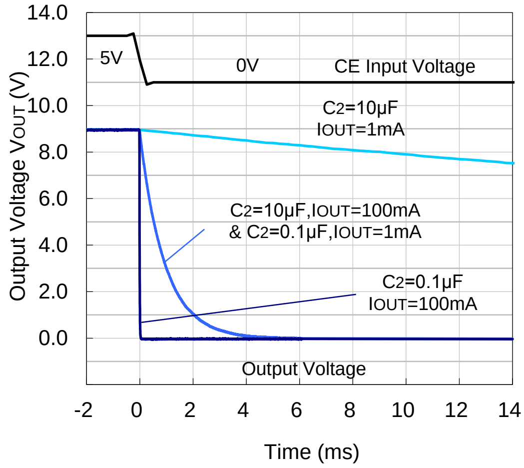




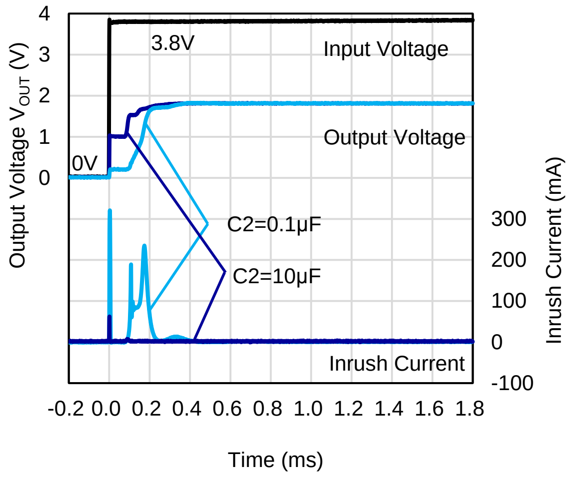
R1524x090B



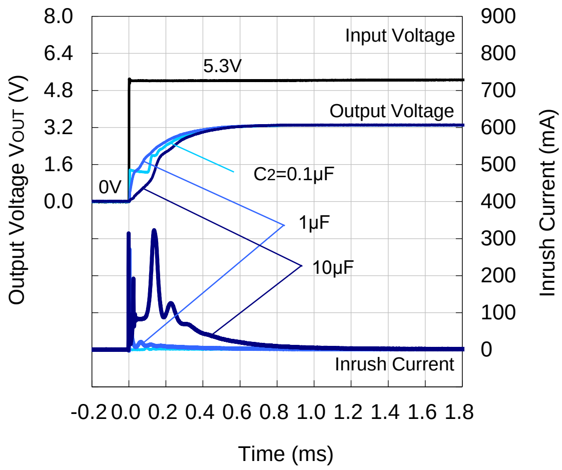


13) Power-on Transient Response (Ta = 25°C, V_{CE} = 5 V)

R1524x018B



R1524x033B



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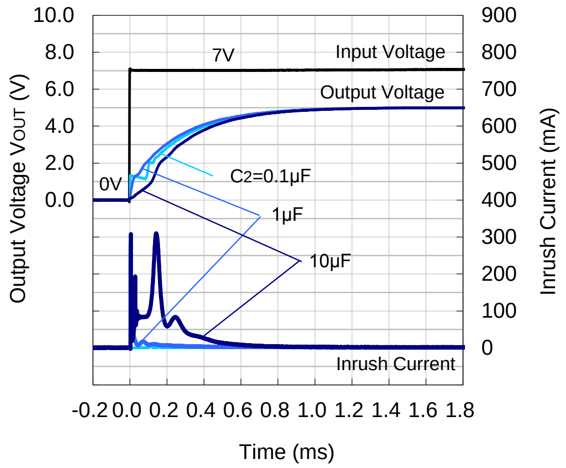
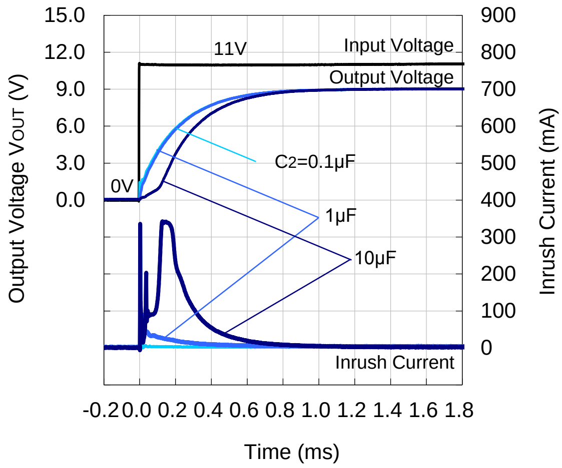
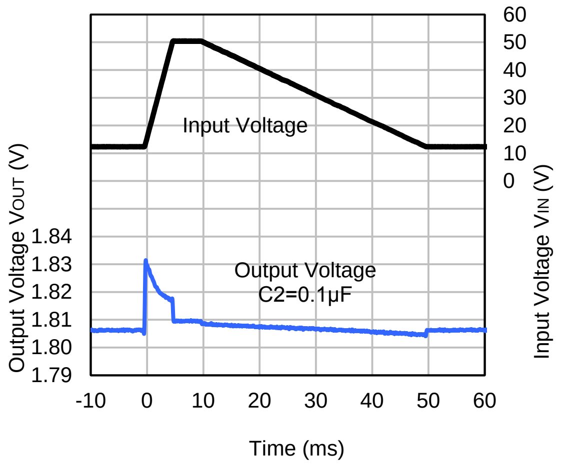


R1524x090B

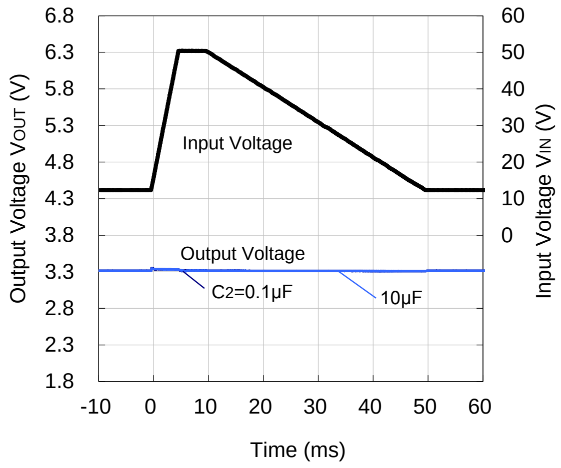


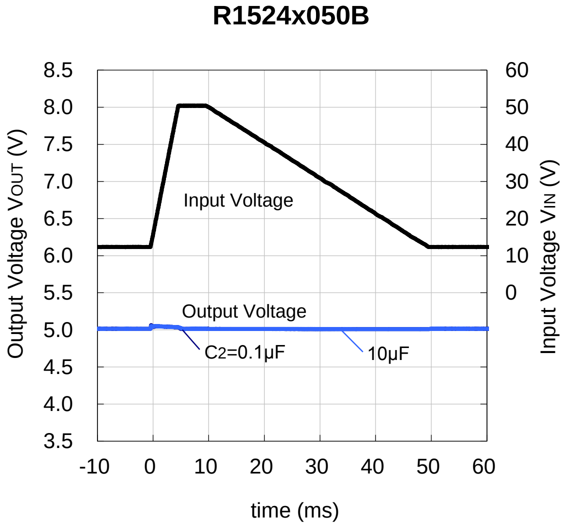
14) Load Dump (Ta = 25°C)

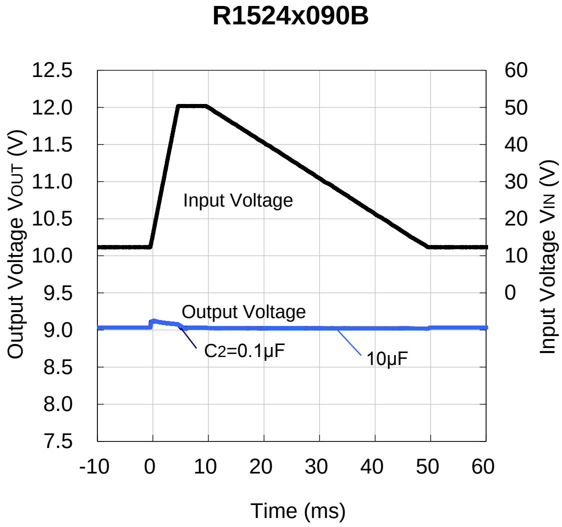
R1524x018B



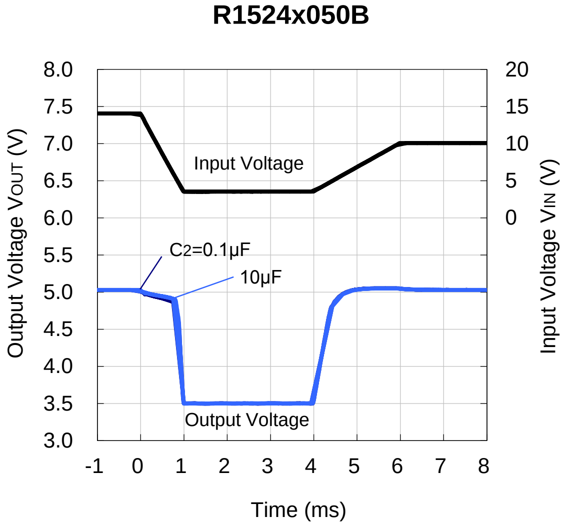
R1524x033B

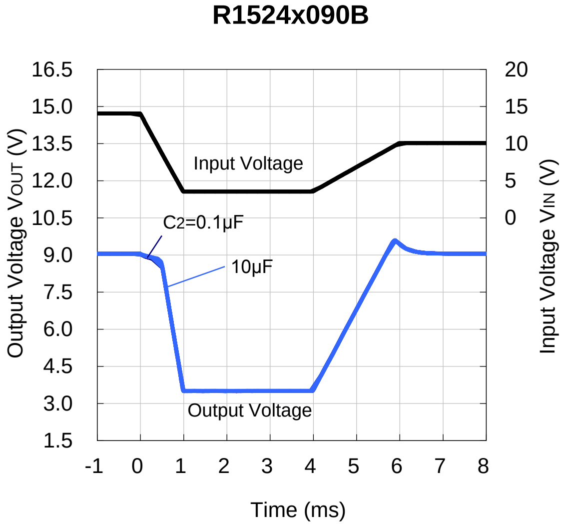






15) Cranking (Ta = 25°C)



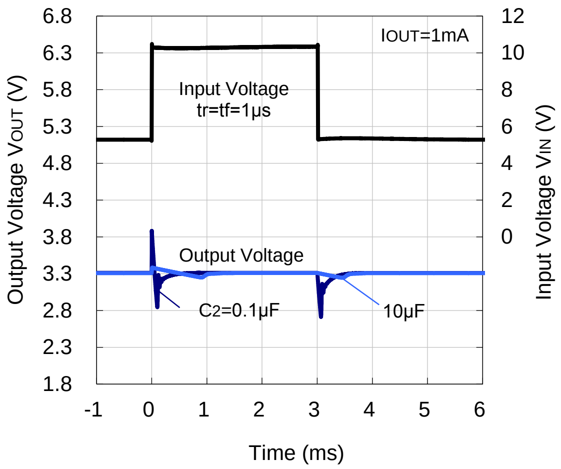


Input Transient/Load Transient vs. Output Capacity (C2)

R1524 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 a high-capacity electrolytic capacitor for the output line, place the electrolytic capacitor a few centimeters apart from the IC after arranging the ceramic capacitor close to the IC.

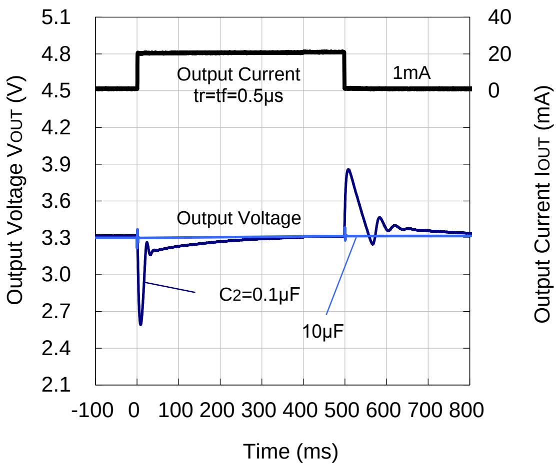
Input Transient Response

R1524x033B



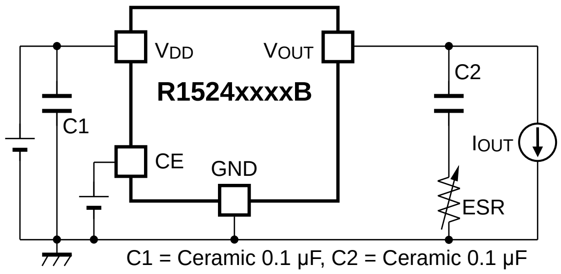
Load Transient Response

R1524x033B



ESR vs. Output Current

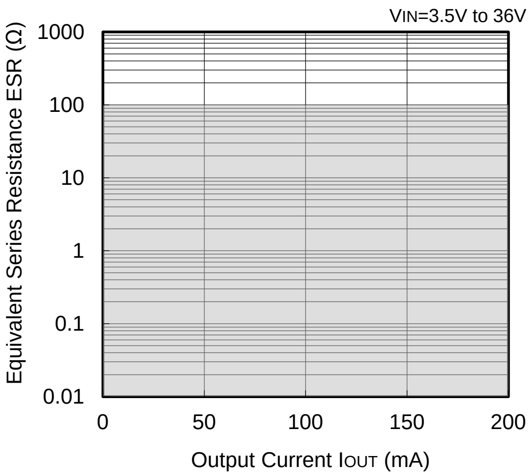
It is recommended that a ceramic type capacitor be used for this device. However, other types of capacitors having lower ESR can also be used. The relation between the output current (I_{OUT}) and the ESR of output capacitor is shown below.



C1 = Ceramic 0.1 μF, C2 = Ceramic 0.1 μF

Measurement Conditions
Frequency Band: 10 Hz to 2 MHz
Measurement Temperature: −40°C to 105°C
Hatched area: Noise level is 40 μV (average) or below
Ceramic Capacitors: C1 = 0.1 μF, C2 = 0.1 μF

R1524x018B



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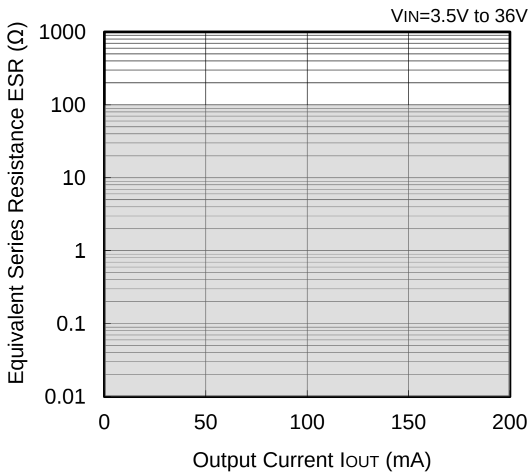
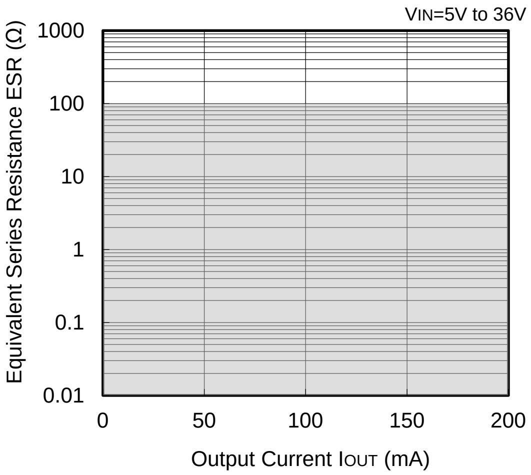
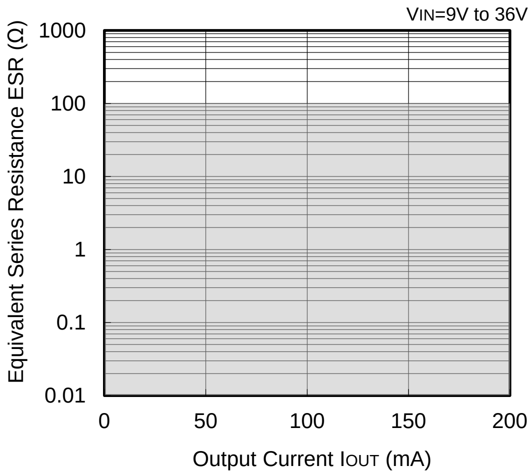


R1524x050B



R1524x090B



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