300mA Regulator IC
Monolithic IC MM3464 series

Outline

This IC is a high speed response 300mA regulator IC with low quiescent current and high ripple rejection.
No load input current is 20μA typ.
And ripple rejection is 75dB typ.
Dropout voltage is low at 160mV typ., and the output current is 300mA.
Therefore the IC applies to most mobile equipment.

Features

1.	Output current	300mA
2.	No load input current	20μA typ.
3.	Input current(OFF)	0.1μA max.
4.	Output voltage range	1.0~5.0V
5.	Output voltage accuracy	±1%(±20mV,Vo<2V)
6.	Dropout voltage	160mV typ. (Io=200mA)
7.	Line regulation	0.2%/V max.
8.	Load regulation	80mV max. (Io=0.1~200mA)
9.	Ripple rejection	75dB typ. (f=1kHz)
10.	Output Capacitor	1μF

Package

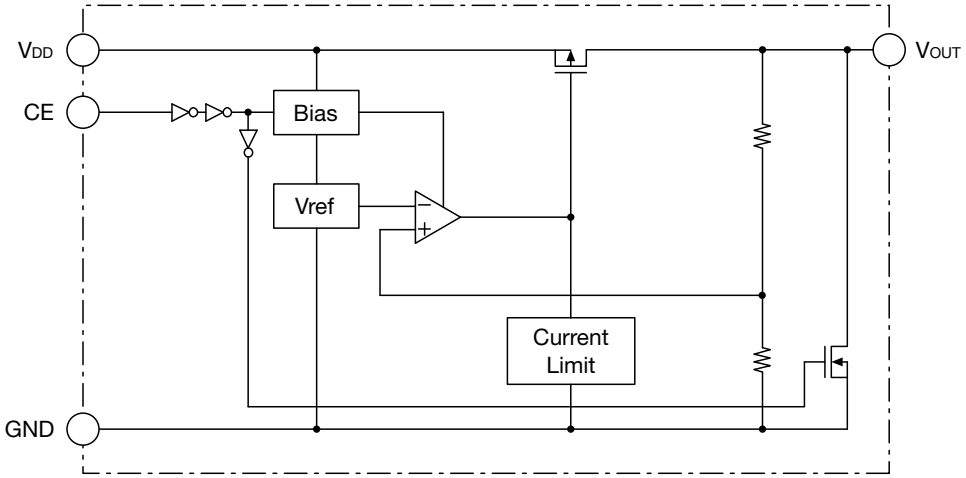
SOT-25
SOT89-5
SC-82

Applications

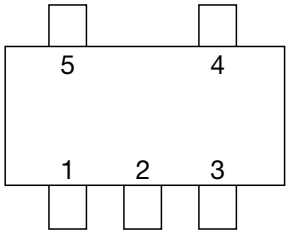
1. Cellular phones
2. Digital still cameras
3. Mobile equipments

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Block Diagram

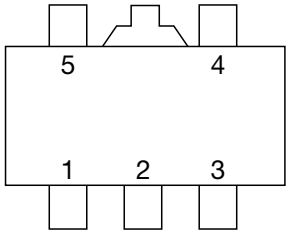


Pin Assignment



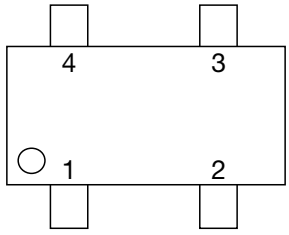
SOT-25
(TOP VIEW)

1	VDD
2	GND
3	CE
4	NC
5	VOUT



SOT89-5
(TOP VIEW)

1	VOUT
2	GND
3	NC
4	CE
5	VDD



SC-82
(TOP VIEW)

1	CE
2	GND
3	VOUT
4	VDD

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Pin Description

SOT-25A

Pin No.	Pin name	Functions
1	V_{DD}	Voltage-supply pin
2	GND	Ground pin
3	CE	ON/OFF-Control pin CE: Low → OFF; High → ON Connect CE pin with V_{DD} pin, when it is not used.
4	NC	No connection
5	V_{OUT}	Output pin

SOT89-5

Pin No.	Pin name	Functions
1	V_{OUT}	Output pin
2	GND	Ground pin
3	NC	No connection
4	CE	ON/OFF-Control pin CE: Low → OFF; High → ON Connect CE pin with V_{DD} pin, when it is not used.
5	V_{DD}	Voltage-supply pin

SC-82

Pin No.	Pin name	Functions
1	CE	ON/OFF-Control pin CE: Low → OFF; High → ON Connect CE pin with V_{DD} pin, when it is not used.
2	GND	Ground pin
3	V_{OUT}	Output pin
4	V_{DD}	Voltage-supply pin

Absolute Maximum Ratings (Except where noted otherwise Ta=25°C)

Item	Symbol	Ratings	Units
Storage temperature	T_{STG}	−55~+150	°C
Supply voltage	V_{DD}	−0.3~+7.0	V
CE input voltage	V_{CE}	−0.3~V_{DD}+0.3	V
Output voltage	V_{OUT}	−0.3~V_{DD}+0.3	V
Output current	Iomax	500	mA
Power dissipation	Pd	350(Note1) (SOT-25)	mW
		1000(Note2) (SOT89-5)	
		330(Note3) (SC-82)	

Note1 : With PC board of glass epoxy 60 × 40 × 1.6^{t}mm
Note2 : With PC board of glass epoxy 114.3 × 76.2 × 1.6^{t}mm
Note3 : With PC board of glass epoxy 110 × 40 × 0.8^{t}mm

Recommended Operating Conditions (Except where noted otherwise Ta=25°C)

Item	Symbol	Ratings	Units
Operating ambient temperature	T_{JOP}	−40~+85	°C
Operating voltage	V_{OP}	2.0~6.5	V
Output current	Io	0~300	mA

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Electrical Characteristics 1 (Except where noted otherwise V_{DD}=V_{OUT}(typ.)+1V, V_{CE}=V_{DD}, Ta=25°C)

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Input current(OFF)	I_{DDoff}	V_{CE}=0V		0.01	0.1	µA
No-load input current	I_{DD}	I_{OUT}=0mA		20	50	µA
Output voltage	V_{OUT}	I_{OUT}=10mA (V_{OUT}≧2.0V)	×0.99		×1.01	V
		I_{OUT}=10mA (V_{OUT}≦1.95V)	–0.02		0.02	V
Line regulation	V_{LINE}	V_O(typ.)+0.5V≦V_{DD}≦6.5V V_{OUT}≧1.1V, I_{OUT}=10mA		0.01	0.2	%/V
		1.6V≦V_{DD}≦6.5V V_{OUT}≦1.05V, I_{OUT}=10mA				
Load regulation	V_{LOAD}	0.1mA≦I_{OUT}≦200mA		20	80	mV
Dropout voltage	Vio	Please refer to another page				V
Ripple rejection (Note4)	RR	f=1kHz, Vripple=0.5V, I_{OUT}=30mA V_{OUT}≧1.0V		75		dB
V_{OUT} temperature coefficient (Note4)	$\Delta V_{OUT}/\Delta T$	I_{OUT}=30mA –40°C≦T_{OP}≦85°C		±50		ppm/°C
Output current limit	Ilim		300	400		mA
Output short-circuit current	Ishort	V_{OUT}=0V		30		mA
CE H threshold voltage	V_{CEH}		1.2		6.0	V
CE L threshold voltage	V_{CEL}				0.3	V
CE H threshold voltage	I_{CEH}		–0.1		0.1	µA
CE L threshold voltage	I_{CEL}		–0.1		0.1	µA
CL Discharge resistance	Rdisc			780		

Note4 : The parameter is guaranteed by design.

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Electrical Characteristics 2 (Except where noted otherwise $V_{DD}=V_{OUT}$(typ.)+1V, $V_{CE}=V_{DD}$, Ta=25°C)

Model No.	Item							
	Output voltage				Dropout voltage			
	V_{OUT} (V)				Vio (mV)			
	Measurement conditions	Min.	Typ.	Max.	Measurement conditions	Min.	Typ.	Max.
MM3464A10	I_{OUT}=10mA	0.980	1.000	1.020	I_{OUT}=200mA V_{OUT}<1.5V (Note5)		660	1300
MM3464Z10		1.030	1.050	1.070				
MM3464A11		1.080	1.100	1.120				
MM3464Z11		1.130	1.150	1.170				
MM3464A12		1.180	1.200	1.220			460	800
MM3464Z12		1.230	1.250	1.270				
MM3464A13		1.280	1.300	1.320				
MM3464Z13		1.330	1.350	1.370				
MM3464A14		1.380	1.400	1.420			400	720
MM3464Z14		1.430	1.450	1.470				
MM3464A15		1.480	1.500	1.520	I_{OUT}=200mA V_{OUT}≧1.5V $V_{DD}=V_{OUT}$(typ.)−0.2V		360	580
MM3464Z15		1.530	1.550	1.570				
MM3464A16		1.580	1.600	1.620			320	500
MM3464Z16		1.630	1.650	1.670				
MM3464A17		1.680	1.700	1.720				
MM3464Z17		1.730	1.750	1.770				
MM3464A18		1.780	1.800	1.820			250	420
MM3464Z18		1.830	1.850	1.870				
MM3464A19		1.880	1.900	1.920				
MM3464Z19		1.930	1.950	1.970				
MM3464A20		1.980	2.000	2.020			230	390
MM3464Z20		2.030	2.050	2.071				
MM3464A21		2.079	2.100	2.121				
MM3464Z21		2.129	2.150	2.172				
MM3464A22		2.178	2.200	2.222				
MM3464Z22		2.228	2.250	2.273				
MM3464A23		2.277	2.300	2.323				
MM3464Z23		2.327	2.350	2.374				
MM3464A24		2.376	2.400	2.424				
MM3464Z24		2.426	2.450	2.475				
MM3464A25		2.475	2.500	2.525			190	340
MM3464Z25		2.525	2.550	2.576				
MM3464A26		2.574	2.600	2.626				
MM3464Z26		2.624	2.650	2.677				
MM3464A27		2.673	2.700	2.727				
MM3464Z27		2.723	2.750	2.778				
MM3464A28		2.772	2.800	2.828				
MM3464Z28		2.822	2.850	2.879				
MM3464A29		2.871	2.900	2.929				
MM3464Z29		2.921	2.950	2.980				

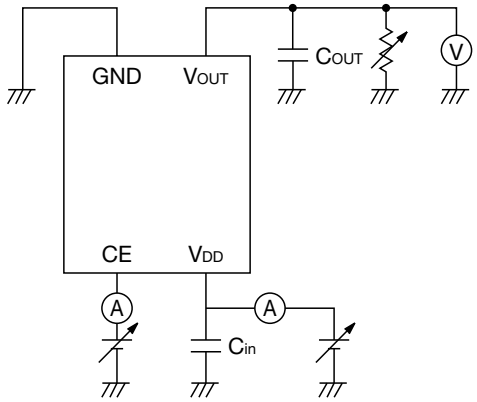
Note5 : Dropout voltage Max. value in the input and it is confirmed that there is no output abnormal voltage impression the load 200mA in the model less than V_{OUT}=1.45V.

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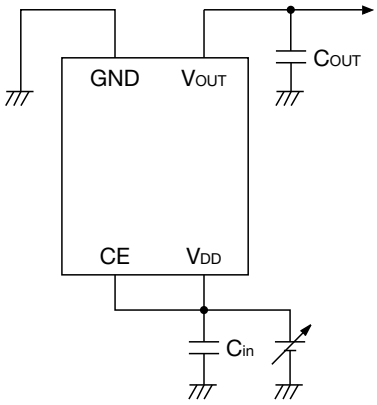
Model No.	Item							
	Output voltage				Dropout voltage			
	V_{OUT} (V)				Vio (mV)			
	Measurement conditions	Min.	Typ.	Max.	Measurement conditions	Min.	Typ.	Max.
MM3464A30		2.970	3.000	3.030				
MM3464Z30		3.020	3.050	3.081				
MM3464A31		3.069	3.100	3.131				
MM3464Z31		3.119	3.150	3.182				
MM3464A32		3.168	3.200	3.232				
MM3464Z32		3.218	3.250	3.283				
MM3464A33		3.267	3.300	3.333				
MM3464Z33		3.317	3.350	3.384				
MM3464A34		3.366	3.400	3.434				
MM3464Z34		3.416	3.450	3.485				
MM3464A35		3.465	3.500	3.535				
MM3464Z35		3.515	3.550	3.586				
MM3464A36		3.564	3.600	3.636				
MM3464Z36		3.614	3.650	3.687				
MM3464A37		3.663	3.700	3.737				
MM3464Z37		3.713	3.750	3.788				
MM3464A38		3.762	3.800	3.838				
MM3464Z38		3.812	3.850	3.889				
MM3464A39		3.861	3.900	3.939				
MM3464Z39		3.911	3.950	3.990	I_{OUT}=200mA			
MM3464A40	I_{OUT}=10mA	3.960	4.000	4.040	V_{OUT}≧1.5V		160	280
MM3464Z40		4.010	4.050	4.091	V_{DD}=V_{OUT}(typ.)–0.2V			
MM3464A41		4.059	4.100	4.141				
MM3464Z41		4.109	4.150	4.192				
MM3464A42		4.158	4.200	4.242				
MM3464Z42		4.208	4.250	4.293				
MM3464A43		4.257	4.300	4.343				
MM3464Z43		4.307	4.350	4.394				
MM3464A44		4.356	4.400	4.444				
MM3464Z44		4.405	4.450	4.495				
MM3464A45		4.455	4.500	4.545				
MM3464Z45		4.504	4.550	4.595				
MM3464A46		4.554	4.600	4.646				
MM3464Z46		4.603	4.650	4.696				
MM3464A47		4.653	4.700	4.747				
MM3464Z47		4.702	4.750	4.797				
MM3464A48		4.752	4.800	4.848				
MM3464Z48		4.801	4.850	4.898				
MM3464A49		4.851	4.900	4.949				
MM3464Z49		4.900	4.950	4.999				
MM3464A50		4.950	5.000	5.050				

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Measuring Circuit



Application Circuit



(Reference example of external parts)

· Output capacitor	Ceramic capacitor 1.0µF	∗Temperature Characteristics : B
· Input capacitor	Ceramic capacitor 1.0µF	

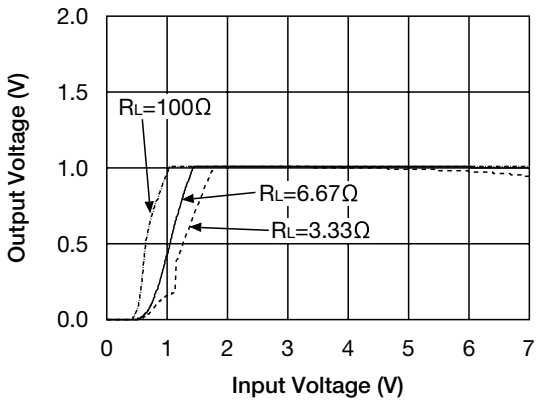
· Note

1. The output capacitor is required between output and GND to prevent oscillation.
2. The ESR of capacitor must be defined in ESR stability area.
   It is possible to use a ceramic capacitor without ESR resistance for output.
   The ceramic capacitor must be used more than 1.0µF and B temperature characteristics.
3. The wire of V_{CC} and GND is required to print full ground plane for noise and stability.
4. The input capacitor must be connected a distance of less than 1cm from input pin.
5. In case the output voltage is above the input voltage, the overcurrent flow by internal parastic diode from output to input.

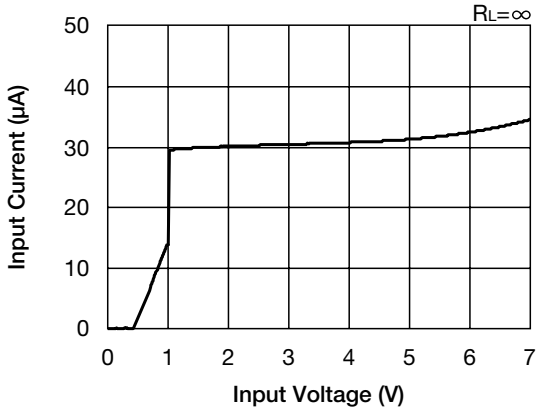
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Characteristics (Vo=1.0V) (Except where noted otherwise $V_{DD}=V_{OUT}$ (typ.) +1V, $V_{CE}=V_{DD}$, Ta=25°C)

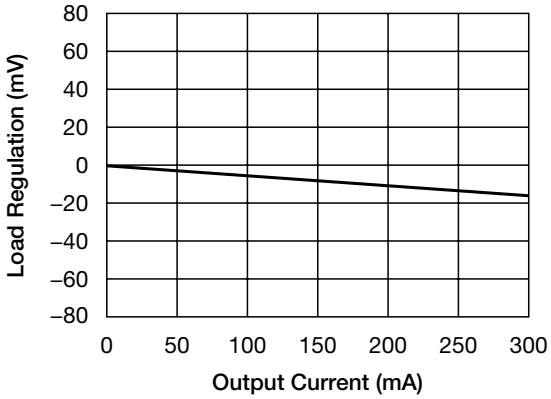
Output - Input voltage



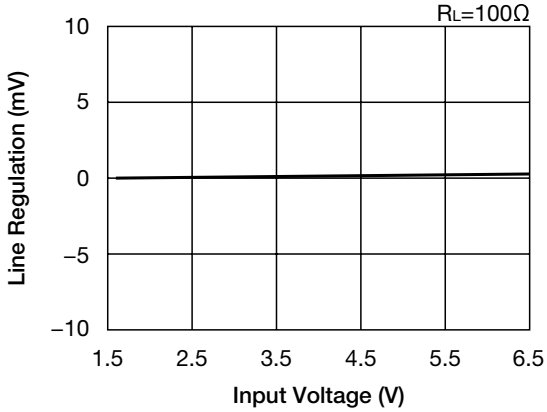
Input current - Input voltage



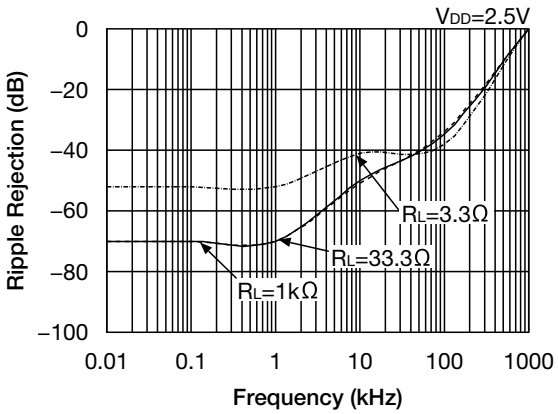
Load regulation



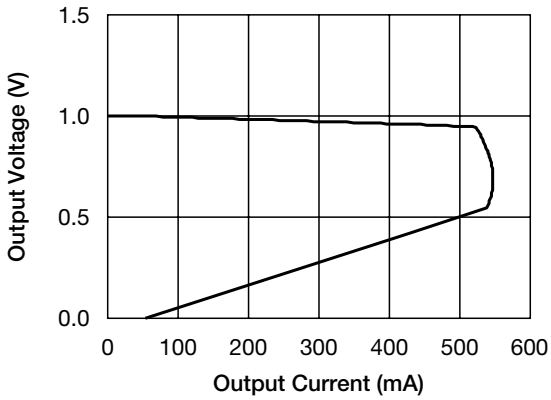
Line regulation



Ripple Rejection

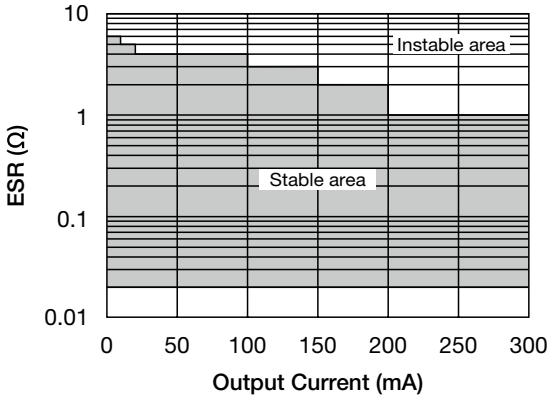


Current Limit

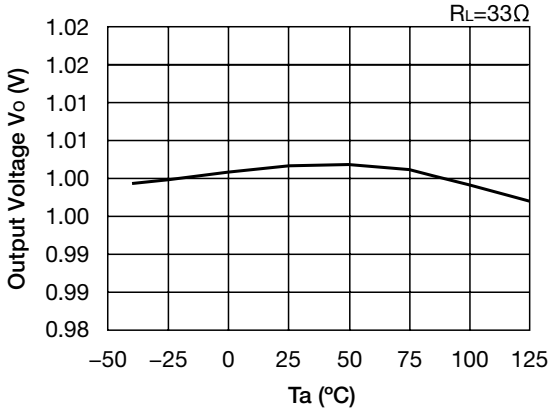


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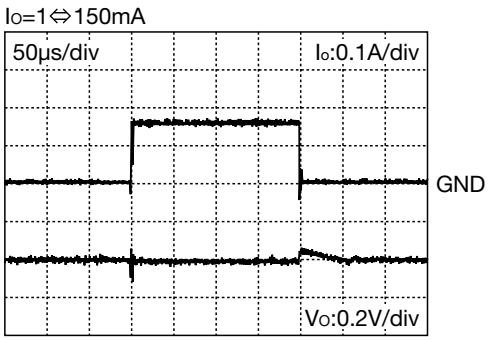
ESR stability area

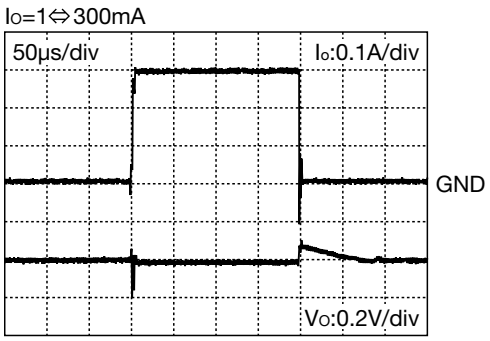


V_{OUT} temperature coefficient



Load transient response (V_{DD}=Vo+1V, V_{CE}=V_{DD}, Cin=Co=1µF)

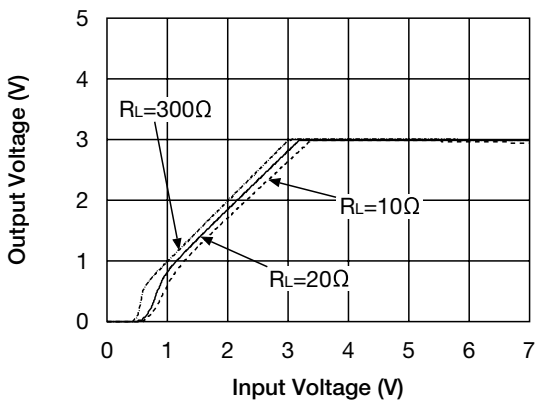




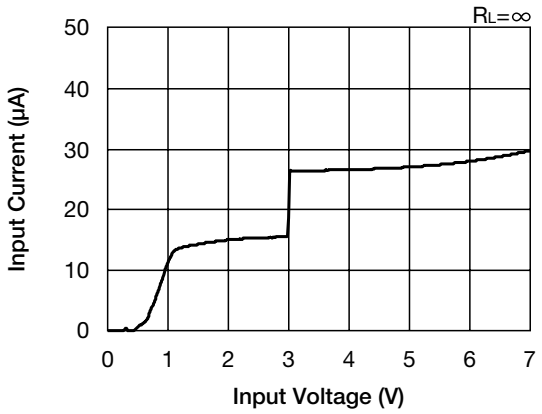
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Characteristics (Vo=3.0V) (Except where noted otherwise $V_{DD}=V_{OUT}$ (typ.) +1V, $V_{CE}=V_{DD}$, Ta=25°C)

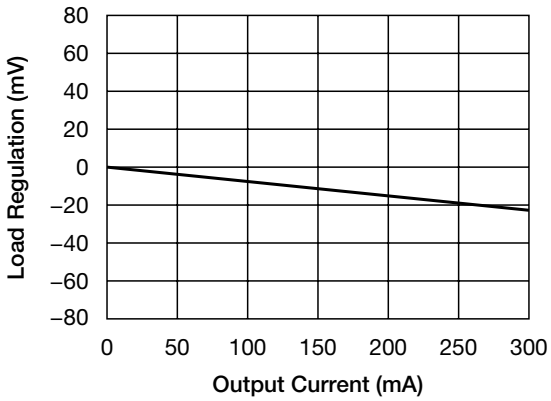
Output - Input voltage



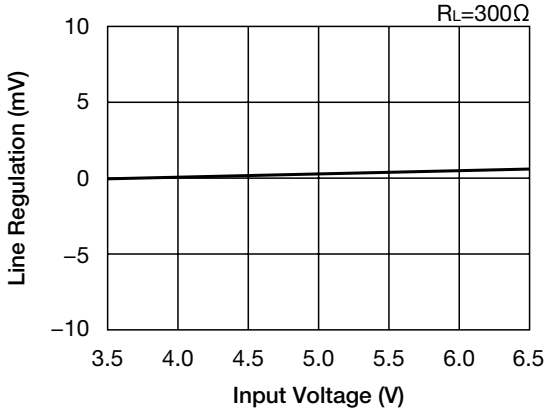
Input current - Input voltage



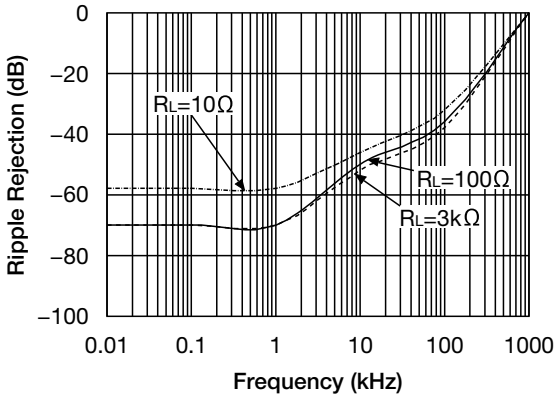
Load regulation



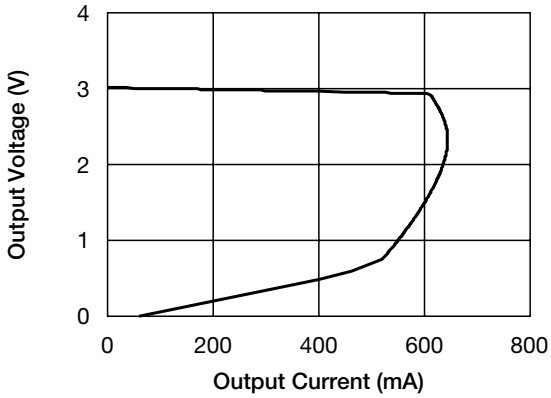
Line regulation



Ripple Rejection

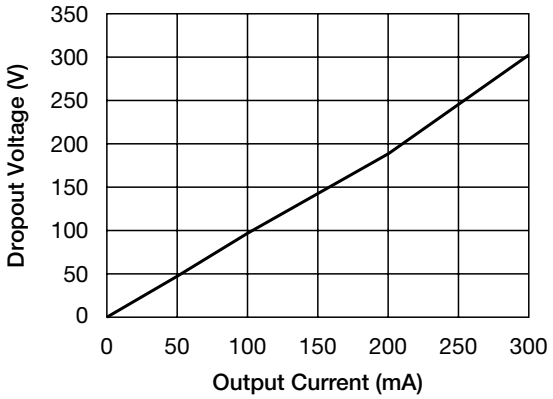


Current Limit

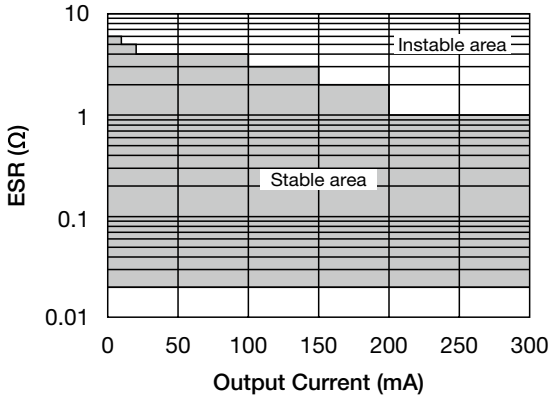


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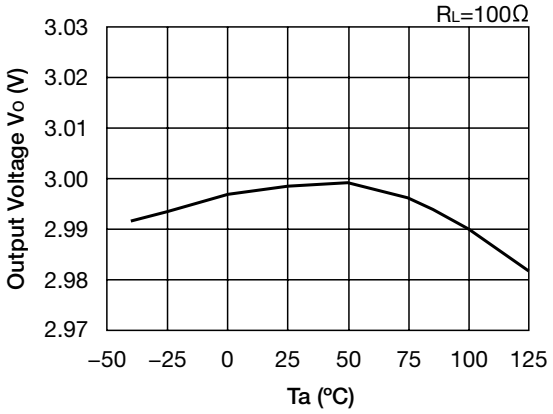
Dropout voltage - Output voltage



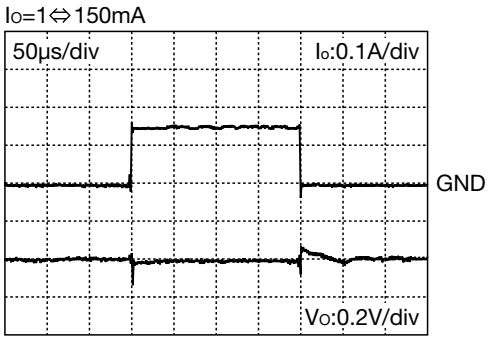
ESR stability area

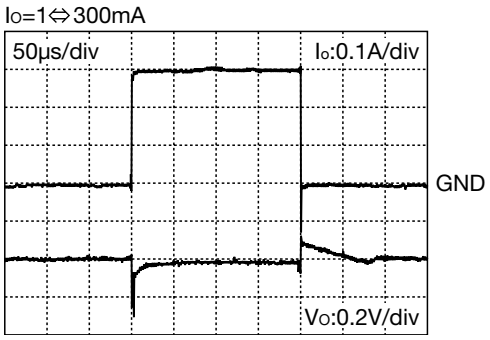


V_{OUT} temperature coefficient



Load transient response (V_{DD}=Vo+1V, V_{CE}=V_{DD}, Cin=Co=1µF)

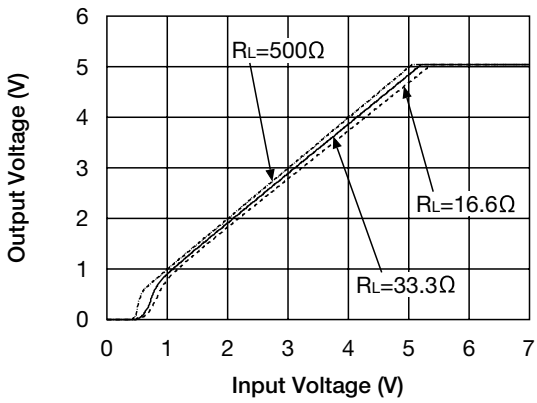




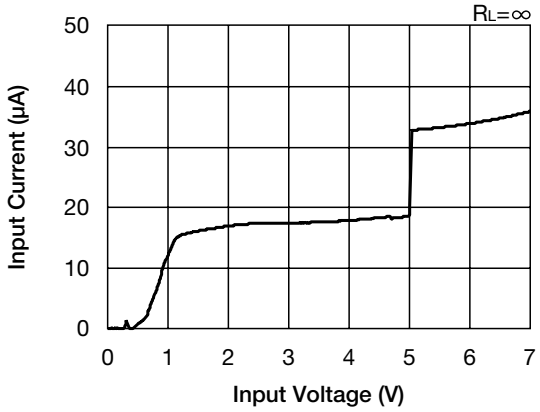
• Any products mentioned in this catalog are subject to any modification in their appearance and others for improvements without prior notification.
• The details listed here are not a guarantee of the individual products at the time of ordering. When using the products, you will be asked to check their specifications.

Characteristics (Vo=5.0V) (Except where noted otherwise $V_{DD}=V_{OUT}$ (typ.) +1V, $V_{CE}=V_{DD}$, Ta=25°C)

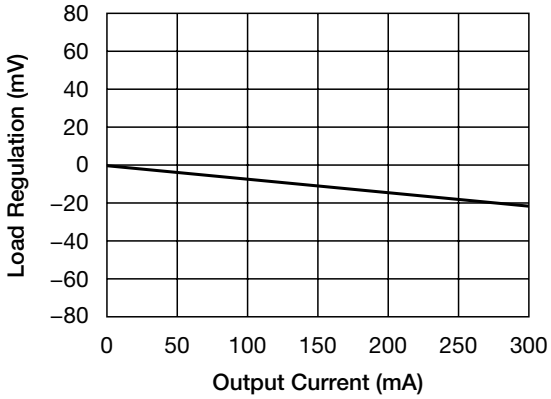
Output - Input voltage



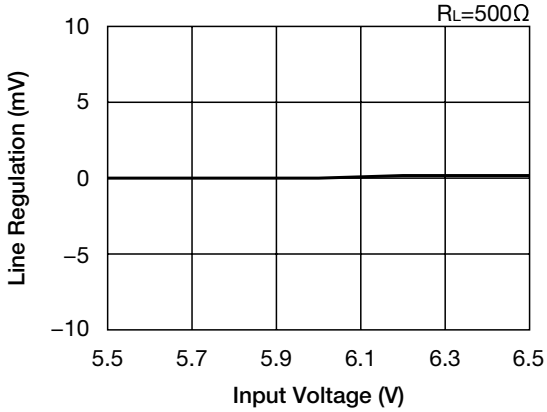
Input current - Input voltage



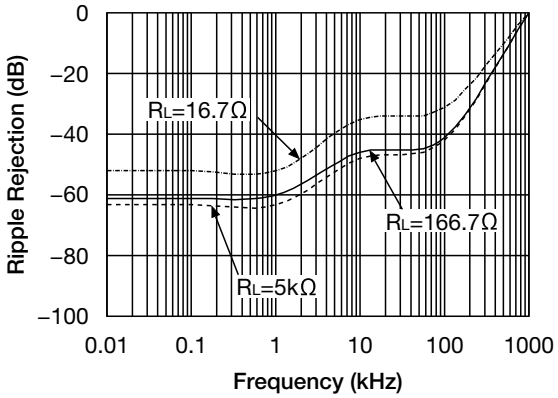
Load regulation



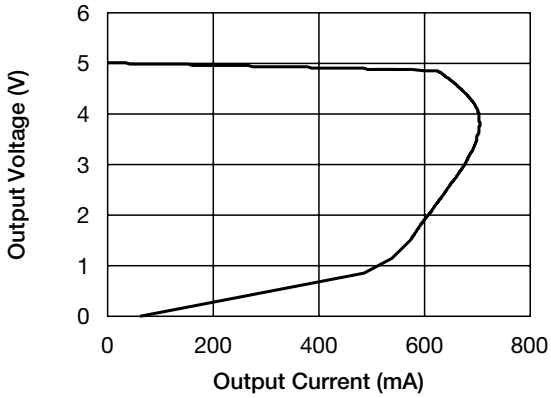
Line regulation



Ripple Rejection

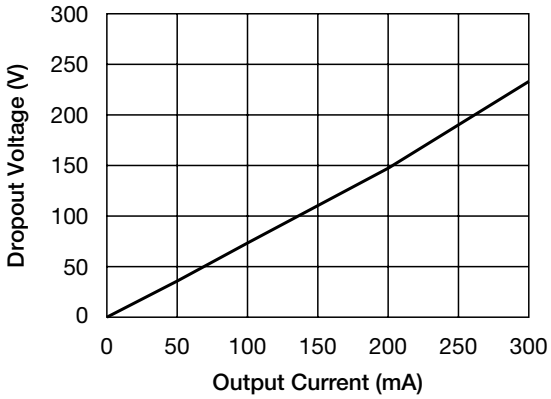


Current Limit

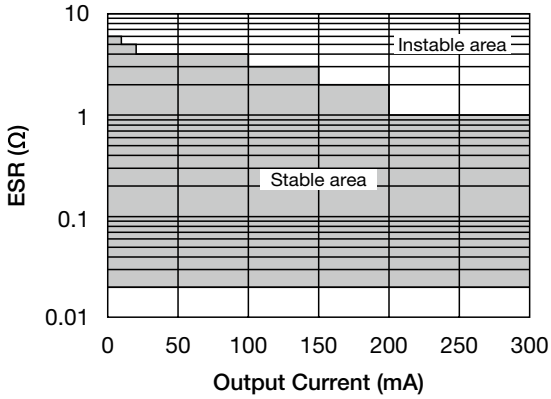


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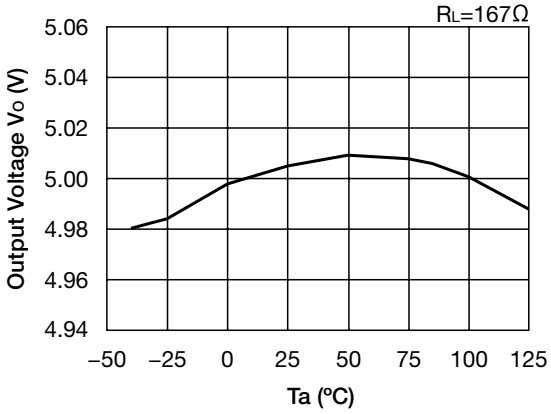
Dropout voltage - Output voltage



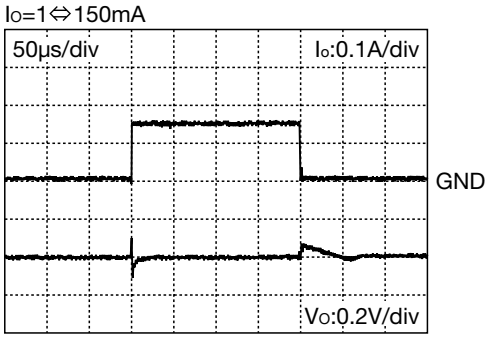
ESR stability area

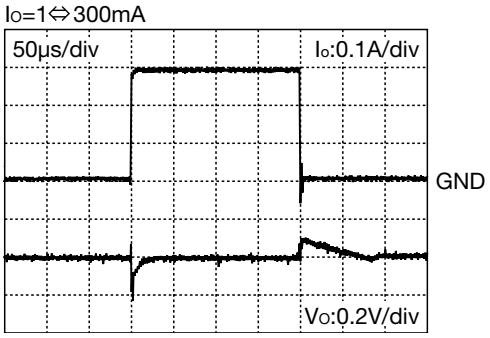


V_{OUT} temperature coefficient



Load transient response (V_{DD}=Vo+1V, V_{CE}=V_{DD}, Cin=Co=1µF)





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