Fast transient response, rush current protection 200mA LDO

MM3816 Series

Overview

This IC is a 200mA Low dropout regulator IC with Rush current protection circuit. No load input current is 42μA typ. and it reduce drop voltage for high speed response. Rush current protection circuit can control rush current and the package is a small PLP-4C (1mm x 1mm), ideal for mobile devices.

Features

- Rush current protection
- High speed response
- High PSRR

Main specifications

(V_{DD}=V_{OUT}(Typ.)+1V, V_{CE}=V_{DD}, Ta=25℃ unless otherwise specified)

- Maximum rating supply voltage : -0.3V to 6.5V (V_{DD}=5.5V at 4.5V≦V_{OUT})
- Operating voltage range : 1.7V to 5.5V
- Operating ambient temperature : -40℃ to 85℃
- Output current : 200mA
- Input current (OFF) : Typ. 0.1uA
- No-load input current : Typ. 42uA
- Output voltage range : 1V to 5V (0.05V step)
- Output voltage accuracy : ±1% (2.0V≦V_{OUT}(Typ.))
  ±20mV (V_{OUT}(Typ.)<2.0V)
- Line regulation : Typ. 0.05%/V (V_{OUT}(Typ.)≦4.0V, V_{DD}=V_{OUT}(Typ.)+0.5V to 5.0V)
  Typ. 0.05%/V (4.0V<V_{OUT}(Typ.)≦4.5V, V_{DD}=V_{OUT}(Typ.)+0.5V to 5.5V)
  Typ. 0.05%/V (4.5V<V_{OUT}(Typ.), VDD=V_{OUT}(Typ.)+5.1V to 5.5V)
- Load regulation : Max. 40mV (I_{OUT}=1mA to 150mA)
  Max. 60mV (I_{OUT}=1mA to 200mA)
- Dropout voltage : Typ. 0.3V (I_{OUT}=200mA, V_{OUT}(Typ.)=3V)
- PSRR : Typ. 75dB (V_{OUT}(Typ.)≦4.0V, f=1kHz)
  Typ. 60dB (4.0V<V_{OUT}(Typ.), f=1kHz)
- Output noise voltage : Typ. 60uVrms (V_{OUT}(Typ.)≦4.0V, f_{BW}=10 to 100kHz, I_{OUT}=30mA)
  Typ. 90uVrms (4.0V<V_{OUT}(Typ.), f_{BW}=10 to 100kHz, I_{OUT}=30mA)
- Output capacitor : 1uF (Ceramic capacitor)
- Protection function : Over current protection
- Additional function : ON/OFF control, Auto discharge

Packages

- PLP-4C

Application

- Audio visual equipment
- Portable communication device
- Photographing / Imaging device
- Wearable device

Model Name

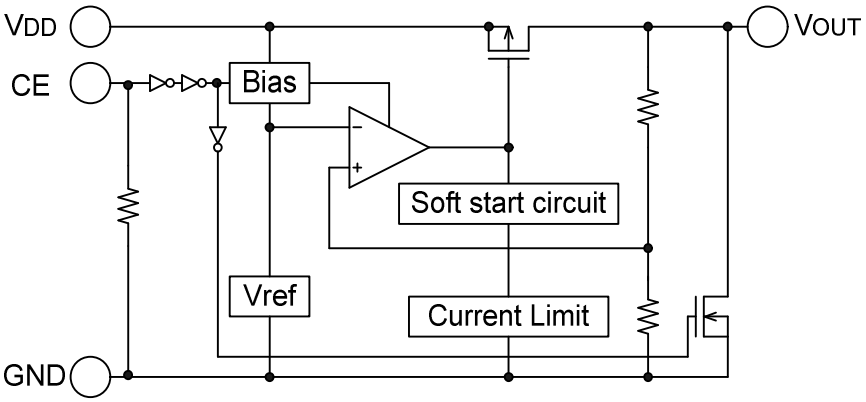
M M 3 8 1 6 X X X X X E

Series name (A) (B) (C) (D)

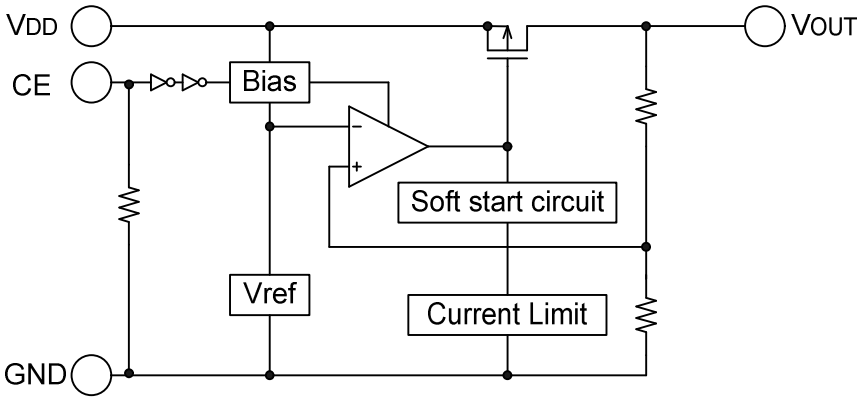
(A)	Function Type	A Z	CE=H active, with discharge function
		C W	CE=H active, without discharge function
(B)	Output voltage rank	10 ≀ 50	(A)="A","C" the output voltage can be designated in the range from 1.00V(10) to 5.00V(50) in 0.1V steps. (A)="Z","W" the output voltage can be designated in the range from 1.05V(10) to 4.95V(49) in 0.05V steps.
(C)	Package	R	PLP-4C
(D)	Packing specifications	R	R housing (Standard)

Block Diagram

■ A, Z rank (CE=H active, with discharge function)

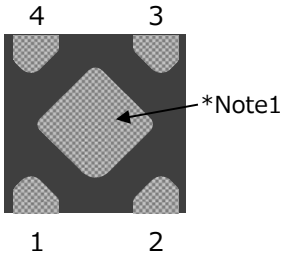


■ C, W rank (CE=H active, without discharge function)



Pin Configuration

- PLP-4C



Top view

Pin No.	Pin name	Function
1	V_{OUT}	Output pin
2	GND	GND pin
3	CE	ON/OFF-control pin (with CE pull-down resistor) Connect CE pin with VDD pin, when it is not used.
4	V_{DD}	Voltage supply pin

*Note1:Heat spreader bottom with GND.

Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Storage temperature	Tstg	-55	150	℃
Junction temperature	Tj_{MAX}	-	150	℃
Supply voltage	V_{DD}	-0.3	6.5	V
CE input voltage	V_{CE}	-0.3	6.5	V
Output current	I_{OUT}	0	300	mA
Power dissipation *Note2	Pd1	-	1300	mW

*Note2:JEDEC51-7 standard

Recommended Operating Conditions

項目	記号	Min.	Max.	単位
Operating ambient temperature	Topr	-40	85	℃
Operating junction temperature	Tjop	-	125	℃
Operating voltage	Vop	1.7	5.5	V
Output current	Iop	0	200	mA

Electrical Characteristics

(V_{DD}=V_{OUT}(Typ.)+1V, V_{CE}=V_{DD}, Ta=25℃ unless otherwise specified)

(V_{DD}=5.5V at 4.5V≦V_{OUT})

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input current(OFF)	I_{DDOff}	V_{CE}=0V	-	0.1	1.0	μA
No-Load Input Current	I_{DD}	I_{OUT}=0mA	-	42	64	μA
Output voltage	V_{OUT}	I_{OUT}=10mA 2.0V≦VOUT	×0.99	-	×1.01	V
		I_{OUT}=10mA V_{OUT}<2.0V	-0.02	-	0.02	V
Line regulation	V_{LINE}	V_{OUT}(Typ.)+0.5V≦V_{DD}≦5V V_{OUT}(Typ.)≦4.0V, I_{OUT}=1mA	-	0.05	0.10	%/V
		V_{OUT}(Typ.)+0.5V≦V_{DD}≦5.5V 4.0V<V_{OUT}(Typ.)≦4.5V, I_{OUT}=1mA				
		5.1V≦V_{DD}≦5.5V 4.5V<V_{OUT}(Typ.)≦5.0V, I_{OUT}=1mA				
Load regulation 1	$V_{LOAD}1$	1mA≦I_{OUT}≦150mA	-	-	40	mV
Load regulation 2	$V_{LOAD}2$	1mA≦I_{OUT}≦200mA	-	-	60	mV
Dropout voltage *Note3	Vio	Please refer to another page.	-	-	-	V
Output short-circuit current *Note4	Ilim	V_{OUT}=0V	-	50	-	mA

*Note3:Please refer to another page.

*Note4:The parameter is guaranteed by design.

Electrical Characteristics

(V_{DD}=V_{OUT}(Typ.)+1V, V_{CE}=V_{DD}, Ta=25℃ unless otherwise specified)
(V_{DD}=5.5V at 4.5V≦V_{OUT})

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Vout temperature coefficient *Note4	ΔV_{OUT} $/\Delta T$	I_{OUT}=10mA -40≦Top≦85℃	-	±100	-	ppm/℃
Ripple rejection *Note4	RR	f=1kHz, Vripple=0.5V I_{OUT}=30mA, V_{OUT}(Typ.)≦4.0V	-	75	-	dB
		f=1kHz, Vripple=0.5V I_{OUT}=30mA, 4.0V<V_{OUT}(Typ.)	-	60	-	
Output noise voltage *Note4	Vn	V_{OUT}(Typ.)≦4.0V, I_{OUT}=30mA f_{BW}=10~100kHz	-	60	-	μVrms
		4.0V<V_{OUT}(Typ.), I_{OUT}=30mA f_{BW}=10~100kHz	-	90	-	
CE pin current *Note4	I_{CE}		-	0.5	-	μA
CE High threshold voltage	V_{CEH}		1.5	-	5.5	V
CE Low threshold voltage	V_{CEL}		0	-	0.3	V
CE pin transient response *Note4	t_{CE}	I_{OUT}=50mA	-	30	-	us
Output NMOS ON resistance *Note4,5	R_{DON}	V_{CE}=0V, V_{DD}=4V	-	20	-	Ω
		4.0V<V_{OUT}(Typ.) V_{CE}=0V, V_{DD}=5.5V				

*Note4:The parameter is guaranteed by design.

*Note5:This parameter is only MM3816A/Z series.

Electrical Characteristics

(V_{DD}=V_{OUT}(Typ.)+1V, V_{CE}=V_{DD}, Ta=25℃ unless otherwise specified)
(V_{DD}=5.5V at 4.5V≦V_{OUT})

Model name	Item							
	Output voltage				Dropout voltage			
	V_{OUT} (V)				Vio (V)			
	Conditions	Min.	Typ.	Max.	Conditions	Min.	Typ.	Max.
MM3816A/C10	I_{OUT}=10mA	0.980	1.000	1.020	I_{OUT}=150mA 1.0V≦ V_{OUT}(Typ.)<1.8V *Note6	-	0.63	0.70
MM3816Z/W10		1.030	1.050	1.070				
MM3816A/C11		1.080	1.100	1.120				
MM3816Z/W11		1.130	1.150	1.170				
MM3816A/C12		1.180	1.200	1.220				
MM3816Z/W12		1.230	1.250	1.270				
MM3816A/C13		1.280	1.300	1.320		-	0.58	0.65
MM3816Z/W13		1.330	1.350	1.370				
MM3816A/C14		1.380	1.400	1.420				
MM3816Z/W14		1.430	1.450	1.470				
MM3816A/C15		1.480	1.500	1.520				
MM3816Z/W15		1.530	1.550	1.570				
MM3816A/C16		1.580	1.600	1.620		-	0.53	0.60
MM3816Z/W16		1.630	1.650	1.670				
MM3816A/C17		1.680	1.700	1.720				
MM3816Z/W17		1.730	1.750	1.770				
MM3816A/C18		1.780	1.800	1.820	I_{OUT}=150mA 1.8V≦V_{OUT} V_{DD}=V_{OUT}(Typ.)-0.2V			
MM3816Z/W18		1.830	1.850	1.870				
MM3816A/C19		1.880	1.900	1.920		-	0.41	0.48
MM3816Z/W19		1.930	1.950	1.970				
MM3816A/C20		1.980	2.000	2.020				
MM3816Z/W20		2.030	2.050	2.071				
MM3816A/C21		2.079	2.100	2.121		-	0.35	0.42
MM3816Z/W21		2.129	2.150	2.172				
MM3816A/C22		2.178	2.200	2.222				
MM3816Z/W22		2.228	2.250	2.273				
MM3816A/C23		2.277	2.300	2.323		-	0.28	0.36
MM3816Z/W23		2.327	2.350	2.374				
MM3816A/C24		2.376	2.400	2.424				
MM3816Z/W24		2.426	2.450	2.475				
MM3816A/C25		2.475	2.500	2.525				
MM3816Z/W25		2.525	2.550	2.576				
MM3816A/C26		2.574	2.600	2.626		-	0.22	0.30
MM3816Z/W26		2.624	2.650	2.677				
MM3816A/C27		2.673	2.700	2.727				
MM3816Z/W27		2.723	2.750	2.778				
MM3816A/C28		2.772	2.800	2.828				
MM3816Z/W28		2.822	2.850	2.879				
MM3816A/C29		2.871	2.900	2.929				
MM3816Z/W29		2.921	2.950	2.980				
MM3816A/C30		2.970	3.000	3.030				
MM3816Z/W30		3.020	3.050	3.081				

*Note6:Dropout voltage MAX value in the input and it is confirmed that there is no output abnormal voltage impression the load 150mA in the model less than Vout<1.8V.

Electrical Characteristics

(V_{DD}=V_{OUT}(Typ.)+1V, V_{CE}=V_{DD}, Ta=25℃ unless otherwise specified)
(V_{DD}=5.5V at 4.5V≦V_{OUT})

Model name	Item							
	Output voltage				Dropout voltage			
	V_{OUT} (V)				Vio (V)			
	Conditions	Min.	Typ.	Max.	Conditions	Min.	Typ.	Max.
MM3816A/C31	I_{OUT}=10mA	3.069	3.100	3.131	I_{OUT}=150mA			
MM3816Z/W31		3.119	3.150	3.182	3.1V≦V_{OUT}			
MM3816A/C32		3.168	3.200	3.232	V_{DD}=V_{OU}T(Typ.)-0.2V			
MM3816Z/W32		3.218	3.250	3.283				
MM3816A/C33		3.267	3.300	3.333				
MM3816Z/W33		3.317	3.350	3.384				
MM3816A/C34		3.366	3.400	3.434				
MM3816Z/W34		3.416	3.450	3.485				
MM3816A/C35		3.465	3.500	3.535				
MM3816Z/W35		3.515	3.550	3.586				
MM3816A/C36		3.564	3.600	3.636				
MM3816Z/W36		3.614	3.650	3.687				
MM3816A/C37		3.663	3.700	3.737				
MM3816Z/W37		3.713	3.750	3.788				
MM3816A/C38		3.762	3.800	3.838				
MM3816Z/W38		3.812	3.850	3.889				
MM3816A/C39		3.861	3.900	3.939				
MM3816Z/W39		3.911	3.950	3.990				
MM3816A/C40		3.960	4.000	4.040				
MM3816Z/W40		4.010	4.050	4.091		-	0.21	0.27
MM3816A/C41		4.059	4.100	4.141				
MM3816Z/W41		4.109	4.150	4.192				
MM3816A/C42		4.158	4.200	4.242				
MM3816Z/W42		4.208	4.250	4.293				
MM3816A/C43		4.257	4.300	4.343				
MM3816Z/W43		4.307	4.350	4.394				
MM3816A/C44		4.356	4.400	4.444				
MM3816Z/W44		4.406	4.450	4.495				
MM3816A/C45		4.455	4.500	4.545				
MM3816Z/W45		4.505	4.550	4.596				
MM3816A/C46		4.554	4.600	4.646				
MM3816Z/W46		4.604	4.650	4.697				
MM3816A/C47		4.653	4.700	4.747				
MM3816Z/W47		4.703	4.750	4.798				
MM3816A/C48		4.752	4.800	4.848				
MM3816Z/W48		4.802	4.850	4.899				
MM3816A/C49		4.851	4.900	4.949				
MM3816Z/W49		4.901	4.950	5.000				
MM3816A/C50		4.950	5.000	5.050		-	0.18	0.25

Electrical Characteristics

(V_{DD}=V_{OUT}(Typ.)+1V, V_{CE}=V_{DD}, Ta=25℃ unless otherwise specified)
(V_{DD}=5.5V at 4.5V≦V_{OUT})

Model name	Item							
	Output voltage				Dropout voltage			
	V_{OUT} (V)				Vio (V)			
	Conditions	Min.	Typ.	Max.	Conditions	Min.	Typ.	Max.
MM3816A/C10	I_{OUT}=10mA	0.980	1.000	1.020	I_{OUT}=200mA 1.0V≦ V_{OUT}(Typ.)<2.1V *Note7	-	0.85	0.98
MM3816Z/W10		1.030	1.050	1.070				
MM3816A/C11		1.080	1.100	1.120				
MM3816Z/W11		1.130	1.150	1.170				
MM3816A/C12		1.180	1.200	1.220				
MM3816Z/W12		1.230	1.250	1.270				
MM3816A/C13		1.280	1.300	1.320		-	0.79	0.92
MM3816Z/W13		1.330	1.350	1.370				
MM3816A/C14		1.380	1.400	1.420				
MM3816Z/W14		1.430	1.450	1.470				
MM3816A/C15		1.480	1.500	1.520				
MM3816Z/W15		1.530	1.550	1.570				
MM3816A/C16		1.580	1.600	1.620		-	0.71	0.83
MM3816Z/W16		1.630	1.650	1.670				
MM3816A/C17		1.680	1.700	1.720				
MM3816Z/W17		1.730	1.750	1.770				
MM3816A/C18		1.780	1.800	1.820				
MM3816Z/W18		1.830	1.850	1.870				
MM3816A/C19		1.880	1.900	1.920		-	0.60	0.72
MM3816Z/W19		1.930	1.950	1.970				
MM3816A/C20		1.980	2.000	2.020				
MM3816Z/W20		2.030	2.050	2.071				
MM3816A/C21		2.079	2.100	2.121	I_{OUT}=200mA 2.1V≦V_{OUT} V_{DD}=V_{OUT}(Typ.)-0.2V	-	0.49	0.59
MM3816Z/W21		2.129	2.150	2.172				
MM3816A/C22		2.178	2.200	2.222				
MM3816Z/W22		2.228	2.250	2.273				
MM3816A/C23		2.277	2.300	2.323		-	0.39	0.51
MM3816Z/W23		2.327	2.350	2.374				
MM3816A/C24		2.376	2.400	2.424				
MM3816Z/W24		2.426	2.450	2.475				
MM3816A/C25		2.475	2.500	2.525				
MM3816Z/W25		2.525	2.550	2.576				
MM3816A/C26		2.574	2.600	2.626		-	0.30	0.42
MM3816Z/W26		2.624	2.650	2.677				
MM3816A/C27		2.673	2.700	2.727				
MM3816Z/W27		2.723	2.750	2.778				
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MM3816Z/W28		2.822	2.850	2.879				
MM3816A/C29		2.871	2.900	2.929				
MM3816Z/W29		2.921	2.950	2.980				
MM3816A/C30		2.970	3.000	3.030				
MM3816Z/W30		3.020	3.050	3.081				

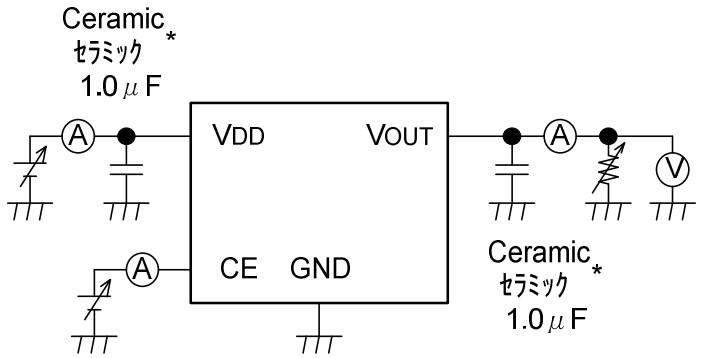
*Note7:Dropout voltage MAX value in the input and it is confirmed that there is no output abnormal voltage impression the load 200mA in the model less than Vout<2.1V.

Electrical Characteristics

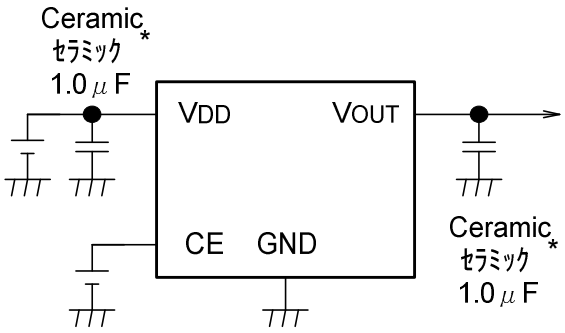
(V_{DD}=V_{OUT}(Typ.)+1V, V_{CE}=V_{DD}, Ta=25℃ unless otherwise specified)
(V_{DD}=5.5V at 4.5V≦V_{OUT})

Model name	Item							
	Output voltage				Dropout voltage			
	V_{OUT} (V)				Vio (V)			
	Conditions	Min.	Typ.	Max.	Conditions	Min.	Typ.	Max.
MM3816A/C31	I_{OUT}=10mA	3.069	3.100	3.131	I_{OUT}=200mA 3.1V≦V_{OUT} V_{DD}=V_{OUT}(Typ.)-0.2V			
MM3816Z/W31		3.119	3.150	3.182				
MM3816A/C32		3.168	3.200	3.232				
MM3816Z/W32		3.218	3.250	3.283				
MM3816A/C33		3.267	3.300	3.333				
MM3816Z/W33		3.317	3.350	3.384				
MM3816A/C34		3.366	3.400	3.434				
MM3816Z/W34		3.416	3.450	3.485				
MM3816A/C35		3.465	3.500	3.535				
MM3816Z/W35		3.515	3.550	3.586				
MM3816A/C36		3.564	3.600	3.636				
MM3816Z/W36		3.614	3.650	3.687				
MM3816A/C37		3.663	3.700	3.737				
MM3816Z/W37		3.713	3.750	3.788				
MM3816A/C38		3.762	3.800	3.838				
MM3816Z/W38		3.812	3.850	3.889				
MM3816A/C39		3.861	3.900	3.939				
MM3816Z/W39		3.911	3.950	3.990				
MM3816A/C40		3.960	4.000	4.040				
MM3816Z/W40		4.010	4.050	4.091		-	0.29	0.39
MM3816A/C41		4.059	4.100	4.141				
MM3816Z/W41		4.109	4.150	4.192				
MM3816A/C42		4.158	4.200	4.242				
MM3816Z/W42		4.208	4.250	4.293				
MM3816A/C43		4.257	4.300	4.343				
MM3816Z/W43		4.307	4.350	4.394				
MM3816A/C44		4.356	4.400	4.444				
MM3816Z/W44		4.406	4.450	4.495				
MM3816A/C45		4.455	4.500	4.545				
MM3816Z/W45		4.505	4.550	4.596				
MM3816A/C46		4.554	4.600	4.646				
MM3816Z/W46		4.604	4.650	4.697				
MM3816A/C47		4.653	4.700	4.747				
MM3816Z/W47		4.703	4.750	4.798				
MM3816A/C48		4.752	4.800	4.848				
MM3816Z/W48		4.802	4.850	4.899				
MM3816A/C49		4.851	4.900	4.949				
MM3816Z/W49		4.901	4.950	5.000				
MM3816A/C50		4.950	5.000	5.050		-	0.25	0.35

Test Circuit



Application Circuit



(Example of external parts)

- Output capacitor Ceramic capacitor 1.0μF
- Input capacitor Ceramic capacitor 1.0μF *Temperature characteristics : B

- In the event a problem which may affect industrial property or any other rights of us or a third party is encountered during the use of information described in these circuit, we shall not be liable for any such problem, nor grant a license therefore.

Note

1. Please use this IC within the stated absolute maximum ratings.
   The IC is liable to malfunction should the ratings be exceeded.

2. Due to restrictions on the package power dissipation, the output current value may not be satisfied.
   Attention should be paid to the power dissipation of the package when the output current is large or the voltage between Iinput and Output is high.

3. The output capacitor is required between output and GND to prevent oscillation.

4. 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.

5. The wire of VDD and GND is required to print full ground plane for noise and stability.

6. The input capacitor must be connected a distance of less than 1cm from input pin.

7. It is able to oscillation when you use the capacitor with intense capacitance change such as micro.
   Please evaluate IC in the set.

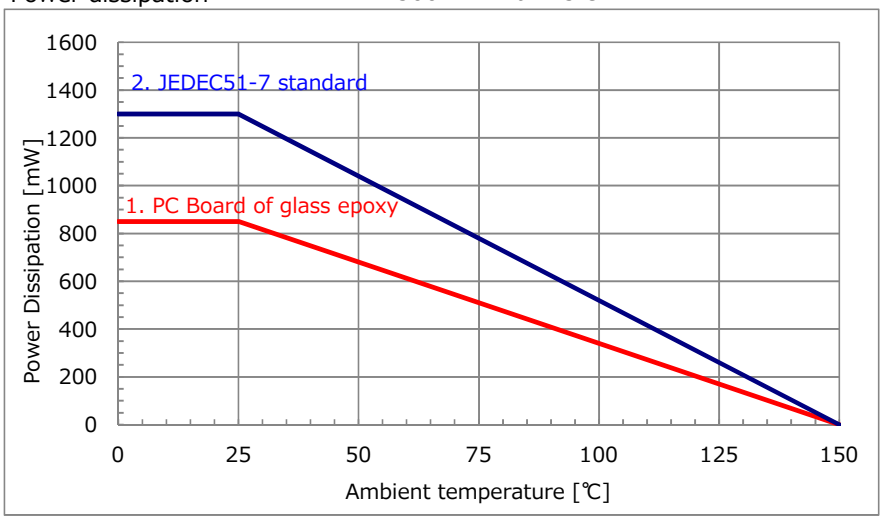
8. In case the output voltage is above the input voltage, the overcurrent flow by internal parastic diode from output to input.
   In such application, the external bypass diode must be connected between output and input pin.

9. This IC will limit the output current with the overcurrent protection circuit when the overcurrent and the output do short-circuit.
   However, IC generates heat because of the substrate and use conditions and there is a possibility of destroying it exceeding a permissible loss.
   The characteristic changes depending on the substrate condition.
   Please evaluate IC in the set.

About Power Dissiopation

The Power dissipation change if board to mount IC change because radiative heat fix at board.
It is reference data below, Evaluate IC in the set.

- PLP-4C
  1. PC Board of glass epoxy
     Board size 40mm×40mm t=1.6mm Copper foil area 80%
     Power dissipation 850mW Ta=25℃
  2. JEDEC51-7 standard (4 layer FR-4 board)
     Board size 114.3mm×76.2mm t=1.6mm Copper foil area 80%
     Power dissipation 1300mW Ta=25℃

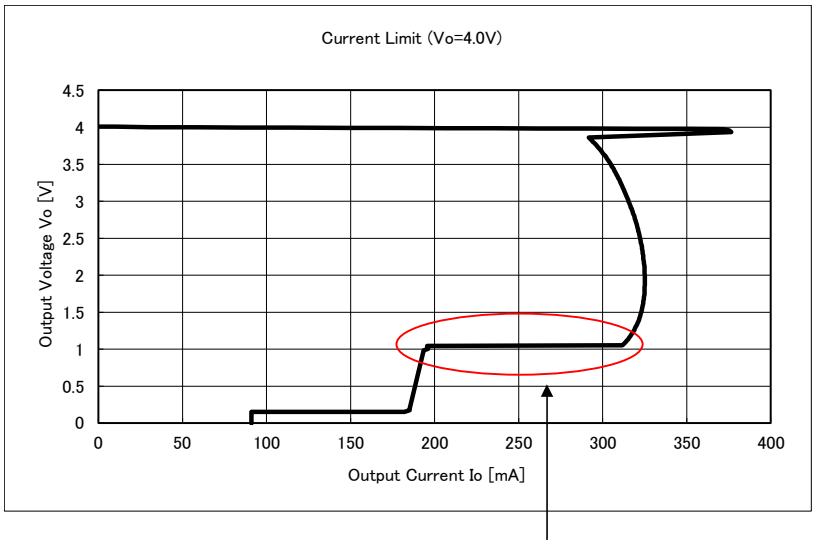


It is recommended to layout the VIA for heat radiation in the GND pattern of reverse (of IC) when there is the GND pattern in the inner layer (in using multiplayer substrate).
By increasing these copper foil pattern area of PCB, Power dissipation improves.

About Power Dissiopation

The thermal shut down circuit is not composed in MM3816.
So IC is able to be destoryed if the IC's heat more than power dissipation
when output resistance is half short(1.8～3.6Ω).
Evaluate IC in the set.

The current limit characteristic of MM3816(Vo=4.0V) is shown below.
Output voltage is about 1.0V when output is half short(1.8～3.6Ω).
Be care of destruction by great heat in area that Output voltage is about 1.0V.

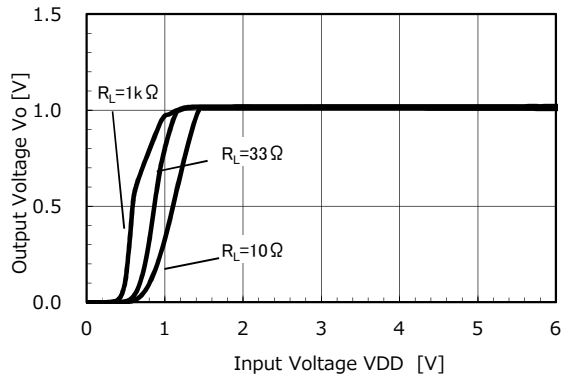


The current limit operate in this area (half short 1.8～3.6Ω).
Be care of IC's heat is great.

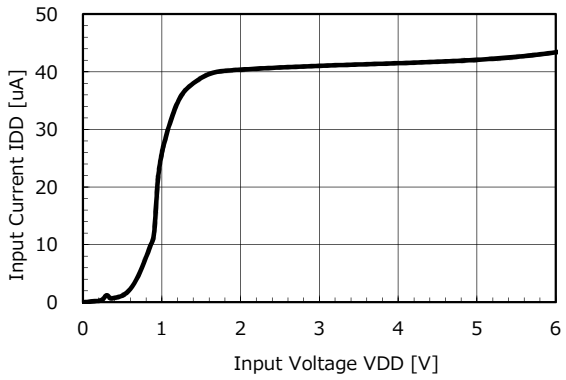
Typical Performance Characteristics (1.0V)

(V_{DD}=V_{OUT}(Typ.)+1V, V_{CE}=V_{DD}, Ta=25℃ unless otherwise specified)

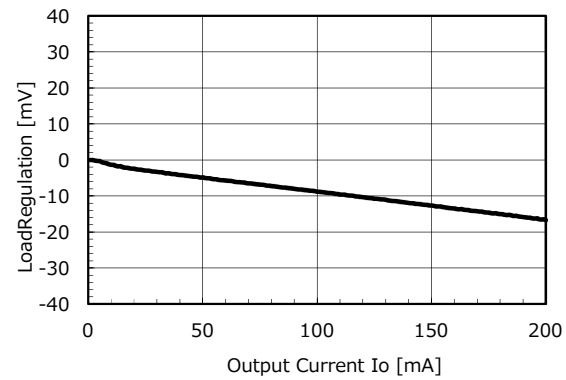
Input Voltage - Output Voltage



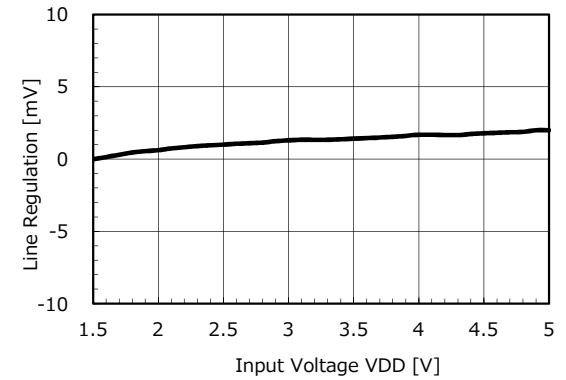
Input Voltage - Input Current R_L=∞



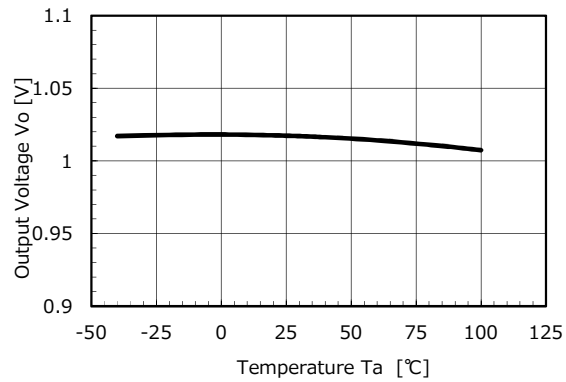
Load Regulation



Line Regulation R_L=1kΩ

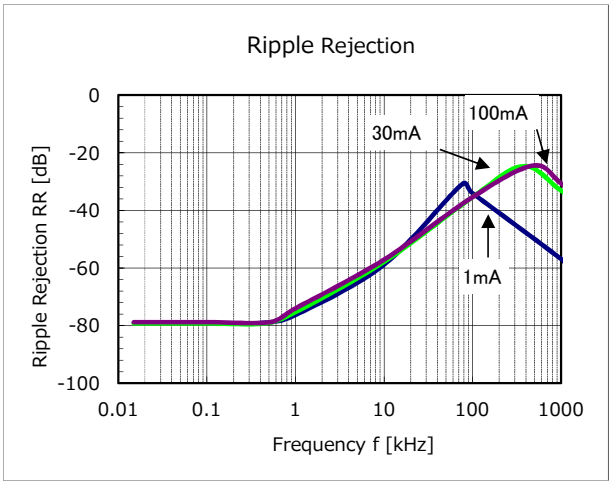


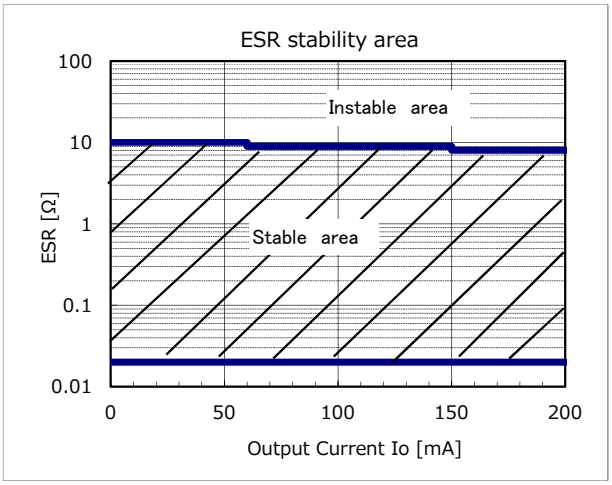
Vout Temperature Coefficient R_L=100Ω

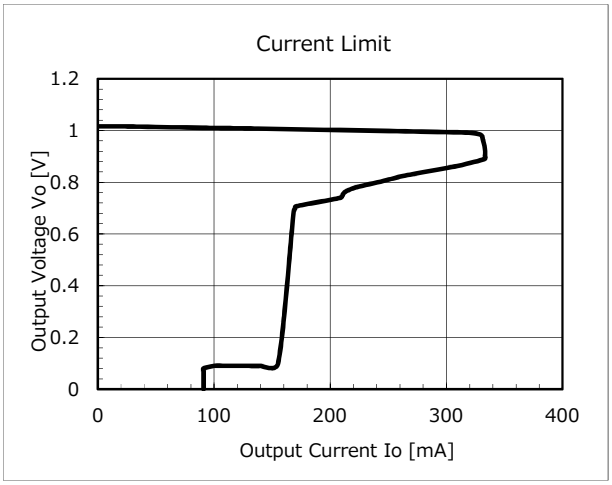


Typical Performance Characteristics (1.0V)

(V_{DD}=V_{OUT}(Typ.)+1V, V_{CE}=V_{DD}, Ta=25℃ unless otherwise specified)







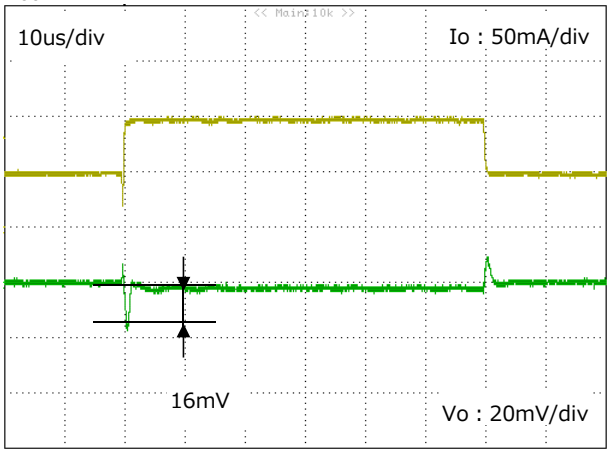
Typical Performance Characteristics (1.0V)

(V_{DD}=V_{OUT}(Typ.)+1V, V_{CE}=V_{DD}, Ta=25℃ unless otherwise specified)

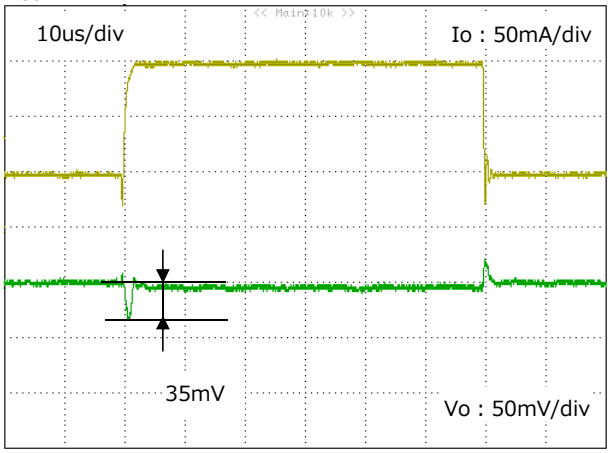
■ Load transient response

(V_{DD}=V_{OUT}+1V,V_{CE}=V_{DD}, Cin=1.0μF)

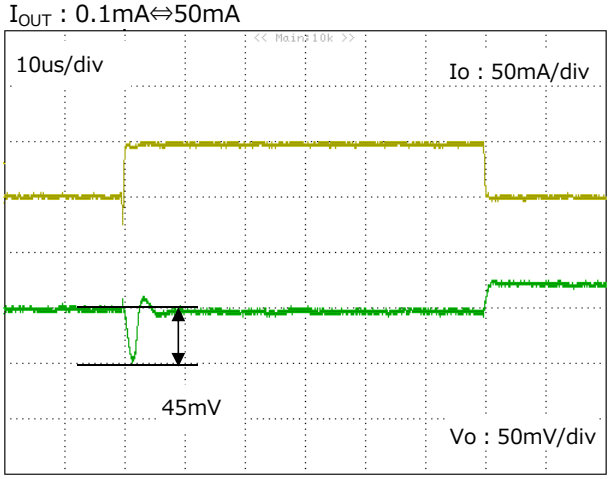
I_{OUT} : 50mA⇔100mA



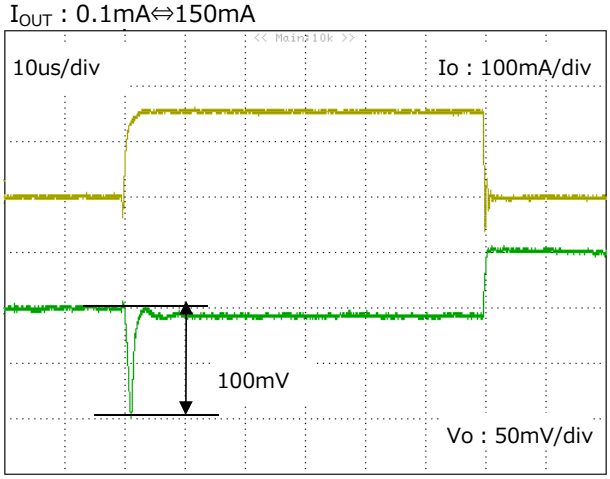
I_{OUT} : 50mA⇔150mA



I_{OUT} : 0.1mA⇔50mA

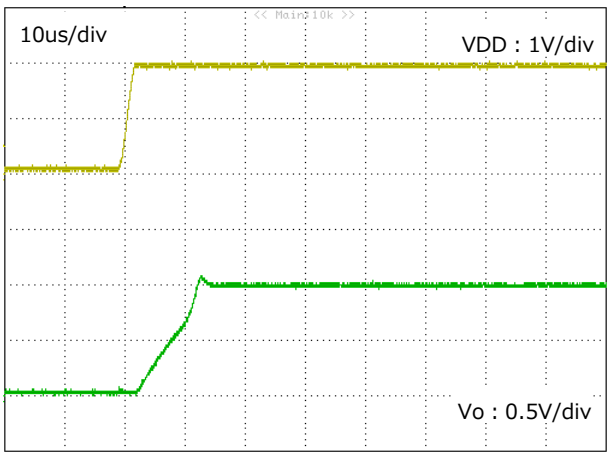


I_{OUT} : 0.1mA⇔150mA



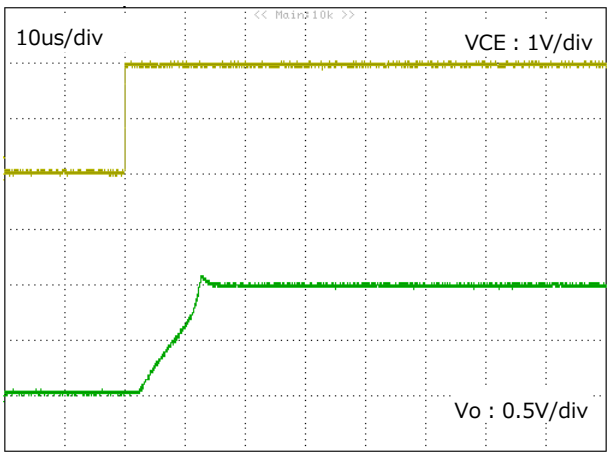
■ Input rise characteristics

(V_{DD}=0V→2V, V_{CE}=V_{DD}, I_{OUT}=50mA)



■ CE rise characteristics

(V_{DD}=2V, V_{CE}=0V→V_{DD}, I_{OUT}=50mA)

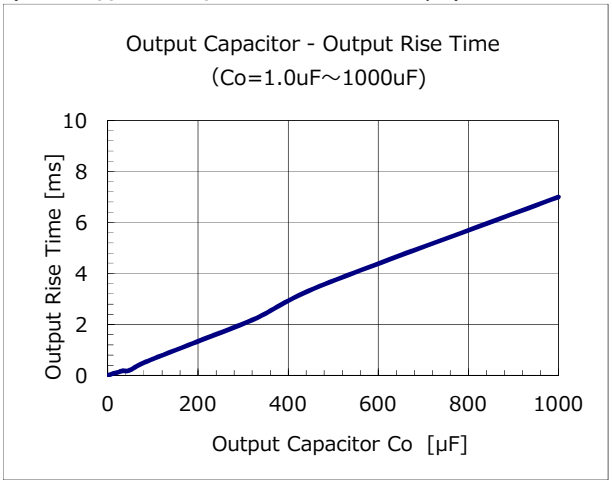


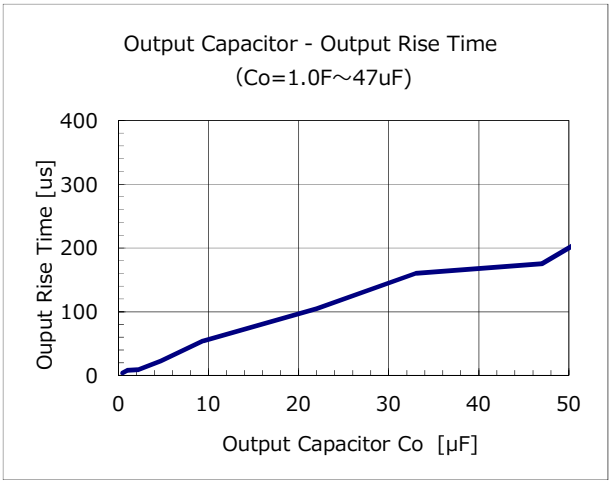
Typical Performance Characteristics (1.0V)

(V_{DD}=V_{OUT}(Typ.)+1V, V_{CE}=V_{DD}, Ta=25℃ unless otherwise specified)

■ Output Rise Time

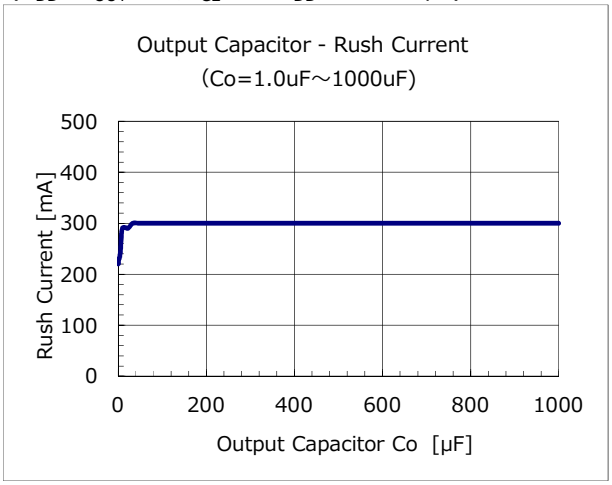
(V_{DD}=V_{OUT}+1V,V_{CE}=0→V_{DD}, Cin=1.0μF)

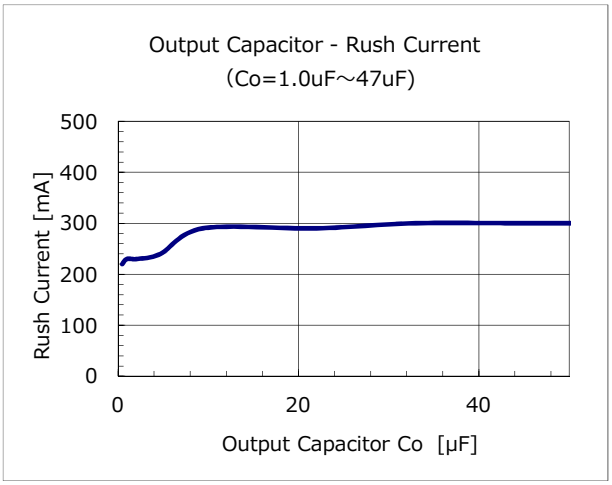




■ Rush Current

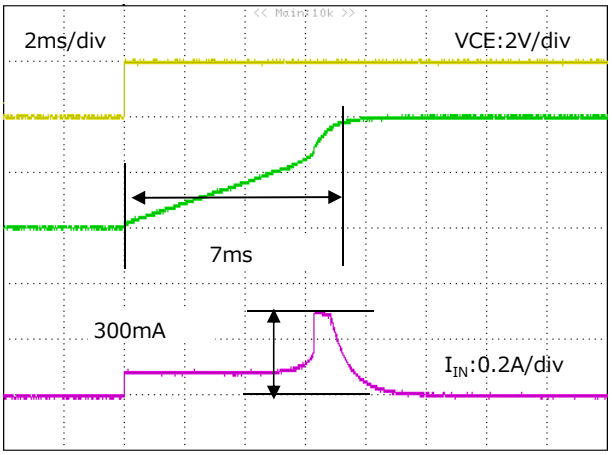
(V_{DD}=V_{OUT}+1V,V_{CE}=0→V_{DD}, Cin=1.0μF)



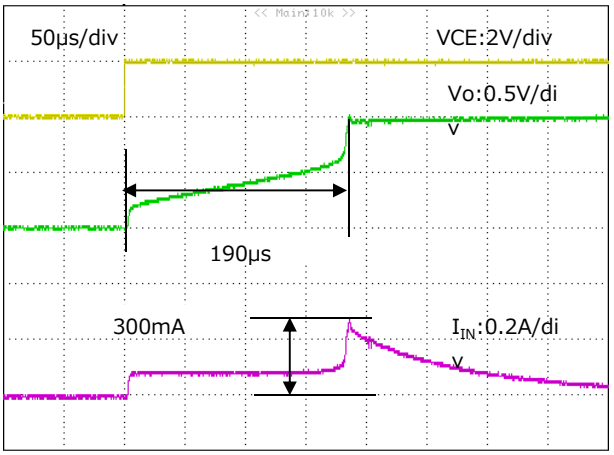


■ Output Rise & Rush Current

(V_{DD}=2V, V_{CE}=0→2V, Cin=1.0μF, Co=1000μF)

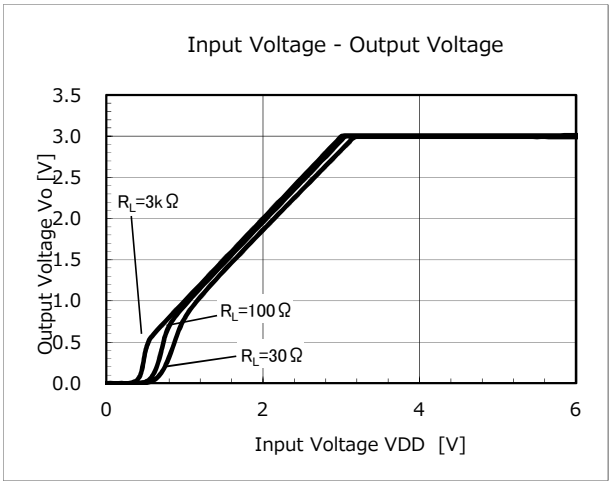


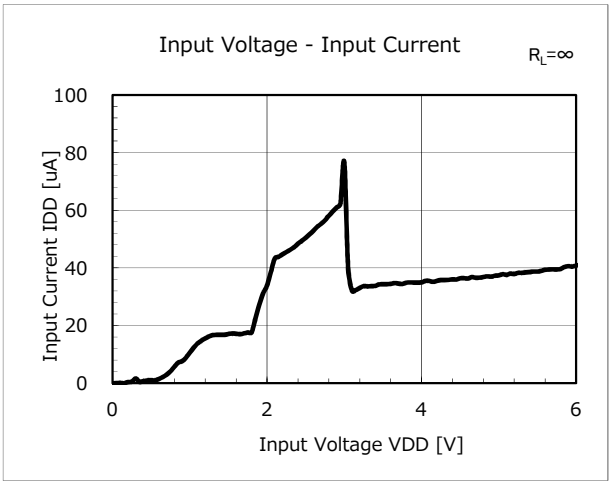
(V_{DD}=2V, V_{CE}=0→2V, Cin=1.0μF, Co=47μF)

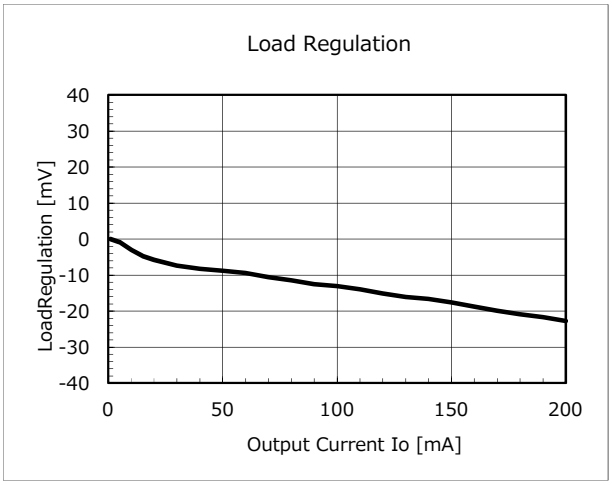


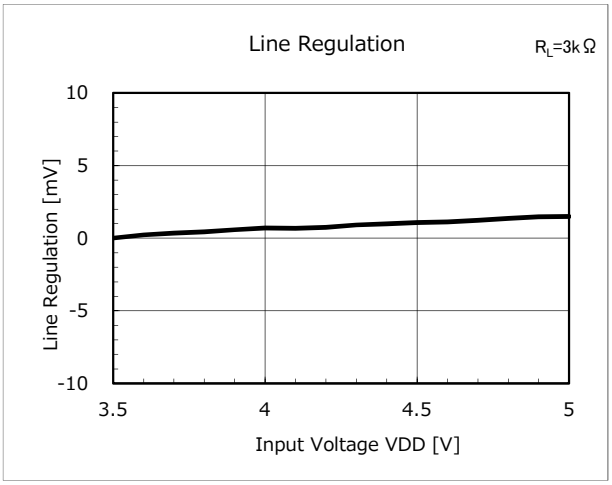
Typical Performance Characteristics (3.0V)

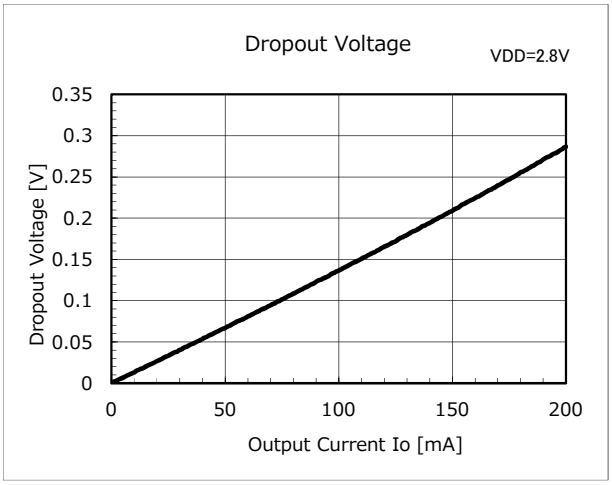
(V_{DD}=V_{OUT}(Typ.)+1V, V_{CE}=V_{DD}, Ta=25℃ unless otherwise specified)

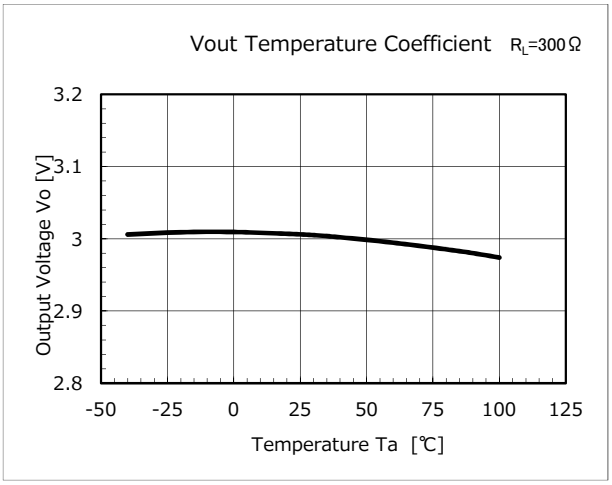








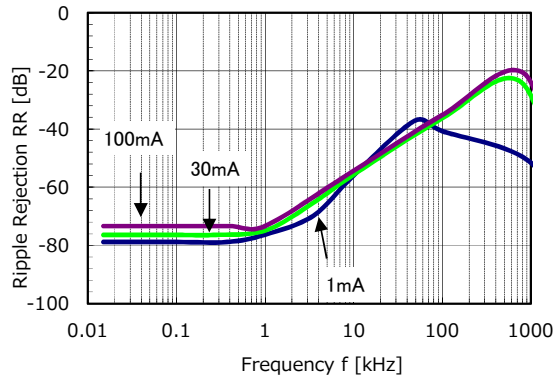




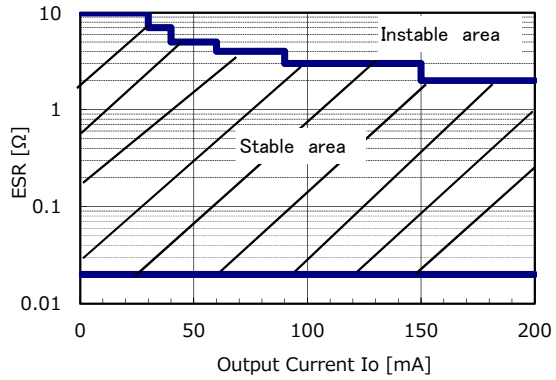
Typical Performance Characteristics (3.0V)

(V_{DD}=V_{OUT}(Typ.)+1V, V_{CE}=V_{DD}, Ta=25℃ unless otherwise specified)

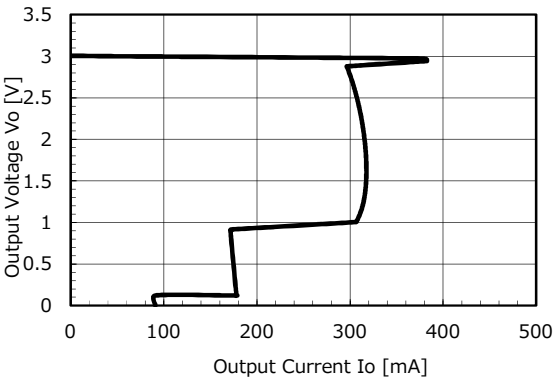
Ripple Rejection



ESR stability area



Current Limit



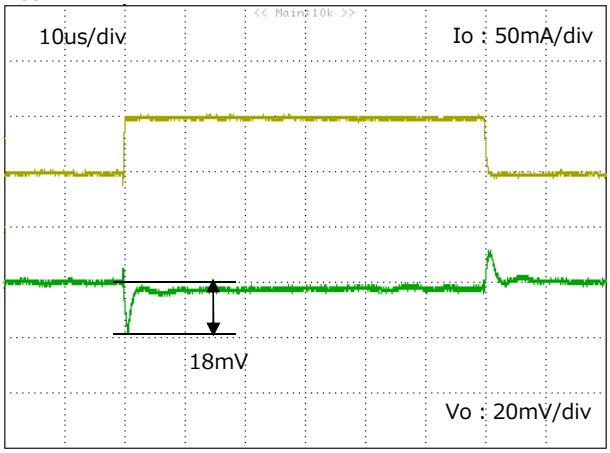
Typical Performance Characteristics (3.0V)

(V_{DD}=V_{OUT}(Typ.)+1V, V_{CE}=V_{DD}, Ta=25℃ unless otherwise specified)

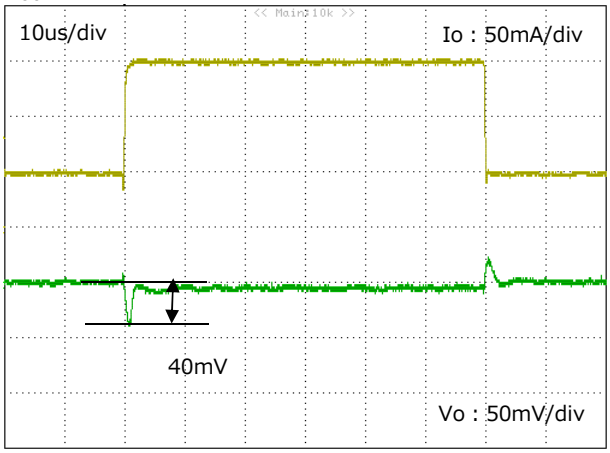
■ Load transient response

(V_{DD}=V_{OUT}+1V,V_{CE}=V_{DD}, Cin=1.0μF)

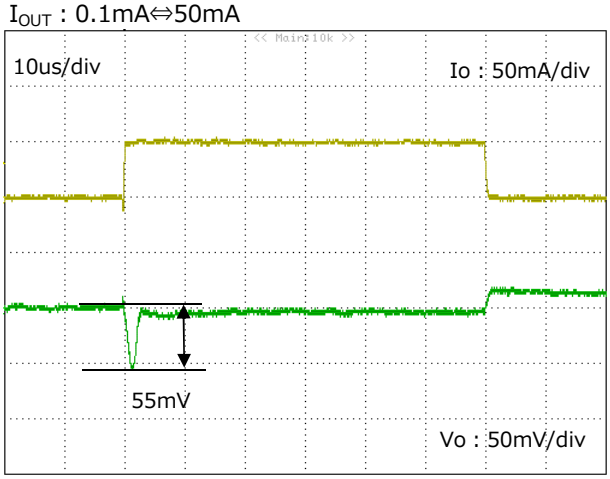
I_{OUT} : 50mA⇔100mA



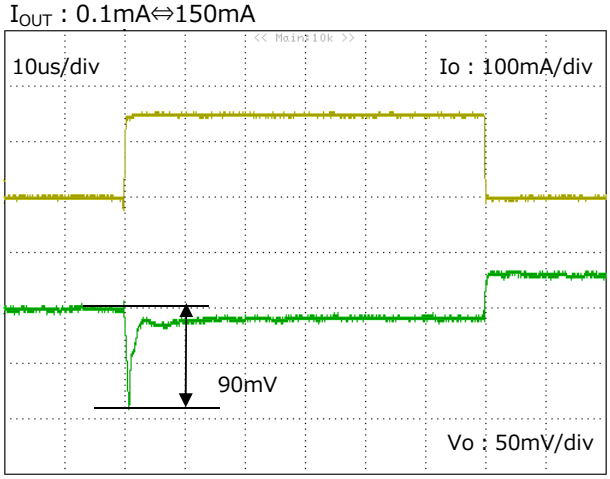
I_{OUT} : 50mA⇔150mA



I_{OUT} : 0.1mA⇔50mA

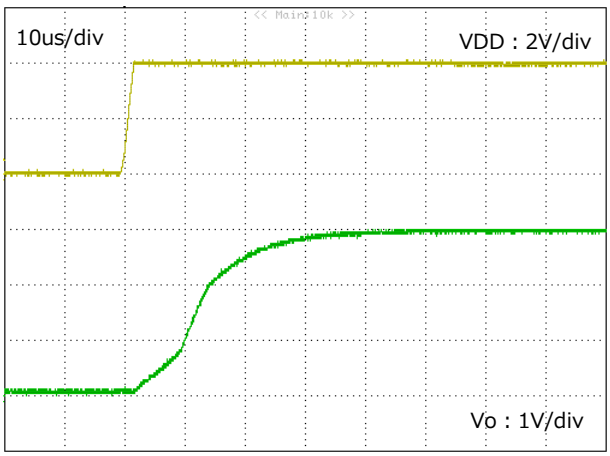


I_{OUT} : 0.1mA⇔150mA



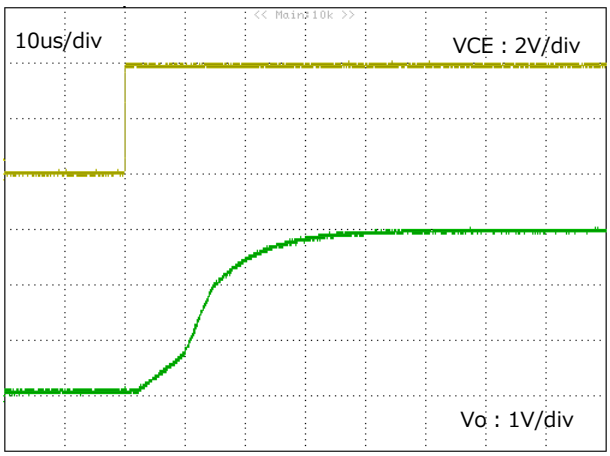
■ Input rise characteristics

(V_{DD}=0V→4V, V_{CE}=V_{DD}, I_{OUT}=50mA)



■ CE rise characteristics

(V_{DD}=4V, V_{CE}=0V→V_{DD}, I_{OUT}=50mA)

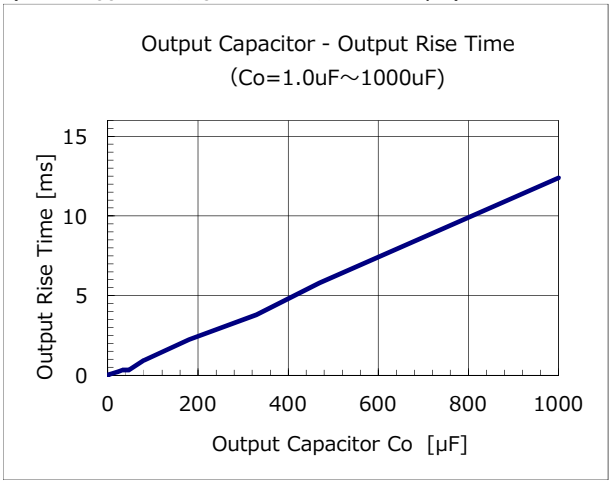


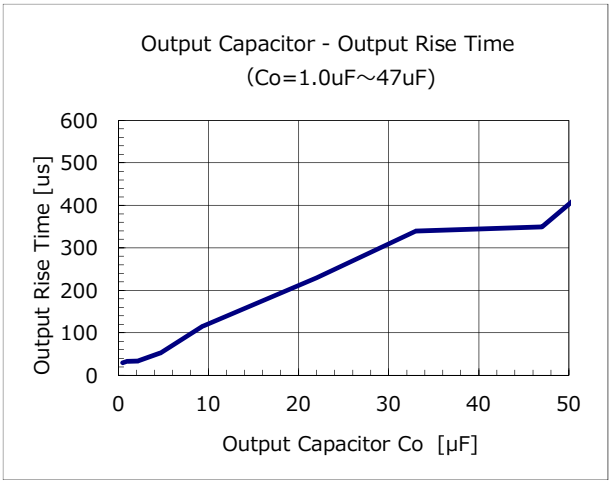
Typical Performance Characteristics (3.0V)

(V_{DD}=V_{OUT}(Typ.)+1V, V_{CE}=V_{DD}, Ta=25℃ unless otherwise specified)

■ Output Rise Time

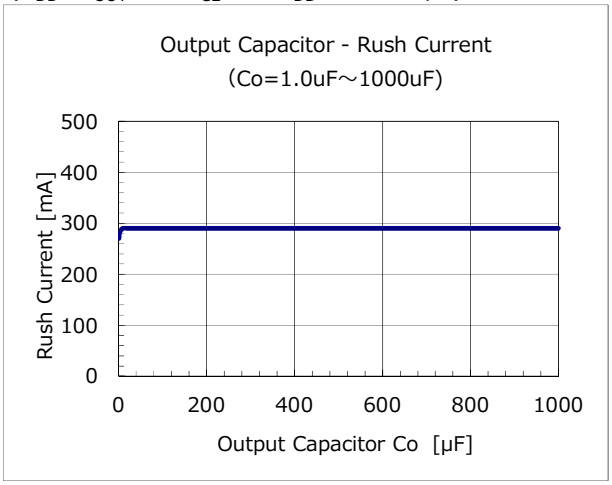
(V_{DD}=V_{OUT}+1V,V_{CE}=0→V_{DD}, Cin=1.0μF)

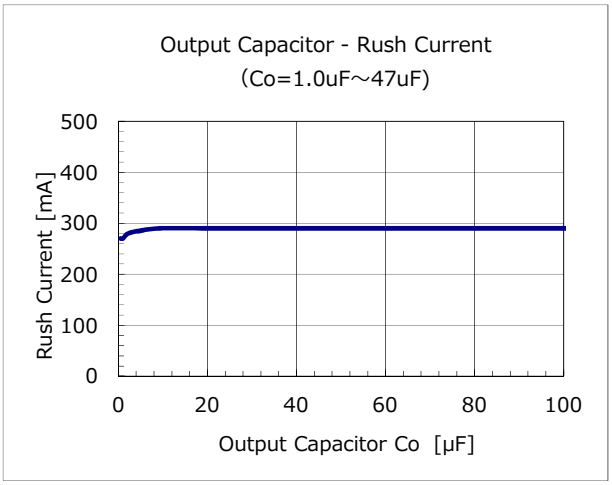




■ Rush Current

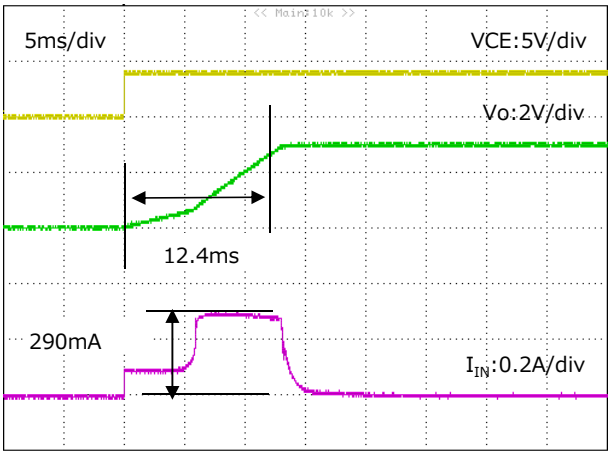
(V_{DD}=V_{OUT}+1V,V_{CE}=0→V_{DD}, Cin=1.0μF)



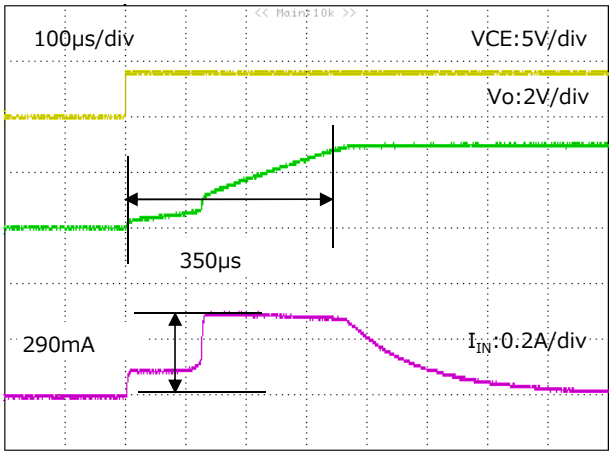


■ Output Rise & Rush Current

(V_{DD}=4V, V_{CE}=0→4V, Cin=1.0μF, Co=1000μF)



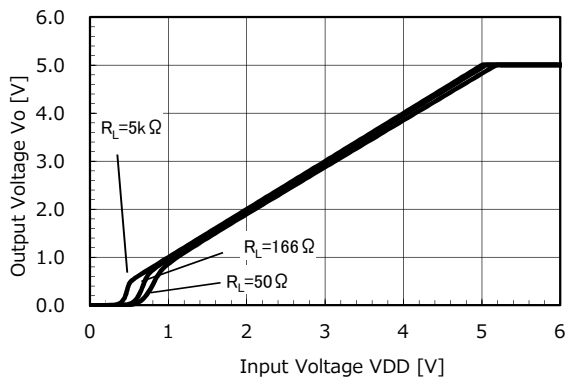
(V_{DD}=4V, V_{CE}=0→4V, Cin=1.0μF, Co=47μF)



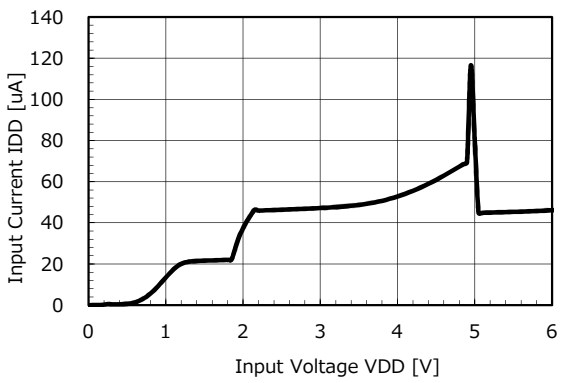
Typical Performance Characteristics (5.0V)

(V_{DD}=V_{OUT}(Typ.)+1V, V_{CE}=V_{DD}, Ta=25℃ unless otherwise specified)

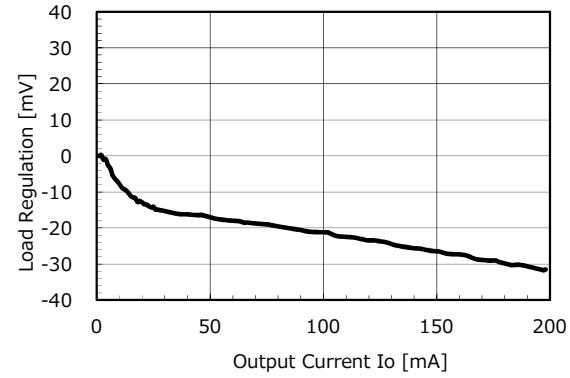
Input Voltage - Output Voltage



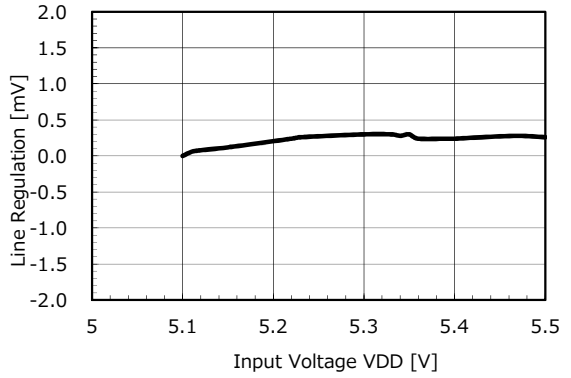
Input Voltage - Input Current R_L=∞



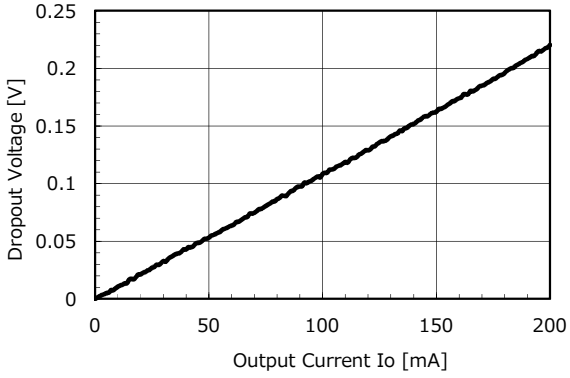
Load Regulation



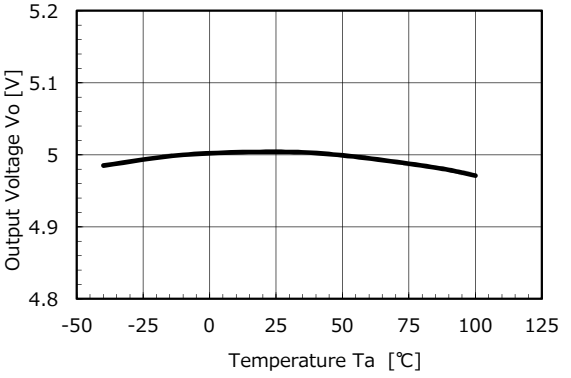
Line Regulation R_L=5kΩ



Dropout Voltage VDD=4.8V

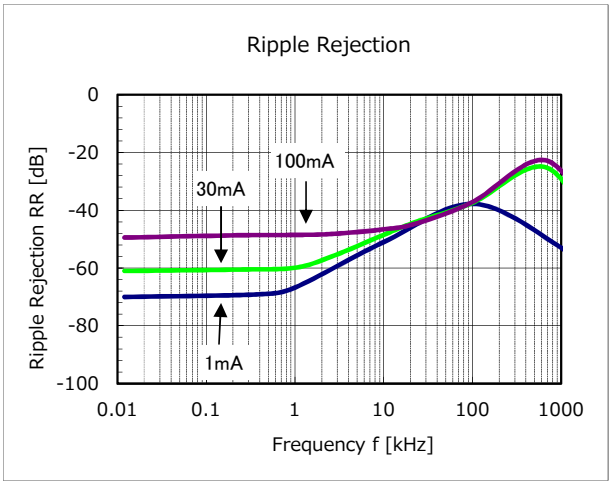


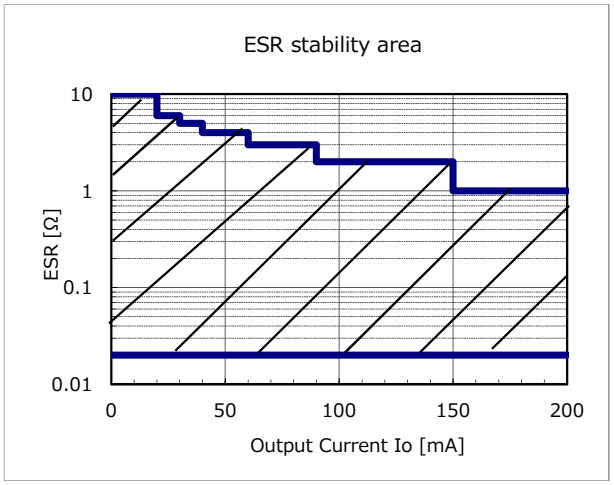
Vout Temperature Coefficient R_L=500Ω

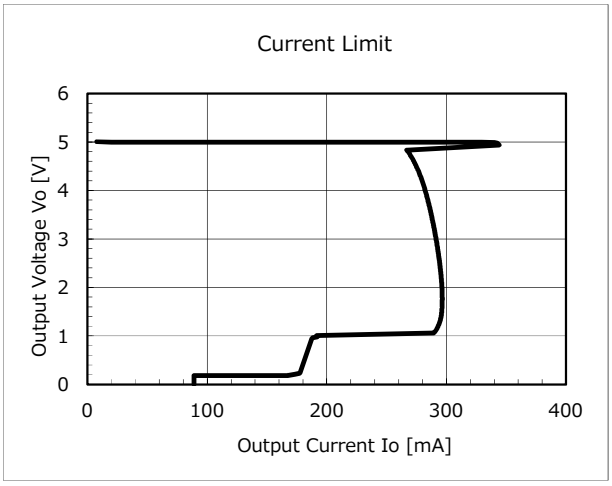


Typical Performance Characteristics (5.0V)

(V_{DD}=V_{OUT}(Typ.)+1V, V_{CE}=V_{DD}, Ta=25℃ unless otherwise specified)







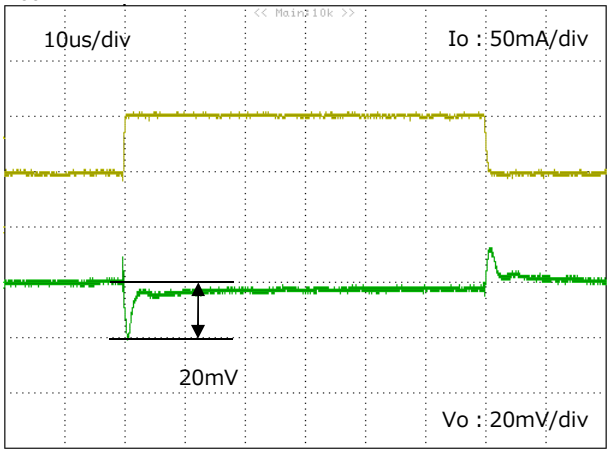
Typical Performance Characteristics (5.0V)

(V_{DD}=V_{OUT}(Typ.)+1V, V_{CE}=V_{DD}, Ta=25℃ unless otherwise specified)

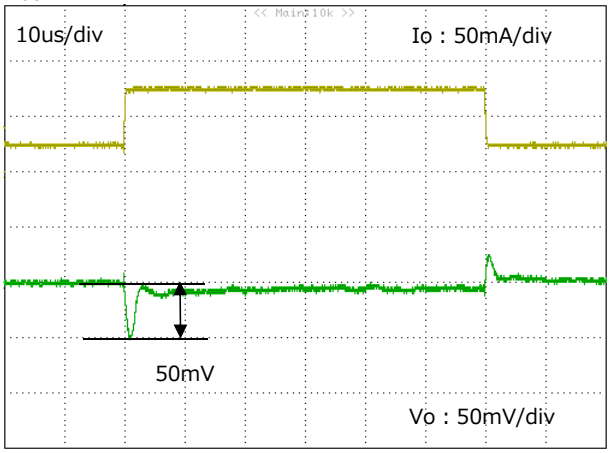
■ Load transient response

(V_{DD}=V_{OUT}+1V,V_{CE}=V_{DD}, Cin=1.0μF)

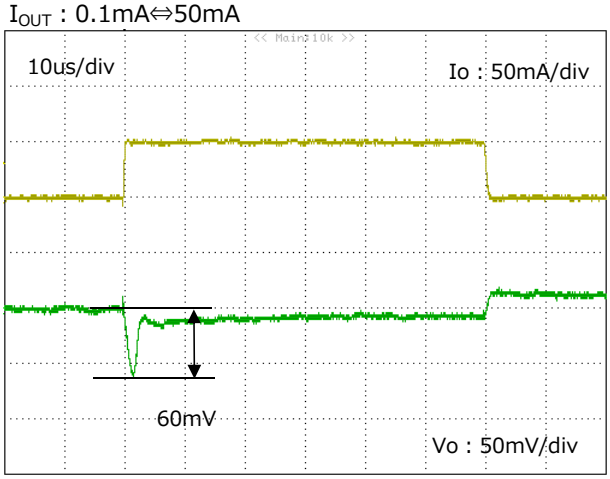
I_{OUT} : 50mA⇔100mA



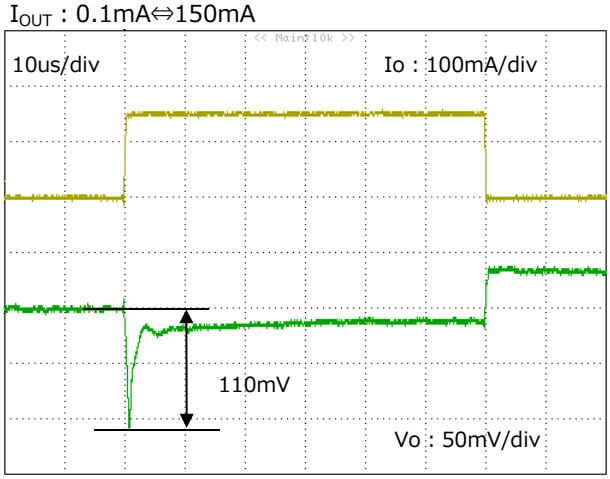
I_{OUT} : 50mA⇔150mA



I_{OUT} : 0.1mA⇔50mA

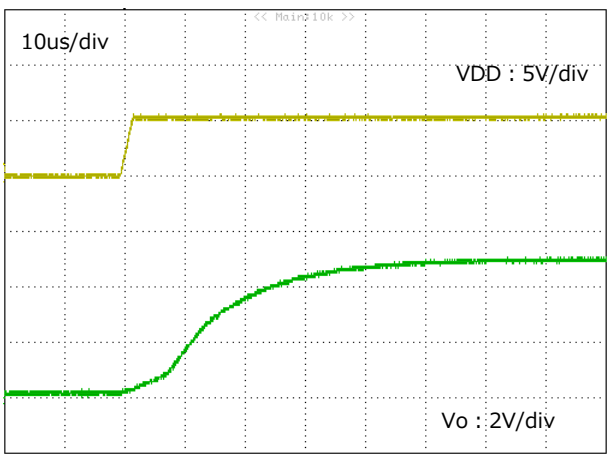


I_{OUT} : 0.1mA⇔150mA



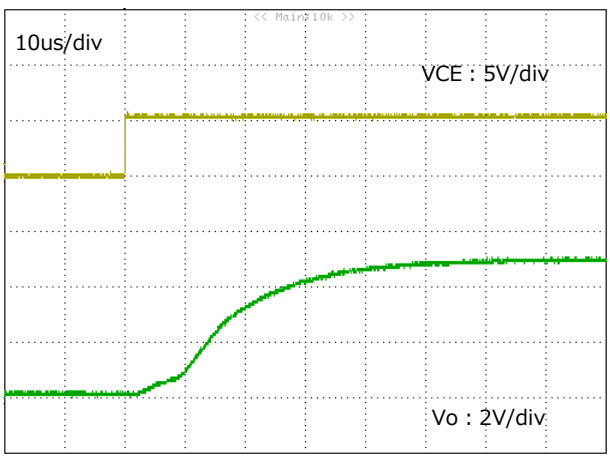
■ Input rise characteristics

(V_{DD}=0V→5.5V, V_{CE}=V_{DD}, I_{OUT}=50mA)



■ CE rise characteristics

(V_{DD}=5.5V, V_{CE}=0V→V_{DD}, I_{OUT}=50mA)

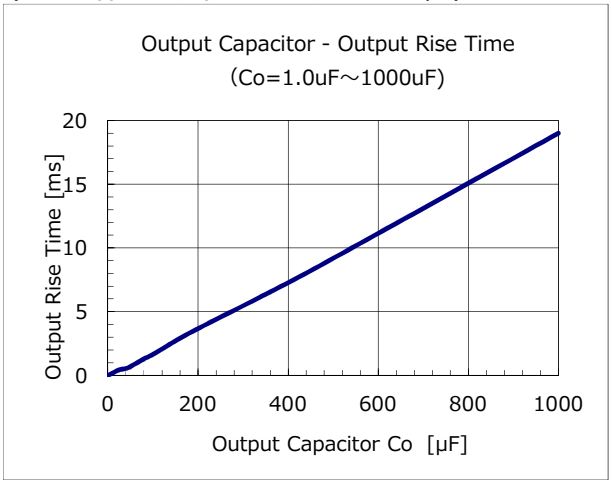


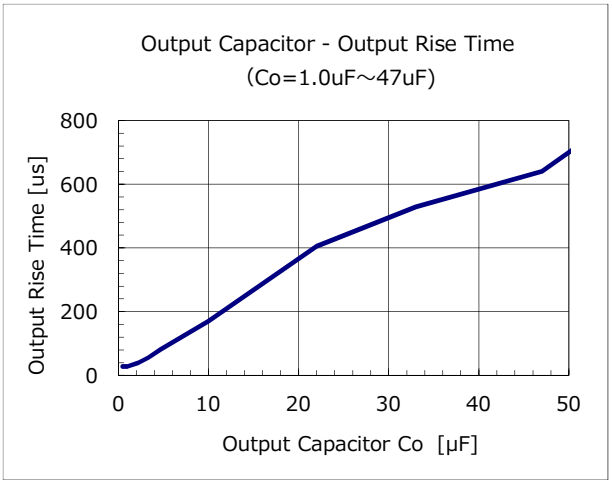
Typical Performance Characteristics (5.0V)

(V_{DD}=V_{OUT}(Typ.)+1V, V_{CE}=V_{DD}, Ta=25℃ unless otherwise specified)

■ Output Rise Time

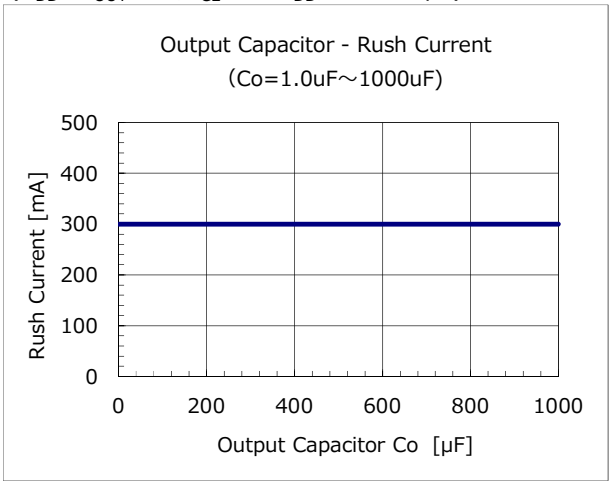
(V_{DD}=V_{OUT}+1V,V_{CE}=0→V_{DD}, Cin=1.0μF)

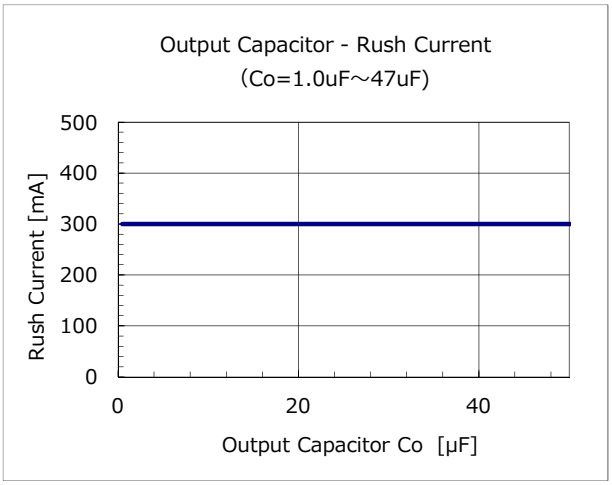




■ Rush Current

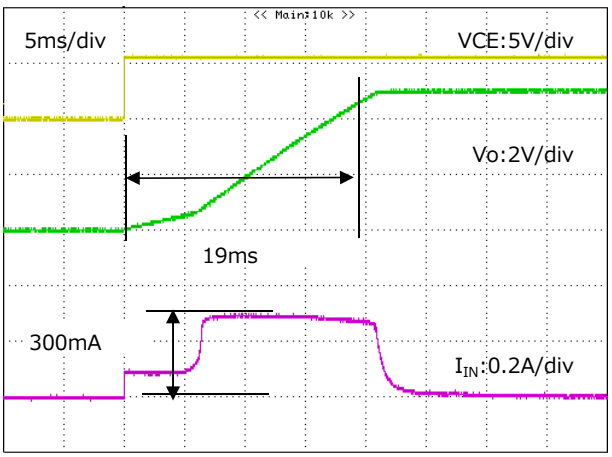
(V_{DD}=V_{OUT}+1V,V_{CE}=0→V_{DD}, Cin=1.0μF)





■ Output Rise & Rush Current

(V_{DD}=5.5V, V_{CE}=0→5.5V, Cin=1.0μF, Co=1000μF)



(V_{DD}=5.5V, V_{CE}=0→5.5V, Cin=1.0μF, Co=47μF)