LOW DROPOUT VOLTAGE REGULATOR

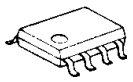
■ GENERAL DESCRIPTION

The NJM2883 is a low dropout voltage regulator in EMP8 package

Advanced Bipolar technology achieves low noise, high ripple rejection and low quiescent current.

It is suitable for portable applications.

■ PACKAGE OUTLINE

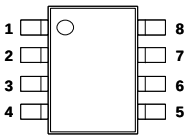


NJM2883E

■ FEATURES

- High Ripple Rejection 75dB typ. (f=1kHz,Vo=3V Version)
- Output Noise Voltage Vno=30μVrms typ.(Cp=0.01μF)
- Output capacitor with 1.0μF ceramic capacitor (Vo≥2.7V)
- Output Current Io(max.)=300mA
- High Precision Output Vo±1%
- Low Dropout Voltage 0.10V typ. (Io=100mA)
- ON/OFF Control (Active High)
- Operating Voltage Range +2.3V~+14V (Vo≤2.0V version)
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- Bipolar Technology
- Package Outline EMP8 (5.0×6.0×1.5mm)

■ PIN CONFIGURATION

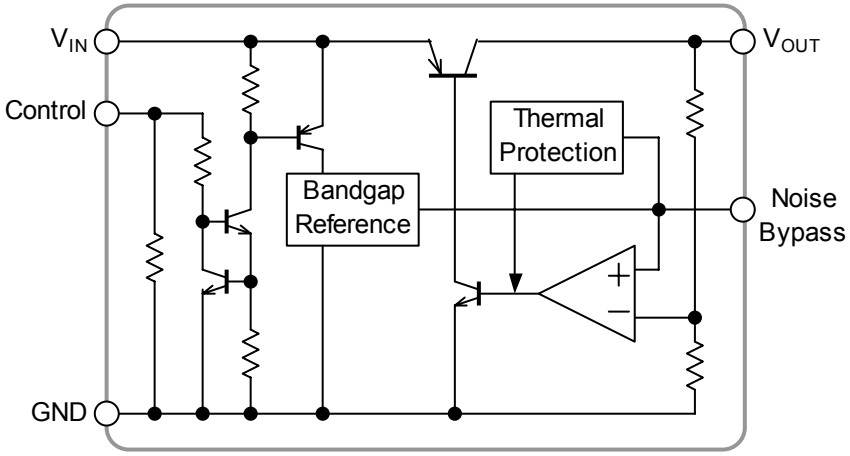


NJM2883E

PIN FUNCTION

1.V_{OUT}	5.CONTROL (Active High)
2.GND	6.GND
3.GND	7.GND
4.NOISE BYPASS	8.V_{IN}

■ EQUIVALENT CIRCUIT



■ OUTPUT VOLTAGE RANK LIST (* : Under development)

Device Name	V_{OUT}	Device Name	V_{OUT}
*NJM2883E15	1.5V	*NJM2883E31	3.1V
*NJM2883E17	1.7V	NJM2883E33	3.3V
NJM2883E18	1.8V	NJM2883E345	3.45V
*NJM2883E21	2.1V	*NJM2883E35	3.5V
NJM2883E25	2.5V	*NJM2883E38	3.8V
NJM2883E28	2.8V	*NJM2883E04	4.0V
*NJM2883E285	2.85V	*NJM2883E43	4.3V
NJM2883E29	2.9V	*NJM2883E47	4.7V
NJM2883E03	3.0V	NJM2883E05	5.0V

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	+14	V
Control Voltage	V_{CONT}	+14(*1)	V
Power Dissipation	P_D	650(*2)	mW
Operating Temperature	Topr	-40 ~ +85	°C
Storage Temperature	Tstg	-40 ~ +125	°C

(*1): When input voltage is less than +14V, the absolute maximum control voltage is equal to the input voltage.

(*2): Mounted on glass epoxy board based on EIA/JEDEC. (114.3x76.2x1.6mm: 2Layers)

■ Operating voltage

V_{IN}=+2.3V ~ +14.0V (In case of Vo<2.1V)

■ ELECTRICAL CHARACTERISTICS

(Vo>2.0V version : V_{IN}=Vo+1V, C_{IN}=0.1µF, Co=1.0µF: Vo≥2.7V (Co=2.2µF: Vo≤2.6V), Cp=0.01µF, Ta=25°C)

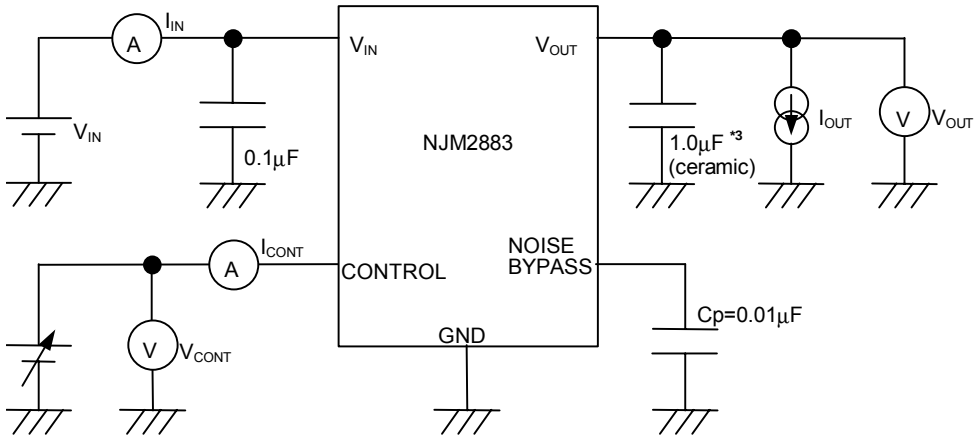
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Io=30mA	-1.0%	–	+1.0%	V
Quiescent Current	I_Q	Io=0mA, expect Icont	–	120	180	µA
Quiescent Current at Control OFF	$I_{Q(OFF)}$	V_{CONT}=0V	–	–	100	nA
Output Current	Io	Vo - 0.3V	300	400	-	mA
Line Regulation	$\Delta Vo/\Delta V_{IN}$	V_{IN}=Vo+1V~Vo+6V, Io=30mA	–	–	0.10	%/V
Load Regulation	$\Delta Vo/\Delta Io$	Io=0~300mA	–	–	0.03	%/mA
Dropout Voltage	ΔV_{I-O}	Io=100mA	–	0.10	0.18	V
Ripple Rejection	RR	ein=200mVrms,f=1kHz, Io=10mA, Vo=3V Version	–	75	–	dB
Average Temperature Coefficient of Output Voltage	$\Delta Vo/\Delta Ta$	Ta=0~+85°C, Io=10mA	–	±50	–	ppm/°C
Output Noise Voltage	V_{NO}	f=10Hz~80kHz, Io=10mA, Vo=3V Version	–	30	–	µVrms
Control Voltage for ON-state	$V_{CONT(ON)}$		1.6	–	–	V
Control Voltage for OFF-state	$V_{CONT(OFF)}$		–	–	0.6	V

(Vo≤2.0V version: V_{IN}=Vo+1V, C_{IN}=0.1µF, Co=2.2µF: Vo≥1.9V (Co=4.7µF: Vo≤1.8V), Cp=0.01µF, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Io=30mA	-1.0%	–	+1.0%	V
Quiescent Current	I_Q	Io=0mA, expect Icont	–	120	180	µA
Quiescent Current at Control OFF	$I_{Q(OFF)}$	V_{CONT}=0V	–	–	100	nA
Output Current	Io	Vo - 0.3V	300	400	-	mA
Line Regulation	$\Delta Vo/\Delta V_{IN}$	V_{IN}=Vo+1V~Vo+6V, Io=30mA	–	–	0.10	%/V
Load Regulation	$\Delta Vo/\Delta Io$	Io=0~300mA	–	–	0.03	%/mA
Ripple Rejection	RR	ein=200mVrms, f=1kHz, Io=10mA, Vo=1.8V Version	–	80	–	dB
Average Temperature Coefficient of Output Voltage	$\Delta Vo/\Delta Ta$	Ta=0~85°C, Io=10mA	–	±50	–	ppm/°C
Output Noise Voltage	V_{NO}	f=10Hz~80kHz, Io=10mA, Vo=1.8V Version	–	20	–	µVrms
Control Voltage for ON-state	$V_{CONT(ON)}$		1.6	–	–	V
Control Voltage for OFF-state	$V_{CONT(OFF)}$		–	–	0.6	V

The above specification is a common specification for all output voltages.
Therefore, it may be different from the individual specification for a specific output voltage.

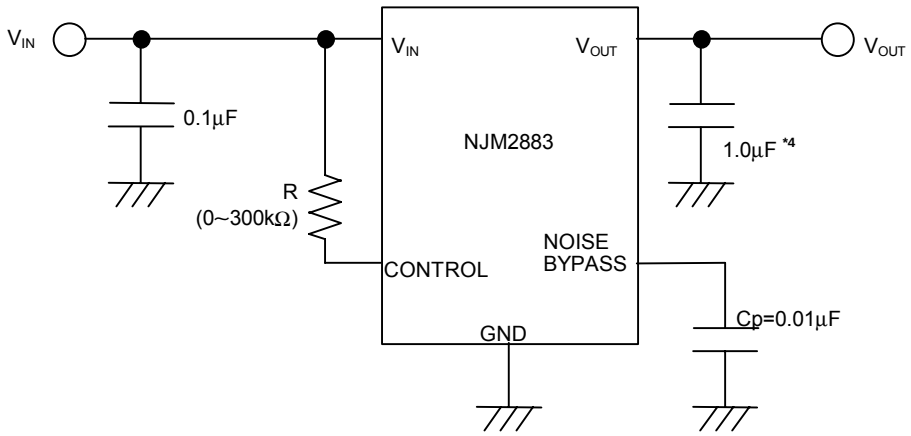
■ TEST CIRCUIT



*3 1.9V ≤ Vo ≤ 2.6V version: Co=2.2µF(ceramic)
Vo ≤ 1.8V version: Co=4.7µF(ceramic)

■ TYPICAL APPLICATION

① In case that ON/OFF Control is not required:

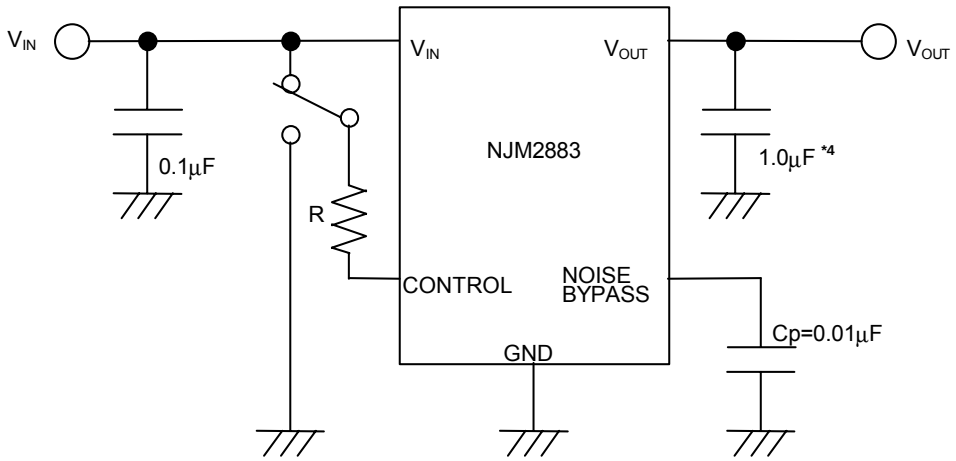


*4 1.9V ≤ Vo ≤ 2.6V version: Co=2.2μF
Vo ≤ 1.8V version: Co=4.7μF

Connect control terminal to V_{IN} terminal

The quiescent current can be reduced by using a resistance "R". Instead, it increases the minimum operating voltage. For further information, please refer to Figure "Output Voltage vs. Control Voltage".

② In use of ON/OFF CONTROL:



*4 1.9V ≤ Vo ≤ 2.6V version : Co=2.2uF
Vo ≤ 1.8V version : Co=4.7uF

State of control terminal:

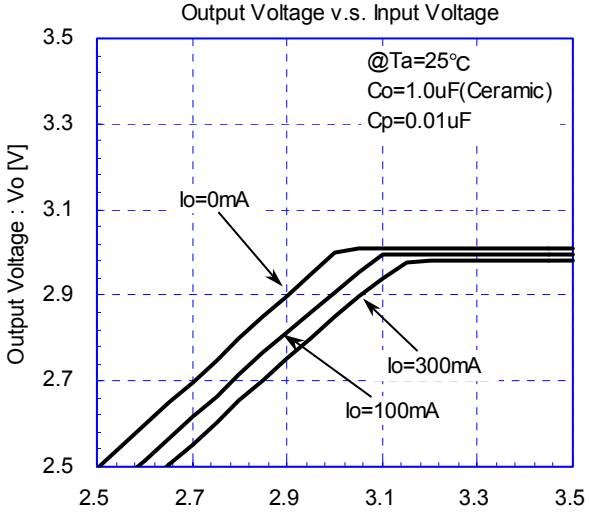
- "H"→ output is enabled.
- "L" or "open" → output is disabled.

∗Noise bypass Capacitance Cp

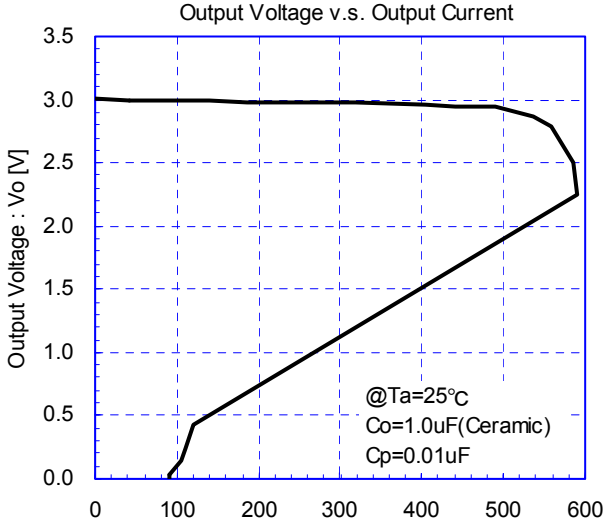
Noise bypass capacitance Cp reduces noise generated by band-gap reference circuit.
Noise level and ripple rejection will be improved when larger Cp is used.
Use of smaller Cp value may cause oscillation.
Use the Cp value of 0.01uF greater to avoid the problem.

■ ELECTRICAL CARACTERISTICS

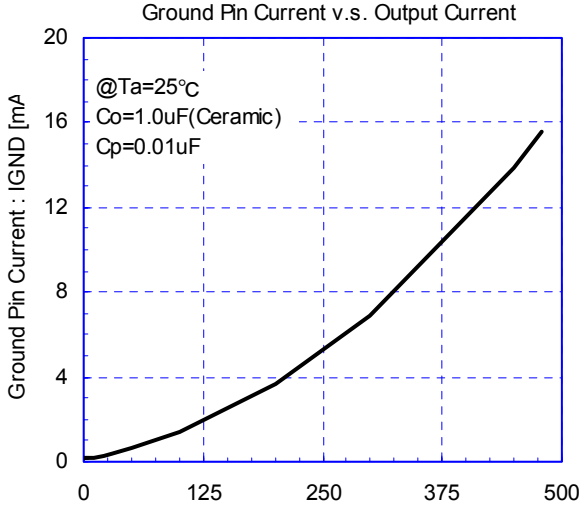
NJM2883_3.0V
Output Voltage v.s. Input Voltage



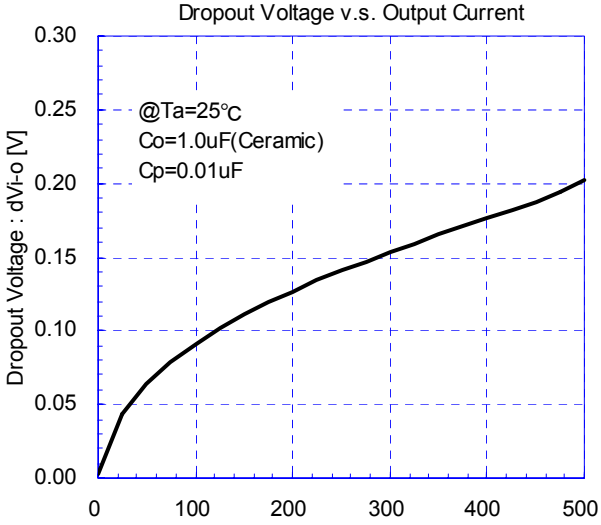
NJM2883_3.0V
Output Voltage v.s. Output Current



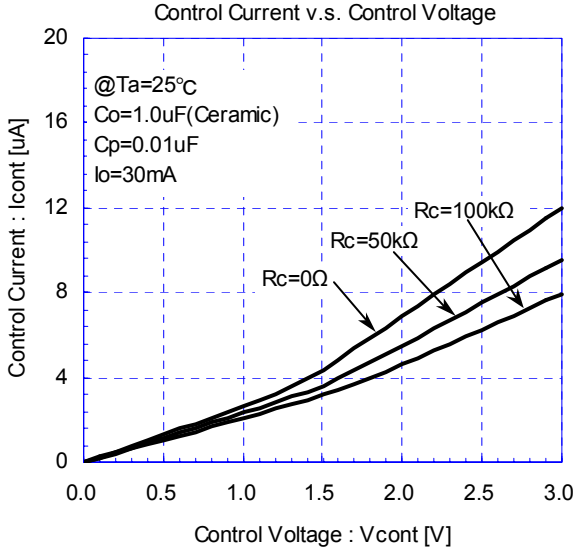
NJM2883_3.0V
Ground Pin Current v.s. Output Current



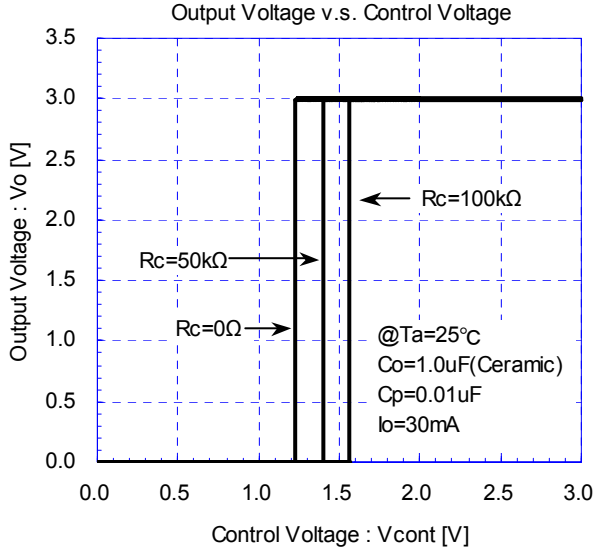
NJM2883_3.0V
Dropout Voltage v.s. Output Current



NJM2883_3.0V
Control Current v.s. Control Voltage

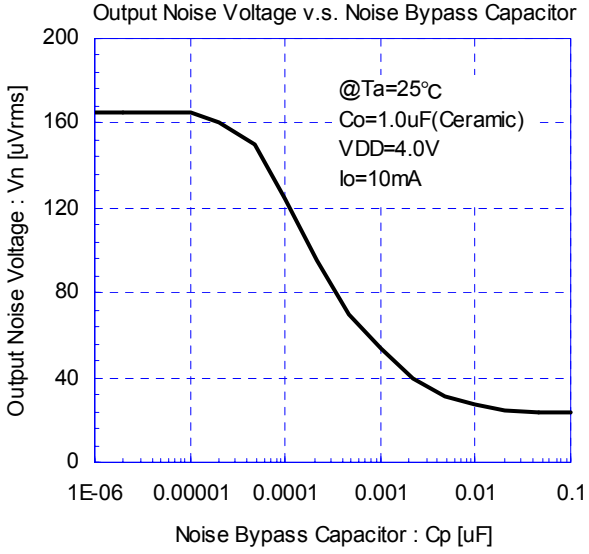


NJM2883_3.0V
Output Voltage v.s. Control Voltage

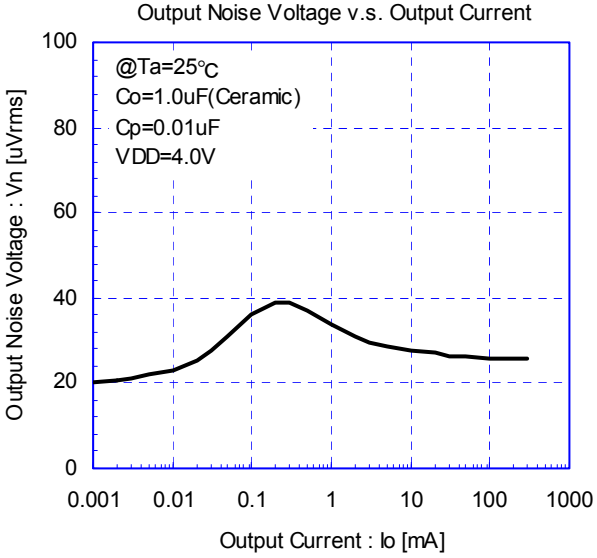


■ ELECTRICAL CARACTERISTICS

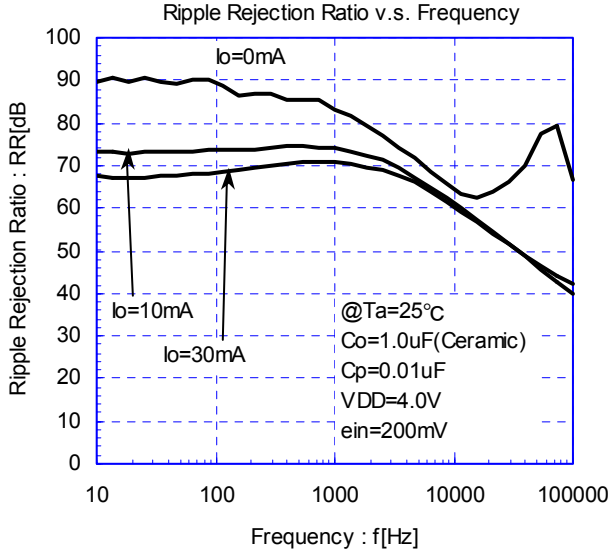
NJM2883_3.0V
Output Noise Voltage v.s. Noise Bypass Capacitor



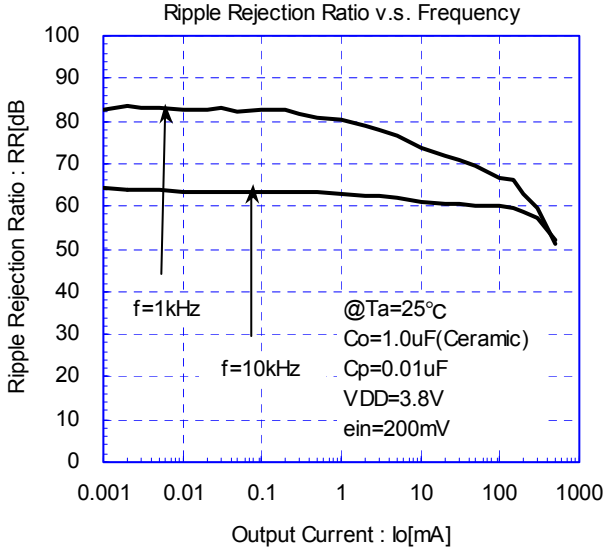
NJM2883_3.0V
Output Noise Voltage v.s. Output Current



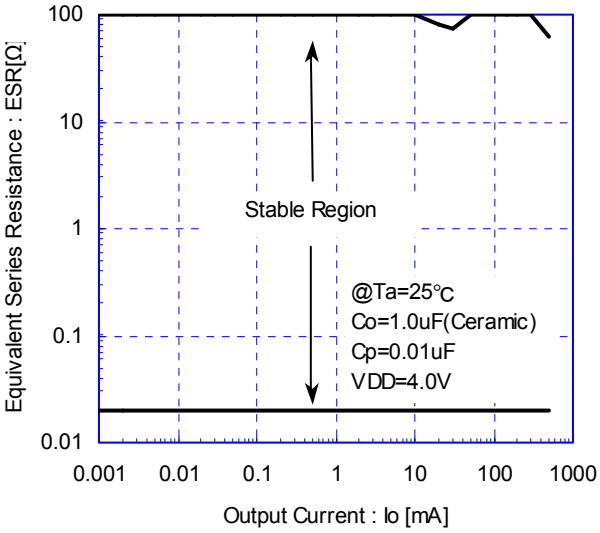
Ripple Rejection Ratio v.s. Frequency



Ripple Rejection Ratio v.s. Frequency



NJM2883_3.0V
Equivalent Series Resistance v.s. Output Current



■ ELECTRICAL CARACTERISTICS