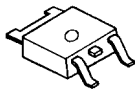
LOW DROPOUT VOLTAGE REGULATOR

■ GENERAL DESCRIPTION

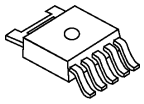
The NJM2845 is low dropout voltage regulator. Advanced Bipolar technology achieves low noise, high ripple rejection and low quiescent current.

NJM2845 is 3 terminal type and NJM2846 is ON/OFF control built in type. These product can be selected according to the applications.

■ PACKAGE OUTLINE



NJM2845DL1

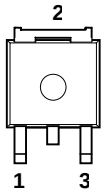


NJM2846DL3

■ FEATURES

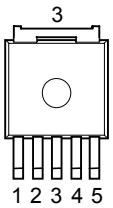
- ● High Ripple Rejection 75dB typ. (f=1kHz,3V Version)
- ● Output Noise Voltage Vno=45μVrms typ. (Vo=3V Version)
- ● Output capacitor with 2.2μF ceramic capacitor (Vo≥2.6V)
- ● Output Current Io(max.)=800mA
- ● High Precision Output Vo ±1.0%
- ● Low Dropout Voltage 0.18V typ. (Io=500mA)
- ● ON/OFF Control (NJM2846)
- ● Internal Short Circuit Current Limit
- ● Internal Thermal Overload Protection
- ● Bipolar Technology
- ● Package Outline TO-252-3 (NJM2845DL1), TO-252-5 (NJM2846DL3)

■ PIN CONFIGURATION



1.V_{IN}
2.GND
3.V_{OUT}

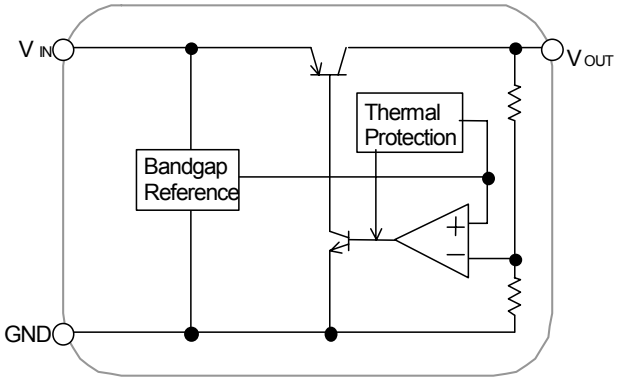
NJM2845DL1



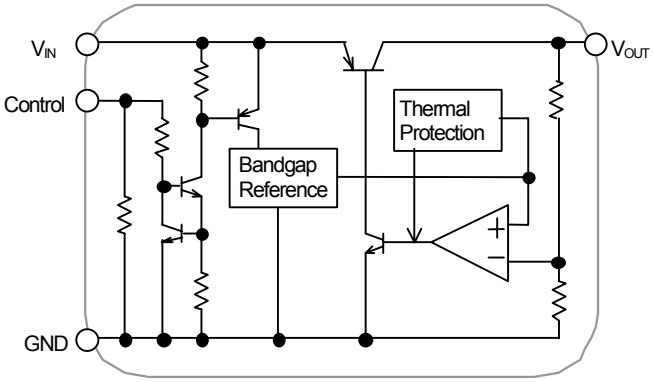
1.CONTROL
2.V_{IN}
3.GND
4.Vo
5.NC

NJM2846DL3

■ EQUIVALENT CIRCUIT



NJM2845DL1



NJM2846DL3

■ OUTPUT VOLTAGE RANK LIST

Device Name	V_{OUT}
NJM284*DL*-18	1.8V
NJM284*DL*-23	2.3V
NJM284*DL*-25	2.5V
NJM284*DL*-03	3.0V
NJM284*DL*-33	3.3V
NJM284*DL*-05	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	10(Tc≤25°C) 1.0(Ta≤25°C)	W
Operating Temperature	Topr	-40 ~ +85	°C
Storage Temperature	Tstg	-40 ~ +150	°C

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

■ Operating voltage

V_{IN}=+2.5V(In case of Vo<2.3V) ~ +(Vo+10V)

■ NJM2845

■ ELECTRICAL CHARACTERISTICS (V_{IN}=Vo+1V, C_{IN}=0.33µF, Co=2.2µF(Vo≤2.6V: Co=4.7µF), Ta=25°C)

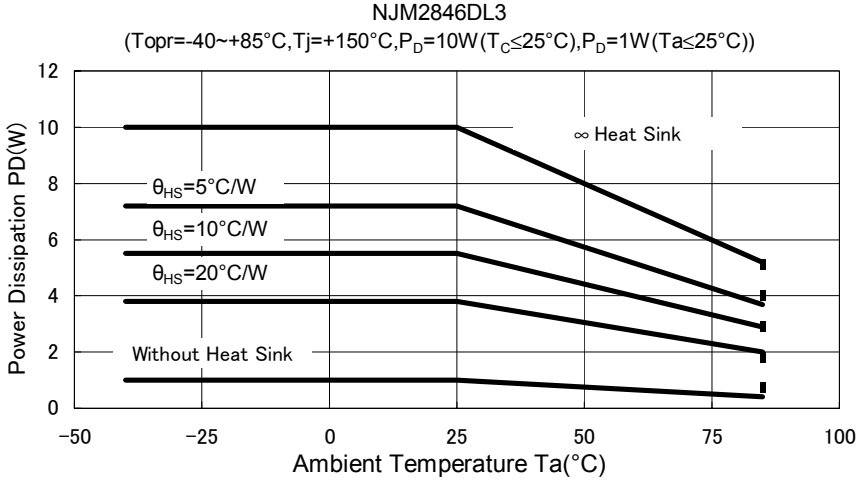
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Io=30mA	-1.0%	-	+1.0%	V
Quiescent Current	I_Q	Io=0mA	-	400	600	µA
Output Current	Io	Vo - 0.3V	800	1050	-	mA
Line Regulation	$\Delta Vo/\Delta V_{IN}$	V_{IN}=Vo+1V ~ Vo+6V, Io=30mA	-	-	0.10	%/V
Load Regulation	$\Delta Vo/\Delta Io$	Io=0 ~ 800mA	-	-	0.004	%/mA
Dropout Voltage(*2)	ΔV_{I-O}	Io=500mA	-	0.18	0.28	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	-	45	-	µVrms

(*2): The output voltage excludes under 2.3V.

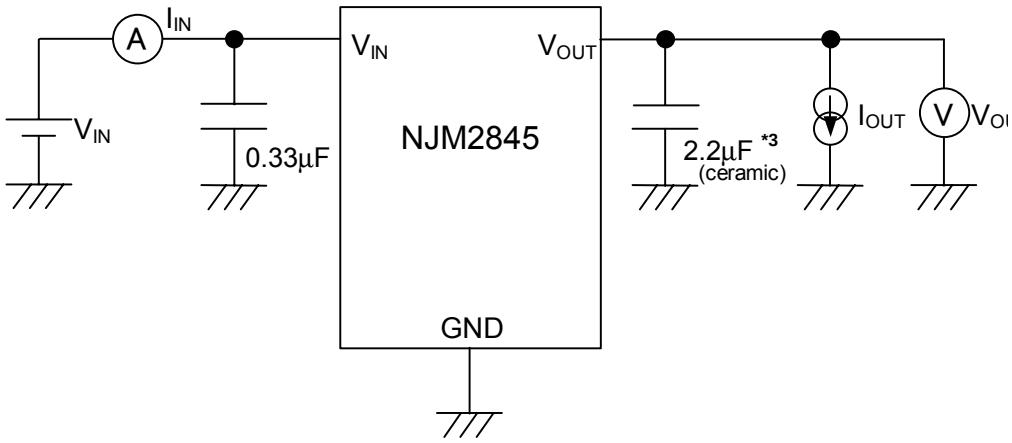
The above specification is a common specification for all output voltages.

Therefore, it may be different from the individual specification for a specific output voltage.

■ POWER DISSIPATION vs. AMBIENT TEMPERATURE

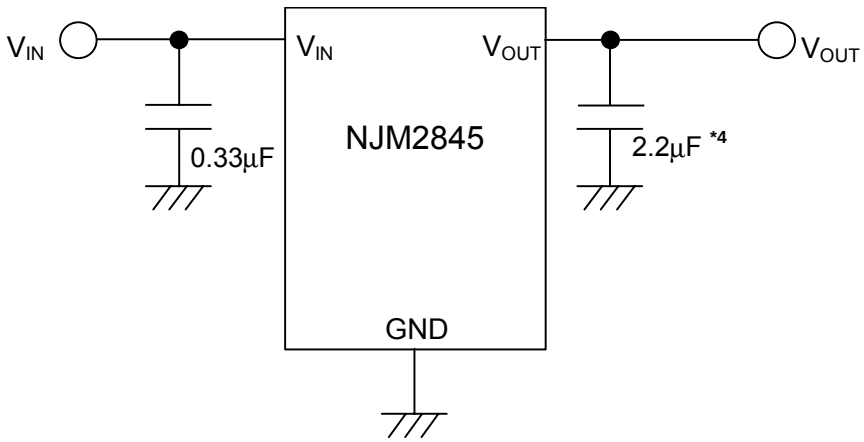


■ TEST CIRCUIT



*3 Vo≤2.6V version: Co=4.7μF(ceramic)

■ TYPICAL APPLICATION



*4 Vo≤2.6V version: Co=4.7μF

■ NJM2846

■ ELECTRICAL CHARACTERISTICS (V_{IN}=Vo+1V, C_{IN}=0.33μF, Co=2.2μF(Vo≤2.6V: Co=4.7μF), Ta=25°C)

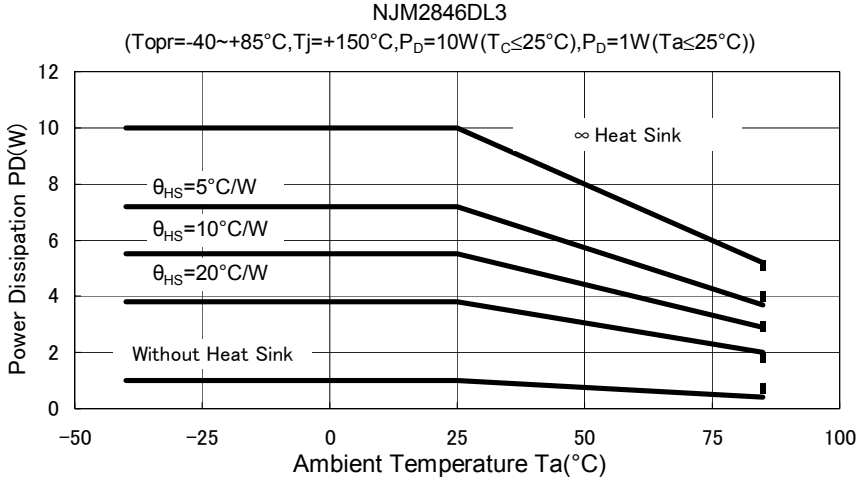
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Io=30mA	-1.0%	-	+1.0%	V
Quiescent Current	I_Q	Io=0mA	-	400	600	μA
Quiescent Current at Control OFF	$I_{Q\,(OFF)}$	V_{CONT}=0V	-	-	100	nA
Line Regulation	Io	Vo - 0.3V	800	1050	-	mA
Line Regulation	$\Delta Vo/\Delta V_{IN}$	V_{IN}=Vo+1V ~ Vo+6V, Io=30mA	-	-	0.10	%/V
Load Regulation	$\Delta Vo/\Delta Io$	Io=0 ~ 800mA	-	-	0.004	%/mA
Dropout Voltage(*5)	ΔV_{I-O}	Io=500mA	-	0.18	0.28	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	-	45	-	μVrms
Control Current	I_{CONT}	V_{CONT}=1.6V, Io=0mA	-	3	12	μA
Control Voltage for ON-state	$V_{CONT(ON)}$		1.6	-	-	V
Control Voltage for OFF-state	$V_{CONT(OFF)}$		-	-	0.6	V

(*5): The output voltage excludes under 2.3V.

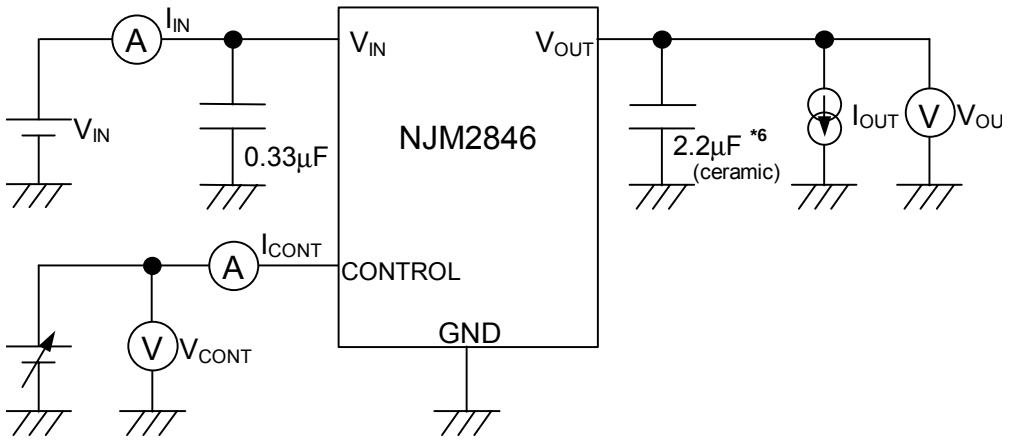
The above specification is a common specification for all output voltages.

Therefore, it may be different from the individual specification for a specific output voltage.

■ POWER DISSIPATION vs. AMBIENT TEMPERATURE



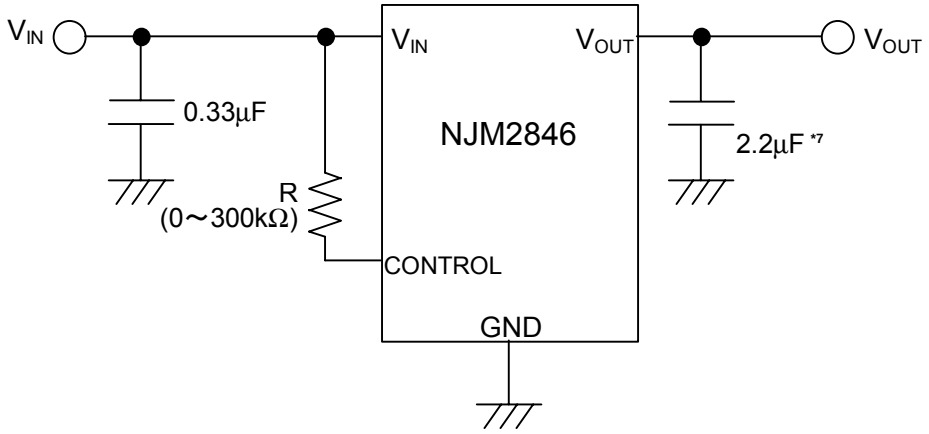
■ TEST CIRCUIT



*6 Vo≤2.6V version: Co=4.7μF(ceramic)

■ TYPICAL APPLICATION

① In the case where ON/OFF Control is not required:

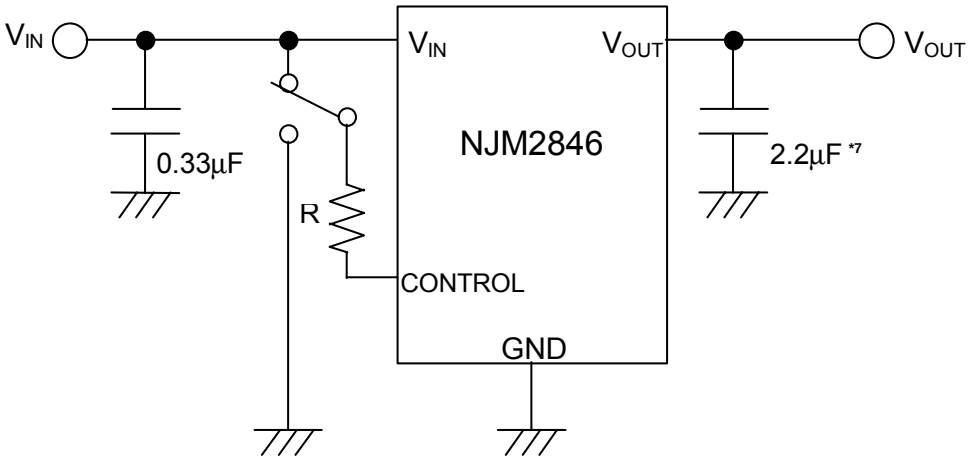


*7 Vo≤2.6V version: Co=4.7μF

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:

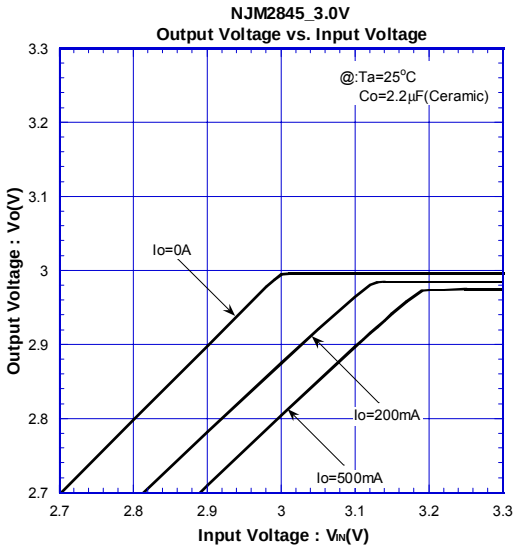


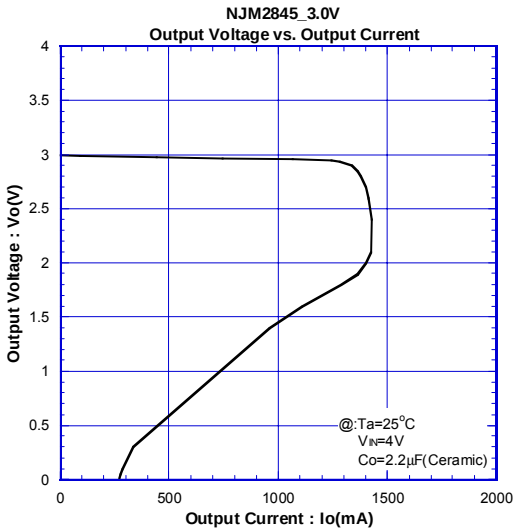
*7 Vo≤2.6V version: Co=4.7μF

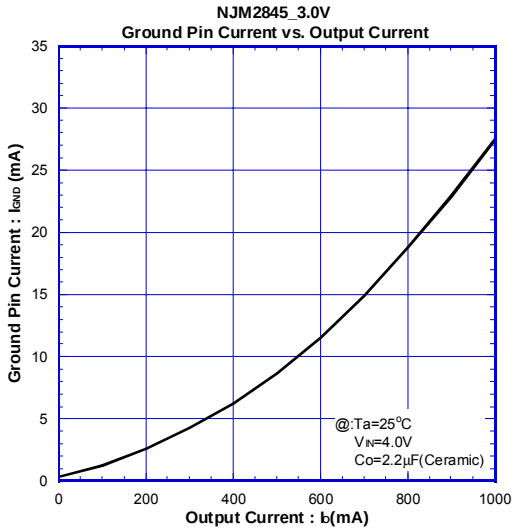
State of control terminal:

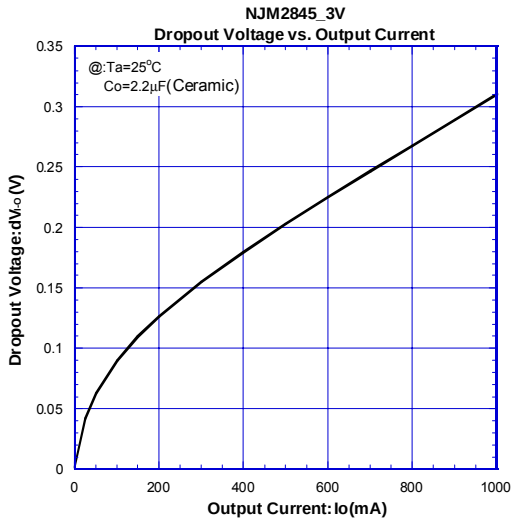
- "H"→ output is enabled.
- "L" or "open" → output is disabled.

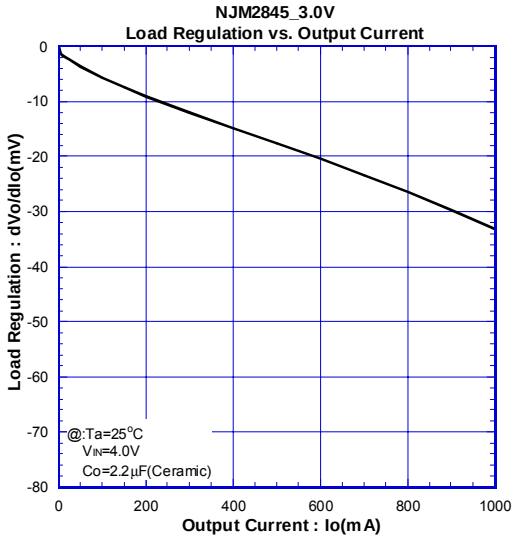
■ TYPICAL CHARACTERISTICS (NJM2845)

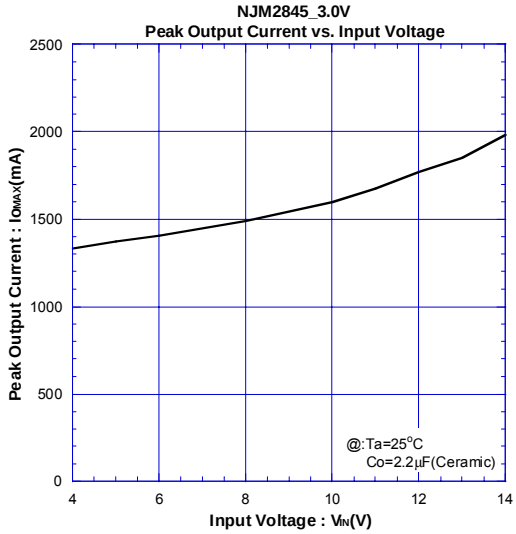






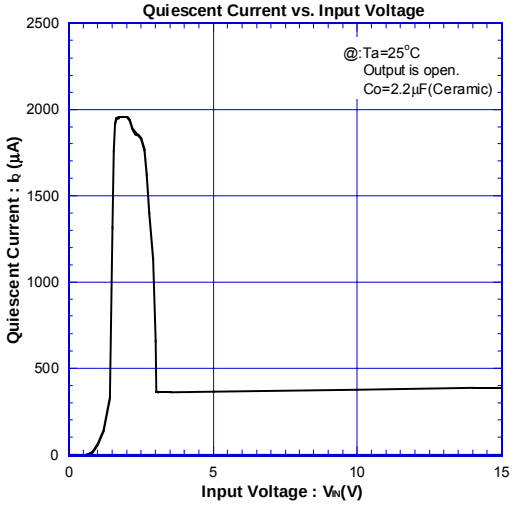




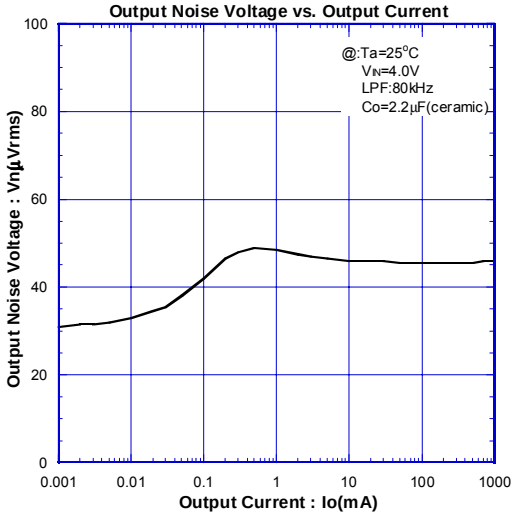


■ TYPICAL CHARACTERISTICS (NJM2845)

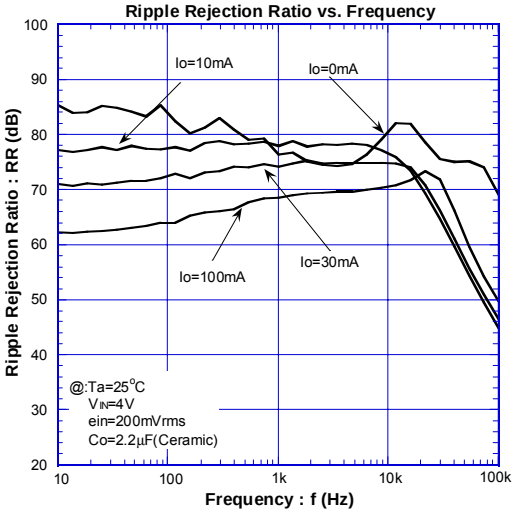
NJM2845_3.0V
Quiescent Current vs. Input Voltage



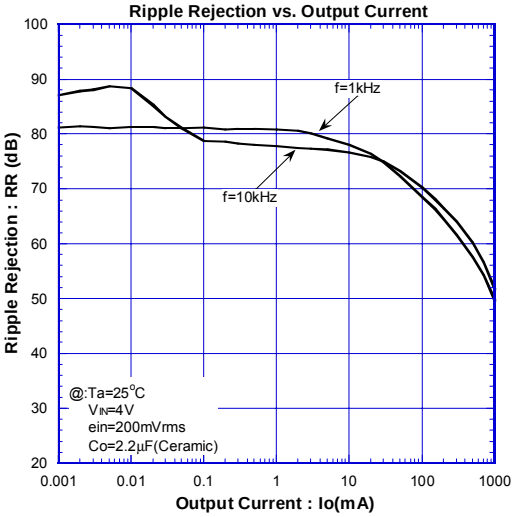
NJM2845_3.0V
Output Noise Voltage vs. Output Current



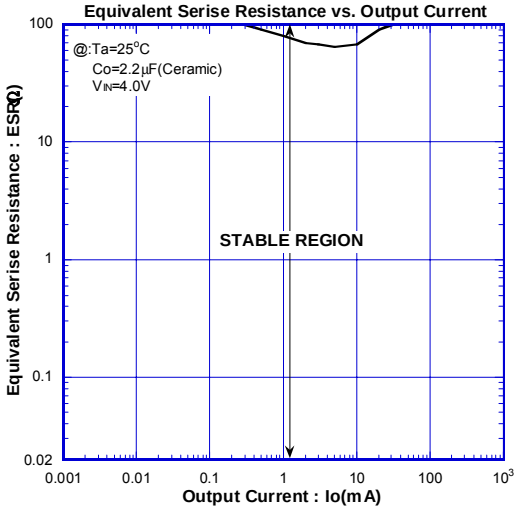
NJM2845_3.0V
Ripple Rejection Ratio vs. Frequency



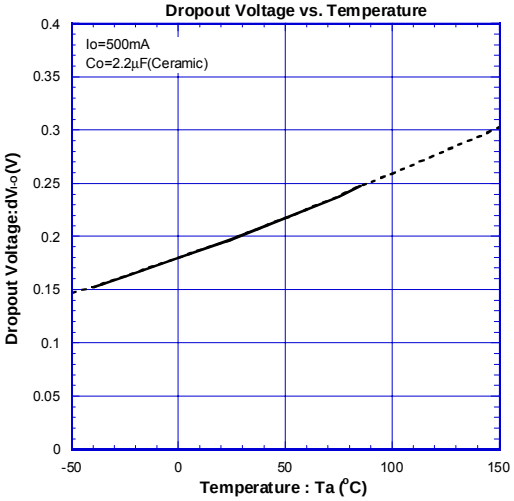
NJM2845_3V
Ripple Rejection vs. Output Current



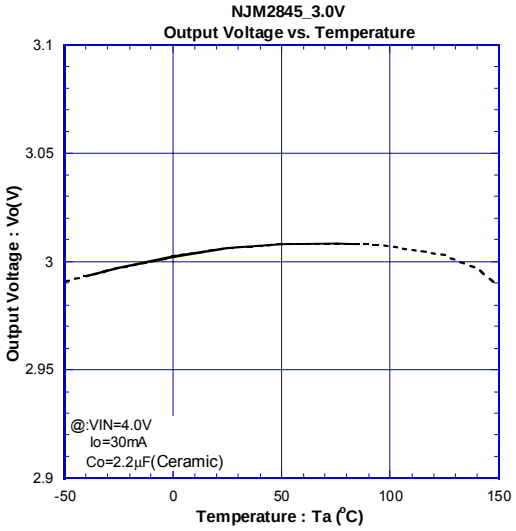
NJM2845_3.0V
Equivalent Serise Resistance vs. Output Current

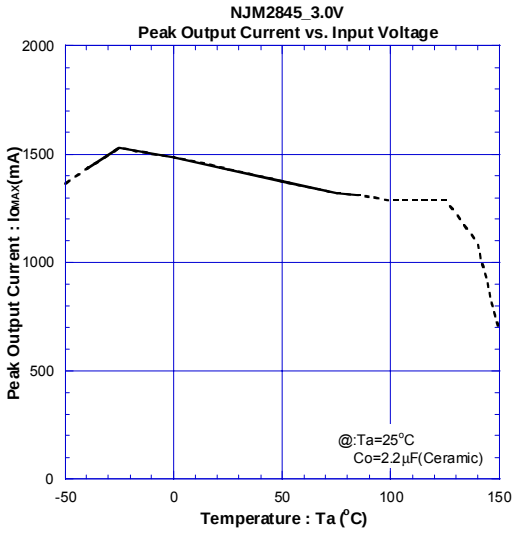


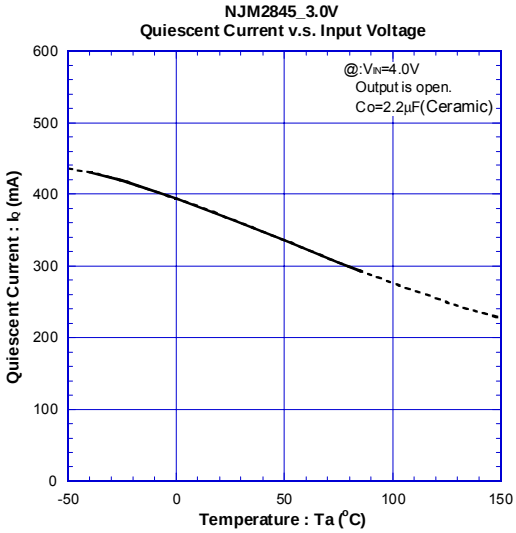
NJM2845_3.0V
Dropout Voltage vs. Temperature

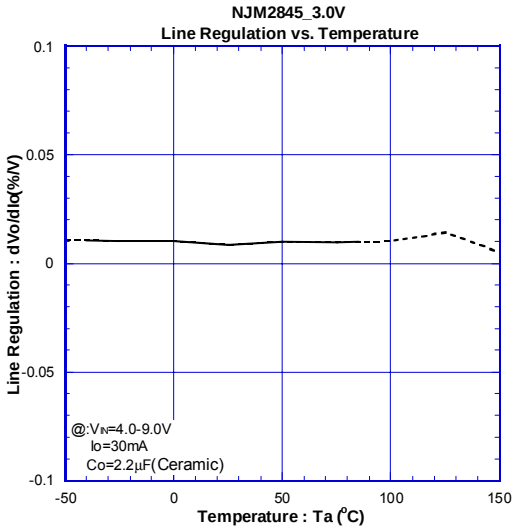


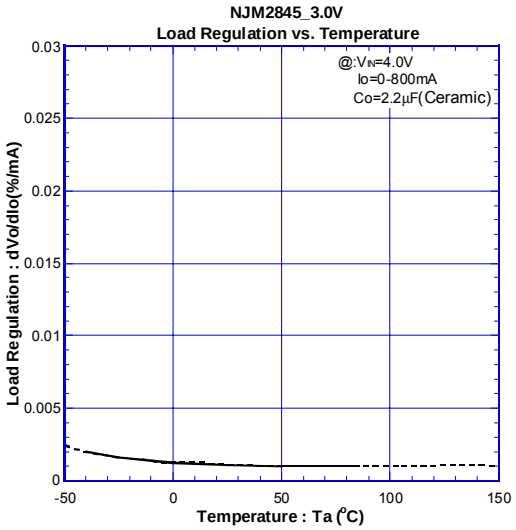
■ TYPICAL CHARACTERISTICS (NJM2845)

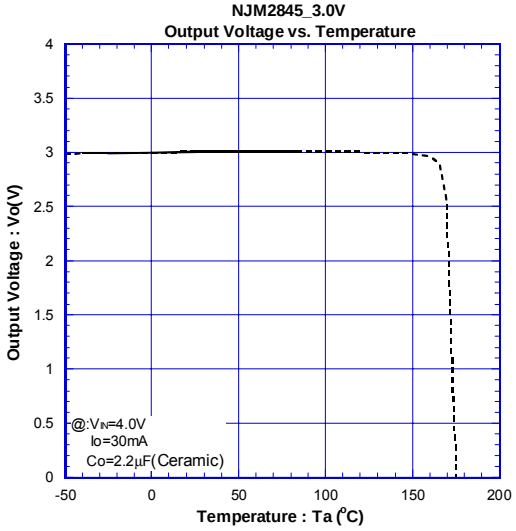




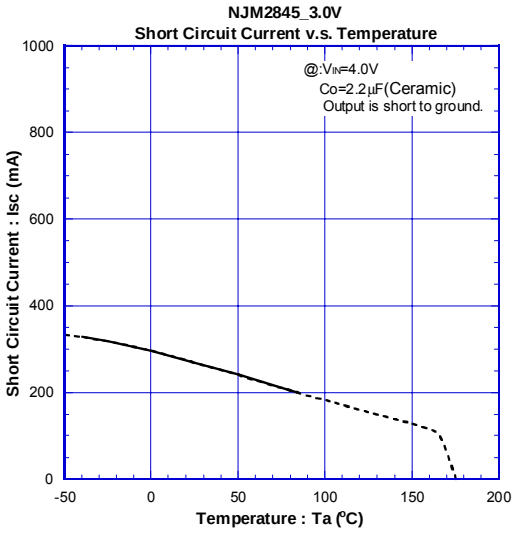


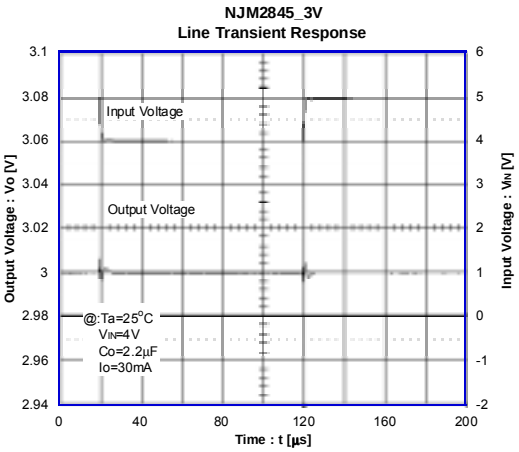


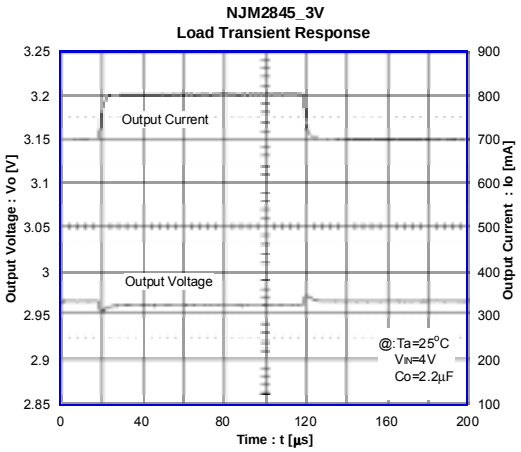




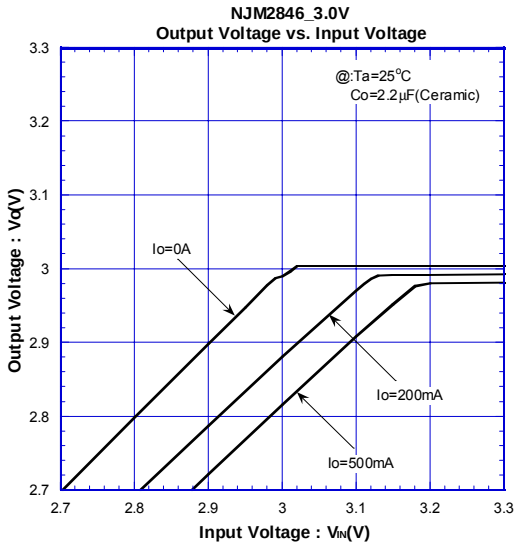
■ TYPICAL CHARACTERISTICS (NJM2845)

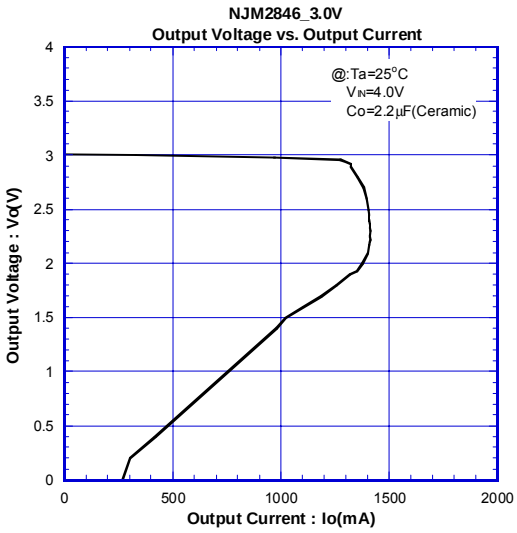


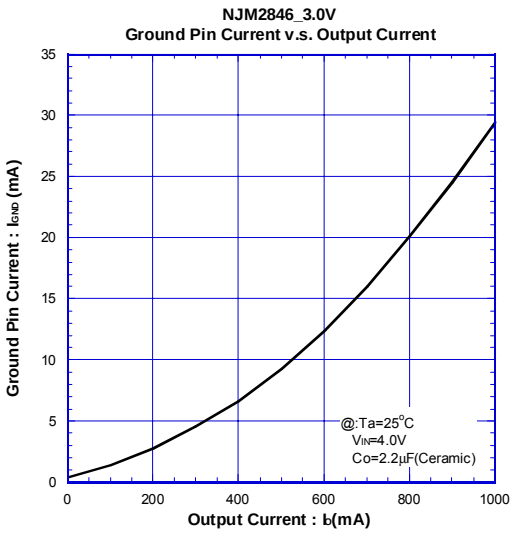


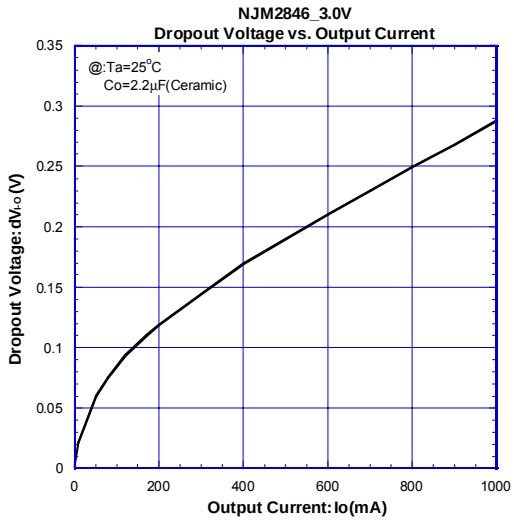


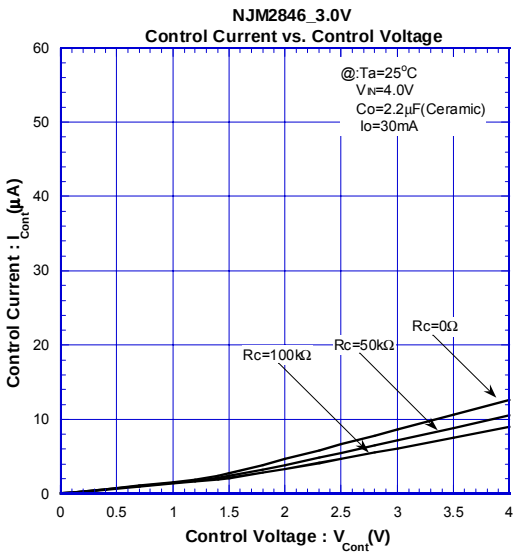
■ TYPICAL CHARACTERISTICS (NJM2846)

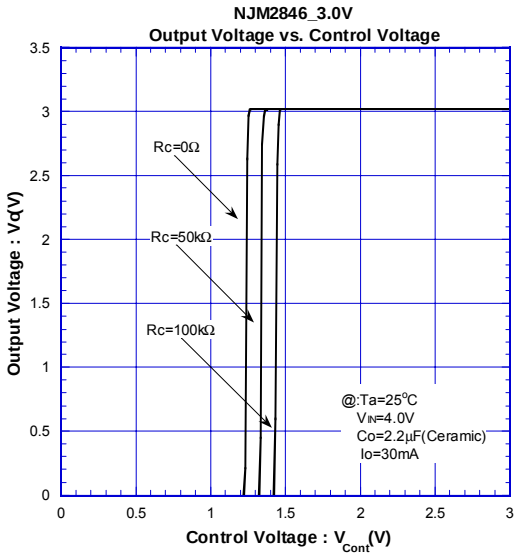






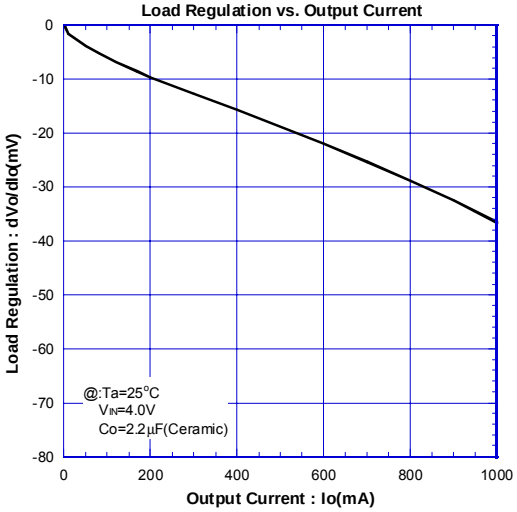




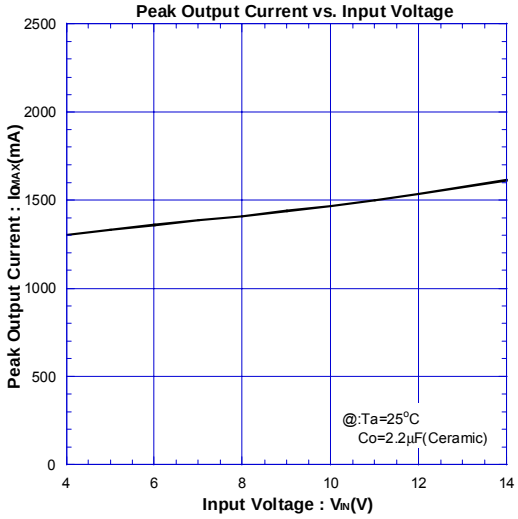


■ TYPICAL CHARACTERISTICS (NJM2846)

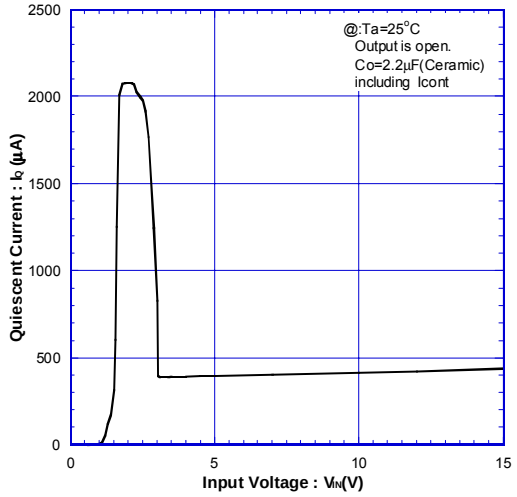
NJM2846_3.0V
Load Regulation vs. Output Current



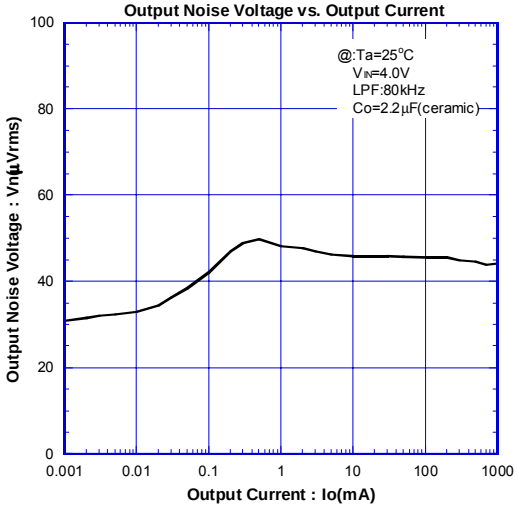
NJM2846_3.0V
Peak Output Current vs. Input Voltage



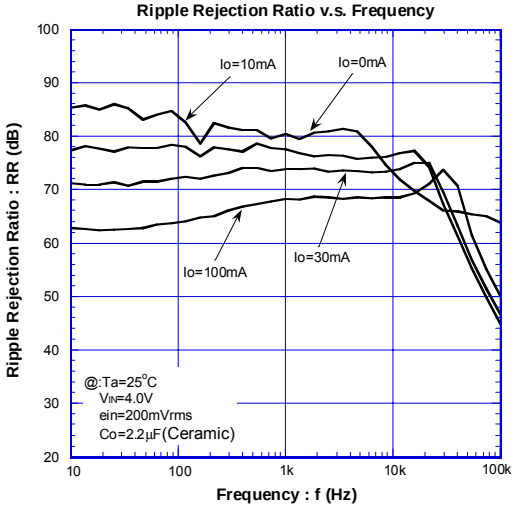
NJM2846_3.0V
Quiescent Current v.s. Input Voltage



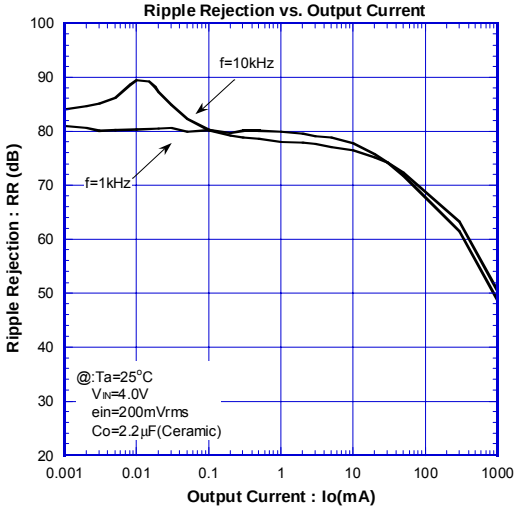
NJM2846_3.0V
Output Noise Voltage vs. Output Current



NJM2846_3.0V
Ripple Rejection Ratio v.s. Frequency

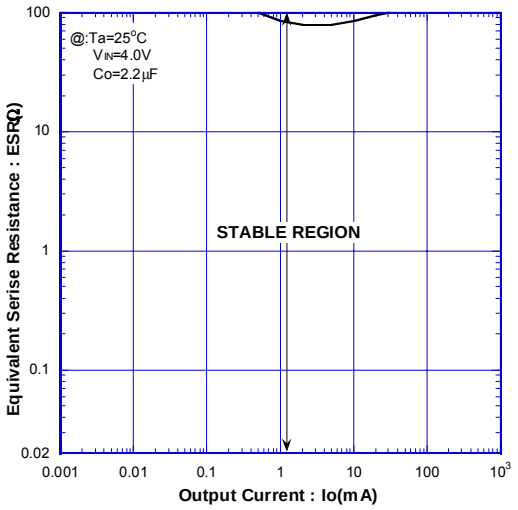


NJM2846_3.0V
Ripple Rejection vs. Output Current

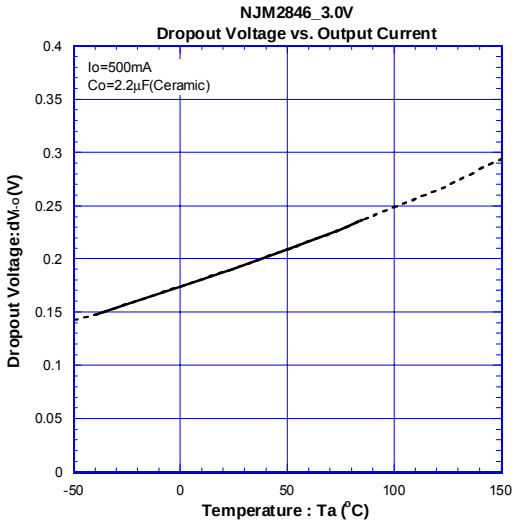


■ TYPICAL CHARACTERISTICS (NJM2846)

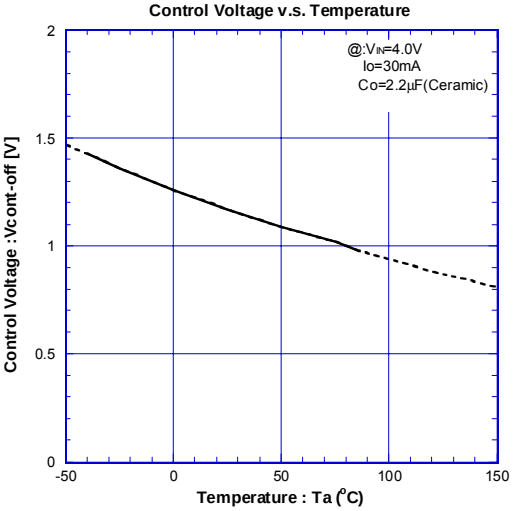
NJM2846_3.0V
Equivalent Serise Resistance vs. Output Current



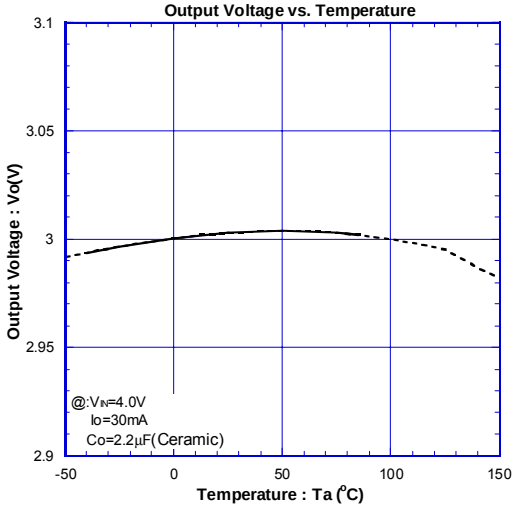
NJM2846_3.0V
Dropout Voltage vs. Output Current



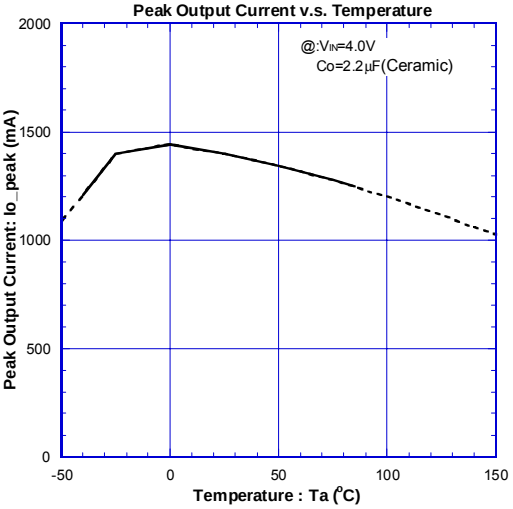
NJM2846_3.0V
Control Voltage v.s. Temperature



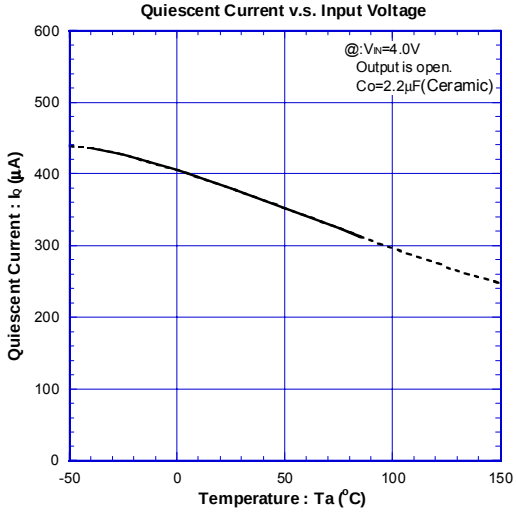
NJM2846_3.0V
Output Voltage vs. Temperature



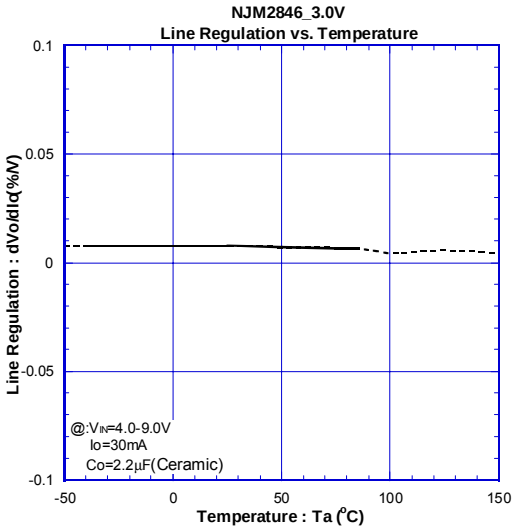
NJM2846_3.0V
Peak Output Current v.s. Temperature

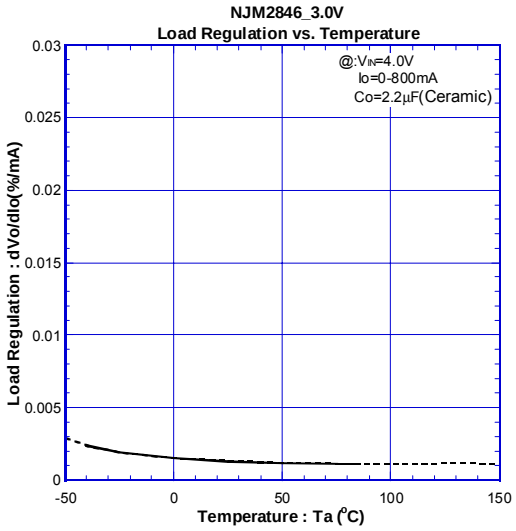


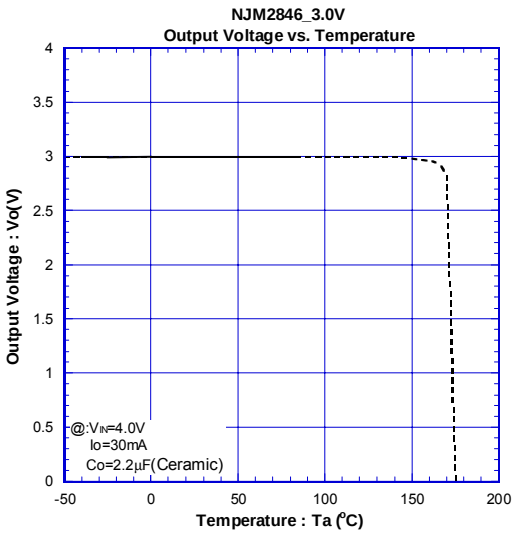
NJM2846_3.0V
Quiescent Current v.s. Input Voltage

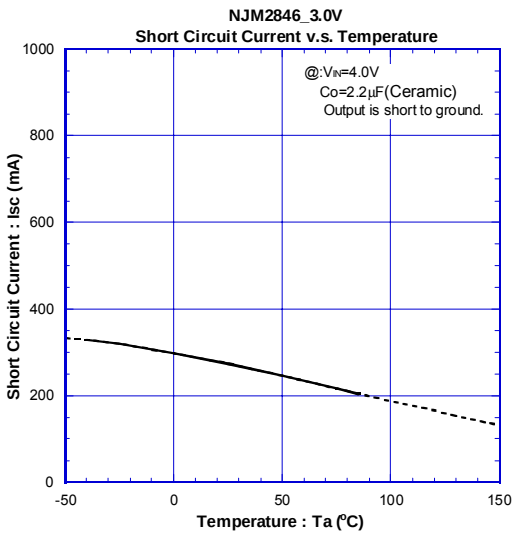


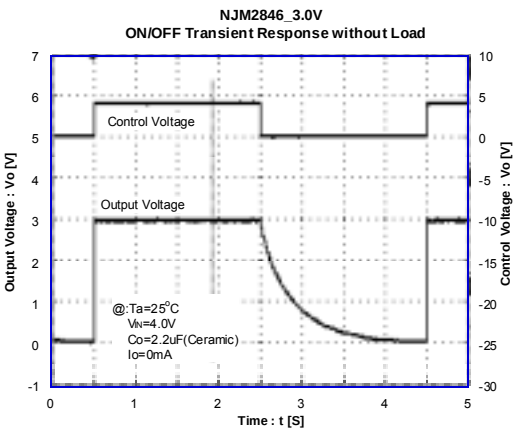
■ TYPICAL CHARACTERISTICS (NJM2846)

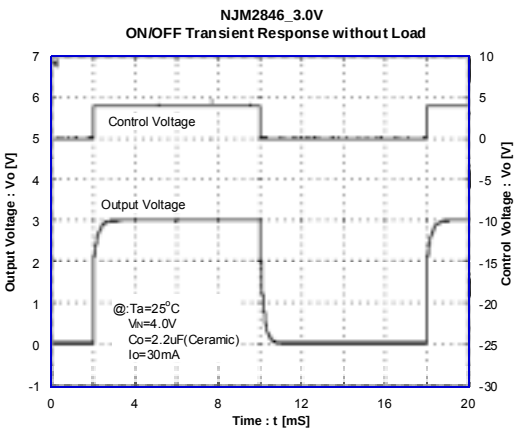












■ TYPICAL CHARACTERISTICS (NJM2846)