LOW DROPOUT VOLTAGE REGULATOR

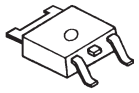
■ GENERAL DESCRIPTION

The NJM2855 is a 3-terminal low dropout voltage regulator. Advanced Bipolar technology achieves low noise, high ripple rejection.

It delivers up to 5V/1A output power with the maximum input voltage of 10V.

The NJM2855 is suitable for various applications such as portable / consumer devices.

■ PACKAGE OUTLINE

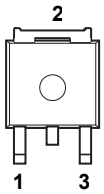


NJM2855DL1

■ FEATURES

- High Ripple Rejection 75dB typ. (f=1kHz,Vo=3V Version)
- Output Noise Voltage Vno=45μVrms typ.
- Output capacitor with 2.2μF ceramic capacitor (Vo≥2.7V)
- Output Current Io (max.)=1A
- High Precision Output Vo±1.0%
- Low Dropout Voltage 0.20V typ. (Io=600mA)
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- Bipolar Technology
- Package Outline TO-252-3

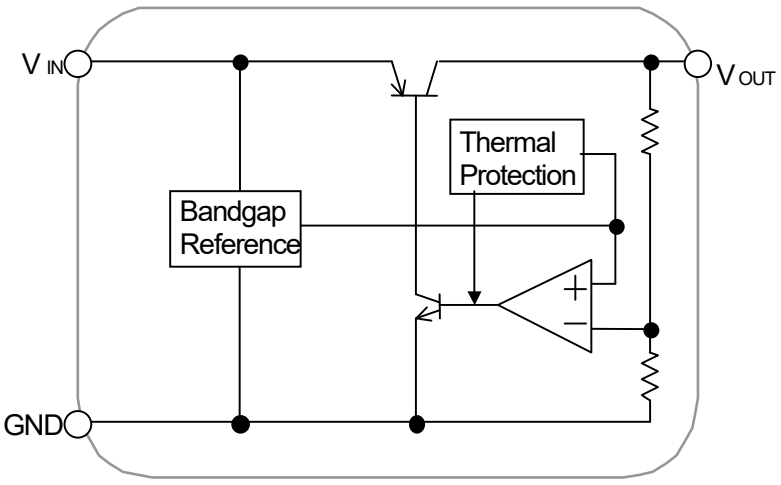
■ PIN CONFIGURATION



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

NJM2855DL1

■ EQUIVALENT CIRCUIT



■ OUTPUT VOLTAGE RANK LIST

The WHITE column shows applicable Voltage Rank(s)

Device Name	V_{out}	Device Name	V_{out}
NJM2855DL1-15	1.5V	NJM2855DL1-35	3.5V
NJM2855DL1-16	1.6V	NJM2855DL1-36	3.6V
NJM2855DL1-17	1.7V	NJM2855DL1-37	3.7V
NJM2855DL1-18	1.8V	NJM2855DL1-38	3.8V
NJM2855DL1-19	1.9V	NJM2855DL1-39	3.9V
NJM2855DL1-02	2.0V	NJM2855DL1-04	4.0V
NJM2855DL1-21	2.1V	NJM2855DL1-41	4.1V
NJM2855DL1-22	2.2V	NJM2855DL1-42	4.2V
NJM2855DL1-23	2.3V	NJM2855DL1-43	4.3V
NJM2855DL1-24	2.4V	NJM2855DL1-44	4.4V
NJM2855DL1-25	2.5V	NJM2855DL1-45	4.5V
NJM2855DL1-26	2.6V	NJM2855DL1-46	4.6V
NJM2855DL1-27	2.7V	NJM2855DL1-47	4.7V
NJM2855DL1-28	2.8V	NJM2855DL1-48	4.8V
NJM2855DL1-29	2.9V	NJM2855DL1-49	4.9V
NJM2855DL1-03	3.0V	NJM2855DL1-05	5.0V
NJM2855DL1-31	3.1V		
NJM2855DL1-32	3.2V		
NJM2855DL1-33	3.3V		
NJM2855DL1-34	3.4V		

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	+10	V
Power Dissipation	P_D	1190(*1) 3125(*2)	mW
Operating Temperature	Topr	-40 ~ +85	°C
Storage Temperature	Tstg	-40 ~ +150	°C

(*1): Mounted on glass epoxy board. (76.2 × 114.3 × 1.6mm:based on EIA/JDEC standard size, 2Layers, Cu area 100mm^2)

(*2): Mounted on glass epoxy board. (76.2 × 114.3 × 1.6mm:based on EIA/JDEC standard, 4Layers)

(For 4Layers: Applying 74.2 × 74.2mm inner Cu area and a thermal via hole to a board based on JEDEC standard JESD51-5)

■ OPERATING VOLTAGE

V_{IN}=+2.5V ~ +8V (In case of Vo<2.3V version)

■ ELECTRICAL CHARACTERISTICS

(V_{IN}=Vo+1V, C_{IN}=0.33µF, Co=2.2µF(1.7V<Vo≤2.6V:4.7µF, Vo≤1.7V:10µF), 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	1000	1300	-	mA
Line Regulation	$\Delta Vo/\Delta V_{IN}$	V_{IN}=Vo+1V~Vo+6V(Vo≤2V), V_{IN}=Vo+1V~8V(Vo>2V), Io=30mA	-	-	0.10	%/V
Load Regulation	ΔVo/ΔIo	Io=0 ~ 1A	-	-	0.004	%/mA
Dropout Voltage(*3)	ΔV_{I-O}	Io=600mA	-	0.20	0.28	V
Ripple Rejection	RR	ein=200mVrms,f=1kHz, Io=10mA Vo=3.0V Version(*4)	-	75	-	dB
Average Temperature Coefficient of Output Voltage	ΔVo/ΔTa	Ta=0~85°C, Io=10mA	-	±50	-	ppm/°C
Output Noise Voltage	V_{NO}	f=10Hz~80kHz, Io=10mA, Vo=3.0V Version(*3)	-	45	-	µVrms
Input Voltage	V_{IN}		-	-	8	V

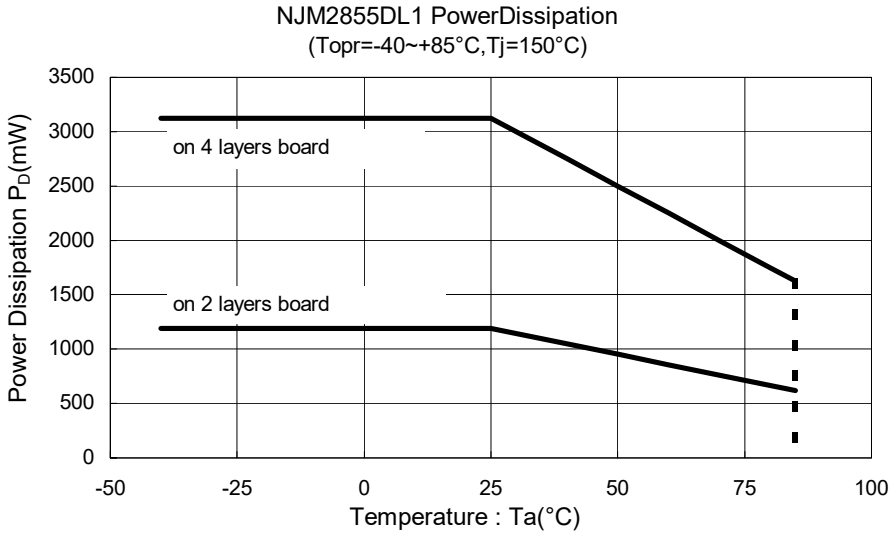
(*3): The output voltage excludes under 2.1V.

(*4): Vo>2.0V : V_{IN}=Vo+1V, Vo≤2.0V : V_{IN}=3.0V

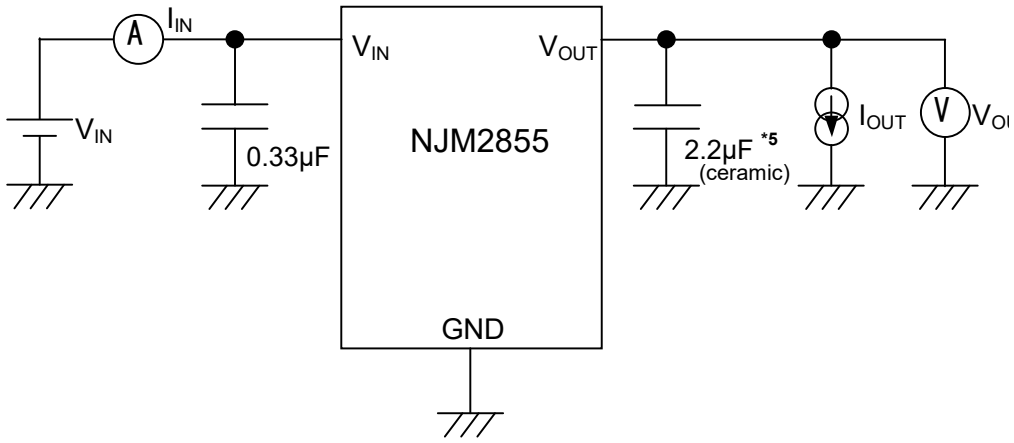
The above specification is a common specification for all output voltages.

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

■ POWER DISSIPATION vs. AMBIENT TEMPERATURE

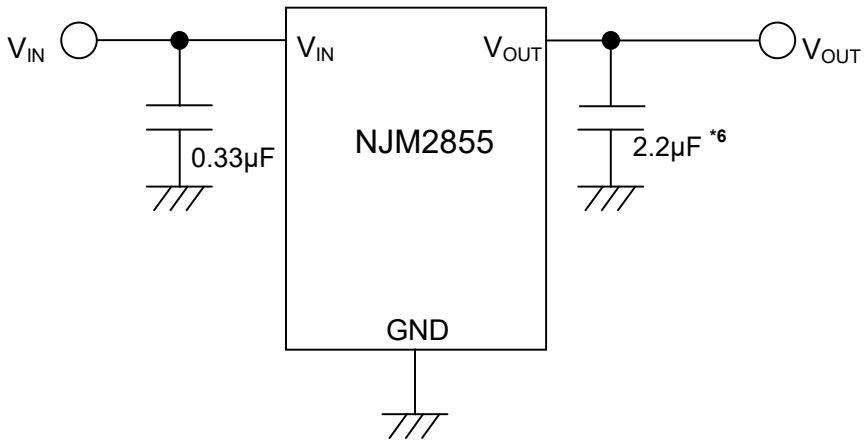


■ TEST CIRCUIT



*5 1.7V<Vo≤2.6V version: Co=4.7µF(ceramic)
Vo≤1.7V version: Co=10µF(ceramic)

■ TYPICAL APPLICATION



*6 1.7V<Vo≤2.6V version: Co=4.7µF
Vo≤1.7V version: Co=10µF

*Input Capacitor C_{IN}

Input Capacitor C_{IN} is required to prevent oscillation and reduce power supply ripple for applications when high power supply impedance or a long power supply line.

Therefore, use the recommended C_{IN} value (refer to conditions of ELECTRIC CHARACTERISTIC) or larger and should connect between GND and V_{IN} as shortest path as possible to avoid the problem.

*Output Capacitor C_O

Output capacitor (C_O) will be required for a phase compensation of the internal error amplifier.

The capacitance and the equivalent series resistance (ESR) influence to stable operation of the regulator.

Use of a smaller C_O may cause excess output noise or oscillation of the regulator due to lack of the phase compensation.

On the other hand, Use of a larger C_O reduces output noise and ripple output, and also improves output transient response when rapid load change.

Therefore, use the recommended C_O value (refer to conditions of ELECTRIC CHARACTERISTIC) or larger and should connect between GND and V_{OUT} as shortest path as possible for stable operation

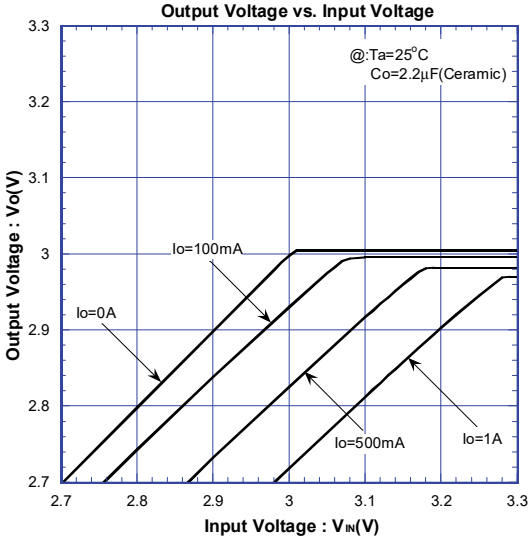
The recommended capacitance depends on the output voltage rank. Especially, low voltage regulator requires larger C_O value.

In addition, you should consider varied characteristics of capacitor (a frequency characteristic, a temperature characteristic, a DC bias characteristic and so on) and unevenness peculiar to a capacitor supplier enough.

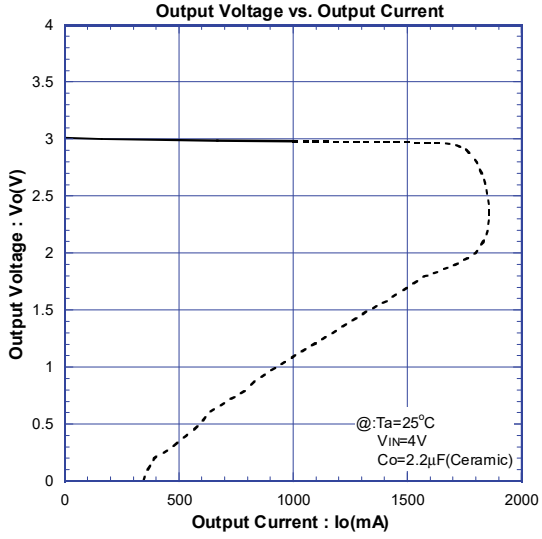
When selecting C_O, recommend that have withstand voltage margin against output voltage and superior temperature characteristic though this product is designed stability works with wide range ESR of capacitor including low ESR products.

■ TYPICAL CHARACTERISTICS

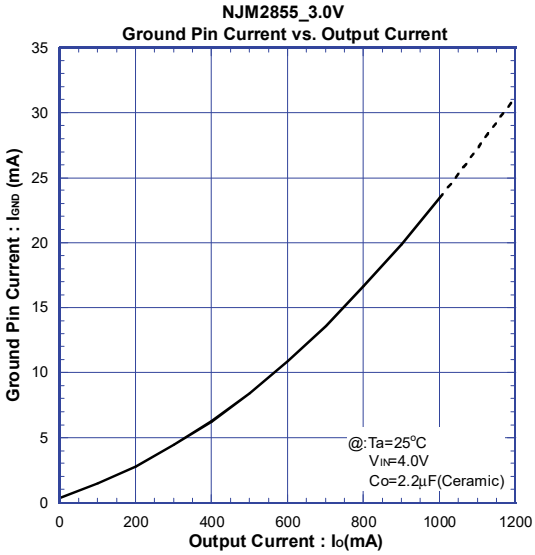
NJM2855_3.0V
Output Voltage vs. Input Voltage



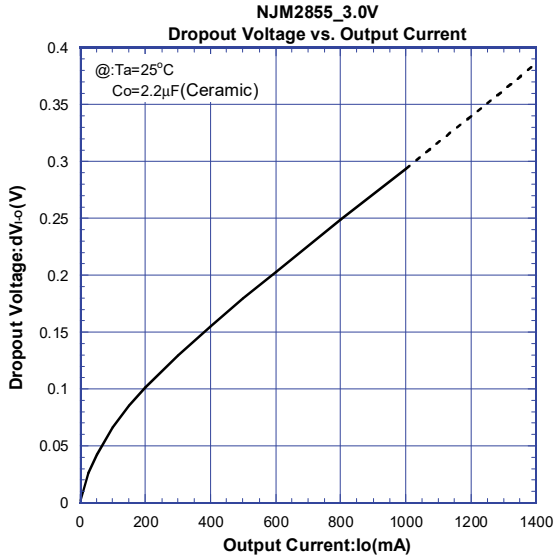
NJM2855_3.0V
Output Voltage vs. Output Current



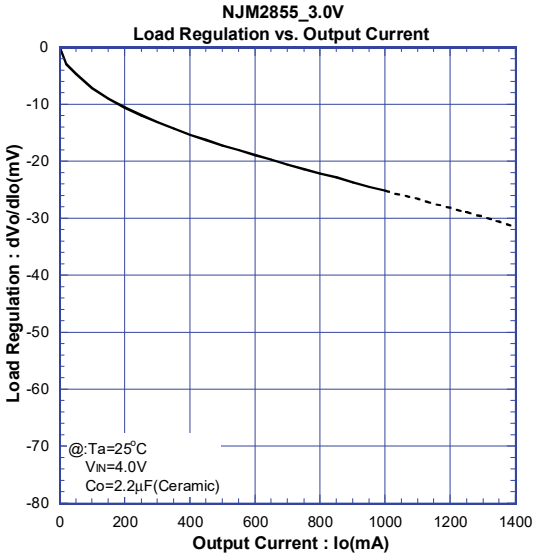
NJM2855_3.0V
Ground Pin Current vs. Output Current



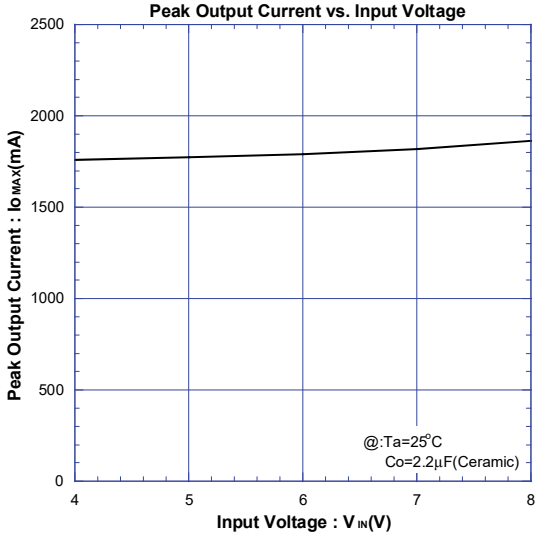
NJM2855_3.0V
Dropout Voltage vs. Output Current



NJM2855_3.0V
Load Regulation vs. Output Current

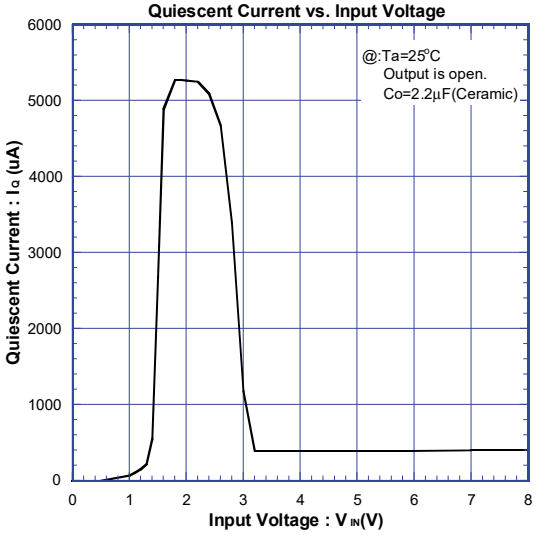


NJM2855_3.0V
Peak Output Current vs. Input Voltage

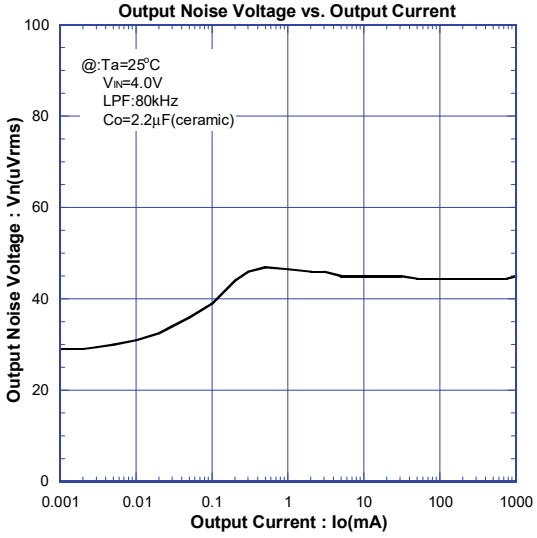


■ TYPICAL CHARACTERISTICS

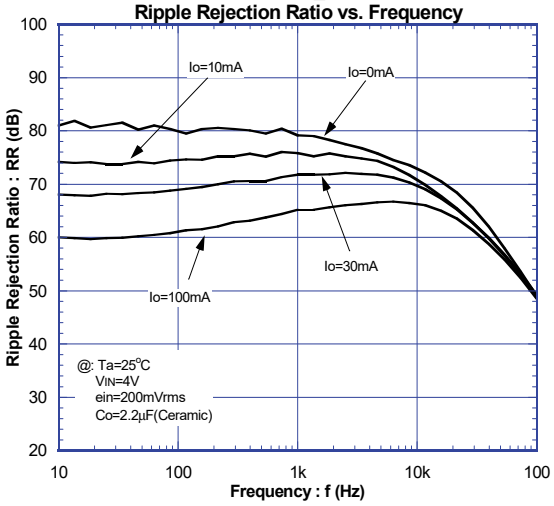
NJM2855_3.0V
Quiescent Current vs. Input Voltage



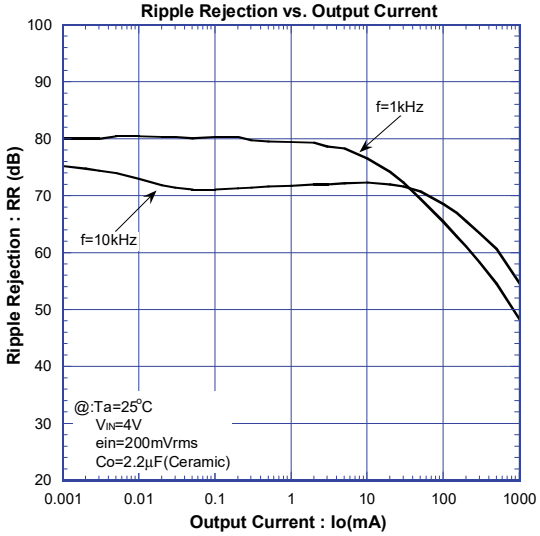
NJM2855_3.0V
Output Noise Voltage vs. Output Current



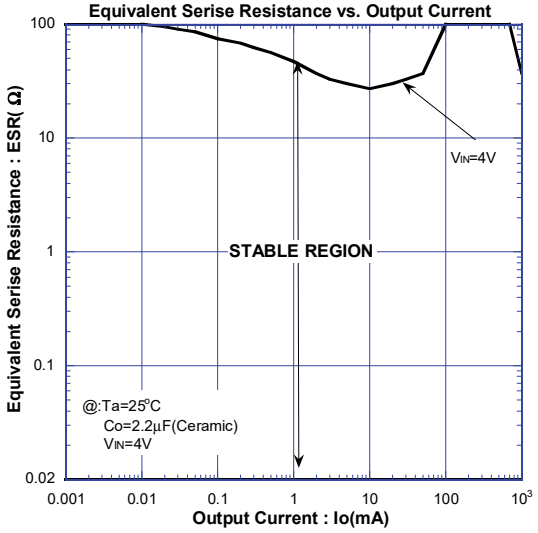
NJM2855_3.0V
Ripple Rejection Ratio vs. Frequency



NJM2855_3.0V
Ripple Rejection vs. Output Current

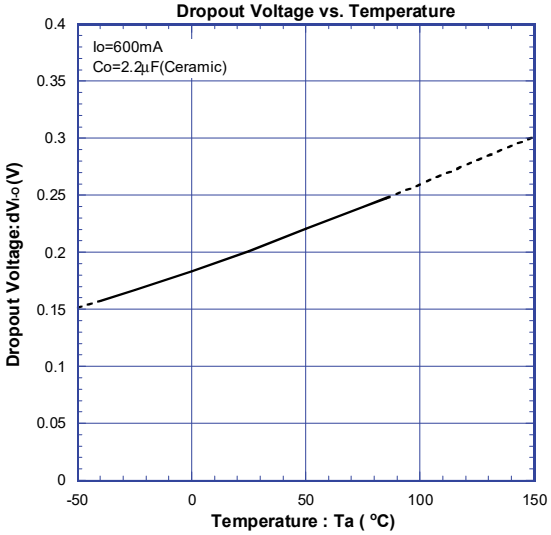


NJM2855_3.0V
Equivalent Serise Resistance vs. Output Current

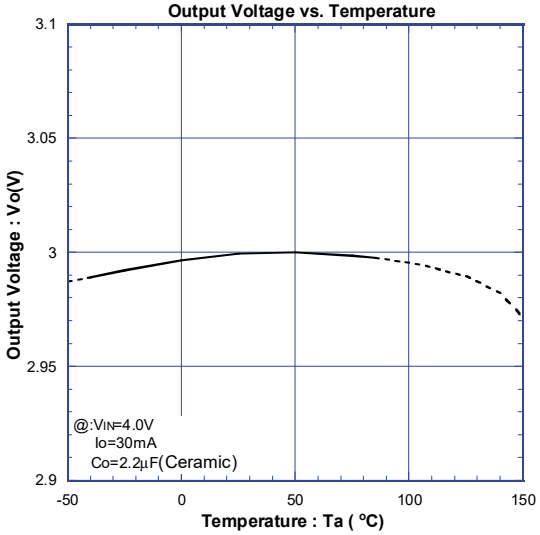


■ TYPICAL CHARACTERISTICS

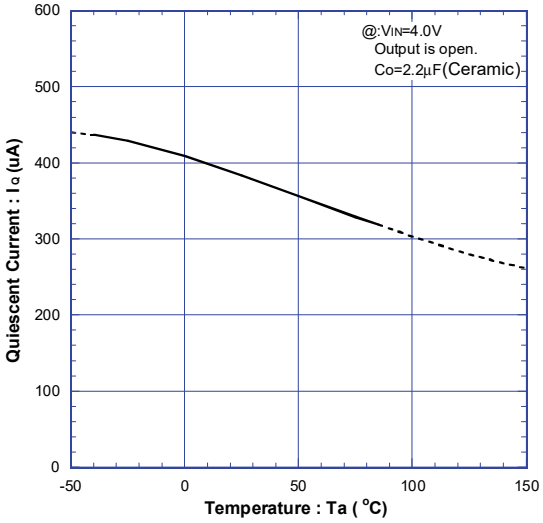
NJM2855_3.0V
Dropout Voltage vs. Temperature



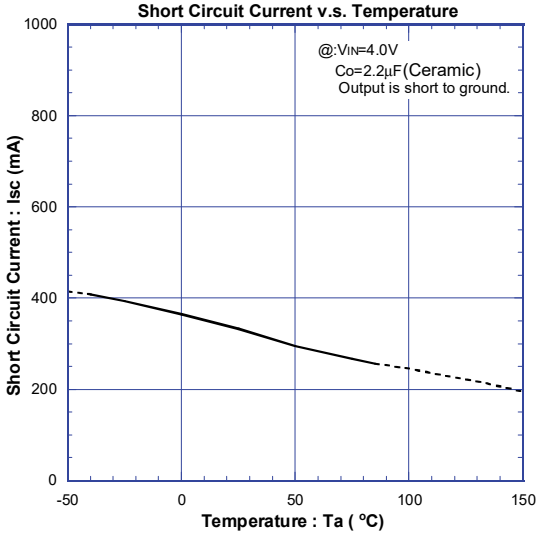
NJM2855_3.0V
Output Voltage vs. Temperature



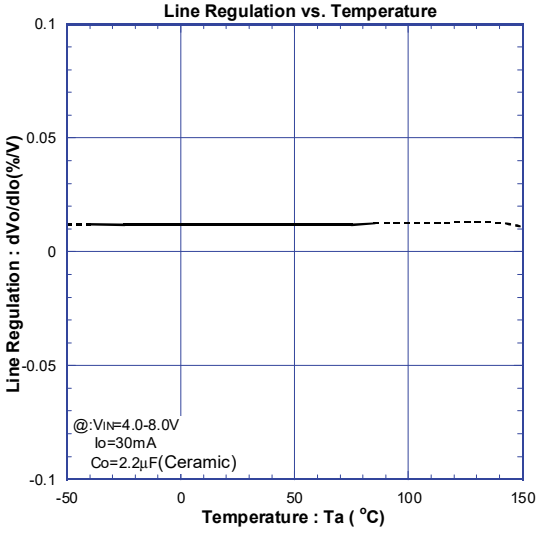
NJM2855_3.0V
Quiescent Current v.s. Input Voltage



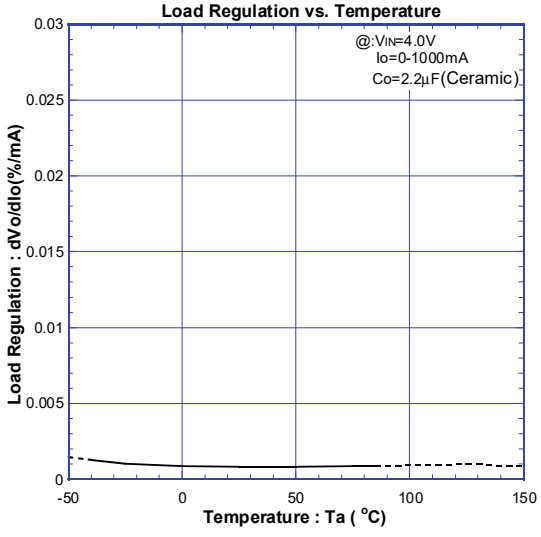
NJM2855_3.0V
Short Circuit Current v.s. Temperature



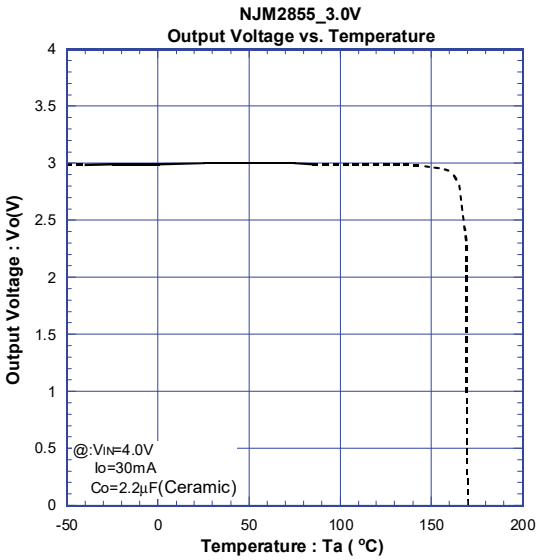
NJM2855_3.0V
Line Regulation vs. Temperature

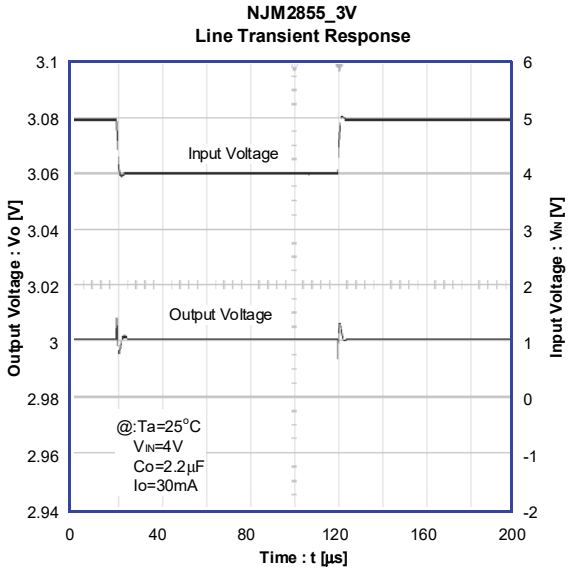


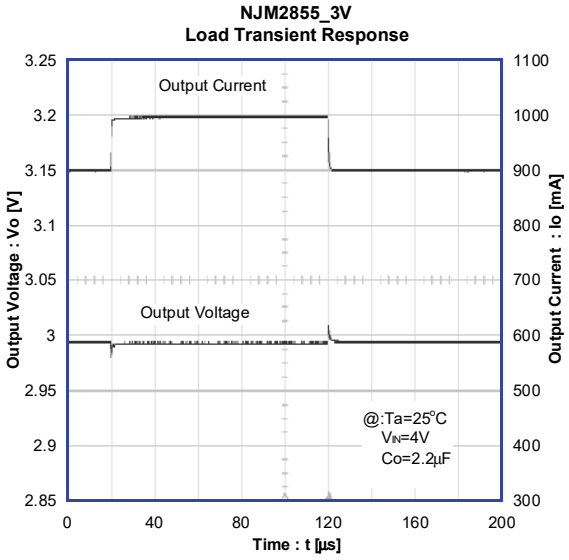
NJM2855_3.0V
Load Regulation vs. Temperature



■ TYPICAL CHARACTERISTICS







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