LOW DROPOUT VOLTAGE REGULATOR

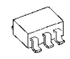
■ GENERAL DESCRIPTION

The NJM2865/66 is a 100mA output low dropout voltage regulator with ON/OFF control.

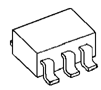
Advanced Bipolar technology achieves low noise, high ripple rejection and low quiescent current.

Small packaging, 1µF small decoupling capacitor, built-in noise bypass capacitor make the NJM2865/66 suitable for space conscious applications.

■ PACKAGE OUTLINE



NJM2865F3

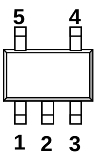


NJM2865F/66F

■ FEATURES

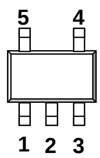
- High Ripple Rejection 75dB typ. (f=1kHz Vo=3V Version)
- Output Noise Voltage Vno=45µVrms typ.
- Output capacitor with 1.0µF ceramic capacitor (Vo≥2.7V)
- Output Current Io(max.)=100mA
- High Precision Output Vo±1.0%
- Low Dropout Voltage 0.10V typ. (Io=60mA)
- Input Voltage Range +2.3V ~ +14V(Vo≤2.0 Version)
- ON/OFF Control (Active High)
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- Bipolar Technology
- Package Outline SC88A (NJM2865F3), SOT-23-5 (NJM2865F/66F)

■ PIN CONFIGURATION



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

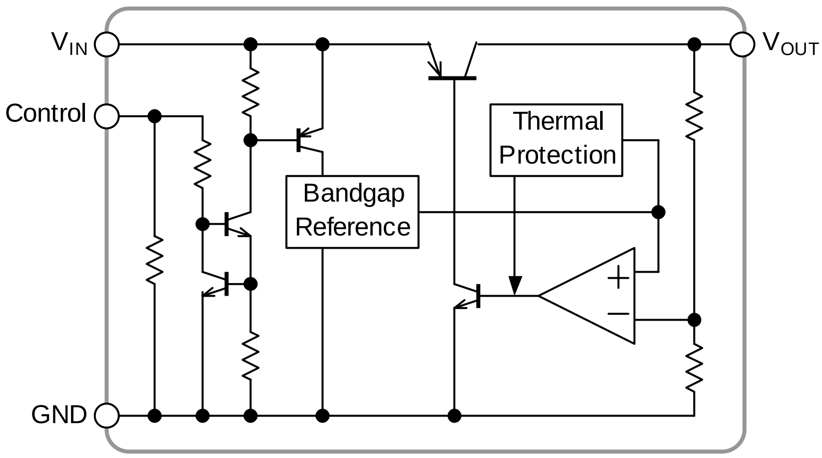
NJM2865F3 / NJM2865F



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

NJM2866F

■ EQUIVALENT CIRCUIT



■ OUTPUT VOLTAGE RANK LIST

Device Name	V_{OUT}	Device Name	V_{OUT}	Device Name	V_{OUT}
NJM2865F3-/F15	1.5V	NJM2865F3-/F29	2.9V	NJM2865F3-/F38	3.8V
NJM2865F3-/F18	1.8V	NJM2865F3-/F03	3.0V	NJM2865F3-/F04	4.0V
NJM2865F3-/F21	2.1V	NJM2865F3-/F31	3.1V	NJM2865F3-/F445	4.45V
NJM2865F3-/F24	2.4V	NJM2865F3-/F32	3.2V	NJM2865F3-/F46	4.6V
NJM2865F3-/F25	2.5V	NJM2865F3-/F33	3.3V	NJM2865F3-/F48	4.8V
NJM2865F3-/F26	2.6V	NJM2865F3-/F34	3.4V	NJM2865F3-/F05	5.0V
NJM2865F3-/F27	2.7V	NJM2865F3-/F35	3.5V		
NJM2865F3-/F28	2.8V	NJM2865F3-/F36	3.6V		

Device Name	V_{OUT}	Device Name	V_{OUT}	Device Name	V_{OUT}
NJM2866F15	1.5V	NJM2866F29	2.9V	NJM2866F38	3.8V
NJM2866F18	1.8V	NJM2866F03	3.0V	NJM2866F04	4.0V
NJM2866F21	2.1V	NJM2866F31	3.1V	NJM2866F445	4.45V
NJM2866F24	2.4V	NJM2866F32	3.2V	NJM2866F46	4.6V
NJM2866F25	2.5V	NJM2866F33	3.3V	NJM2866F48	4.8V
NJM2866F26	2.6V	NJM2866F34	3.4V	NJM2866F05	5.0V
NJM2866F27	2.7V	NJM2866F35	3.5V		
NJM2866F28	2.8V	NJM2866F36	3.6V		

■ 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	SC88A	250(*2)	mW
		SOT-23-5	200(*3)	
			350(*2)	
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)
(*3): Device itself.

■ Operating voltage

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

■ ELECTRICAL CHARACTERISTICS

($V_o \geq 2.0V$ version: $V_{IN}=V_o+1V$, $C_{IN}=0.1\mu F$, $C_o=1.0\mu F$: $V_o \geq 2.7V$ ($C_o=2.2\mu F$: $V_o \leq 2.6V$), Ta=25°C)

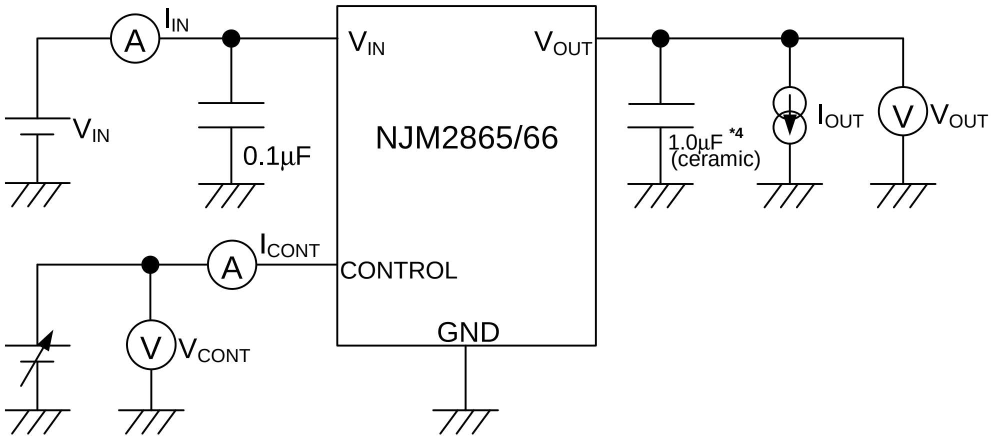
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Io=30mA	-1.0%	–	+1.0%	V
Quiescent Current	I_Q	Io=0mA, expect Icont	–	120	180	µA
Quiescent Current at Control OFF	$I_{Q(OFF)}$	V_{CONT}=0V	–	–	100	nA
Output Current	Io	Vo-0.3V	100	130	–	mA
Line Regulation	$\Delta V_o/\Delta V_{IN}$	V_{IN}=Vo+1V ~ Vo+6V, Io=30mA	–	–	0.10	%/V
Load Regulation	$\Delta V_o/\Delta I_o$	Io=0 ~ 60mA	–	–	0.03	%/mA
Dropout Voltage	ΔV_{I-O}	Io=60mA	–	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	$\Delta V_o/\Delta Ta$	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	–	–	12	µA
Control Voltage for ON-state	$V_{CONT(ON)}$		1.6	–	–	V
Control Voltage for OFF-state	$V_{CONT(OFF)}$		–	–	0.6	V

($V_o \leq 2.0V$ version: $V_{IN=}$ Vo+1V, $C_{IN}=0.1\mu F$, $C_o=2.2\mu F$($C_o=4.7\mu F$: $V_o \leq 1.6V$),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	100	130	–	mA
Line Regulation	$\Delta V_o/\Delta V_{IN}$	V_{IN}=Vo+1V ~ Vo+6V, Io=30mA	–	–	0.10	%/V
Load Regulation	$\Delta V_o/\Delta I_o$	Io=0 ~ 60mA	–	–	0.03	%/mA
Ripple Rejection	RR	ein=200mVrms,f=1kHz,Io=10mA, Vo=1.8V Version	–	80	–	dB
Average Temperature Coefficient of Output Voltage	$\Delta V_o/\Delta Ta$	Ta=0 ~ 85°C, Io=10mA	–	±50	–	ppm/°C
Output Noise Voltage	V_{NO}	f=10Hz ~ 80kHz, Io=10mA Vo=1.8V Version	–	27	–	µVrms
Control Current	I_{CONT}	V_{CONT}=1.6V, Io=0mA	–	–	12	µA
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.

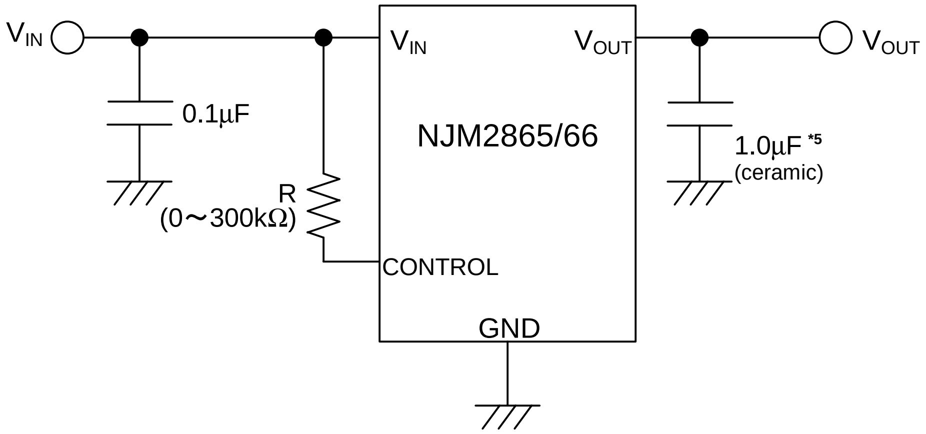
■ TEST CIRCUIT



*4 1.6V<Vo≤2.6V version: Co=2.2µF(ceramic)
Vo≤1.6V version: 4.7µF(ceramic)

■ TYPICAL APPLICATION

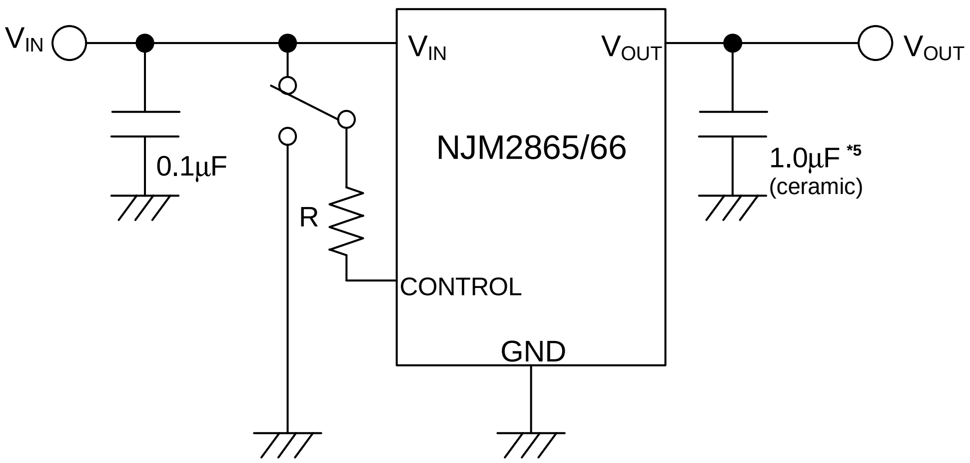
① In the case where ON/OFF Control is not required:



*5 1.6V<Vo≤2.6V version: Co=2.2µF(ceramic)
Vo≤1.6V version: 4.7µF(ceramic)

Connect control terminal to V_{IN} terminal

② In use of ON/OFF CONTROL:



*5 1.6V<Vo≤2.6V version: Co=2.2µF(ceramic)
Vo≤1.6V version: 4.7µF(ceramic)

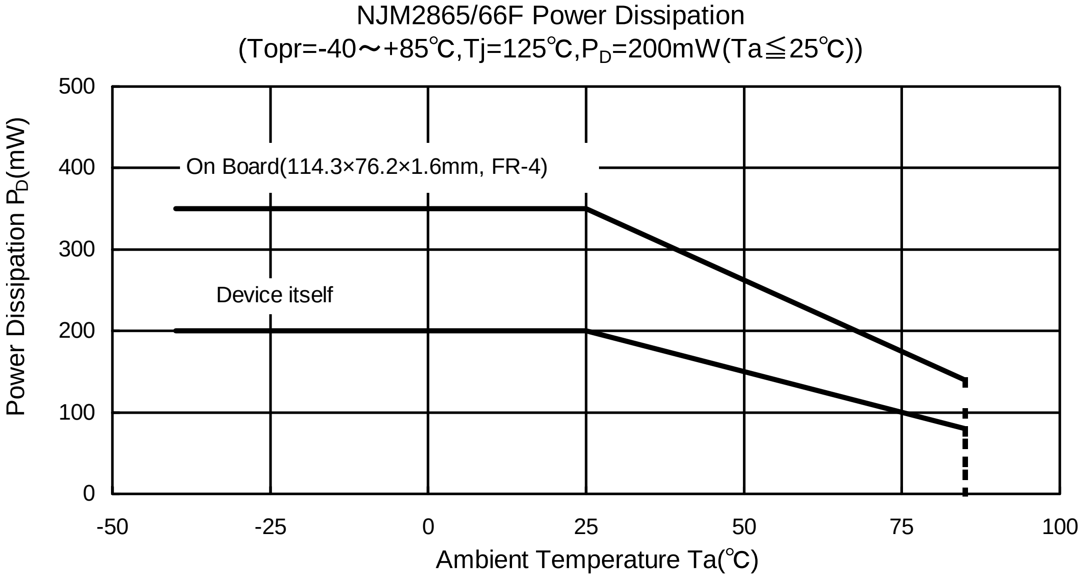
State of control terminal:
- "H"→ output is enabled.
- "L" or "open" → output is disabled.

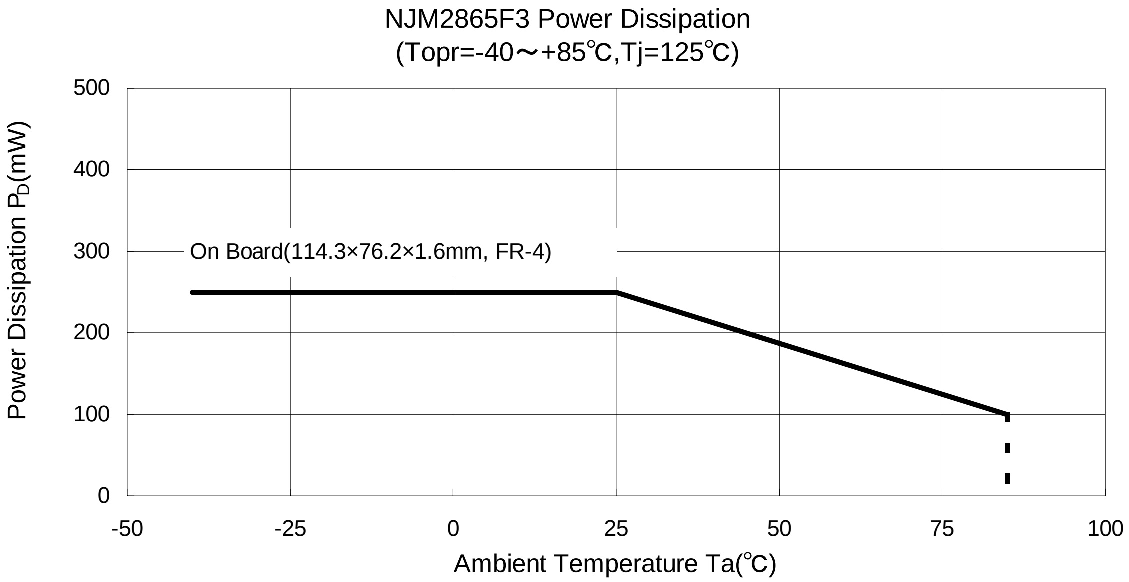
∗In the case of using a resistance "R" between V_{IN} and control.

The current flow into the control terminal while the IC is ON state (I_{CONT}) can be reduced when a pull up resistance "R" is inserted between V_{IN} and the control terminal.

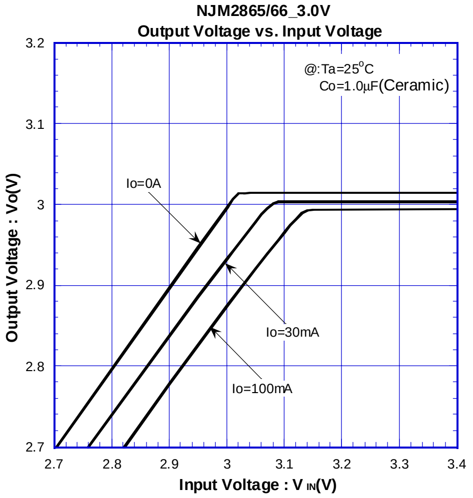
The minimum control voltage for ON state ($V_{CONT (ON)}$) is increased due to the voltage drop caused by I_{CONT} and the resistance "R". The I_{CONT} is temperature dependence as shown in the "Control Current vs. Temperature" characteristics. Therefore, the resistance "R" should be carefully selected to ensure the control voltage exceeds the $V_{CONT (ON)}$ over the required temperature range.

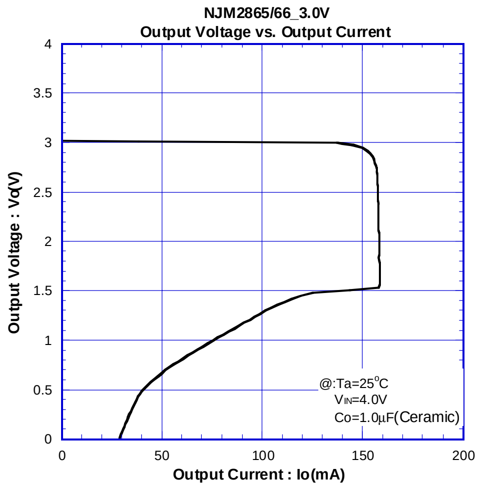
■ POWER DISSIPATION vs. AMBIENT TEMPERATURE

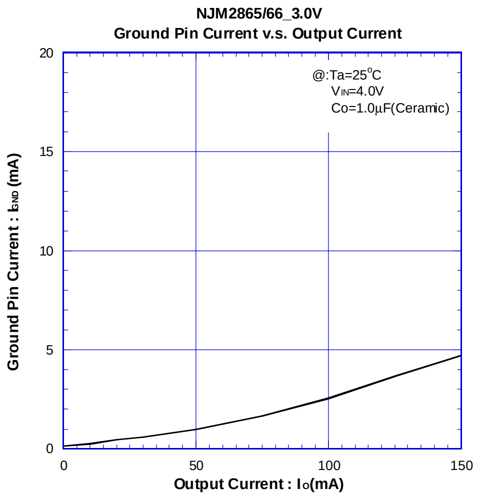


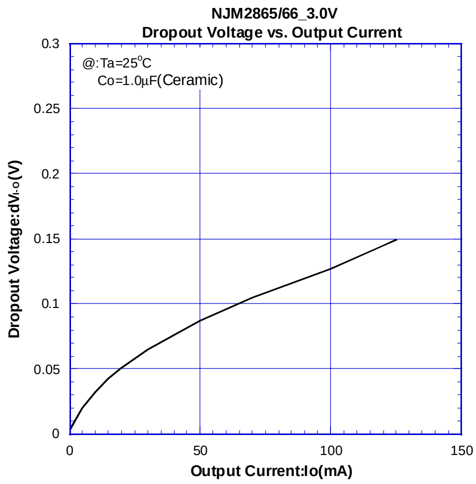


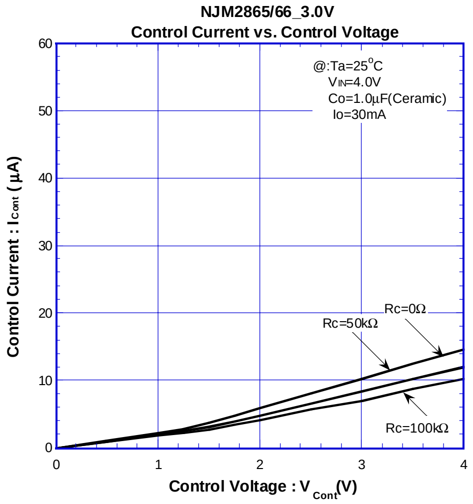
■ ELECTRICAL CHARACTERISTICS

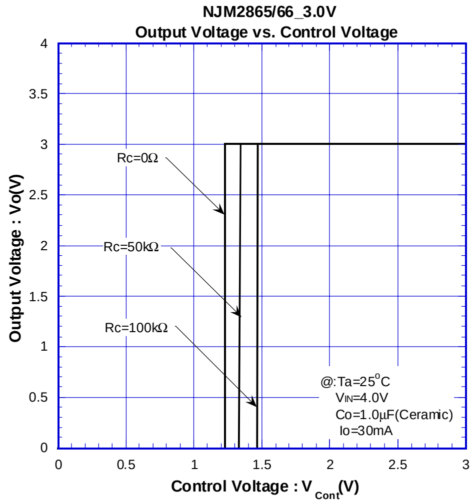












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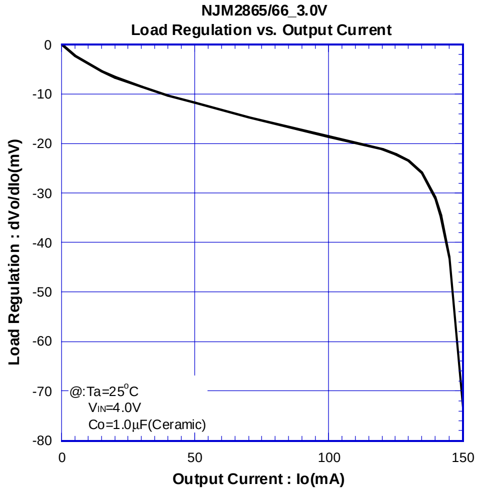

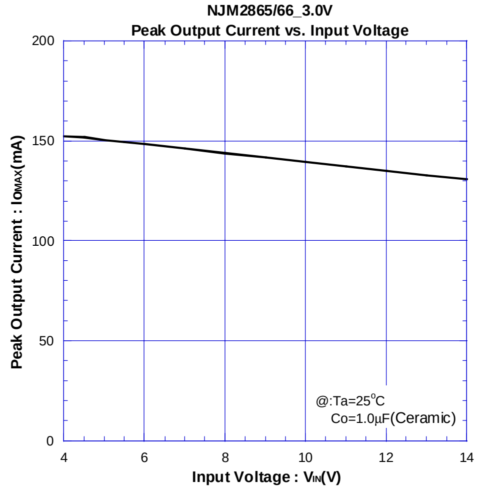

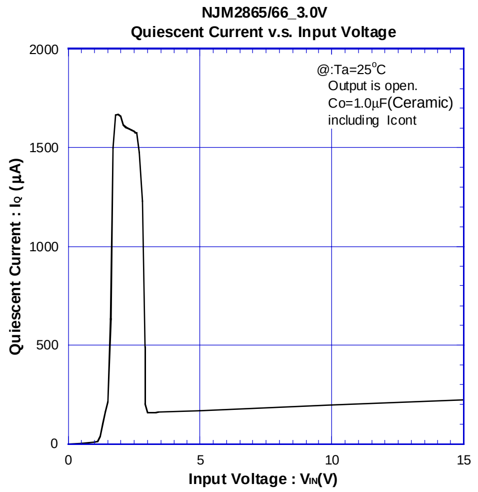

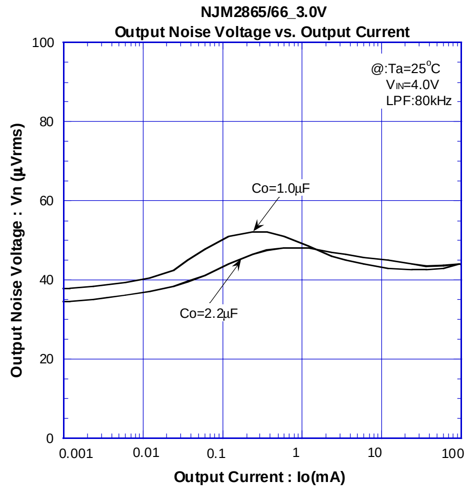

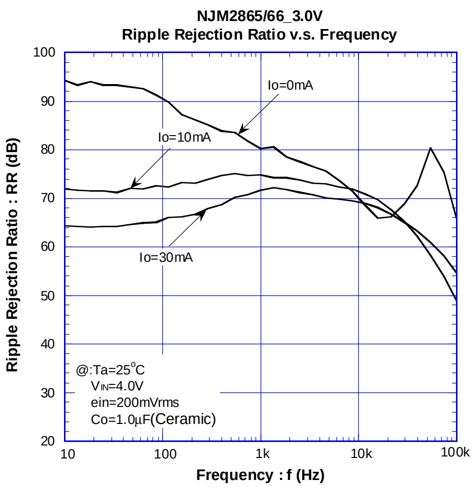

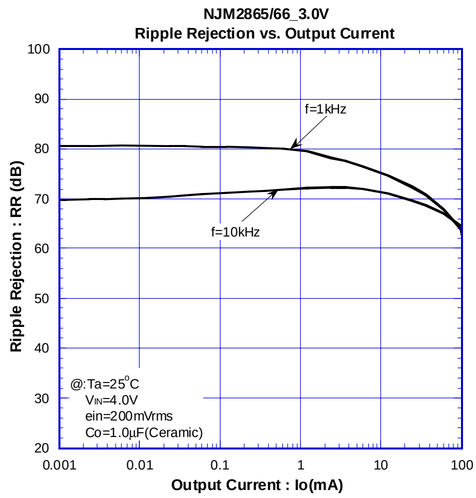

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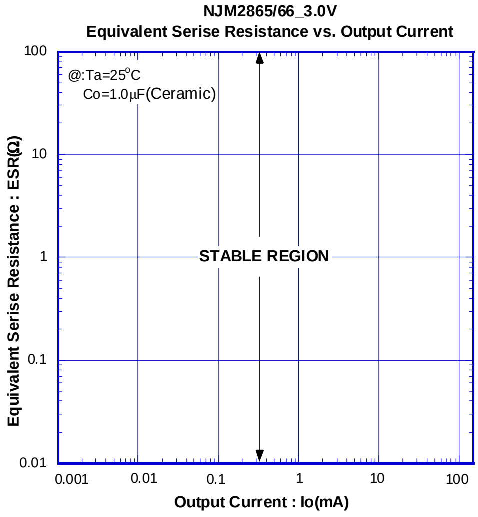

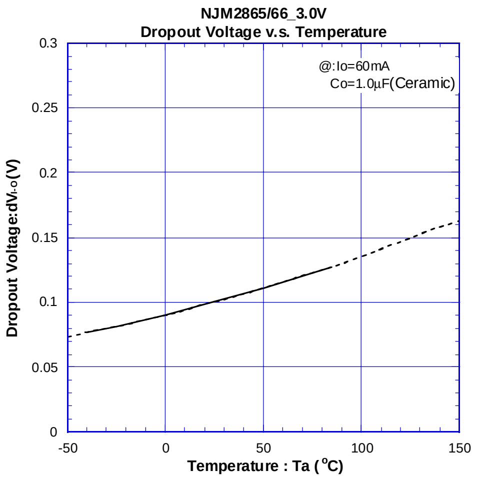

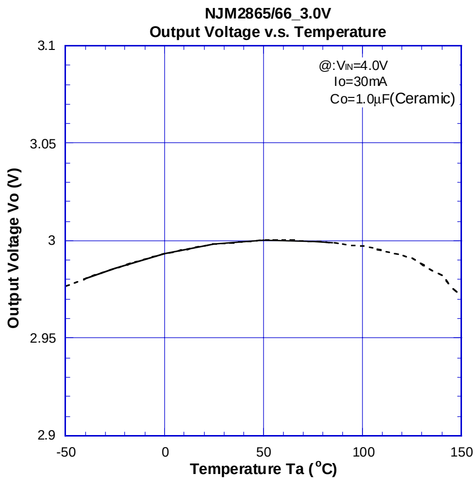

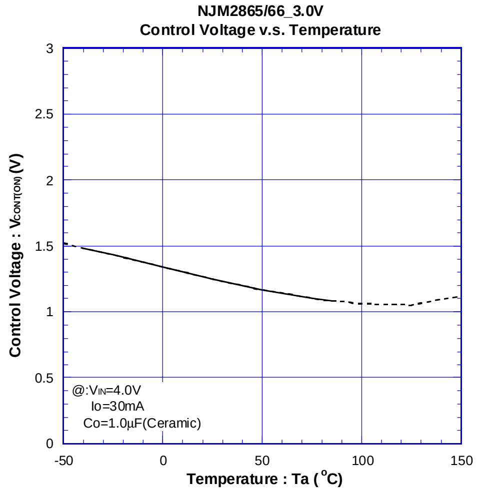

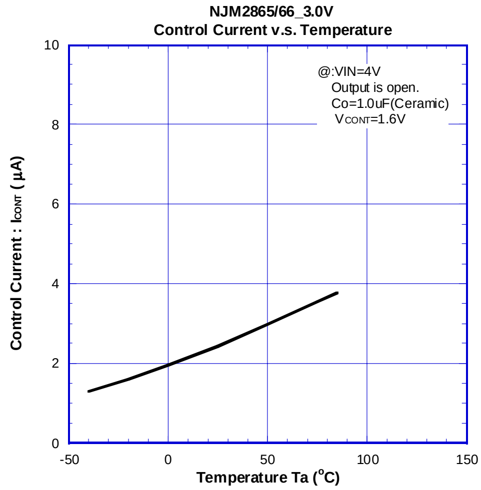

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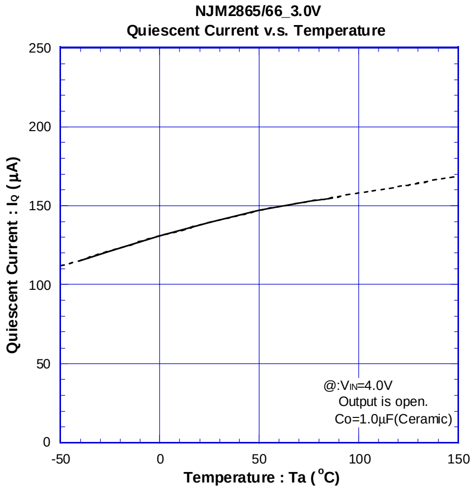

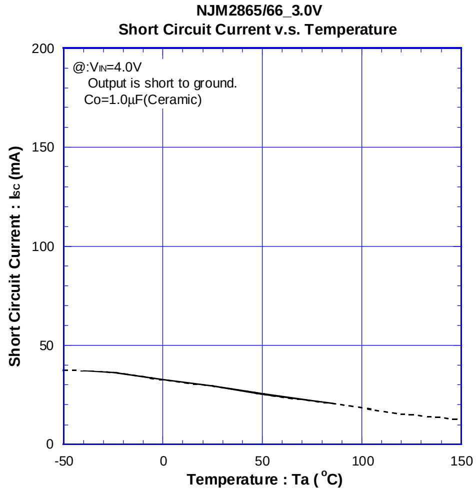

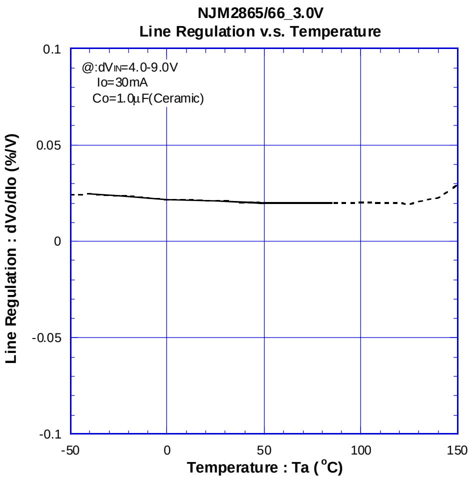

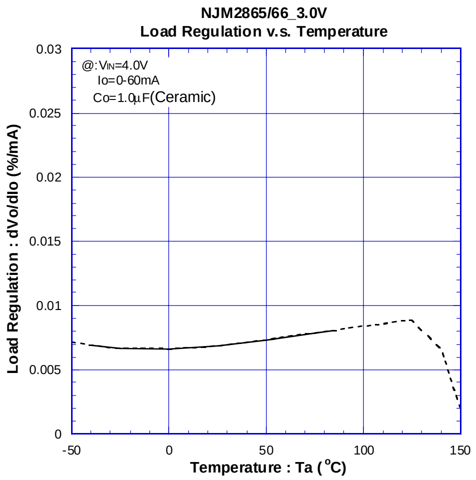

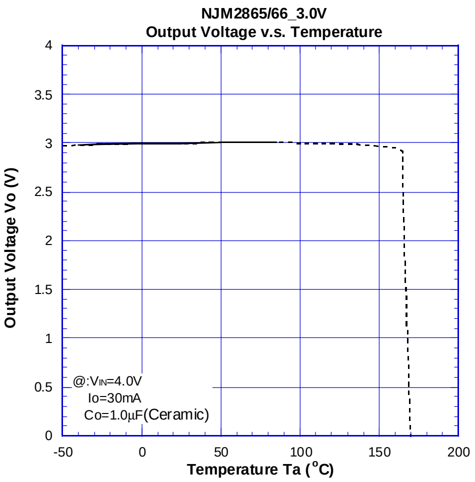

■ ELECTRICAL CHARACTERISTICS