3-TERMINAL NEGATIVE VOLTAGE REGULTOR

■ FEATURES

- Full Compatible with NJM79L00UA
- Output Current 100 mA
- Output Voltage Accuracy V_O ±4.0%
- Operating Temperature Ta = −40°C to 125°C
- High Ripple Rejection
- Overcurrent Protection
- Thermal Shutdown
- Bipolar Process
- Package SOT-89-3

■ APPLICATIONS

- Industrial Equipment
- OA Equipment
- Consumer Equipment

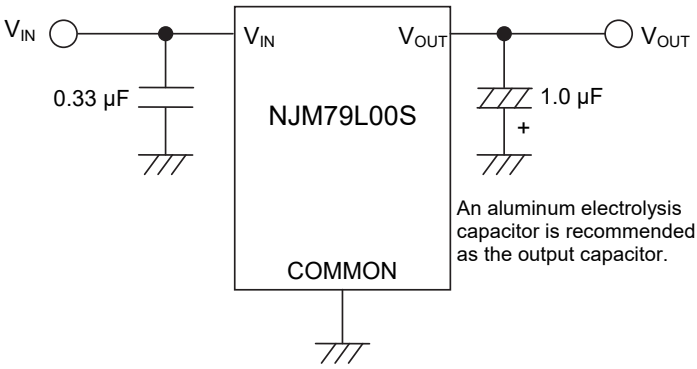
■ DESCRIPTION

The NJM79L00S series negative voltage regulators deliver up to 100 mA of output current.

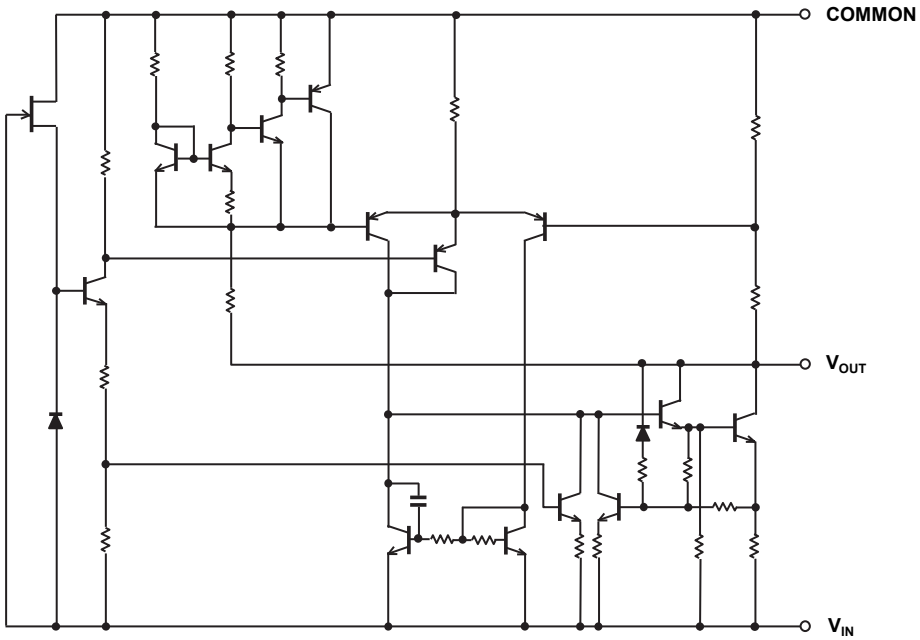
This series is enabling to direct replacement from NJM79L00UA series.

These devices offer improved usability by extending the operating temperature and maximum input voltage. This series is available in a SOT-89-3 package and is specified over the industrial temperature range of −40°C to 125°C.

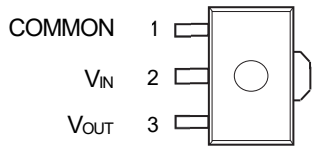
■ TYPICAL APPLICATION



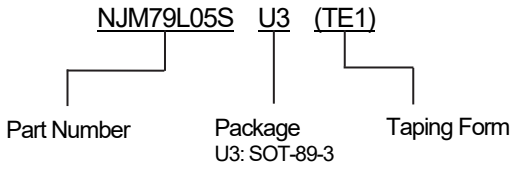
■ EQUIVALENT CIRCUIT



■ PIN CONFIGURATIONS

PIN FUNCTIONS	PIN NO.	SYMBOL	DESCRIPTION
	1	COMMON	Common pin
	2	V_{IN}	Input pin
	3	V_{OUT}	Output pin

■ PRODUCT NAME INFORMATION



■ ORDERING INFORMATION

PRODUCT NAME	OUTPUT VOLTAGE	PACKAGE	RoHS	HALOGEN-FREE	TERMINAL FINISH	MARKING	WEIGHT (mg)	MOQ (pcs)
NJM79L05SU3 (TE1)	−5.0 V	SOT-89-3	Yes	Yes	Sn-2Bi	111	61	1000
NJM79L06SU3 (TE1)	−6.0 V	SOT-89-3	Yes	Yes	Sn-2Bi	121	61	1000
NJM79L08SU3 (TE1)	−8.0 V	SOT-89-3	Yes	Yes	Sn-2Bi	131	61	1000
NJM79L09SU3 (TE1)	−9.0 V	SOT-89-3	Yes	Yes	Sn-2Bi	141	61	1000
NJM79L12SU3 (TE1)	−12 V	SOT-89-3	Yes	Yes	Sn-2Bi	151	61	1000
NJM79L15SU3 (TE1)	−15 V	SOT-89-3	Yes	Yes	Sn-2Bi	161	61	1000

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATING	UNIT
Input Voltage	V_{IN}	+0.3 to −40	V
Output Voltage	V_{OUT}	+0.3 to V_{IN} (−40) (1)	V
Power Dissipation (Ta = 25°C) SOT-89-3	P_D	2-Layer (2) / 4-Layer (3) 580 / 2200	mW
Junction Temperature	Tj	−40 to 150	°C
Operating Temperature	T_{opr}	−40 to 125	°C
Storage Temperature	T_{stg}	−50 to 150	°C

(1) Although the terminal rating is −40 V, the output voltage must not exceed the input voltage.
(2) 2-Layer: Mounted on glass epoxy board (76.2 mm × 114.3 mm × 1.6 mm: based on EIA/JEDEC standard, 2-layer FR-4).
(3) 4-Layer: Mounted on glass epoxy board (76.2 mm × 114.3 mm × 1.6 mm: based on EIA/JEDEC standard, 4-layer FR-4).
(For 4-layer: Applying 74.2 mm × 74.2 mm inner Cu area and a thermal via hole to a board based on JEDEC standard JESD51-5.)

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	VALUE	UNIT
Operating Voltage	V_{IN}	V_O − 2.0 to −30	V
Output Current	I_O	0 to 100	mA

■ **ELECTRICAL CHARACTERISTICS** C_{IN} = 0.33 µF, C_O = 1.0 µF, T_J = 25°C, unless otherwise noted.

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
NJM79L05S						
Output Voltage	V_O	V_{IN} = −10 V, I_O = 40 mA	−4.80	−5.00	−5.20	V
Line Regulation	ΔV_O-V_{IN}	V_{IN} = −7 V to −20 V, I_O = 40 mA	-	15	100	mV
Load Regulation	ΔV_O-I_O	V_{IN} = −10 V, I_O = 1 mA to 100 mA	-	7	50	mV
Quiescent Current	I_Q	V_{IN} = −10 V, I_O = 0 mA	-	3.5	6.0	mA
Dropout Voltage	ΔV_{IO}	I_O = 100 mA	-	1.6	2.0	V
Ripple Rejection	RR	V_{IN} = −8 V to −18 V, I_O = 40 mA, ein = 1 V_{P-P}, f = 120 Hz	41	76	-	dB
Output Noise Voltage	V_{NO}	V_{IN} = −10 V, BW = 10 Hz to 100 kHz, I_O = 40 mA	-	110	-	µV
NJM79L06S						
Output Voltage	V_O	V_{IN} = −12 V, I_O = 40 mA	−5.76	−6.00	−6.24	V
Line Regulation	ΔV_O-V_{IN}	V_{IN} = −8.5 V to −20 V, I_O = 40 mA	-	18	100	mV
Load Regulation	ΔV_O-I_O	V_{IN} = −12 V, I_O = 1 mA to 100 mA	-	8	60	mV
Quiescent Current	I_Q	V_{IN} = −12 V, I_O = 0 mA	-	3.5	6.0	mA
Dropout Voltage	ΔV_{IO}	I_O = 100 mA	-	1.6	2.0	V
Ripple Rejection	RR	V_{IN} = −9 V to −19 V, I_O = 40 mA, ein = 1 V_{P-P}, f = 120 Hz	40	71	-	dB
Output Noise Voltage	V_{NO}	V_{IN} = −12 V, BW = 10 Hz to 100 kHz, I_O = 40 mA	-	140	-	µV
NJU79L08S						
Output Voltage	V_O	V_{IN} = −14 V, I_O = 40 mA	−7.68	−8.00	−8.32	V
Line Regulation	ΔV_O-V_{IN}	V_{IN} = −10.5 V to −23 V, I_O = 40 mA	-	24	120	mV
Load Regulation	ΔV_O-I_O	V_{IN} = −14 V, I_O = 1 mA to 100 mA	-	10	70	mV
Quiescent Current	I_Q	V_{IN} = −14 V, I_O = 0 mA	-	3.5	6.0	mA
Dropout Voltage	ΔV_{IO}	I_O = 100 mA	-	1.6	2.0	V
Ripple Rejection	RR	V_{IN} = −11 V to −21 V, I_O = 40 mA, ein = 1 V_{P-P}, f = 120 Hz	39	69	-	dB
Output Noise Voltage	V_{NO}	V_{IN} = −14 V, BW = 10 Hz to 100 kHz, I_O = 40 mA	-	190	-	µV
NJM79L09S						
Output Voltage	V_O	V_{IN} = −15 V, I_O = 40 mA	−8.64	−9.00	−9.36	V
Line Regulation	ΔV_O-V_{IN}	V_{IN} = −11.5 V to −24 V, I_O = 40 mA	-	27	140	mV
Load Regulation	ΔV_O-I_O	V_{IN} = −15 V, I_O = 1 mA to 100 mA	-	12	75	mV
Quiescent Current	I_Q	V_{IN} = −15 V, I_O = 0 mA	-	3.5	6.0	mA
Dropout Voltage	ΔV_{IO}	I_O = 100 mA	-	1.6	2.0	V
Ripple Rejection	RR	V_{IN} = −12 V to −22 V, I_O = 40 mA, ein = 1 V_{P-P}, f = 120 Hz	38	68	-	dB
Output Noise Voltage	V_{NO}	V_{IN} = −15 V, BW =10 Hz to 100 kHz, I_O = 40 mA	-	210	-	µV
NJM79L12S						
Output Voltage	V_O	V_{IN} = −19 V, I_O = 40 mA	−11.5	−12.0	−12.5	V
Line Regulation	ΔV_O-V_{IN}	V_{IN} = −14.5 V to −27 V, I_O = 40 mA	-	36	170	mV
Load Regulation	ΔV_O-I_O	V_{IN} = −19 V, I_O = 1 mA to 100 mA	-	16	85	mV
Quiescent Current	I_Q	V_{IN} = −19 V, I_O = 0 mA	-	3.5	6.5	mA
Dropout Voltage	ΔV_{IO}	I_O = 100 mA	-	1.6	2.0	V
Ripple Rejection	RR	V_{IN} = −15 V to −25 V, I_O = 40 mA, ein = 1 V_{P-P}, f = 120 Hz	37	67	-	dB
Output Noise Voltage	V_{NO}	V_{IN} = −19 V, BW = 10 Hz to 100 kHz, I_O = 40 mA	-	290	-	µV

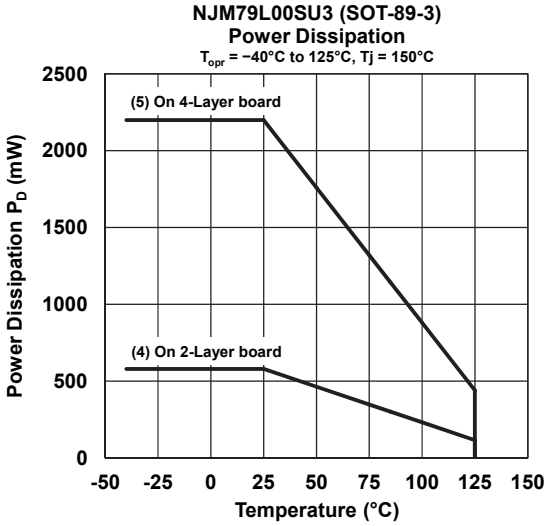
■ **ELECTRICAL CHARACTERISTICS (continued)** C_{IN} = 0.33 µF, C_O = 1.0 µF, T_J = 25°C, unless otherwise noted.

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
NJM79L15S						
Output Voltage	V_O	V_{IN} = −23 V, I_O = 40 mA	−14.4	−15.0	−15.6	V
Line Regulation	ΔV_O-V_{IN}	V_{IN} = −17.5 V to −30 V, I_O = 40 mA	-	45	200	mV
Load Regulation	ΔV_O-I_O	V_{IN} = −23 V, I_O = 1 mA to 100 mA	-	20	125	mV
Quiescent Current	I_Q	V_{IN} = −23 V, I_O = 0 mA	-	3.5	6.5	mA
Dropout Voltage	ΔV_{IO}	I_O = 100 mA	-	1.6	2.0	V
Ripple Rejection	RR	V_{IN} = −18.5 V to −28.5 V, I_O = 40 mA, ein = 1 V_{P-P}, f = 120 Hz	34	64	-	dB
Output Noise Voltage	V_{NO}	V_{IN} = −23 V, BW = 10 Hz to 100 kHz, I_O = 40 mA	-	340	-	µV

■ **THERMAL CHARACTERISTICS**

PARAMETER	SYMBOL	VALUE	UNIT
Junction-to-Ambient Thermal Resistance SOT-89-3	θja	2-Layer (4) / 4-Layer (5) 215 / 58	°C/W
Junction-to-Top of Package Characterization Parameter SOT-89-3	Ψjt	2-Layer (4) / 4-Layer (5) 40 / 19	°C/W

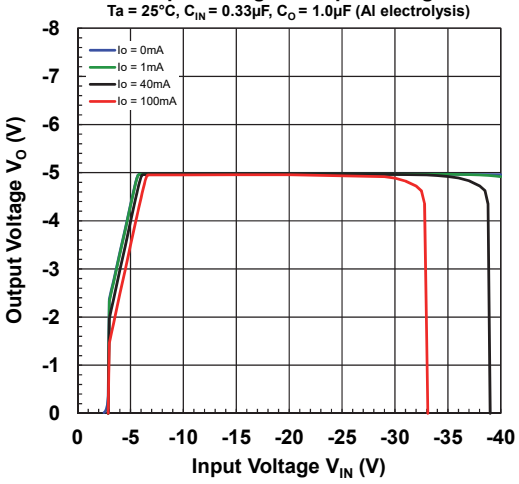
■ **POWER DISSIPATION vs. AMBIENT TEMPERATURE**



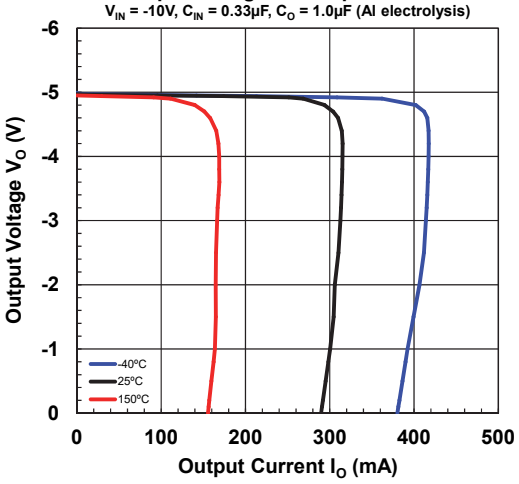
(4) 2-Layer: Mounted on glass epoxy board (76.2 mm × 114.3 mm × 1.6 mm: based on EIA/JEDEC standard, 2-layer FR-4).
(5) 4-Layer: Mounted on glass epoxy board (76.2 mm × 114.3 mm × 1.6 mm: based on EIA/JEDEC standard, 4-layer FR-4).
(For 4-layer: Applying 74.2 mm × 74.2 mm inner Cu area and a thermal via hole to a board based on JEDEC standard JESD51-5.)

■ −5V TYPICAL CHARACTERISTICS

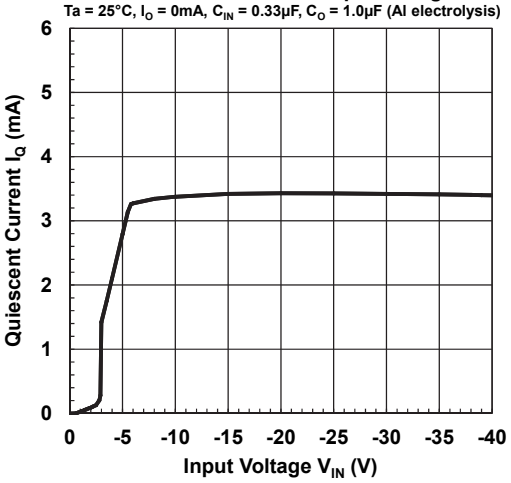
NJM79L05SU3
Output Voltage vs. Input Voltage
Ta = 25°C, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



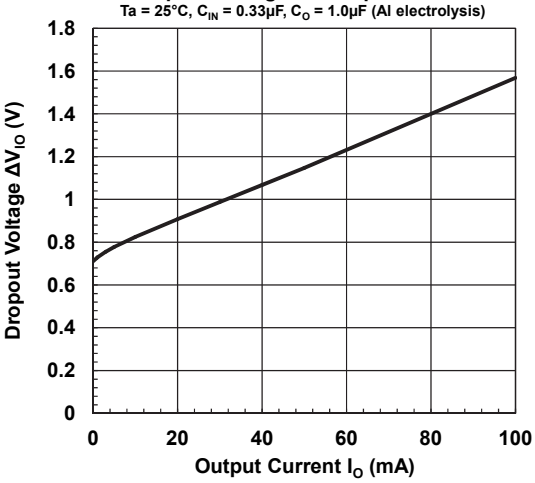
NJM79L05SU3
Output Voltage vs. Output Current
V_{IN} = -10V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



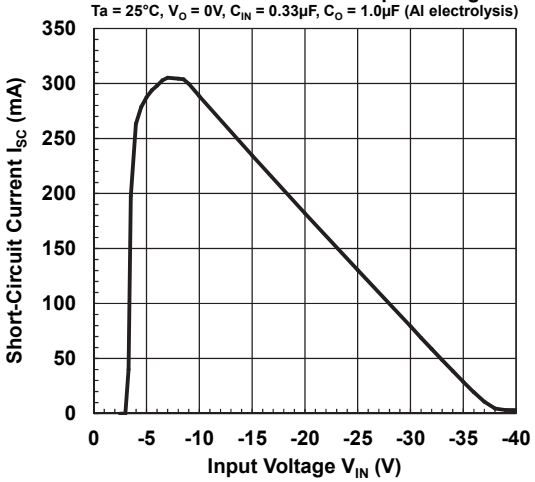
NJM79L05SU3
Quiescent Current vs. Input Voltage
Ta = 25°C, I_O = 0mA, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



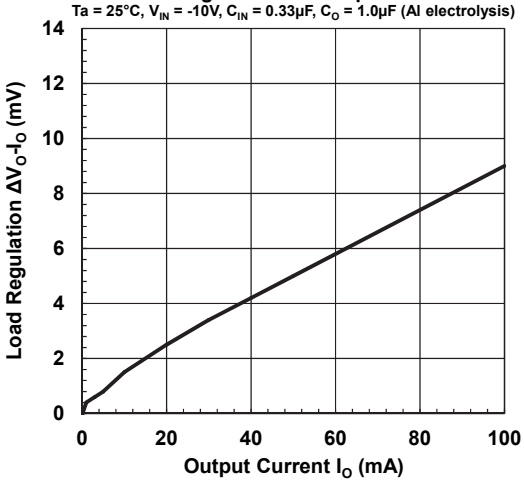
NJM79L05SU3
Dropout Voltage vs. Output Current
Ta = 25°C, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



NJM79L05SU3
Short-Circuit Current vs. Input Voltage
Ta = 25°C, V_O = 0V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

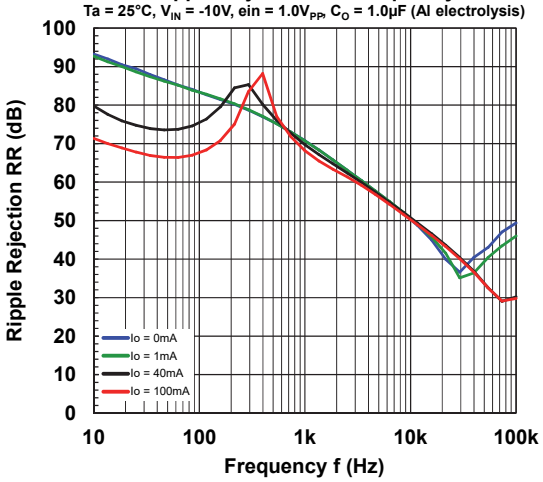


NJM79L05SU3
Load Regulation vs. Output Current
Ta = 25°C, V_{IN} = -10V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

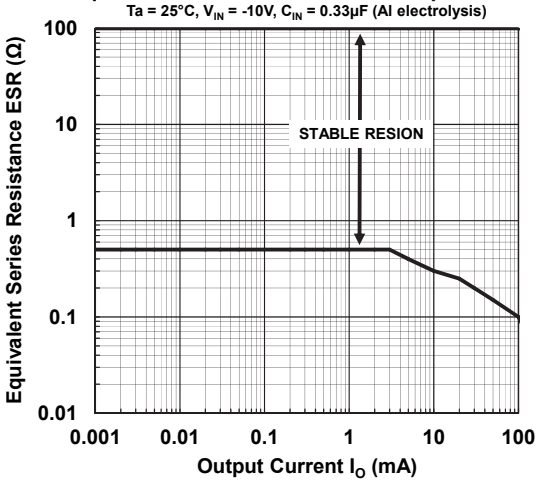


■ −5V TYPICAL CHARACTERISTICS

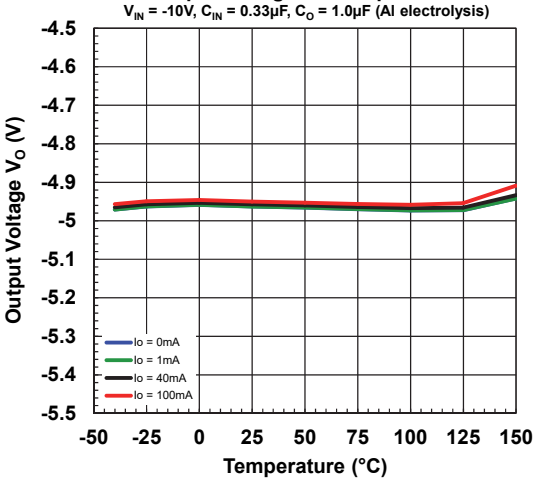
NJM79L05SU3
Ripple Rejection vs. Frequency
Ta = 25°C, V_{IN} = -10V, ein = 1.0V_{PP}, C_O = 1.0µF (Al electrolysis)



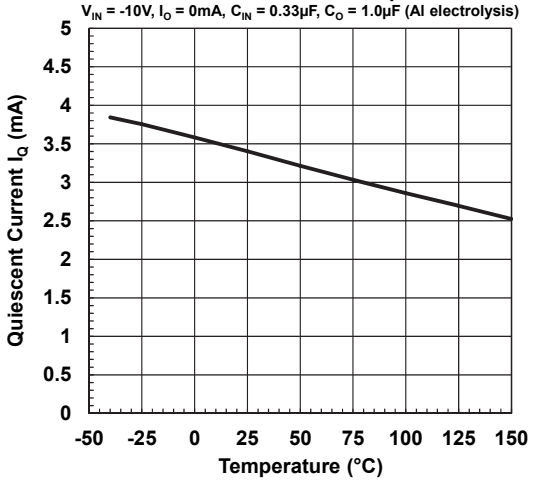
NJM79L05SU3
Equivalent Series Resistance vs. Output Current
Ta = 25°C, V_{IN} = -10V, C_{IN} = 0.33µF (Al electrolysis)



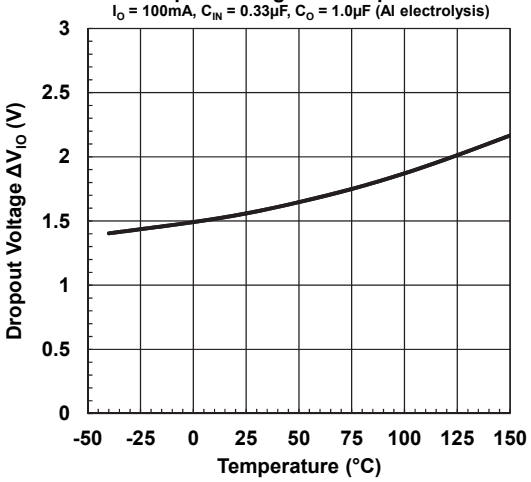
NJM79L05SU3
Output Voltage vs. Temperature
V_{IN} = -10V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



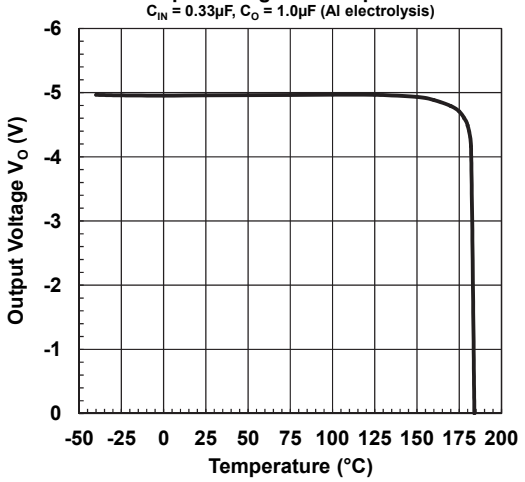
NJM79L05SU3
Quiescent Current vs. Temperature
V_{IN} = -10V, I_O = 0mA, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



NJM79L05SU3
Dropout Voltage vs. Temperature
I_O = 100mA, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

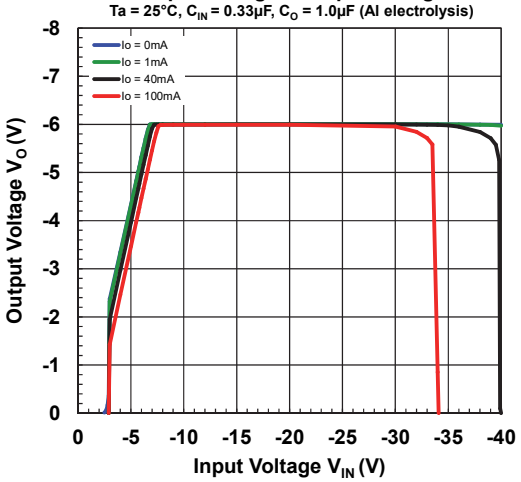


NJM79L05SU3
Output Voltage vs. Temperature
C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

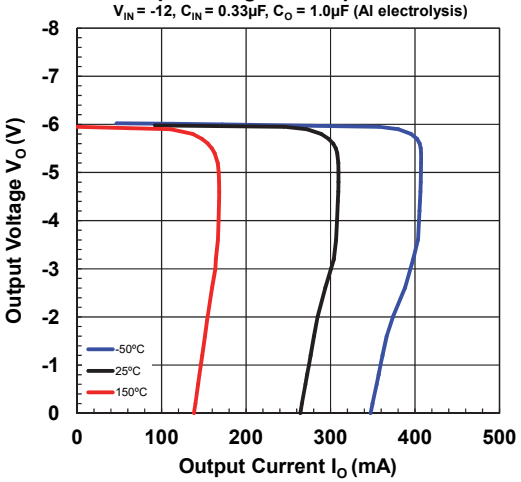


■ −6V TYPICAL CHARACTERISTICS

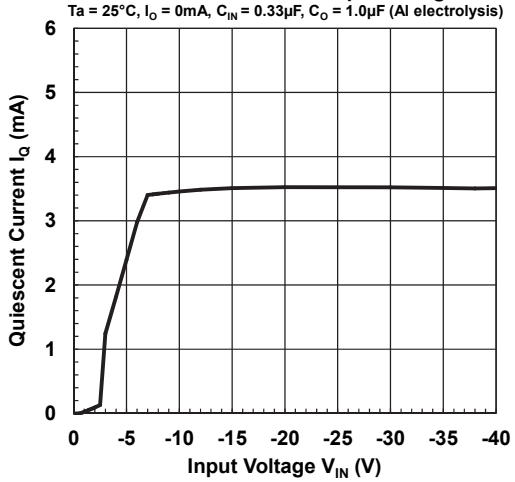
NJM79L06SU3
Output Voltage vs. Input Voltage
Ta = 25°C, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



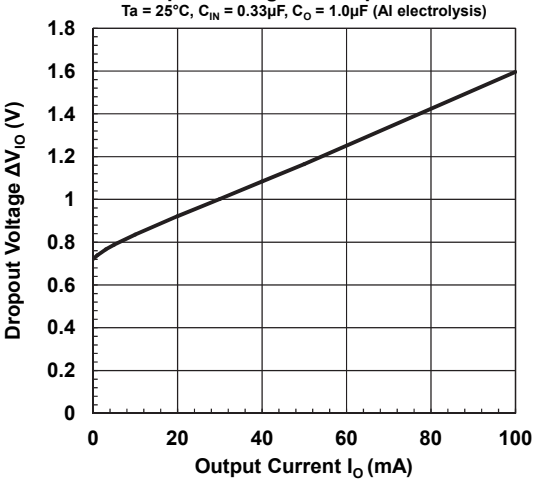
NJM79L06SU3
Output Voltage vs. Output Current
V_{IN} = -12, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



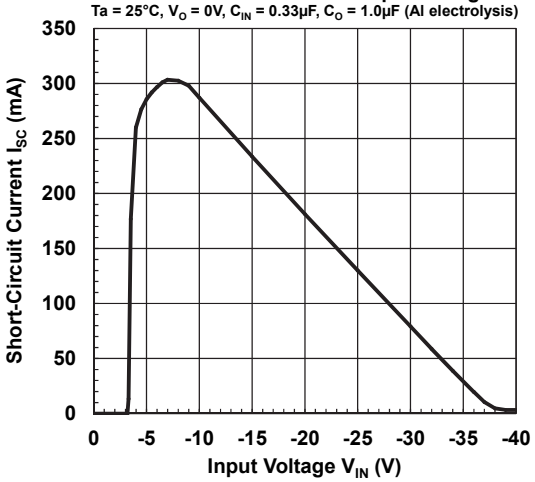
NJM79L06SU3
Quiescent Current vs. Input Voltage
Ta = 25°C, I_O = 0mA, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



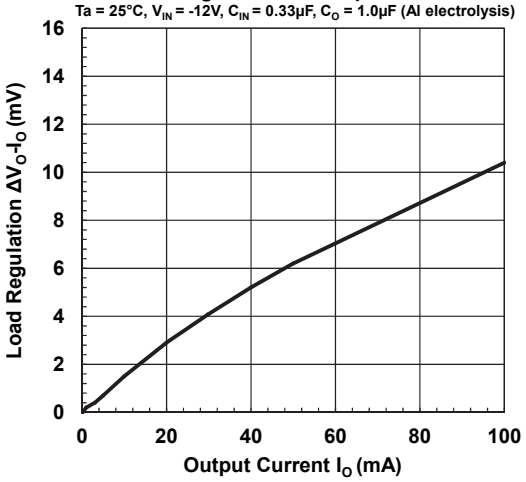
NJM79L06SU3
Dropout Voltage vs. Output Current
Ta = 25°C, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



NJM79L06SU3
Short-Circuit Current vs. Input Voltage
Ta = 25°C, V_O = 0V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

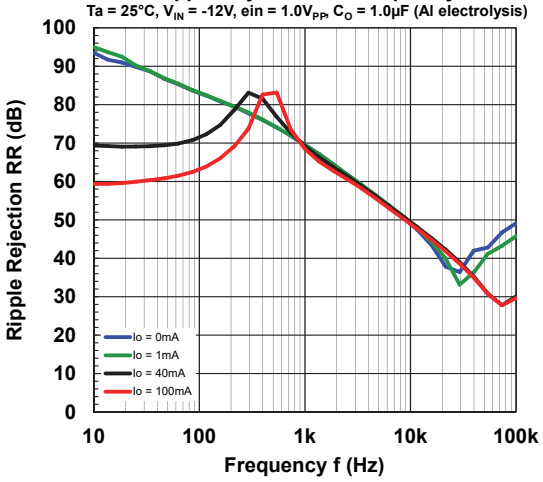


NJM79L06SU3
Load Regulation vs. Output Current
Ta = 25°C, V_{IN} = -12V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

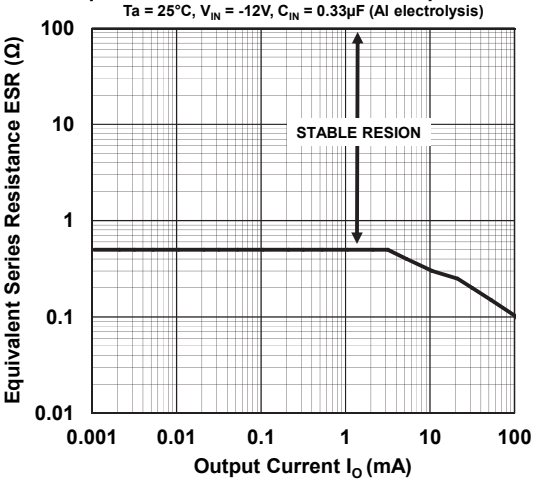


■ −6V TYPICAL CHARACTERISTICS

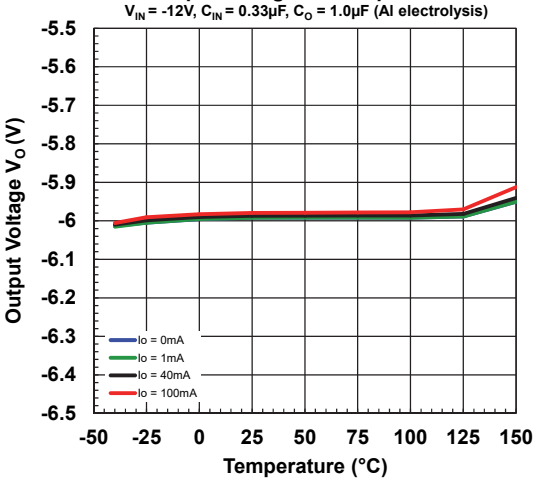
NJM79L06SU3
Ripple Rejection vs. Frequency
Ta = 25°C, V_{IN} = -12V, ein = 1.0V_{PP}, C_O = 1.0µF (Al electrolysis)



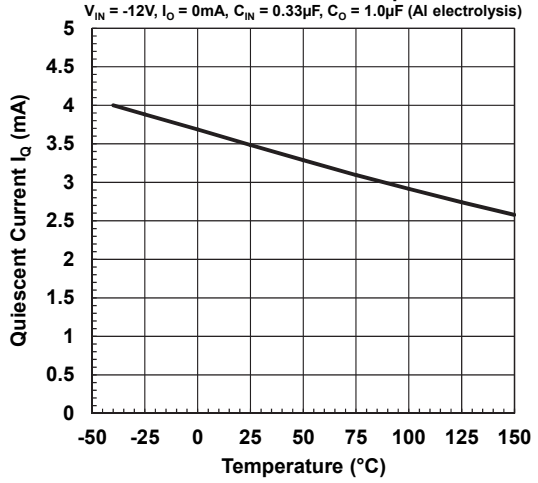
NJM79L06SU3
Equivalent Series Resistance vs. Output Current
Ta = 25°C, V_{IN} = -12V, C_{IN} = 0.33µF (Al electrolysis)



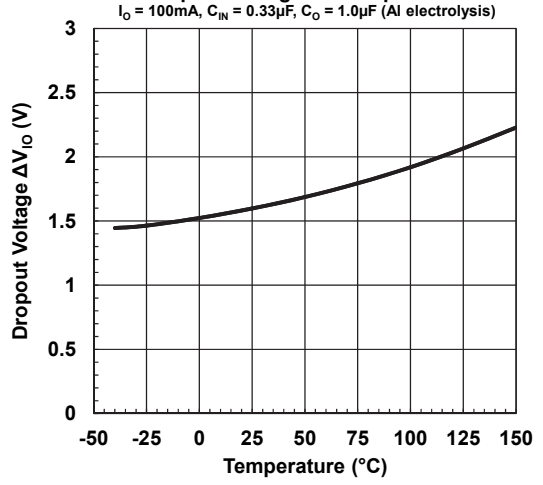
NJM79L06SU3
Output Voltage vs. Temperature
V_{IN} = -12V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



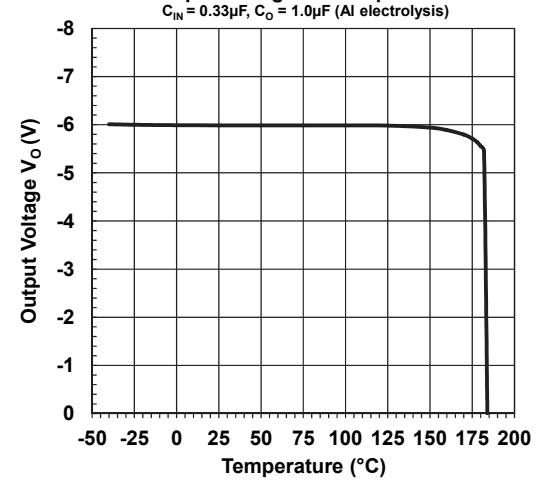
NJM79L06SU3
Quiescent Current vs. Temperature
V_{IN} = -12V, I_O = 0mA, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



NJM79L06SU3
Dropout Voltage vs. Temperature
I_O = 100mA, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

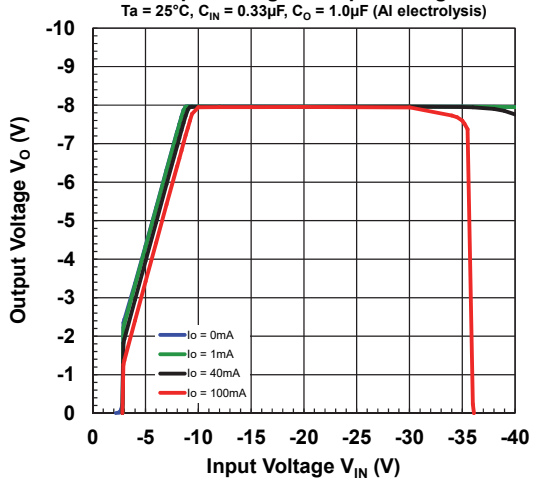


NJM79L06SU3
Output Voltage vs. Temperature
C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

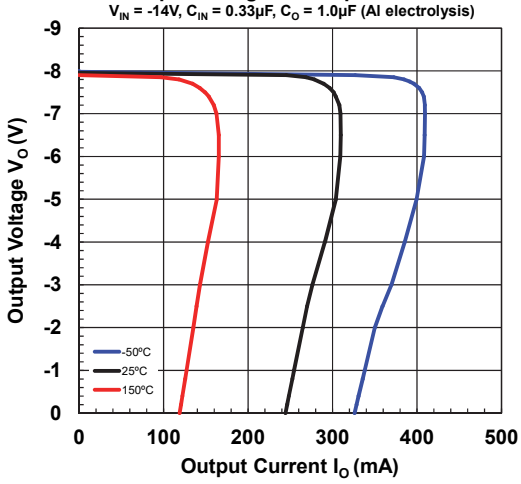


■ −8V TYPICAL CHARACTERISTICS

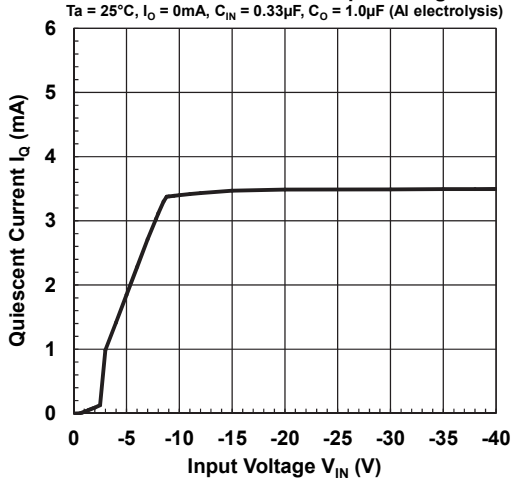
NJM79L08SU3
Output Voltage vs. Input Voltage
Ta = 25°C, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



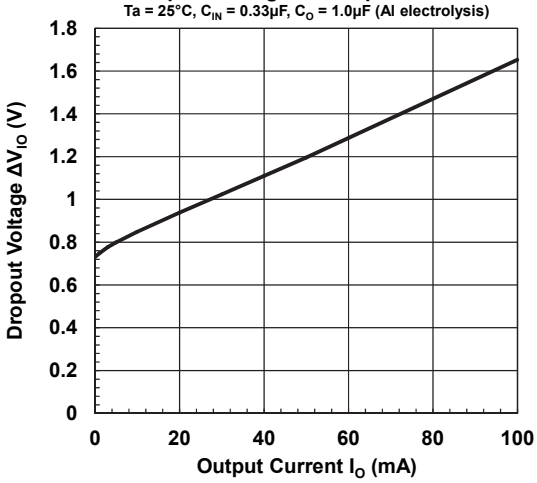
NJM79L08SU3
Output Voltage vs. Output Current
V_{IN} = -14V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



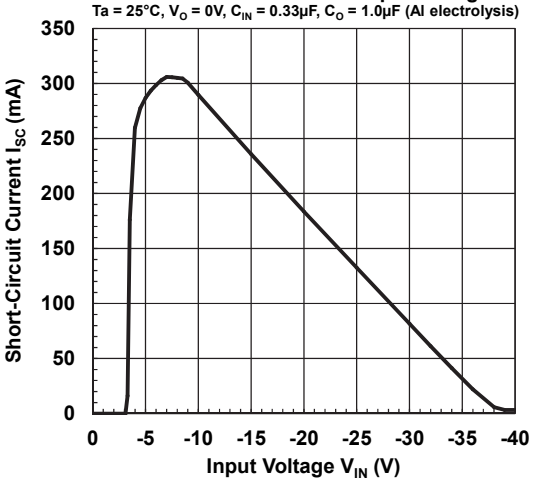
NJM79L08SU3
Quiescent Current vs. Input Voltage
Ta = 25°C, I_O = 0mA, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



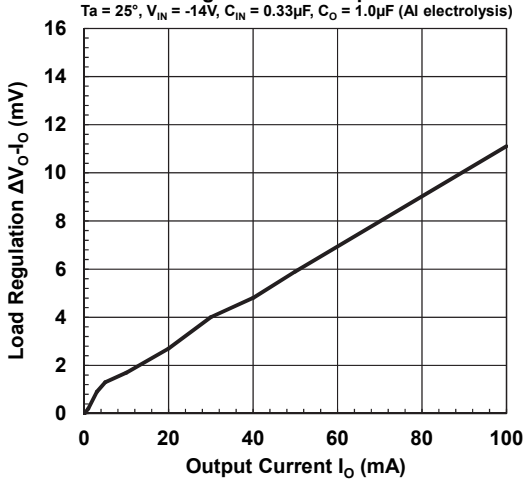
NJM79L08SU3
Dropout Voltage vs. Output Current
Ta = 25°C, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



NJM79L08SU3
Short-Circuit Current vs. Input Voltage
Ta = 25°C, V_O = 0V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

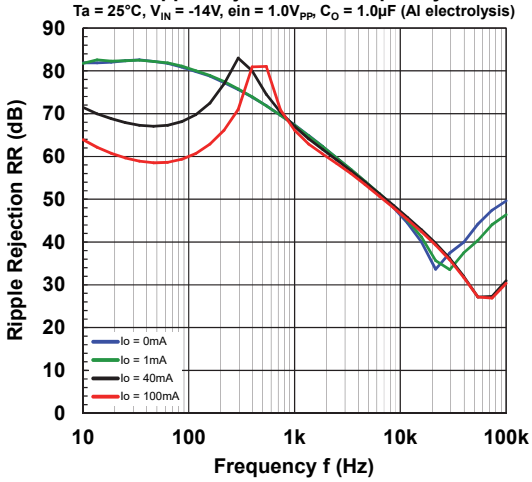


NJM79L08SU3
Load Regulation vs. Output Current
Ta = 25°, V_{IN} = -14V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

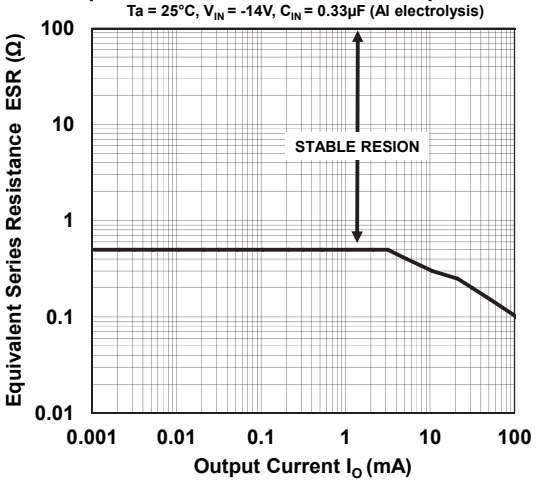


■ −8V TYPICAL CHARACTERISTICS

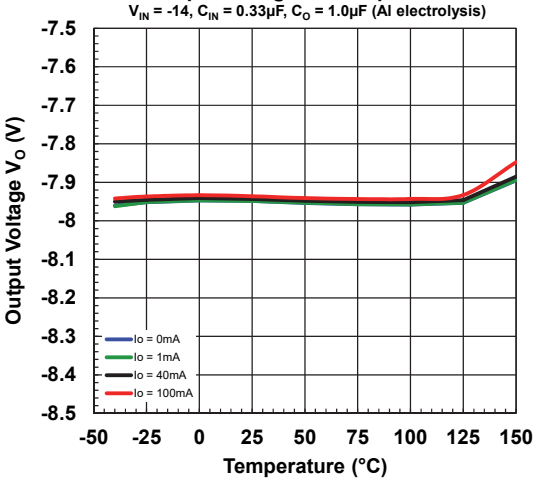
NJM79L08SU3
Ripple Rejection vs. Frequency
Ta = 25°C, V_{IN} = -14V, ein = 1.0V_{PP}, C_O = 1.0µF (Al electrolysis)



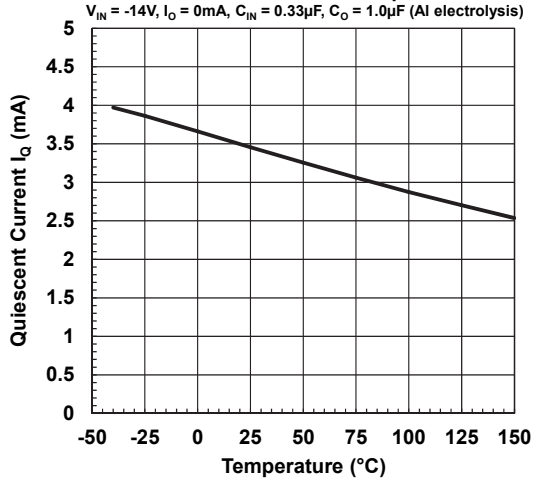
NJM79L08SU3
Equivalent Series Resistance vs. Output Current
Ta = 25°C, V_{IN} = -14V, C_{IN} = 0.33µF (Al electrolysis)



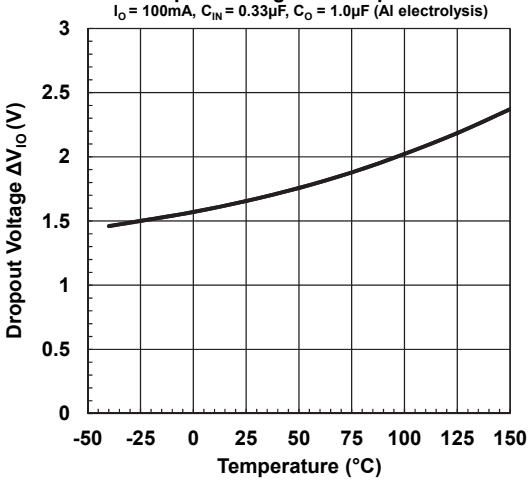
NJM79L08SU3
Output Voltage vs. Temperature
V_{IN} = -14, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



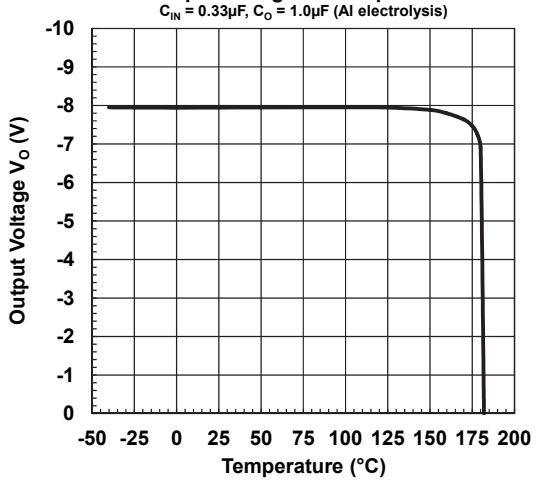
NJM79L08SU3
Quiescent Current vs. Temperature
V_{IN} = -14V, I_O = 0mA, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



NJM79L08SU3
Dropout Voltage vs. Temperature
I_O = 100mA, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

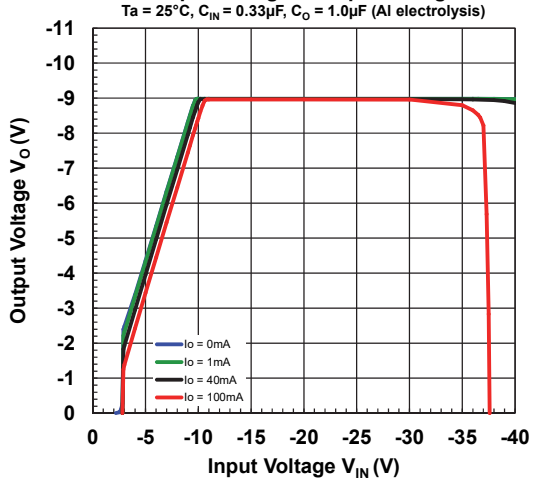


NJM79L08SU3
Output Voltage vs. Temperature
C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

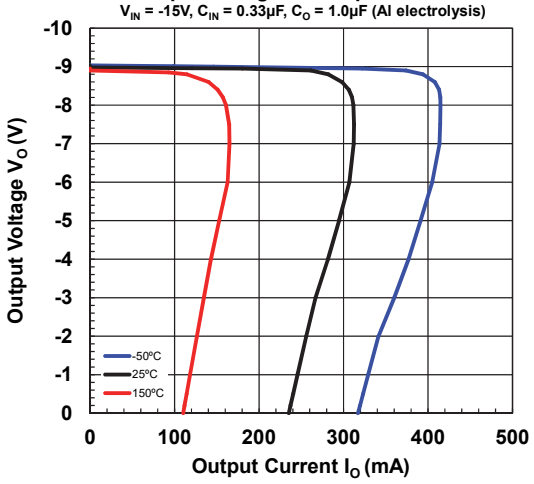


■ −9V TYPICAL CHARACTERISTICS

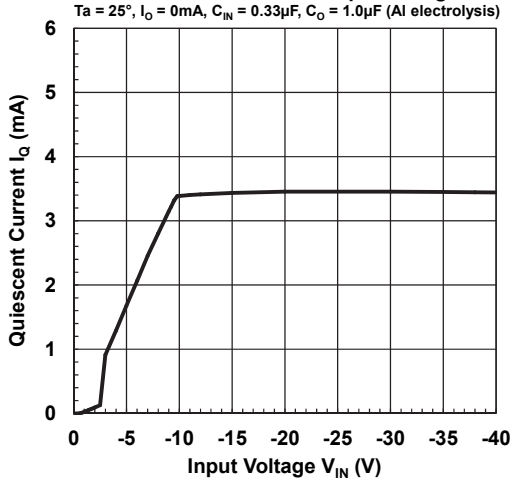
NJM79L09SU3
Output Voltage vs. Input Voltage
Ta = 25°C, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



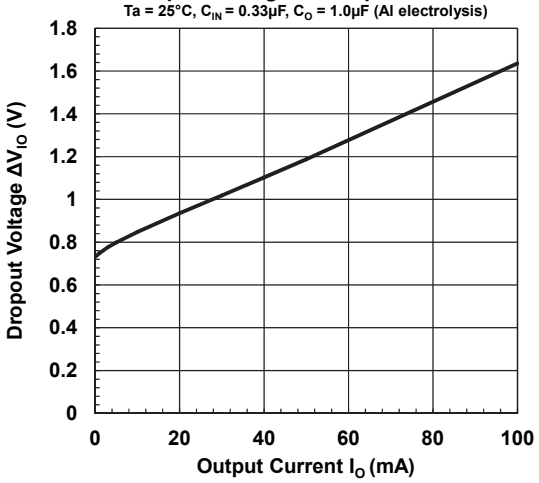
NJM79L09SU3
Output Voltage vs. Output Current
V_{IN} = -15V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



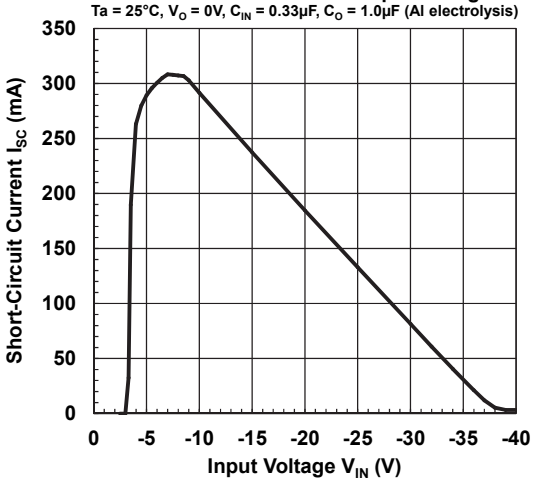
NJM79L09SU3
Quiescent Current vs. Input Voltage
Ta = 25°, I_O = 0mA, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



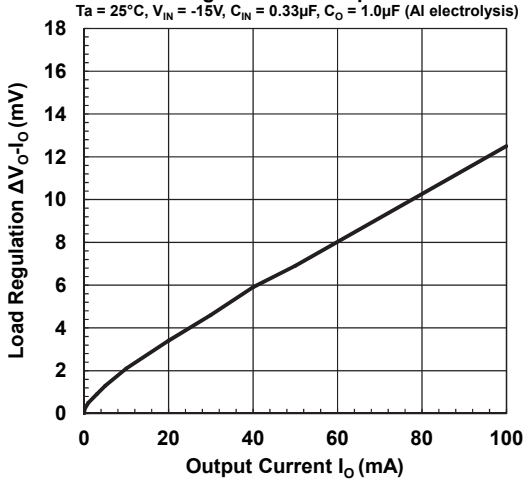
NJM79L09SU3
Dropout Voltage vs. Output Current
Ta = 25°C, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



NJM79L09SU3
Short-Circuit Current vs. Input Voltage
Ta = 25°C, V_O = 0V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

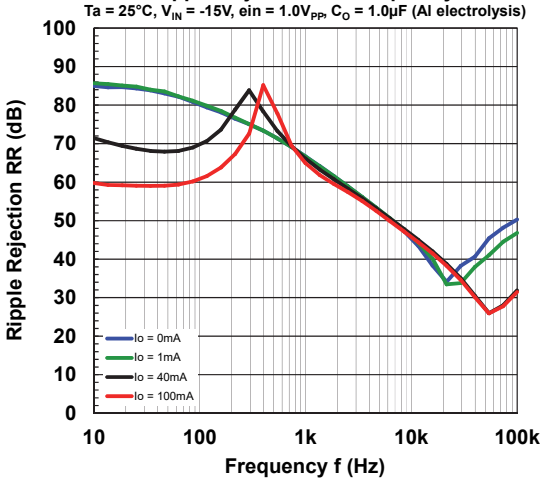


NJM79L09SU3
Load Regulation vs. Output Current
Ta = 25°C, V_{IN} = -15V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

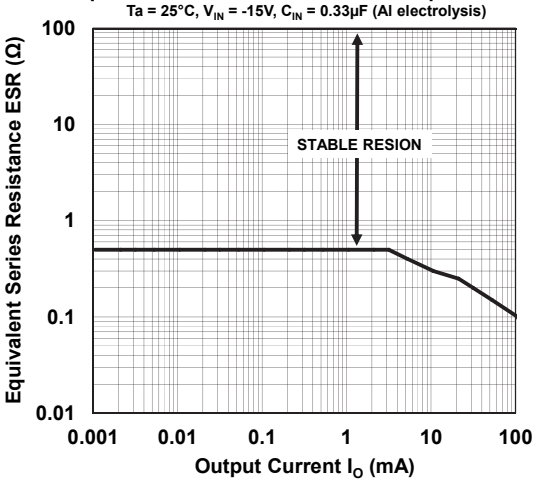


■ −9V TYPICAL CHARACTERISTICS

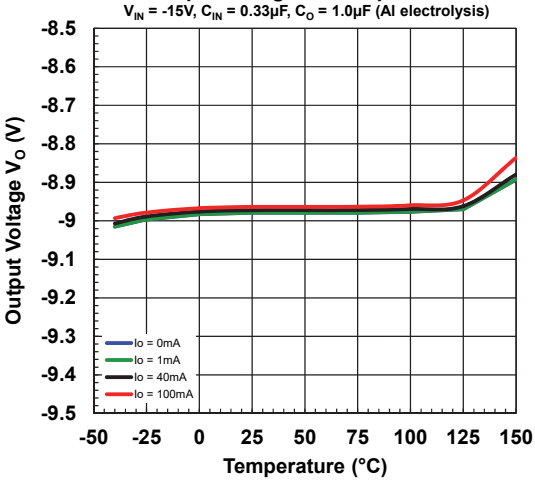
NJM79L09SU3
Ripple Rejection vs. Frequency
Ta = 25°C, V_{IN} = -15V, ein = 1.0V_{PP}, C_O = 1.0µF (Al electrolysis)



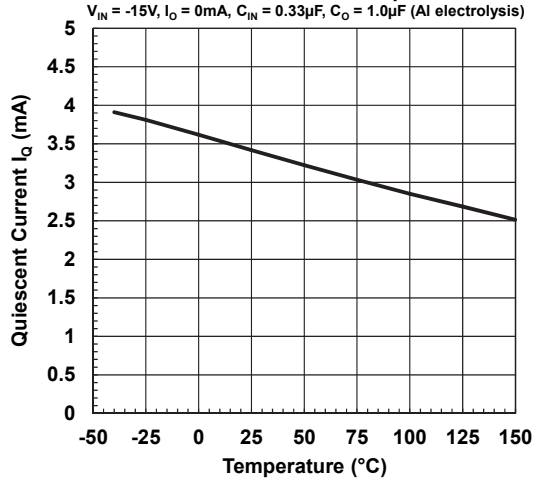
NJM79L09SU3
Equivalent Series Resistance vs. Output Current
Ta = 25°C, V_{IN} = -15V, C_{IN} = 0.33µF (Al electrolysis)



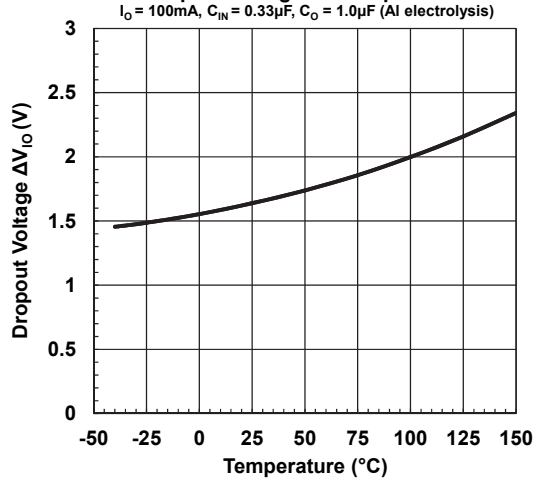
NJM79L09SU3
Output Voltage vs. Temperature
V_{IN} = -15V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



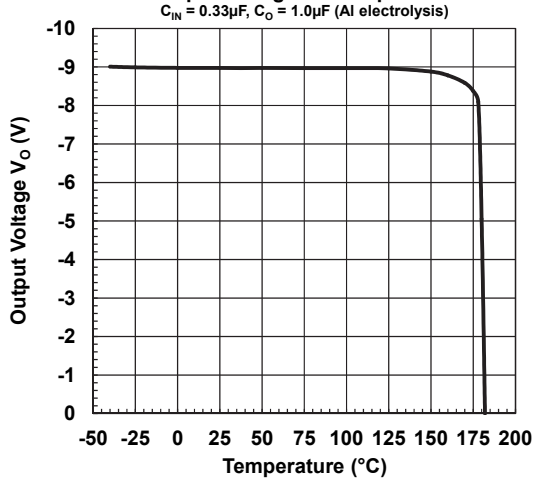
NJM79L09SU3
Quiescent Current vs. Temperature
V_{IN} = -15V, I_O = 0mA, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



NJM79L09SU3
Dropout Voltage vs. Temperature
I_O = 100mA, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

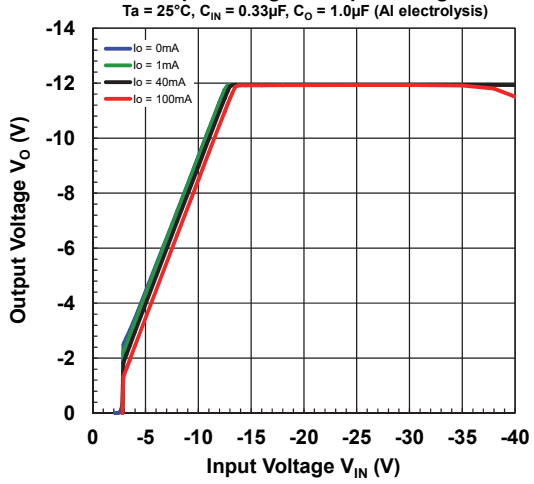


NJM79L09SU3
Output Voltage vs. Temperature
C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

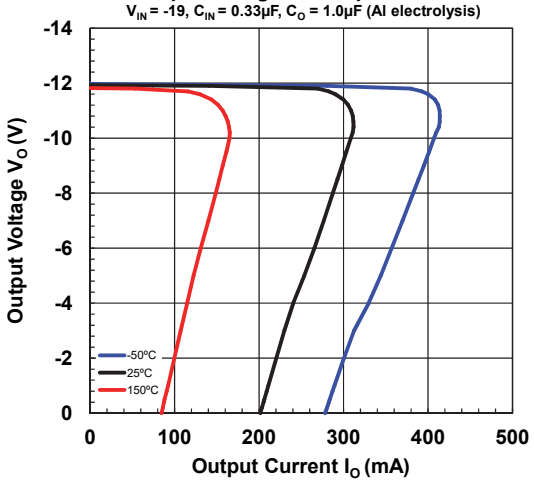


■ −12V TYPICAL CHARACTERISTICS

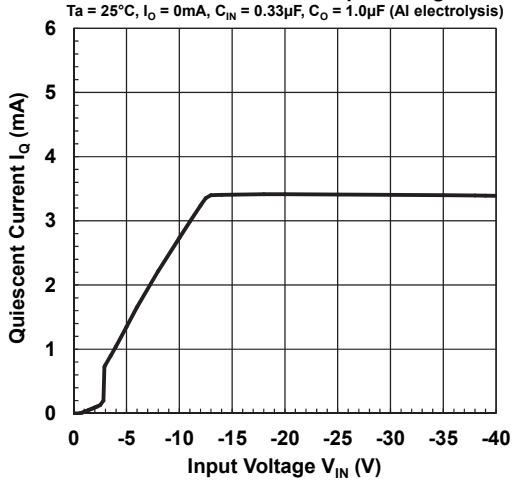
NJM79L12SU3
Output Voltage vs. Input Voltage
Ta = 25°C, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



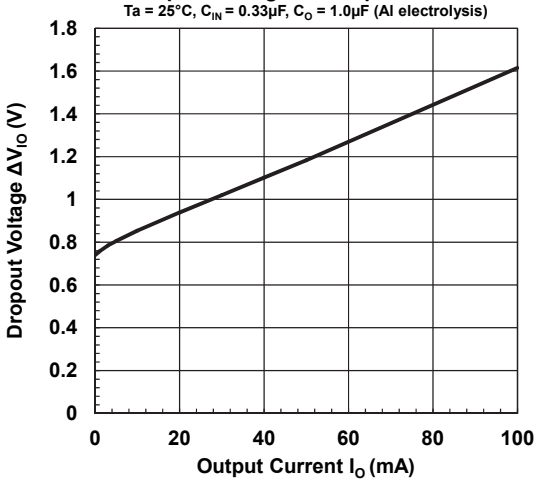
NJM79L12SU3
Output Voltage vs. Output Current
V_{IN} = -19, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



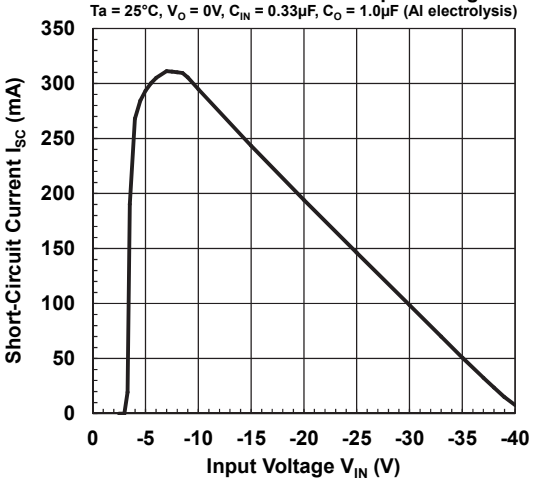
NJM79L12SU3
Quiescent Current vs. Input Voltage
Ta = 25°C, I_O = 0mA, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



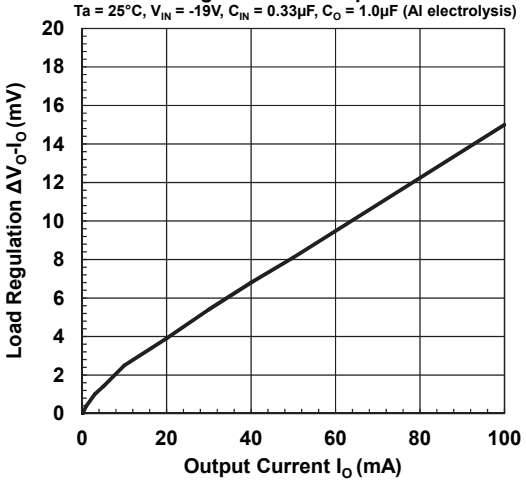
NJM79L12SU3
Dropout Voltage vs. Output Current
Ta = 25°C, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



NJM79L12SU3
Short-Circuit Current vs. Input Voltage
Ta = 25°C, V_O = 0V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

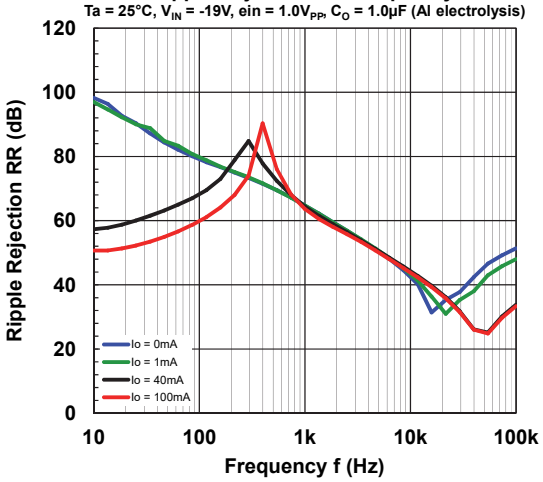


NJM79L12SU3
Load Regulation vs. Output Current
Ta = 25°C, V_{IN} = -19V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

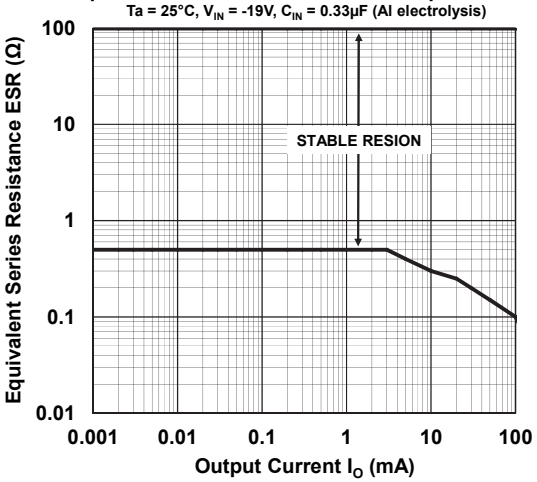


■ −12V TYPICAL CHARACTERISTICS

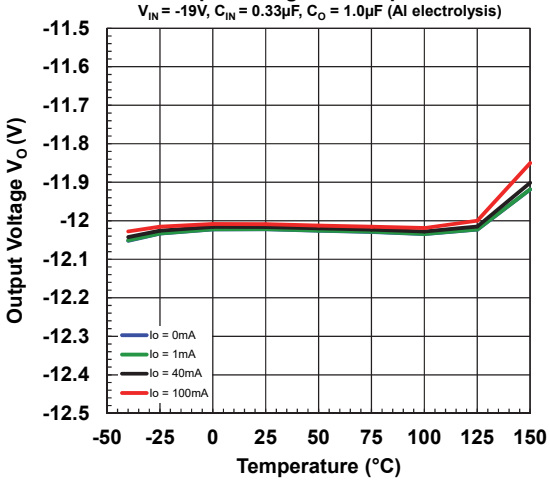
NJM79L12SU3
Ripple Rejection vs. Frequency
Ta = 25°C, V_{IN} = -19V, ein = 1.0V_{PP}, C_O = 1.0µF (Al electrolysis)



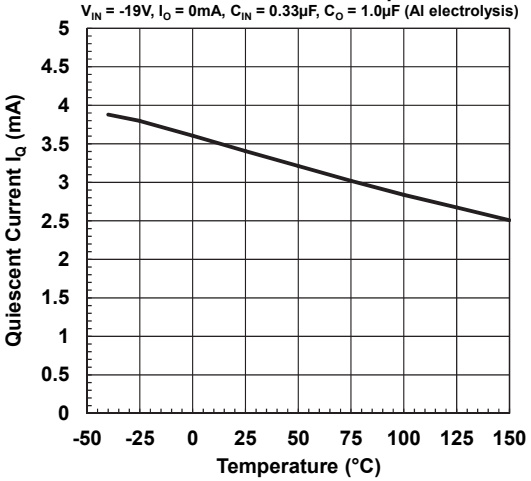
NJM79L12SU3
Equivalent Series Resistance vs. Output Current
Ta = 25°C, V_{IN} = -19V, C_{IN} = 0.33µF (Al electrolysis)



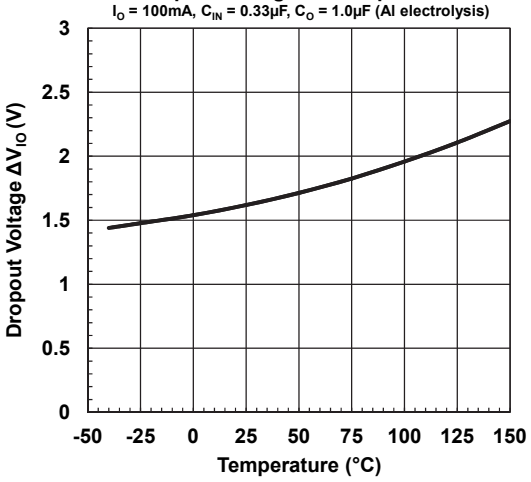
NJM79L12SU3
Output Voltage vs. Temperature
V_{IN} = -19V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



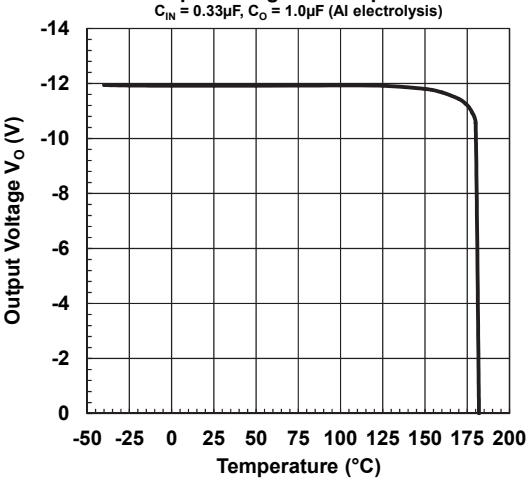
NJM79L12SU3
Quiescent Current vs. Temperature
V_{IN} = -19V, I_O = 0mA, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



NJM79L12SU3
Dropout Voltage vs. Temperature
I_O = 100mA, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

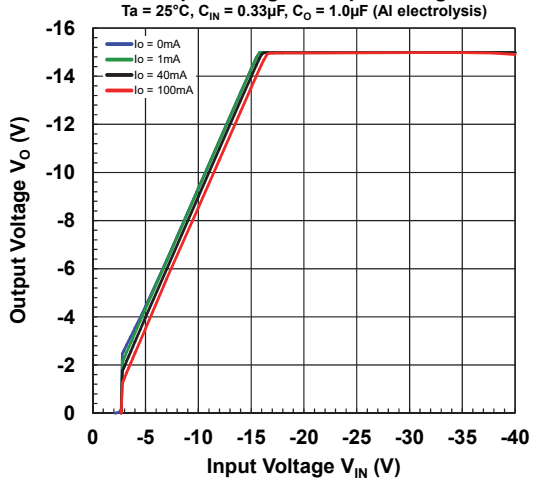


NJM79L12SU3
Output Voltage vs. Temperature
C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

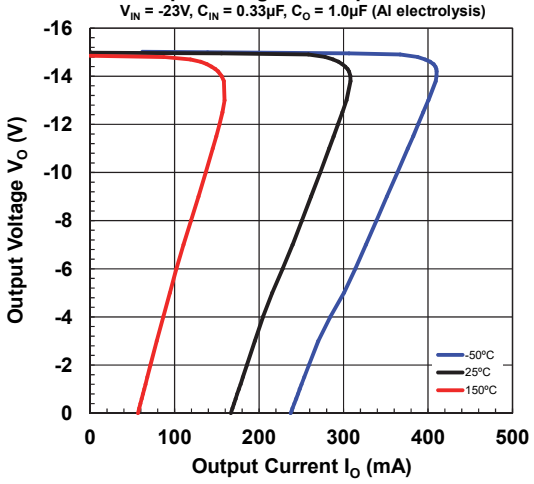


■ −15V TYPICAL CHARACTERISTICS

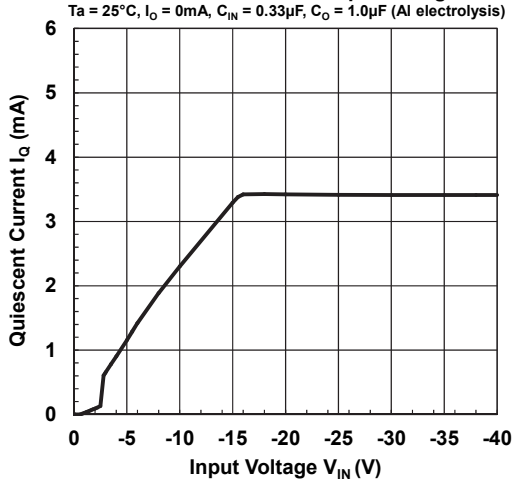
NJM79L15SU3
Output Voltage vs. Input Voltage
Ta = 25°C, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



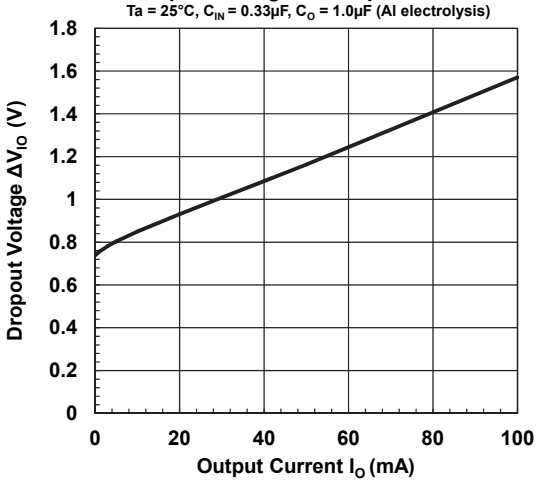
NJM79L15SU3
Output Voltage vs. Output Current
V_{IN} = -23V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



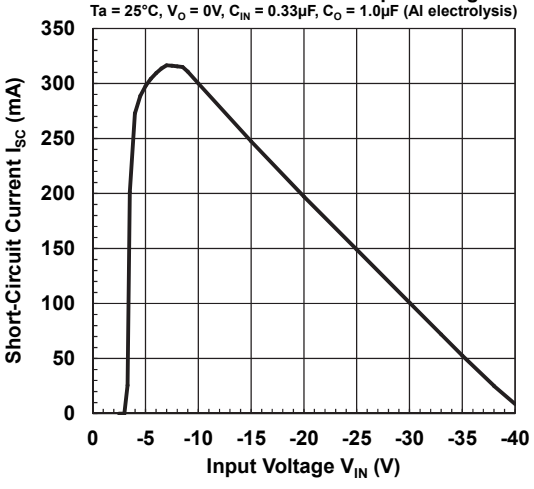
NJM79L15SU3
Quiescent Current vs. Input Voltage
Ta = 25°C, I_O = 0mA, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



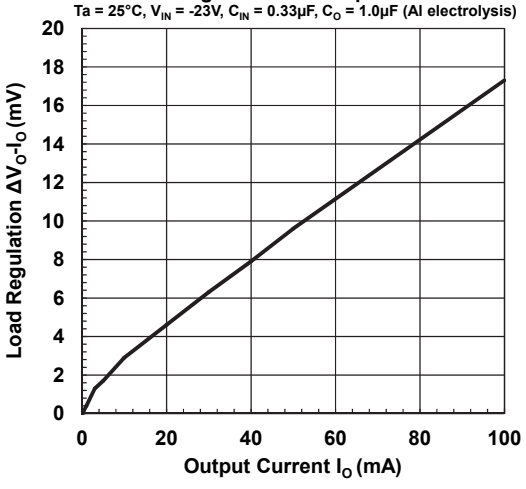
NJM79L15SU3
Dropout Voltage vs. Output Current
Ta = 25°C, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



NJM79L15SU3
Short-Circuit Current vs. Input Voltage
Ta = 25°C, V_O = 0V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

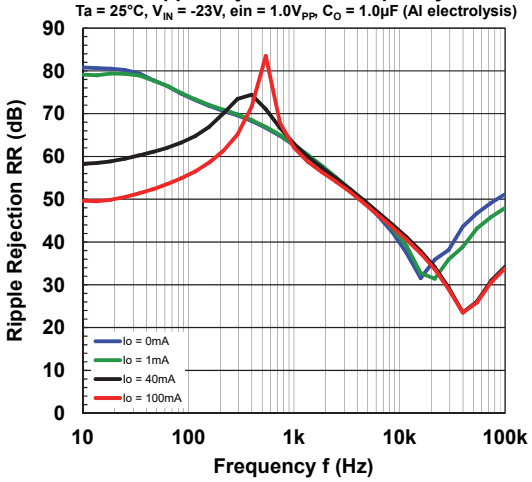


NJM79L15SU3
Load Regulation vs. Output Current
Ta = 25°C, V_{IN} = -23V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)

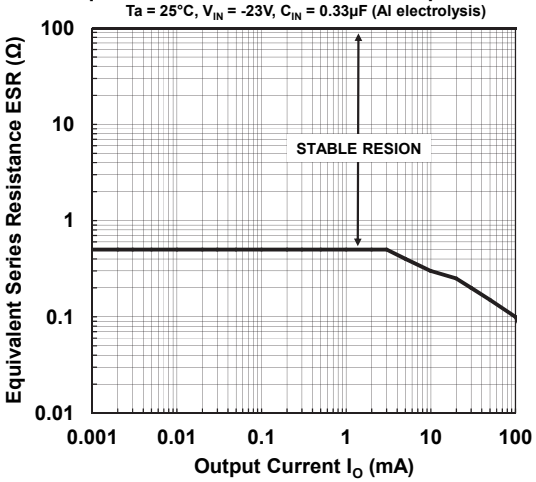


■ −15V TYPICAL CHARACTERISTICS

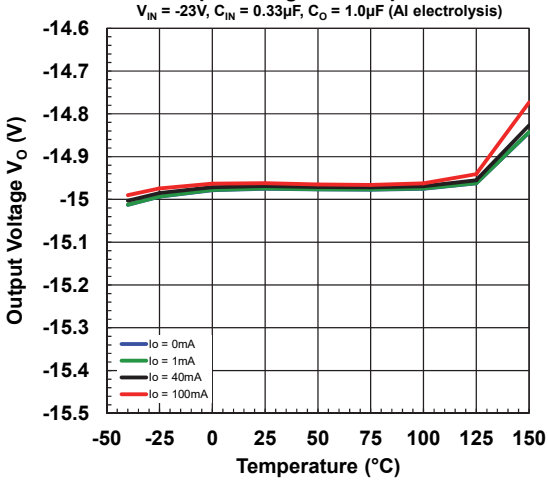
NJM79L15SU3
Ripple Rejection vs. Frequency
Ta = 25°C, V_{IN} = -23V, ein = 1.0V_{PP}, C_O = 1.0µF (Al electrolysis)



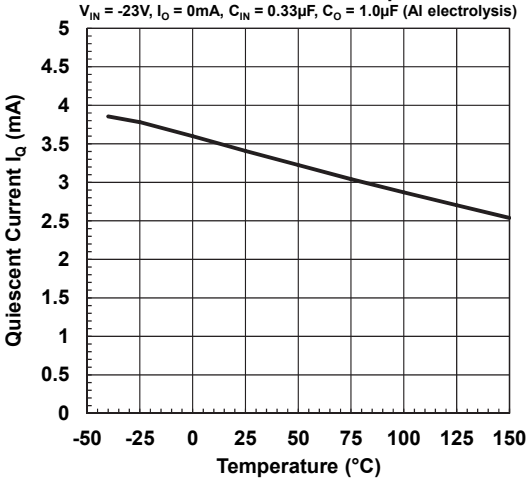
NJM79L15SU3
Equivalent Series Resistance vs. Output Current
Ta = 25°C, V_{IN} = -23V, C_{IN} = 0.33µF (Al electrolysis)



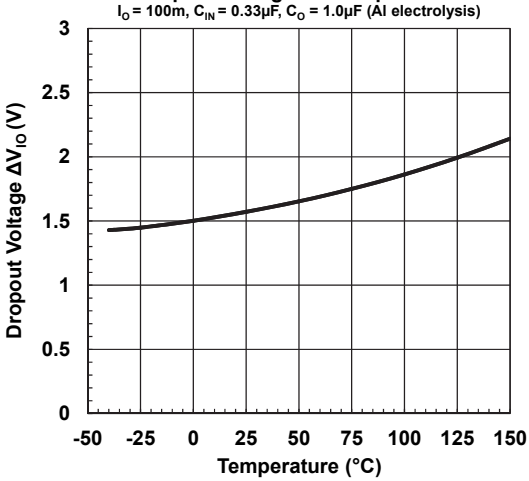
NJM79L15SU3
Output Voltage vs. Temperature
V_{IN} = -23V, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



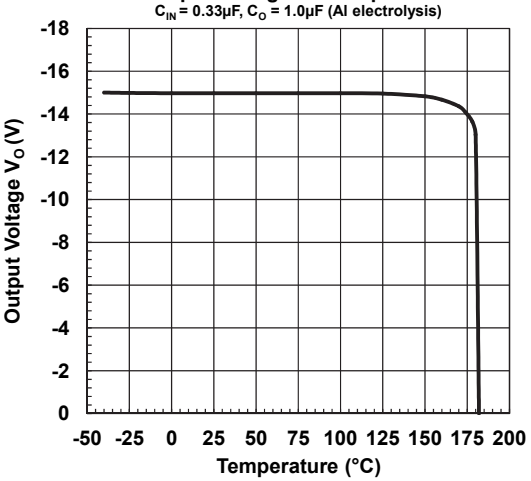
NJM79L15SU3
Quiescent Current vs. Temperature
V_{IN} = -23V, I_O = 0mA, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



NJM79L15SU3
Dropout Voltage vs. Temperature
I_O = 100m, C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



NJM79L15SU3
Output Voltage vs. Temperature
C_{IN} = 0.33µF, C_O = 1.0µF (Al electrolysis)



■ APPLICATION NOTE / GLOSSARY

Input Capacitor (C_{IN})

The C_{IN} prevents oscillations and reduce power supply ripple of applications when the power supply impedance is high or power supply line is long. Connecting a 0.33 µF or larger C_{IN} between V_{IN} and GND pins as short path as possible.

Output Capacitor (C_O)

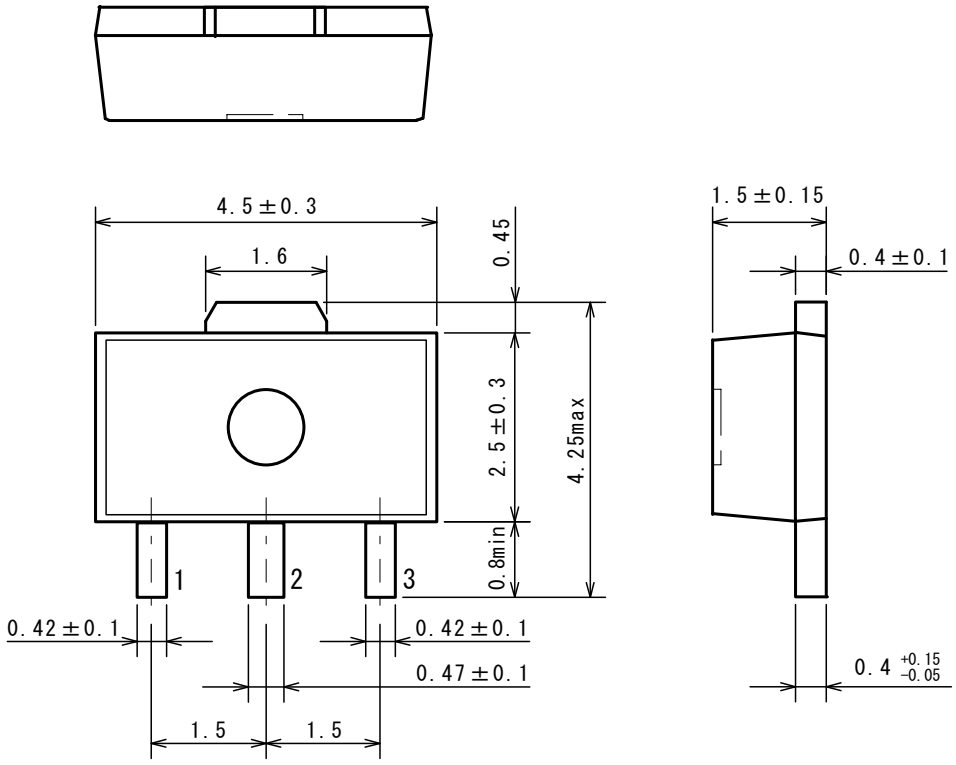
C_O is necessary for phase compensation of the error amplifier built in the regulator, and the capacitance value and ESR (Equivalent Series Resistance) affect the stability of the circuit. If a C_O with a capacitance value of less than 1.0 µF or a C_O with an ESR characteristic outside the stable area is used, output noise and/or regulator oscillation may occur due to lack of the phase compensation. For stable operation, connect a 1.0 µF or larger aluminum electrolytic capacitor with ESR characteristics within the stable operation area between the V_{OUT} and GND pins as short path as possible. As the capacitance value of C_O increases, output noise and ripple decrease, and the response to output load fluctuations also improves.

Select the output capacitor considering various characteristics such as frequency characteristics, temperature characteristics, and DC bias characteristics. For the C_O, a capacitor with excellent temperature characteristics and sufficient margin for output voltage is recommended.

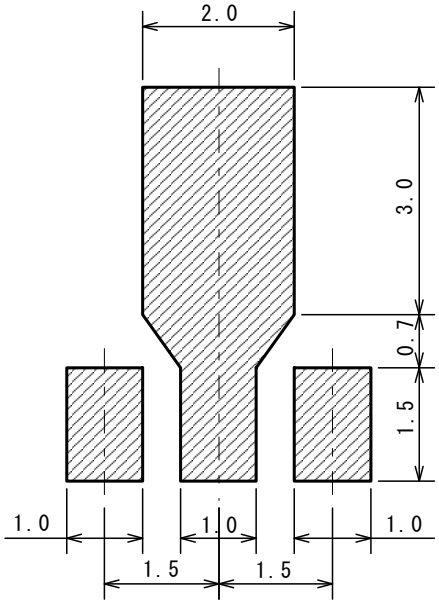
SOT-89-3

Unit: mm

■ PACKAGE DIMENSIONS



■ EXAMPLE OF SOLDER PADS DIMENSIONS

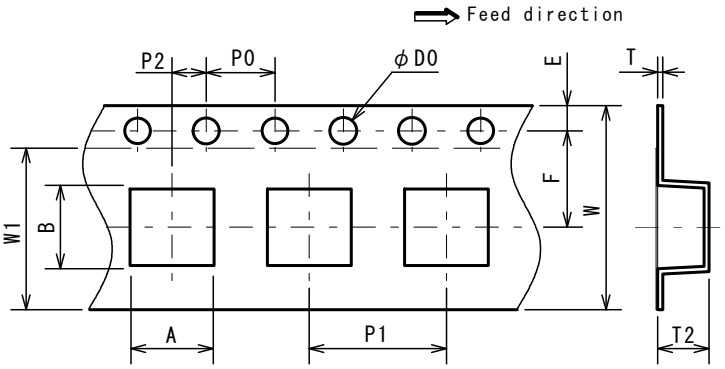


SOT-89-3

■ PACKING SPEC

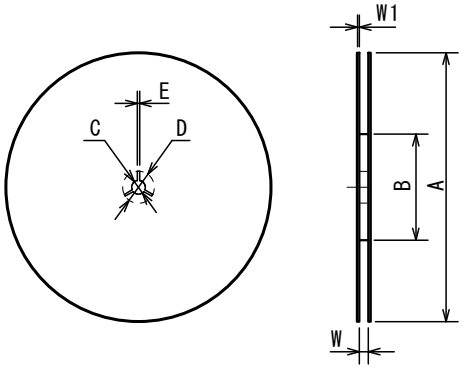
Unit: mm

TAPING DIMENSIONS



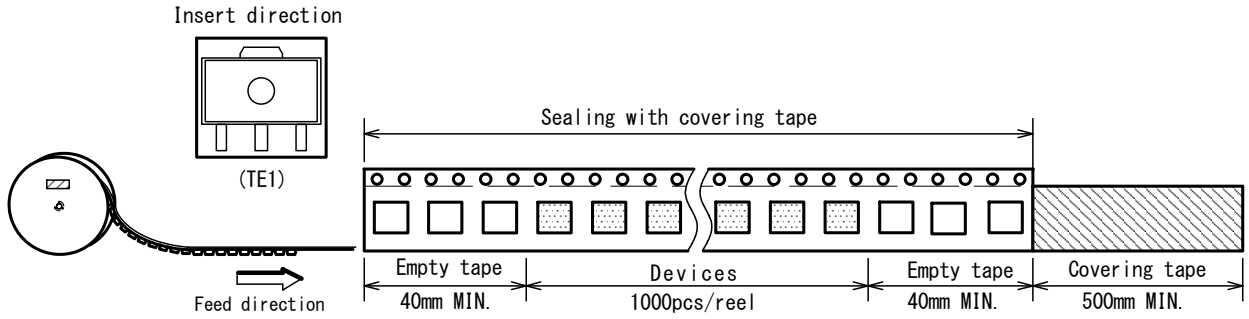
SYMBOL	DIMENSION	REMARKS
A	4.9±0.1	BOTTOM DIMENSION
B	4.5±0.1	BOTTOM DIMENSION
D0	$1.5^{+0.1}_{0}$	
E	1.5±0.1	
F	5.65±0.1	
P0	4.0±0.1	
P1	8.0±0.1	
P2	2.0±0.05	
T	0.3±0.05	
T2	2.0	
W	12.0±0.3	
W1	9.5	THICKNESS 0.1MAX

REEL DIMENSIONS

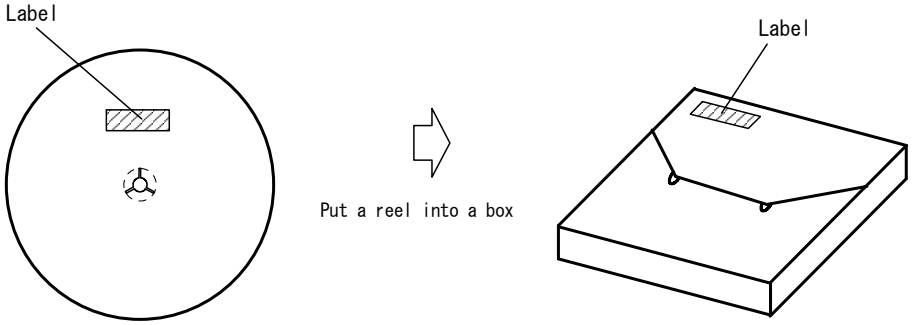


SYMBOL	DIMENSION
A	φ180±1
B	φ 60±1
C	φ 13±0.2
D	φ 21±0.8
E	2±0.5
W	13±0.5
W1	1.2±0.2

TAPING STATE

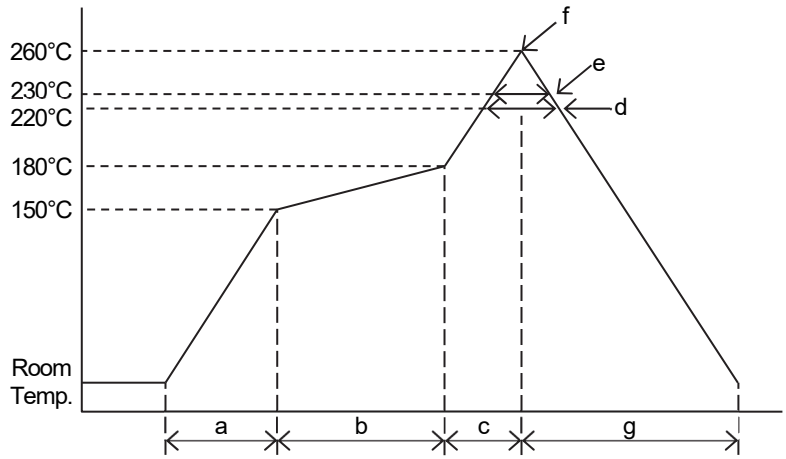


PACKING STATE



■ RECOMMENDED MOUNTING METHOD

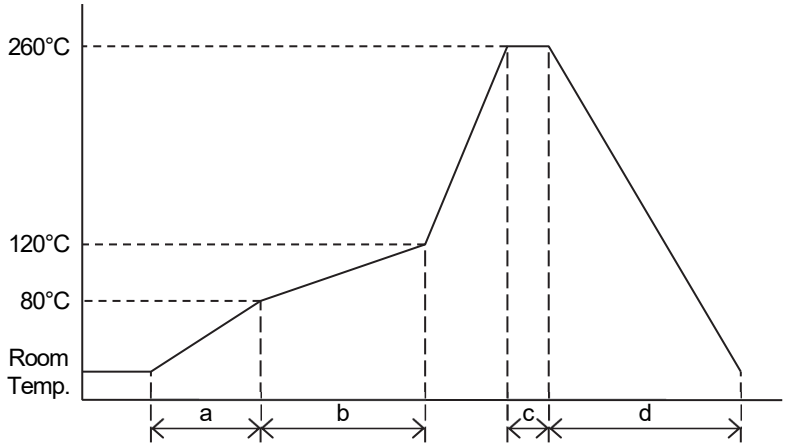
INFRARED REFLOW SOLDERING PROFILE



a	Temperature ramping rate	1 to 4°C/s
b	Pre-heating temperature Pre-heating time	150 to 180°C 60 to 120s
c	Temperature ramp rate	1 to 4°C/s
d	220°C or higher time	shorter than 60s
e	230°C or higher time	shorter than 40s
f	Peak temperature	lower than 260°C
g	Temperature ramping rate	1 to 6°C/s

The temperature indicates at the surface of mold package.

FLOW SOLDERING PROFILE



a	Temperature ramping rate	1 to 7°C/s
b	Pre-heating temperature Pre-heating time	80 to 120°C 60 to 120s
c	Peak temperature Peak time	lower than 260°C shorter than 10s
d	Temperature ramping rate	1 to 7°C/s

The temperature indicates at the surface of mold package.

■ REVISION HISTORY

DATE	REVISION	CHANGES
December 20, 2019	Ver.1.0	Initial release
August 21, 2026	Ver.2.0	Changed company name and design form

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