DATA SHEET

NEC

BIPOLAR ANALOG INTEGRATED CIRCUIT

μPC29xxB Series

THREE-TERMINAL LOW DROPOUT VOLTAGE REGULATOR (OUTPUT CURRENT: 1.0 A)

DESCRIPTION

The μPC29xxB series is a series of three-terminal low dropout voltage regulators with 1.0 A output current. This series is suitable for low voltage operated IC and has 4 output voltage types, 1.8 V, 2.5 V, 3.3 V and 5.0 V. Compared with the μPC29xx and μPC29xxA series, this series has improved output voltage tolerance (V_O ± 2%), quiescent current (1.8 mA TYP. (I_O = 0 A)), and short-circuit current.

FEATURES

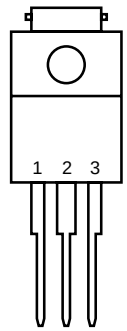
- Output current capacity: 1.0 A
- Output voltage tolerance: V_O ± 2% (T_A = 25°C)
- Low quiescent current: 1.8 mA TYP. (I_O = 0 A)
- Low short-circuit current: 0.3 A TYP. (μPC2918B), 0.6 A TYP. (μPC2925B, μPC2933B), 0.65 A TYP. (μPC2905B)
- Low dropout voltage: V_{DIF} = 0.6 V MAX. (I_O = 0.5 A)
- On-chip inrush current protection circuit at the time of input voltage rising (when input voltage is low)
- On-chip over-current limiter
- On-chip thermal shut down circuit

APPLICATIONS

Digital TV, DVD, LCD Monitors, Printers, Audio, Air Conditioners, and other applications.

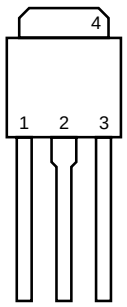
PIN CONFIGURATIONS (Marking Side)

Isolated TO-220 (MP-45G)



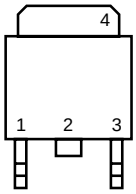
1: INPUT
2: GND
3: OUTPUT

SC-64 (MP-3)



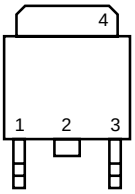
1: INPUT
2: GND Note1
3: OUTPUT
4: GND (Fin)

SC-63 (MP-3Z)



1: INPUT
2: GND Note2
3: OUTPUT
4: GND (Fin)

TO-252 (MP-3ZK)



1: INPUT
2: GND Note2
3: OUTPUT
4: GND (Fin)

Notes 1. No.2 pin and No.4 fin are common GND.

2. No.2 pin is cut. No.2 pin and No.4 fin are common GND.

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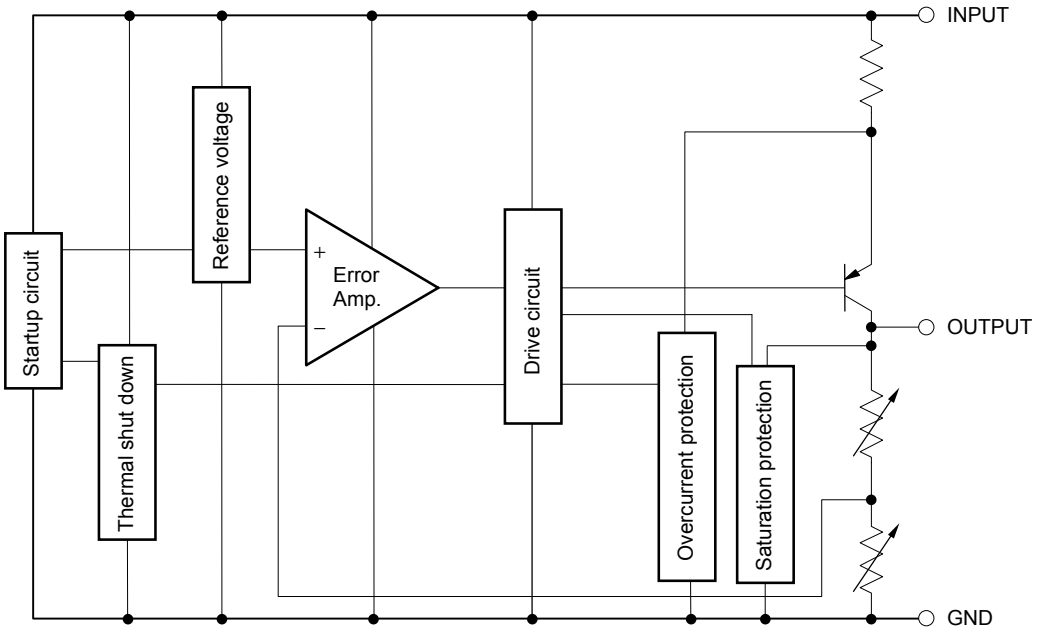
The mark <R> shows major revised points.

The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

BLOCK DIAGRAM



<R> ORDERING INFORMATION

Part Number	Package	Output Voltage	Marking
μPC2918BHF	Isolated TO-220 (MP-45G)	1.8 V	2918B
μPC2918BHB	SC-64 (MP-3)	1.8 V	2918B
μPC2918BT	SC-63 (MP-3Z)	1.8 V	2918B
μPC2918BT1D	TO-252 (MP-3ZK)	1.8 V	2918BD
μPC2925BHF	Isolated TO-220 (MP-45G)	2.5 V	2925B
μPC2925BHB	SC-64 (MP-3)	2.5 V	2925B
μPC2925BT	SC-63 (MP-3Z)	2.5 V	2925B
μPC2925BT1D	TO-252 (MP-3ZK)	2.5 V	2925BD
μPC2933BHF	Isolated TO-220 (MP-45G)	3.3 V	2933B
μPC2933BHB	SC-64 (MP-3)	3.3 V	2933B
μPC2933BT	SC-63 (MP-3Z)	3.3 V	2933B
μPC2933BT1D	TO-252 (MP-3ZK)	3.3 V	2933BD
μPC2905BHF	Isolated TO-220 (MP-45G)	5.0 V	2905B
μPC2905BHB	SC-64 (MP-3)	5.0 V	2905B
μPC2905BT	SC-63 (MP-3Z)	5.0 V	2905B
μPC2905BT1D	TO-252 (MP-3ZK)	5.0 V	2905BD

Remark Tape-packaged products have the symbol -E1, or -E2 suffixed to the part number. In Pb-free products, any of -AT, -AZ or -AY is added to the end of their part number. Refer to the following table for details.

Part Number [Note1]	Package	Package Type
μPC29xxBHF	Isolated TO-220 (MP-45G)	• Packed in envelop
μPC29xxBHF-AZ [Note2]	Isolated TO-220 (MP-45G)	• Packed in envelop
μPC29xxBHB	SC-64 (MP-3)	• Packed in envelop
μPC29xxBHB-AZ [Note2]	SC-64 (MP-3)	• Packed in envelop
μPC29xxBHB-AY [Note3]	SC-64 (MP-3)	• Packed in envelop
μPC29xxBT	SC-63 (MP-3Z)	• Packed in envelop
μPC29xxBT-AZ [Note2]	SC-63 (MP-3Z)	• Packed in envelop
μPC29xxBT-E1	SC-63 (MP-3Z)	• 16 mm wide embossed taping • Pin 1 on draw-out side • 2000 pcs/reel
μPC29xxBT-E1-AZ [Note2]	SC-63 (MP-3Z)	• 16 mm wide embossed taping • Pin 1 on draw-out side • 2000 pcs/reel
μPC29xxBT-E1-AY [Note3]	SC-63 (MP-3Z)	• 16 mm wide embossed taping • Pin 1 on draw-out side • 2000 pcs/reel
μPC29xxBT-E2	SC-63 (MP-3Z)	• 16 mm wide embossed taping • Pin 1 at take-up side • 2000 pcs/reel
μPC29xxBT-E2-AZ [Note2]	SC-63 (MP-3Z)	• 16 mm wide embossed taping • Pin 1 at take-up side • 2000 pcs/reel
μPC29xxBT-E2-AY [Note3]	SC-63 (MP-3Z)	• 16 mm wide embossed taping • Pin 1 at take-up side • 2000 pcs/reel
μPC29xxBT1D-E1	TO-252 (MP-3ZK)	• 16 mm wide embossed taping • Pin 1 on draw-out side • 2500 pcs/reel
μPC29xxBT1D-E1-AT [Note4]	TO-252 (MP-3ZK)	• 16 mm wide embossed taping • Pin 1 on draw-out side • 2500 pcs/reel
μPC29xxBT1D-E2	TO-252 (MP-3ZK)	• 16 mm wide embossed taping • Pin 1 at take-up side • 2500 pcs/reel
μPC29xxBT1D-E2-AT [Note4]	TO-252 (MP-3ZK)	• 16 mm wide embossed taping • Pin 1 at take-up side • 2500 pcs/reel

Notes 1. xx stands for symbols that indicate the output voltage.

2. Pb-free (This product does not contain Pb in the external electrode.)

3. Pb-free (This product does not contain Pb in the external electrode, Sn100% plating.)

4. Pb-free (This product does not contain Pb in the external electrode and other parts.)

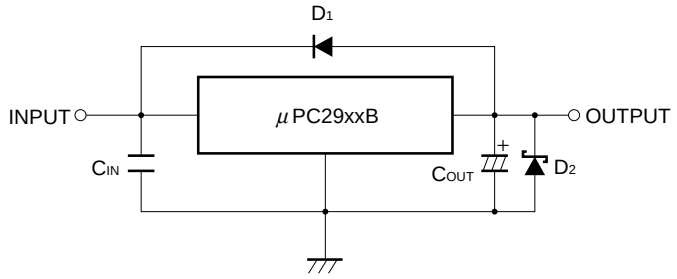
ABSOLUTE MAXIMUM RATINGS (T_A = 25°C, unless otherwise specified)

Parameter	Symbol	Rating		Unit
		μPC29xxBHF	μPC29xxBHB, μPC29xxBT, μPC29xxBT1D	
Input Voltage	V_{IN}	−0.3 to +16.0		V
Internal Power Dissipation (T_C = 25°C) Note	P_T	15	10	W
Operating Ambient Temperature	T_A	−40 to +85		°C
Operating Junction Temperature	T_J	−40 to +150		°C
Storage Temperature	T_{stg}	−55 to +150		°C
Thermal Resistance (junction to case)	$R_{th(J-C)}$	7	12.5	°C/W
Thermal Resistance (junction to ambient)	$R_{th(J-A)}$	65	125	°C/W

Note Internally limited. When the operating junction temperature rises above 150°C, the internal circuit shuts down the output voltage.

Caution Product quality may suffer if the absolute maximum rating is exceeded even momentarily for any parameter. That is, the absolute maximum ratings are rated values at which the product is on the verge of suffering physical damage, and therefore the product must be used under conditions that ensure that the absolute maximum ratings are not exceeded.

TYPICAL CONNECTION



C_{IN} : 0.1 μF or higher. Be sure to connect C_{IN} to prevent parasitic oscillation. Set this value according to the length of the line between the regulator and the INPUT pin. Use of a film capacitor or other capacitor with first-rate voltage and temperature characteristics is recommended. If using a laminated ceramic capacitor, it is necessary to ensure that C_{IN} is 0.1 μF or higher for the voltage and temperature range to be used.

C_{OUT}: 10 μF or higher. Be sure to connect C_{OUT} to prevent oscillation and improve excessive load regulation. Place C_{IN} and C_{OUT} as close as possible to the IC pins (within 1 to 2 cm). Also, use an electrolytic capacitor with low impedance characteristics if considering use at sub-zero temperatures.

D_1 : If the OUTPUT pin has a higher voltage than the INPUT pin, connect a diode.

D_2 : If the OUTPUT pin has a lower voltage than the GND pin, connect a Schottky barrier diode.

Caution Make sure that no voltage is applied to the OUTPUT pin from external.

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Type Number	MIN.	TYP.	MAX.	Unit
Input Voltage	V_{IN}	μPC2918B	2.8		12.0	V
		μPC2925B	3.5		12.0	V
		μPC2933B	4.3		12.0	V
		μPC2905B	6.0		12.0	V
Output Current	I_O	All	0		1.0	A
Operating Ambient Temperature	T_A	All	−40		+85	°C
Operating Junction Temperature	T_J	All	−40		+125	°C

Caution Use of conditions exceeding the above-listed recommended operating conditions is not a problem as long as the absolute maximum ratings are not exceeded. However, since the use of such conditions diminishes the margin of safety, careful evaluation is required before such conditions are used.

ELECTRICAL CHARACTERISTICS

μPC2918B (T_J = 25°C, V_{IN} = 2.8 V, I_O = 0.5 A, C_{IN} = 0.1 μF, C_{OUT} = 10 μF, unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output Voltage	V_{O1}		1.764	1.8	1.836	V
	V_{O2}	2.8 V ≤ V_{IN} ≤ 12 V, 0 A ≤ I_O ≤ 1 A	(1.746)	–	(1.854)	V
Line Regulation	REG_{IN}	2.8 V ≤ V_{IN} ≤ 12 V	–	4.0	25.0	mV
Load Regulation	REG_L	0 A ≤ I_O ≤ 1 A	–	3.5	30.0	mV
Quiescent Current	I_{BIAS}	I_O = 0 A	–	1.8	4.0	mA
		I_O = 0.5 A	–	18.0	(30.0)	mA
Startup Quiescent Current	$I_{BIAS(S)}$	V_{IN} = 1.7 V, I_O = 0 A	–	1.0	30.0	mA
		V_{IN} = 2.4 V, I_O = 1 A	–	–	(80.0)	mA
Quiescent Current Change	ΔI_{BIAS}	2.8 V ≤ V_{IN} ≤ 12 V	–	(3.0)	(15.0)	mA
Output Noise Voltage	V_n	10 Hz ≤ f ≤ 100 kHz	–	50.0	–	$\mu V_{r.m.s.}$
Ripple Rejection	R•R	f = 120 Hz, 2.8 V ≤ V_{IN} ≤ 3.8 V, I_O = 0.3 A	–	62	–	dB
Dropout Voltage	V_{DIF}	I_O = 0.5 A	–	0.3	0.6	V
		I_O = 1 A	–	(0.7)	–	V
Short Circuit Current	I_{Oshort}	V_{IN} = 2.8 V	(0.1)	0.3	(0.8)	A
		V_{IN} = 12 V	–	(0.4)	–	A
Peak Output Current	I_{Opeak}	V_{IN} = 2.8 V	1.0	1.3	(1.6)	A
		V_{IN} = 12 V	–	(1.1)	–	A
Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	0°C ≤ T_J ≤ 125°C, I_O = 5 mA	–	0.1	–	mV/°C

Remark Values in parentheses are product design values, and are thus provided as reference values.

μPC2925B (T_J = 25°C, V_{IN} = 3.5 V, I_O = 0.5 A, C_{IN} = 0.1 μF, C_{OUT} = 10 μF, unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output Voltage	V_{O1}		2.45	2.5	2.55	V
	V_{O2}	3.5 V ≤ V_{IN} ≤ 12 V, 0 A ≤ I_O ≤ 1 A	(2.425)	–	(2.575)	V
Line Regulation	REG_{IN}	3.5 V ≤ V_{IN} ≤ 12 V	–	5.5	25.0	mV
Load Regulation	REG_L	0 A ≤ I_O ≤ 1 A	–	3.5	40.0	mV
Quiescent Current	I_{BIAS}	I_O = 0 A	–	1.8	4.0	mA
		I_O = 0.5 A	–	18.0	(30.0)	mA
Startup Quiescent Current	$I_{BIAS(S)}$	V_{IN} = 2.4 V, I_O = 0 A	–	11.0	30.0	mA
		V_{IN} = 3.1 V, I_O = 1 A	–	–	(80.0)	mA
Quiescent Current Change	ΔI_{BIAS}	3.5 V ≤ V_{IN} ≤ 12 V	–	(3.0)	(15.0)	mA
Output Noise Voltage	V_n	10 Hz ≤ f ≤ 100 kHz	–	62.0	–	$\mu V_{r.m.s.}$
Ripple Rejection	R•R	f = 120 Hz, 3.5 V ≤ V_{IN} ≤ 4.5 V, I_O = 0.3 A	–	60	–	dB
Dropout Voltage	V_{DIF}	I_O = 0.5 A	–	0.36	0.6	V
		I_O = 1 A	–	(0.7)	–	V
Short Circuit Current	I_{Oshort}	V_{IN} = 3.5 V	(0.1)	0.6	(0.8)	A
		V_{IN} = 12 V	–	(0.4)	–	A
Peak Output Current	I_{Opeak}	V_{IN} = 3.5 V	1.0	1.3	(1.6)	A
		V_{IN} = 12 V	–	(1.1)	–	A
Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	0°C ≤ T_J ≤ 125°C, I_O = 5 mA	–	0.2	–	mV/°C

Remark Values in parentheses are product design values, and are thus provided as reference values.

μPC2933B (T_J = 25°C, V_{IN} = 5.0 V, I_O = 0.5 A, C_{IN} = 0.1 μF, C_{OUT} = 10 μF, unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output Voltage	V_{O1}		3.234	3.3	3.366	V
	V_{O2}	4.3 V ≤ V_{IN} ≤ 12 V, 0 A ≤ I_O ≤ 1 A	(3.201)	–	(3.399)	V
Line Regulation	REG_{IN}	4.3 V ≤ V_{IN} ≤ 12 V	–	6.0	25.0	mV
Load Regulation	REG_L	0 A ≤ I_O ≤ 1 A	–	4.2	50.0	mV
Quiescent Current	I_{BIAS}	I_O = 0 A	–	1.8	4.0	mA
		I_O = 0.5 A	–	18.0	(30.0)	mA
Startup Quiescent Current	$I_{BIAS(S)}$	V_{IN} = 3.1 V, I_O = 0 A	–	11.0	30.0	mA
		V_{IN} = 3.7 V, I_O = 1 A	–	–	(80.0)	mA
Quiescent Current Change	ΔI_{BIAS}	4.3 V ≤ V_{IN} ≤ 12 V	–	(3.0)	(15.0)	mA
Output Noise Voltage	V_n	10 Hz ≤ f ≤ 100 kHz	–	82.0	–	$\mu V_{r.m.s.}$
Ripple Rejection	R•R	f = 120 Hz, 4.3 V ≤ V_{IN} ≤ 5.3 V, I_O = 0.3 A	–	58	–	dB
Dropout Voltage	V_{DIF}	I_O = 0.5 A	–	0.36	0.6	V
		I_O = 1 A	–	(0.7)	–	V
Short Circuit Current	I_{Oshort}	V_{IN} = 5.0 V	(0.1)	0.6	(0.8)	A
		V_{IN} = 12 V	–	(0.4)	–	A
Peak Output Current	I_{Opeak}	V_{IN} = 5.0 V	1.0	1.5	(1.6)	A
		V_{IN} = 12 V	–	(1.1)	–	A
Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	0°C ≤ T_J ≤ 125°C, I_O = 5 mA	–	0.4	–	mV/°C

Remark Values in parentheses are product design values, and are thus provided as reference values.

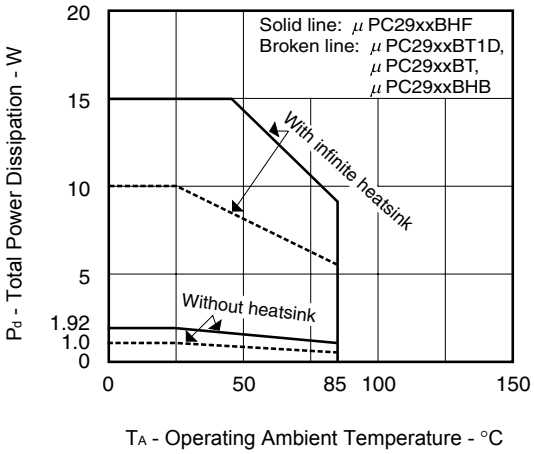
μPC2905B (T_J = 25°C, V_{IN} = 6.0 V, I_O = 0.5 A, C_{IN} = 0.1 μF, C_{OUT} = 10 μF, unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output Voltage	V_{O1}		4.90	5.0	5.10	V
	V_{O2}	6.0 V ≤ V_{IN} ≤ 12 V, 0 A ≤ I_O ≤ 1 A	(4.85)	–	(5.15)	V
Line Regulation	REG_{IN}	6.0 V ≤ V_{IN} ≤ 12 V	–	6.5	25.0	mV
Load Regulation	REG_L	0 A ≤ I_O ≤ 1 A	–	5.0	80.0	mV
Quiescent Current	I_{BIAS}	I_O = 0 A	–	1.8	4.0	mA
		I_O = 0.5 A	–	18.0	(30.0)	mA
Startup Quiescent Current	$I_{BIAS(S)}$	V_{IN} = 4.8 V, I_O = 0 A	–	11.0	30.0	mA
		V_{IN} = 5.5 V, I_O = 1 A	–	–	(80.0)	mA
Quiescent Current Change	ΔI_{BIAS}	6.0 V ≤ V_{IN} ≤ 12 V	–	(3.0)	(15.0)	mA
Output Noise Voltage	V_n	10 Hz ≤ f ≤ 100 kHz	–	122.0	–	$\mu V_{r.m.s.}$
Ripple Rejection	R•R	f = 120 Hz, 6.0 V ≤ V_{IN} ≤ 7 V, I_O = 0.3 A	–	57	–	dB
Dropout Voltage	V_{DIF}	I_O = 0.5 A	–	0.38	0.6	V
		I_O = 1 A	–	(0.7)	–	V
Short Circuit Current	I_{Oshort}	V_{IN} = 6.5 V	(0.1)	0.65	(0.8)	A
		V_{IN} = 12 V	–	(0.4)	–	A
Peak Output Current	I_{Opeak}	V_{IN} = 6.5 V	1.0	1.5	(1.6)	A
		V_{IN} = 12 V	–	(1.1)	–	A
Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	0°C ≤ T_J ≤ 125°C, I_O = 5 mA	–	0.6	–	mV/°C

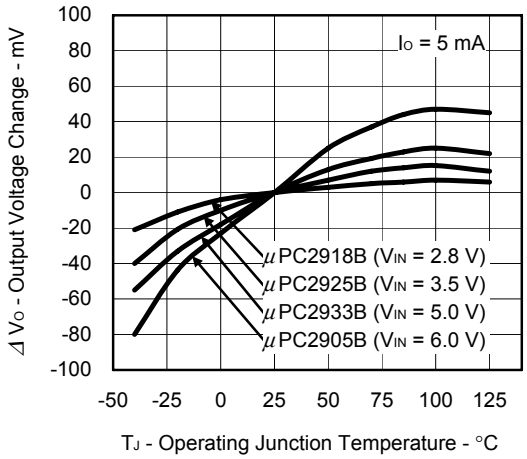
Remark Values in parentheses are product design values, and are thus provided as reference values.

TYPICAL CHARACTERISTICS (T_A = 25°C)

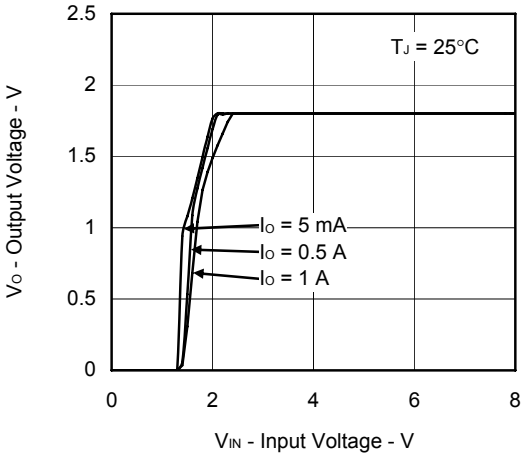
P_d vs. T_A



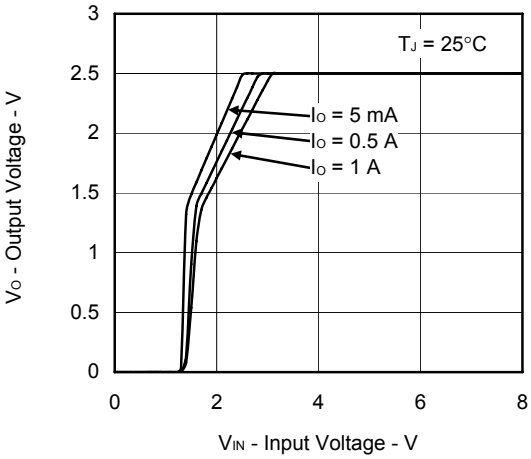
ΔV_O vs. T_J



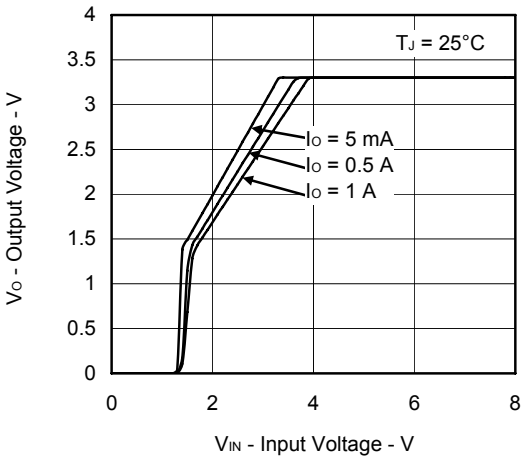
V_O vs. V_{IN} (μPC2918B)



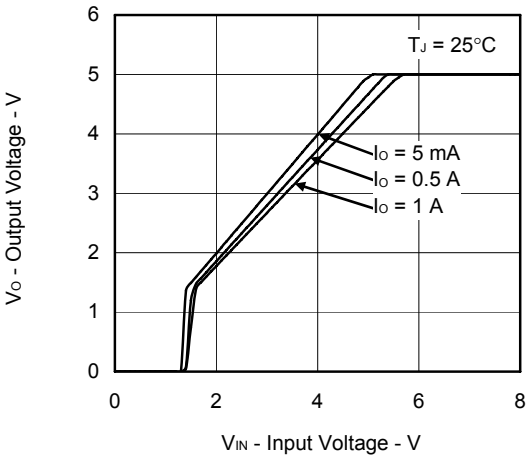
V_O vs. V_{IN} (μPC2925B)



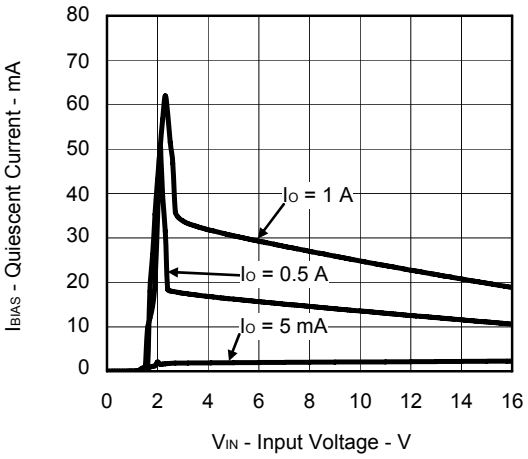
V_O vs. V_{IN} (μPC2933B)



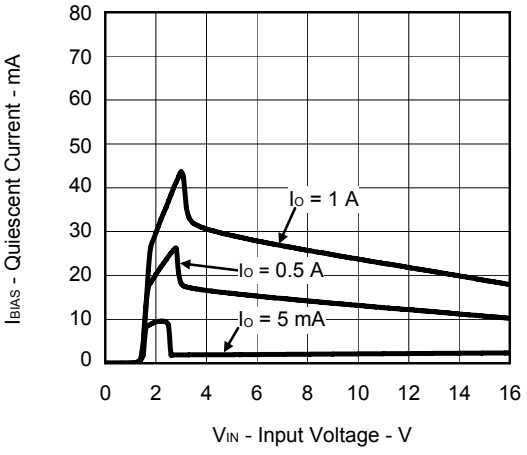
V_O vs. V_{IN} (μPC2905B)



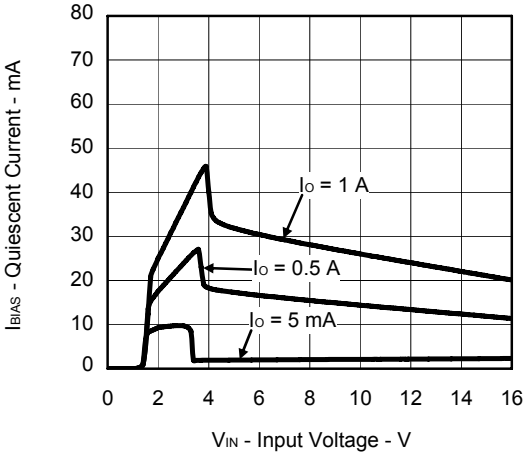
I_{BIAS} ($I_{BIAS(S)}$) vs. V_{IN} (μPC2918B)



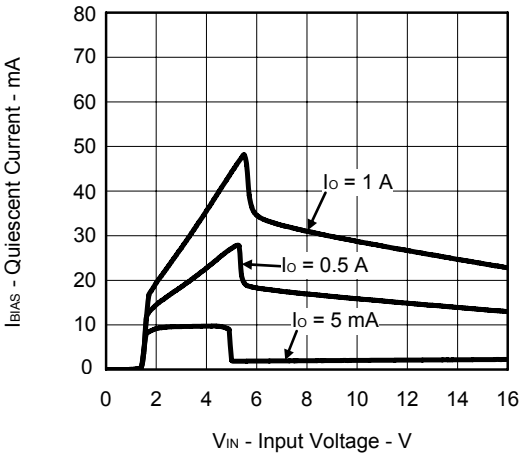
I_{BIAS} ($I_{BIAS(S)}$) vs. V_{IN} (μPC2925B)



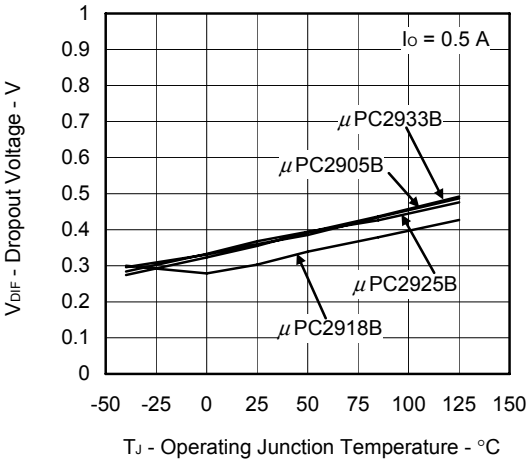
I_{BIAS} ($I_{BIAS(S)}$) vs. V_{IN} (μPC2933B)



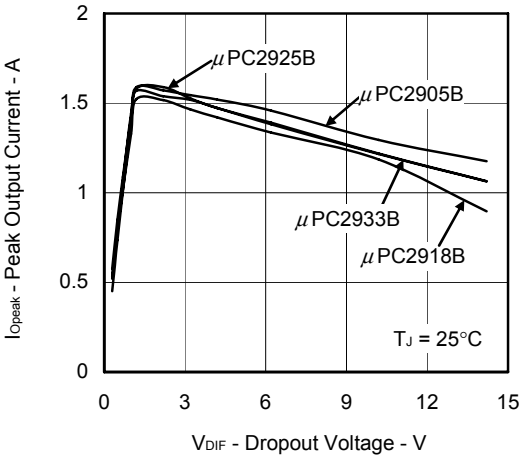
I_{BIAS} ($I_{BIAS(S)}$) vs. V_{IN} (μPC2905B)



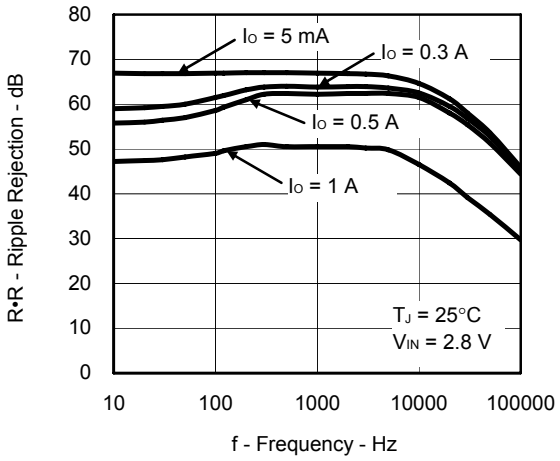
V_{DIF} vs. T_J



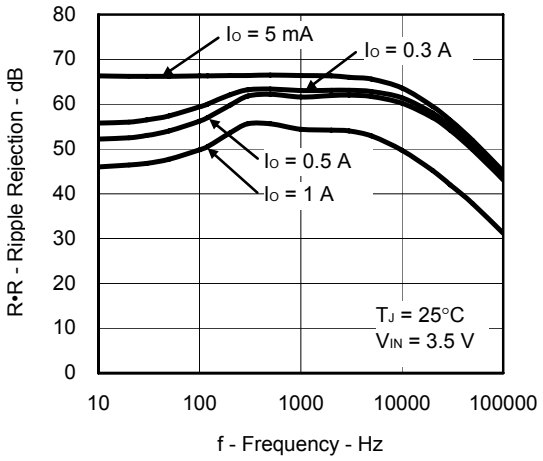
I_{Opeak} vs. V_{DIF}



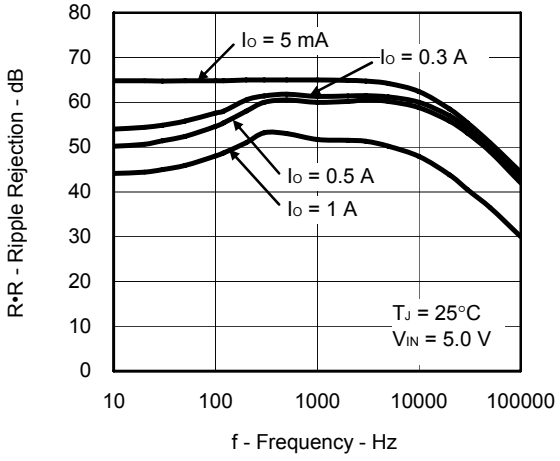
R•R vs. f (μPC2918B)



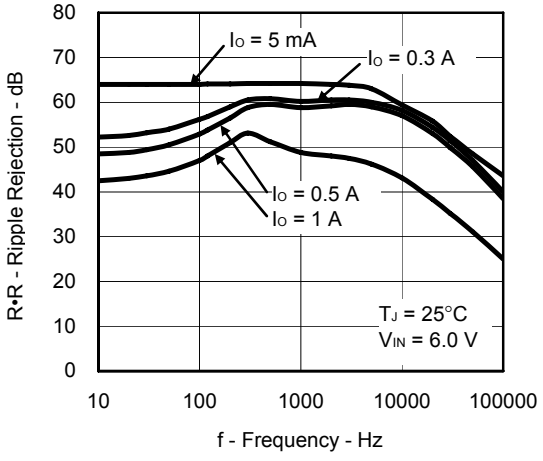
R•R vs. f (μPC2925B)



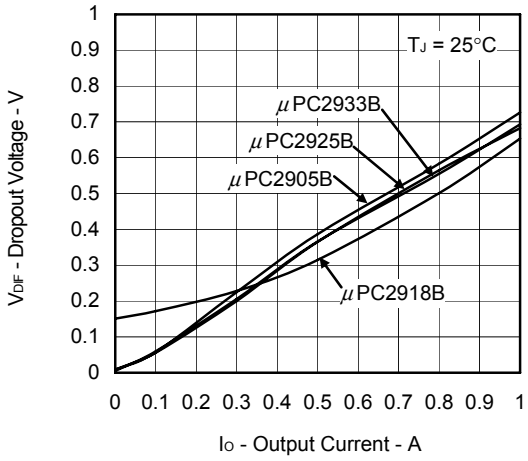
R•R vs. f (μPC2933B)



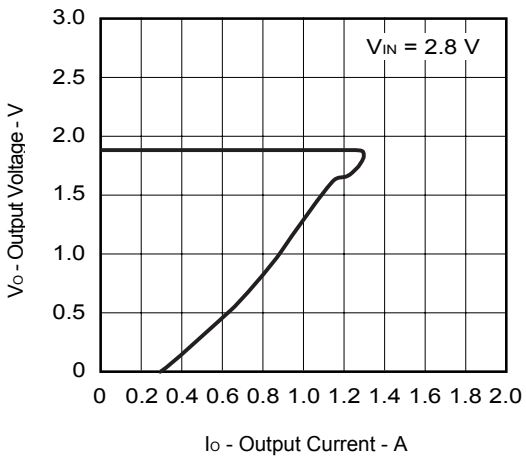
R•R vs. f (μPC2905B)



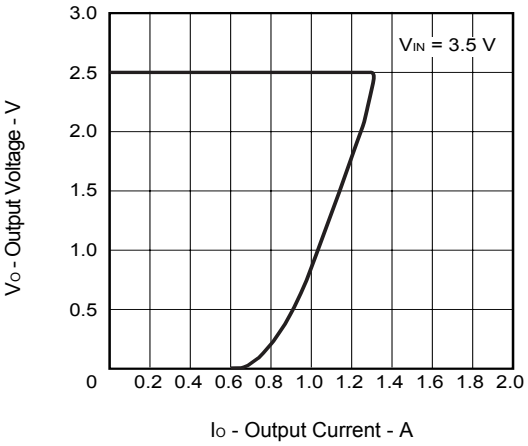
VDIF vs. IO



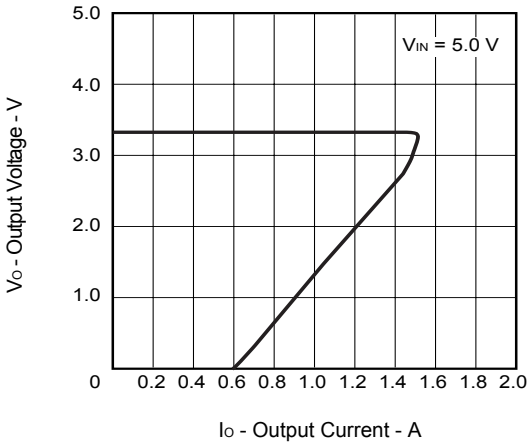
VO vs. IO (μPC2918B)



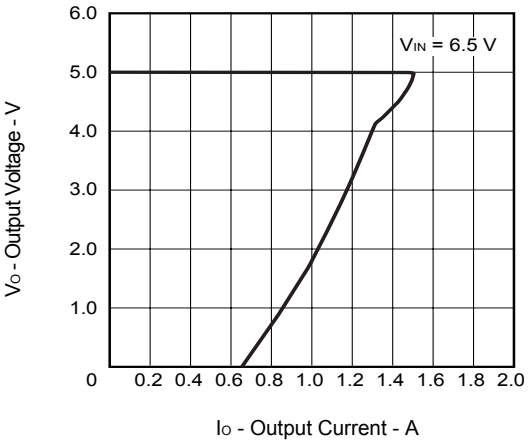
VO vs. IO (μPC2925B)



VO vs. IO (μPC2933B)



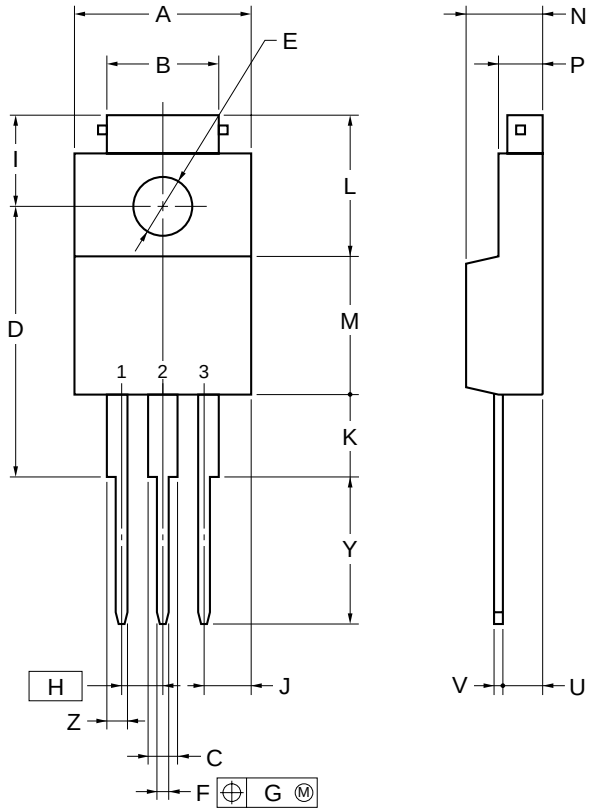
VO vs. IO (μPC2905B)



PACKAGE DRAWINGS (Unit: mm)

μPC2918BHF, μPC2925BHF, μPC2933BHF, μPC2905BHF

3PIN PLASTIC SIP (MP-45G)



NOTE

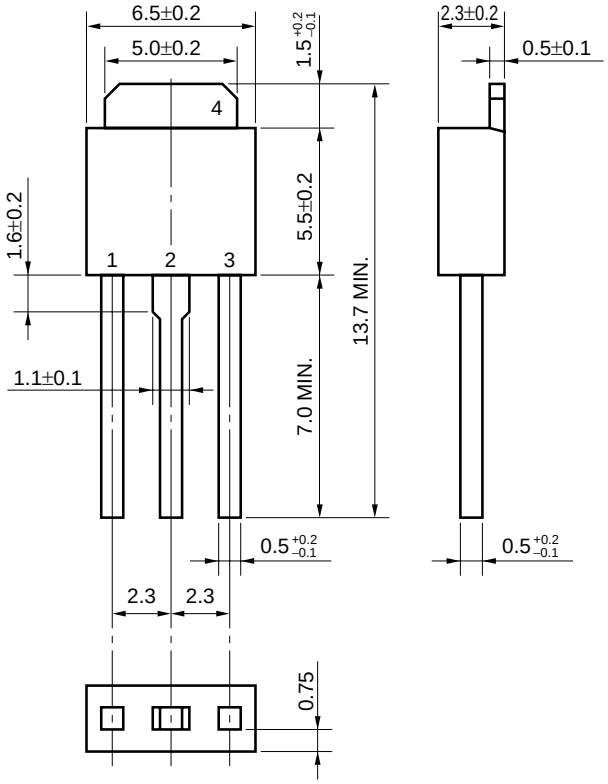
Each lead centerline is located within 0.25 mm of its true position (T.P.) at maximum material condition.

ITEM	MILLIMETERS
A	10.0±0.2
B	7.0±0.2
C	1.50±0.2
D	17.0±0.3
E	φ3.3±0.2
F	0.75±0.10
G	0.25
H	2.54 (T.P.)
I	5.0±0.3
J	2.46±0.2
K	5.0±0.2
L	8.5±0.2
M	8.5±0.2
N	4.5±0.2
P	2.8±0.2
U	2.4±0.5
V	0.65±0.10
Y	8.9±0.7
Z	1.30±0.2

P3HF-254B-4

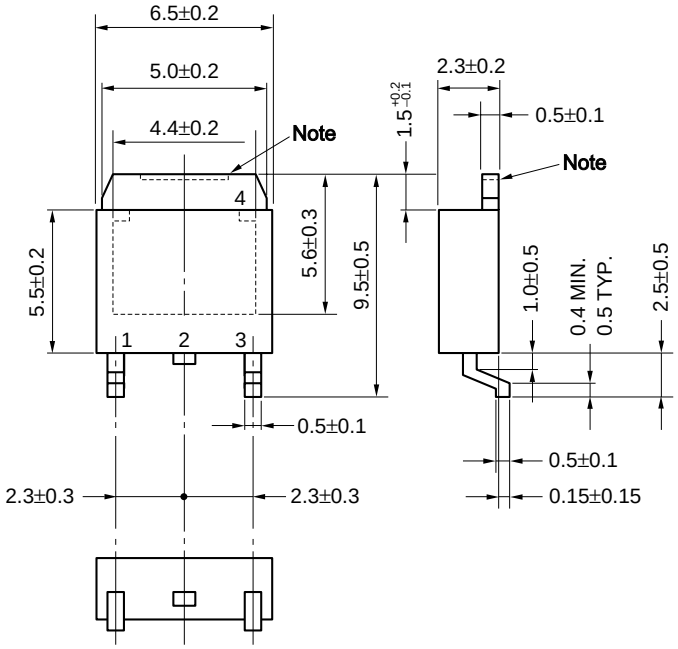
μPC2918BHB, μPC2925BHB, μPC2933BHB, μPC2905BHB

SC-64 (MP-3)



μPC2918BT, μPC2925BT, μPC2933BT, μPC2905BT

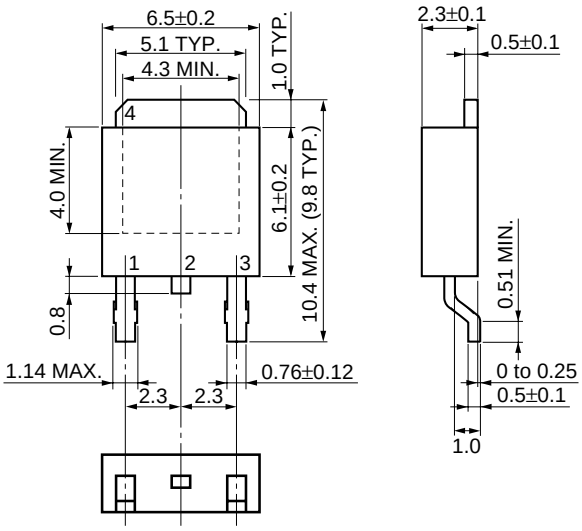
<R> **SC-63 (MP-3Z) (Unit: mm)**



Note The depth of notch at the top of the fin is from 0 to 0.2 mm.

μPC2918BT1D, μPC2925BT1D, μPC2933BT1D, μPC2905BT1D

TO-252 (MP-3ZK)



<R> RECOMMENDED MOUNTING CONDITIONS

The μPC29xxB Series should be soldered and mounted under the following recommended conditions.

For soldering methods and conditions other than those recommended below, contact an NEC Electronics sales representative.

For technical information, see the following website.

Semiconductor Device Mount Manual (http://www.necel.com/pkg/en/mount/index.html)

Surface Mount Device

μPC29xxBT Series: SC-63 (MP-3Z)
μPC29xxBT1D Series: TO-252 (MP-3ZK)

Process	Conditions	Symbol
Infrared Ray Reflow	Peak temperature: 260°C or below (Package surface temperature), Reflow time: 60 seconds or less (at 220°C or higher), Maximum number of reflow processes: 3 times or less.	IR60-00-3
Vapor Phase Soldering	Peak temperature: 215°C or below (Package surface temperature), Reflow time: 40 seconds or less (at 200°C or higher), Maximum number of reflow processes: 3 times or less.	VP15-00-3
Partial Heating Method	Pin temperature: 350°C or below, Heat time: 3 seconds or less (Per each side of the device).	P350

μPC29xxBT-AZ Series [Note1], μPC29xxBT-AY Series [Note2]: SC-63 (MP-3Z)
μPC29xxBT1D-AT Series [Note3]: TO-252 (MP-3ZK)

Process	Conditions	Symbol
Infrared Ray Reflow	Peak temperature: 260°C or below (package surface temperature), Reflow time: 60 seconds or less (at 220°C or higher), Maximum number of reflows processes: 3 times or less.	IR60-00-3
Partial Heating Method	Pin temperature: 350°C or below, Heat time: 3 seconds or less (per each side of the device).	P350

Notes 1. Pb-free (This product does not contain Pb in the external electrode.)
2. Pb-free (This product does not contain Pb in the external electrode, Sn100% plating.)
3. Pb-free (This product does not contain Pb in the external electrode and other parts.)

Caution Apply only one kind of soldering condition to a device, except for "partial heating method", or the device will be damaged by heat stress.

Remark Flux: Rosin-based flux with low chlorine content (chlorine 0.2 Wt% or below) is recommended.

Type of Through-hole Device

μPC29xxBHF Series, μPC29xxBHF-AZ Series [Note1]: Isolated TO-220 (MP-45G)
μPC29xxBHB Series, μPC29xxBHB-AZ Series [Note1], μPC29xxBHB-AY Series [Note2]: SC-64 (MP-3)

Process	Conditions	Symbol
Wave Soldering (only to leads)	Solder temperature: 260°C or below, Flow time: 10 seconds or less	WS60-00-1
Partial Heating Method	Pin temperature: 350°C or below, Heat time: 3 seconds or less (per each pin).	P350

Notes 1. Pb-free (This product does not contain Pb in the external electrode.)
2. Pb-free (This product does not contain Pb in the external electrode, Sn100% plating.)

Caution For through-hole device, the wave soldering process must be applied only to leads, and make sure that the package body does not get jet soldered.

REFERENCE DOCUMENTS

	USER'S MANUAL USAGE OF THREE TERMINAL REGULATORS	Document No.G12702E
<R>	REVIEW OF QUALITY AND RELIABILITY HANDBOOK	Document No.C12769E
	INFORMATION VOLTAGE REGULATOR OF SMD	Document No.G11872E
	SEMICONDUCTOR DEVICE MOUNT MANUAL	http://www.necel.com/pkg/en/mount/index.html

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  The "Specific" quality grade applies only to NEC Electronics products developed based on a customer-designated "quality assurance program" for a specific application. The recommended applications of an NEC Electronics product depend on its quality grade, as indicated below. Customers must check the quality grade of each NEC Electronics product before using it in a particular application.

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  "Special": Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support).

  "Specific": Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems and medical equipment for life support, etc.

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