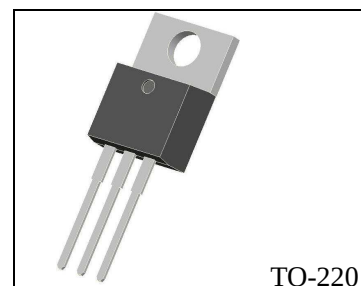


3-Pin Negative Output Voltage Regulator(1A Type)

HS79XX

General Description

The D79XX series is 3-pin fixed negative output type monolithic voltage regulators. A stabilized fixed negative output voltage is obtained from an unstable DC input voltage without using any external parts. Eleven types of fixed output voltage are available from -5V through -10V , -12V , -15V , -18V , -20V , and -24V . They can be used widely as power circuits with a current capacitance of up to 1A .

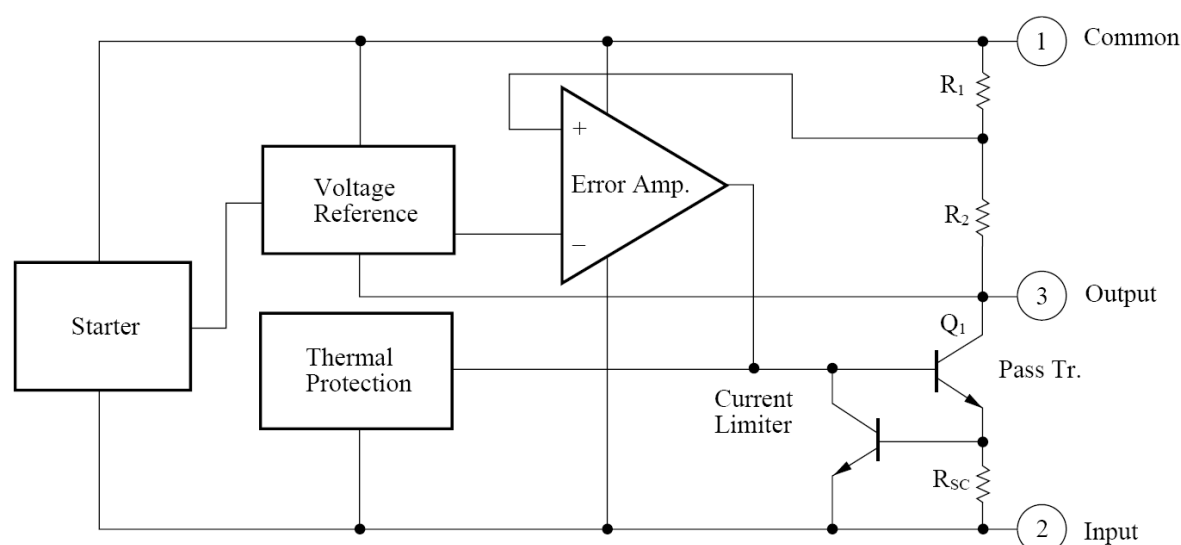


D79XX is available in TO-220 package.

Features

- No external components
- Output voltage : D7905: -5V, D7906: -6V, D7907: -7V, D7908: -8V,
D7909: -9V, D7910: -10V, D7912: -12V, D7915: -15V,
D7918: -18V, D7920: -20V, D7924: -24V
- Overcurrent limit circuit built-in
- Thermal over-load protection built-in
- Area of safe operation (ASO) circuit built-in

Block Diagram



3-Pin Negative Output Voltage Regulator(1A Type)
HS79XX
Absolute Maximum Ratings (Ta=25°C)

Characteristics	Symbol	Value	Units
Input Voltage	Vi	-35 *1	V
		-40 *2	
Power dissipation	PD	15 *3	W
Operating Temperature Range	T _{OPR}	-30~+80	°C
Storage Temperature Range	T _{STG}	-55~+150	°C
Thermal Resistance Junction-Case	R _{θJC}	5	°C/W
Thermal Resistance Junction-Air	R _{θJA}	65	°C/W

*1 D7905, D7906, D7907, D7908, D7909, D7910, D7912, D7915, D7918

*2 D7920, D7924

*3 Follow the derating curve. When Tj exceeds 150°C, the internal circuit shuts off the output.

D7905 Electrical Characteristics (-5V,Type; Ta=25°C)

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	Vo	Tj=+25°C	-4.8	-5.0	-5.2	V
Output Voltage tolerance		Vi=-7V to -20V, I _O =5mA to 1A P _D ≤15W	-4.75		-5.25	
Line Regulation	REG _{IN}	Tj=+25°C		3	100	mV
				1	5	
Load Regulation	REG _L	Tj=+25°C		10	100	mV
				3	50	
Bias Current	I _{bias}	Tj=+25°C		2	4	mA
Input bias fluctuation	Δ I _{bias(IN)}	Vi=-7V to -25V, Tj=+25°C			1.3	mA
Load bias current fluctuation	Δ I _{bias(L)}	I _O =5mA to 1A, Tj=+25°C			0.5	mA
Output noise voltage	V _{no}	f=10Hz to 100kHz, Tj=+25°C		40		μV
Ripple rejection ratio	RR	Vi=-8V to -18V, I _O =100mA f=120Hz	62	74		dB
Minimum i/o voltage difference	V _{DIF(min)}	I _O =1A, Tj=+25°C		1.1		V
Peak output current	I _{O(Peak)}	Tj=+25°C		2.1		A
Output voltage temperature coefficient	Δ I _O /Ta	I _O =5mA, Tj=0 to 125°C		-0.4		mV/°C

Note 1) The specified condition Tj=25°C means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) Unless otherwise specified, Vi=-10V, I_O=500mA, C_I=2μF, C_O=1μF, Tj=0 to 125°C

3-Pin Negative Output Voltage Regulator(1A Type)

HS79XX

D7906 Electrical Characteristic (-6V,Type; Ta=25°C)

Characteristics	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V _O	T _J =+25°C		-5.75	-6	-6.25	V
Output Voltage tolerance		V _I =-8V to -21V, I _O =5mA to 1A P _D ≤ 15W		-5.7		-6.3	
Line Regulation	REG _{IN}	T _J =+25°C	V _I =-8V to -25V		4	120	mV
			V _I =-9V to -13V		1.5	60	
Load Regulation	REG _L	T _J =+25°C	I _O =5mA to 1.5A		10	120	mV
			I _O =250 to 750mA		3	60	
Bias Current	I _{bias}	T _J =+25°C			2	4	mA
Input bias fluctuation	Δ I _{bias(IN)}	V _I =-8V to -25V, T _J =+25°C				1.3	mA
Load bias current fluctuation	Δ I _{bias(L)}	I _O =5mA to 1A, T _J =+25°C				0.5	mA
Output noise voltage	V _{no}	f=10Hz to 100kHz, T _J =+25°C			44		μV
Ripple rejection ratio	RR	V _I =-9V to -19V, I _O =100mA f=120Hz		60	73		dB
Minimum i/o voltage difference	V _{DIF(min)}	I _O =1A, T _J =+25°C			1.1		V
Peak output current	I _{O(Peak)}	T _J =+25°C			2.1		A
Output voltage temperature coefficient	Δ I _O /Ta	I _O =5mA, T _J =0 to 125°C			-0.5		mV/°C

Note 1) The specified condition T_J=25°C means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) Unless otherwise specified, V_I=-11V, I_O=500mA, C_I=2μF, C_O=1μF, T_J=0 to 125°C

3-Pin Negative Output Voltage Regulator(1A Type)
HS79XX
D7907 Electrical Characteristic (-7V,Type; Ta=25°C)

Characteristics	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	Vo	Tj=+25°C		-6.7	-7	-7.3	V
Output Voltage tolerance		Vi=-9V to -22V, Io=5mA to 1A PD≤15W		-6.65		-7.35	
Line Regulation	REG _{IN}	Tj=+25°C	Vi=-9V to -25V		5	140	mV
			Vi=-10V to -14V		1.5	70	
Load Regulation	REG _L	Tj=+25°C	Io=5mA to 1.5A		12	140	mV
			Io=250 to 750mA		4	70	
Bias Current	I _{bias}	Tj=+25°C			2	4	mA
Input bias fluctuation	Δ I _{bias(IN)}	Vi=-9V to -25V, Tj=+25°C				1.3	mA
Load bias current fluctuation	Δ I _{bias(L)}	Io=5mA to 1A, Tj=+25°C				0.5	mA
Output noise voltage	V _{no}	f=10Hz to 100kHz, Tj=+25°C			48		μV
Ripple rejection ratio	RR	Vi=-10V to -20V, Io=100mA f=120Hz		58	72		dB
Minimum i/o voltage difference	V _{DIF(min)}	Io=1A, Tj=+25°C			1.1		V
Peak output current	I _{O(Peak)}	Tj=+25°C			2.1		A
Output voltage temperature coefficient	Δ I _O /Ta	Io=5mA, Tj=0 to 125°C			-0.5		mV/°C

Note 1) The specified condition Tj=25°C means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) Unless otherwise specified, Vi=-12V, Io=500mA, Ci=2μF, Co=1μF, Tj=0 to 125°C

3-Pin Negative Output Voltage Regulator(1A Type)
HS79XX
D7908 Electrical Characteristic (-8V,Type; Ta=25°C)

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	Vo	Tj=+25°C	-7.7	-8	-8.3	V
Output Voltage tolerance		Vi=-10V to -23V, Io=5mA to 1A, PD≤15W	-7.6		-8.4	
Line Regulation	REG _{IN}	Tj=+25°C	Vi=-10.5V to -25V	6	160	mV
			Vi=-11V to -17V	2	80	
Load Regulation	REG _L	Tj=+25°C	Io=5mA to 1.5A	12	160	mV
			Io=250 to 750mA	4	80	
Bias Current	I _{bias}	Tj=+25°C		2.2	4.5	mA
Input bias fluctuation	Δ I _{bias(IN)}	Vi=-10.5V to -25V, Tj=+25°C			1	mA
Load bias current fluctuation	Δ I _{bias(L)}	Io=5mA to 1A, Tj=+25°C			0.5	mA
Output noise voltage	V _{no}	f=10Hz to 100kHz, Tj=+25°C		52		μV
Ripple rejection ratio	RR	Vi=-11V to -21V, Io=100mA f=120Hz	56	71		dB
Minimum i/o voltage difference	V _{DIF(min)}	Io=1A, Tj=+25°C		1.1		V
Peak output current	I _{O(Peak)}	Tj=+25°C		2.1		A
Output voltage temperature coefficient	Δ I _O /Ta	Io=5mA, Tj=0 to 125°C		-0.6		mV/°C

Note 1) The specified condition Tj=25°C means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) Unless otherwise specified, Vi=-14V, Io=500mA, Ci=2μF, Co=1μF, Tj=0 to 125°C

3-Pin Negative Output Voltage Regulator(1A Type)
HS79XX
D7909 Electrical Characteristic (-9V,Type; Ta=25°C)

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	Vo	Tj=+25°C	-8.65	-9	-9.35	V
Output Voltage tolerance		Vi=-11.5V to -24V, Io=5mA to 1A, PD≤15W	-8.55		-9.45	
Line Regulation	REG _{IN}	Tj=+25°C	Vi=-11.5V to -26V	7	180	mV
			Vi=-12V to -18V	2	90	
Load Regulation	REG _L	Tj=+25°C	Io=5mA to 1.5A	12	180	mV
			Io=250 to 750mA	4	90	
Bias Current	I _{bias}	Tj=+25°C		2.2	4.5	mA
Input bias fluctuation	Δ I _{bias(IN)}	Vi=-11.5V to -26V, Tj=+25°C			1	mA
Load bias current fluctuation	Δ I _{bias(L)}	Io=5mA to 1A, Tj=+25°C			0.5	mA
Output noise voltage	V _{no}	f=10Hz to 100kHz, Tj=+25°C		58		μV
Ripple rejection ratio	RR	Vi=-12V to -22V, Io=100mA f=120Hz	56	71		dB
Minimum i/o voltage difference	V _{DIF(min)}	Io=1A, Tj=+25°C		1.1		V
Peak output current	I _{O(Peak)}	Tj=+25°C		2.1		A
Output voltage temperature coefficient	Δ I _O /Ta	Io=5mA, Tj=0 to 125°C		-0.6		mV/°C

Note 1) The specified condition Tj=25°C means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) Unless otherwise specified, Vi=-15V, Io=500mA, Ci=2μF, Co=1μF, Tj=0 to 125°C

3-Pin Negative Output Voltage Regulator(1A Type)

HS79XX

D7910 Electrical Characteristic (-10V,Type; Ta=25°C)

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	Vo	T _J =+25°C	-9.6	-10	-10.4	V
Output Voltage tolerance		V _i =-12.5V to -25V, I _O =5mA to 1A, P _D ≤15W	-9.5		-10.5	
Line Regulation	REG _{IN}	T _J =+25°C	V _i =-12.5V to -27V		8	mV
			V _i =-13V to -19V		2.5	
Load Regulation	REG _L	T _J =+25°C	I _O =5mA to 1.5A		12	mV
			I _O =250 to 750mA		4	
Bias Current	I _{bias}	T _J =+25°C		2.5	5	mA
Input bias fluctuation	Δ I _{bias(IN)}	V _i =-12.5V to -27V, T _J =+25°C			1	mA
Load bias current fluctuation	Δ I _{bias(L)}	I _O =5mA to 1A, T _J =+25°C			0.5	mA
Output noise voltage	V _{no}	f=10Hz to 100kHz, T _J =+25°C		64		μV
Ripple rejection ratio	RR	V _i =-13V to -23V, I _O =100mA f=120Hz	56	71		dB
Minimum i/o voltage difference	V _{DIF(min)}	I _O =1A, T _J =+25°C		1.1		V
Peak output current	I _{O(Peak)}	T _J =+25°C		2.1		A
Output voltage temperature coefficient	Δ I _O /Ta	I _O =5mA, T _J =0 to 125°C		-0.7		mV/°C

Note 1) The specified condition T_J=25°C means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) Unless otherwise specified, V_I=-16V, I_O=500mA, C_I=2μF, C_O=1μF, T_J=0 to 125°C

3-Pin Negative Output Voltage Regulator(1A Type)

HS79XX

D7912 Electrical Characteristic (-12V,Type; Ta=25°C)

Characteristics	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	Vo	Tj=+25°C		-11.5	-12	-12.5	V
Output Voltage tolerance		Vi=-14.5V to -27V, Io=5mA to 1A, PD≤15W		-11.4		-12.6	
Line Regulation	REG _{IN}	Tj=+25°C	Vi=-14.5V to -30V		10	240	mV
			Vi=-16V to -22V		3	120	
Load Regulation	REG _L	Tj=+25°C	Io=5mA to 1.5A		12	240	mV
			Io=250 to 750mA		4	120	
Bias Current	I _{bias}	Tj=+25°C			2.5	5	mA
Input bias fluctuation	Δ I _{bias(IN)}	Vi=-14.5V to -30V, Tj=+25°C				1	mA
Load bias current fluctuation	Δ I _{bias(L)}	Io=5mA to 1A, Tj=+25°C				0.5	mA
Output noise voltage	V _{no}	f=10Hz to 100kHz, Tj=+25°C			75		μV
Ripple rejection ratio	RR	Vi=-15V to -25V, Io=100mA f=120Hz		55	70		dB
Minimum i/o voltage difference	V _{DIF(min)}	Io=1A, Tj=+25°C			1.1		V
Peak output current	I _{O(Peak)}	Tj=+25°C			2.1		A
Output voltage temperature coefficient	Δ I _O /Ta	Io=5mA, Tj=0 to 125°C			-0.8		mV/°C

Note 1) The specified condition Tj=25°C means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) Unless otherwise specified, Vi=-19V, Io=500mA, Ci=2μF, Co=1μF, Tj=0 to 125°C

3-Pin Negative Output Voltage Regulator(1A Type)
HS79XX
D7915 Electrical Characteristic (-15V,Type; Ta=25°C)

Characteristics	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	Vo	Tj=+25°C		-14.4	-15	-15.6	V
Output Voltage tolerance		Vi=-17.5V to -30V, Io=5mA to 1A, PD≤15W		-14.25		-15.75	
Line Regulation	REG _{IN}	Tj=+25°C	Vi=-17.5V to -30V		11	300	mV
			Vi=-20V to -26V		3	150	
Load Regulation	REG _L	Tj=+25°C	Io=5mA to 1.5A		12	300	mV
			Io=250 to 750mA		4	150	
Bias Current	I _{bias}	Tj=+25°C			2.5	5	mA
Input bias fluctuation	Δ I _{bias(IN)}	Vi=-17.5V to -30V, Tj=+25°C				1	mA
Load bias current fluctuation	Δ I _{bias(L)}	Io=5mA to 1A, Tj=+25°C				0.5	mA
Output noise voltage	V _{no}	f=10Hz to 100kHz, Tj=+25°C			90		μV
Ripple rejection ratio	RR	Vi=-18.5V to -28.5V, Io=100mA, f=120Hz		54	69		dB
Minimum i/o voltage difference	V _{DIF(min)}	Io=1A, Tj=+25°C			1.1		V
Peak output current	I _{O(Peak)}	Tj=+25°C			2.1		A
Output voltage temperature coefficient	Δ I _O /Ta	Io=5mA, Tj=0 to 125°C			-0.9		mV/°C

Note 1) The specified condition Tj=25°C means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) Unless otherwise specified, Vi=-23V, Io=500mA, Ci=2μF, Co=1μF, Tj=0 to 125°C

3-Pin Negative Output Voltage Regulator(1A Type)
HS79XX
D7918 Electrical Characteristic (-18V,Type; Ta=25°C)

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	Vo	Tj=+25°C	-17.3	-18	-18.7	V
Output Voltage tolerance		Vi=-21V to -33V, Io=5mA to 1A, PD≤15W	-17.1		-18.9	
Line Regulation	REG _{IN}	Tj=+25°C	Vi=-21V to -33V	15	360	mV
			Vi=-24V to -30V	5	180	
Load Regulation	REG _L	Tj=+25°C	Io=5mA to 1.5A	12	360	mV
			Io=250 to 750mA	4	180	
Bias Current	I _{bias}	Tj=+25°C		2.5	5	mA
Input bias fluctuation	Δ I _{bias(IN)}	Vi=-21V to -33V, Tj=+25°C			1	mA
Load bias current fluctuation	Δ I _{bias(L)}	Io=5mA to 1A, Tj=+25°C			0.5	mA
Output noise voltage	V _{no}	f=10Hz to 100kHz, Tj=+25°C		110		μV
Ripple rejection ratio	RR	Vi=-22V to -32V, Io=100mA f=120Hz	53	68		dB
Minimum i/o voltage difference	V _{DIF(min)}	Io=1A, Tj=+25°C		1.1		V
Peak output current	I _{O(Peak)}	Tj=+25°C		2.1		A
Output voltage temperature coefficient	Δ I _O /Ta	Io=5mA, Tj=0 to 125°C		-1		mV/°C

Note 1) The specified condition Tj=25°C means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) Unless otherwise specified, Vi=-27V, Io=500mA, Ci=2μF, Co=1μF, Tj=0 to 125°C

3-Pin Negative Output Voltage Regulator(1A Type)
HS79XX
D7920 Electrical Characteristic (-20V,Type; Ta=25°C)

Characteristics	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	Vo	Tj=+25°C		-19.2	-20	-20.8	V
Output Voltage tolerance		Vi=-23V to -35V, Io=5mA to 1A, PD≤15W		-19		-21	
Line Regulation	REG _{IN}	Tj=+25°C	Vi=-23V to -35V		16	400	mV
			Vi=-26V to -32V		5.5	200	
Load Regulation	REG _L	Tj=+25°C	Io=5mA to 1.5A		12	400	mV
			Io=250 to 750mA		4	200	
Bias Current	I _{bias}	Tj=+25°C			3	5	mA
Input bias fluctuation	Δ I _{bias(IN)}	Vi=-23V to -35V, Tj=+25°C				1	mA
Load bias current fluctuation	Δ I _{bias(L)}	Io=5mA to 1A, Tj=+25°C				0.5	mA
Output noise voltage	V _{no}	f=10Hz to 100kHz, Tj=+25°C			135		μV
Ripple rejection ratio	RR	Vi=-24V to -34V, Io=100mA f=120Hz		52	67		dB
Minimum i/o voltage difference	V _{DIF(min)}	Io=1A, Tj=+25°C			1.1		V
Peak output current	I _{O(Peak)}	Tj=+25°C			2.1		A
Output voltage temperature coefficient	Δ I _O /Ta	Io=5mA, Tj=0 to 125°C			-1		mV/°C

Note 1) The specified condition Tj=25°C means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) Unless otherwise specified, Vi=-29V, Io=500mA, Ci=2μF, Co=1μF, Tj=0 to 125°C

3-Pin Negative Output Voltage Regulator(1A Type)

HS79XX

D7924 Electrical Characteristic (-24V,Type; Ta=25°C)

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	Vo	Tj=+25°C	-23	-24	-25	V
Output Voltage tolerance		Vi=-27V to -38V, Io=5mA to 1A, PD≤15W	-22.8		-25.2	
Line Regulation	REG _{IN}	Tj=+25°C	Vi=-27V to -38V		18	mV
			Vi=-30V to -36V		6	
Load Regulation	REG _L	Tj=+25°C	Io=5mA to 1.5A		12	mV
			Io=250 to 750mA		4	
Bias Current	I _{bias}	Tj=+25°C		3	5	mA
Input bias fluctuation	Δ I _{bias(IN)}	Vi=-27V to -38V, Tj=+25°C			1	mA
Load bias current fluctuation	Δ I _{bias(L)}	Io=5mA to 1A, Tj=+25°C			0.5	mA
Output noise voltage	V _{no}	f=10Hz to 100kHz, Tj=+25°C		170		μV
Ripple rejection ratio	RR	Vi=-28V to -38V, Io=100mA f=120Hz	50	65		dB
Minimum i/o voltage difference	V _{DIF(min)}	Io=1A, Tj=+25°C		1.1		V
Peak output current	I _{O(Peak)}	Tj=+25°C		2.1		A
Output voltage temperature coefficient	Δ I _O /Ta	Io=5mA, Tj=0 to 125°C		-1		mV/°C

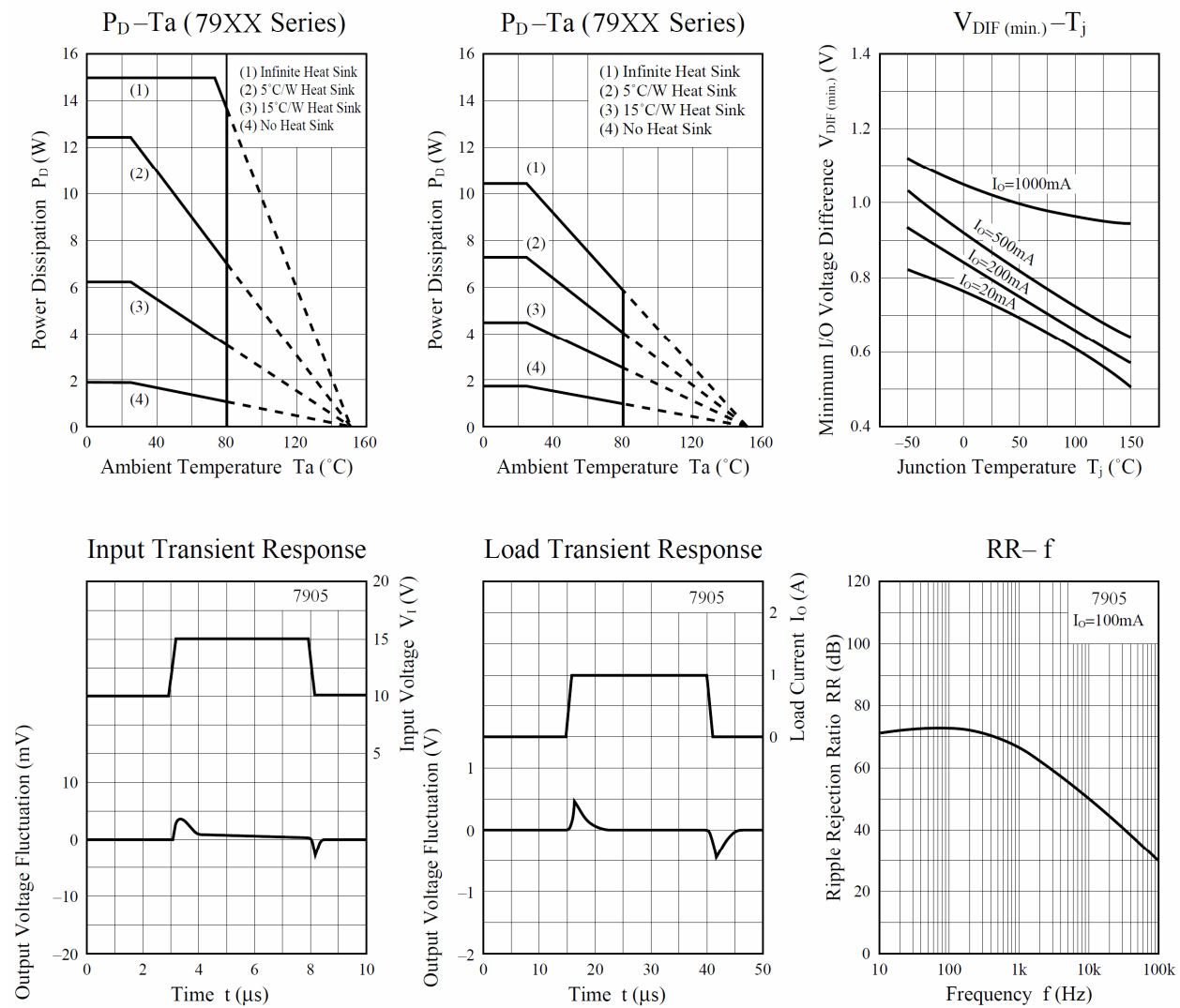
Note 1) The specified condition Tj=25°C means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) Unless otherwise specified, Vi=-33V, Io=500mA, Ci=2μF, Co=1μF, Tj=0 to 125°C

3-Pin Negative Output Voltage Regulator(1A Type)

HS79XX

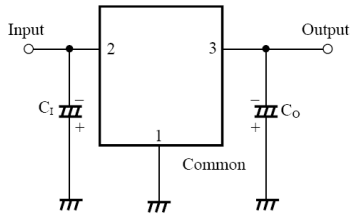
Characteristics Curve



Basic Regulator Circuit Application Circuit

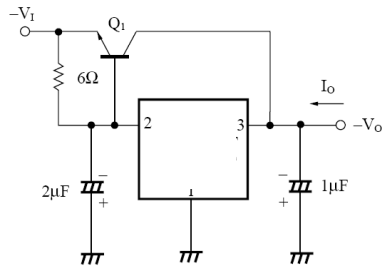
3-Pin Negative Output Voltage Regulator(1A Type)

HS79XX

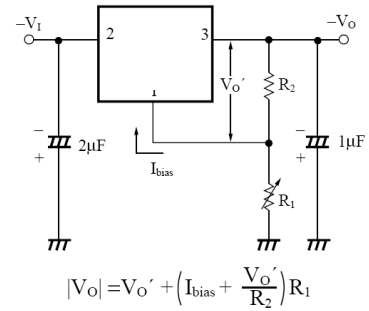


C_1 : Required when the input line is long
 C_0 : Improves the transient response.

1) Current Bootstrap Circuit



2) Adjustable Output Regulator



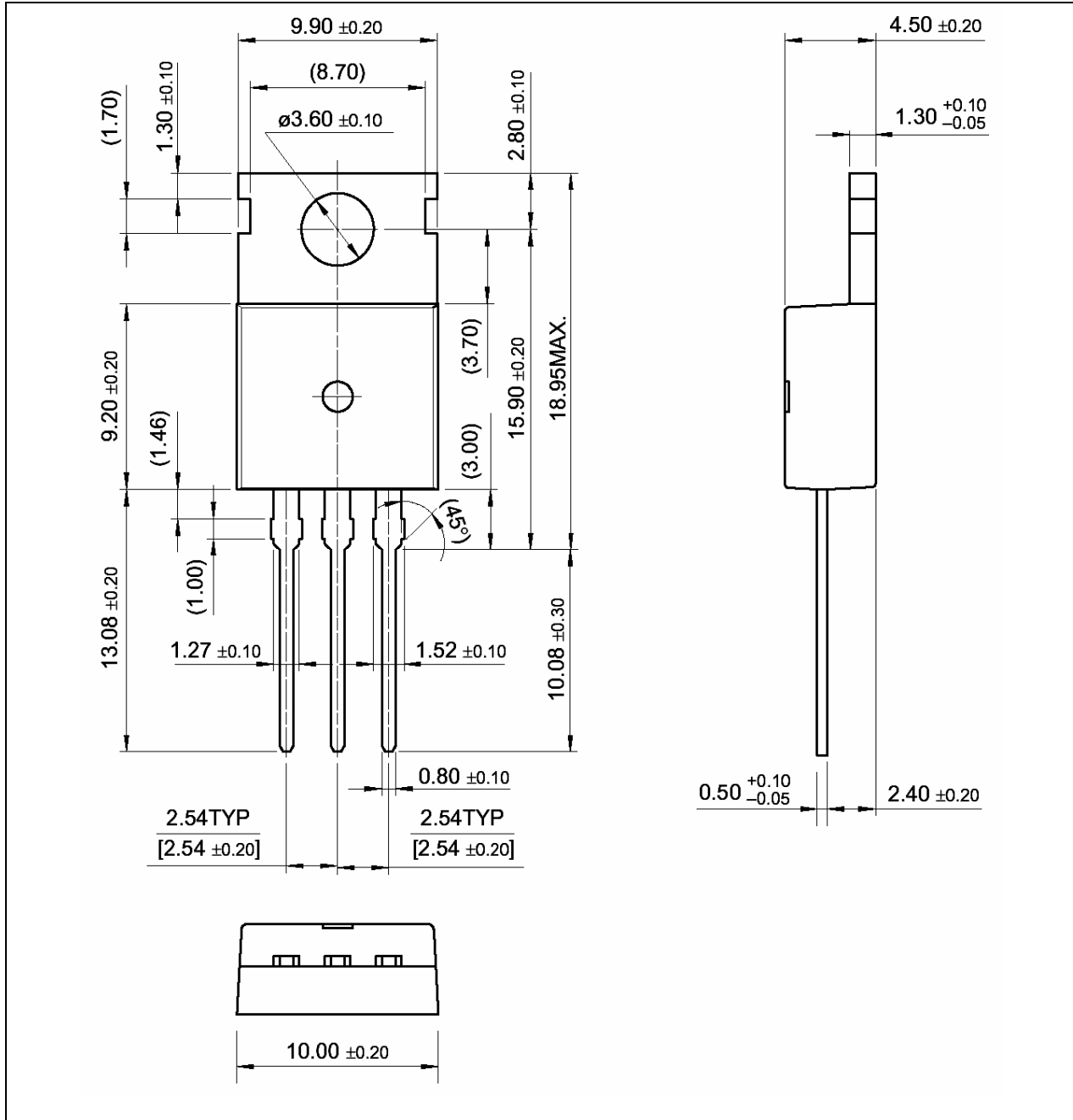
Outline Drawing

TO-220:

Unit:mm

3-Pin Negative Output Voltage Regulator(1A Type)

HS79XX



Statements

3-Pin Negative Output Voltage Regulator(1A Type)**HS79XX**

- Silicore Technology reserves the right to make changes without further notice to any products or specifications herein. Before customers place an order, customers need to confirm whether datasheet obtained is the latest version, and to verify the integrity of the relevant information.
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