

To all our customers

Regarding the change of names mentioned in the document, such as Mitsubishi Electric and Mitsubishi XX, to Renesas Technology Corp.

The semiconductor operations of Hitachi and Mitsubishi Electric were transferred to Renesas Technology Corporation on April 1st 2003. These operations include microcomputer, logic, analog and discrete devices, and memory chips other than DRAMs (flash memory, SRAMs etc.) Accordingly, although Mitsubishi Electric, Mitsubishi Electric Corporation, Mitsubishi Semiconductors, and other Mitsubishi brand names are mentioned in the document, these names have in fact all been changed to Renesas Technology Corp. Thank you for your understanding. Except for our corporate trademark, logo and corporate statement, no changes whatsoever have been made to the contents of the document, and these changes do not constitute any alteration to the contents of the document itself.

Note : Mitsubishi Electric will continue the business operations of high frequency & optical devices and power devices.

Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

M5279LXX

FIXED NEGATIVE OUTPUT 3-TERMINAL REGULATOR (WITH PROTECTION CIRCUIT)

DESCRIPTION

M529LXX is a monolithic integrated circuit designed as the 79L series for negative power source 3-pin regulators with the maximum load current of 150mA level.

This IC contains a power supply protection circuit in case of the short circuit, over heat protection circuit, and safe operation area protection circuit in the 3-terminal package.

This IC is best suitable for the wide range of general power source because of its various applicable voltage levels.

FEATURES

- Has the compatibility with other maker's 79L series.
- Small current flows in case of a short circuit because of the adoption of the circuit $I_{OS} = 30mA$
- Various voltage ranks (-5V, -6V, -9V, -12V, -15V)
- Large internal permissible loss 900mW (Max.)

APPLICATION

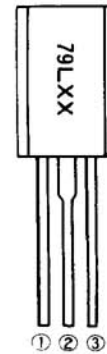
Power source for general electronic devices such as VTRs and CDs

FUNCTION CODE

M5279LXX
 └── Output voltage value

Type	Marking	Output voltage
M5279L05	79L05	5V
M5279L06	79L06	6V
M5279L09	79L09	9V
M5279L12	79L12	12V
M5279L15	79L15	15V

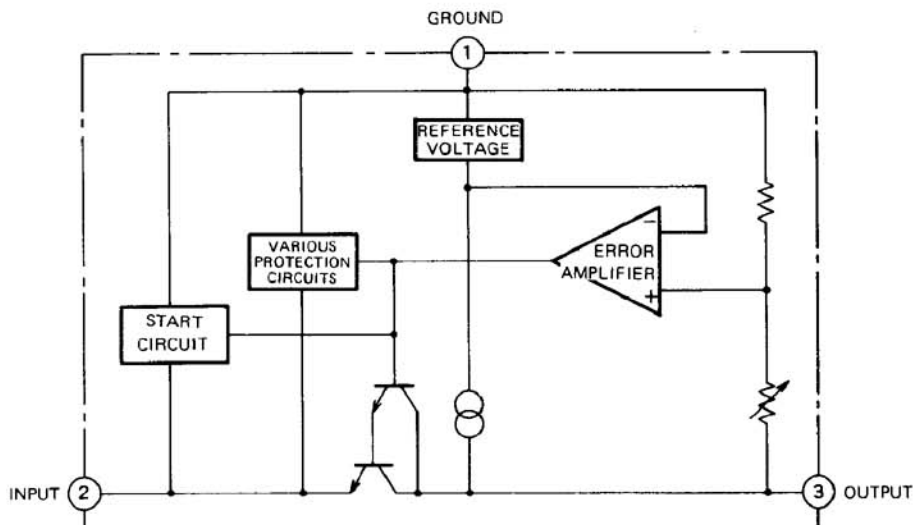
PIN CONFIGURATION



- ELECTRODE CONNECTIONS
- ① GROUND
 - ② INPUT
 - ③ OUTPUT

Outline EIAJ:TO-92L

BLOCK DIAGRAM

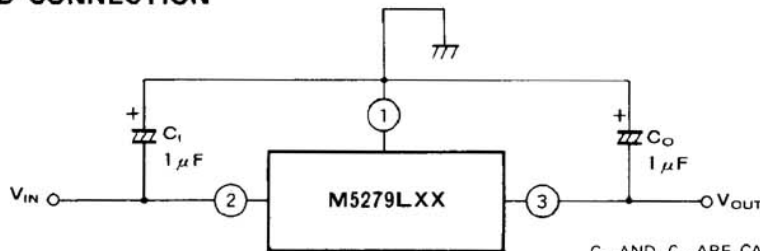


FIXED NEGATIVE OUTPUT 3-TERMINAL REGULATOR(WITH PROTECTION CIRCUIT)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C, unless otherwise noted)

Symbol	Parameter	Ratings	Unit
V _{IN}	Input voltage	-36	V
I _L	Load current	150	mA
P _d	Power dissipation	900	mW
T _{opr}	Operating temperature	-20 ~ +75	°C
T _{stg}	Storage temperature	-55 ~ +150	°C

STANDARD CONNECTION



C₁ AND C₀ ARE CAPACITORS TO PREVENT OSCILLATIONS. MAKE CONNECTIONS AS CLOSE TO THE IC AS POSSIBLE.

ELECTRICAL CHARACTERISTICS

M5279L05 (V_I = -10V, I_L = 40mA, Ta = 25°C, C₁ = 0.33µF, C₀ = 0.1µF unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V _O	Output voltage		-5.20	-5.0	-4.80	V
Reg-in	Input regulation	-20V ≤ V _I ≤ -7V			200	mV
		-20V ≤ V _I ≤ -8V			150	
Reg-L	Load regulation	1mA ≤ I _L ≤ 150mA			60	mV
		1mA ≤ I _L ≤ 40mA			30	
V _O	Output voltage	-20V ≤ V _I ≤ -7V, 1mA ≤ I _L ≤ 40mA	-5.25		-4.75	V
		V _I = -10V, 1mA ≤ I _L ≤ 70mA	-5.25		-4.75	
I _B	Bias current	I _L = 0		2.6	5.0	mA
ΔI _B	Bias current variability	-20V ≤ V _I ≤ -8V, I _L = 40mA		0.1	1.5	mA
		V _I = -10V, 1mA ≤ I _L ≤ 40mA			0.2	
V _{NO}	Output noise voltage	BW : 10Hz ~ 100kHz		40		µV _{rms}
RR	Ripple rejection ratio	f = 120Hz, V _I = 0dBm	41	49		dB
V _{DIF}	Minimum input/output voltage difference			1.0		V
I _{LP}	Peak load current		150			mA
I _{OS}	Output short holding current			30		mA

M5279L06 (V_I = -11V, I_L = 40mA, Ta = 25°C, C₁ = 0.33µF, C₀ = 0.1µF unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V _O	Output voltage		-6.24	-6.0	-5.76	V
Reg-in	Input regulation	-21V ≤ V _I ≤ -8V			200	mV
		-21V ≤ V _I ≤ -9V			150	
Reg-L	Load regulation	1mA ≤ I _L ≤ 150mA			60	mV
		1mA ≤ I _L ≤ 40mA			30	
V _O	Output voltage	-21V ≤ V _I ≤ -8V, 1mA ≤ I _L ≤ 40mA	-6.3		-5.7	V
		V _I = -11V, 1mA ≤ I _L ≤ 70mA	-6.3		-5.7	
I _B	Bias current	I _L = 0		2.6	5.0	mA
ΔI _B	Bias current variability	-21V ≤ V _I ≤ -9V, I _L = 40mA		0.1	1.5	mA
		V _I = -11V, 1mA ≤ I _L ≤ 40mA			0.2	
V _{NO}	Output noise voltage	BW : 10Hz ~ 100kHz		40		µV _{rms}
RR	Ripple rejection ratio	f = 120Hz, V _I = 0dBm	39	47		dB
V _{DIF}	Minimum input/output voltage difference			1.0		V
I _{LP}	Peak load current		150			mA
I _{OS}	Output short holding current			30		mA

FIXED NEGATIVE OUTPUT 3-TERMINAL REGULATOR(WITH PROTECTION CIRCUIT)**M5279L09** ($V_I = -15V$, $I_L = 40mA$, $T_a = 25^\circ C$, $C_I = 0.33\mu F$, $C_O = 0.1\mu F$ unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V_O	Output voltage		-9.36	-9.0	-8.64	V
Reg-in	Input regulation	$-24V \leq V_I \leq -11.5V$			225	mV
		$-24V \leq V_I \leq -12V$			170	
Reg-L	Load regulation	$1mA \leq I_L \leq 150mA$			90	mV
		$1mA \leq I_L \leq 40mA$			40	
V_O	Output voltage	$-24V \leq V_I \leq -11.5V$, $1mA \leq I_L \leq 40mA$	-9.45		-8.55	V
		$V_I = -15V$, $1mA \leq I_L \leq 70mA$	-9.45		-8.55	
I_B	Bias current	$I_L = 0$		2.6	5.0	mA
ΔI_B	Bias current variability	$-24V \leq V_I \leq -12V$, $I_L = 40mA$		0.1	1.5	mA
		$V_I = -15V$, $1mA \leq I_L \leq 40mA$			0.2	
V_{NO}	Output noise voltage	BW : 10Hz ~ 100kHz		65		μV_{rms}
RR	Ripple rejection ratio	$f = 120Hz$, $V_I = 0dBm$	37	45		dB
V_{DIF}	Minimum input/output voltage difference			1.0		V
I_{LP}	Peak load current		150			mA
I_{OS}	Output short holding current			30		mA

M5279L12 ($V_I = -19V$, $I_L = 40mA$, $T_a = 25^\circ C$, $C_I = 0.33\mu F$, $C_O = 0.1\mu F$ unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V_O	Output voltage		-12.48	-12.0	-11.52	V
Reg-in	Input regulation	$-27V \leq V_I \leq -14.5V$			250	mV
		$-27V \leq V_I \leq -16V$			200	
Reg-L	Load regulation	$1mA \leq I_L \leq 150mA$			100	mV
		$1mA \leq I_L \leq 40mA$			50	
V_O	Output voltage	$-27V \leq V_I \leq -14.5V$, $1mA \leq I_L \leq 40mA$	-12.6		-11.4	V
		$V_I = -19V$, $1mA \leq I_L \leq 70mA$	-12.6		-11.4	
I_B	Bias current	$I_L = 0$		2.6	5.0	mA
ΔI_B	Bias current variability	$-27V \leq V_I \leq -16V$, $I_L = 40mA$		0.1	1.5	mA
		$V_I = -19V$, $1mA \leq I_L \leq 40mA$			0.2	
V_{NO}	Output noise voltage	BW : 10Hz ~ 100kHz		80		μV_{rms}
RR	Ripple rejection ratio	$f = 120Hz$, $V_I = 0dBm$	37	42		dB
V_{DIF}	Minimum input/output voltage difference			1.0		V
I_{LP}	Peak load current		150			mA
I_{OS}	Output short holding current			30		mA

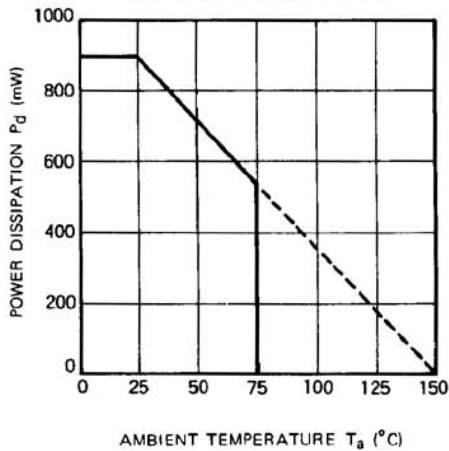
M5279L15 ($V_I = -23V$, $I_L = 40mA$, $T_a = 25^\circ C$, $C_I = 0.33\mu F$, $C_O = 0.1\mu F$ unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V_O	Output voltage		-15.6	-15.0	-14.4	V
Reg-in	Input regulation	$-30V \leq V_I \leq -17.5V$			300	mV
		$-30V \leq V_I \leq -20V$			250	
Reg-L	Load regulation	$1mA \leq I_L \leq 150mA$			150	mV
		$1mA \leq I_L \leq 40mA$			75	
V_O	Output voltage	$-30V \leq V_I \leq -17.5V$, $1mA \leq I_L \leq 40mA$	-15.75		-14.25	V
		$V_I = -23V$, $1mA \leq I_L \leq 70mA$	-15.75		-14.25	
I_B	Bias current	$I_L = 0$		2.6	5.0	mA
ΔI_B	Bias current variability	$-30V \leq V_I \leq -20V$, $I_L = 40mA$		0.1	1.5	mA
		$V_I = -23V$, $1mA \leq I_L \leq 40mA$			0.2	
V_{NO}	Output noise voltage	BW : 10Hz ~ 100kHz		90		μV_{rms}
RR	Ripple rejection ratio	$f = 120Hz$, $V_I = 0dBm$	34	39		dB
V_{DIF}	Minimum input/output voltage difference			1.0		V
I_{LP}	Peak load current		150			mA
I_{OS}	Output short holding current			30		mA

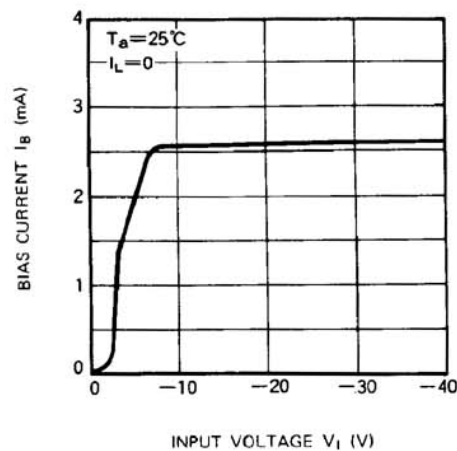
FIXED NEGATIVE OUTPUT 3-TERMINAL REGULATOR(WITH PROTECTION CIRCUIT)

TYPICAL CHARACTERISTICS

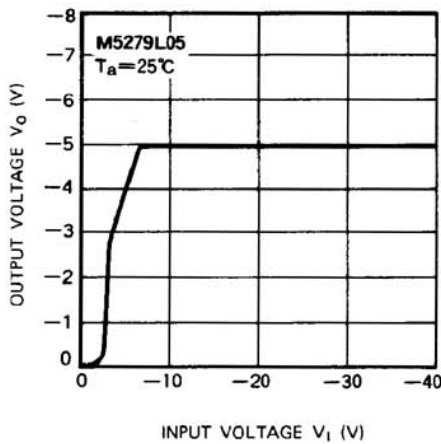
THERMAL DERATING



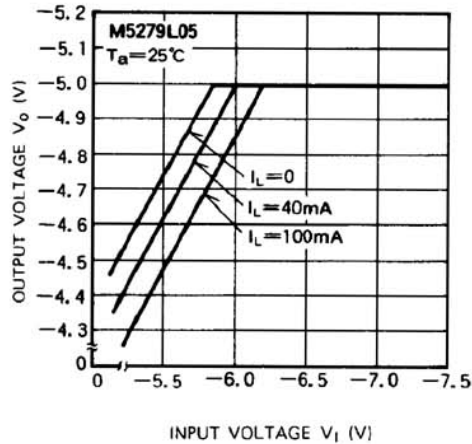
BIAS CURRENT VS. INPUT VOLTAGE



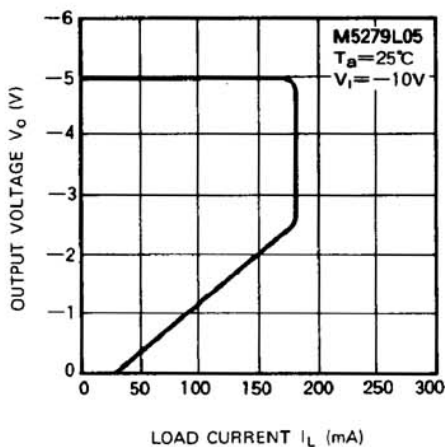
OUTPUT VOLTAGE VS. INPUT VOLTAGE



OUTPUT VOLTAGE VS. INPUT VOLTAGE



OUTPUT VOLTAGE VS. LOAD CURRENT



PEAK LOAD CURRENT VS. INPUT VOLTAGE

