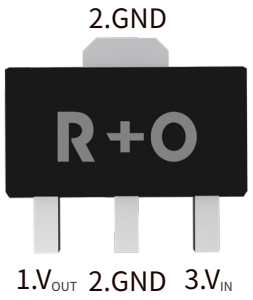
100mA Three Teminal Regulator

Features

- Quiescent Current:6mA (V_{OUT}=-5,-6,-9V); 6.5mA(V_{OUT}=-12V)
- Input Voltage: -30V
- Output Current: 100mA
- Low Dropout Voltage: -1.7V(Max.)@40mA (V_{OUT}=-5.0V)
- Thermal overload protection
- Short circuit current limiting

Output Current
100mA
Input Voltage
-30V

SOT-89



Applications

- Battery Power Supply Equipment
- Communication Equipment
- Audio/Video Equipment
- Monitor Equipment

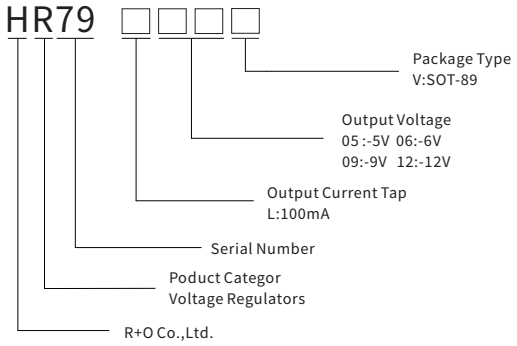
General Description

The HR79 Series is three-terminal positive regulators. One of these regulators can deliver up to 100mA of output current. The internal limiting and thermal-shutdown features of the regulator make them essentially immune to overload. When used as are placement for a zener diode-resistor Combination, an effective improvement in output impedance can be obtained, together with lower quiescent current.

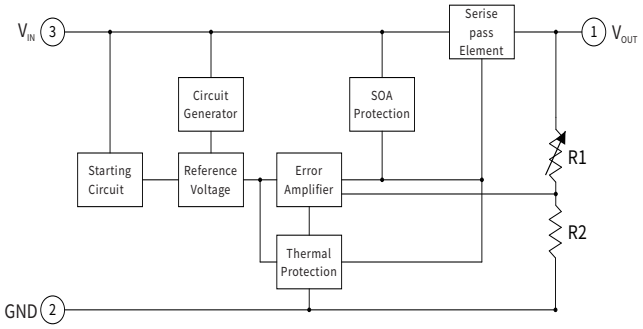
Reference News

SOT-89 Marking:
HR79L05V: 79L05 HR79L06V: 79L06
HR79L09V: 79L09 HR78L12V: 78L12

Part Numbering



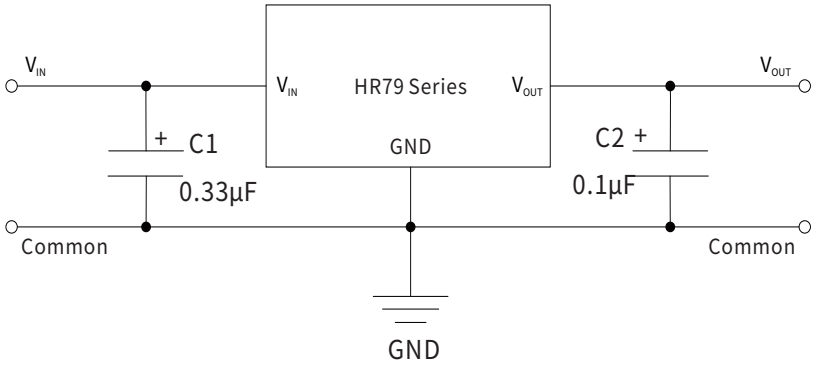
Block Diagram



Ordering Information

Package	Package Code	Unit Weight(g)	Reel(pcs)	Box(pcs)	Carton(pcs)	Delivery Mode	MSL
SOT-89	R1	0.045	1000	8000	48000	7''	3

Typical Application Circuit



Absolute Maximum Ratings (Ta=25°C Unless otherwise specified)

PARAMETER	SYMBOL	Value	UNIT
Input Voltage Limit	V_{IN}	-30	V
Operating Current	I_O	100	mA
Power Dissipation	P_D	600	mW
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	208	°C /W
Solder Temperature/Time	T_d	260/10	°C /S
Operating Ambient Temperature	T_A	-40~+125	°C
Junction Temperature	T_J	-55~+150	°C
Storage Temperature	T_{stg}	-55~+150	°C

Electrical Characteristics(HR79L05V) (Vi=-10V Io=40mA Ci=0.33uF Co=0.1uF Ta=25°C Unless otherwise specified)

PARAMETER	SYMBOL	Conditions	Min.	Typ.	Max.	UNIT
Output Voltage	V_{OUT}	I_{OUT}=40mA,V_{IN}=-10V 25°C	-4.85	-5	-5.15	V
Output Voltage	V_{OUT}	-7V ⩽ V_{IN} ⩽ -20V 1mA ⩽ I_{OUT} ⩽ 40mA 0~125°C	-4.75	-5	-5.25	V
Output Voltage	V_{OUT}	V_{IN}=-10V 1mA ⩽ I_{OUT} ⩽ 70mA 0~125°C	-4.75	-5	-5.25	V
Dropout Voltage	V_D	I_{OUT}=40mA,25°C	—	-1.7	—	V
Quiescent Current	I_Q	V_{IN}=-10V,I_{OUT}=0mA 25°C	—	2	6	mA
Quiescent Current Change	△I_Q	-8V ⩽ V_{IN} < -20V 0~125°C	—	—	1.5	mA
Quiescent Current Change	△I_Q	1mA ⩽ I_{OUT} ⩽ 40mA 0~125°C	—	—	0.1	mA
Line Regulation	△V_{OUT}	-7V ⩽ V_{IN} ⩽ -20V I_{OUT}=40mA,25°C	—	15	150	mV
Line Regulation	△V_{OUT}	-8V ⩽ V_{IN} ⩽ -20V I_{OUT}=40mA,25°C	—	12	100	mV
Load Regulation	△V_{OUT}	1mA ⩽ I_{OUT} ⩽ 100mA V_{IN}=-10V,25°C	—	20	60	mV
Load Regulation	△V_{OUT}	1mA ⩽ I_{OUT} ⩽ 40mA V_{IN}=-10V,25°C	—	10	30	mV
Output Noise Voltage	V_N	10Hz ⩽ f ⩽ 100kHz 25°C	—	40	—	uV/V_{OUT}
Ripple Rejection	RR	-8V ⩽ V_{IN} ⩽ -18V f=120Hz,0~125°C	41	49	—	dB

Electrical Characteristics(HR79L06V) (Vi=-12V Io=40mA Ci=0.33uF Co=0.1uF Ta=25°C Unless otherwise specified)

PARAMETER	SYMBOL	Conditions	Min.	Typ.	Max.	UNIT
Output Voltage	V_{OUT}	I_{OUT}=40mA,V_{IN}=-12V 25°C	-5.75	-6	-6.24	V
Output Voltage	V_{OUT}	-8V ⩽ V_{IN} ⩽ -21V 1mA ⩽ I_{OUT} ⩽ 40mA 0~125°C	-5.6	-6	-6.4	V
Output Voltage	V_{OUT}	V_{IN}=-12V 1mA ⩽ I_{OUT} ⩽ 70mA 0~125°C	-5.6	-6	-6.4	V
Dropout Voltage	V_D	I_{OUT}=40mA,25°C	—	-1.7	—	V
Quiescent Current	I_Q	V_{IN}=-12V,I_{OUT}=0mA 25°C	—	2	6	mA
Quiescent Current Change	△I_Q	-10V ⩽ V_{IN} < -21V 0~125°C	—	—	1.5	mA
Quiescent Current Change	△I_Q	1mA ⩽ I_{OUT} ⩽ 40mA 0~125°C	—	—	0.1	mA
Line Regulation	△V_{OUT}	-8V ⩽ V_{IN} ⩽ -21V I_{OUT}=40mA,25°C	—	18	160	mV
Line Regulation	△V_{OUT}	-10V ⩽ V_{IN} ⩽ -21V I_{OUT}=40mA,25°C	—	16	150	mV
Load Regulation	△V_{OUT}	1mA ⩽ I_{OUT} ⩽ 100mA V_{IN}=-12V,25°C	—	8	72	mV
Load Regulation	△V_{OUT}	1mA ⩽ I_{OUT} ⩽ 40mA V_{IN}=-12V,25°C	—	7	50	mV
Output Noise Voltage	V_N	10Hz ⩽ f ⩽ 100kHz 25°C	—	144	—	uV/V_{OUT}
Ripple Rejection	RR	-9V ⩽ V_{IN} ⩽ -19V f=120Hz,0~125°C	40	70	—	dB

Electrical Characteristics(HR79L09V) (Vi=-15V Io=40mA Ci=0.33uF Co=0.1uF Ta=25°C Unless otherwise specified)

PARAMETER	SYMBOL	Conditions	Min.	Typ.	Max.	UNIT
Output Voltage	V_{OUT}	I_{OUT}=40mA,V_{IN}=-15V 25°C	-8.73	-9	-9.27	V
Output Voltage	V_{OUT}	-11V ⩽ V_{IN} ⩽ -24V 1mA ⩽ I_{OUT} ⩽ 40mA 0~125°C	-8.6	-9	-9.4	V
Output Voltage	V_{OUT}	V_{IN}=-15V 1mA ⩽ I_{OUT} ⩽ 70mA 0~125°C	-8.6	-9	-9.4	V
Dropout Voltage	V_D	I_{OUT}=40mA,25°C	—	-1.7	—	V
Quiescent Current	I_Q	V_{IN}=-15V,I_{OUT}=0mA 25°C	—	3	6	mA
Quiescent Current Change	△I_Q	-12V ⩽ V_{IN} < -23V 0~125°C	—	—	1.5	mA
Quiescent Current Change	△I_Q	1mA ⩽ I_{OUT} ⩽ 40mA 0~125°C	—	—	0.1	mA
Line Regulation	△V_{OUT}	-11V ⩽ V_{IN} ⩽ -24V I_{OUT}=40mA,25°C	—	50	200	mV
Line Regulation	△V_{OUT}	-12V ⩽ V_{IN} ⩽ -23V I_{OUT}=40mA,25°C	—	30	150	mV
Load Regulation	△V_{OUT}	1mA ⩽ I_{OUT} ⩽ 100mA V_{IN}=-15V,25°C	—	90	100	mV
Load Regulation	△V_{OUT}	1mA ⩽ I_{OUT} ⩽ 40mA V_{IN}=-15V,25°C	—	60	80	mV
Output Noise Voltage	V_N	10Hz ⩽ f ⩽ 100kHz 25°C	—	200	—	uV/V_{OUT}
Ripple Rejection	RR	-12V ⩽ V_{IN} ⩽ -23V f=120Hz,0~125°C	30	60	—	dB

Electrical Characteristics(HR79L12V) (Vi=-19V Io=40mA Ci=0.33uF Co=0.1uF Ta=25°C Unless otherwise specified)

PARAMETER	SYMBOL	Conditions	Min.	Typ.	Max.	UNIT
Output Voltage	V_{OUT}	I_{OUT}=40mA,V_{IN}=-19V 25°C	-11.64	-12	-12.36	V
Output Voltage	V_{OUT}	-14.5V ⩽ V_{IN} ⩽ -27V 1mA ⩽ I_{OUT} ⩽ 40mA 0~125°C	-11.4	-12	-12.6	V
Output Voltage	V_{OUT}	V_{IN}=-19V 1mA ⩽ I_{OUT} ⩽ 70mA 0~125°C	-11.4	-12	-12.6	V
Dropout Voltage	V_D	I_{OUT}=40mA,25°C	—	-1.7	—	V
Quiescent Current	I_Q	V_{IN}=-19V,I_{OUT}=0mA 25°C	—	—	6.5	mA
Quiescent Current Change	△I_Q	-16V ⩽ V_{IN} < -27V 0~125°C	—	—	1.5	mA
Quiescent Current Change	△I_Q	1mA ⩽ I_{OUT} ⩽ 40mA 0~125°C	—	—	0.1	mA
Line Regulation	△V_{OUT}	-14.5V ⩽ V_{IN} ⩽ -27V I_{OUT}=40mA,25°C	—	50	250	mV
Line Regulation	△V_{OUT}	-16V ⩽ V_{IN} ⩽ -27V I_{OUT}=40mA,25°C	—	40	200	mV
Load Regulation	△V_{OUT}	1mA ⩽ I_{OUT} ⩽ 100mA V_{IN}=-19V,25°C	—	24	100	mV
Load Regulation	△V_{OUT}	1mA ⩽ I_{OUT} ⩽ 40mA V_{IN}=-19V,25°C	—	15	50	mV
Output Noise Voltage	V_N	10Hz ⩽ f ⩽ 100kHz 25°C	—	80	—	uV/V_{OUT}
Ripple Rejection	RR	-15V ⩽ V_{IN} ⩽ -25V f=120Hz,0~125°C	37	42	—	dB

Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)

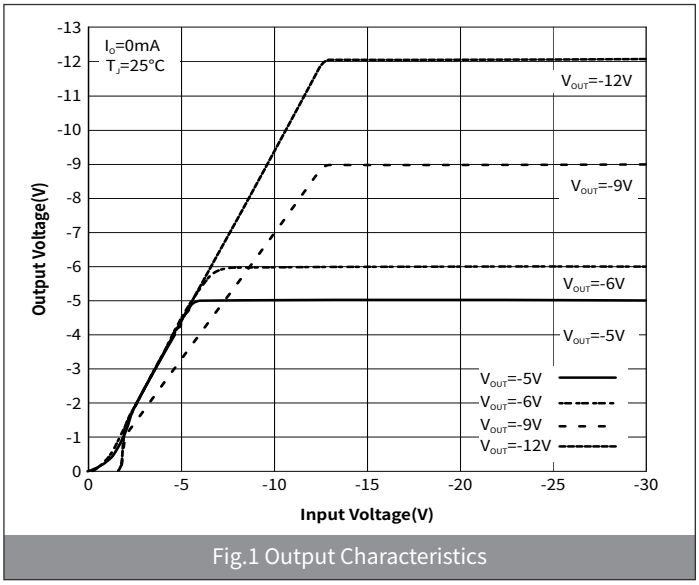


Fig.1 Output Characteristics

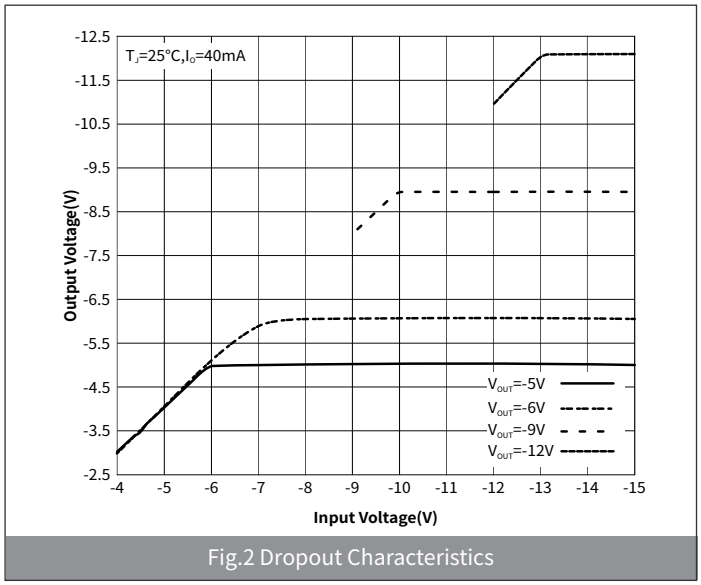


Fig.2 Dropout Characteristics

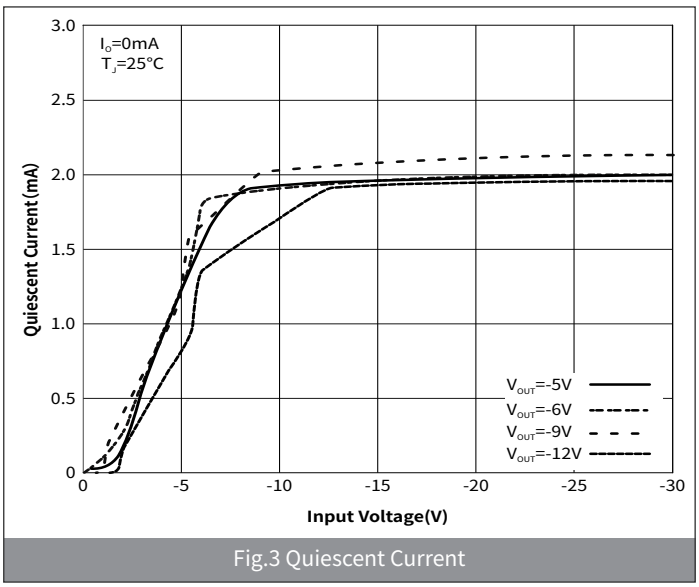


Fig.3 Quiescent Current

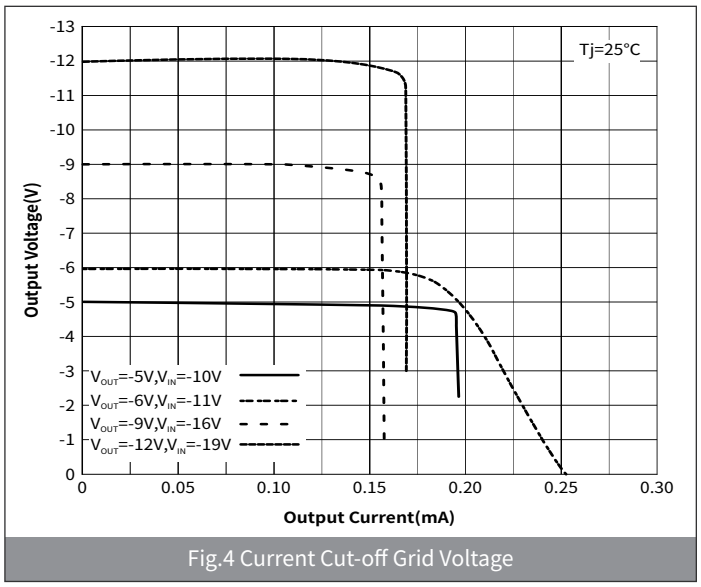


Fig.4 Current Cut-off Grid Voltage

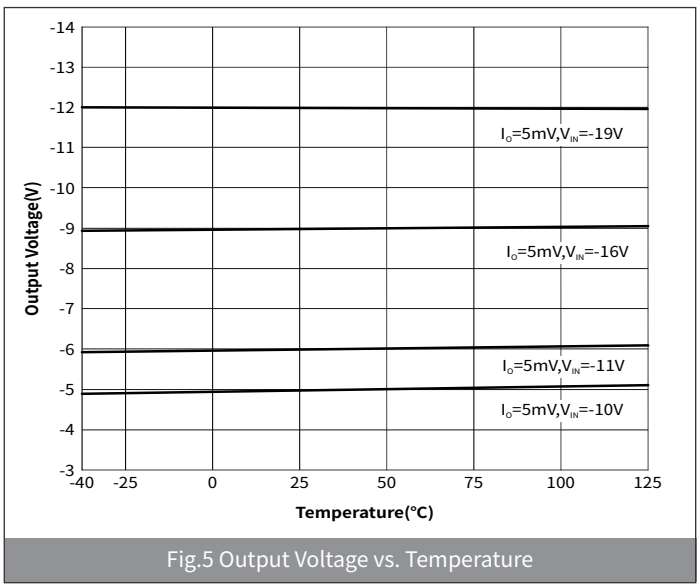


Fig.5 Output Voltage vs. Temperature

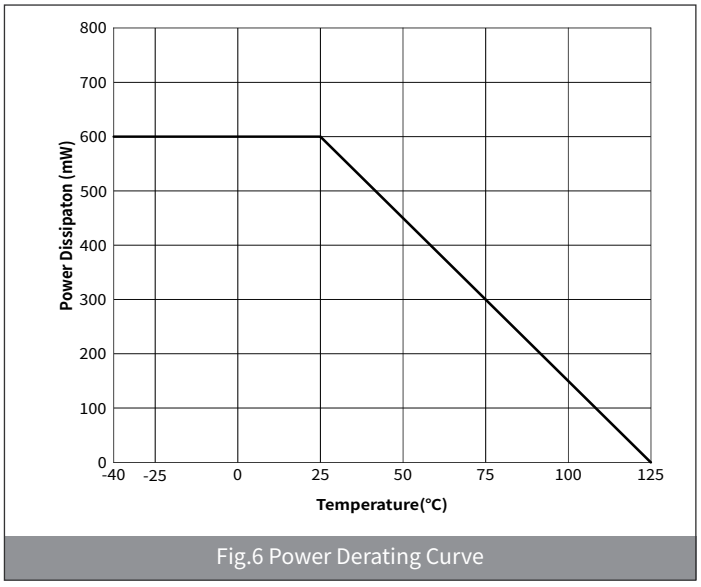
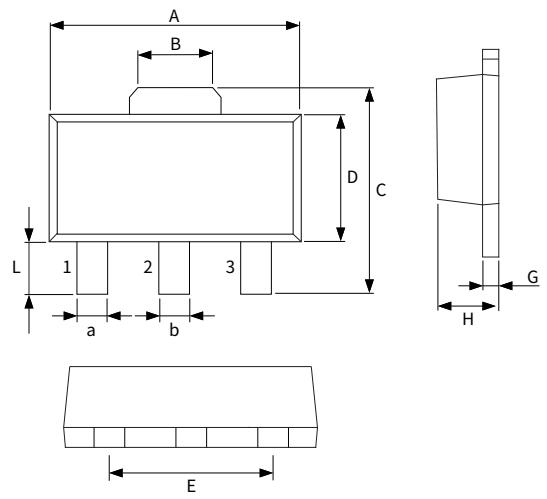


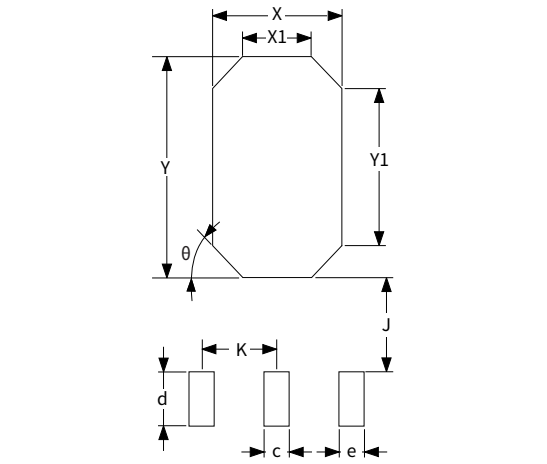
Fig.6 Power Derating Curve

Package Outline Dimensions (SOT-89)



Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
B	1.35	1.83	0.053	0.072
C	3.75	4.25	0.148	0.167
D	2.29	2.60	0.090	0.102
E	2.95	3.05	0.116	0.120
a	0.35	0.48	0.014	0.019
b	0.40	0.56	0.016	0.022
L	0.80	1.20	0.031	0.047
G	0.35	0.44	0.014	0.017
H	1.40	1.60	0.055	0.063

Suggested Pad Layout



Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
c	0.80	1.00	0.032	0.04
d	1.30	1.50	0.052	0.060
e	0.70	0.90	0.028	0.036
J	1.80	2.00	0.072	0.080
K	1.40	1.60	0.056	0.064
X	2.50	2.70	0.100	0.108
X1	1.30	1.50	0.052	0.060
Y	4.30	4.50	0.172	0.180
Y1	3.10	3.30	0.124	0.132
θ	-	45°	-	45°