

DESCRIPTION

The μA79M00 series of monolithic Three Terminal Negative Regulators employs internal current limiting, thermal shutdown, and safe-area compensation making them essentially indestructible. If adequate heat sinking is provided they can deliver over 500mA output current. They are intended as fixed voltage regulators, but used with external components, can provide adjustable output voltages and currents.

FEATURES

- Output current up to 500mA
- No external components
- Internal thermal overload protection
- Internal short circuit current limiting
- Output transistor safe-area compensation
- Available in the TO-220 and the TO-39 package
- Output voltages of -5, -5.2, -6, -8, -12, -15, -18 and -24 volts
- MII std 883B pending

ABSOLUTE MAXIMUM RATINGS

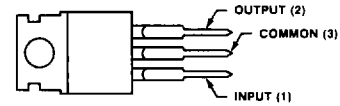
PARAMETER	RATING	UNIT
Input voltage (-5V through -15V) ¹ (-20V, -24V)	-35 -40	V V
Internal power dissipation	Internally limited	
Storage temperature range		
TO-39	-65 to +150	°C
TO-220	-55 to +125	°C
Operating junction temperature range ²		
79M00	-55 to +150	°C
79M00C	0 to +125	°C
Lead temperature		
TO-39 package (soldering, 60sec)	300	°C
TO-220 package (soldering, 10sec)	230	°C

NOTES

1. Thermal resistance of the packages (without a heat sink)
 Junction to case: TO-220 Package 2°C/W TO-39 Package 20°C/W.
 Junction to ambient: TO-220 Package 50°C/W TO-39 Package 170°C/W.
2. Operating ambient temperature range
 -55°C to +125°C
 0°C to -85°C

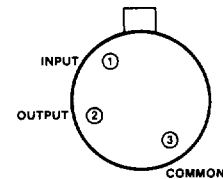
PIN CONFIGURATIONS

U PACKAGE (TO-220)



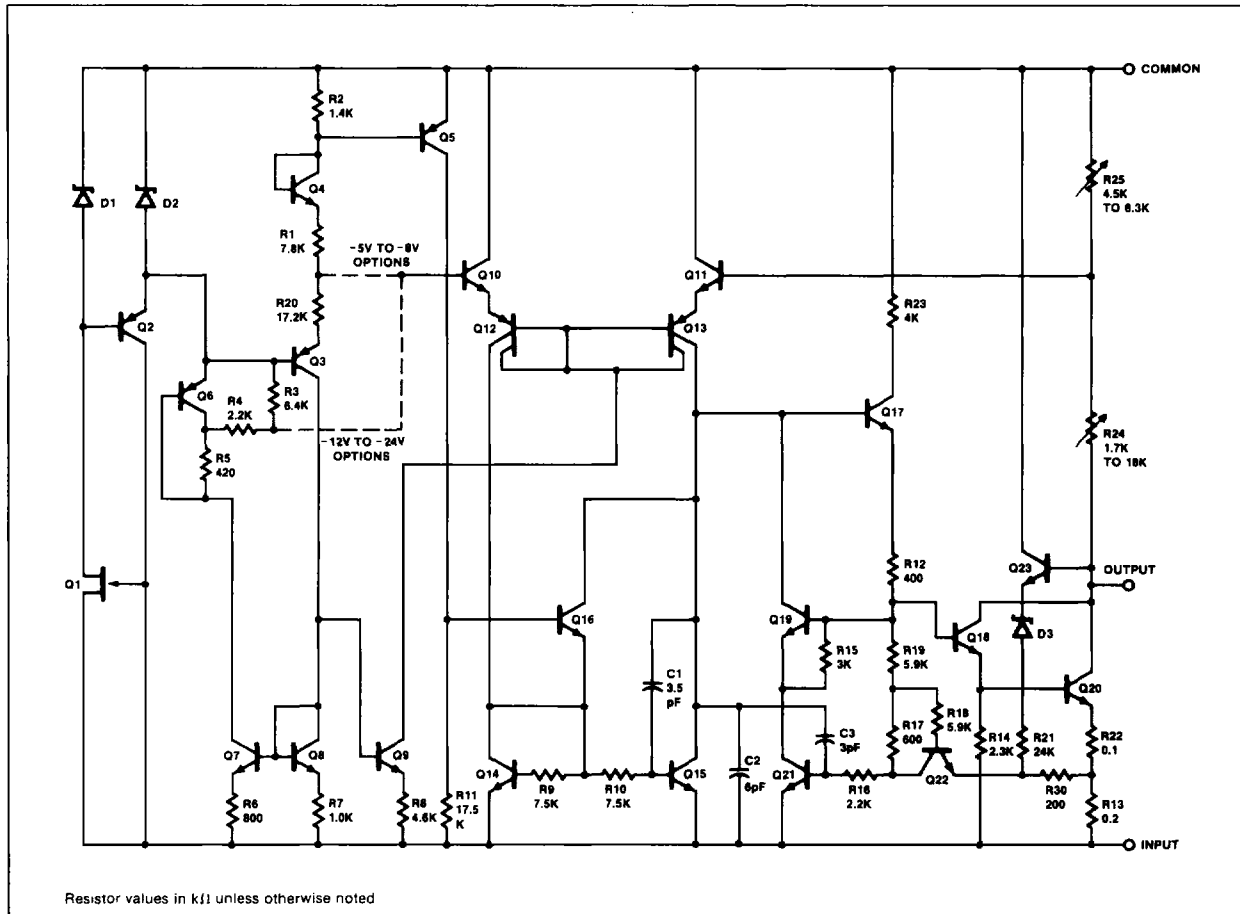
ORDER INFORMATION	ORDER
OUTPUT VOLTAGE	PART NO.
-5V	79M05 CU
-5.2V	79M05.2 CU
-6V	79M06 CU
-8V	79M08 CU
-12V	79M12 CU
-15V	79M15 CU
-18V	79M18 CU
-24V	79M24 CU

DB PACKAGE (TO-39)



ORDER INFORMATION	ORDER
OUTPUT VOLTAGE	PART NO.
-5V	79M05 DB
-5.2V	79M05.2 DB
-6V	79M06 DB
-8V	79M08 DB
-12V	79M12 DB
-15V	79M15 DB
-18V	79M18 DB
-24V	79M24 DB
-5V	79M05 CDB
-5.2V	79M05.2 CDB
-6V	79M06 CDB
-8V	79M08 CDB
-12V	79M12 CDB
-15V	79M15 CDB
-18V	79M18 CDB
-24V	79M24 CDB

EQUIVALENT CIRCUIT



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DC ELECTRICAL CHARACTERISTICS $I_{OUT} = 350\text{mA}$, $T_J = 25^\circ\text{C}$, $C_{IN} = 2\mu\text{F}$, $C_{OUT} = 1\mu\text{F}$, unless otherwise specified.

PARAMETER	TEST CONDITIONS	79M05			79M05C			UNIT
		Min	Typ	Max	Min	Typ	Max	
V_{OUT} Output voltage	$5\text{mA} \leq I_{OUT} \leq 350\text{mA}$, $P_D \leq 4\text{W}$, over temp.*	$V_{IN} = -10\text{V}$ -5.2 -5.0 -4.8			$V_{IN} = -10\text{V}$ -5.2 -5.0 -4.8			V
		$-25\text{V} \leq V_{IN} \leq -7\text{V}$ -5.25 -4.75			$-25\text{V} \leq V_{IN} \leq -7\text{V}$ -5.25 -4.75			V
Line regulation		$-25\text{V} \leq V_{IN} \leq -7\text{V}$ 7.0 50			$-25\text{V} \leq V_{IN} \leq -7\text{V}$ 7.0 50			mV
		$-18\text{V} \leq V_{IN} \leq -8\text{V}$ 3.0 30			$-18\text{V} \leq V_{IN} \leq -8\text{V}$ 3.0 30			mV
Load regulation	$5\text{mA} \leq I_{OUT} \leq 500\text{mA}$ $5\text{mA} \leq I_{OUT} \leq 350\text{mA}$	75 100			75 100			mV
		50			50			mV
I_{CC}		1.0 2.0			1.0 2.0			mA
ΔI_{CC} ΔI_{CC}	With line With load, $5\text{mA} \leq I_{OUT} \leq 350\text{mA}$	$-25\text{V} \leq V_{IN} \leq -8\text{V}$ 0.4			$-25\text{V} \leq V_{IN} \leq -8\text{V}$ 0.4			mA
		0.4			0.4			mA
Output noise voltage	$10\text{Hz} \leq f \leq 100\text{KHz}$	125			125			μV
Ripple rejection	$f = 120\text{Hz}$ $I_{OUT} = 100\text{mA}$, over temp.*	$-18\text{V} \leq V_{IN} \leq -8\text{V}$ 50			$-18\text{V} \leq V_{IN} \leq -8\text{V}$ 50			dB
Dropout voltage		1.1			1.1			V
Peak output current		650			650			mA
Average temperature coefficient of output voltage	$I_{OUT} = 5\text{mA}$	-0.4			-0.4			$\text{mV}/^\circ\text{C}$
I_{SC}	$V_{IN} = -30\text{V}$	140			140			mA

DC ELECTRICAL CHARACTERISTICS (Cont'd)

PARAMETER	TEST CONDITIONS	79M05.2			79M05.2C			UNIT
		Min	Typ	Max	Min	Typ	Max	
V_{OUT} Output voltage	$5\text{mA} \leq I_{OUT} \leq 350\text{mA}$, $P_D \leq 4\text{W}$, over temp.*	$V_{IN} = -10\text{V}$ -5.0 -5.2 -5.4			$V_{IN} = -10\text{V}$ -5.0 -5.2 -5.4			V
		$-25\text{V} \leq V_{IN} \leq -7\text{V}$ -5.45 -4.95			$-25\text{V} \leq V_{IN} \leq -7\text{V}$ -5.00 -5.4			V
Line regulation		$-25\text{V} \leq V_{IN} \leq -7\text{V}$ 7.0 50			$-25\text{V} \leq V_{IN} \leq -7\text{V}$ 7.0 50			mV
		$-18\text{V} \leq V_{IN} \leq -8\text{V}$ 3.0 30			$-18\text{V} \leq V_{IN} \leq -8\text{V}$ 3.0 30			mV
Load regulation	$5\text{mA} \leq I_{OUT} \leq 500\text{mA}$ $5\text{mA} \leq I_{OUT} \leq 350\text{mA}$	75 100			75 100			mV
		52			52			mV
I_{CC}		1.0 2.0			1.0 2.0			mA
ΔI_{CC} ΔI_{CC}	With line With load, $5\text{mA} \leq I_{OUT} \leq 350\text{mA}$	$-25\text{V} \leq V_{IN} \leq -8\text{V}$ 0.4			$-25\text{V} \leq V_{IN} \leq -8\text{V}$ 0.4			mA
		0.4			0.4			mA
Output noise voltage	$10\text{Hz} \leq f \leq 100\text{KHz}$	125			125			μV
Ripple rejection	$f = 120\text{Hz}$ $I_{OUT} = 100\text{mA}$, over temp.*	$-18\text{V} \leq V_{IN} \leq -8\text{V}$ 50			$-18\text{V} \leq V_{IN} \leq -8\text{V}$ 50			dB
Dropout voltage		1.1			1.1			V
Peak output current		650			650			mA
Average temperature coefficient of output voltage	$I_{OUT} = 5\text{mA}$	-0.4			-0.4			$\text{mV}/^\circ\text{C}$
I_{SC}	$V_{IN} = -30\text{V}$	140			140			mA

*NOTE

$-55^\circ\text{C} \leq T_J \leq +150^\circ\text{C}$ for 79M00
 $0^\circ\text{C} \leq T_J \leq +125^\circ\text{C}$ for 79M00C

DC ELECTRICAL CHARACTERISTICS (Cont'd) $I_{OUT} = 350\text{mA}$, $T_J = 25^\circ\text{C}$, $C_{IN} = 2\mu\text{F}$, $C_{OUT} = 1\mu\text{F}$, unless otherwise specified.

PARAMETER	TEST CONDITIONS	79M06			79M06C			UNIT
		Min	Typ	Max	Min	Typ	Max	
V_{OUT} Output voltage	$5\text{mA} \leq I_{OUT} \leq 350\text{mA}$, $P_D \leq 4\text{W}$, over temp.*	$V_{IN} = -11\text{V}$			$V_{IN} = -11\text{V}$			V
		-6.25	-6.0	-5.75	-6.25	-6.0	-5.75	V
Line regulation		$-25\text{V} \leq V_{IN} \leq -8\text{V}$			$-25\text{V} \leq V_{IN} \leq -8\text{V}$			mV
		-6.3	-5.7	-6.3	-5.7	-6.3	-5.7	mV
Load regulation	$5\text{mA} \leq I_{OUT} \leq 500\text{mA}$ $5\text{mA} \leq I_{OUT} \leq 350\text{mA}$	$-25\text{V} \leq V_{IN} \leq -7\text{V}$			$-25\text{V} \leq V_{IN} \leq -7\text{V}$			mV
			7.0	60		7.0	60	mV
I_{CC}								mA
			1.0	2.0		1.0	2.0	mA
ΔI_{CC} ΔI_{CC}	With line With load, $5\text{mA} \leq I_{OUT} \leq 350\text{mA}$	$-25\text{V} \leq V_{IN} \leq -9\text{V}$			$-25\text{V} \leq V_{IN} \leq -9\text{V}$			mA
				0.4			0.4	mA
Output noise voltage	$10\text{Hz} \leq f \leq 100\text{KHz}$		150			150	μV	
Ripple rejection	$f = 120\text{Hz}$ $I_{OUT} = 100\text{mA}$, over temp.*	$-19\text{V} \leq V_{IN} \leq -9\text{V}$			$-19\text{V} \leq V_{IN} \leq -9\text{V}$			dB
Dropout voltage			1.1			1.1	V	
Peak output current			650			650	mA	
Average temperature coefficient of output voltage	$I_{OUT} = 5\text{mA}$		-0.4			-0.4	$\text{mV}/^\circ\text{C}$	
I_{SC}	$V_{IN} = -30\text{V}$		140			140	mA	

DC ELECTRICAL CHARACTERISTICS (Cont'd)

PARAMETER	TEST CONDITIONS	79M08			79M08C			UNIT
		Min	Typ	Max	Min	Typ	Max	
V_{OUT} Output voltage	$5\text{mA} \leq I_{OUT} \leq 350\text{mA}$, $P_D \leq 4\text{W}$, over temp.*	$V_{IN} = -14\text{V}$			$V_{IN} = -14\text{V}$			V
		-8.3	-8.0	-7.7	-8.3	-8.0	-7.7	V
Line regulation		$-25\text{V} \leq V_{IN} \leq -10.5\text{V}$			$-25\text{V} \leq V_{IN} \leq -10.5\text{V}$			mV
		-8.4	-7.6	-8.4	-7.6	-8.4	-7.6	mV
Load regulation	$5\text{mA} \leq I_{OUT} \leq 500\text{mA}$ $5\text{mA} \leq I_{OUT} \leq 350\text{mA}$	$-25\text{V} \leq V_{IN} \leq -10.5\text{V}$			$-25\text{V} \leq V_{IN} \leq -10.5\text{V}$			mV
			8.0	80		8.0	80	mV
I_{CC}		$-21\text{V} \leq V_{IN} \leq -11\text{V}$			$-21\text{V} \leq V_{IN} \leq -11\text{V}$			mA
			4.0	50		4.0	50	mA
ΔI_{CC} ΔI_{CC}	With line With load, $5\text{mA} \leq I_{OUT} \leq 350\text{mA}$	$-25\text{V} \leq V_{IN} \leq -10.5\text{V}$			$-25\text{V} \leq V_{IN} \leq -10.5\text{V}$			mA
				0.4			0.4	mA
Output noise voltage	$10\text{Hz} \leq f \leq 100\text{KHz}$		200			200	μV	
Ripple rejection	$f = 120\text{Hz}$ $I_{OUT} = 100\text{mA}$, over temp.*	$-21.5\text{V} \leq V_{IN} \leq -11.5\text{V}$			$-21.5\text{V} \leq V_{IN} \leq -11.5\text{V}$			dB
Dropout voltage			1.1			1.1	V	
Peak output current			650			650	mA	
Average temperature coefficient of output voltage	$I_{OUT} = 5\text{mA}$		-0.6			-0.6	$\text{mV}/^\circ\text{C}$	
I_{SC}	$V_{IN} = -30\text{V}$		140			140	mA	

*NOTE

$-55^\circ\text{C} \leq T_J \leq +150^\circ\text{C}$ for 79M00

$0^\circ\text{C} \leq T_J \leq +125^\circ\text{C}$ for 79M00C

DC ELECTRICAL CHARACTERISTICS (Cont'd) $I_{OUT} = 350\text{mA}$, $T_J = 25^\circ\text{C}$, $C_{IN} = 2\mu\text{F}$, $C_{OUT} = 1\mu\text{F}$, unless otherwise specified.

PARAMETER	TEST CONDITIONS	79M12			79M12C			UNIT
		Min	Typ	Max	Min	Typ	Max	
V_{OUT} Output voltage	$5\text{mA} \leq I_{OUT} \leq 350\text{mA}$, $P_D \leq 4\text{W}$, over temp.*	$V_{IN} = -19\text{V}$ -12.5 -12 -11.5			$V_{IN} = -19\text{V}$ -12.5 -12 -11.5			V
		$-30\text{V} \leq V_{IN} \leq -14.5\text{V}$ -12.6 -11.4			$-30\text{V} \leq V_{IN} \leq -14.5\text{V}$ -12.6 -11.4			V
Line regulation		$-30\text{V} \leq V_{IN} \leq -14.5\text{V}$ 9.0 80			$-30\text{V} \leq V_{IN} \leq -14.5\text{V}$ 9.0 80			mV
		$-25\text{V} \leq V_{IN} \leq -15\text{V}$ 5.0 50			$-25\text{V} \leq V_{IN} \leq -15\text{V}$ 5.0 50			mV
Load regulation	$5\text{mA} \leq I_{OUT} \leq 500\text{mA}$ $5\text{mA} \leq I_{OUT} \leq 350\text{mA}$							mV
								mV
I_{CC}		1.5 3.0			1.5 3.0			mA
ΔI_{CC} ΔI_{CC}	With line With load, $5\text{mA} \leq I_{OUT} \leq 350\text{mA}$	$-30\text{V} \leq V_{IN} \leq -14.5\text{V}$ 0.4			$-30\text{V} \leq V_{IN} \leq -14.5\text{V}$ 0.4			mA
								mA
Output noise voltage	$10\text{Hz} \leq f \leq 100\text{KHz}$	300			300			μV
Ripple rejection	$f = 120\text{Hz}$ $I_{OUT} = 100\text{mA}$, over temp.*	$-28.5\text{V} \leq V_{IN} \leq -18.5\text{V}$ 50			$-28.5\text{V} \leq V_{IN} \leq -18.5\text{V}$ 50			dB
Dropout voltage		1.1			1.1			V
Peak output current		650			650			mA
Average temperature coefficient of output voltage	$I_{OUT} = 5\text{mA}$	-0.8			-0.8			$\text{mV}/^\circ\text{C}$
I_{SC}	$V_{IN} = -30\text{V}$	140			140			mA

DC ELECTRICAL CHARACTERISTICS (Cont'd)

PARAMETER	TEST CONDITIONS	79M15			79M15C			UNIT
		Min	Typ	Max	Min	Typ	Max	
V_{OUT} Output voltage	$5\text{mA} \leq I_{OUT} \leq 350\text{mA}$, $P_D \leq 4\text{W}$, over temp.*	$V_{IN} = -23\text{V}$ -15.6 -15 -14.4			$V_{IN} = -23\text{V}$ -15.6 -15 -14.4			V
		$-30\text{V} \leq V_{IN} \leq -17.5\text{V}$ -15.75 -14.25			$-30\text{V} \leq V_{IN} \leq -17.5\text{V}$ -15.75 -14.25			V
Line regulation		$-30\text{V} \leq V_{IN} \leq -17.5\text{V}$ 9.0 80			$-30\text{V} \leq V_{IN} \leq -17.5\text{V}$ 9.0 80			mV
		$-28\text{V} \leq V_{IN} \leq -18\text{V}$ 7.0 50			$-28\text{V} \leq V_{IN} \leq -18\text{V}$ 7.0 50			mV
Load regulation	$5\text{mA} \leq I_{OUT} \leq 500\text{mA}$ $5\text{mA} \leq I_{OUT} \leq 350\text{mA}$							mV
								mV
I_{CC}		1.5 3.0			1.5 3.0			mA
ΔI_{CC} ΔI_{CC}	With line With load, $5\text{mA} \leq I_{OUT} \leq 350\text{mA}$	$-30\text{V} \leq V_{IN} \leq -17.5\text{V}$ 0.4			$-30\text{V} \leq V_{IN} \leq -17.5\text{V}$ 0.4			mA
								mA
Output noise voltage	$10\text{Hz} \leq f \leq 100\text{KHz}$	375			375			μV
Ripple rejection	$f = 120\text{Hz}$ $I_{OUT} = 100\text{mA}$, over temp.*	$-28.5\text{V} \leq V_{IN} \leq -18.5\text{V}$ 50			$-28.5\text{V} \leq V_{IN} \leq -18.5\text{V}$ 50			dB
Dropout voltage		1.1			1.1			V
Peak output current		650			650			mA
Average temperature coefficient of output voltage	$I_{OUT} = 5\text{mA}$	-1.0			-1.0			$\text{mV}/^\circ\text{C}$
I_{SC}	$V_{IN} = -30\text{V}$	140			140			mA

*NOTE

$-55^\circ\text{C} \leq T_J \leq +150^\circ\text{C}$ for 79M00

$0^\circ\text{C} \leq T_J \leq +125^\circ\text{C}$ for 79M00C

DC ELECTRICAL CHARACTERISTICS (Cont'd) $I_{OUT} = 350\text{mA}$, $T_J = 25^\circ\text{C}$, $C_{IN} = 2\mu\text{F}$, $C_{OUT} = 1\mu\text{F}$, unless otherwise specified.

PARAMETER	TEST CONDITIONS	79M18			79M18C			UNIT
		Min	Typ	Max	Min	Typ	Max	
V _{OUT} Output voltage	5mA ≤ I _{OUT} ≤ 350mA, P _D ≤ 4W, over temp.*	V _{IN} = -27V -18.7 -18 -17.3			V _{IN} = -27V -18.7 -18 -17.3			V
		-33V ≤ V _{IN} ≤ -21V -18.9 -17.1			-33V ≤ V _{IN} ≤ -21V -18.9 -17.1			V
Line regulation		-33V ≤ V _{IN} ≤ -21V 11 80			-33V ≤ V _{IN} ≤ -21V 11 80			mV
		-32V ≤ V _{IN} ≤ -22V 11 70			-32V ≤ V _{IN} ≤ -22V 11 70			mV
Load regulation	5mA ≤ I _{OUT} ≤ 500mA		70	300		70	300	mV
	5mA ≤ I _{OUT} ≤ 350mA		48			48		mV
I _{CC}			1.5	3.5		1.5	3.5	mA
ΔI _{CC} ΔI _{CC}	With line	-33V ≤ V _{IN} ≤ -21V .4			-33V ≤ V _{IN} ≤ -21V .4			mA
	With load, 5mA ≤ I _{OUT} ≤ 350mA	.4			.4			mA
Output noise voltage	10Hz ≤ f ≤ 100KHz			450			450	μV
Ripple rejection	f = 120Hz I _{OUT} = 100mA, over temp.*	-32V ≤ V _{IN} ≤ -22V 50			-32V ≤ V _{IN} ≤ -22V 50			dB
Dropout voltage			1.1			1.1		V
Peak output current			650			650		mA
Average temperature coefficient of output voltage	I _{OUT} = 5mA		-1.0			-1.0		mV/°C
I _{SC}	V _{IN} = -30V		140			140		mA

DC ELECTRICAL CHARACTERISTICS (Cont'd)

PARAMETER	TEST CONDITIONS	79M24			79M24C			UNIT
		Min	Typ	Max	Min	Typ	Max	
V _{OUT} Output voltage	5mA ≤ I _{OUT} ≤ 350mA, P _D ≤ 4W, over temp.*	V _{IN} = -33V -25 -24 -23			V _{IN} = -33V -25 -24 -23			V
		-38V ≤ V _{IN} ≤ -27V -25.2 -22.8			-38V ≤ V _{IN} ≤ -27V -25.2 -22.8			V
Line regulation		-38V ≤ V _{IN} ≤ -27V 12 80			-38V ≤ V _{IN} ≤ -27V 12 80			mV
		-38V ≤ V _{IN} ≤ -28V 12 70			-38V ≤ V _{IN} ≤ -28V 12 70			mV
Load regulation	5mA ≤ I _{OUT} ≤ 500mA		75	300		75	300	mV
	5mA ≤ I _{OUT} ≤ 350mA		50			50		mV
I _{CC}			1.5	3.5		1.5	3.5	mA
ΔI _{CC} ΔI _{CC}	With line	-38V ≤ V _{IN} ≤ -27V 0.4			-38V ≤ V _{IN} ≤ -27V 0.4			mA
	With load, 5mA ≤ I _{OUT} ≤ 350mA	0.4			0.4			mA
Output noise voltage	10Hz ≤ f ≤ 100KHz			600			600	μV
Ripple rejection	f = 120Hz I _{OUT} = 100mA, over temp.*	-38V ≤ V _{IN} ≤ -28V 50			-38V ≤ V _{IN} ≤ -28V 50			dB
Dropout voltage	I _{OUT} = 5mA		1.1			1.1		V
Peak output current			650			650		mA
Average temperature coefficient of output voltage	V _{IN} = -30V		-1.0			-1.0		mV/°C
I _{SC}			140			140		mA

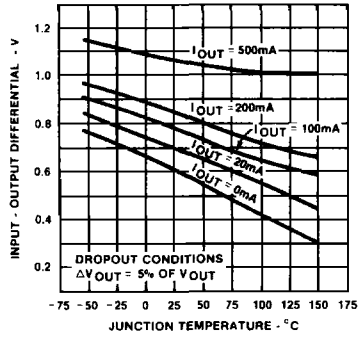
*NOTE

-55°C ≤ T_J ≤ +150°C for 79M00
0°C ≤ T_J ≤ +125°C for 79M00C

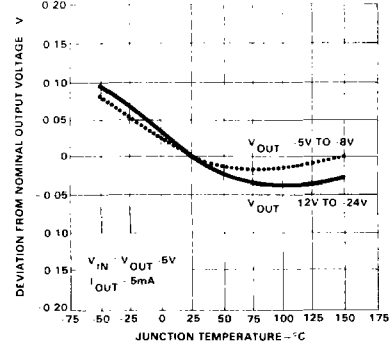
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TYPICAL PERFORMANCE CHARACTERISTICS

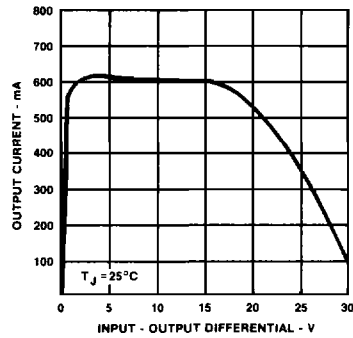
DROPOUT VOLTAGE AS A FUNCTION OF JUNCTION TEMPERATURE



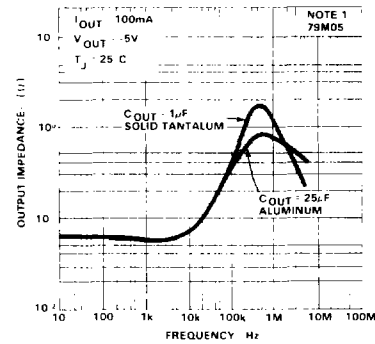
OUTPUT VOLTAGE AS A FUNCTION OF JUNCTION TEMPERATURE



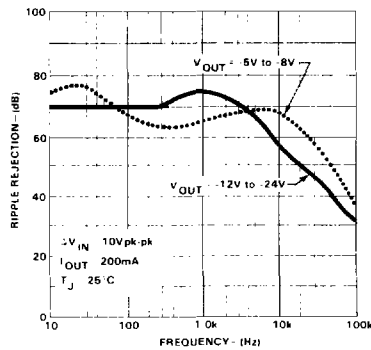
PEAK OUTPUT CURRENT AS A FUNCTION OF INPUT-OUTPUT DIFFERENTIAL VOLTAGE



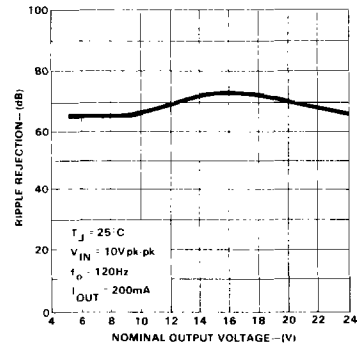
OUTPUT IMPEDANCE AS A FUNCTION OF FREQUENCY



RIPPLE REJECTION AS A FUNCTION OF FREQUENCY

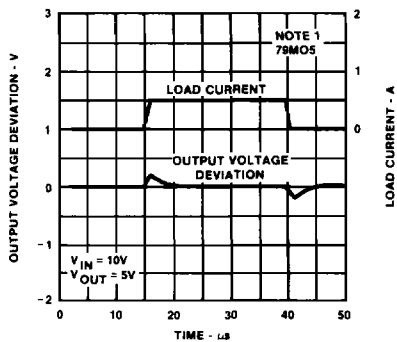


RIPPLE REJECTION AS A FUNCTION OF OUTPUT VOLTAGES

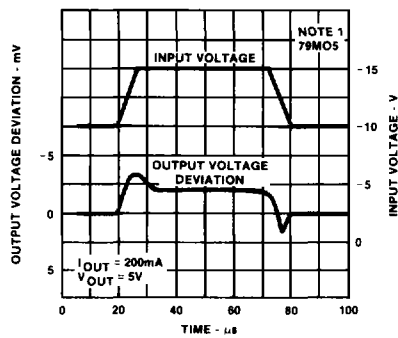


TYPICAL PERFORMANCE CHARACTERISTICS (Cont'd)

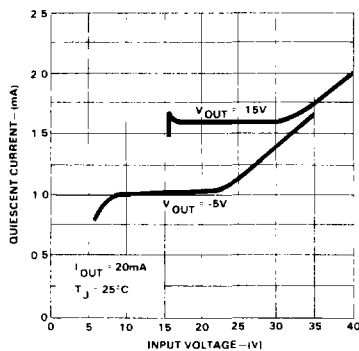
LOAD TRANSIENT RESPONSE



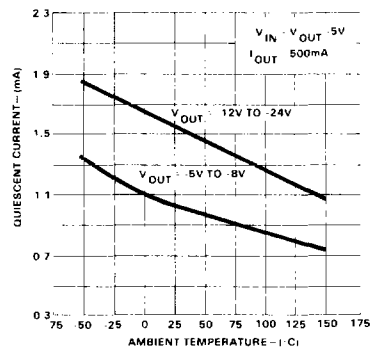
LINE TRANSIENT RESPONSE



QUIESCENT CURRENT AS A FUNCTION OF INPUT VOLTAGE



QUIESCENT CURRENT AS A FUNCTION OF TEMPERATURE



NOTE

The other μ A79M00 voltage series devices have similar performance curves

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