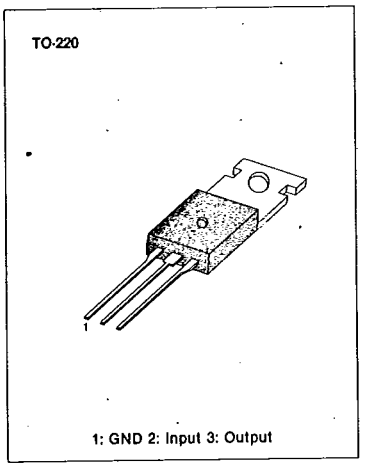
MC79MXXC SERIES — LINEAR INTEGRATED CIRCUIT

3-TERMINAL 0.5A NEGATIVE VOLTAGE REGULATOR

The MC79MXX series of 3-Terminal medium current negative voltage regulators are monolithic integrated circuits designed as fixed voltage regulators. These regulators employ internal current limiting, thermal shutdown and safe-area compensation making them essentially indestructible. If adequate heat sinking is provided, they can deliver up to 500mA output current. They are intended as fixed voltage regulators in a wide range of applications including local (on-card) regulation for elimination of noise and distribution problems associated with single point regulation. In addition to use as fixed voltage regulators, these devices can be used with external components to obtain adjustable output voltages and currents.



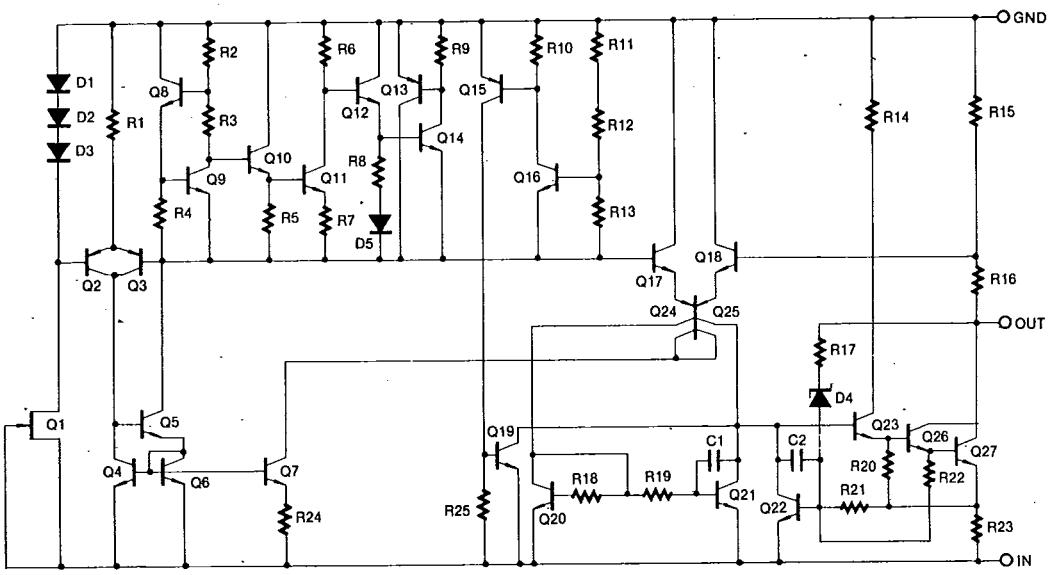
FEATURES

- **Output current in excess of 0.5A**
- **Internal thermal-overload protection**
- **Internal short circuit current limiting**
- **Output transistor safe-area compensation**
- **Available in JEDEC TO-220**
- **Output voltages of −5V, −6V, −8V, −12V, −15V, −18V, −24V**

ORDERING INFORMATION

Device	Package	Operating Temperature
MC79MXXCT	TO-220	0 ~ 125°C

SCHEMATHIC DIAGRAM



MC79MXXC SERIES LINEAR INTEGRATED CIRCUIT

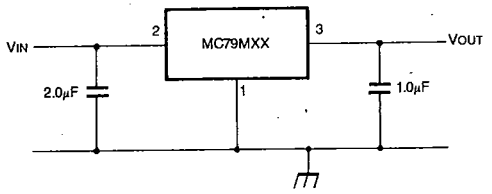
ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Input Voltage (for V_o = −5V to −18V)	V_I	−35	V
(for V_o = 24V)	V_I	−40	V
Thermal Resistance			
Junction-Case	Θ_{JC}	5	°C/W
Junction-Air	Θ_{JA}	65	°C/W
Operating Junction Temperature	T_{opr}	0 ~ +125	°C
Storage Temperature	T_{stg}	−65 ~ +150	°C

TYPICAL APPLICATION

Bypass capacitors are recommended for stable operation of the MC79MXXC series of regulators over the input voltage and output current ranges. Output bypass capacitors will improve the transient response of the regulator.
The bypass capacitors, (2μF on the input, 1μF on the output) should be ceramic or solid tantalum which have good high frequency characteristics. If aluminum electrolytics are used, their values should be 10μF or larger. The bypass capacitors should be mounted with the shortest leads, and if possible, directly across the regulator terminals.

Fixed Output Regulator



MC79MXXC SERIES LINEAR INTEGRATED CIRCUIT

ELECTRICAL CHARACTERISTICS MC79M05C

(Refer to test circuit, $0°C<T_j<125°C$, $I_o=350mA$, $V_i=-10V$, unless otherwise specified)

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V_o	$T_j=25°C$		−4.8	−5.0	−5.2	V
		$5.0mA \le I_o \le 350mA$, $V_i=-7V$ to $-25V$		−4.75	−5.0	−5.25	
Line Regulation	ΔV_o	$T_j=25°C$	$V_i=-7V$ to $-25V$		7.0	50	mV
			$V_i=-8V$ to $-18V$		2.0	30	
Load Regulation	ΔV_o	$T_j=25°C$	$I_o=5.0mA$ to $500mA$		30	100	mV
Quiescent Current	I_d	$T_j=25°C$			3	6	mA
Quiescent Current Change	ΔI_d	$I_o=5.0mA$ to $350mA$				0.4	mA
		$V_i=-8V$ to $-25V$				0.4	
Output Voltage Drift	$\Delta V_o/\Delta T$	$I_o=5mA$			0.2		mV/°C
Output Noise Voltage	V_N	$f=10Hz$ to $100KHz$ $T_j=25°C$			40		μV
Ripple Rejection	RR	$f=120Hz$, $V_i=-8$ to $-18V$		54	60		dB
Dropout Voltage	V_D	$I_o=500mA$, $T_j=25°C$			1.1		V
Short Circuit Current	I_{SC}	$V_i=-35V$, $T_j=25°C$			140		mA
Peak Current	I_{peak}	$T_j=25°C$			650		mA

ELECTRICAL CHARACTERISTICS MC79M06C

(Refer to test circuit, $0°C<T_j<125°C$, $I_o=350mA$, $V_i=-11V$, unless otherwise specified)

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V_o	$T_j=25°C$		−5.75	−6.0	−6.25	V
		$5.0mA \le I_o \le 350mA$, $V_i=-8.0V$ to $-25V$		−5.7	−6.0	−6.3	
Line Regulation	ΔV_o	$T_j=25°C$	$V_i=-8V$ to $-25V$		7.0	60	mV
			$V_i=-9V$ to $-19V$		2.0	40	
Load Regulation	ΔV_o	$T_j=25°C$	$I_o=5.0mA$ to $500mA$		30	120	mV
Quiescent Current	I_d	$T_j=25°C$			3	6	mA
Quiescent Current Change	ΔI_d	$I_o=5.0mA$ to $350mA$				0.4	mA
		$V_i=-8.0V$ to $-25V$				0.4	
Output Voltage Drift	$\Delta V_o/\Delta T$	$I_o=5mA$			0.4		mV/°C
Output Noise Voltage	V_N	$f=10Hz$ to $100KHz$ $T_j=25°C$			50		μV
Ripple Rejection	RR	$f=120Hz$, $V_i=-9$ to $-19V$		54	60		dB
Dropout Voltage	V_D	$I_o=500mA$, $T_j=25°C$			1.1		V
Short Circuit Current	I_{SC}	$V_i=-35V$, $T_j=25°C$			140		mA
Peak Current	I_{peak}	$T_j=25°C$			650		mA

* Load and line regulation are specified at constant junction temperature changes in V_o due to heating effects must be taken into account separately pulse testing with low duty is used.

MC79MXXC SERIES LINEAR INTEGRATED CIRCUIT

ELECTRICAL CHARACTERISTICS MC79M08C

(Refer to test circuit, $0°C < T_j < 125°C$, $I_o = 350mA$, $V_i = -14V$, unless otherwise specified)

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V_o	$T_j = 25°C$		−7.7	−8.0	−8.3	V
		$5.0mA \leq I_o \leq 350mA$, $V_i = -10.5V$ to $-25V$		−7.6	−8.0	−8.4	
Line Regulation	ΔV_o	$T_j = 25°C$	$V_i = -10.5V$ to $-25V$		7.0	80	mV
			$V_i = -11V$ to $-21V$		2.0	50	
Load Regulation	ΔV_o	$T_j = 25°C$	$I_o = 5.0mA$ to 500mA		30	160	mV
Quiescent Current	I_d	$T_j = 25°C$			3	6	mA
Quiescent Current Change	ΔI_d	$I_o = 5.0mA$ to 350mA				0.4	mA
		$V_i = -10.5V$ to $-25V$				0.4	
Output Voltage Drift	$\Delta V_o/\Delta T$	$I_o = 5mA$			−0.6		mV/°C
Output Noise Voltage	V_N	$f = 10Hz$ to $100KHz$ $T_j = 25°C$			60		μV
Ripple Rejection	RR	$f = 120Hz$, $V_i = -11.5V$ to $-21.5V$		54	59		dB
Dropout Voltage	V_D	$I_o = 500mA$, $T_j = 25°C$			1.1		V
Short Circuit Current	I_{SC}	$V_i = -35V$, $T_j = 25°C$			140		mA
Peak Current	I_{peak}	$T_j = 25°C$			650		mA

ELECTRICAL CHARACTERISTICS MC79M12C

(Refer to test circuit, $0°C < T_j < 125°C$, $I_o = 350mA$, $V_i = -19V$, unless otherwise specified)

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V_o	$T_j = 25°C$		−11.5	−12	−12.5	V
		$5.0mA \leq I_o \leq 350mA$, $V_i = -14.5V$ to $-30V$		−11.4	−1.2	−12.6	
Line Regulation	ΔV_o	$T_j = 25°C$	$V_i = -14.5V$ to $-30V$		8.0	80	mV
			$V_i = -15V$ to $-25V$		3.0	50	
Load Regulation	ΔV_o	$T_j = 25°C$	$I_o = 5.0mA$ to 500mA		30	240	mV
Quiescent Current	I_d	$T_j = 25°C$			3	6	mA
Quiescent Current Change	ΔI_d	$I_o = 5.0mA$ to 350mA				0.4	mA
		$V_i = -14.5V$ to $-30V$				0.4	
Output Voltage Drift	$\Delta V_o/\Delta T$	$I_o = 5mA$			−0.8		mV/°C
Output Noise Voltage	V_N	$f = 10Hz$ to $100KHz$ $T_j = 25°C$			75		μV
Ripple Rejection	RR	$f = 120Hz$, $V_i = -15V$ to $-25V$		54	60		dB
Dropout Voltage	V_D	$I_o = 500mA$, $T_j = 25°C$			1.1		V
Short Circuit Current	I_{SC}	$V_i = -35V$, $T_j = 25°C$			140		mA
Peak Current	I_{peak}	$T_j = 25°C$			650		mA

* Load and line regulation are specified at constant junction temperature changes in V_o due to heating effects must be taken into account separately pulse testing with low duty is used.

MC79MXXC SERIES LINEAR INTEGRATED CIRCUIT

ELECTRICAL CHARACTERISTICS MC79M15C

(Refer to test circuit, $0°C<T_j<125°C$, $I_o=350mA$, $V_i=-23V$, unless otherwise specified)

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V_o	$T_j=25°C$		−14.4	−15	−15.6	V
		$5.0mA\leq I_o\leq 350mA$, $V_i=-17.5V$ to $-30V$		−14.25	−15	−15.75	
Line Regulation	ΔV_o	$T_j=25°C$	$V_i=-17.5V$ to $-30V$		9.0	80	mV
			$V_i=-18V$ to $-28V$		5.0	50	
Load Regulation	ΔV_o	$T_j=25°C$	$I_o=5.0mA$ to $500mA$		30	240	mV
Quiescent Current	I_d	$T_j=25°C$			3	6	mA
Quiescent Current Change	ΔI_d	$I_o=5.0mA$ to $350mA$				0.4	mA
		$V_i=-17.5V$ to $-28V$				0.4	
Output Voltage Drift	$\Delta V_o/\Delta T$	$I_o=5mA$			−1.0		mV/°C
Output Noise Voltage	V_N	$f=10Hz$ to $100KHz$ $T_j=25°C$			90		μV
Ripple Rejection	RR	$f=120Hz$, $V_i=-18.5V$ to $-28.5V$		54	59		dB
Dropout Voltage	V_D	$I_o=500mA$, $T_j=25°C$			1.1		V
Short Circuit Current	I_{SC}	$V_i=-35V$, $T_j=25°C$			140		mA
Peak Current	I_{peak}	$T_j=25°C$			650		mA

ELECTRICAL CHARACTERISTICS MC79M18C

(Refer to test circuit, $0°C<T_j<125°C$, $I_o=350mA$, $V_i=-27V$, unless otherwise specified)

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V_o	$T_j=25°C$		−17.3	−18	−18.7	V
		$5.0mA\leq I_o\leq 350mA$, $V_i=-21V$ to $-33V$		−17.1	−18	−18.9	
Line Regulation	ΔV_o	$T_j=25°C$	$V_i=-21V$ to $-33V$		9.0	80	mV
			$V_i=-24V$ to $-30V$		5.0	60	
Load Regulation	ΔV_o	$T_j=25°C$	$I_o=5.0mA$ to $500mA$		30	360	mV
Quiescent Current	I_d	$T_j=25°C$			3	6	mA
Quiescent Current Change	ΔI_d	$I_o=5.0mA$ to $350mA$				0.4	mA
		$V_i=-21V$ to $-33V$				0.4	
Output Voltage Drift	$\Delta V_o/\Delta T$	$I_o=5mA$			−1.0		mV/°C
Output Noise Voltage	V_N	$f=10Hz$ to $100KHz$ $T_j=25°C$			110		μV
Ripple Rejection	RR	$f=120Hz$, $V_i=-22V$ to $-32V$		54	59		dB
Dropout Voltage	V_D	$I_o=500mA$, $T_j=25°C$			1.1		V
Short Circuit Current	I_{SC}	$V_i=-35V$, $T_j=25°C$			140		mA
Peak Current	I_{peak}	$T_j=25°C$			650		mA

* Load and line regulation are specified at constant junction temperature changes in V_o due to heating effects must be taken into account separately pulse testing with low duty is used.

MC79MXXC SERIES LINEAR INTEGRATED CIRCUIT

ELECTRICAL CHARACTERISTICS MC79M24C

(Refer to test circuit, $0°C < T_j < 125°C$, $I_o = 350mA$, $V_i = -33V$, unless otherwise specified)

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V_o	$T_j = 25°C$		-23	-24	-25	V
		$5.0mA \leq I_o \leq 350mA$, $V_i = -27V$ to $-38V$		-22.8	-24	-25.2	
Line Regulation	ΔV_o	$T_j = 25°C$	$V_i = -27V$ to $-38V$		9.0	80	mV
			$V_i = -30V$ to $-36V$		5.0	70	
Load Regulation	ΔV_o	$T_j = 25°C$	$I_o = 5.0mA$ to $500mA$		30	300	mV
Quiescent Current	I_d	$T_j = 25°C$			3	6	mA
Quiescent Current Change	ΔI_d	$I_o = 5.0mA$ to $350mA$				0.4	mA
		$V_i = -27V$ to $-38V$				0.4	
Output Voltage Drift	$\Delta V_o/\Delta T$	$I_o = 5mA$			-1.0		mV/°C
Output Noise Voltage	V_N	$f = 10Hz$ to $100KHz$ $T_j = 25°C$			180		μV
Ripple Rejection	RR	$f = 120Hz$, $V_i = -28V$ to $-38V$		54	58		dB
Dropout Voltage	V_D	$I_o = 500mA$, $T_j = 25°C$			1.1		V
Short Circuit Current	I_{SC}	$V_i = -35V$, $T_j = 25°C$			140		mA
Peak Current	I_{peak}	$T_j = 25°C$			650		mA