# MC79MXX 3-Terminal 0.5A Negative Voltage Regulator

### Features

· No external components required

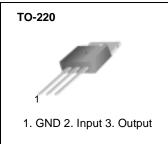
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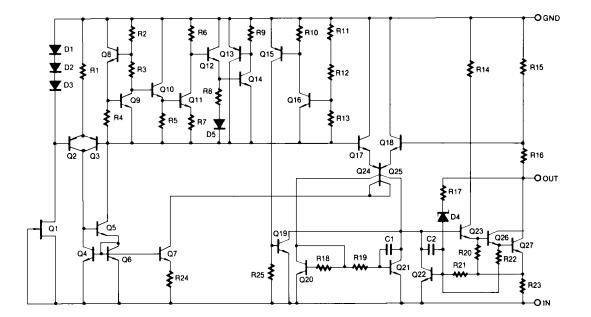
- Output current in excess of 0.5A
- Internal thermal overload
- Internal short circuit current limiting
- Output transistor safe area compensation
- Output voltages of -5V,-6V,-8V,-12V,-15V,-18Vand -24V

### Description

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.



### **Schematic Diagram**



### **Absolute Maximum Ratings**

Parameter	Symbol	Value	Unit
Input Voltage(for $V_O = -5V$ to $-18V$ ) (for $V_O = -24V$ )	VI VI	-35 -40	V V
Thermal Resistance Junction-Cases	Rejc	5	°C /W
Thermal Resistance Junction-Air	RθJA	65	°C /W
Operating Temperature Range	TOPR	0 ~ +125	°C
Storage Temperature Range	TSTG	-65 ~ +125	۵°

# **Electrical Characteristics (MC79M05)**

(Refer to test circuit, 0 °C  $\leq$ TJ  $\leq$  +125 °C, IO =350mA, VI = -10V,unless otherwise specified, CI =0.33 $\mu$ F,CO=0.1 $\mu$ F)

Parameter	Symbol	Con	ditions	Min.	Тур.	Max.	Unit
		TJ= +25 °C	TJ= +25 °C		-5	-5.2	
Output Voltage	Vo	IO = 5mA to 35 VI = -7V to -25		-4.75	-5	-5.25	V
Line Regulation (Note1)	41/0	T 25°C	VI = -7V to -25V	-	7.0	50	mV
Line Regulation (Note1)	ΔVo	TJ =+25°C	VI = -8V to -25V	-	2.0	30	mv
Load Regulation (Note1)	ΔVo	IO = 5mA to 50 TJ = +25 °C	00mA	-	30	100	mV
Quiescent Current	lQ	TJ= +25 °C		-	3.0	6.0	mA
		IO = 5mA to 35	50mA	-	-	0.4	
Quiescent Current Change	ΔlQ	IO = 200mA VI = -8V to -25	IO = 200mA VI = -8V to -25V		-	0.4	mA
Output Voltage Drift	$\Delta Vo/\Delta T$	IO = 5mA		-	-0.2	-	mV/ °C
Output Noise Voltage	VN	f = 10Hz, 100K T <sub>A</sub> = +25 °C	Ήz	-	40	-	μV
Ripple Rejection	RR	f = 120Hz VJ= -8 to -18V		54	60	-	dB
Dropout Voltage	VD	TJ =+25 °C, IO = 500mA		-	1.1	-	V
Short Circuit Current	ISC	TJ= +25 °C, VI = -35V		-	140	-	mA
Peak Current	IPK	TJ= +25 °C		-	650	-	mA

#### Note:

# **Electrical Characteristics (MC79M06)**

(Refer to test circuit, 0 °C  $\leq$ TJ  $\leq$  +125 °C, IO =350mA, VI = -11V,unless otherwise specified)

Parameter	Symbol	C	Conditions		Тур.	Max.	Unit
		TJ= +25 °C		- 5.75	- 6.0	- 6.25	
Output Voltage	Vo	-	IO = 5mA to 350mA VI = -8.0V to -25V		- 6.0	- 6.3	V
Line Regulation (Note1)		T	VI = -8V to -25V	-	7.0	60	mV
Line Regulation (Note1)	ΔVo	TJ =+25°C	VI = -9V to -19V	-	2.0	40	IIIV
Load Regulation (Note1)	ΔVο	TJ= +25 °C	IO = 5.0mA to 500mA	-	30	120	mV
Quiescent Current	lQ	TJ= +25 °C		-	3	6	mA
Quieseent Current Change	Ale	IO = 5mA to 3	IO = 5mA to 350mA		-	0.4	
Quiescent Current Change	ΔlQ	VI = -8V to -2	25V	-	-	0.4	mA
Output Voltage Drift	$\Delta V_O / \Delta T$	IO = 5mA		-	0.4	-	mV/ °C
Output Noise Voltage	VN	f = 10Hz to 1	00KHz,TA = +25 °C	-	50	-	μV
Ripple Rejection	RR	f = 120Hz,VI = -9V to -19V		54	60	-	dB
Dropout Voltage	VD	IO = 500mA, TJ = +25 °C		-	1.1	-	V
Short Circuit Current	Isc	VI = -35V, TJ = +25 °C		-	140	-	mA
Peak Current	lрк	TJ= +25 °C		-	650	-	mA

#### Note:

# **Electrical Characteristics (MC79M08)**

(Refer to test circuit, 0 °C  $\leq$ TJ  $\leq$  +125 °C, IO =350mA, VI = -14V,unless otherwise specified)

Parameter	Symbol	Conditions		Min.	Тур.	Max.	Unit		
		TJ= +25 °C		Tj= +25 °C		- 7.7	- 8.0	- 8.3	
Output Voltage	Vo	•	IO = 5mA to 350mA VI = -10.5V to -25V		- 8.0	- 8.4	V		
Line Degulation (Nate1)	4)/0	T 25°C	VI = -10.5V to -25V	-	7.0	80	mV		
Line Regulation (Note1)	ΔVo	TJ =+25°C	VI = -11V to -21V	-	2.0	50	mv		
Load Regulation (Note1)	ΔVo	TJ= +25 °C	IO = 5.0mA to 500mA	-	30	160	mV		
Quiescent Current	lQ	TJ= +25 °C		-	3	6	mA		
Ouisseent Current Change	Ale	IO = 5mA to	IO = 5mA to 350mA		-	0.4			
Quiescent Current Change	ΔlQ	VI = -8V to -2	25V	-	-	0.4	mA		
Output Voltage Drift	$\Delta V_O / \Delta T$	IO = 5mA		-	-0.6	-	mV/ °C		
Output Noise Voltage	VN	f = 10Hz to 1	00KHz,TA = +25 °C	-	60	-	μV		
Ripple Rejection	RR	f = 120Hz,VI = -9V to -19V		54	59	-	dB		
Dropout Voltage	VD	IO = 500mA, TJ = +25 °C		-	1.1	-	V		
Short Circuit Current	Isc	VI = -35V, TJ = +25 °C		-	140	-	mA		
Peak Current	Iрк	TJ = +25 °C		-	650	-	mA		

#### Note:

# **Electrical Characteristics (MC79M12)**

(Refer to test circuit, 0 °C  $\leq$ TJ  $\leq$  +125 °C, IO =350mA, VI = -19V,unless otherwise specified)

Parameter	Symbol	C	Conditions	Min.	Тур.	Max.	Unit		
		TJ= +25 °C		TJ= +25 °C		-11.5	-12	-12.5	
Output Voltage	Vo	-	IO = 5mA to 350mA VI = -14.5V to -30V		-12	-12.6	V		
Line Regulation (Note1)	4)/0	T	VI = -14.5V to -30V	-	8.0	80	mV		
Line Regulation (Note1)	ΔVo	TJ =+25°C	VI = -15V to -25V	-	3.0	50	IIIV		
Load Regulation (Note1)	ΔVo	TJ= +25 °C	IO = 5.0mA to 500mA	-	30	240	mV		
Quiescent Current	lq	TJ= +25 °C		-	3	6	mA		
Quieseent Current Change		IO = 5mA to 3	IO = 5mA to 350mA		-	0.4			
Quiescent Current Change	ΔlQ	VI = -14.5V te	o -30V	-	-	0.4	mA		
Output Voltage Drift	$\Delta V_O / \Delta T$	IO = 5mA		-	-0.8	-	mV/ °C		
Output Noise Voltage	VN	f = 10Hz to 1	00KHz,TA =+25 °C	-	75	-	μV		
Ripple Rejection	RR	f = 120Hz,VI	f = 120Hz,VI = -15V to -25V		60	-	dB		
Dropout Voltage	VD	IO = 500mA, TJ = +25 °C		-	1.1	-	V		
Short Circuit Current	Isc	VI = -35V, TJ = +25 °C		-	140	-	mA		
Peak Current	Iрк	TJ= +25 °C		-	650	-	mA		

#### Note:

# **Electrical Characteristics (MC79M15)**

(Refer to test circuit, 0 °C  $\leq$ TJ  $\leq$  +125 °C, IO =350mA, VI = -23V,unless otherwise specified)

Parameter	Symbol	C	Conditions	Min.	Тур.	Max.	Unit
		TJ= +25 °C		- 14.4	- 15	- 15.6	
Output Voltage	Vo	IO = 5mA to 350mA VI = -17.5V to -30V		-14.25	- 15	-15.75	V
Line Regulation (Note1)	ΔVο	Тј =+25°С	VI = -17.5V to -30V	-	9.0	80	mV
Line Regulation (Note1)	200	1J =+25°C	VI = -18V to -28V	-	5.0	50	ΠV
Load Regulation (Note1)	ΔVo	TJ= +25 °C	IO = 5.0mA to 500mA	-	30	240	mV
Quiescent Current	lQ	Tj= +25 °C	TJ= +25 °C		3	6	mA
Quiescent Current Change	410	IO = 5mA to 3	350mA	-	-	0.4	
Quiescent Current Change	ΔlQ	VI = -17.5V to	o -28V	-	-	0.4	mA
Output Voltage Drift	$\Delta V_O / \Delta T$	IO = 5mA		-	-1.0	-	mV/ °C
Output Noise Voltage	VN	f = 10Hz to 1	00KHz,TA = +25 °C	-	90	-	μV
Ripple Rejection	RR	f = 120Hz,VI	f = 120Hz,VI = -18.5V to -28.5V		59	-	dB
Dropout Voltage	Vd	IO = 500mA, TJ = +25 °C		-	1.1	-	V
Short Circuit Current	Isc	VI = -35V, TJ = +25 °C		-	140	-	mA
Peak Current	lрк	TJ= +25 °C		-	650	-	mA

#### Note:

# **Electrical Characteristics (MC79M18)**

(Refer to test circuit, 0 °C  $\leq$ TJ  $\leq$  +125 °C, IO =350mA, VI = -27V,unless otherwise specified)

Parameter	Symbol	C	conditions	Min.	Тур.	Max.	Unit
		Tj= +25 °C		- 17.3	- 18	- 18.7	
Output Voltage	Vo	IO = 5mA to 350mA VI = -21V to -33V		- 17.1	- 18	- 18.9	V
Line Regulation (Note1)	ΔVο	TJ =+25°C	VI = -21V to -33V	-	9.0	80	mV
Line Regulation (Note1)	200	1J =+25 C	VI = -24V to -30V	-	5.0	80	ΠV
Load Regulation (Note1)	ΔVO	TJ= +25 °C	IO = 5.0mA to 500mA	-	30	360	mV
Quiescent Current	lq	TJ= +25 °C		-	3	6	mA
Quiescent Current Change		IO = 5mA to 3	350mA	-	-	0.4	
Quiescent Current Change	ΔlQ	V <sub>I</sub> = -21V to -	-33V	-	-	0.4	mA
Output Voltage Drift	$\Delta V_O / \Delta T$	IO = 5mA		-	-1.0	-	mV/ °C
Output Noise Voltage	VN	f = 10Hz to 1	00KHz,TA = +25 °C	-	110	-	μV
Ripple Rejection	RR	f = 120Hz,VI	= -22V to -32V	54	59	-	dB
Dropout Voltage	VD	IO = 500mA, TJ = +25 °C		-	1.1	-	V
Short Circuit Current	Isc	VI = -35V, TJ = +25 °C		-	140	-	mA
Peak Current	Iрк	TJ= +25 °C		-	650	-	mA

#### Note;

# **Electrical Characteristics (MC79M24)**

(Refer to test circuit, 0 °C  $\leq$ TJ  $\leq$  +125 °C, IO =350mA, VI = -33V,unless otherwise specified)

Parameter	Symbol	C	Conditions	Min.	Тур.	Max.	Unit
		Tj= +25 °C		- 23	- 24	- 25	
Output Voltage	Vo	IO = 5mA to 350mA VI = -27V to -38V		- 22.8	- 24	- 25.2	V
Line Degulation (Note1)	41/0	T	VI = -27V to -38V	-	9.0	80	mV
Line Regulation (Note1)	ΔVo	TJ =+25°C	VI = -30V to -36V	-	5.0	70	mv
Load Regulation (Note1)	ΔVo	TJ= +25 °C	IO = 5.0mA to 500mA	-	30	300	mV
Quiescent Current	lQ	Tj= +25 °C	·	-	3	6	mA
Quipagent Current Change	Ale	IO = 5mA to 3	350mA	-	-	0.4	
Quiescent Current Change	ΔlQ	VI = -27V to -	-38V	-	-	0.4	mA
Output Voltage Drift	$\Delta V_O / \Delta T$	IO = 5mA		-	-1.0	-	mV/ °C
Output Noise Voltage	VN	f = 10Hz to 1	00KHz,TA = +25 °C	-	180	-	μV
Ripple Rejection	RR	f = 120Hz,VI = -28V to -38V		54	58	-	dB
Dropout Voltage	VD	IO = 500mA, TJ = +25 °C		-	1.1	-	V
Short Circuit Current	ISC	VI = -35V, TJ = +25 °C		-	140	-	mA
Peak Current	IPK	TJ= +25 °C		-	650	-	mA

#### Note:

# **Typical Applications**

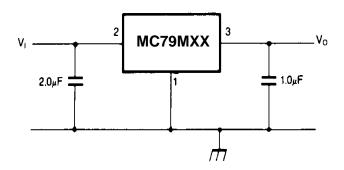


Figure 1. Fixed Output Regulator

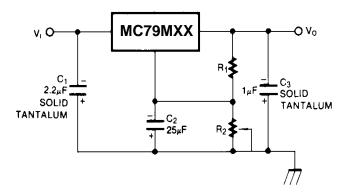


Figure 2. Variable Output

#### Notes:

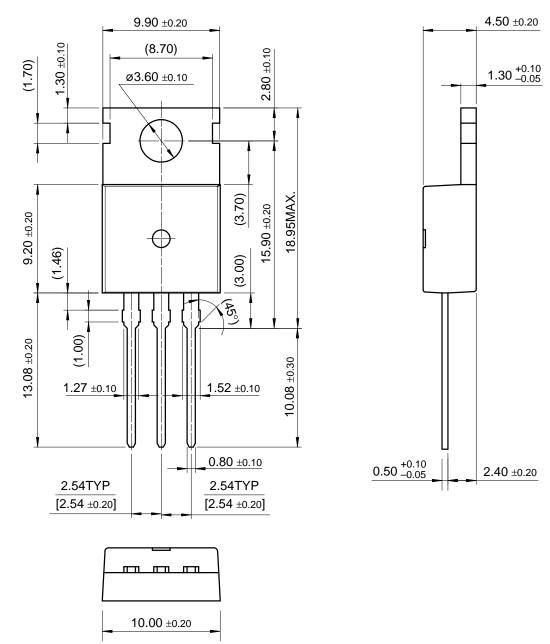
- 1. Required for stability. For value given, capacitor must be solid tantalum. 25µF aluminum electrolytic may be substituted.
- 2. C2 improves transient response and ripple rejection. Do not increase beyond  $50\mu\text{F}.$

### **Mechanical Dimensions**

### Package

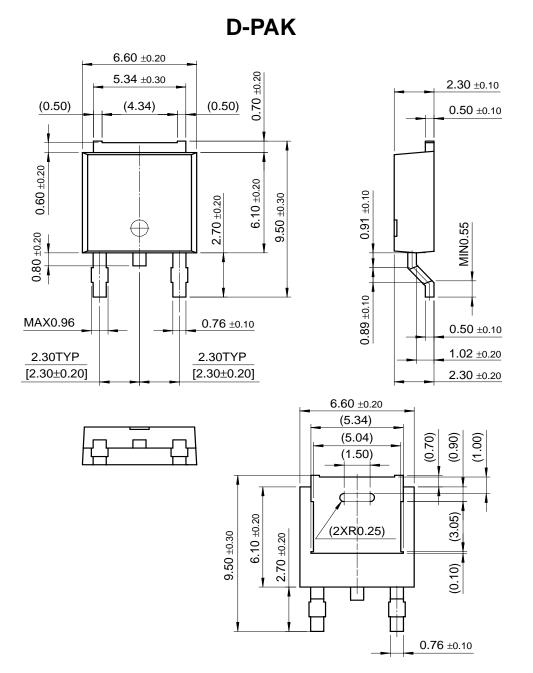
#### **Dimensions in millimeters**

**TO-220** 



### Mechanical Dimensions (Continued)

### Package



**Dimensions in millimeters** 

# **Ordering Information**

Product Number	Package	Operating Temperature
MC79M05CT		
MC79M06CT		
MC79M08CT		
MC79M12CT	TO-220	0 ~ + 125°C
MC79M15CT		
MC79M18CT		
MC79M24CT		

#### DISCLAIMER

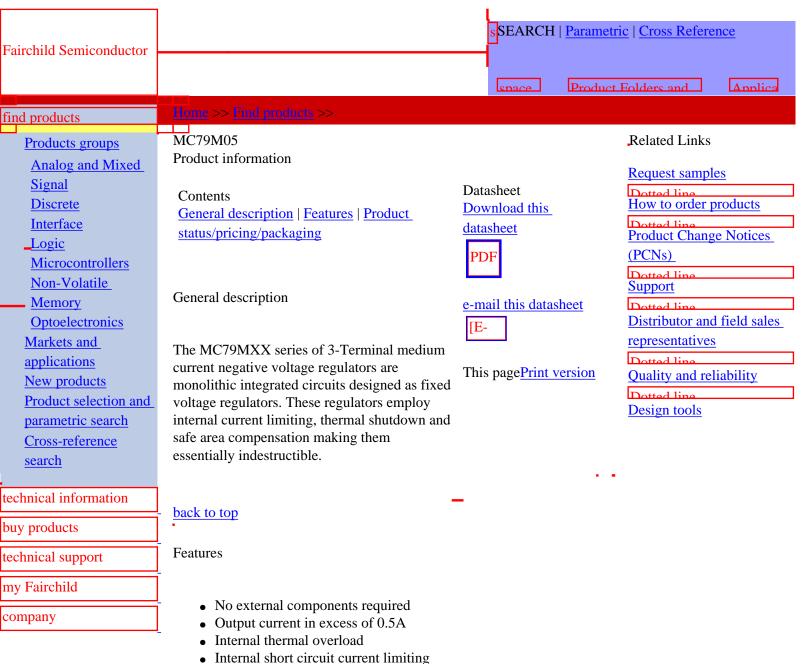
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- Output transistor safe area compensation
- Output voltages of -5V, -6V, -8V, -12V, -15V, -18V and -24V

Product	Product status	Package type	Leads	Packing method
MC79M05CT	Full Production	TO-220	3	RAIL
MC79M05CTBU	Full Production	TO-220	3	BULK

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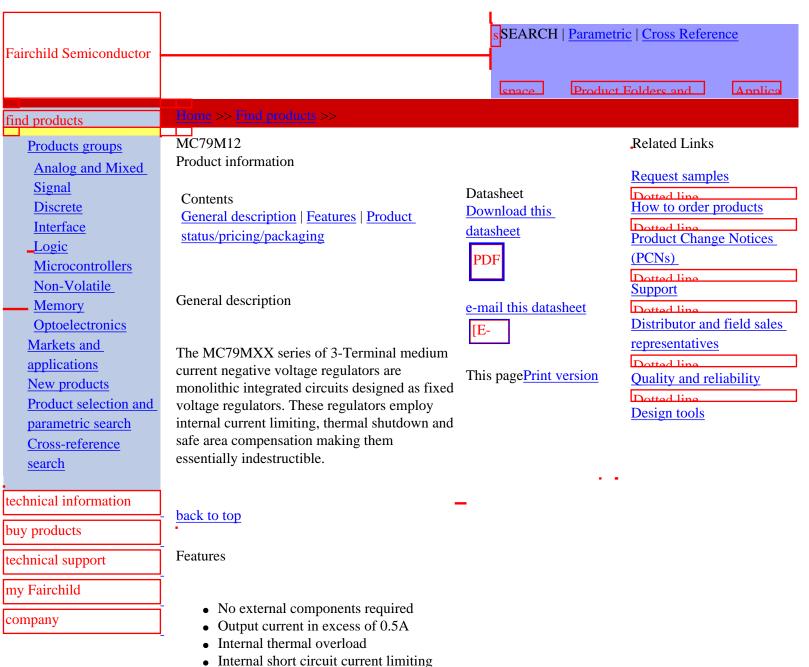
- Output transistor safe area compensation
- Output voltages of -5V, -6V, -8V, -12V, -15V,-18V and -24V

Product	Product status	Package type	Leads	Packing method
MC79M06CT	Full Production	TO-220	3	RAIL
MC79M06CTBU	Full Production	TO-220	3	BULK

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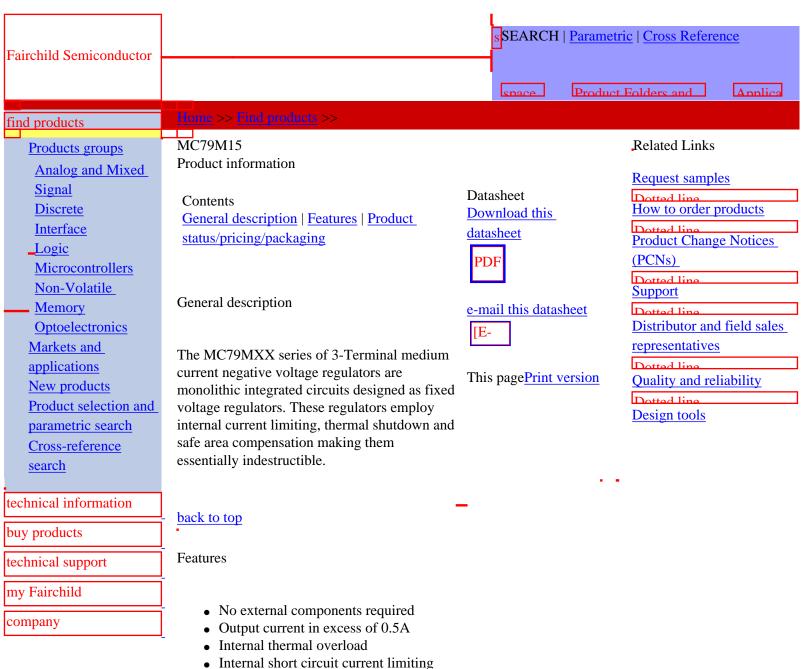
- Output transistor safe area compensation
- Output voltages of -5V, -6V, -8V, -12V, -15V, -18V and -24V

Product	Product status	Package type	Leads	Packing method
MC79M08CTBU	Full Production	TO-220	3	BULK
MC79M08CT	Full Production	TO-220	3	RAIL



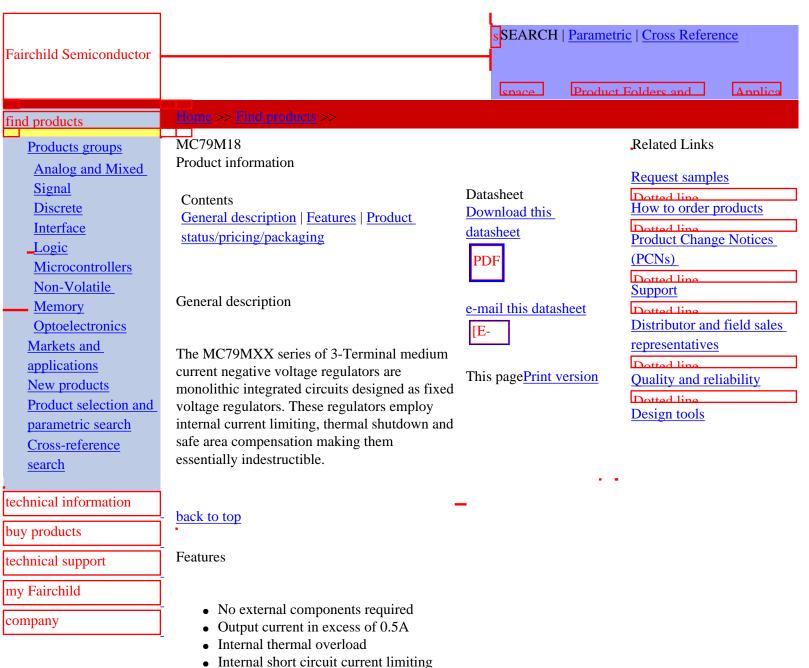
- Output transistor safe area compensation
- Output voltages of -5V, -6V, -8V, -12V, -15V, -18V and -24V

Product	Product status	Package type	Leads	Packing method
MC79M12CT	Full Production	TO-220	3	RAIL
MC79M12CTBU	Full Production	TO-220	3	BULK



- Output transistor safe area compensation
- Output voltages of -5V, -6V, -8V, -12V, -15V, -18V and -24V

Product	Product status	Package type	Leads	Packing method
MC79M15CTBU	Full Production	TO-220	3	BULK
MC79M15CT	Full Production	TO-220	3	RAIL



- Output transistor safe area compensation
- Output voltages of -5V, -6V, -8V, -12V, -15V, -18V and -24V

Product	Product status	Package type	Leads	Packing method
MC79M18CT	Full Production	TO-220	3	RAIL
MC79M18CTBU	Full Production	TO-220	3	BULK

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- Internal short circuit current limiting
  Output transistor safe area compensation
- Output voltages of -5V, -6V, -8V, -12V, -15V, -18V and -24V

Product	Product status	Package type	Leads	Packing method
MC79M24CTBU	Full Production	TO-220	3	BULK
MC79M24CT	Full Production	TO-220	3	RAIL