MC78PC00 Series

Low Noise 150 mA Low Drop Out (LDO) Linear Voltage Regulator

The MC78PC00 are a series of CMOS linear voltage regulators with high output voltage accuracy, low supply current, low dropout voltage, and high Ripple Rejection. Each of these voltage regulators consists of an internal voltage reference, an error amplifier, resistors, a current limiting circuit and a chip enable circuit.

The dynamic Response to line and load is fast, which makes these products ideally suited for use in hand−held communication equipment. The MC78PC00 series are housed in the SOT−23 5 lead package, for maximum board space saving.

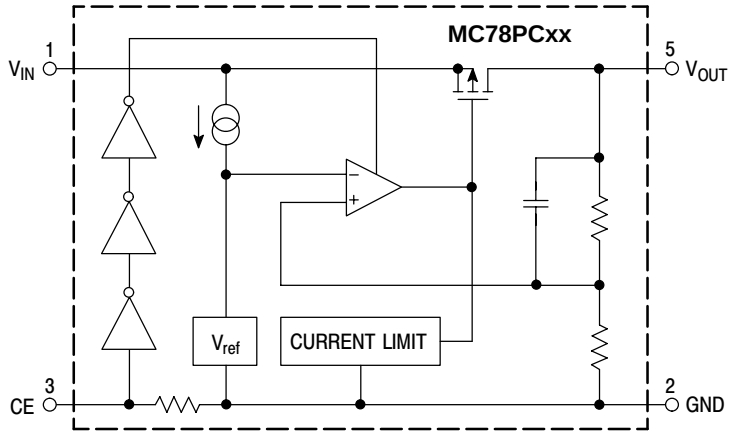
MC78PC00 Features:

- Ultra−Low Supply Current: typical 35 μA in ON mode with no load.
- Standby Mode: typical 0.1 μA.
- Low Dropout Voltage: typical 0.2 V @ I_{OUT} = 100 mA.
- High Ripple Rejection: typical 70 dB @ f = 1 kHz.
- Low Temperature−Drift Coefficient of Output Voltage: typical ±100 ppm/°C.
- Excellent Line Regulation: typical 0.05%/V.
- High Accuracy Output Voltage: ±2.0%.
- Fast Dynamic Response to Line and Load.
- Small Package: SOT−23 5 leads.
- Built−in Chip Enable circuit (CE input pin).
- Identical Pinout to the LP2980/1/2.
- Pb−Free Packages are Available

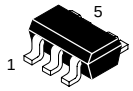
MC78PC00 Applications:

- Power source for cellular phones (GSM, CDMA, TDMA), Cordless Phones (PHS, DECT) and 2−way radios.
- Power source for domestic appliances such as cameras, VCRs and camcorders.
- Power source for battery−powered equipment.

Block Diagram

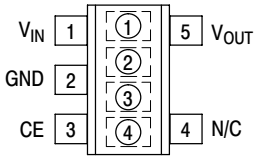


ON Semiconductor®



SOT−23−5
N SUFFIX
CASE 1212

PIN CONNECTIONS



DEVICE MARKING
(4 digits are available for device marking)

	Marking	Voltage Version
① ②	K8	1.8 V
	F5	2.5 V
	F8	2.8 V
	G0	3.0 V
	G3	3.3 V
	J0	5.0 V
③ ④		Lot Number

PIN DESCRIPTION

Pin #	Symbol	Description
1	V_{IN}	Input Pin
2	GND	Ground Pin
3	CE	Chip Enable Pin
4	N/C	No Connection
5	V_{OUT}	Output Pin

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 14 of this data sheet.

© Semiconductor Components Industries, LLC, 2005

Publication Order Number:
MC78PC00/D

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Input Voltage	V_{IN}	9.0	V
Input Voltage	V_{CE}	−0.3 ~V_{IN} +0.3	V
Output Voltage	V_{OUT}	−0.3 ~V_{IN} +0.3	V
Power Dissipation	P_D	250	mW
Operating Temperature Range	T_A	−40 to +85	°C
Operating Junction Temperature	T_J	+125	°C
Maximum Junction Temperature	T_{Jmax}	+150	°C
Storage Temperature Range	T_{stg}	−55 to +125	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

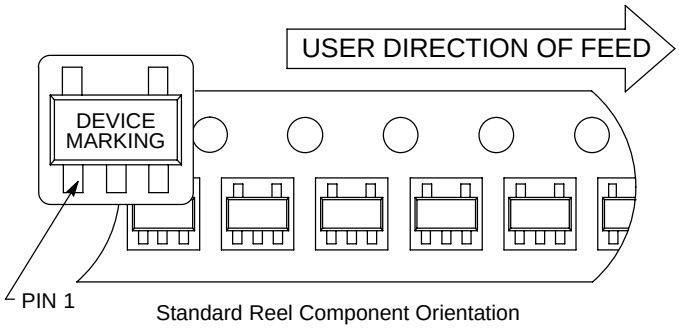
Characteristic	Symbol	Min	Typ	Max	Unit
Output Voltage (V_{IN} = V_{OUT} + 1.0 V, I_{OUT} = 30 mA)	V_{OUT}				V
MC78PC18		1.764	1.80	1.836	
MC78PC25		2.450	2.50	2.550	
MC78PC28		2.744	2.80	2.856	
MC78PC30		2.94	3.00	3.06	
MC78PC33		3.234	3.3	3.366	
MC78PC50		4.9	5.0	5.1	
Nominal Output Current (V_{IN} = V_{OUT} + 1.0 V, V_{OUT} = $V_{OUT(nom)}$ − 0.1 V)	I_{OUT}	150	−	−	mA
Load Regulation (V_{IN} = V_{OUT} + 1.0 V, 1.0 mA ≤ I_{OUT} ≤ 80 mA)	$\Delta V_{OUT}/\Delta I_{OUT}$	−	12	40	mV
Supply Current in ON mode (V_{IN} = V_{OUT} + 1.0 V, I_{OUT} = 0 mA)	I_{SS}	−	35	70	μA
Supply Current in OFF mode, i.e. V_{CE} = GND (V_{IN} = V_{OUT} + 1.0 V, I_{OUT} = 0 mA)	$I_{standby}$	−	0.1	1.0	μA
Ripple Rejection (f = 1.0 kHz, Ripple 0.5 V_{p-p}, V_{IN} = V_{OUT} + 1.0 V)	RR	−	70	−	dB
Input Voltage	V_{IN}	−	−	8.0	V
Output Voltage Temperature Coefficient (I_{OUT} = 30 mA, −40°C ≤ T_A ≤ +85°C)	$\Delta V_{OUT}/\Delta T$	−	±100	−	ppm/°C
Short Circuit Current Limit (V_{OUT} = 0 V)	I_{lim}	−	50	−	mA
CE Pull−down Resistance	R_{PD}	2.5	5.0	10	MΩ
CE Input Voltage “H” (ON Mode)	V_{IH}	1.5	−	V_{IN}	V
CE Input Voltage “L” (OFF Mode)	V_{IL}	0	−	0.25	V
Output Noise Voltage (f = 10 Hz to 100 kHz)	e_n	−	30	−	μV_{rms}

ELECTRICAL CHARACTERISTICS by OUTPUT VOLTAGE V_{OUT} (T_A = 25°C)

Characteristic	Symbol	Min	Typ	Max	Unit
Dropout Voltage (I_{OUT} = 100 mA)	V_{DIF}				V
1.8 ≤ V_{OUT} ≤ 1.9		−	0.60	1.40	
2.0 ≤ V_{OUT} ≤ 2.4		−	0.35	0.70	
2.5 ≤ V_{OUT} ≤ 2.7		−	0.24	0.35	
2.8 ≤ V_{OUT} ≤ 3.3		−	0.20	0.30	
3.4 ≤ V_{OUT} ≤ 6.0		−	0.17	0.26	
Line Regulation (V_{OUT} + 0.5 V ≤ V_{IN} ≤ 8.0 V, I_{OUT} = 30 mA)	$\Delta V_{OUT}/\Delta V_{IN}$	−	0.05	0.20	%/V

TAPE AND REEL INFORMATION

Component Taping Orientation for 5L SOT−23 Devices



Standard Reel Component Orientation
for TR Suffix Device
(Mark Right Side Up)

Tape & Reel Specifications Table

Package	Tape Width (W)	Pitch (P)	Part Per Full Reel	Reel Diameter
5L SOT−23	8 mm	4 mm	3000	7 inches

ORDERING INFORMATION

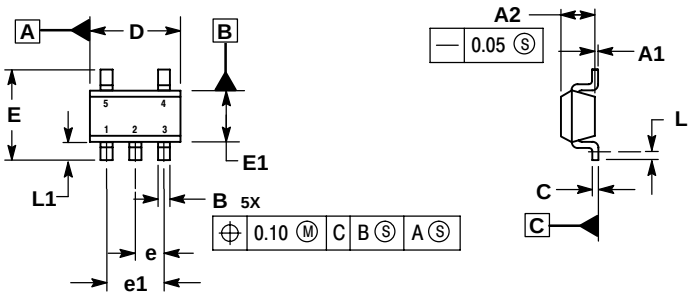
Device	Package	Shipping†
MC78PC18NTR	SOT−23 5 Leads	3000 Units/Tape & Reel
MC78PC18NTRG	SOT−23 5 Leads (Pb−Free)	
MC78PC25NTR	SOT−23 5 Leads	
MC78PC25NTRG	SOT−23 5 Leads (Pb−Free)	
MC78PC28NTR	SOT−23 5 Leads	
MC78PC28NTRG	SOT−23 5 Leads (Pb−Free)	
MC78PC30NTR	SOT−23 5 Leads	
MC78PC30NTRG	SOT−23 5 Leads (Pb−Free)	
MC78PC33NTR	SOT−23 5 Leads	
MC78PC33NTRG	SOT−23 5 Leads (Pb−Free)	
MC78PC50NTR	SOT−23 5 Leads	
MC78PC50NTRG	SOT−23 5 Leads (Pb−Free)	

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

Other voltages are available. Consult your ON Semiconductor representative.

PACKAGE DIMENSIONS

SOT−23−5
N SUFFIX
PLASTIC PACKAGE
CASE 1212−01
ISSUE O



NOTES:
1. DIMENSIONS ARE IN MILLIMETERS.
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
3. DATUM C IS A SEATING PLANE.

	MILLIMETERS	
DIM	MIN	MAX
A1	0.00	0.10
A2	1.00	1.30
B	0.30	0.50
C	0.10	0.25
D	2.80	3.00
E	2.50	3.10
E1	1.50	1.80
e	0.95 BSC	
e1	1.90 BSC	
L	0.20	---
L1	0.45	0.75

SOLDERING FOOTPRINT*

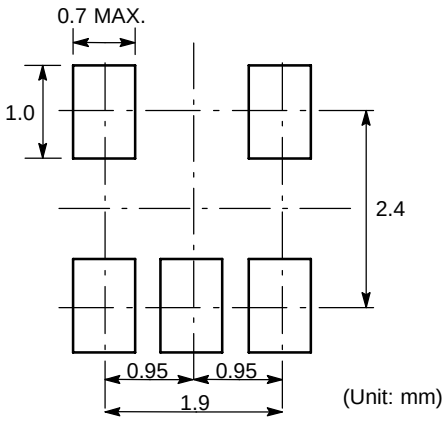


Figure 51. SOT−23−5

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.