Features

- Output Current Up to 500mA
- Low Dropout Voltage Typically 1V at 500mA Output Current Application
- Low Quiescent Current:2.5uA
- Operating Input Voltage Range: 3.0V to 24V
- Fixed Output Voltage Options:1.5V to 5.0V
- ±2% Initial Voltage Accuracy
- Fast Transient Response Over Line and Load Transient
- High PSRR: 90dB at 1KHz
- Build Internal Soft-Start
- Over Current Protection and Short-circuit Protection
- Over-temperature Protection
- Green Product RoHS Compliant and Halogen Free
- ESD Protected up to 2KV(HBM),200V(CDM)

500mA Low Drop-out Voltage Regulators

Applications

- Vehicular Equipment
- Battery-powered Equipment
- Telecom Infrastructure
- Microprocessor and Chipset Supplies
- Home Applications
- Industrial Automation Supplies
- Servers Device Applications

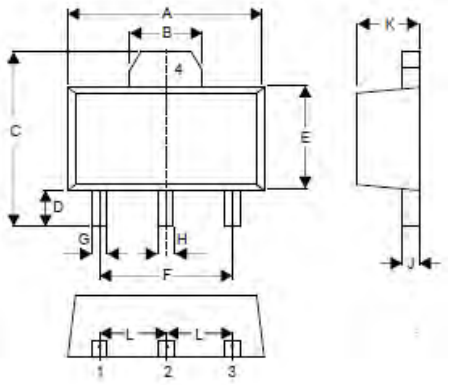
Description

The MCL9913F is a 500mA low dropout linear voltage regulator with 2.5uA low quiescent current, operating input voltage up to 24V, and offering fixed output voltage ranges from 1.5V to 5.0V. Also, the device is designed for use in applications requiring high input voltage in the EN Pin to enable and disable the linear regulator. Integrating many functions the MCL9913F provides high power supply rejection, and owns excellent line and load transient response with only a small 1uF~10uF ceramic output capacitor. Building internal soft-start minimizes stress on the input power source by reducing capacities inrush current during start-up time. The functions of thermal shutdown, over current and short-circuit protection to protect the device against thermal and current over-loads. A wide fixed output voltage options, making the MCL9913F a very common solution in different applications.

Part Number and Marking Code

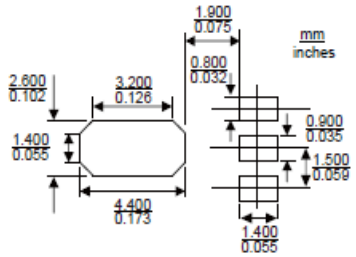
Part No	Marking
MCL9913FM30	ITE9913 YYXX30
MCL9913FM33	ITE9913 YYXX33
MCL9913FM50	ITE9913 YYXX50

SOT-89

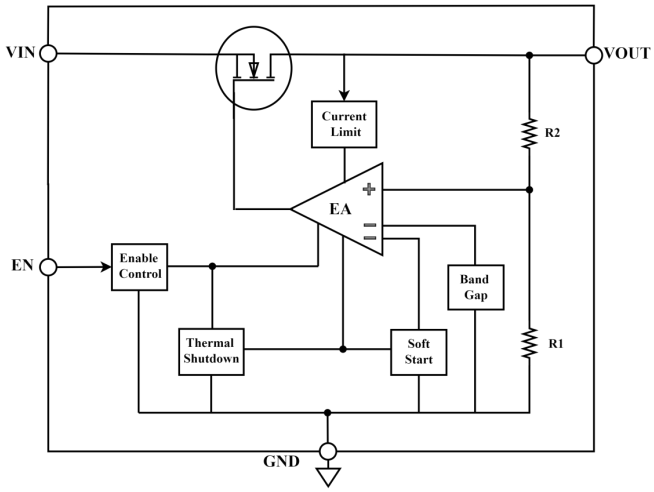


DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.169	0.185	4.30	4.70	
B	0.061		1.55		TYP.
C	0.154	0.171	3.91	4.35	
D	0.031	0.047	0.80	1.20	
E	0.089	0.104	2.25	2.65	
F	0.118		3.00		TYP.
G	0.013	0.020	0.33	0.52	
H	0.015	0.021	0.38	0.53	
J	0.014	0.017	0.35	0.44	
K	0.055	0.063	1.40	1.60	
L	0.059		1.50		TYP.

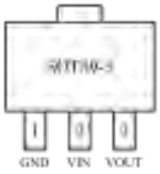
Suggested Solder Pad Layout



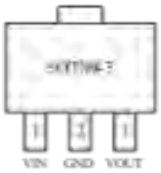
Functional Block Diagram



Pin Configuration and Functions (Top View)



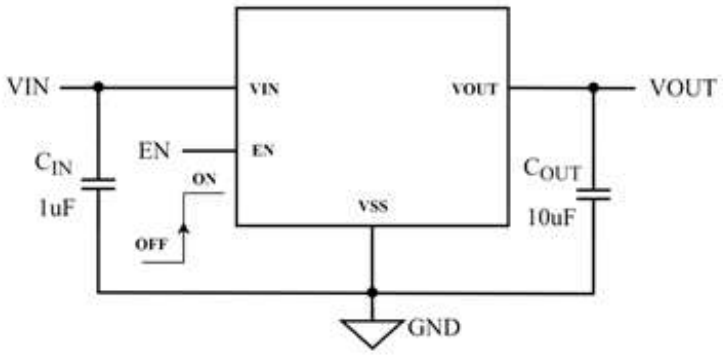
MCL9913FM



MCL9913FE

Name	Description
VIN	Supply input voltage. A 1μF ceramic capacitor is recommended at this pin.
GND	IC Ground.
VOUT	Output Voltage. The power output of the device. A 10μF ceramic capacitor is recommended at this pin.

Typical Application Circuit



Absolute Maximum Ratings

- Operating Temperature Range: -40~+85°C
- Storage Temperature Range: -65~+150℃

Symbol	Parameter	Min	Max	Unit
V_{IN}	Supply Voltage	-0.3	36	V
V_{OUT}	Output Voltage	-0.3	6	V
V_{EN}	Enable Voltage	-0.3	45	V
T_{LEAD}	Lead Temperature Soldering Time		260℃, 10s	℃

Electrical Characteristics

(V_{IN}=5.0V, C_{IN}=10uF, C_{OUT}=10μF, T_A=25°C, unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Supply Voltage						
V_{IN}	Input Voltage	V_{IN} Input Range ,V_{OUT}=V_{FB}	3.0		24	V
V_{IN_H}	V_{IN} POR Rising Threshold	I_{OUT}=1.0mA		1.6		V
V_{IN_L}	V_{IN} POR Hysteresis	I_{OUT}=1.0mA		60		mV
I_{GND}	Quiescent Current	V_{IN}=12V,I_{OUT}=0A		2.5		uA
I_{SD}	Shutdown Current	V_{IN}=12V,EN=0V		0.2	1.0	uA
Output Voltage						
V_{OUT}	Output Voltage Accuracy	V_{IN}=12V,I_{OUT}=10mA	-2.0		+2.0	%
$\triangle V_{LOAD}$	Load Regulation	V_{IN}=12V,1mA≤I_{OUT}≤100mA		0.02		%/mA
$\triangle V_{LINE\_VIN}$	Line Regulation	Set V_{OUT}+0.5V≤V_{IN}≤24V,I_{OUT}=1mA		0.01		%/V
V_{DROP}	Dropout Voltage	V_{OUT}=5V,I_{OUT}=50mA		62.5		mV
		V_{OUT}=5V,I_{OUT}=100mA		125		mV
Enable						
I_{EN}	EN Input Bias Current	V_{IN}=V_{EN}=12V			1.0	uA
V_{ENH}	EN Input Voltage High	V_{IN}=12V,I_{OUT}=10mA	1.4			V
V_{ENL}	EN Input Voltage Low	V_{IN}=12V,I_{OUT}=10mA			0.4	V
PSRR						
PSRR	Ripple Rejection	V_{IN}=12V,V_{OUT}=3.3V,I_{OUT}=10mA, F=1KHz		90		dB
Output Current Protection						
I_{OUT_MAX}	Output Current	V_{IN}=12V	500			mA
I_{OCP}	Limit Current	V_{IN}=12V		830		mA
I_{SHORT}	Short Current	V_{IN}=12V, V_{OUT}<0.2V		430		mA
T_{SS}	Soft Start Time	V_{IN}=12V,V_{OUT}=5V,I_{OUT}=0A		280		uS
Enable						
I_{EN}	EN Input Bias Current	V_{IN} = V_{EN} = 12V			1.0	μA
V_{EN_H}	EN Input Voltage High	V_{IN} = 5V, I_{OUT} = 10mA	1.2			V
V_{EN_L}	EN Input Voltage Low	V_{IN} = 5V, I_{OUT} = 10mA			0.4	V
R_{DIS}	ShutdownAuto-Discharge Resistance	EN=0V,V_{IN}=5V		2.44		KΩ
Thermal Shutdown						
T_{SD}	Thermal Shutdown Temperature	T_J Rising		150		℃
T_{SR}	Thermal Shutdown Returned Temperature			130		℃

Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 1Kpcs/Reel