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MIC5219-X.XYM5-MS

Product specification





GENERAL DESCRIPTION

The MIC5219-X.XYM5-MS series are a group of low-dropout (LDO) voltage regulators offering the benefits of wide input voltage range, low dropout voltage, low power consumption, and miniaturized packaging.

Quiescent current of only 1.5µA makes these devices ideal for powering the battery-powered, always-on systems that require very little idle-state power dissipation to a longer service life.

The MIC5219-X.XYM5-MS series of linear regulators are stable with the ceramic output capacitor over its wide input range from 2V to 24V and the entire range of output load current (0mAto 500mA).

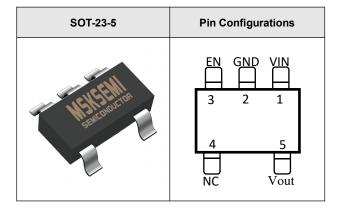
Features

- 1.5µA Ground Current at no Load
- ±2% Output Accuracy
- 500mA Output Current
- Wide Operating Input Voltage Range: 2V to 24V
- Dropout Voltage: 0.35V at 100mA / VOUT 5V
- Support Fixed Output Voltage 1.8V, 3.3V, 5V
- Stable with Ceramic or Tantalum Capacitor
- Current Limit Protection
- Over-Temperature Protection
- SOT-23-5 Packages Available

Applications

- Portable, Battery Powered Equipment
- Low Power Microcontrollers
- Laptop, Palmtops and PDAs
- Wireless Communication Equipment
- Audio/Video Equipment
- Car Navigation Systems
- Industrial Controls
- Weighting Scales
- Meters
- Home Automation

Reference News&Marking

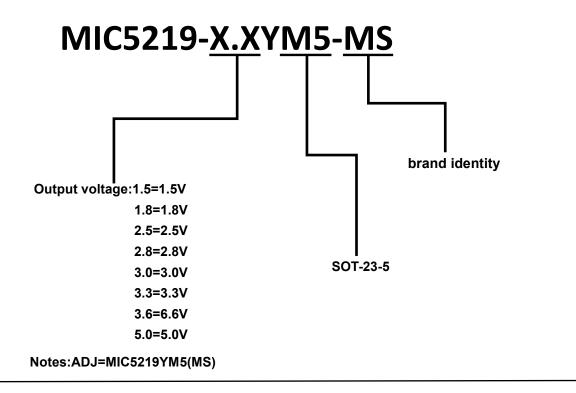


MIC5219YM5-MS	ADJ Pin Configurations		
<u>LGAA</u>	BN GND VIN 3 2 1 4 5 ADJ Vout		

MIC5219-1.5YM5-MS	MIC5219-1.8YM5-MS
<u>LG</u> 15	<u>LG</u> 18
MIC5219-2.5YM5-MS	MIC5219-2.8YM5-MS
<u>LG</u> 25	<u>LG</u> 28
MIC5219-3.0YM5-MS	MIC5219-3.3YM5-MS
<u>LG</u> 30	<u>LG33</u>
MIC5219-3.6YM5-MS	MIC5219-5.0YM5-MS
<u>LG</u> 36	<u>LG</u> 50



Part Number Code



Description of Functional Pins

Pin No	Pin Name	Pin Function	
2	GND	Ground	
5	VOUT	Output of the Regulator	
1	VIN Input of Supply Voltage.		
4	NC No Internal Connection.		
3	CE	Enable Control Input.	



Typical Application Circuits

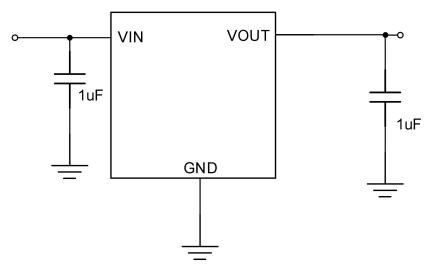
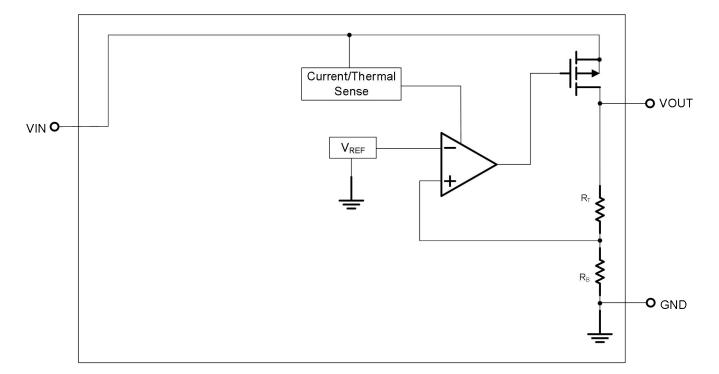


Figure 1: Application circuit of Fixed V_{OUT} LDO

Function Block Diagram





Absolute Maximum Ratings (Note 1)	
VIN to GND	0.3V to 24V
VOUT to GND	
1.8V,3.3V,5V	0.3V to 6.0V
VOUT to VIN	28V to 0.3V
Package Thermal Resistance (Note 2)	
θJA	200 °C /W
Lead Temperature (Soldering, 10 sec.)	
Junction Temperature	150 °C
Storage Temperature Range	40 °C to 150 °C
ESD Susceptibility	
HBM	2KV
MM	200V
Recommended Operating Conditions	
Input Voltage VIN	2.0V to 24V
Junction Temperature Range	40°C to 125°C
AmbientTemperatureRange	40°C to 85°C



Electrical Characteristics

(V_{IN} =15V, V_{EN} =5V, T_A =25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Тур	Max	Unit	
Supply Voltage	V _{IN}		2		24	V	
DC Output Voltage Accuracy		I _{LOAD} =0.1mA	-2		2	%	
	V_{DROP}	V _{OUT} ≥ 5V		0.35			
Dropout Voltage (I _{LOAD} =100mA)	V _{DROP_3.3V}	V _{OUT} = 3.3V		0.42		V	
	V _{DROP_1.8V}	V _{OUT} = 1.8V		0.5			
Ground Current (I _{LOAD} = 0mA)	IQ	V _{OUT} = 5V		2.2		μΑ	
Line Regulation	ΔLINE	$I_{LOAD} = 1 \text{mA},$ $5 \le V_{IN} \le 30 \text{V}$		0.3		%	
Load Regulation	ΔLOAD	1mA≤ I _{LOAD} ≤ 0.2A		0.1		%	
Output Current Limit	I _{LIM}	V _{OUT} =0		500		mA	
Power Supply Rejection Ratio	PSRR	V _{OUT} =5V, I _{LOAD} =1mA, V _{IN} = 12V, f = 100Hz		70		dB	
Thermal Shutdown Temperature	T _{SD}	I _{LOAD} =10mA		160		°C	
Thermal Shutdown Hysteresis	ΔT _{SD}	ILUAD - IUIIIA		15		°C	

Note 1. Stresses beyond those listed "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions may affect device reliability.



Application Guideline

Input and Output Capacitor Requirements

The external input and output capacitors of MIC52 19-X.XYM5-MS series must be properly selected for stability and performance. Use a 1 μ F or larger in put capacitor and place it close to the IC's VIN and GN D pins. Any output capacitor meeting the minimum 1m Ω ESR (Equivalent Series Resistance) and effective c apacitance between 1 μ F and 22 μ F requirement may be used. Place the output capacitor close to the IC's V OUT and GND pins.Increasing capacitance and de creasing ESR can improve the circuit's PSRR and lin e transient response.

Current Limit

The MIC5219-X.XYM5-MS series contain the curren t limiter of output power transistor, which monitors a nd controls the transistor, limiting the output cur rent to 700mA(typical).

The output can be shorted to ground indefinitely without damaging the part.

Dropout Voltage

The MIC5219-X.XYM5-MS series use a PMOS pas s transistor to achieve low dropout. When (VIN - VOUT) is less than the dropout voltage (V_{DROP}), t he PMOS pass device is in the linear region of operati on and the input-to-output resistance is the RDS(on) o f the PMOS pass element. V_{DROP} scales approximatel y with the output current because the PMOS device behaves as a

resistor in dropout condition.

As any linear regulator, PSRR and transient response are degraded as (VIN – VOUT) approaches dropout condition.

OTP (Over Temperature Protection)

The over temperature protection function of MIC52 19-X.XYM5-MS series will turn off the P-MOSFET w hen the junction temperature exceeds 160°C (typ.). Once the junction temperature cools down by approximately 15°C, the regulator will automatically resume operation.

Thermal Application

For continuous operation, do not exceed the absolute maximum junction temperature. The maximum power dissipation depends on the thermal resistance of the IC package, PCB layout, rate of surrounding airflow, and difference between junction and ambient temperature. The maximum power dissipation can be calculated as below:

The max PD (Max)= $(125^{\circ}C - 25^{\circ}C) / (200^{\circ}C/W) = 0.5W$.

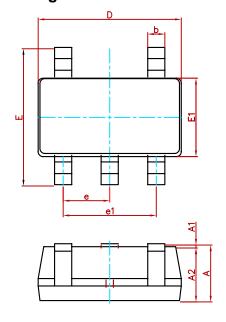
Power dissipation (PD) is equal to the product of the output current and the voltage drop across the output pass element, as shown in the equation below:

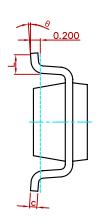
Layout Consideration

By placing input and output capacitors on the same side of the PCB as the LDO, and placing them as close as is practical to the package can achieve the best performance. The ground connections for input and output capacitors must be back to the MIC5219-X.XYM5-MS ground pin using as wide and as short of a copper trace as is practical. Connections using long trace lengths, narrow trace widths, and/or connections through via must be avoided. These add parasitic inductances and resistance that results in worse performance especially during transient conditions.



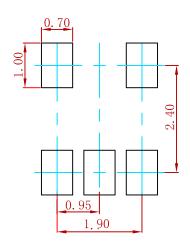
Package Outline Dimensions





	Dimensions In Millimeters Min. Max.		Dimension	ns In Inches
Symbol			Min.	Max.
Α	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
С	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	2.650	2.950	0.104	0.116
E1	1.500	1.700	0.059	0.067
е	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

Suggested Pad Layout



- 1.Controlling dimension:in millimeters.
- 2.General tolerance:± 0.05mm.
 3.The pad layout is for reference purposes only.

REEL SPECIFICATION

P/N	PKG	QTY
MIC5219-X.XYM5-MS	SOT-23-5	3000



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