

150mA CMOS Low Noise LDO Voltage Regulator
◆ DESCRIPTION

The MT508 is a low noise, fast enable response time and low dropout. An external capacitor can be connected to the bypass pin to lower the output noise. Each device contains a voltage reference unit, an error amplifier, a PMOS power transistor, and resistors for setting output voltage, and current limit and temperature limit protection circuits.

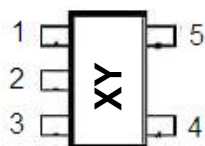
The MT508 has been designed to be used with low cost ceramic and requires a minimum output capacitor of 1.0 μ F. Standard voltage versions are 1.5, 1.8, 2.5, 2.8, 3.0 and 3.3V. Beside, MT508 comes in a miniature 5-pin SOT-23 and 5-pin SC-70 (SOT-353) packages.

◆ FEATURES

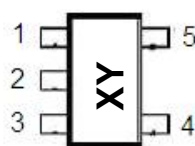
- Fast Enable Turn-On Time of 20 μ s (Typ.)
- Typical Low Dropout Voltage of 200mV at 75mA.
- Thermal shutdown protection
- Wide Operating Voltage Range of 2.8V to 6.0V.
- Excellent Line and Load Regulation.
- High Accuracy Output Voltage of 2%.
- Typical Low Ground Current at 50 μ A.

◆ APPLICATIONS

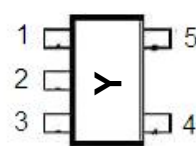
- Wireless LAN's
- Cellular Telephones
- PCMCIA Cards

◆ PIN CONFIGURATIONS
SOT-23-5L (Top View)

MT5081-X.XN

1.VIN 2.GND 3.ENABLE 4.BP 5.VOUT

SOT-23-5L (Top View)

MT5082-X.XN

1.ENABLE 2.GND 3.BP 4.VOUT 5.VIN

SC-70-5L (Top View)

MT508-X.XE

1.VIN 2.GND 3.ENABLE 4.BP 5.VOUT

Marking Information
XY (SOT-23-5L) or Y (SC-70-5L)

X = 1 is MT5081, 2 is MT5082

Y = Output Voltage (A ~ F) Note : A=3.3V B=2.8V C=2.5 V D=1.8V E=1.5 V F=3.0 V

150mA CMOS Low Noise LDO Voltage Regulator
◆ ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Maximum	Unit
Input supply voltage	V_{IN}	6	V
Enable voltage	V_{EN}	-0.3 to V_{IN}	V
Output voltage	V_{OUT}	-0.3 to V_{IN}	V
Thermal resistance junction to ambient SOT-23-5L	θ_{JA}	230	$^{\circ}\text{C}/\text{W}$
Junction temperature	T_J	150	$^{\circ}\text{C}$
Storage temperature range	T_{STG}	- 10 to 150	$^{\circ}\text{C}$
Lead temperature (soldering) 10sec	T_{LEAD}	260	$^{\circ}\text{C}$

Note:

Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of the specified terminal.

◆ ORDERING INFORMATION

Device	Package		Vout Volts	T_A ($^{\circ}\text{C}$)
MT5081-X.XN	N	SOT-23-5L	X.X_1.5/1.8/2.5/2.8/3.0/3.3	0 ~ 70
MT5082-X.XN				
MT508-X.XE	E	SC-70-5L	X.X_1.5/1.8/2.5/2.8/3.0/3.3	0 ~ 70

◆ POWER DISSIPATION TABLE

Package	θ_{JA} ($^{\circ}\text{C}/\text{W}$)	Df($\text{mW}/^{\circ}\text{C}$) $T_A \geq 25^{\circ}\text{C}$	$T_A \leq 25^{\circ}\text{C}$ Power rating(mW)	$T_A = 70^{\circ}\text{C}$ Power rating(mW)	$T_A = 85^{\circ}\text{C}$ Power rating (mW)
N	230	3.5	543	348	283

Note :

- Exceeding the maximum allowable power dissipation will result in excessive die temperature, and the regulator will go into Thermal shutdown
- T_J Junction Temperature Calculation: $T_J = T_A + (P_D \times \theta_{JA})$,
The θ_{JA} numbers are guidelines for the thermal performance of the device/PC-board system
All of the above assume no ambient airflow
- θ_{JA} : Thermal Resistance-Junction to Ambient, Df: Derating factor, P_D : Power consumption.

◆ RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Operating Conditions			Units
		Min.	Typ.	Max.	
Input Voltage	V_{IN}	2.0	-	5.5	V
Input Capacitor (V_{IN} to GND)	C_{IN}	1.0	-	-	μF
Output Capacitor with ESR of 10Ω max.(V_{OUT} to GND)	C_{OUT}	1.0	-	-	μF
Junction temperature range	T_J	0~125			$^{\circ}\text{C}$

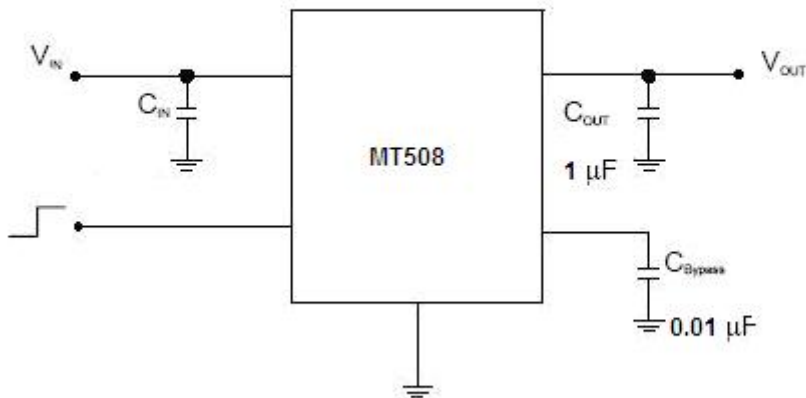
150mA CMOS Low Noise LDO Voltage Regulator
◆ ELECTRICAL CHARACTERISTICS
 $V_{IN} = 5V$; $C_{IN} = 1\mu F$; $C_{OUT} = 1\mu F$; $I_{OUT} = 10mA$; $T_A = 25^\circ C$; unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	MT508-1.5	1.470	1.5	1.530	V
		MT508-1.8	1.764	1.8	1.836	
		MT508-2.5	2.450	2.5	2.550	
		MT508-2.8	2.744	2.8	2.856	
		MT508-3.0	2.940	3.0	3.060	
		MT508-3.3	3.234	3.3	3.366	
Line Regulation	V_{SR}	$V_{IN} = 4.5V$ to $5.5V$, $I_{OUT} = 10mA$	-	1.0	-	%/V
Load Regulation (1)	V_{LR}	$10mA \leq I_{OUT} \leq 150mA$	-	1.0	-	%/V
Dropout Voltage (2)	V_D	$I_{OUT} = 10mA$	-	20	-	mV
		$I_{OUT} = 75mA$	-	200	-	
		$I_{OUT} = 150mA$	-	500	-	
Current Limit	I_{CL}		-	150	-	mA
V_{OUT} Temperature Coefficient (3)	T_c		-	0.1	-	mV/ $^\circ C$
Quiescent Current	I_Q	$V_{EN}=0V$	-	0.1	-	μA
		$V_{EN}=V_{TH(EN)}$, $I_{OUT} = 10mA$		50	-	
Thermal Protection	T_{PRO}	Thermal protection temperature	-	150	-	$^\circ C$
		Protection Hysterisys	-	20	-	
Enable Input Threshold Voltage	$V_{TH(EN)}$	Voltage Increasing, Output Turns On, Logic High	1.6	-	-	V
		Voltage Decreasing, Output Turns Off, Logic Low	-	-	0.4	
Ripple Rejection Ratio	PSRR	$f = 120Hz$,	-	62	-	dB

NOTES:

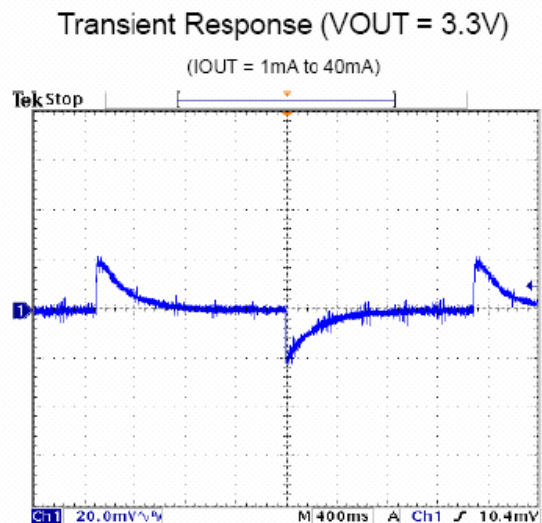
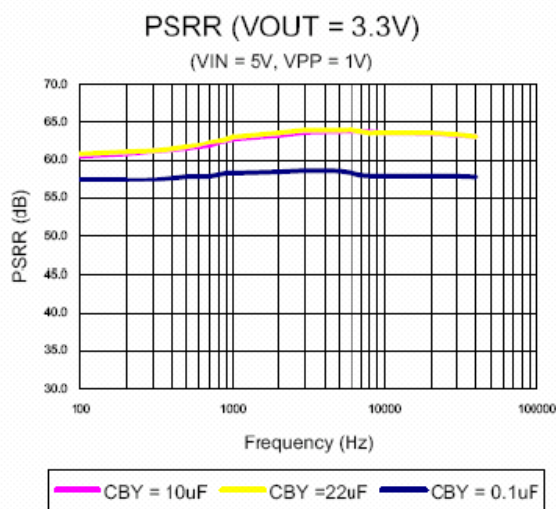
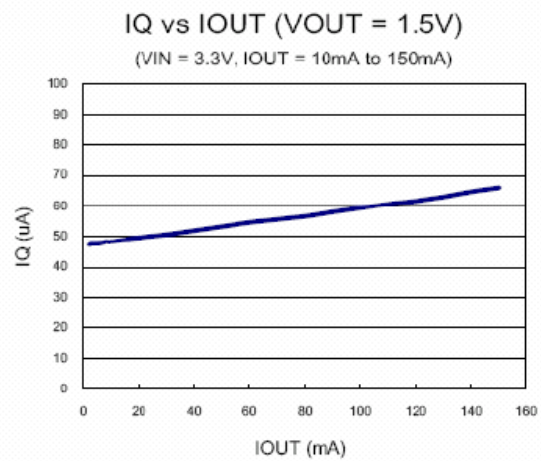
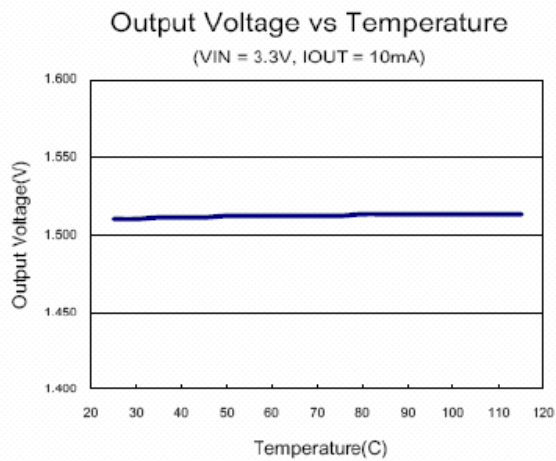
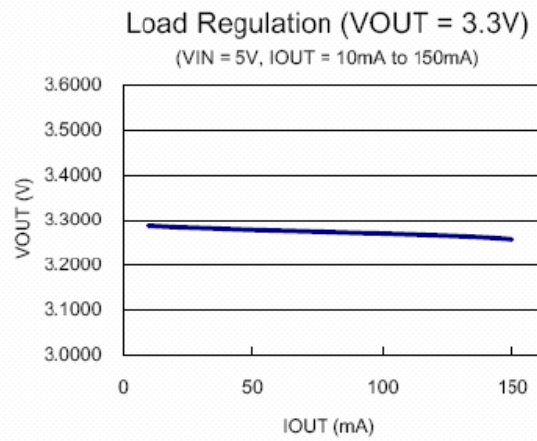
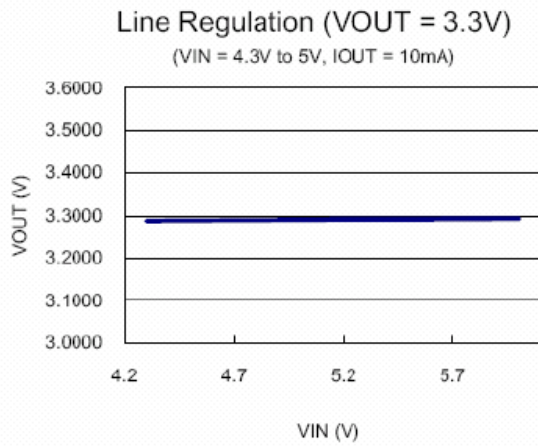
- (1) Regulation is measured at constant junction temperature using low duty cycle pulse testing. Parts are tested for load regulation in the load range from 0.1mA to 150mA. Changes in output voltage duo to heating effects are covered by the thermal regulation specification.
- (2) The V_D is defined as the input to output differential at which the output voltage drops 2% below its nominal value measured at 1V differential.
- (3) Output voltage temperature coefficient is the worst case voltage change divided by the total temperature range.

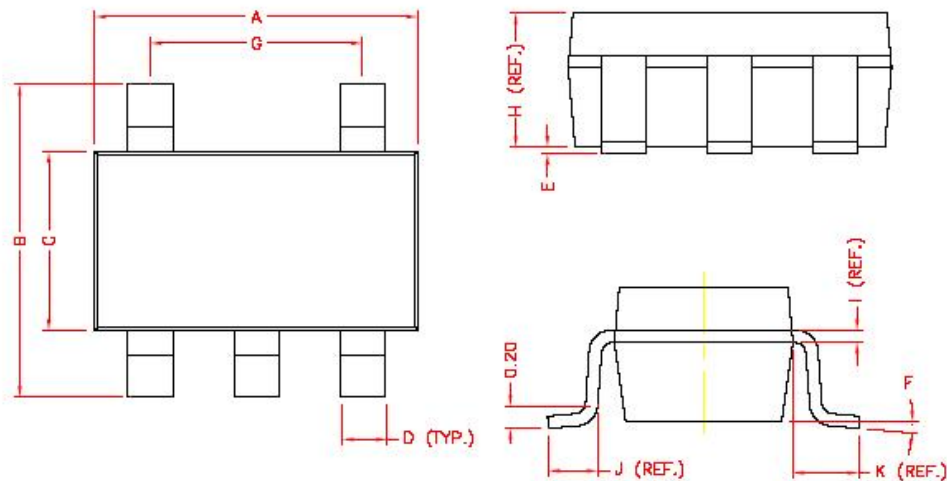
◆ **TYPICAL APPLICATIONS**



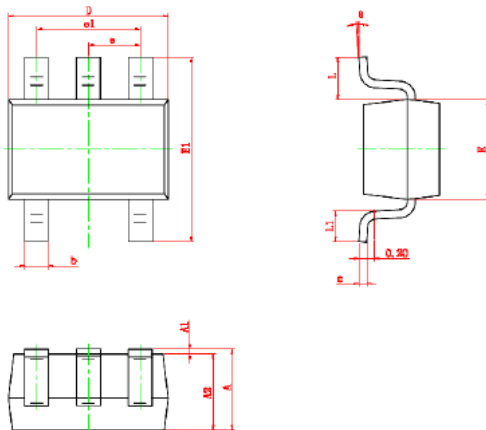
◆ **APPLICATION HINTS**

Like any low dropout regulator, MT508 requires external capacitors to ensure stability. The external capacitors must be carefully selected to ensure performance.

150mA CMOS Low Noise LDO Voltage Regulator
◆ TYPICAL PERFORMANCE CHARACTERISTICS


150mA CMOS Low Noise LDO Voltage Regulator
◆ PHYSICAL DIMENSIONS
5-Pin surface Mount SOT-23(N)


REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	1.90 REF.	
B	2.60	3.00	H	1.20 REF.	
C	1.40	1.80	I	0.12 REF.	
D	0.30	0.55	J	0.37 REF.	
E	0	0.10	K	0.60 REF.	
F	0°	10°			

150mA CMOS Low Noise LDO Voltage Regulator
◆ PHYSICAL DIMENSIONS
5-Pin surface Mount SC-70 (E)


Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°