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AMC7637

ULTRA LOW I_Q 300mA LOW DROPOUT REGULATOR

DESCRIPTION

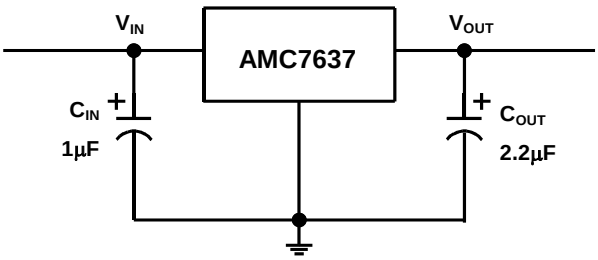
The AMC7637 is an ultra low quiescent current, and low dropout regulator rated for 300mA output current. The low power consumption and high accuracy is achieved through CMOS technology and internal trimmed reference voltage.

The AMC7637 consists of a high-precision voltage reference, error correction circuit, and a current limit output driver. The fast transient response is an outstanding feature for applications with various loads.

FEATURES

- **Ultra low quiescent current of 15μA in typical.**
- **Typical 2% internally trimmed output.**
- **Output current is excess of 300mA.**
- **Low Dropout Voltage.**
- **P-MOS output stage with low $R_{DS(ON)}$.**
- **Short circuit protection.**
- **Internal thermal overload protection.**
- **Available in 3-Lead surface mount SOT-23 package.**

TYPICAL APPLICATION



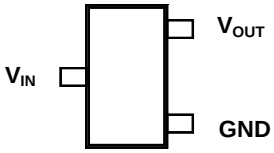
APPLICATIONS

- Digital Camera
- Battery Powered Applications
- PDA
- Smart Phones

VOLTAGE OPTIONS

AMC7637-1.5	1.5V Fixed
AMC7637-1.8	1.8V Fixed
AMC7637-2.5	2.5V Fixed
AMC7637-3.0	3.0V Fixed
AMC7637-3.3	3.3V Fixed

PACKAGE PIN OUT



3-Pin Plastic SOT-23

Surface Mount

ORDER INFORMATION

T_A (°C)		
	DB	SOT-23
		3-pin
-40 to +85	**AMC7637-X.XDBF (Lead Free)**	

Note: 1. All surface-mount packages are available in Tape & Reel. Append the letter "T" to part number (i.e. AMC7637-X.XDBFT).
Note: 2. The letter "F" is marked for Lead Free process.

ABSOLUTE MAXIMUM RATINGS (Note)

Input Voltage, V_{IN}	8V
Maximum Operating Junction Temperature, T_J	150°C
Storage Temperature Range	-65°C to 150°C
Lead Temperature (soldering, 10 seconds)	260°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.

THERMAL DATA

Thermal Resistance from Junction to Ambient, θ_{JA}	250°C /W

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.
Connect the ground pin to ground using a large pad or ground plane for better heat dissipation.
All of the above assume no ambient airflow.

Maximum Power Calculation:

$$P_{D(MAX)} = \frac{T_{J(MAX)} - T_{A(MAX)}}{\theta_{JA}}$$

T_J(°C): Maximum recommended junction temperature

T_A(°C): Ambient temperature of the application

θ_{JA}(°C /W): Junction-to-Ambient temperature thermal resistance of the package, and other heat dissipating materials.

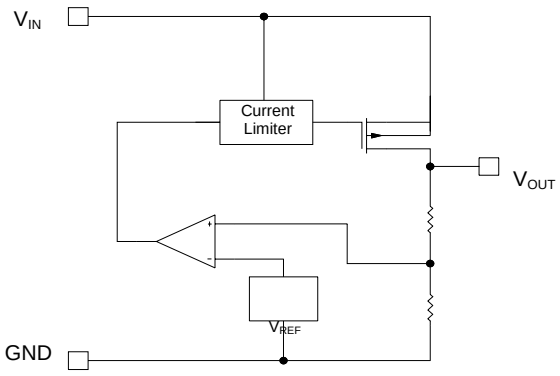
The maximum power dissipation for a single-output regulator is:

$$P_{D(MAX)} = [(V_{IN(MAX)} - V_{OUT(NOM)})] \times I_{OUT(NOM)} + V_{IN(MAX)} \times I_Q$$

Where: $V_{OUT(NOM)}$ = the nominal output voltage
$I_{OUT(NOM)}$ = the nominal output current, and
I_Q = the quiescent current the regulator consumes at $I_{OUT(MAX)}$
$V_{IN(MAX)}$ = the maximum input voltage

Then $\theta_{JA} = (125°C - T_A)/P_D$

BLOCK DIAGRAM



RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min.	Typ.	Max.	Units
Input Voltage	V_{IN}	NOTE		7	V
Load Current (with adequate heat sinking)	I_O	5		300	mA
Input Capacitor (V_{IN} to GND)		0.1			μF
Output Capacitor with ESR of 10Ω max. (V_{OUT} to GND)		1.0			μF
Operating ambient temperature range	T_A	-40		85	^{O}C
Operating junction temperature	T_J			125	^{O}C

Note : $V_{IN(MIN)} = V_{OUT} + V_{DROP}$

ELECTRICAL CHARACTERISTICS

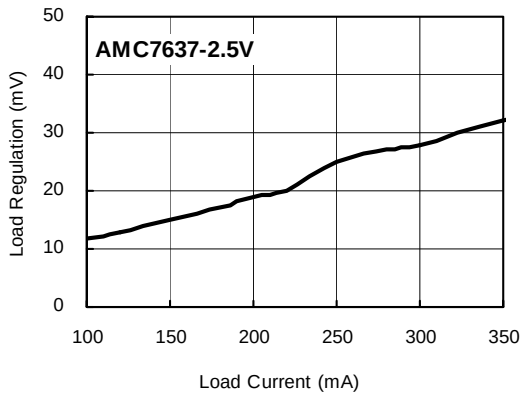
Unless otherwise specified, $V_{IN} = V_{O(TYP)} + 1V$, I_O = 10mA, C_{OUT} = 2.2μF, T_A=25^{O}C, and are for DC characteristics only. (Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.)

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Output Voltage Accuracy	V_O	I_O = 10mA		-2		+2	%
Line Regulation	ΔV_{OI}	$V_{IN} = (V_O + 0.5V)$ to 8V			0.1	0.3	%/V
Load Regulation	ΔV_{OL}	10mA ≤ I_O ≤100mA			15	30	mV
		10mA ≤ I_O ≤ 300mA			45	80	
Dropout Voltage	V_{DROP}	I_O = 100mA $V_O=V_{O(NOM)}$-2.0%	$V_{O(NOM)} \leqq 2.0V$			300	mV
			$2.0V < V_{O(NOM)}$			200	
		I_O = 300mA $V_O=V_{O(NOM)}$-2.0%	$1.3V \leqq V_{O(NOM)} \leqq 2.0V$			1300	
			$2.0V < V_{O(NOM)} \leqq 2.8V$			600	
			$2.8 < V_{O(NOM)}$			500	
Ground Pin Current	I_Q	I_O = 10mA~300mA			15	30	μA
Current Limit	I_{CL}	$V_{IN} = V_{OUT}$+ 0.5V		350			mA
Output Voltage Temperature Coefficient		I_O=100mA, -40°C ≤ T_J ≤ 125°C			±100		ppm/^{O}C

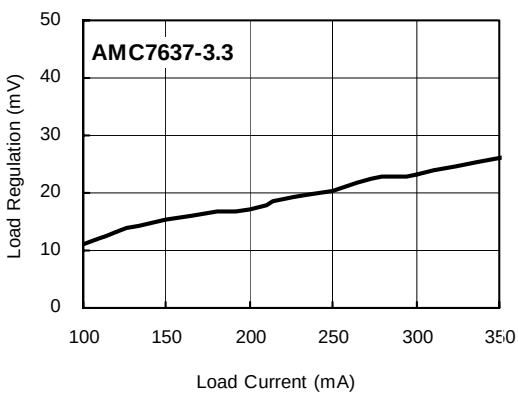
CHARACTERIZATION CURVES

V_{IN}= 5V，C_{IN}=1μF，C_{OUT}= 2.2μF，T_A=25°C unless otherwise specified.

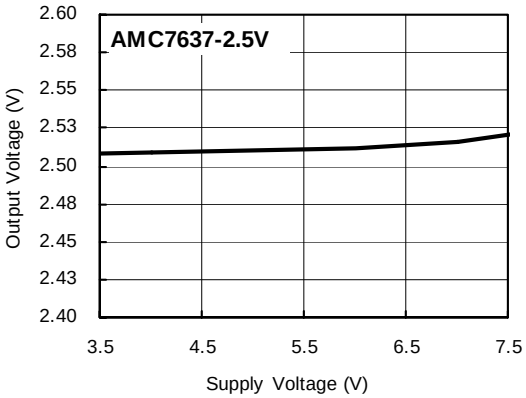
Load Regulation vs. Load Current



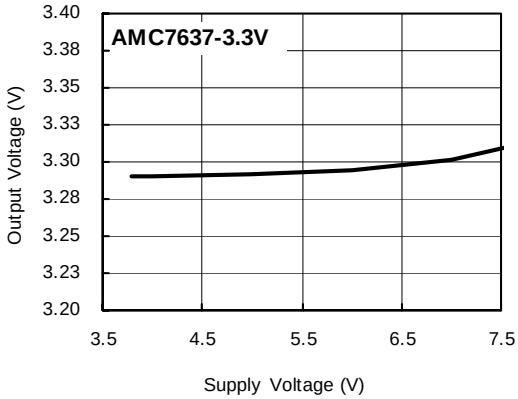
Load Regulation vs. Load Current



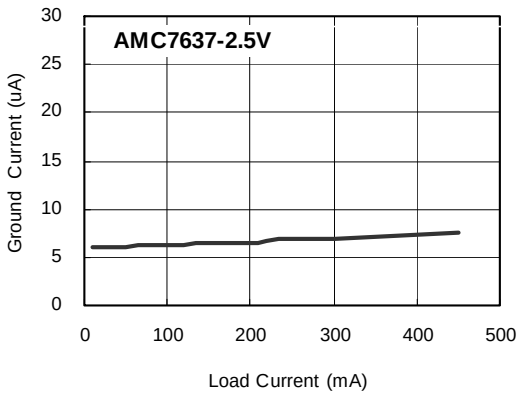
Output Voltage vs. Supply Voltage



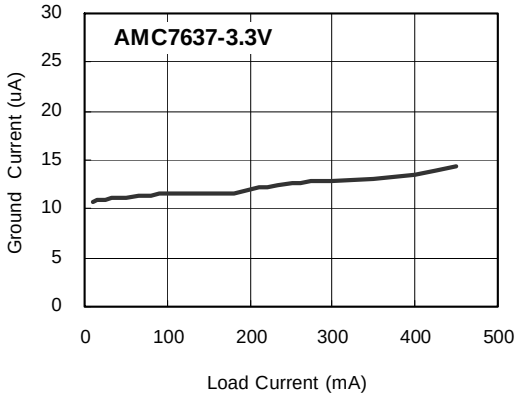
Output Voltage vs. Supply Voltage



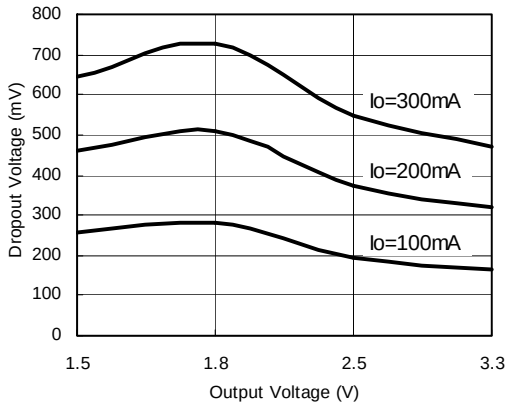
Ground Current vs. Load Current



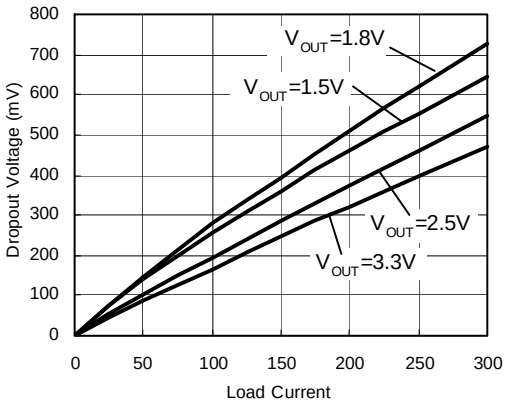
Ground Current vs. Load Current



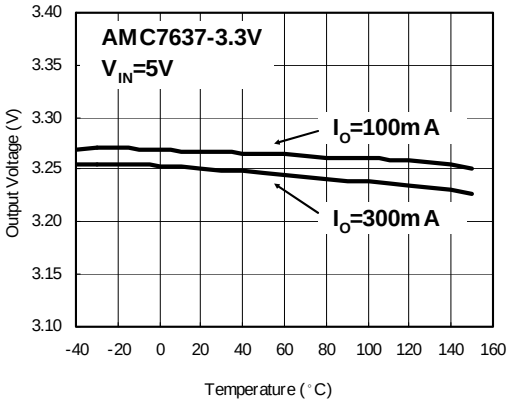
Dropout Voltage vs. Output Voltage



Dropout Voltage vs. Load Curent

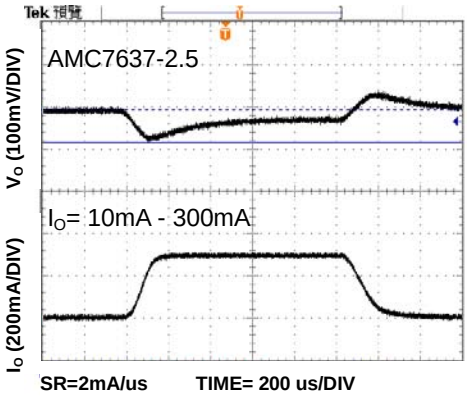


Output Voltage vs. Temperature



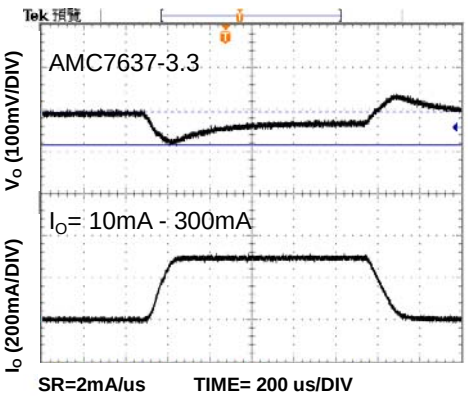
Load Transient Response

V_{IN}=5V, C_{IN}=1uF, C_{OUT}=2.2uF,T_A=25℃



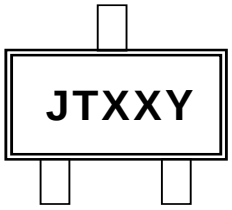
Load Transient Response

V_{IN}=5V, C_{IN}=1uF, C_{OUT}=2.2uF,T_A=25℃



PACKAGE

Symbol

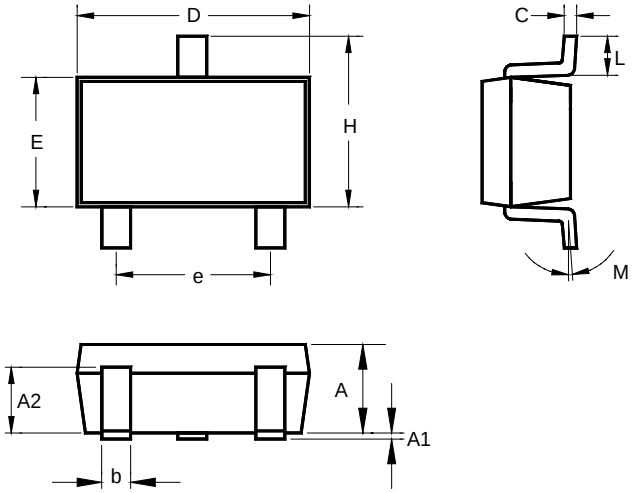


XX: Output Voltage Options

15 = 1.5V, 18 = 1.8V, 25 = 2.5V, 30 = 3.0V, 33 = 3.3V

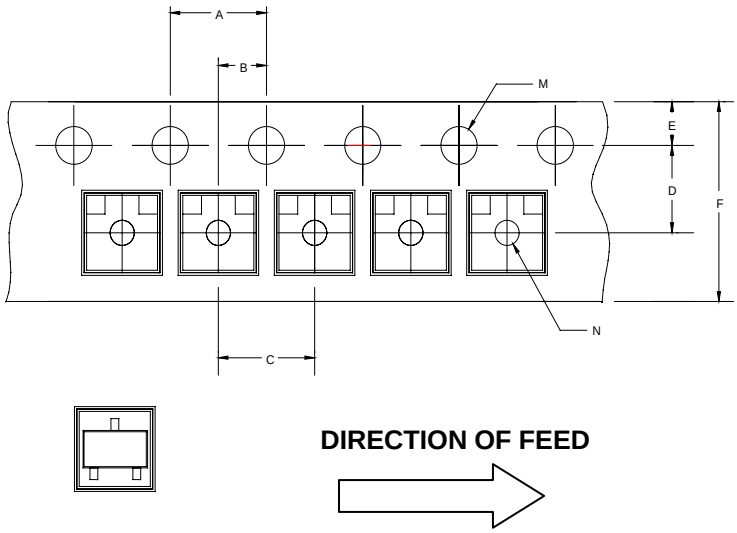
Y: A/T Site

Surface Mount SOT-23



	INCHES			MILLIMETERS		
	MIN	TYP	MAX	MIN	TYP	MAX
A	0.039	0.043	0.051	1.00	1.10	1.30
A1	0.000	-	0.004	0.00	-	0.10
A2	0.028	0.032	0.035	0.70	0.80	0.90
b	0.014	0.016	0.020	0.35	0.40	0.50
C	0.004	0.005	0.010	0.10	0.15	0.25
D	0.106	0.114	0.122	2.70	2.90	3.10
E	0.055	0.063	0.071	1.40	1.60	1.80
e	0.075 TYP.			1.90 TYP.		
H	0.102	0.110	0.118	2.60	2.80	3.00
L	0.015	-	-	0.37	-	-
M	1°	5°	9°	1°	5°	9°

Surface Mount SOT-23 Carrier Dimensions



MILLIMETERS			
A	4.0 ± 0.1	M	1.5 ± 0.1
B	2.0 ± 0.05	N	1.1 ± 0.1
C	4.0± 0.1		
D	2.5 ± 0.05		
E	1.75 ± 0.1		
F	6.0 ± 0.2		

IMPORTANT NOTICE

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