December 18, 2004

RT6206

300mA LDO LINEAR VOLTAGE / REGULATORS

◆ DESCRIPTION

The RT6206 series is a low-drop-out (LDO) linear regulator. The devices have been optimized for applications where fast transient response and minimum input voltages are critical. At light loads the typical dropout voltage is 10mV, and at full load the maximum dropout voltage is less than 500mV. The internal over-current protection and thermal protection ,makes the device extremely easy to use in a wide range of applications.

◆ FEATURES

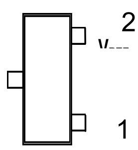
* Low dropout performance
* Output current of 300mA typical
* Thermal shutdown protection
* Fixed 1.5V/ 1.8V/ 2.5V/ 3.0V/ 3.3V output voltages available
*, SOT-23

◆ APPLICATIONS

* Active SCSI terminators
* Battery charges
* High efficiency linear regulators
* Wireless communication systems
* Digital camera

◆ PIN CONFIGURATIONS

SOT-23
(Top View)



***RT6206-XX2CX** 1: GND, 2: OUT, 3: IN

Note: **Y (Output Voltage)**

18: V_{OUT}=1.8V, 25: V_{OUT}=2.5V
30: V_{OUT}=3.0V, 33: V_{OUT}=3.3V

◆ ABSOLUTE MAXTMUM RETINGS

SYMBOL	PARAMETER	MAXIMUM	UNITS
V_{IN}	Input supply voltage	6	V
θ_{JA}	Thermal resistance junction to ambient SOT-23	230	^{o}C/W
T_J	Operating junction temperature range	150	^{o}C
T_{STG}	Storage temperature range	- 65 to 150	^{o}C
T_{LEAD}	Lead temperature (soldering) 10sec	260	^{o}C

Note 1: 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.

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ORDERING INFORMATION

DEVICE	PACKAGE		V_{OUT} VOLTS	(max)A	T_A (°C)
RT6206-XX2CX5	S	SOT-23	1.5/1.8/2.5/3.0/3.3	300mA	-40 ~ 85

POWER DISSIPATION TABLE:

Package	θ_{JA} (°C /W)	Df(mW/°C) $T_A \geq 25$°C	$T_A \leq 25$°C Power rating(mW)	T_A=70°C Power rating(mW)	T_A= 85°C Power rating (mW)
S	230	3.5	397	239	187

Note :

1. Exceeding the maximum allowable power disspation will result in excessive die temperature, and the regulator will go into thermal shutdown.
2. 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.

3. θ_{JA}: Thermal Resistance-Junction to Ambient, D_F : Derating factor, Po: Power consumption.
4. θ_{JT}: Thermal Resistance-Junction to Ambient, T_C: case(Tab) temperature,

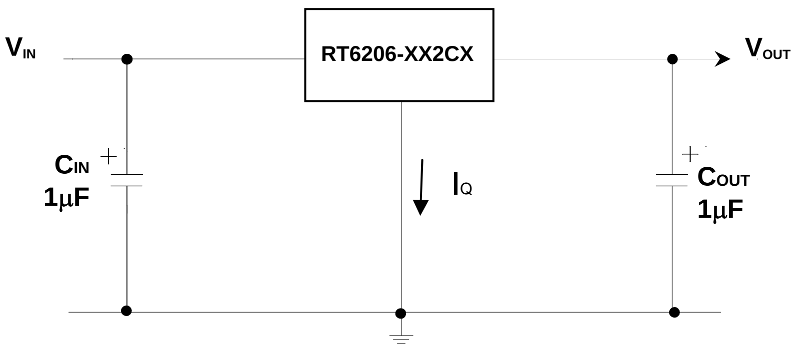
$$T_J = T_C + (P_D \times \theta_{JT})$$ for S package.

RECOMMENDED OPERATING CONDITIONS:

Symbol	Parameter	Recommended Operating			Units
		Min.	Typ.	Max.	
V_{IN}	Input Voltage	2.8		5.5	V
I_O	Load Current (with adequate heatsinking)	5			mA
T_J	Junction temperature			125	°C

TYPICAL APPLICATIONS:

Fixed Voltage Regulator:



◆ ELECTRICAL CHARACTERISTICS:

Operating Conditions: V_{IN} = 5V, $I_{OUT(MIN)}$ =10mA; T_J = 25°C unless otherwise specified.(C_{OUT}=1uF, C_{IN}=1uF)

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNITS
V_O	Output Voltage (1)	V_{IN}=5V, 10mA≤ I_{OUT}≤ 500mA T_A=25°C, RT6206-1.5 RT6206-1.8 RT6206-2.5 RT6206-3.0 RT6206-3.3	1.470 1.764 2.450 2.940 3.234	1.5 1.8 2.5 3.0 3.3	1.530 1.836 2.550 3.060 3.366	V
V_{SR}	Line Regulation (1)	4.5V ≤ V_{IN} ≤ 5.5V I_{OUT}=10mA		1		%
V_{LR}	Load Regulation (1)	V_{IN} =5V 10mA≤ I_{OUT}≤ 500mA		1		%
V_D	Dropout Voltage (2)	I_{OUT}=500mA I_{OUT}=300mA I_{OUT}=100mA I_{OUT}=10mA		800m 380m 175m 15m		V
I_{CL}	Current Limit	(V_{IN}-V_{OUT})=2V	0.6			A
T_C	Vo Temperature Coefficient (3)	$\Delta V_{OUT}/\Delta T$		50		ppm/°C
I_Q	Quiescent Current	I_{OUT}=500mA			0.17	mA
T_{PRO}	Thermal Protection	Thermal protection temperature		150		°C
V_N	RMS Output Noise	T_A=25℃, 10Hz ≤ f ≤ 10kHz,		0.003		%/Vo
RA	Ripple Rejection Ratio	f = 120Hz,		35		dB

NOTES:

(1) Low duty cycle pulse testing with which T_J remain unchanged.

(2) Dropout voltage is defined as the to output differential at which the output voltage drops 2% below its normal value measured at 1V differential.

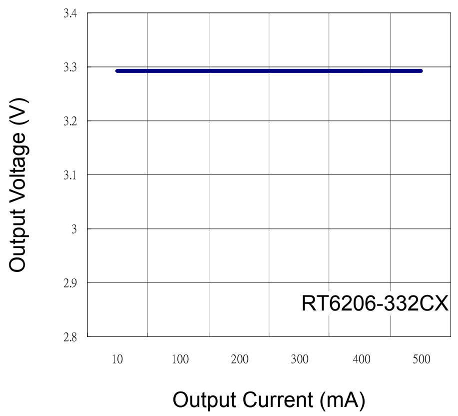
(3) Output voltage temperature coefficient is the worst case voltage change divided by the total temperature range.

(4) 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.

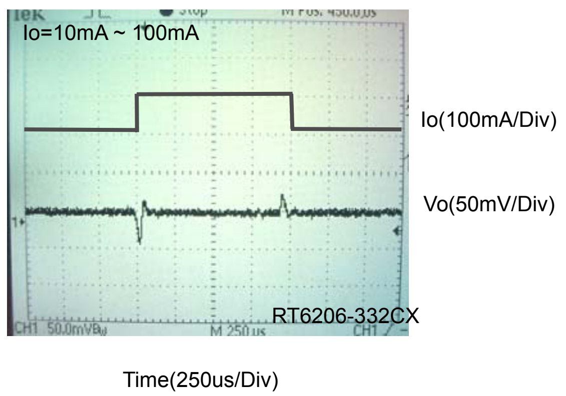
◆ TYPICAL PERFORMANCE CHARACTERISTICS:

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

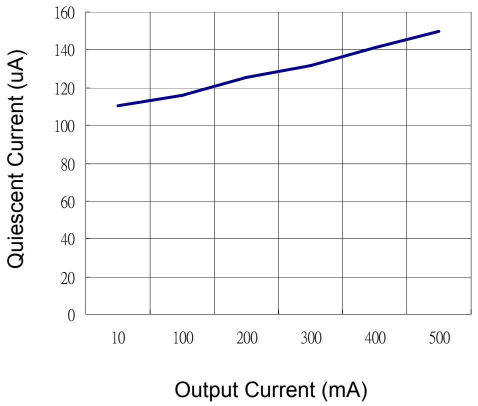
LOAD REGULATION



LOAD TRANSIENT RESPONRT



Quiescent Current vs Output Current



◆ APPLICATION NOTE:

1. **Maximum Power Dissipation Calculation:**

$$P_{D(max)} = [(V_{IN(max)} - V_{O(nom)})] \times I_{O(nom)} + V_{IN(max)} \times I_Q$$

Where: $V_{O(nom)}$: The nominal output voltage
$I_{O(nom)}$: The nominal output current, and
I_Q : The quiescent current the regulator consumes at $I_{O(MAX)}$
$V_{IN(max)}$: The maximum input voltage

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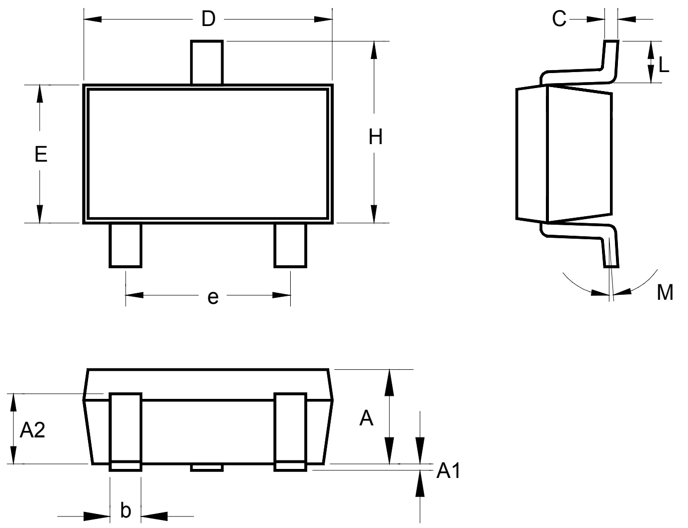
◆ PHYSICAL DIMENSIONS:

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°