

500nA I_Q , 300mA Low-Dropout Linear Regulator

Description

The FLD0503A ultra-low quiescent current regulator features low dropout voltage and low current in the standby mode. With less than 500nA quiescent current at no load, the FLD0503A is ideally suited for standby micro-control-unit systems, especially for always-on applications like portable, and other battery operated systems. The FLD0503A retains all of the features that are common to low dropout regulators including a low dropout PMOS pass device, short circuit protection, and thermal shutdown.

The FLD0503A has a 6V maximum operating voltage limit, a 0 °C to 100 °C operating temperature range, and $\pm 2\%$ output voltage tolerance over the entire output current, input voltage, and temperature range. The FLD0503A is available in SOT23 surface mount packages.

Features

- V_{IN} Range up to 6V
- Output Voltage Tolerances of $\pm 2\%$ Over the Temperature Range
- Output Current of 300mA, Supports 450mA peak Output
- Ultra Low Quiescent Current ($I_Q = 500nA$)
- Dropout Voltage Typically 400mV at $I_{OUT} = 300mA$
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limit
- Ceramic Capacitor Stable

APPLICATIONS

- Portable, Battery Powered Equipment
- Ultra Low Power Microcontroller
- Notebook computers

TYPICAL APPLICATION

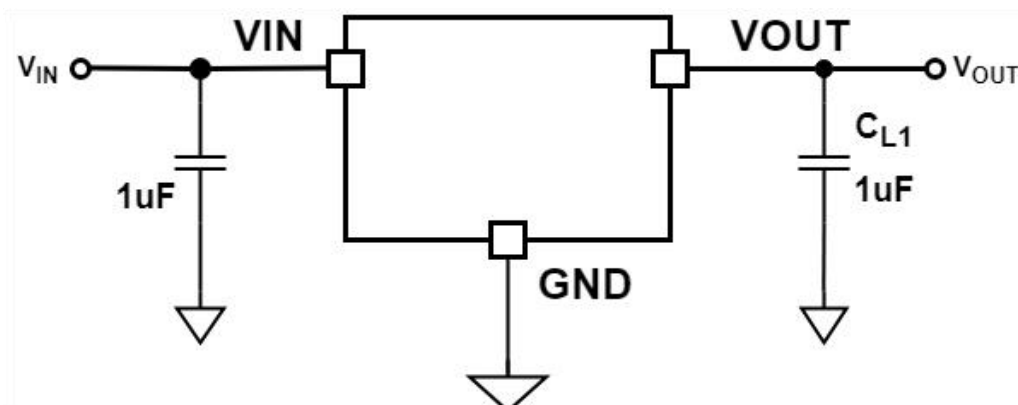


Figure 1. Typical Application for FLD0503A

Order information

Mode	VOUT(V)	Package	Ordering Number	Packing Option
FLD0503A-1.2	1.2	SOT23	FLD0503A-1.2YSOT23G/TR	Tape and Reel,3000
FLD0503A-2.2	2.2		FLD0503A-2.2YSOT23G/TR	Tape and Reel,3000
FLD0503A-2.5	2.5		FLD0503A-2.5YSOT23G/TR	Tape and Reel,3000
FLD0503A-2.8	2.8		FLD0503A-2.8YSOT23G/TR	Tape and Reel,3000
FLD0503A-3.3	3.3		FLD0503A-3.3YSOT23G/TR	Tape and Reel,3000

PIN CONFIGURATION

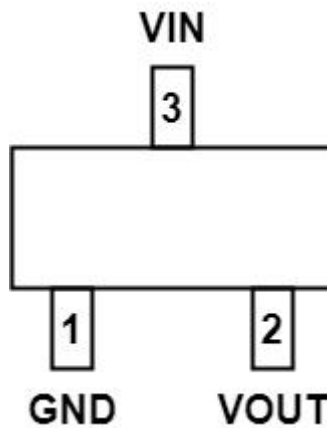


Figure 2. Pin Assignment of FLD0503A Package SOT23

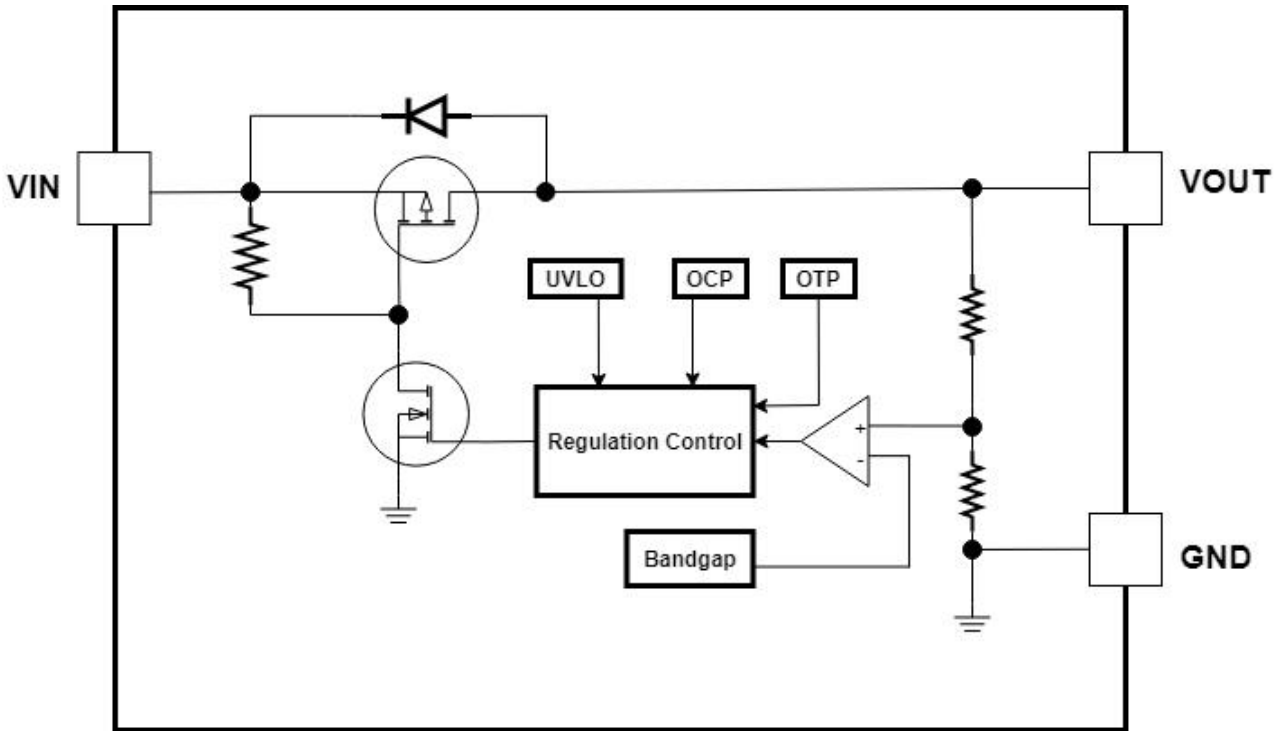
PIN DESCRIPTION

Pin Name	Pin No.SOT23	Pin Function
VOUT	2	Output Voltage Pin
GND	1	Ground
VIN	3	Input Voltage pin

Absolute Maximum Ratings

- VIN-----0.3V to +6.5V
- Junction Temperature -----125°C
- Lead Temperature (Soldering, 10 sec.) -----300°C
- Storage Temperature-----65°C to 150°C

FUNCTIONAL Block Diagram



ELECTRICAL CHARACTERISTICS

($V_{IN} = V_{OUT} + 1V$, $I_{OUT} = 1mA$, $C_{IN} = C_{OUT} = 1\mu F$, $T_J = 25^\circ C$, unless otherwise specified)

Paramter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage Accuracy	ΔV_{OUT}		-2%		2%	V
Line Regulation	ΔV_{LINE}	$V_{IN} = V_{OUT} + 1V$ to 5.5V		20	50	mV
Load Regulation	ΔV_{LOAD}	$I_{OUT} = 1mA$ to 150mA		13	25	mV
		$I_{OUT} = 1mA$ to 300mA		25	40	
Dropout Voltage	V_{DROP}	$I_{OUT} = 100mA$, $V_{OUT} = 3.3V$		130		mV
		$I_{OUT} = 300mA$, $V_{OUT} = 3.3V$		400		mV
Quiescent Current	I_Q	$T_J = 25^\circ C$		1	1.5	μA
Current Limit	I_{CL}		360	560		mA
Power-supply rejection ratio	PSRR	$f = 1kHz$		60		dB
Thermal Shutdown	T_{SD}			150		$^\circ C$
Thermal Shutdown Hy	T_{SDHY}			20		$^\circ C$

TYPICAL CHARACTERISTICS

$V_{IN} = V_{OUT} + 1V$, $I_{OUT} = 1mA$, $V_{OUT} = 3.3V$, $C_{IN} = C_{OUT} = 1\mu F$, $T_J = 25^\circ C$, unless otherwise specified

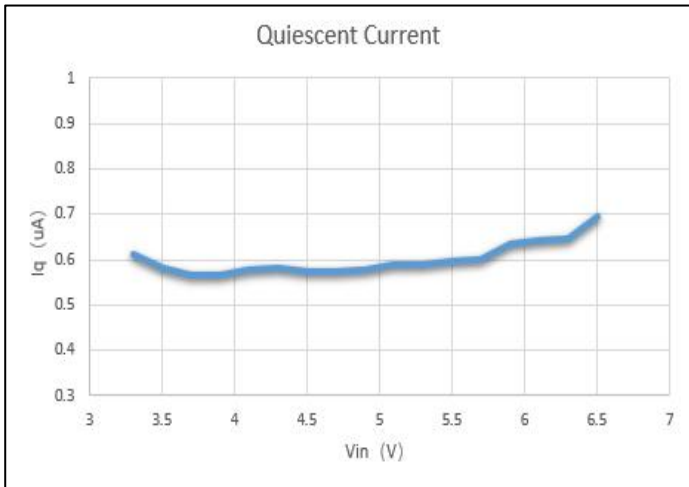


Fig 1. I_Q vs V_{IN} (I_{OUT} = 0mA)

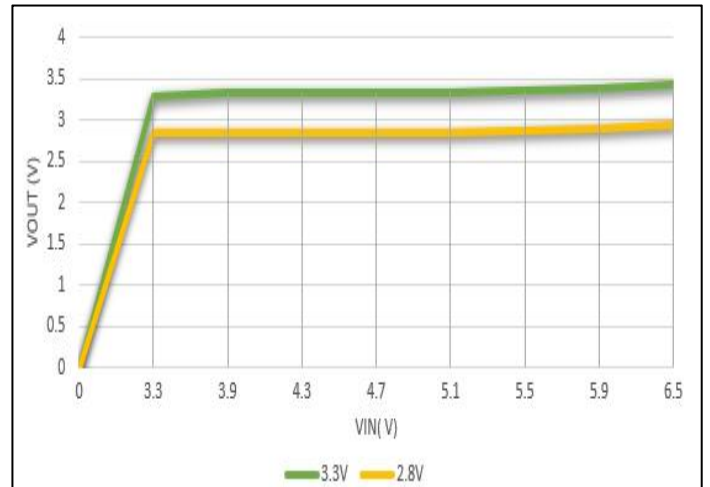


Fig 2. V_{OUT} vs V_{IN} (I_{OUT} = 1mA)

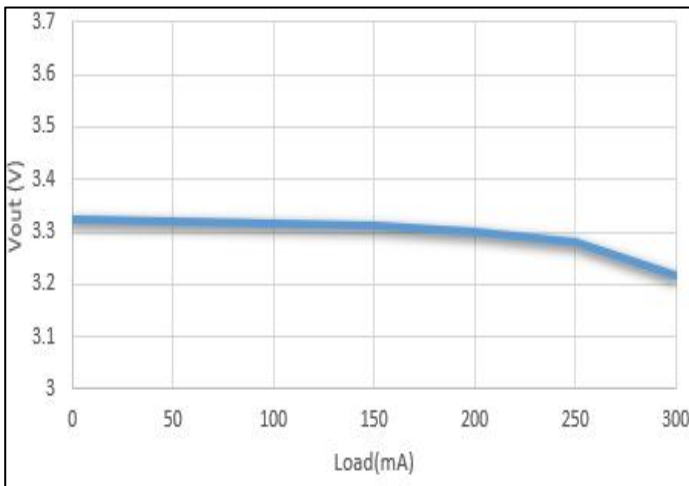


Fig 3. V_{OUT} vs Load

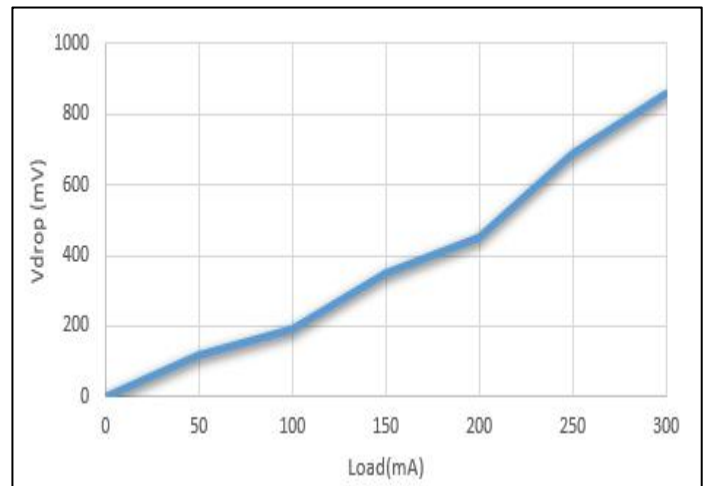


Fig 4. V_{DROP} vs Load

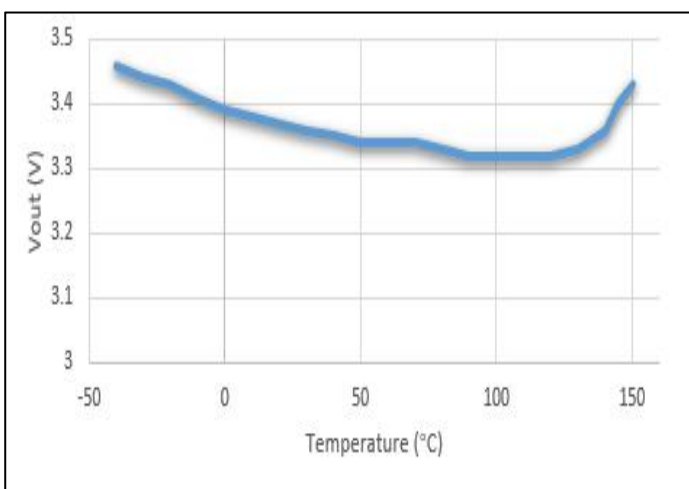


Fig 5. V_{OUT} vs Temperature (I_{OUT} = 1mA)

Operating Waveforms

VIN=5V, VOUT=3.3V, TA=25°C, IOUT=300mA, unless otherwise specified

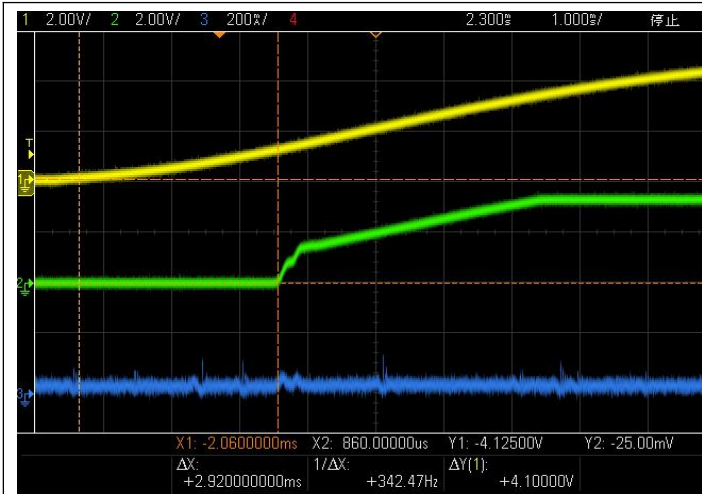


Fig 1. VIN Power ON(IOUT=0mA)
CH1:VIN,2V/Div,DC; CH2:VOUT,2V/Div,DC
CH3:IOUT,200mA/Div,DC; TIME:1ms/Div

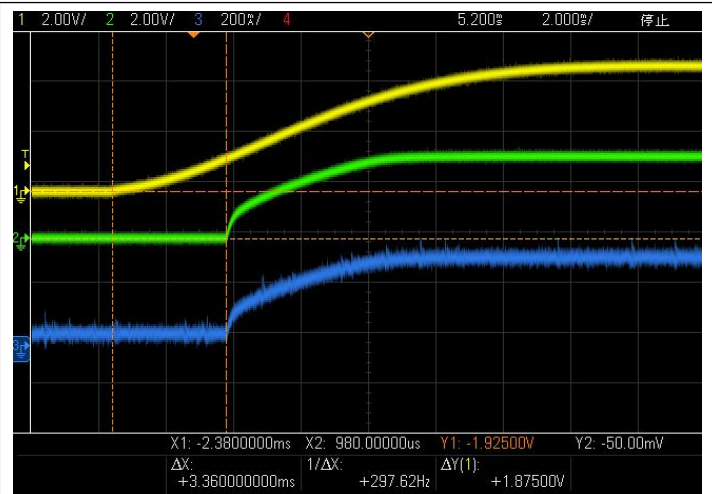


Fig 2. VIN Power ON(IOUT=300mA)
CH1:VIN,2V/Div,DC; CH2:VOUT,2V/Div,DC
CH3:IOUT,200mA/Div,DC; TIME:2ms/Div

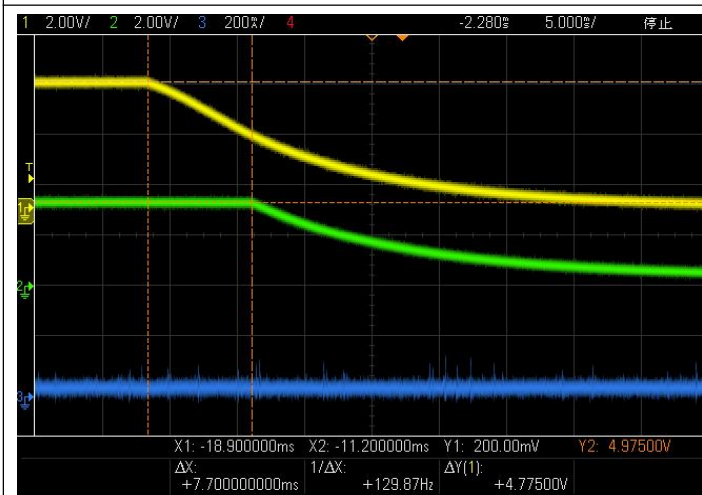


Fig 3. VIN Power OFF(IOUT=0mA)
CH1:VIN,2V/Div,DC; CH2:VOUT,2V/Div,DC
CH3:IOUT, 200mA/Div,DC; TIME:5ms/Div

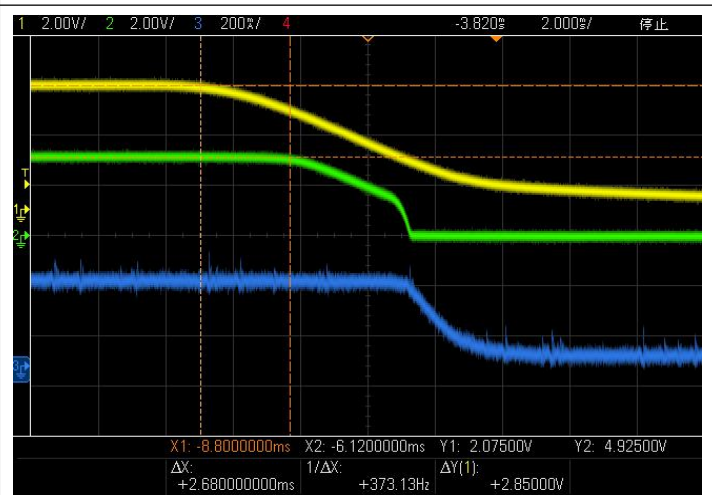


Fig 4. VIN Power OFF(IOUT=300mA)
CH1:VIN,2V/Div,DC; CH2:VOUT,2V/Div,DC
CH3:IOUT,200mA/Div,DC; TIME:2ms/Div

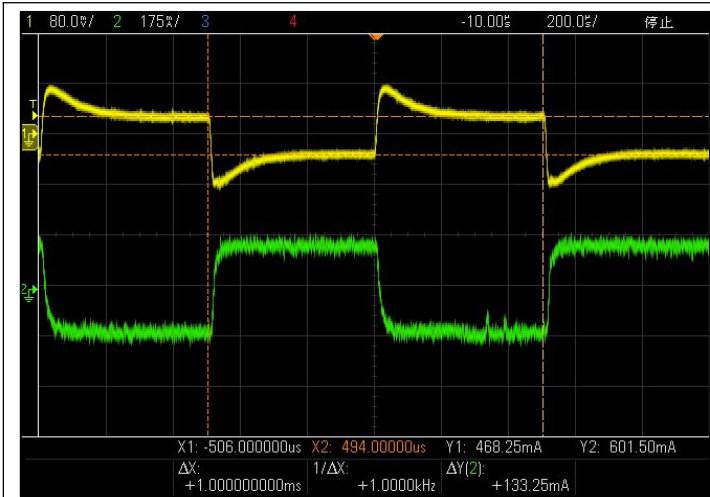
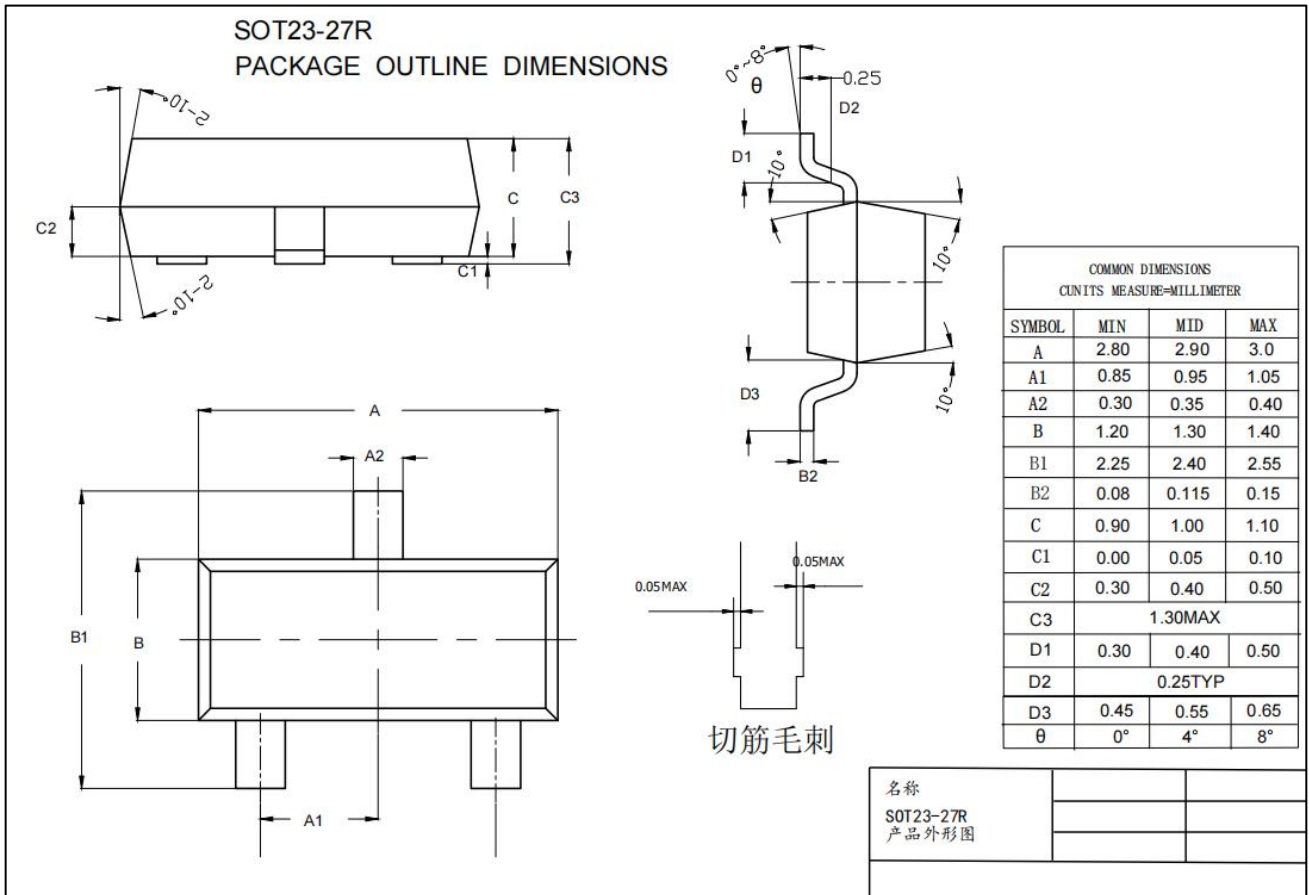


Fig 9. Load Transient (1mA to 300mA)

Package Outline Dimensions(All dimensions in mm.)

(1) Package Type: SOT23



Version Modification Record

Version Number	Revision	Date
first edition		/
V1.0	1. Update the Quiescent Current on page 3	2024/06/14