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## TLV70XXXDBVR(MS)

Product specification

## TLV70XXXDBVR(MS) LOW DROPOUT LINEAR REGULATOR

### GENERAL DESCRIPTION

TLV70XXXDBVR(MS) series are a set of Low Dropout Linear Regulator ICs implemented in CMOS technology. They can withstand voltage 30V. And they are available with low voltage drop and low quiescent current, widely used in audio, video and communication appliances.

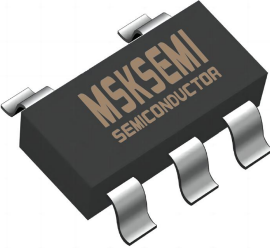
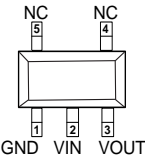
### FEATURES

- Low Power Consumption
- Low Voltage Drop
- Low Temperature Coefficient
- Withstanding Voltage 30V
- Quiescent Current 1.5 $\mu$ A
- Output Voltage Accuracy: tolerance  $\pm$ 2%
- High output current: 100mA

### TYPICAL APPLICATIONS

- Battery-powered Equipments
- Communication Equipments
- Audio/Video Equipments

### Reference News

PACKAGE OUTLINE	PIN CONFIGURATION
	
SOT-23-5	

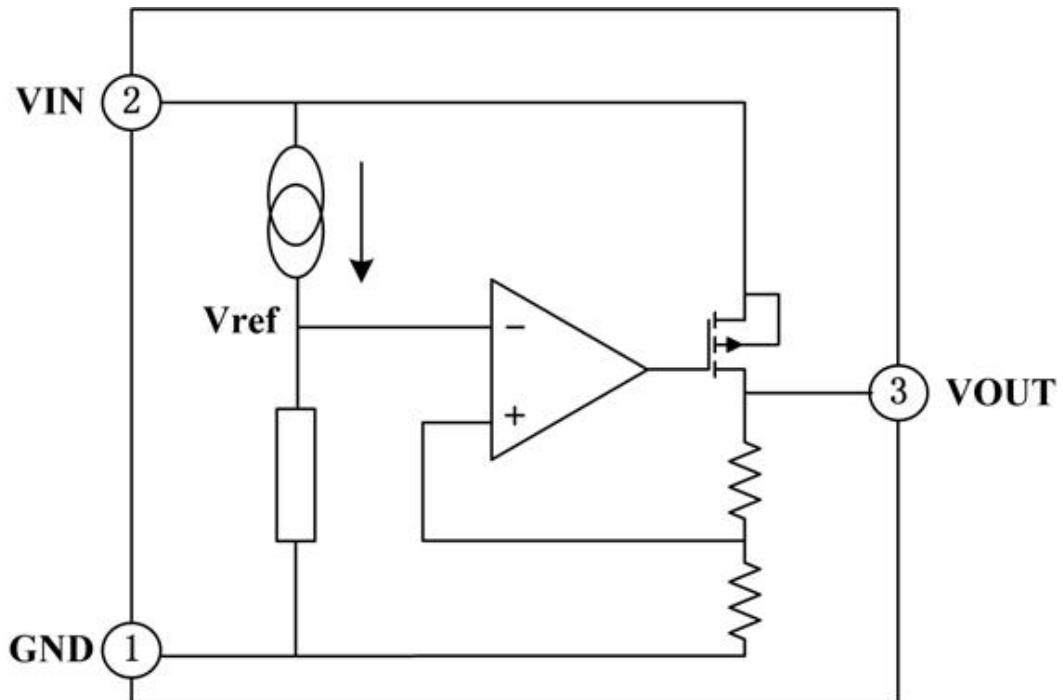
### PIN DESCRIPTION

No.	Name	Functions Description
1	GND	ground
2	V <sub>IN</sub>	input
3	V <sub>OUT</sub>	output

**OUTPUT**

Series	Marking	Output	Package
TLV70425	425	2.5V	SOT-23-5
TLV70428	428	2.8V	
TLV70430	QUQ	3.0V	
TLV70433	PA0	3.3V	
TLV70436	436	3.6V	
TLV70440	440	4.0V	
TLV70444	444	4.4V	
TLV70450	PAX	5.0V	

**FUNCTIONALBLOCKDIAGRAM**



**ABSOLUTE MAXIMUM RATINGS**

Description	Symbol	Value range	Unit
Limit Power Voltage	$V_{IN}$	-0.3 ~ +33	V
Storage Temperature Range	$T_{STG}$	-50 ~ +125	°C
Operating Free-air Temperature Range	$T_A$	-40 ~ +85	°C

**Note** : Stresses greater than those listed under “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 under “Recommended Operating Conditions” is not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.

**HEAT DISSIPATION**

Description	Symbol	Value range Unit
Thermal resistance	$\theta_{JA}$	500 °C/W
Power dissipation	$P_W$	200 mW

**DC CHARACTERISTICS** (unless otherwise noted  $T_A = \pm 25^\circ\text{C}$ )

**TLV70425DBVR(MS)**

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$	2.45	2.50	2.55	V
Output Current	$I_{OUT}$	$V_{IN}=V_{OUT}+2.0V$	70	100	—	mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA \leq I_{OUT} \leq 50mA$	—	25	60	mV
Voltage Drop	$V_{DIF}$	$I_{OUT}=1mA$ , $\Delta V_{OUT}=2\%$	—	30	100	mV
Quiescent Current	$I_{SS}$	No Load	—	1.5	3.0	$\mu A$
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \cdot \frac{\Delta V_{IN}}{\Delta V_{IN}}$ *	$V_{OUT}+1.0V \leq V_{IN} \leq 30V$ , $I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	$V_{IN}$	—	—	—	30	V
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A} \cdot V_{OUT}$	$V_{OUT}+2.0V$ , $I_{OUT}=10mA$ , $-40^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$	—	100	—	ppm/ $^\circ\text{C}$

**Note :** When  $V_{IN}=V_{OUT}+2.0V$ , as the output voltage declined 2%, the  $V_{DIF}=V_{IN}-V_{OUT}$ .

**TLV70428DBVR(MS)**

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$	2.744	2.80	2.856	V
Output Current	$I_{OUT}$	$V_{IN}=V_{OUT}+2.0V$	70	100	—	mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA \leq I_{OUT} \leq 50mA$	—	25	60	mV
Voltage Drop	$V_{DIF}$	$I_{OUT}=1mA$ , $\Delta V_{OUT}=2\%$	—	30	100	mV
Quiescent Current	$I_{SS}$	No Load	—	1.5	3.0	$\mu A$
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \cdot \frac{\Delta V_{IN}}{\Delta V_{IN}}$ *	$V_{OUT}+1.0V \leq V_{IN} \leq 30V$ , $I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	$V_{IN}$	—	—	—	30	V
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A} \cdot V_{OUT}$	$V_{OUT}+2.0V$ , $I_{OUT}=10mA$ , $-40^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$	—	100	—	ppm/ $^\circ\text{C}$

**Note :** When  $V_{IN}=V_{OUT}+2.0V$ , as the output voltage declined 2%, the  $V_{DIF}=V_{IN}-V_{OUT}$ .

**TLV70430DBVR(MS)**

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$	2.94	3.00	3.06	V
Output Current	$I_{OUT}$	$V_{IN}=V_{OUT}+2.0V$	70	100	—	mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA \leq I_{OUT} \leq 50mA$	—	25	60	mV
Voltage Drop	$V_{DIF}$	$I_{OUT}=1mA$ , $\Delta V_{OUT}=2\%$	—	30	100	mV
Quiescent Current	$I_{SS}$	No Load	—	1.5	3.0	$\mu A$
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} / \frac{\Delta V_{IN}}{V_{IN}}$ *	$V_{OUT}+1.0V \leq V_{IN} \leq 30V$ , $I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	$V_{IN}$	—	—	—	30	V
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A} * V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$ , $-40^\circ C \leq T_A \leq 85^\circ C$	—	100	—	ppm/ $^\circ C$

**Note :** When  $V_{IN}=V_{OUT}+2.0V$ , as the output voltage declined 2%, the  $V_{DIF}=V_{IN}-V_{OUT}$ .

**TLV70433DBVR(MS)**

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$	3.234	3.30	3.366	V
Output Current	$I_{OUT}$	$V_{IN}=V_{OUT}+2.0V$	70	100	—	mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA \leq I_{OUT} \leq 50mA$	—	25	60	mV
Voltage Drop	$V_{DIF}$	$I_{OUT}=1mA$ , $\Delta V_{OUT}=2\%$	—	25	55	mV
Quiescent Current	$I_{SS}$	No Load	—	1.5	3.0	$\mu A$
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} / \frac{\Delta V_{IN}}{V_{IN}}$ *	$V_{OUT}+1.0V \leq V_{IN} \leq 30V$ , $I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	$V_{IN}$	—	—	—	30	V
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A} * V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$ , $-40^\circ C \leq T_A \leq 85^\circ C$	—	100	—	ppm/ $^\circ C$

**Note :** When  $V_{IN}=V_{OUT}+2.0V$ , as the output voltage declined 2%, the  $V_{DIF}=V_{IN}-V_{OUT}$ .

**TLV70436DBVR(MS)**

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$	3.528	3.60	3.672	V
Output Current	$I_{OUT}$	$V_{IN}=V_{OUT}+2.0V$	70	100	—	mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA \leq I_{OUT} \leq 50mA$	—	25	60	mV
Voltage Drop	$V_{DIF}$	$I_{OUT}=1mA$ , $\Delta V_{OUT}=2\%$	—	25	55	mV
Quiescent Current	$I_{SS}$	No Load	—	1.5	3.0	$\mu A$
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \cdot \frac{\Delta V_{IN}}{\Delta V_{IN}}$	$V_{OUT}+1.0V \leq V_{IN} \leq 30V$ , $I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	$V_{IN}$	—	—	—	30	V
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A} \cdot V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$ , $-40^\circ C \leq T_A \leq 85^\circ C$	—	100	—	ppm/ $^\circ C$

**Note :** When  $V_{IN}=V_{OUT}+2.0V$ , as the output voltage declined 2%, the  $V_{DIF}=V_{IN}-V_{OUT}$ .

**TLV70440DBVR(MS)**

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$	3.92	4.0	4.08	V
Output Current	$I_{OUT}$	$V_{IN}=V_{OUT}+2.0V$	70	100	—	mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA \leq I_{OUT} \leq 50mA$	—	25	60	mV
Voltage Drop	$V_{DIF}$	$I_{OUT}=1mA$ , $\Delta V_{OUT}=2\%$	—	25	55	mV
Quiescent Current	$I_{SS}$	No Load	—	1.5	3.0	$\mu A$
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \cdot \frac{\Delta V_{IN}}{\Delta V_{IN}}$	$V_{OUT}+1.0V \leq V_{IN} \leq 30V$ , $I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	$V_{IN}$	—	—	—	30	V
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A} \cdot V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$ , $-40^\circ C \leq T_A \leq 85^\circ C$	—	100	—	ppm/ $^\circ C$

**Note :** When  $V_{IN}=V_{OUT}+2.0V$ , as the output voltage declined 2%, the  $V_{DIF}=V_{IN}-V_{OUT}$ .

**TLV70444DBVR(MS)**

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$	4.312	4.4	4.488	V
Output Current	$I_{OUT}$	$V_{IN}=V_{OUT}+2.0V$	70	100	—	mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA \leq I_{OUT} \leq 50mA$	—	25	60	mV
Voltage Drop	$V_{DIF}$	$I_{OUT}=1mA$ , $\Delta V_{OUT}=2\%$	—	25	55	mV
Quiescent Current	$I_{SS}$	No Load	—	1.5	3.0	$\mu A$
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} / \frac{\Delta V_{IN}}{V_{IN}}$ *	$V_{OUT}+1.0V \leq V_{IN} \leq 30V$ , $I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	$V_{IN}$	—	—	—	30	V
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A} * V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$ , $-40^\circ C \leq T_A \leq 85^\circ C$	—	100	—	ppm/ $^\circ C$

**Note :** When  $V_{IN}=V_{OUT}+2.0V$ , as the output voltage declined 2%, the  $V_{DIF}=V_{IN}-V_{OUT}$ .

**TLV70450DBVR(MS)**

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$	4.9	5.0	5.1	V
Output Current	$I_{OUT}$	$V_{IN}=V_{OUT}+2.0V$	100	150	—	mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA \leq I_{OUT} \leq 70mA$	—	25	60	mV
Voltage Drop	$V_{DIF}$	$I_{OUT}=1mA$ , $\Delta V_{OUT}=2\%$	—	25	55	mV
Quiescent Current	$I_{SS}$	No Load	—	1.5	3.0	$\mu A$
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} / \frac{\Delta V_{IN}}{V_{IN}}$ *	$V_{OUT}+1.0V \leq V_{IN} \leq 30V$ , $I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	$V_{IN}$	—	—	—	30	V
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A} * V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$ , $-40^\circ C \leq T_A \leq 85^\circ C$	—	100	—	ppm/ $^\circ C$

**Note :** When  $V_{IN}=V_{OUT}+2.0V$ , as the output voltage declined 2%, the  $V_{DIF}=V_{IN}-V_{OUT}$ .



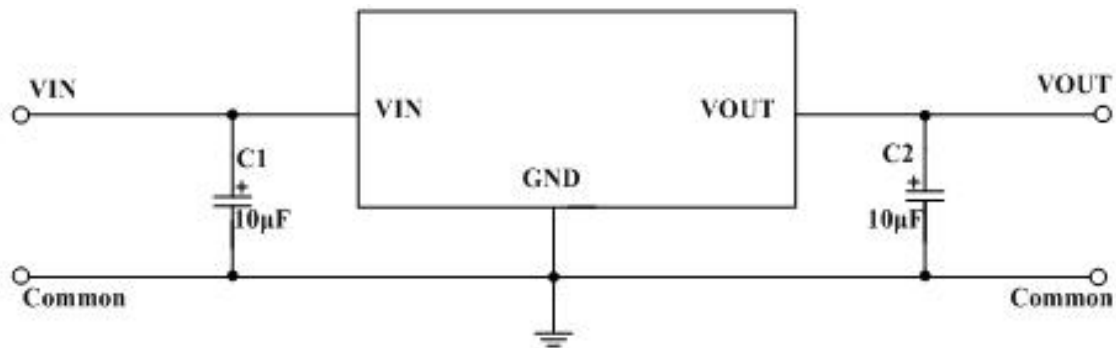
## FUNCTIONAL DESCRIPTION

TLV70XXXDBVR(MS) series are linear voltage regulator ICs withstanding 30V voltage. The series IC consists of a voltage reference, an error amplifier, a current limiter and a phase compensation circuit plus a driver transistor. The output stabilization capacitor is also compatible with low ESR ceramic capacitors.

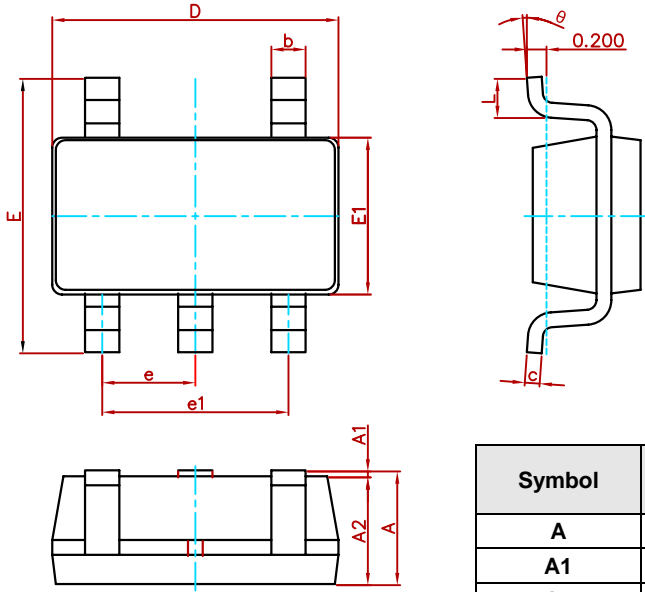
The over current protection circuit and the over voltage protection circuit are built-in. The protection circuit will operate when the output current or input voltage reaches limit level.

## TYPICAL APPLICATION CIRCUIT

### Basic Circuit

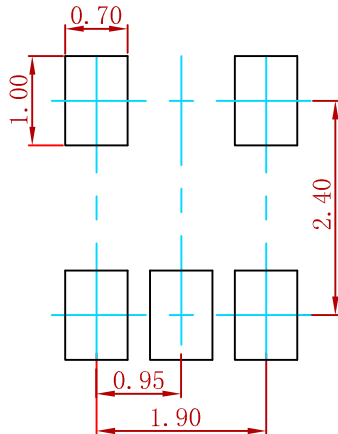


**Package Outline Dimensions**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	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
c	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
e	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**



Note:  
 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
TLV70XXXDBVR(MS)	SOT-23-5	3000

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