
High Voltage Low Power Consumption LDO

MD7662 Series

CMOS Voltage Regulator

200mA



MD7662 is a high voltage low power low dropout voltage regulator (LDO) manufactured in CMOS processes. It can deliver up to 200mA of current while consuming only 3.0 μ A of quiescent current, at the same time with high input voltage capacity it can be up to 60V, suitable for applications which requires higher voltage circuit.

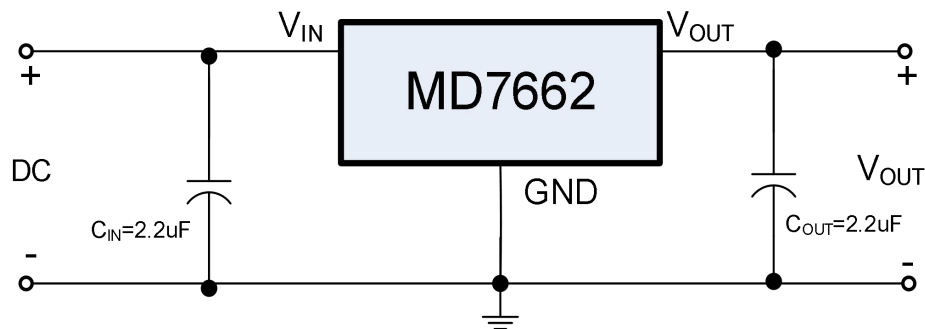
■ Features

- Output Voltage Highly Accurate: $\pm 2\%$
- Dropout Voltage: 4.2mV@ $I_{OUT}=1mA$
- Low Quiescent Current: 3.0 μ A
- Temperature Stability: $\pm 60ppm/^{\circ}C$
- Maximum Input Voltage: 60V
- Current Limit Protection
- Thermal Shutdown Protection

■ Applications

- Automotive electronics
- Intelligent meters and instruments
- Industrial control

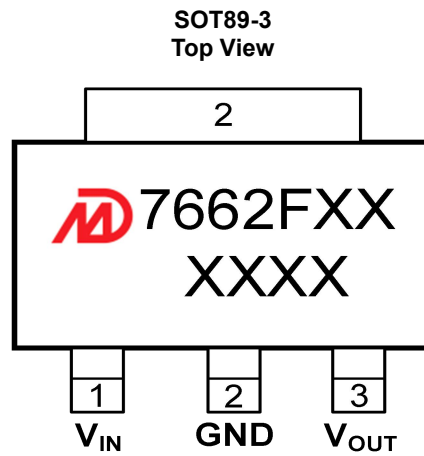
■ Typical Applications



■ Notes on Use

1. Input Capacitor (C_{IN}): 2.2 μ F above.
2. Output Capacitor (C_{OUT}): 2.2 μ F above.

■ Pin Configuration and Functions



■ Product Selections

Product Name	V _{OUT} (V)	Package	Ordering Name	Marking	Package Information
MD7662F33	3.3	SOT223-3L	MD7662F33YA2	 7662F33 XXXX	Tape and Reel, 2500pcs
MD7662F50	5.0	SOT223-3L	MD7662F50YA2	 7662F50 XXXX	
MD7662FC0	12.0	SOT223-3L	MD7662FC0YA2	 7662FC0 XXXX	

Notes:

1* Customer can request to customize the output voltage ranged from 2.5V to 13V if desired voltage is not found in the selections.

2* Customer can request customization of package choice.

3* Please pay attention to the Marking of the product package type

Absolute Maximum Ratings

(Unless otherwise indicated: Ta=25°C)

PARAMETER	SYMBOL	RATINGS		UNITS
Input Voltage	VIN	-0.3 ~ 65		V
Output Voltage	VOUT	Vss-0.3 ~ VIN+0.3V		
Power Dissipation	P _D	SOT223-3L	1500	mW
Thermal Resistance	θ _{JC}	SOT223-3L	66	°C/W
Operating Ambient Temperature	T _{opr}	-40 ~ +85		°C
Storage Temperature	T _{stg}	-40 ~ +125		
ESD Protection	ESD HBM	3000		V
	ESD CDM	1000		

Note: Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device.

■ Pin Configuration and Functions

MD7662 Series (Unless otherwise indicated: Ta=25°C)

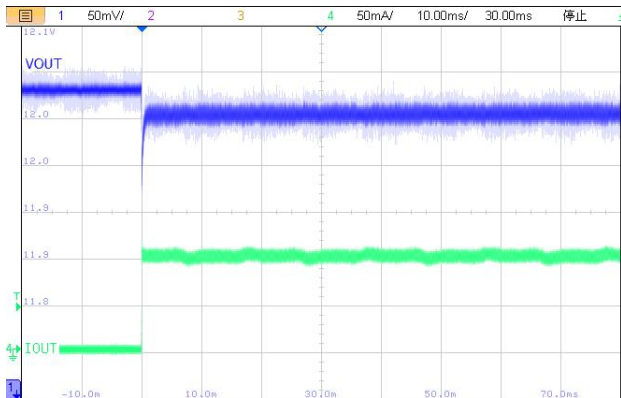
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage*1	$V_{OUT(S)}$	$V_{IN}=V_{OUT(S)}+2V$, $I_{OUT}=1mA$	$V_{OUT(S)}^* \cdot 0.98$	$V_{OUT(S)}$	$V_{OUT(S)}^* \cdot 1.02$	V
Output Current	I_{OUT}	$V_{IN} = V_{OUT(S)} + 2V$	200			mA
Dropout Voltage*2	V_{drop}	$V_{IN}=V_{OUT(S)}+2V$ $I_{OUT}=1mA$		4.2	7.0	mV
		$V_{IN}=V_{OUT(S)}+2V$ $I_{OUT}=200mA$		650	1000	
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT(S)}}$	$V_{OUT(S)}+2V \leq V_{IN} \leq 60V$ $I_{OUT} = 1mA$		0.01	0.15	%/V
Load Regulation	ΔV_{OUT2}	$V_{IN} = V_{OUT(S)}+2V$ $1mA \leq I_{OUT} \leq 200mA$		30	50	mV
Temperature Stability		$V_{IN} = V_{OUT(S)}+2V$, $I_{OUT}=10mA$ $-40^\circ C \leq T_a \leq 125^\circ C$		± 60	± 100	ppm/°C
Quiescent Current	I_{SS}	$V_{IN} = 40V$, no load		3.0	4	μA
Input Voltage	V_{INmax}	---	2.2		60	V
Power Supply Rejection Ratio	PSRR	f=100Hz, $I_{OUT}=10mA$		73		dB
		f=1kHz, $I_{OUT}=10mA$		83		
		f=10kHz, $I_{OUT}=10mA$		80		
		f=100kHz, $I_{OUT}=10mA$		60		
Current Limit *3	I_{LIM}	$V_{IN}= V_{OUT(S)}+2V$, $V_{OUT}= 0.9 \cdot V_{OUT(S)}$		330		mA
Over Temperature Protection	T_{SHDN}	$I_{OUT}=1mA$		170		°C

Notes:

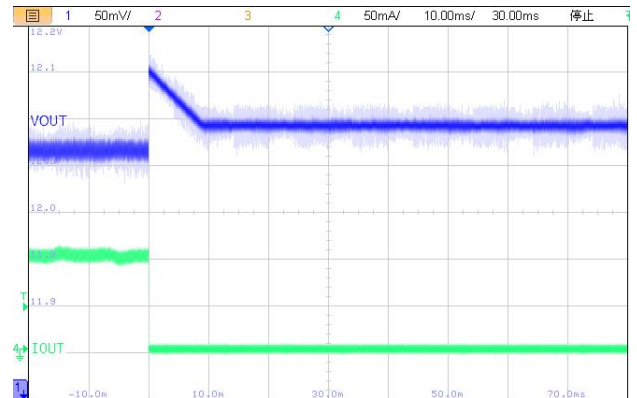
1. $V_{OUT(S)}$: Output voltage when $V_{IN}=V_{OUT}+2V$, $I_{OUT}=1mA$.
2. $V_{DROP}=V_{IN1} - (V_{OUT(S)} \times 0.98)$ where V_{IN1} is the input voltage when $V_{OUT} = V_{OUT(S)} \times 0.98$.
3. I_{LIM} : Output current when $V_{IN}=V_{OUT(S)}+2V$ and $V_{OUT} = 0.90 \cdot V_{OUT(S)}$.

Typical Performance Characteristics:

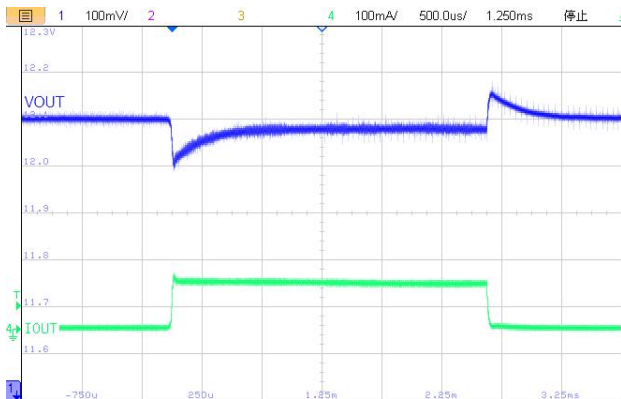
Test Conditions: $V_{IN}=V_{OUT}+2.0V$, $C_{IN}=2.2\mu F$, $C_{OUT}=2.2\mu F$, $T_a=25^\circ C$, unless otherwise indicated.



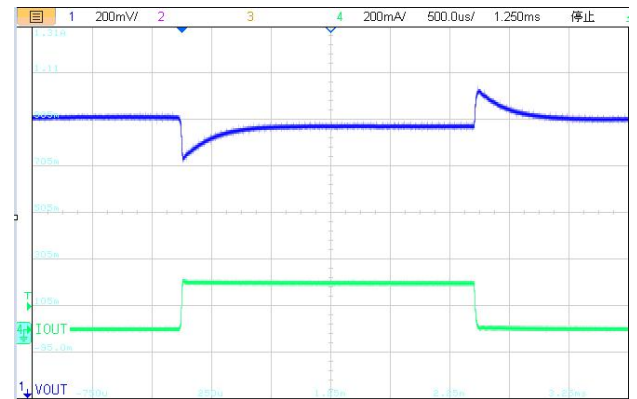
Load Transient at $V_{OUT}=12V$:
($I_{OUT}=0mA\sim 100mA$)



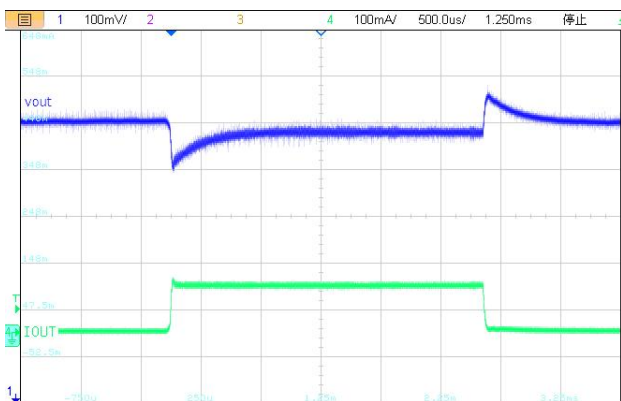
Load Transient at $V_{OUT}=12V$:
($I_{OUT}=100mA\sim 0mA$)



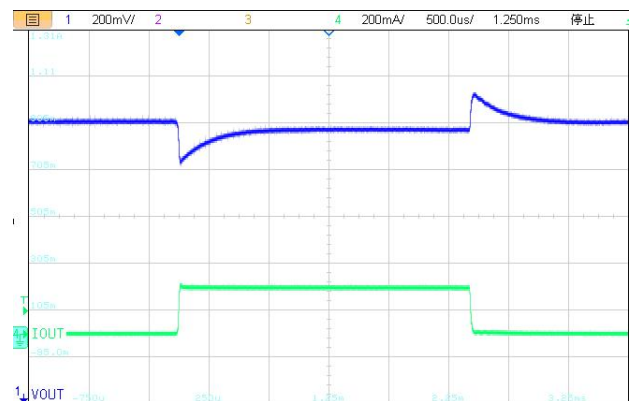
Load Transient at $V_{OUT}=12V$:
($I_{OUT}=1mA\sim 100mA\sim 1mA$)



Load Transient at $V_{OUT}=12V$:
($I_{OUT}=1mA\sim 200mA\sim 1mA$)



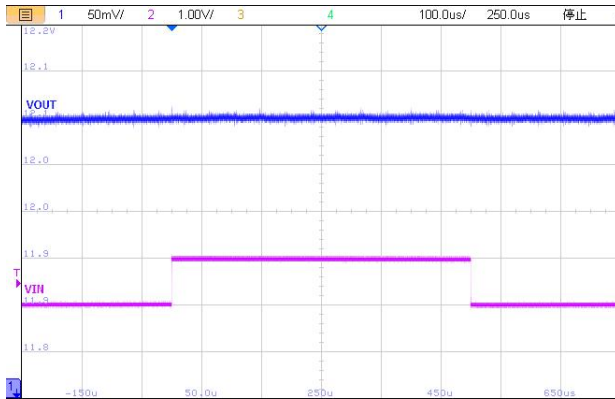
Load Transient at $V_{OUT}=12V$:
($I_{OUT}=0mA\sim 100mA\sim 0mA$)



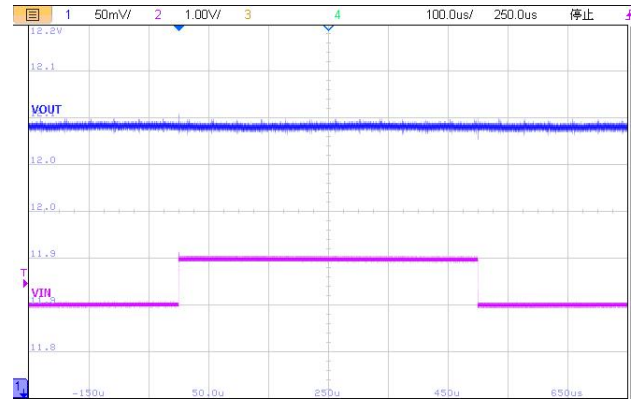
Load Transient at $V_{OUT}=12V$:
($I_{OUT}=0mA\sim 200mA\sim 0mA$)

Typical Performance Characteristics(Continued):

Test Conditions: $V_{IN}=V_{OUT}+2.0V$, $C_{IN}=2.2\mu F$, $C_{OUT}=2.2\mu F$, $T_a=25^{\circ}C$, unless otherwise indicated.



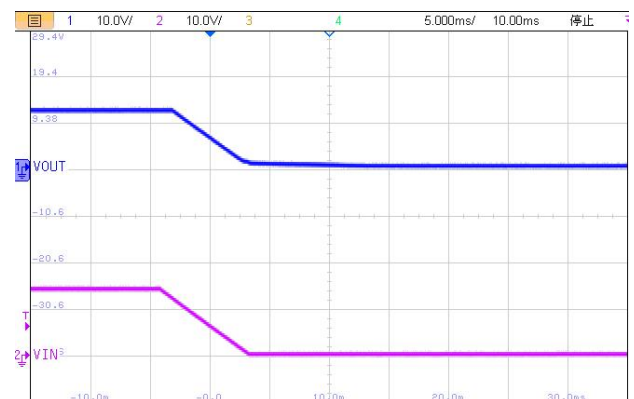
Line Transient at $V_{OUT}=12V$:
($I_{OUT}=1mA$)



Line Transient at $V_{OUT}=12V$:
($I_{OUT}=10mA$)



Power-Up at $V_{OUT}=12V$:
($I_{OUT}=1mA$)



Power-Down at $V_{OUT}=12V$:
($I_{OUT}=1mA$)



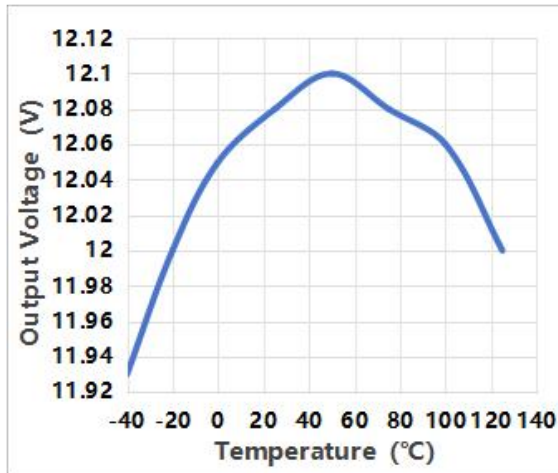
Power-Up at $V_{OUT}=12V$:
($I_{OUT}=200mA$)



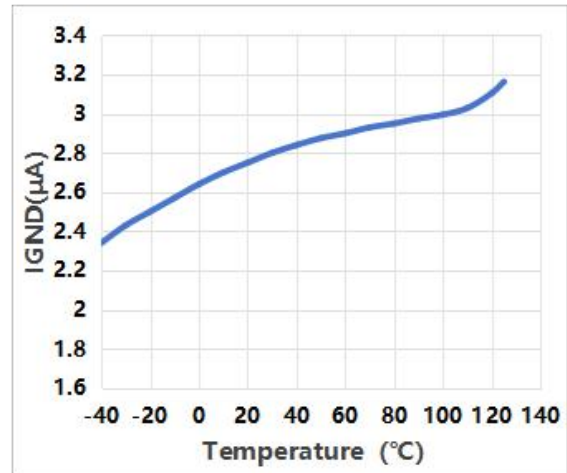
Power-Down at $V_{OUT}=12V$:
($I_{OUT}=200mA$)

■ Typical Performance Characteristics (Continued):

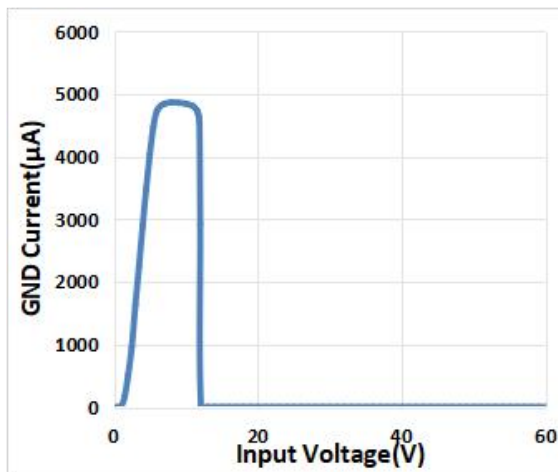
Test Conditions: $V_{IN}=V_{OUT}+2.0V$, $C_{IN}=2.2\mu F$, $C_{OUT}=2.2\mu F$, $T_a=25^\circ C$, unless otherwise indicated.



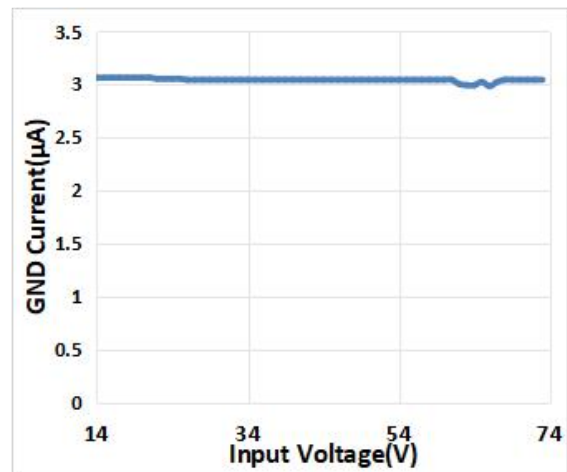
Output Voltage vs. Temperature at $V_{OUT}=12.0V$



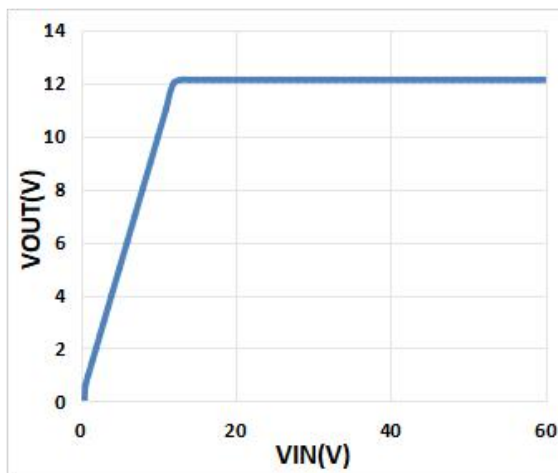
GND Current vs. Temperature at $V_{OUT}=12.0V$



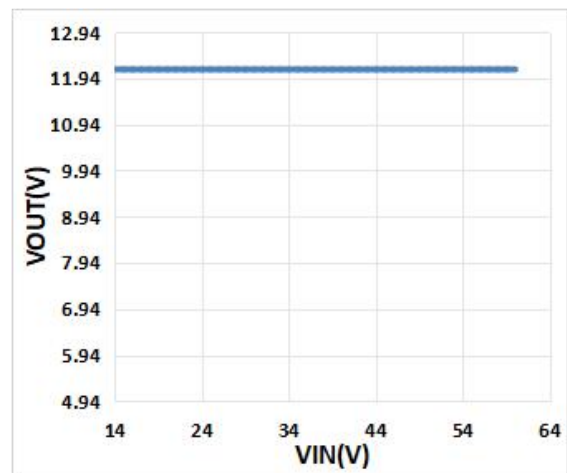
GND Current vs. Input Voltage at $V_{OUT}=12.0V$



GND Current vs. Input Voltage at $V_{OUT}=12.0V$



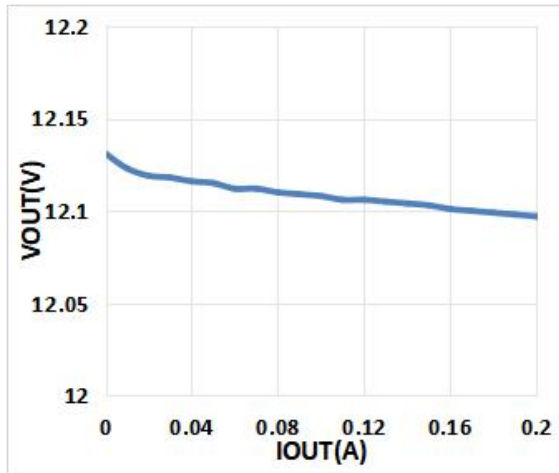
Output Voltage vs. Input Voltage at $V_{OUT}=12.0V$



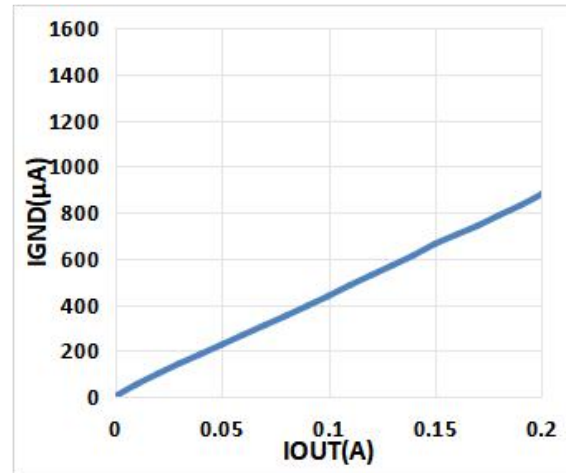
Output Voltage vs. Input Voltage at $V_{OUT}=12.0V$

■ Typical Performance Characteristics (Continued):

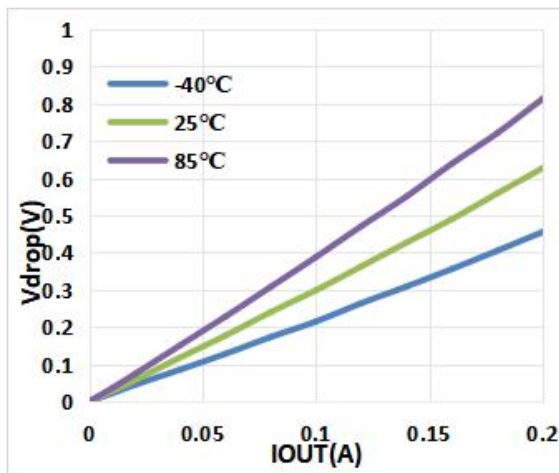
Test Conditions: $V_{IN}=V_{OUT}+2.0V$, $C_{IN}=2.2\mu F$, $C_{OUT}=2.2\mu F$, $T_A=25^\circ C$, unless otherwise indicated.



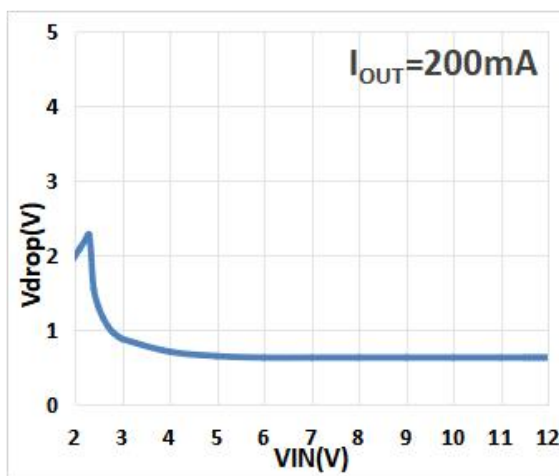
Output Voltage vs Output Current at $V_{OUT}=12.0V$



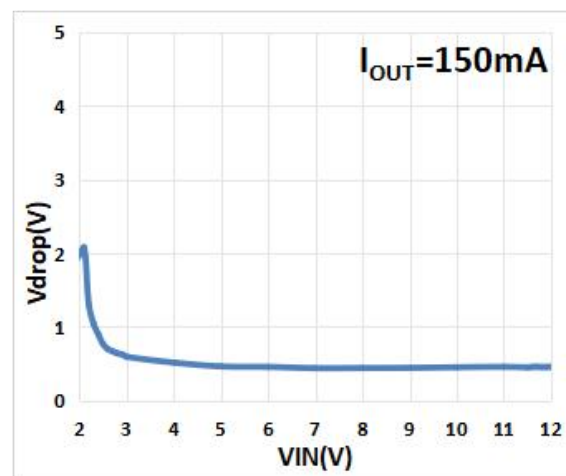
GND Current vs Output Current at $V_{OUT}=12.0V$



Dropout Voltage vs. Output Current at $V_{OUT}=12.0V$



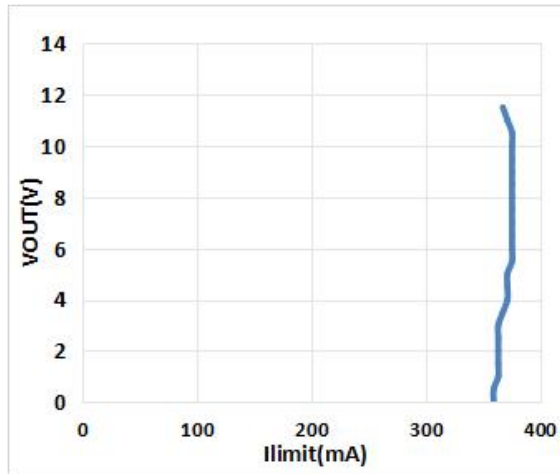
V_{drop} vs. Input Voltage at $V_{OUT}=12.0V$



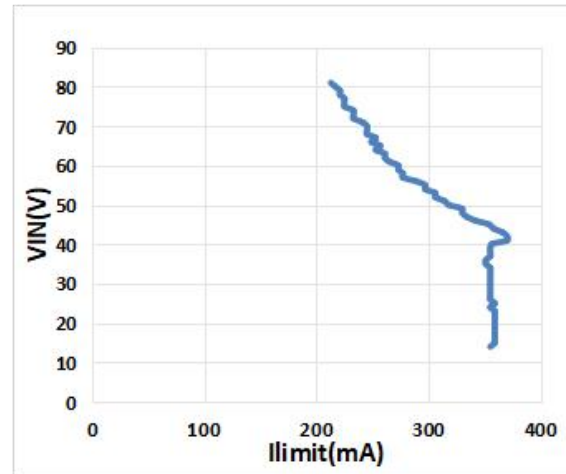
V_{drop} vs. Input Voltage at $V_{OUT}=12.0V$

■ Typical Performance Characteristics (Continued):

Test Conditions: $V_{IN}=V_{OUT}+2.0V$, $C_{IN}=2.2\mu F$, $C_{OUT}=2.2\mu F$, $T_A=25^{\circ}C$, unless otherwise indicated.



V_{OUT} vs. I_{limit} at $V_{OUT}=12.0V$

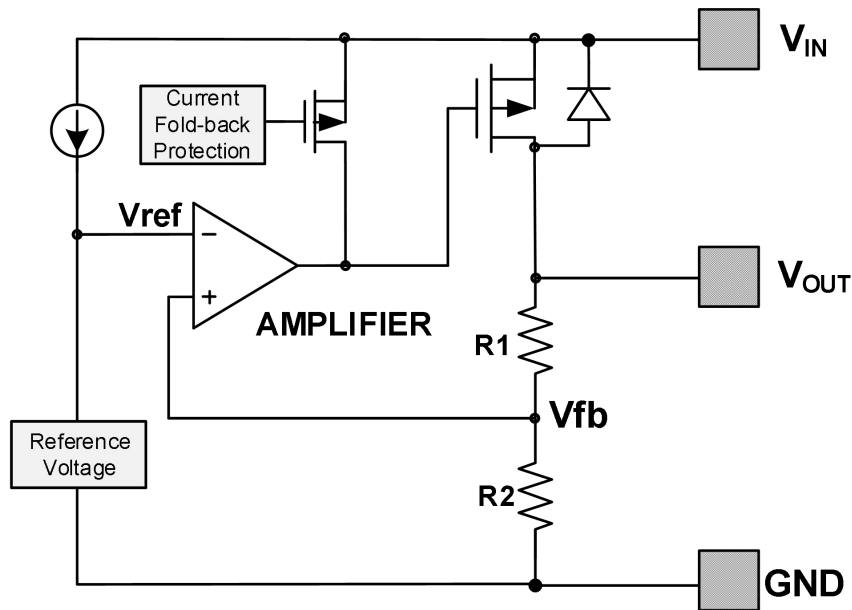


V_{IN} vs. I_{limit} at $V_{OUT}=12.0V$

Operational Explanation

1. Output voltage control

The following diagram is a block diagram of MD7662. The voltage divided by resistors R_f and R_s is compared with the internal reference voltage by the error amplifier. The amplifier output then drives the P-channel MOSFET connected to the VOUT pin. The output voltage at the VOUT pin is regulated by this negative feedback system. The current limit circuit operates in relation to output current level.



2. Pass transistor

The pass transistor with low turn-on resistance used in MD7662 is a P-channel MOSFET. If the potential on VOUT pin is higher than V_{IN} , it is possible that IC will be destroyed due to reverse current which is caused by parasitic diodes between V_{IN} and VOUT. Therefore, the VOUT pin potential exceeds $V_{IN}+0.3V$ is not allowed.

3. Current Limiter, over temperature protection

The MD7662 series includes a combination of a fixed current limiter circuit and a foldback circuit, which aid the operations of the current limiter and circuit protection. When the load current reaches the current limit level, the fixed current limiter circuit operates and output voltage drops. As a result of this drop in output voltage, the foldback circuit operates, output voltage drops further and output current decreases. This design can prevent the chip be damaged due to over temperature, moreover, the heat dissipation is limited by the package type.

Special attention should be paid to that the product of the dropout voltage on the chip and the output current must be smaller than the heat dissipation.

4. Input capacitance(C_{IN})

Stable input voltage: Provide a stable input current for the converter to ensure that the input voltage (V_{IN}) remains constant when the load changes, avoiding voltage fluctuations caused by transient current surges. Improve response speed: By quickly charging and discharging to respond to sudden load changes, shorten the adjustment time of the control loop, and enhance system stability.

Input Capacitor (C_{IN}): 2.2 μ F above.

5. Output capacitance(C_{OUT})

Suppress output ripple: Absorb the current fluctuations caused by high-frequency switching operations, and control the output voltage ripple within a safe range.

Support transient response: When the load switches from standby to full-speed operation, quickly release or store charges to compensate for the response delay of the control loop, preventing voltage drops or overshoots.

Output Capacitor (C_{OUT}): 2.2 μ F above.

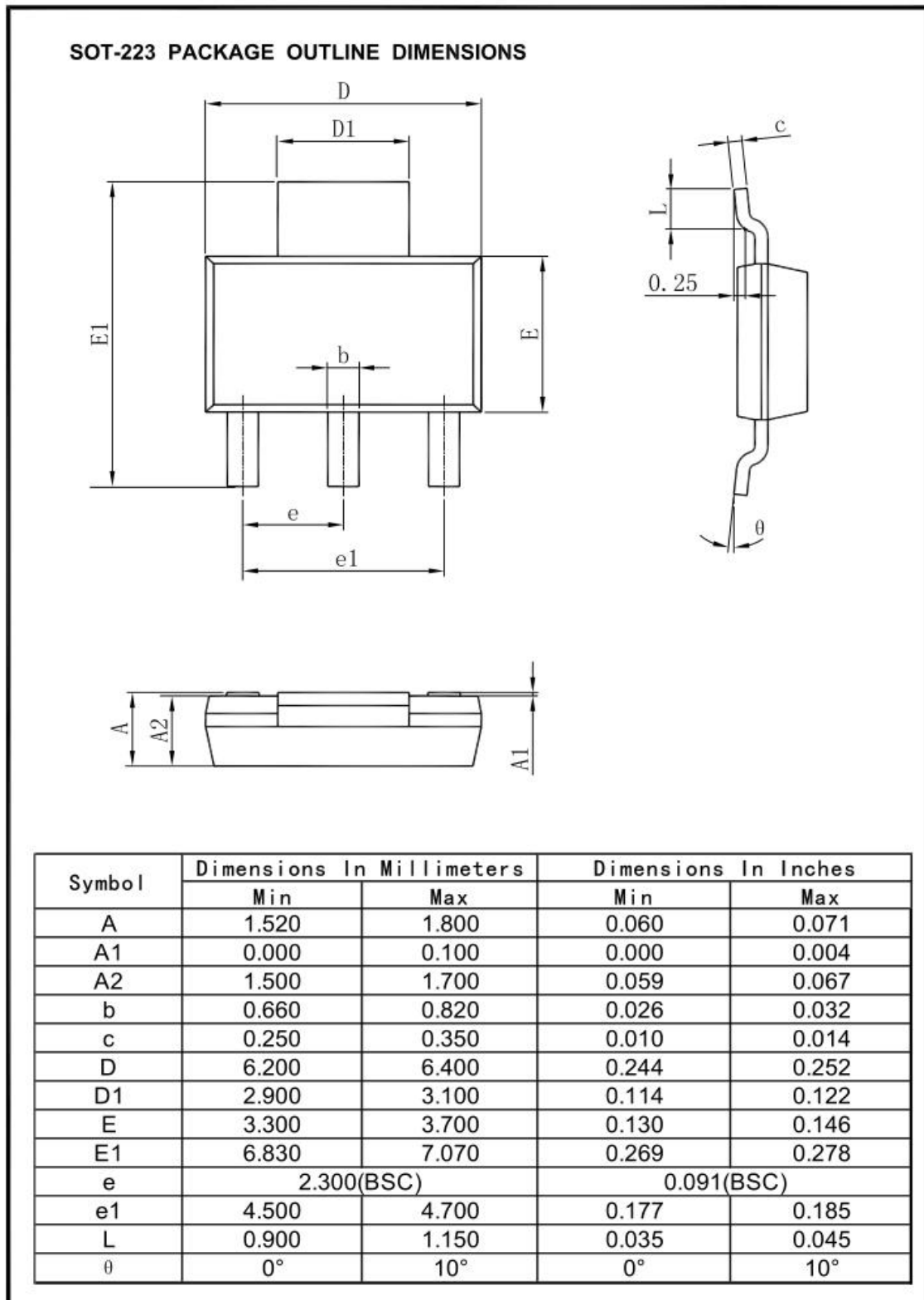
■ Notes:

1. The input and output capacitors should be placed as close as possible to the IC.
2. If the impedance of the power supply is high, which is caused by forgetting installing input capacitor or installing too small value capacitor, the oscillation may occur.

■ Revision History:

VERSION	Change Date	Change Item
Rev.1.0	2025/08/08	1.Update Marking

Packaging Information



For the newest datasheet, please see the website:

www.md-ic.com.cn

Version Rev.1.0 20250808