



## Asymmetric LDO Enhancement-Mode MOSFET

### General Description

- Low gate charge.
- Use as a load switch.
- Use in PWM applications

### Product Summary

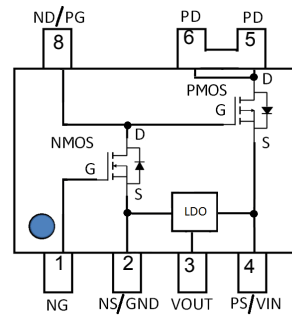
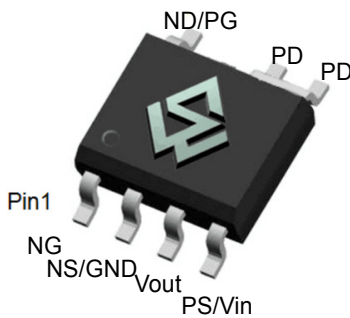
N-Channel

- $BV_{DSS} = 20V$
- $R_{DS(on)} (@VGS= 10V) < 42m\Omega$
- $R_{DS(on)} (@VGS= 4.5V) < 45m\Omega$

P-Channel

- $BV_{DSS} = -20V$
- $R_{DS(on)} (@VGS= -10V) < 45m\Omega$
- $R_{DS(on)} (@VGS= -4.5V) < 48m\Omega$

SOP-7



### Absolute Maximum Ratings ( $T_A = 25^\circ C$ unless otherwise noted) MOSFET

Parameter	Symbol	Maximum		Units
		N-Channel	P-Channel	
Drain-Source Voltage	$V_{DS}$	20	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	$\pm 12$	V
Drain Current ( $T_A=25^\circ C, t<10s, V_{GS}=10V$ )	$I_D$	4.0	-4.5	A
Drain Current ( $T_A=75^\circ C, t<10s, V_{GS}=10V$ )		2.5	-2.5	A
Pulsed Drain Current <sup>a</sup>	$I_{DM}$	20	-25	A
Power Dissipation <sup>b</sup> ( $T_A=25^\circ C$ )	$P_D$	1.4	1.4	W
Power Dissipation <sup>b</sup> ( $T_A=75^\circ C$ )		1.0	0.9	W
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 ~ +150	-55 ~ +150	$^\circ C$

### LDO

Voltage in	$V_{in}$	20	V
Power Dissipation ( $T_A=25^\circ C$ )	$P_D$	200~450	mW
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 ~ +150	$^\circ C$



### N-Channel Electrical Characteristics (T<sub>A</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0V , I <sub>D</sub> = 250uA	20			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 20V , V <sub>GS</sub> = 0V			1	uA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V			±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250uA	0.6		1.2	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> = 10V , I <sub>D</sub> = 3.0A		32	42	mΩ
		V <sub>GS</sub> = 4.5V , I <sub>D</sub> = 2.5A		35	45	mΩ
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> = 5V , I <sub>D</sub> = 3.0A		15		S
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> = 0V , I <sub>S</sub> = 1.0A			1.2	V
I <sub>S</sub>	Maximum Body-Diode Continuous Current				2.0	A
C <sub>ISS</sub>	Input Capacitance	V <sub>DS</sub> = 10V , V <sub>GS</sub> = 0V f = 1.0MHz		750		pF
C <sub>OSS</sub>	Output Capacitance			100		pF
C <sub>RSS</sub>	Reverse Transfer Capacitance			73		pF
Q <sub>g</sub>	Total Gate Charge			16		nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> = 10V , I <sub>D</sub> = 3.0A V <sub>GS</sub> = 6V		2.8		nC
Q <sub>gd</sub>	Gate-Drain Charge			4.1		nC
t <sub>D(ON)</sub>	Turn-On Delay Time	V <sub>DD</sub> = 10V , I <sub>D</sub> = 1A V <sub>GS</sub> = 6V R <sub>GEN</sub> = 6 ohm		15		ns
t <sub>r</sub>	Turn-On Rise Time			6		ns
t <sub>D(OFF)</sub>	Turn-Off Delay Time			26		ns
t <sub>f</sub>	Turn-Off Fall Time			12		ns

### P-Channel Electrical Characteristics (T<sub>A</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0V , I <sub>D</sub> = -250uA	-20			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = -20V , V <sub>GS</sub> = 0V			-1	uA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V			±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250uA	-0.4		-1.0	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> = -10V , I <sub>D</sub> = -3.0A		32	45	mΩ
		V <sub>GS</sub> = -4.5V , I <sub>D</sub> = -2.5A		35	48	mΩ
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> = -10V , I <sub>D</sub> = -3.0A		24		S
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> = 0V , I <sub>S</sub> = -1.0A			-1.2	V
I <sub>S</sub>	Maximum Body-Diode Continuous Current				-2.0	A
C <sub>ISS</sub>	Input Capacitance	V <sub>DS</sub> = -10V , V <sub>GS</sub> = 0V f = 1.0MHz		992		pF
C <sub>OSS</sub>	Output Capacitance			132		pF
C <sub>RSS</sub>	Reverse Transfer Capacitance			93		pF
Q <sub>g</sub>	Total Gate Charge			35		nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> = -10V , I <sub>D</sub> = -3.0A V <sub>GS</sub> = -6V		6		nC
Q <sub>gd</sub>	Gate-Drain Charge			8		nC
t <sub>D(ON)</sub>	Turn-On Delay Time	V <sub>DD</sub> = -10V , I <sub>D</sub> = -1A V <sub>GS</sub> = -6V R <sub>GEN</sub> = 6 ohm		15		ns
t <sub>r</sub>	Turn-On Rise Time			6.4		ns
t <sub>D(OFF)</sub>	Turn-Off Delay Time			29		ns
t <sub>f</sub>	Turn-Off Fall Time			9		ns

- Repetitive rating, Pulse width limited by junction temperature T<sub>J(MAX)</sub>=150 °C. Ratings are based on low frequency and duty cycles to keep initial T<sub>J</sub>=25 °C
- The power dissipation P<sub>D</sub> is based on T<sub>J(MAX)</sub>=150 °C , using ≤10s junction-to-ambient thermal resistance.
- The value of R<sub>θJA</sub> is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub> = 25°C. The value in any given application depends on the user's specific board design.
- The R<sub>θJA</sub> is the sum of the thermal impedance from junction to lead R<sub>θJL</sub> and lead to ambient.

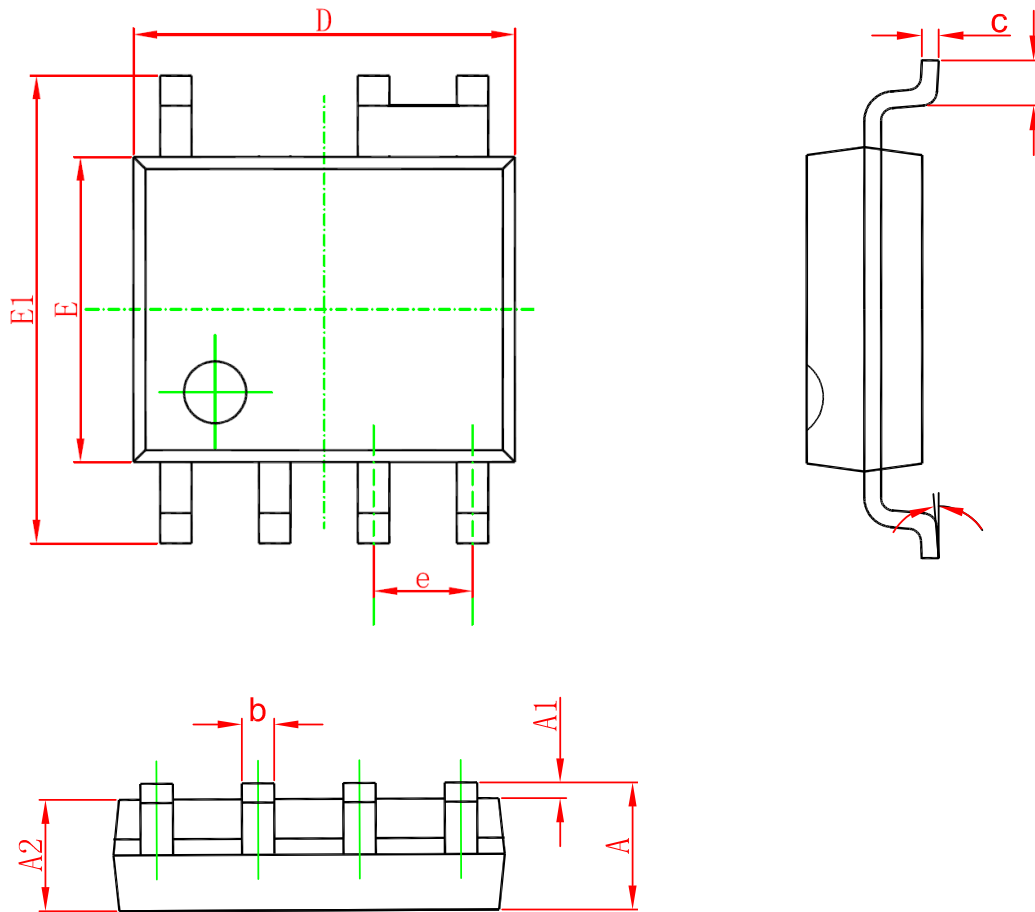


## LDO

参数	测试条件	最小值	典型值	最大值	单位
$V_{OUT}$ 输出电压	$VCC1=7V, I_{OUT}=1mA$	4.85	5	5.15	V
$I_{OUT}$ 输出电流	$VCC1=7V$	60	100	-	mA
$\Delta V_{OUT}$ 负载调节	$VCC1=7V, 1mA \leq I_{OUT} \leq 30mA$	-	60	150	mV
$V_{DIF}$ 跌落电压	$I_{OUT}=1mA$	-	100	-	mV
$I_{SS}$ 静态电流	$VCC1=7V$ , 空载	-	2	3	$\mu A$
$\Delta V_{OUT}/\Delta VCC1/V_{OUT}$ 线性调整	$6V \leq VCC1 \leq 18V, I_{OUT}=1mA$	-	0.2	-	%/V
$V_{IN}$ 输入电压	-	-	-	18	V
$\Delta V_{OUT}/\Delta T_A/V_{OUT}$ 温度系数	$VCC1=7V, I_{OUT}=10mA$ $0^\circ C \leq T_A \leq 70^\circ C$	-	100	-	ppm/ $^\circ C$



## SOP-7 Package Outline



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
<b>A</b>	1.350	1.750	0.053	0.069
<b>A1</b>	0.100	0.250	0.004	0.010
<b>A2</b>	1.350	1.550	0.053	0.061
<b>b</b>	0.330	0.510	0.013	0.020
<b>c</b>	0.170	0.250	0.006	0.010
<b>D</b>	4.700	5.100	0.185	0.200
<b>E</b>	3.800	4.000	0.150	0.157
<b>E1</b>	5.800	6.200	0.228	0.244
<b>e</b>	1.270(BSC)		0.050(BSC)	
<b>L</b>	0.400	1.270	0.016	0.050
<b>θ</b>	0°	8°	0°	8°

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