

20V Complementary Enhancement-Mode MOSFET

General Description

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

Product Summary

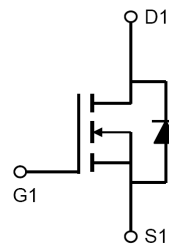
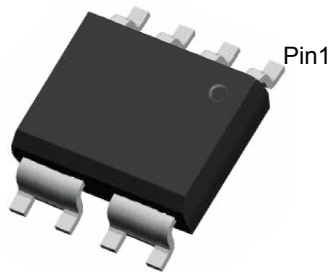
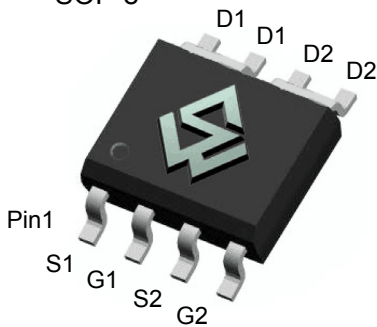
N-Channel

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

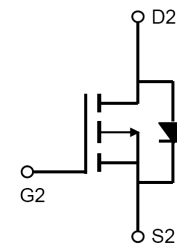
P-Channel

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

SOP-8



N-Channel



P-Channel

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

Parameter	Symbol	Maximum		Units
		N-Channel	P-Channel	
Drain-Source Voltage	V_{DS}	20	-20	V
Gate-Source Voltage	V_{GS}	± 12	± 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 ^a	I_{DM}	20	-25	A
Power Dissipation ^b ($T_A=25^\circ C$)	P_D	1.4	1.4	W
Power Dissipation ^b ($T_A=75^\circ C$)		1.0	0.9	W
Junction and Storage Temperature Range	T_J, T_{STG}	-55 ~ +150	-55 ~ +150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Maximum		Units
		N-Channel	P-Channel	
Junction-to-Ambient ^a ($t \leq 10s$)	$R_{\theta JA}$	100	100	$^\circ C/W$
Junction-to-Ambient ^{a,d} (Steady-State)		130	130	$^\circ C/W$
Junction-to-Lead (Steady-State)	$R_{\theta JL}$	90	90	$^\circ C/W$

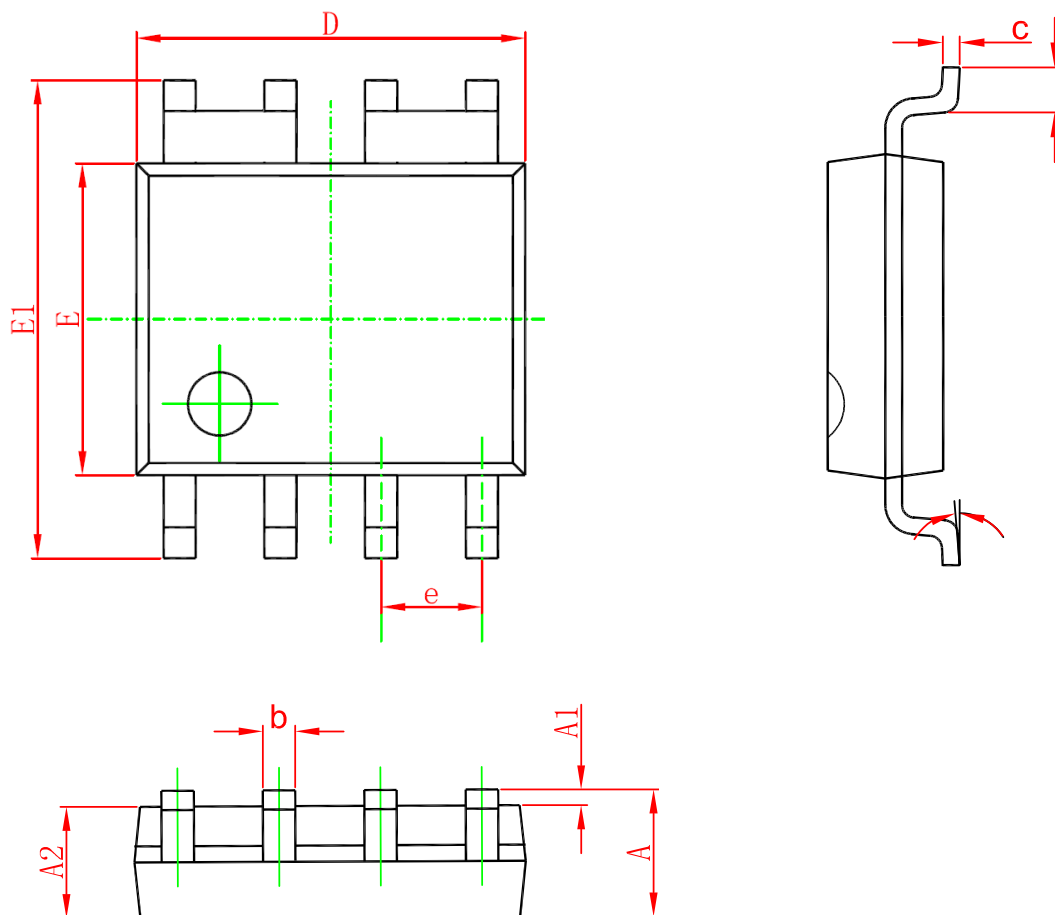
N-Channel Electrical Characteristics (T _A = 25°C unless otherwise noted)						
Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V , I _D = 250uA	20			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 20V , V _{GS} = 0V			1	uA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±12V, V _{DS} = 0V			±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250uA	0.6		1.2	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} = 10V , I _D = 3.0A		32	42	mΩ
		V _{GS} = 4.5V , I _D = 2.5A		35	45	mΩ
g _{FS}	Forward Transconductance	V _{DS} = 5V , I _D = 3.0A		15		S
Drain-Source Diode Characteristics						
V _{SD}	Diode Forward Voltage	V _{GS} = 0V , I _S = 1.0A			1.2	V
I _S	Maximum Body-Diode Continuous Current				2.0	A
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = 10V , V _{GS} = 0V f = 1.0MHz		750		pF
C _{oss}	Output Capacitance			100		pF
C _{rss}	Reverse Transfer Capacitance			73		pF
Switching Characteristics						
Q _g	Total Gate Charge	V _{DS} = 10V , I _D = 3.0A V _{GS} = 6V		16		nC
Q _{gs}	Gate-Source Charge			2.8		nC
Q _{gd}	Gate-Drain Charge			4.1		nC
t _{D(ON)}	Turn-On Delay Time	V _{DD} = 10V , ID = 1A V _{GS} = 6 V R _{GEN} = 6 ohm		15		ns
t _r	Turn-On Rise Time			6		ns
t _{D(OFF)}	Turn-Off Delay Time			26		ns
t _f	Turn-Off Fall Time			12		ns

- Repetitive rating, Pulse width limited by junction temperature T_{J(MAX)}=150 °C. Ratings are based on low frequency and duty cycles to keep initial T_J=25 °C
- The power dissipation P_D is based on T_{J(MAX)}=150 °C , using ≤10s junction-to-ambient thermal resistance.
- The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A = 25°C. The value in any given application depends on the user's specific board design.
- The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient.

P-Channel Electrical Characteristics (T _A = 25°C unless otherwise noted)						
Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V , I _D = -250uA	-20			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -20V , V _{GS} = 0V			-1	uA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±12V, V _{DS} = 0V			±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250uA	-0.4		-1.0	V
R _{DS(ON))}	Drain-Source On-State Resistance	V _{GS} = -10V , I _D = -3.0A		32	45	mΩ
		V _{GS} = -4.5V , I _D = -2.5A		35	48	mΩ
g _{FS}	Forward Transconductance	V _{DS} = -10V , I _D = -3.0A		24		S
Drain-Source Diode Characteristics						
V _{SD}	Diode Forward Voltage	V _{GS} = 0V , I _S = -1.0A			-1.2	V
I _S	Maximum Body-Diode Continuous Current				-2.0	A
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = -10V , V _{GS} = 0V f = 1.0MHz		992		pF
C _{oss}	Output Capacitance			132		pF
C _{rss}	Reverse Transfer Capacitance			93		pF
Switching Characteristics						
Q _g	Total Gate Charge	V _{DS} = -10V , I _D = -3.0A V _{GS} = -6V		35		nC
Q _{gs}	Gate-Source Charge			6		nC
Q _{gd}	Gate-Drain Charge			8		nC
t _{D(ON)}	Turn-On Delay Time	V _{DD} = -10V , ID = -1A V _{GS} = -6 V R _{GEN} = 6 ohm		15		ns
t _r	Turn-On Rise Time			6.4		ns
t _{D(OFF)}	Turn-Off Delay Time			29		ns
t _f	Turn-Off Fall Time			9		ns

- Repetitive rating, Pulse width limited by junction temperature $T_{J(MAX)}=150^\circ\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^\circ\text{C}$
- The power dissipation P_D is based on $T_{J(MAX)}=150^\circ\text{C}$, using $\leq 10\text{s}$ junction-to-ambient thermal resistance.
- The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$. The value in any given application depends on the user's specific board design.
- The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

SOP-8 Package Outline



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