SWD7708A

20V Complementary Enhancement-Mode MOSFET

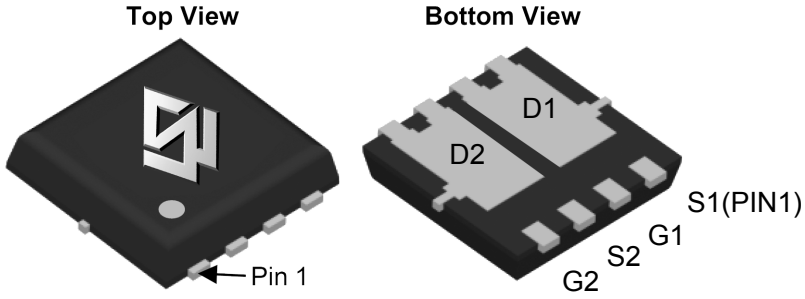
General Description

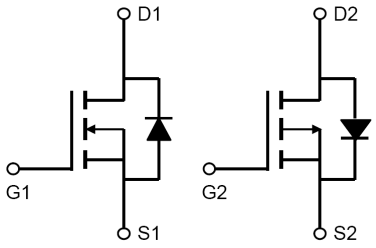
- Low gate charge.
- Use as a load switch.
- Use in PWM applications

Product Summary

N-Channel	P-Channel
• BV_{DSS} = 20V	• BV_{DSS} = -20V
• $R_{DS(on)}$ (@VGS= 10V) < 40mΩ	• $R_{DS(on)}$ (@VGS= -10V) < 42mΩ
• $R_{DS(on)}$ (@VGS= 4.5V) < 45mΩ	• $R_{DS(on)}$ (@VGS= -4.5V) < 45mΩ

PDFN3X3-8L





Absolute Maximum Ratings (T_A = 25°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°C,t<10s,Vgs=10V)	I_D	4.0	-4.5	A
Drain Current (T_A=75°C,t<10s, Vgs=10V)		2.5	-2.5	A
Pulsed Drain Current [a]	I_{DM}	20	-25	A
Power Dissipation [b] (T_A=25°C)	P_D	1.4	1.4	W
Power Dissipation [b] (T_A=75°C)		1.0	0.9	W
Junction and Storage Temperature Range	T_J, T_{STG}	-55 ~ +150	-55 ~ +150	°C

Thermal Characteristics

Parameter	Symbol	Maximum		Units
		N-Channel	P-Channel	
Junction-to-Ambient [a] (t ≤ 10s)	$R_{\theta JA}$	100	100	°C/W
Junction-to-Ambient [a,d] (Steady-State)		130	130	°C/W
Junction-to-Lead (Steady-State)	$R_{\theta JL}$	90	90	°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		30	40	mΩ
		V_{GS} = 4.5V , I_D = 2.5A		32	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

a. Repetitive rating, Pulse width limited by junction temperature $T_{J(MAX)}$=150 ºC. Ratings are based on low frequency and duty cycles to keep initial T_J=25 ºC

b. The power dissipation P_D is based on $T_{J(MAX)}$=150 ºC , using≤10s junction-to-ambient thermal resistance.

c. 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°C. The value in any given application depends on the user's specific board design.

d. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ 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		30	42	mΩ
		V_{GS} = -4.5V , I_D = -2.5A		32	45	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

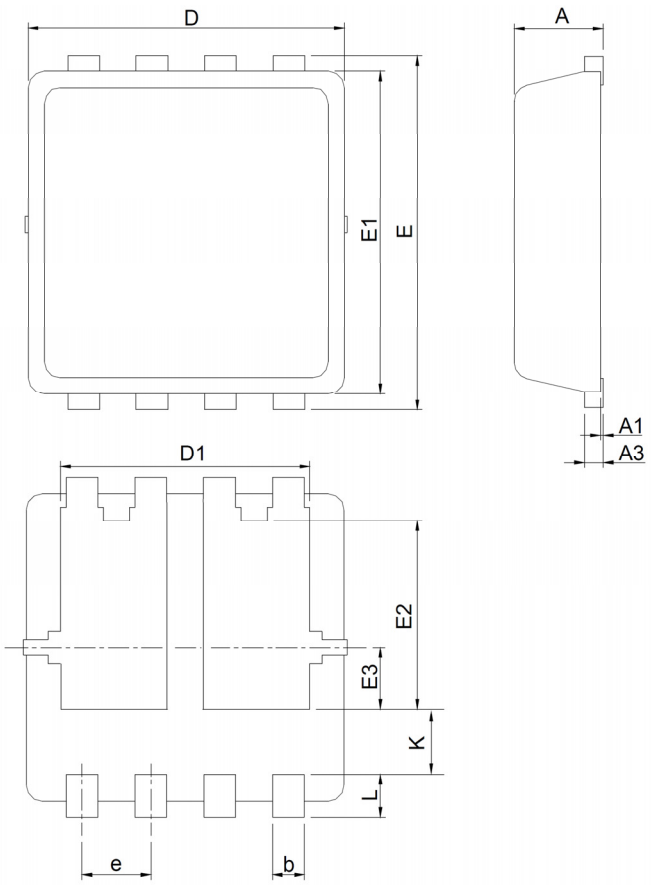
a. Repetitive rating, Pulse width limited by junction temperature $T_{J(MAX)}$=150 ºC. Ratings are based on low frequency and duty cycles to keep initial T_J=25 ºC

b. The power dissipation P_D is based on $T_{J(MAX)}$=150 ºC , using≤10s junction-to-ambient thermal resistance.

c. 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°C. The value in any given application depends on the user's specific board design.

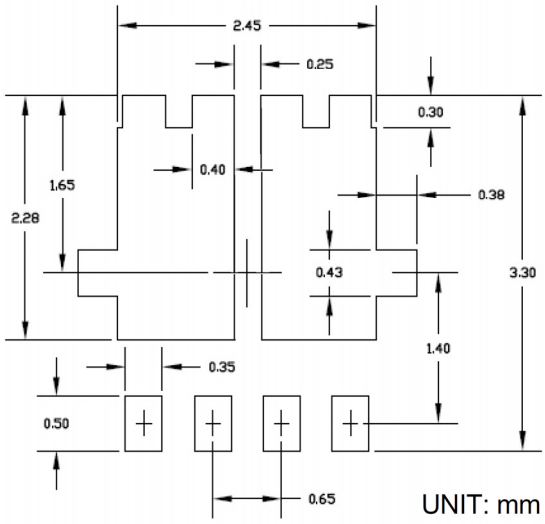
d. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.

PDFN3x3-8L Package



SYMBOL	DFN3x3-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.80	1.00	0.031	0.039
A1	0.00	0.05	0.000	0.002
A3	0.10	0.25	0.004	0.010
b	0.24	0.35	0.009	0.014
D	2.90	3.10	0.114	0.122
D1	2.25	2.45	0.089	0.096
E	3.10	3.30	0.122	0.130
E1	2.90	3.10	0.114	0.122
E2	1.65	1.85	0.065	0.073
E3	0.56	0.58	0.022	0.023
e	0.65 BSC		0.026 BSC	
K	0.475	0.775	0.019	0.031
L	0.30	0.50	0.012	0.020

RECOMMENDED LAND PATTERN



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>>SiliconWisdom(矽睿半导体)