SWK4606

30V Complementary Enhancement-Mode MOSFET

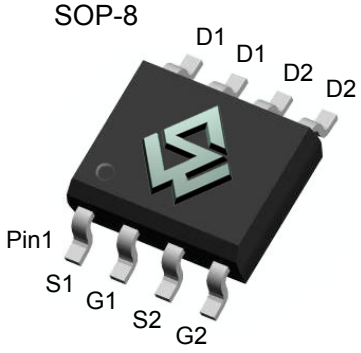
General Description

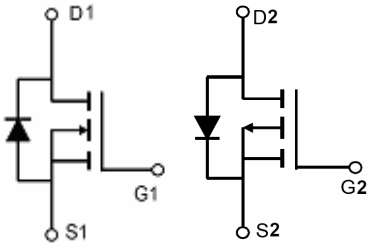
- Low gate charge.
- Use as a load switch.
- Use in PWM applications

Product Summary

N-Channel	P-Channel
• BV_{DSS} = 30V	• BV_{DSS} = -30V
• $R_{DS(on)}$ (@VGS= 10V) < 30mΩ	• $R_{DS(on)}$ (@VGS= -10V) < 28mΩ
• $R_{DS(on)}$ (@VGS= 4.5V) < 42mΩ	• $R_{DS(on)}$ (@VGS= -4.5V) < 44mΩ

SOP-8





Absolute Maximum Ratings (T_A = 25°C unless otherwise noted)

Parameter	Symbol	Maximum		Units
		N-Channel	P-Channel	
Drain-Source Voltage	V_{DS}	30	-30	V
Gate-Source Voltage	V_{GS}	±20	±20	V
Drain Current (T_A=25ºC)	I_D	6	-6.5	A
Drain Current (T_A=75ºC)		4	-4.5	A
Pulsed Drain Current [a]	I_{DM}	24	-28	A
Power Dissipation [b] (T_A=25ºC)	P_D	2.5	2.5	W
Power Dissipation [b] (T_A=75ºC)		1.0	1.0	W
Junction and Storage Temperature Range	T_J, T_{STG}	-55 ~ +150	-55 ~ +150	ºC

Thermal Characteristics

Parameter	Symbol	Maximum		Units
		N-Channel	P-Channel	
Junction-to-Ambient [a] (t ≤ 10s)	$R_{\theta JA}$	50	60	ºC/W
Junction-to-Ambient [a,d] (Steady-State)		80	90	ºC/W
Junction-to-Lead (Steady-State)	$R_{\theta JL}$	25	35	ºC/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	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 24V , V_{GS} = 0V			1	uA
I_{GSS}	Gate-Body Leakage Current	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS} , I_D = 250uA	1		2.5	V
$R_{DS(ON))}$	Drain-Source On-State Resistance	V_{GS} = 10V , I_D = 6A			30	mΩ
		V_{GS} = 4.5V , I_D = 5A			42	mΩ
g_{FS}	Forward Transconductance	V_{DS} = 10V , I_D = 6A		30		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				2.5	A
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 15V , V_{GS} = 0V f = 1.0MHz		740		pF
C_{oss}	Output Capacitance			186		pF
C_{rss}	Reverse Transfer Capacitance			82		pF
Switching Characteristics						
Q_g	Total Gate Charge	V_{DS} = 15V , I_D = 6A V_{GS} = 10V		15		nC
Q_{gs}	Gate-Source Charge			2.5		nC
Q_{gd}	Gate-Drain Charge			3.3		nC
$t_{D(ON)}$	Turn-On Delay Time	V_{DD} = 15V , ID = 1A V_{GS} = 10 V R_{GEN} = 3 ohm		11		ns
t_r	Turn-On Rise Time			6		ns
$t_{D(OFF)}$	Turn-Off Delay Time			27		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	-30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -24V , V_{GS} = 0V			-1	uA
I_{GSS}	Gate-Body Leakage Current	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS} , I_D = -250uA	-1		-2.5	V
$R_{DS(ON))}$	Drain-Source On-State Resistance	V_{GS} = -10V , I_D = -6.5A			28	mΩ
		V_{GS} = -4.5V , I_D = -5.5A			44	mΩ
g_{FS}	Forward Transconductance	V_{DS} = -10V , I_D = -6.5A		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				-2.5	A
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = -15V , V_{GS} = 0V f = 1.0MHz		1490		pF
C_{oss}	Output Capacitance			301		pF
C_{rss}	Reverse Transfer Capacitance			190		pF
Switching Characteristics						
Q_g	Total Gate Charge	V_{DS} = -15V , I_D = -6.5A V_{GS} = -10V		26		nC
Q_{gs}	Gate-Source Charge			4		nC
Q_{gd}	Gate-Drain Charge			5		nC
$t_{D(ON)}$	Turn-On Delay Time	V_{DD} = -15V , ID = -1A V_{GS} = -10 V R_{GEN} = 6 ohm		10		ns
t_r	Turn-On Rise Time			5.5		ns
$t_{D(OFF)}$	Turn-Off Delay Time			26		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.