Dual N & P-Channel PowerTrench MOSFET

KDS8958

■ Features

- N-Channel

  7.0 A, 30 V $R_{DS(ON)}$ = 0.028 Ω @ V_{GS} = 10 V

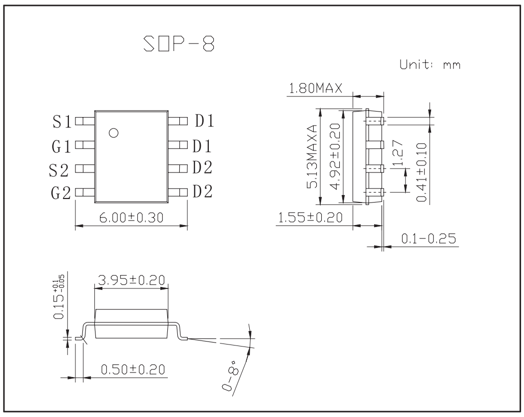
  $R_{DS(ON)}$ = 0.040 Ω @ V_{GS} =4.5V

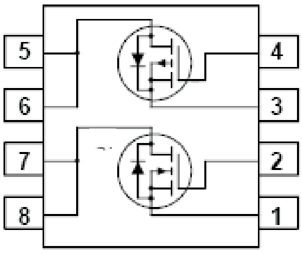
- P-Channel

  -5 A, -30 V $R_{DS(ON)}$ = 0.052 Ω @ V_{GS} =- 10 V

  $R_{DS(ON)}$ = 0.080 Ω @ V_{GS} =-4.5V

- Fast switching speed
- High power and handling capability in a widely used surface mount package





■ Absolute Maximum Ratings Ta = 25℃

Parameter	Symbol	N-Channel	P- Channel	Unit
Drain to Source Voltage	V_{DSS}	30	30	V
Gate to Source Voltage	V_{GS}	±20	±20	V
Drain Current Continuous (Note 1a)	I_D	7	-5	A
Drain Current Pulsed		20	-20	A
Power Dissipation for Single Operation	P_D	2		W
Power Dissipation for Single Operation (Note 1a)	P_D	1.6		W
(Note 1b)		1		
(Note 1c)		0.9		
Operating and Storage Temperature	T_J, T_{STG}	-55 to 150		℃
Thermal Resistance Junction to Ambient (Note 1a)	$R_{\theta JA}$	78		℃/W
Thermal Resistance Junction to Case (Note 1)	$R_{\theta JC}$	40		℃/W

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■ Electrical Characteristics Ta = 25℃

Parameter	Symbol	Testconditons		Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250 μA	N-Ch	30			V
		V_{GS} = 0 V, I_D = -250 μA	P-Ch	-30			
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS} / \Delta T_J$	I_D = 250 μA, Referenced to 25℃	N-Ch		25		mV/℃
		I_D = -250 μA, Referenced to 25℃	P-Ch		-22		
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 24V, V_{GS} = 0 V	N-Ch			1	μA
		V_{DS} = -24 V, V_{GS} = 0 V	P-Ch			-1	
Gate-Body Leakage	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0 V	N-Ch			±100	nA
		V_{GS} = ±20 V, V_{DS} = 0 V	P-Ch			±100	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	N-Ch	1	1.6	3	V
		V_{DS} = V_{GS}, I_D = -250 μA	P-Ch	-1	-1.7	-3	
Gate Threshold Voltage Temperature Coefficient	$\Delta V_{GS(th)} / \Delta T_J$	I_D = 250 μA, Referenced to 25℃	N-Ch		-4.3		mV/℃
		I_D = -250 μA, Referenced to 25℃	P-Ch		4		
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D =7A	N-Ch		21	28	mΩ
		V_{GS} = 10 V, I_D = 7 A,T_J = 125℃			32	42	
		V_{GS} = 4.5 V, I_D =6 A			27	40	
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = -10 V, I_D =-5 A	P-Ch		41	52	
		V_{GS} = -10 V, I_D =-5 A,TJ = 125℃			58	78	
		V_{GS} = -4.5 V, I_D =-4A			58	80	
On-State Drain Current	$I_{D(on)}$	V_{GS} = 10 V, V_{DS} = 5V	N-Ch	20			A
		V_{GS} = -10 V, V_{DS} = -5V	P-Ch	-20			
Forward Transconductance	g_{FS}	V_{DS} = 5V, I_D = 7A	N-Ch		19		S
		V_{DS} = -5V, I_D = -5A	P-Ch		11		
Input Capacitance	C_{iss}	N-Channel V_{DS} = 10 V, V_{GS} = 0 V,f = 1.0 MHz	N-Ch		789		pF
			P-Ch		690		
Output Capacitance	C_{oss}	P-Channel V_{DS} = -10 V, V_{GS} = 0 V,f = 1.0 MHz	N-Ch		173		pF
			P-Ch		306		
Reverse Transfer Capacitance	C_{rss}		N-Ch		66		pF
			P-Ch		77		
Turn-On Delay Time	$t_{d(on)}$	N-Channel V_{DD} = 10 V, I_D = 1 A, V_{GS} = 10 V, R_{GEN} = 6 Ω(Note 2)	N-Ch		6	12	ns
			P-Ch		6.7	13.4	
Turn-On Rise Time	t_r		N-Ch		10	18	ns
			P-Ch		9.7	19.4	
Turn-Off Delay Time	$t_{d(off)}$	P-Channel V_{DD} = -10 V, I_D = -1 A, V_{GS} = -10 V, R_{GEN} = 6 Ω(Note 2)	N-Ch		18	29	ns
			P-Ch		19.8	35.6	
Turn-Off Fall Time	t_f		N-Ch		5	12	ns
			P-Ch		12.3	22.2	
Total Gate Charge	Q_g	N-Channel V_{DS} =15V,I_D=7A,V_{GS}=10V(Note 2)	N-Ch		16	26	nC
			P-Ch		14	23	
Gate-Source Charge	Q_{gs}	P-Channel V_{DS}=-15V,I_D=-5A,V_{GS}=-10V(Note 2)	N-Ch		2.5		nC
			P-Ch		2.2		
Gate-Drain Charge	Q_{gd}		N-Ch		2.1		nC
			P-Ch		1.9		

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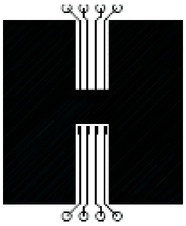
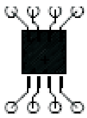
Parameter	Symbol	Testconditons		Min	Typ	Max	Unit
Maximum Continuous Drain-Source Diode Forward Current	Is		N-Ch			1.3	A
			P-Ch			-1.3	
Drain-Source Diode Forward Voltage	VSD	VGS = 0 V, Is = 1.3A (Not 2)	N-Ch		0.74	1.2	V
		VGS = 0 V, Is = -1.3A (Not 2)	P-Ch		-0.76	-1.2	

Notes:

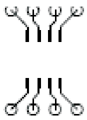
1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a) 78°/W when mounted on a 0.5 in² pad of 2 oz copper



b) 125°/W when mounted on a .02 in² pad of 2 oz copper



c) 135°/W when mounted on a minimum pad.

Scale 1 : 1 on letter size paper

2. Pulse Test: Pulse Width < 300µs, Duty Cycle < 2.0%