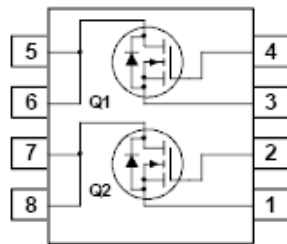
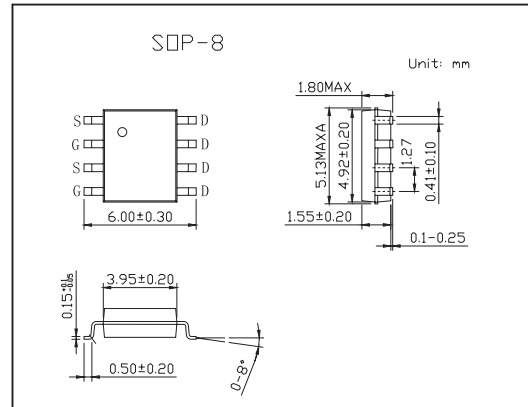


## 100V Dual N-Channel PowerTrench MOSFET

## KDS3912

## ■ Features

- 3 A, 100 V.  $R_{DS(ON)} = 125m\Omega$  @  $V_{GS} = 10\text{ V}$   
 $R_{DS(ON)} = 135m\Omega$  @  $V_{GS} = 6\text{ V}$
- Low gate charge (14 nC typical)
- Fast switching speed
- High performance trench technology for extremely low  $R_{DS(ON)}$
- High power and current handling capability

■ Absolute Maximum Ratings  $T_a = 25^\circ\text{C}$ 

Parameter	Symbol	Rating	Unit
Drain to Source Voltage	$V_{DS}$	100	V
Gate to Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current Continuous (Note 1a)	$I_D$	3	A
Drain Current Pulsed		20	A
Power Dissipation for Dual Operation	$P_D$	1.6	W
Power Dissipation for Single Operation (Note 1a)	$P_D$	1	W
Power Dissipation for Single Operation (Note 1b)		0.9	
Power Dissipation for Single Operation (Note 1c)		0.9	
Operating and Storage Temperature	$T_J, T_{STG}$	-55 to 175	$^\circ\text{C}$
Thermal Resistance Junction to Case (Note 1)	$R_{\theta JC}$	40	$^\circ\text{C/W}$
Thermal Resistance Junction to Ambient (Note 1a)	$R_{\theta JA}$	78	$^\circ\text{C/W}$

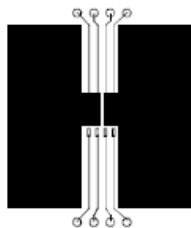
## KDS3912

## ■ Electrical Characteristics Ta = 25°C

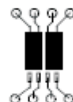
Parameter	Symbol	Testconditons	Min	Typ	Max	Unit
Single Pulse Drain-Source Avalanche Energy	W <sub>DSS</sub>	Single Pulse, V <sub>DD</sub> =50V, I <sub>D</sub> =3A(Not 2)			90	mJ
Maximum Drain-Source Avalanche Current	I <sub>AR</sub>	( Not 2)			3.0	A
Drain-Source Breakdown Voltage	B <sub>V</sub> DSS	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μ A	100			V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta B_{V_{DSS}}}{\Delta T_J}$	I <sub>D</sub> = 250 μ A, Referenced to 25°C		108		mV/°C
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 80 V, V <sub>GS</sub> = 0 V			10	μ A
Gate-Body Leakage, Forward	I <sub>GSSF</sub>	V <sub>GS</sub> = 20 V, V <sub>DS</sub> = 0 V			100	nA
Gate-Body Leakage, Reverse	I <sub>GSSR</sub>	V <sub>GS</sub> = -20 V, V <sub>DS</sub> = 0 V			-100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μ A	2	2.5	4	V
Gate Threshold Voltage Temperature Coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	I <sub>D</sub> = 250 μ A, Referenced to 25°C		-6		mV/°C
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 3 A		92	125	mΩ
		V <sub>GS</sub> = 6 V, I <sub>D</sub> = 2.8 A		98	135	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 3 A, T <sub>J</sub> = 125°C		175	250	
On-State Drain Current	I <sub>D(on)</sub>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 10V	10			A
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 3A		11		S
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 0 V, f = 1.0 MHz		632		pF
Output Capacitance	C <sub>oss</sub>			40		pF
Reverse Transfer Capacitance	C <sub>rss</sub>			20		pF
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 50 V, I <sub>D</sub> = 1 A, V <sub>GS</sub> = 10 V, R <sub>GEN</sub> = 6 Ω		8.5	17	ns
Turn-On Rise Time	t <sub>r</sub>			2	4	ns
Turn-Off Delay Time	t <sub>d(off)</sub>			23	37	ns
Turn-Off Fall Time	t <sub>f</sub>			4.5	9	ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 50 V, I <sub>D</sub> = 3 A, V <sub>GS</sub> = 10 V (Note 2)		14	20	nC
Gate-Source Charge	Q <sub>gs</sub>			2.4		nC
Gate-Drain Charge	Q <sub>gd</sub>			3.8		nC
Maximum Continuous Drain-Source Diode Forward Current	I <sub>S</sub>				1.3	A
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 1.3 A (Not 2)		0.76	1.2	V
Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 3A		30		nS
Diode Reverse Recovery Charge	Q <sub>rr</sub>	di <sub>F</sub> /dt = 100 A/μ s (Not 2)		106		nC

## Notes:

1. R<sub>θJA</sub> 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<sub>θJC</sub> is guaranteed by design while R<sub>θCA</sub> is determined by the user's board design.



a) 78°C/W when mounted on a 0.5in<sup>2</sup> pad of 2 oz copper



b) 125°C/W when mounted on a 0.02 in<sup>2</sup> pad of 2 oz copper



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

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