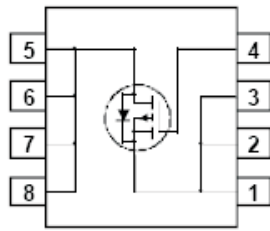
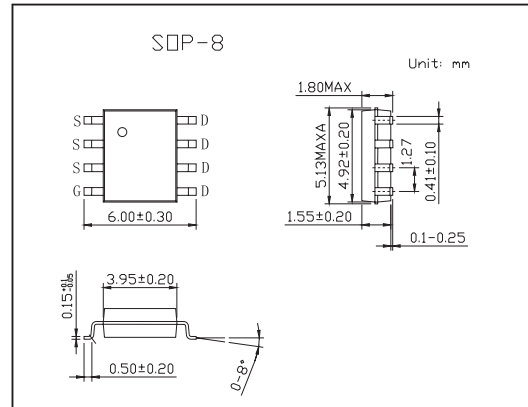


## 30V P-Channel PowerTrench MOSFET

## KDS6685

## ■ Features

- -8.8 A, -30 V.  $R_{DS(ON)} = 20\text{m}\Omega$  @  $V_{GS} = -10\text{V}$   
 $R_{DS(ON)} = 35\text{m}\Omega$  @  $V_{GS} = -4.5\text{V}$
- Low gate charge(17 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	$V_{DS}$	-30	V
Gate to Source Voltage	$V_{GS}$	$\pm 25$	V
Drain Current Continuous (Note 1a)	$I_D$	-8.8	A
Drain Current Pulsed		-50	A
Power Dissipation for Single Operation (Note 1a)	$P_D$	2.5	W
Power Dissipation for Single Operation (Note 1b)		1.2	
Power Dissipation for Single Operation (Note 1c)		1	
Operating and Storage Temperature	$T_J, T_{STG}$	-55 to 175	$^\circ\text{C}$
Thermal Resistance Junction to Ambient (Note 1a)	$R_{\theta JA}$	50	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction to Ambient (Note 1c)	$R_{\theta JA}$	125	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction to Case (Note 1)	$R_{\theta JC}$	25	$^\circ\text{C}/\text{W}$

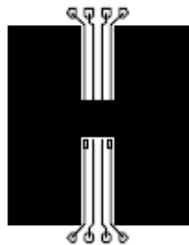
## KDS6685

## ■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Testconditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BVDSS	V <sub>GS</sub> = 0 V, I <sub>D</sub> = -250 μA	-30			V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BVDSS}{\Delta T_J}$	I <sub>D</sub> = -250 μA, Referenced to 25°C		-21		mV/°C
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = -24 V, V <sub>GS</sub> = 0 V			-1	μA
Gate-Body Leakage, Forward	I <sub>GSSF</sub>	V <sub>GS</sub> = 25V, V <sub>DS</sub> = 0 V			100	nA
Gate-Body Leakage, Reverse	I <sub>GSSR</sub>	V <sub>GS</sub> = -25 V, V <sub>DS</sub> = 0 V			-100	nA
Gate Threshold Voltage(Not 2)	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250 μA	-1	-1.7	-3	V
Gate Threshold Voltage Temperature Coefficient(Not 2)	$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	I <sub>D</sub> = -250 μA, Referenced to 25°C		5		mV/°C
Static Drain-Source On-Resistance(Not 2)	R <sub>DS(on)</sub>	V <sub>GS</sub> = -10 V, I <sub>D</sub> = -8.8 A		15	24	mΩ
		V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -6.7 A		22	32	
		V <sub>GS</sub> = -10 V, I <sub>D</sub> = -8.8 A, T <sub>J</sub> = 125°C		19	39	
On-State Drain Current	I <sub>D(on)</sub>	V <sub>GS</sub> = -10 V, V <sub>DS</sub> = -5V	-25			A
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = -5 V, I <sub>D</sub> = -8.8A		24		S
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -15 V, V <sub>GS</sub> = 0 V, f = 1.0 MHz		1604		pF
Output Capacitance	C <sub>oss</sub>		408		pF	
Reverse Transfer Capacitance	C <sub>rss</sub>		202		pF	
Turn-On Delay Time	t <sub>d(on)</sub>			13	23	ns
Turn-On Rise Time	t <sub>r</sub>	V <sub>DD</sub> = -15 V, I <sub>D</sub> = -1 A, V <sub>GS</sub> = -10 V, R <sub>GEN</sub> = 6 Ω (Note 2)		13.5	24	ns
Turn-Off Delay Time	t <sub>d(off)</sub>			42	68	ns
Turn-Off Fall Time	t <sub>f</sub>			25	40	ns
Total Gate Charge	Q <sub>g</sub>			17	24	nC
Gate-Source Charge	Q <sub>gs</sub>	V <sub>DS</sub> = -15 V, I <sub>D</sub> = -8.8 A, V <sub>GS</sub> = -5V (Note 2)		5		nC
Gate-Drain Charge	Q <sub>gd</sub>			6		nC
Maximum Continuous Drain-Source Diode Forward Current	I <sub>S</sub>				-2.1	A
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = -2.1A (Not 2)		-0.73	-1.2	V

## Notes:

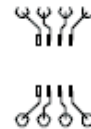
1. R<sub>θJA</sub> is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. R<sub>θJC</sub> is guaranteed by design while R<sub>θCA</sub> is determined by the user's board design.



a) 50°C/W when mounted on a 1 in<sup>2</sup> pad of 2 oz copper



b) 105°C/W when mounted on a .04 in<sup>2</sup> pad of 2 oz copper



c) 125°C/W when mounted on a minimum pad.

Scale 1 : 1 on letter size paper

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