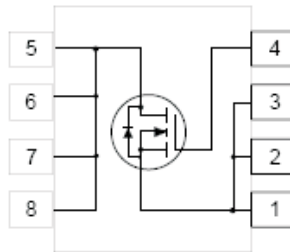
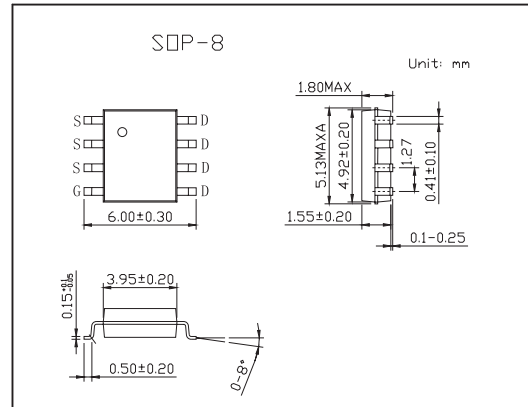


## 60V N-Channel PowerTrench™ MOSFET

## KDS5670

## ■ Features

- 10 A, 60 V.  $R_{DS(ON)} = 0.014 \Omega$  @  $V_{GS} = 10 \text{ V}$   
 $R_{DS(ON)} = 0.017 \Omega$  @  $V_{GS} = 6 \text{ V}$
- Low gate charge
- 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	$V_{DS}$	60	V
Gate to Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current Continuous (Note 1a)	$I_D$	10	A
Drain Current Pulsed		50	A
Power dissipation (Note 1a)	$P_D$	2.5	W
Power dissipation (Note 1b)		1.2	
Power dissipation (Note 1c)		1	
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to 175	$^\circ\text{C}$
Thermal Resistance Junction to Ambient (Note 1a)	$R_{\theta JA}$	50	$^\circ\text{C/W}$
Thermal Resistance Junction to Case (Note 1)	$R_{\theta JC}$	25	$^\circ\text{C/W}$

## KDS5670

## ■ 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	60			V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BVDSS}{\Delta T_J}$	I <sub>D</sub> = 250 μA, Referenced to 25°C		58		mV/°C
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 48 V, V <sub>GS</sub> = 0 V			1	μA
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 μA	2	2.4	4	V
Gate Threshold Voltage Temperature Coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	I <sub>D</sub> = 250 μA, Referenced to 25°C		6.8		mV/°C
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 10 A		0.012	0.014	Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 10 A, T <sub>J</sub> = 125°C		0.019	0.027	
		V <sub>GS</sub> = 6 V, I <sub>D</sub> = 9 A		0.014	0.017	
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> = 5V, I <sub>D</sub> = 10 A		39		S
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0 V, f = 1.0 MHz		2900		pF
Output Capacitance	C <sub>oss</sub>			685		pF
Reverse Transfer Capacitance	C <sub>rss</sub>			180		pF
Turn-On Delay Time	t <sub>d(on)</sub>			16	29	ns
Turn-On Rise Time	t <sub>r</sub>	V <sub>DD</sub> = 30 V, I <sub>D</sub> = 1 A, V <sub>GS</sub> = 10 V, R <sub>GEN</sub> = 6 Ω (Note 2)		10	20	ns
Turn-Off Delay Time	t <sub>d(off)</sub>			50	80	ns
Turn-Off Fall Time	t <sub>f</sub>			23	42	ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 20 V, I <sub>D</sub> = 10 A, V <sub>GS</sub> = 10 V (Note 2)		49	70	nC
Gate-Source Charge	Q <sub>gs</sub>			9		nC
Gate-Drain Charge	Q <sub>gd</sub>			10.4		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> = 2.1 A (Not 2)		0.72	1.2	V

## Notes:

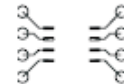
1. R<sub>θJA</sub> is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. R<sub>θJC</sub> is guaranteed by design while R<sub>θJA</sub> is determined by the user's board design.



a) 50° C/W when mounted on a 0.5 in<sup>2</sup> pad of 2 oz. copper.



b) 105° C/W when mounted on a 0.02 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 ≤ 300 μs, Duty Cycle ≤ 2.0%