

60V Complementary PowerTrench MOSFET

KDS8333C

■ Features

● N-Channel

4.1 A, 30 V $R_{DS(ON)} = 80\text{m}\Omega$ @ $V_{GS} = 10\text{V}$ $R_{DS(ON)} = 130\text{m}\Omega$ @ $V_{GS} = 4.5\text{V}$

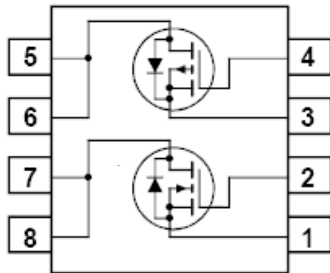
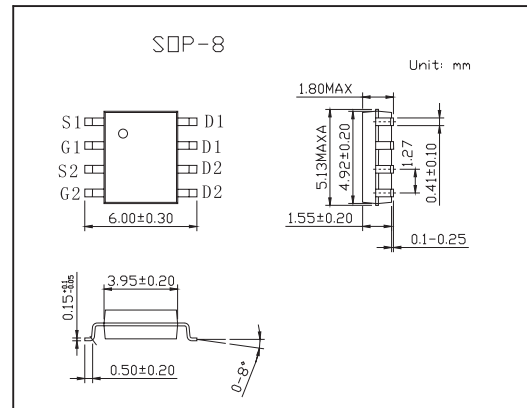
● P-Channel

-3.4 A, 30 V $R_{DS(ON)} = 130\text{m}\Omega$ @ $V_{GS} = -10\text{V}$ $R_{DS(ON)} = 200\text{m}\Omega$ @ $V_{GS} = -4.5\text{V}$

● Low gate charge

● High performance trench technology for extremely low $R_{DS(ON)}$.

● High power and handling capability in a widely used surface mount package.

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

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain to Source Voltage	V_{DSS}	30	-60	V
Gate to Source Voltage	V_{GS}	± 16	± 20	V
Drain Current Continuous (Note 1a)	I_D	4.1	-3.4	A
Drain Current Pulsed		20	-20	A
Power Dissipation for Single Operation	P_D	2		W
Power Dissipation for Single Operation (Note 1a) (Note 1b) (Note 1c)	P_D	1.6		W
		1		
		0.9		
Operating and Storage Temperature	T_J, T_{STG}	-55 to 150		$^\circ\text{C}$
Thermal Resistance Junction to Ambient (Note 1a)	$R_{\theta JA}$	78		$^\circ\text{C}/\text{W}$
Thermal Resistance Junction to Case (Note 1)	$R_{\theta JC}$	40		$^\circ\text{C}/\text{W}$

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■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Testconditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0 V, I _D = 250 μA		30		V
		V _{GS} = 0 V, I _D = -250 μA		-30		
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I _D = 250 μA, Referenced to 25°C		25		mV/°C
		I _D = -250 μA, Referenced to 25°C		-22		
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 24V, V _{GS} = 0 V			1	μA
		V _{DS} = -24 V, V _{GS} = 0 V			-1	
Gate-Body Leakage	I _{GSS}	V _{GS} = ±16V, V _{DS} = 0 V			±100	nA
		V _{GS} = ±20 V, V _{DS} = 0 V			±100	
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1	1.7	3	V
		V _{DS} = V _{GS} , I _D = -250 μA	-1	-1.8	-3	
Gate Threshold Voltage Temperature Coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	I _D = 250 μA, Referenced to 25°C		-4.2		mV/°C
		I _D = -250 μA, Referenced to 25°C		3.7		
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 4.1A		67	80	mΩ
		V _{GS} = 10 V, I _D = 4.1 A, T _J = 125°C		81	130	
		V _{GS} = 4.5 V, I _D = 3.2 A		103	145	
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = -10 V, I _D = -3.4A		105	130	
		V _{GS} = -10 V, I _D = -3.4 A, T _J = 125°C		167	200	
		V _{GS} = -4.5 V, I _D = -2.5A		147	220	
On-State Drain Current	I _{D(on)}	V _{GS} = 10 V, V _{DS} = 5V	10			A
		V _{GS} = -10 V, V _{DS} = -5V	-5			
Forward Transconductance	g _{FS}	V _{DS} = 5V, I _D = 4.1A		9		S
		V _{DS} = -5V, I _D = -3.4A		5		
Input Capacitance	C _{iss}	N-Channel		282		pF
		V _{DS} = 10 V, V _{GS} = 0 V, f = 1.0 MHz		185		
Output Capacitance	C _{oss}	N-Channel		49		pF
		P-Channel		56		
Reverse Transfer Capacitance	C _{rss}	V _{DS} = -10 V, V _{GS} = 0 V, f = 1.0 MHz		20		pF
				26		
Gate Resistance	R _G	V _{GS} = 15 mV, f = 1.0MHz		2.3		Ω
		V _{GS} = -15 mV, f = 1.0MHz		-9.6		
Turn-On Delay Time	t _{d(on)}	N-Channel		4.5	9	ns
		V _{DD} = 10 V, I _D = 1 A,		4.5	9	
Turn-On Rise Time	t _r	V _{GS} = 4.5 V, R _{GEN} = 6 Ω (Note 2)		6	12	ns
				13	23	
Turn-Off Delay Time	t _{d(off)}	P-Channel		19	34	ns
		V _{DD} = -10 V, I _D = -1 A,		11	20	
Turn-Off Fall Time	t _f	V _{GS} = -4.5 V, R _{GEN} = 6 Ω (Note 2)		1.5	3	ns
				2	4	
Total Gate Charge	Q _g	N-Channel		4.7	6.6	nC
		V _{DS} = 10V, I _D = 4.1A, V _{GS} = 4.5V		4.1	5.7	
Gate-Source Charge	Q _{gs}	R _{GEN} = 6 Ω (Note 2)		0.9		nC
		P-Channel		0.8		
Gate-Drain Charge	Q _{gd}	V _{DS} = -10V, I _D = -3.4A, V _{GS} = -4.5V (Note 2)		0.6		nC
				0.4		

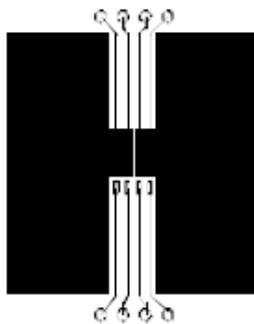
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■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Testconditions	Min	Typ	Max	Unit
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} = 0 V, I _S = 1.3A (Not 2)		0.8	1.2	V
		V _{GS} = 0 V, I _S = -1.3A (Not 2)		0.8	-1.2	
Diode Reverse Recovery Time	t _{rr}	I _F = 4.1 A, diF/dt = 100 A/μs		16.3		nS
		I _F = -3.4 A, diF/dt = 100 A/μs		14.5		
Diode Reverse Recovery Charge	Q _{rr}	I _F = 4.1 A, diF/dt = 100 A/μs		26.7		nC
		I _F = -3.4 A, diF/dt = 100 A/μs		21.1		

Notes:

1. R_{θJA} 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_{θJC} is guaranteed by design while R_{θCA} is determined by the user's board design.



a) 79°C/W when mounted on a 0.5in² pad of 2 oz copper



b) 125°C/W when mounted on a 0.02 in² pad of 2 oz copper



c) 135°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%