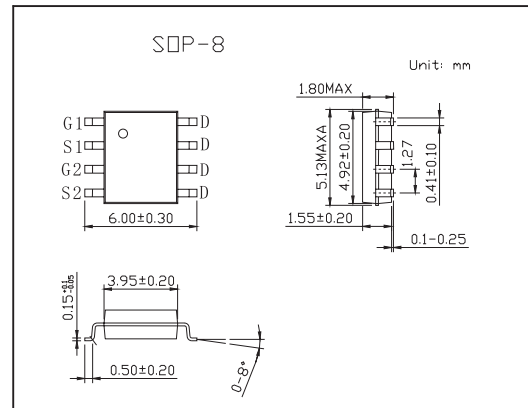
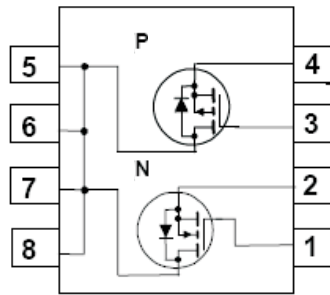


20V N & P-Channel PowerTrench MOSFET

KDR8702H

■ Features

- N-Ch $R_{DS(ON)} = 54m\Omega @ V_{GS} = 2.5V$
3.6 A, 20 V $R_{DS(ON)} = 38m\Omega @ V_{GS} = 4.5V$
- P-Ch $R_{DS(ON)} = 110m\Omega @ V_{GS} = -2.5V$
-2.6 A, -20 V $R_{DS(ON)} = 80m\Omega @ V_{GS} = -4.5V$
- Fast switching speed
- High performance trench technology for extremely low $R_{DS(ON)}$

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

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain to Source Voltage	V_{DS}	20	-20	V
Gate to Source Voltage	V_{GS}	± 12	± 8	V
Drain Current Continuous (Note 1a)	I_D	3.6	-2.6	A
Drain Current Pulsed		15	-10	A
Power Dissipation for Single Operation (Note 1a)	P_D	0.8		W
Operating and Storage Temperature	T_J, T_{STG}	-55 to 150		$^\circ\text{C}$
Thermal Resistance Junction to Ambient (Note 1a)	$R_{\theta JA}$	146		$^\circ\text{C/W}$
Thermal Resistance Junction to Ambient (Note 1b)	$R_{\theta JA}$	76		$^\circ\text{C/W}$
Thermal Resistance Junction to Case (Note 1)	$R_{\theta JC}$	40		$^\circ\text{C/W}$

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■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Testconditons	Min	Typ	Max	Unit	
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0 V, I _D = 250 μA	N-Ch	20		V	
		V _{GS} = 0 V, I _D = -250 μA	P-Ch	-20			
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I _D = 250 μA, Referenced to 25°C	N-Ch		36	mV/°C	
		I _D = -250 μA, Referenced to 25°C	P-Ch		-15		
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 16V, V _{GS} = 0 V	N-Ch		1	μA	
		V _{DS} = -16 V, V _{GS} = 0 V	P-Ch		-1		
Gate-Body Leakage	I _{GSS}	V _{GS} = ±12 V, V _{DS} = 0 V	N-Ch		±100	nA	
		V _{GS} = ±8 V, V _{DS} = 0 V	P-Ch		±100		
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	N-Ch	0.6	0.8	1.5	V
		V _{DS} = V _{GS} , I _D = -250 μA	P-Ch	-0.4	-0.7	-1.6	
Gate Threshold Voltage Temperature Coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	I _D = 250 μA, Referenced to 25°C	N-Ch		-2	mV/°C	
		I _D = -250 μA, Referenced to 25°C	P-Ch		2.5		
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 4.5 V, I _D = 3.6A	N-Ch		31	38	mΩ
		V _{GS} = 2.5 V, I _D = 3.1 A			42	54	
		V _{GS} = 4.5 V, I _D = 3.6 A, T _J = 125°C			41	58	
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = -4.5 V, I _D = -2.6 A	P-Ch		66	80	
		V _{GS} = -2.5 V, I _D = -2.2 A			85	110	
		V _{GS} = -4.5 V, I _D = -2.6 A, T _J = 125°C			83	108	
On-State Drain Current	I _{D(on)}	V _{GS} = 4.5 V, V _{DS} = 5V	N-Ch	10		A	
		V _{GS} = -4.5 V, V _{DS} = -5V	P-Ch	-10			
Forward Transconductance	g _{FS}	V _{DS} = V _{GS} , I _D = 250 μA	N-Ch		15	S	
		V _{DS} = V _{GS} , I _D = -250 μA	P-Ch		9		
Gate Resistance	R _G	V _{GS} = 15 mV, f = 1.0 MHz	N-Ch		1	Ω	
			P-Ch		4.8		
Input Capacitance	C _{iss}	N-Channel V _{DS} = 10 V, V _{GS} = 0 V, f = 1.0 MHz	N-Ch		650	pF	
			P-Ch		607		
Output Capacitance	C _{oss}	P-Channel	N-Ch		170	pF	
			P-Ch		165		
Reverse Transfer Capacitance	C _{rss}	V _{DS} = -10 V, V _{GS} = 0 V, f = 1.0 MHz	N-Ch		80	pF	
			P-Ch		60		
Turn-On Delay Time	t _{d(on)}	N-Channel V _{DD} = 10 V, I _D = 1 A,	N-Ch		8	16	ns
			P-Ch		12	22	
Turn-On Rise Time	t _r	V _{GS} = 4.5 V, R _{GEN} = 6 Ω	N-Ch		9	18	ns
			P-Ch		11	20	
Turn-Off Delay Time	t _{d(off)}	P-Channel V _{DD} = -10 V, I _D = -1 A,	N-Ch		16	29	ns
			P-Ch		26	42	
Turn-Off Fall Time	t _f	V _{GS} = -4.5 V, R _{GEN} = 6 Ω	N-Ch		7	14	ns
			P-Ch		8	16	

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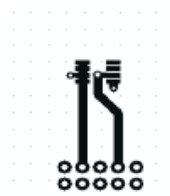
Parameter	Symbol	Testconditions		Min	Typ	Max	Unit
Total Gate Charge	Q _g	N-Channel V _{DS} = 10V, I _D = 3.6A, V _{GS} = 4.5V	N-Ch		7	10	nC
			P-Ch		6	8	
Gate-Source Charge	Q _{gs}	(Note 2) P-Channel	N-Ch		1.3		nC
			P-Ch		1.2		
Gate-Drain Charge	Q _{gd}	V _{DS} = -10V, I _D = -2.6A, V _{GS} = -4.5V (Note 2)	N-Ch		2.2		nC
			P-Ch		1.6		
Maximum Continuous Drain-Source Diode Forward Current	I _S		N-Ch			0.7	A
			P-Ch			-0.7	
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} = 0 V, I _S = 0.7A (Not 2)	N-Ch		0.7	1.2	V
		V _{GS} = 0 V, I _S = -0.7A (Not 2)	P-Ch		-0.7	-1.2	
Diode Reverse Recovery Time	t _{rr}	N-Channel I _F = 3.6A, di _F /dt = 100 A/μs	N-Ch		16		nS
			P-Ch		22		
Maximum Reverse Recovery Current	I _{rm}	P-Channel I _F = -2.6A, di _F /dt = 100 A/μs	N-Ch		0.6		A
			P-Ch		0.7		
Diode Reverse Recovery Charge	Q _{rr}		N-Ch		5		nC
			P-Ch		8		

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) 76°C/W when mounted on a 1in² pad of 2 oz copper



- b) 148°C/W when mounted on a minimum pad of 2 oz copper

Scale 1 : 1 on letter size paper

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