

30V Complementary PowerTrench MOSFET KI4542DY

■ Features

● N-Channel

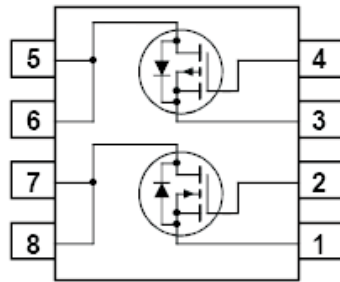
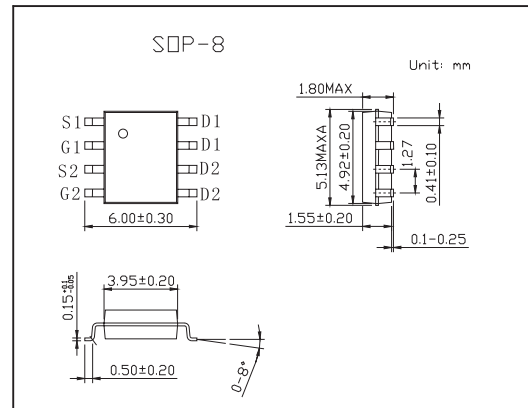
6 A, 30 V $R_{DS(ON)} = 28m\Omega @ V_{GS} = 10V$

$R_{DS(ON)} = 35m\Omega @ V_{GS} = 4.5V$

● P-Channel

-6 A, -30 V $R_{DS(ON)} = 32m\Omega @ V_{GS} = -10V$

$R_{DS(ON)} = 45m\Omega @ V_{GS} = -4.5V$



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

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain to Source Voltage	V_{DS}	30	-30	V
Gate to Source Voltage	V_{GS}	± 20	± 20	V
Drain Current Continuous (Note 1a)	I_D	6	-6	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
		1.2		
		1		
Operating and Storage Temperature	T_J, T_{STG}	-55 to 175		$^\circ\text{C}$
Thermal Resistance Junction to Ambient (Note 1a)	$R_{\theta JA}$	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	N-Ch	30		V	
		V _{GS} = 0 V, I _D = -250 μA	P-Ch	-30			
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I _D = 250 μA, Referenced to 25°C	N-Ch		23	mV/°C	
		I _D = -250 μA, Referenced to 25°C	P-Ch		-21		
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 24V, V _{GS} = 0 V	N-Ch		1	μA	
		V _{DS} = -24 V, V _{GS} = 0 V	P-Ch		-1		
Gate-Body Leakage	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0 V	N-Ch		±100	nA	
		V _{GS} = ±20 V, V _{DS} = 0 V	P-Ch		±100		
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	N-Ch	1	1.5	3	V
		V _{DS} = V _{GS} , I _D = -250 μA	P-Ch	-1	-1.7	-3	
Gate Threshold Voltage Temperature Coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	I _D = 250 μA, Referenced to 25°C	N-Ch		-4	mV/°C	
		I _D = -250 μA, Referenced to 25°C	P-Ch		4		
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 6A	N-Ch		19	28	mΩ
		V _{GS} = 10 V, I _D = 6A, T _J = 125°C			32	48	
		V _{GS} = 4.5 V, I _D = 5A			25	35	
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = -10 V, I _D = -6 A	P-Ch		21	32	
		V _{GS} = -10 V, I _D = -5 A, T _J = 125°C			29	51	
		V _{GS} = -4.5 V, I _D = -5A			30	45	
On-State Drain Current	I _{D(on)}	V _{GS} = 10 V, V _{DS} = 5V	N-Ch	20		A	
		V _{GS} = -10 V, V _{DS} = -5V	P-Ch	-20			
Forward Transconductance	g _{FS}	V _{DS} = 15V, I _D = 6A	N-Ch		18	S	
		V _{DS} = -10V, I _D = -6A	P-Ch		16		
Input Capacitance	C _{iss}	N-Channel V _{DS} = 15 V, V _{GS} = 0 V, f = 1.0 MHz	N-Ch		830	pF	
			P-Ch		1540		
Output Capacitance	C _{oss}	P-Channel	N-Ch		185	pF	
			P-Ch		400		
Reverse Transfer Capacitance	C _{rss}	V _{DS} = -15 V, V _{GS} = 0 V, f = 1.0 MHz	N-Ch		80	pF	
			P-Ch		170		
Turn-On Delay Time	t _{d(on)}	N-Channel V _{DD} = 15 V, I _D = 1 A,	N-Ch		6	12	ns
			P-Ch		13	24	
Turn-On Rise Time	t _r	V _{GS} = 10 V, R _{GEN} = 6 Ω (Note 2)	N-Ch		10	18	ns
			P-Ch		22	35	
Turn-Off Delay Time	t _{d(off)}	P-Channel V _{DD} = -15 V, I _D = -1 A,	N-Ch		18	29	ns
			P-Ch		47	75	
Turn-Off Fall Time	t _f	V _{GS} = -10 V, R _{GEN} = 6 Ω (Note 2)	N-Ch		5	12	ns
			P-Ch		18	30	
Total Gate Charge	Q _g	N-Channel V _{DS} = 15V, I _D = 7.5A, V _{GS} = 5V (Note 2)	N-Ch		9	13	nC
			P-Ch		15	20	
Gate-Source Charge	Q _{gs}	P-Channel	N-Ch		2.8	nC	
			P-Ch		4		
Gate-Drain Charge	Q _{gd}	V _{DS} = -10V, I _D = -6A, V _{GS} = -5V (Note 2)	N-Ch		3.1	nC	
			P-Ch		5		

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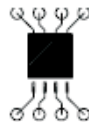
Parameter	Symbol	Testconditons	Min	Typ	Max	Unit
Maximum Continuous Drain-Source Diode Forward Current	Is	N-Ch			1.3	A
		P-Ch			-1.3	
Drain-Source Diode Forward Voltage	VSD	VGS = 0 V, Is = 1.3A (Not 2)		0.7	1.2	V
		VGS = 0 V, Is = -1.3A (Not 2)		-0.7	-1.2	

Notes:

1. $R_{\theta JA}$ 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. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a) 78°C/W when mounted on a 0.5 in² pad of 2 oz copper



b) 125°C/W when mounted on a .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%