

30V Complementary PowerTrench MOSFET
KI4542DY

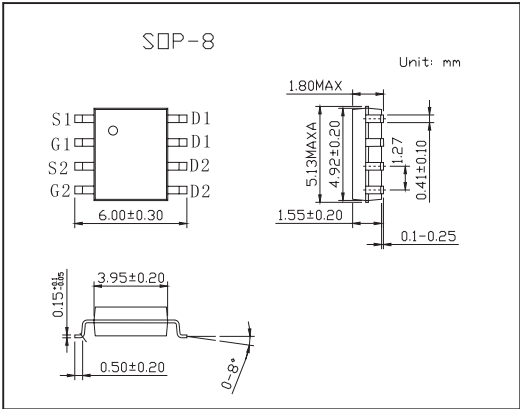
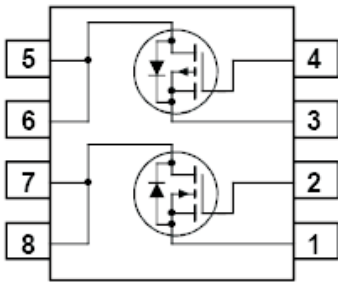
■ Features

● 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 $T_a = 25^{\circ}C$

Parameter	Symbol	N-Channel	P- Channel	Unit
Drain to Source Voltage	V _{DSS}	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)	P _D	1.6		W
(Note 1b)		1.2		
(Note 1c)		1		
Operating and Storage Temperature	T _J , T _{STG}	-55 to 175		°C
Thermal Resistance Junction to Ambient (Note 1a)	R _{θJA}	78		°C/W
Thermal Resistance Junction to Case (Note 1)	R _{θJC}	40		°C/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 μ A	N-Ch	30		V
		V _{GS} = 0 V, I _D = -250 μ A	P-Ch	-30		
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I _D = 250 μ A, Referenced to 25°C	N-Ch	23		mV/°C
		I _D = -250 μ A, Referenced to 25°C	P-Ch	-21		
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 24V, V _{GS} = 0 V	N-Ch		1	μ A
		V _{DS} = -24 V, V _{GS} = 0 V	P-Ch		-1	
Gate-Body Leakage	I _{GSS}	V _{GS} = $\pm$ 20V, V _{DS} = 0 V	N-Ch		$\pm$ 100	nA
		V _{GS} = $\pm$ 20 V, V _{DS} = 0 V	P-Ch		$\pm$ 100	
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μ A	N-Ch	1	1.5	V
		V _{DS} = V _{GS} , I _D = -250 μ A	P-Ch	-1	-1.7	
Gate Threshold Voltage Temperature Coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	I _D = 250 μ A, Referenced to 25°C	N-Ch	-4		mV/°C
		I _D = -250 μ A, 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	m Ω
		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 V _{DS} = -15 V, V _{GS} = 0 V, f = 1.0 MHz	N-Ch	185		pF
			P-Ch	400		
Reverse Transfer Capacitance	C _{rss}		N-Ch	80		pF
			P-Ch	170		
Turn-On Delay Time	t _{d(on)}	N-Channel V _{DD} = 15 V, I _D = 1 A, V _{GS} = 10 V, R _{GEN} = 6 Ω (Note 2)	N-Ch	6	12	ns
			P-Ch	13	24	
Turn-On Rise Time	t _r	P-Channel V _{DD} = -15 V, I _D = -1 A, 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)}		N-Ch	18	29	ns
			P-Ch	47	75	
Turn-Off Fall Time	t _f		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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■ Electrical Characteristics $T_a = 25^\circ\text{C}$

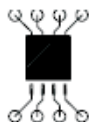
Parameter	Symbol	Testconditions	Min	Typ	Max	Unit
Maximum Continuous Drain-Source Diode Forward Current	I_S	N-Ch			1.3	A
		P-Ch			-1.3	
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 1.3\text{ A (Not 2)}$		0.7	1.2	V
		$V_{GS} = 0\text{ V}, I_S = -1.3\text{ A (Not 2)}$		-0.7	-1.2	

Notes:

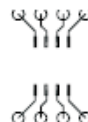
1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



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



b) 125°C/W when mounted on a $.02\text{ in}^2$ 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 $< 300\mu\text{s}$, Duty Cycle $< 2.0\%$