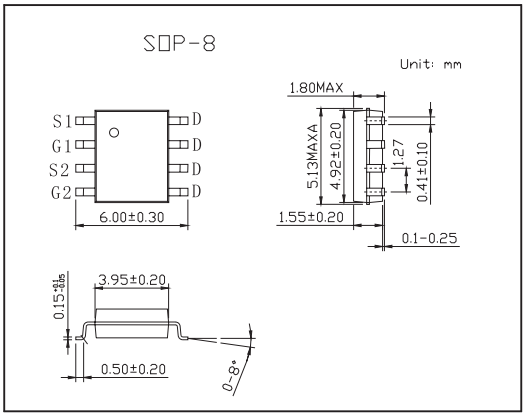
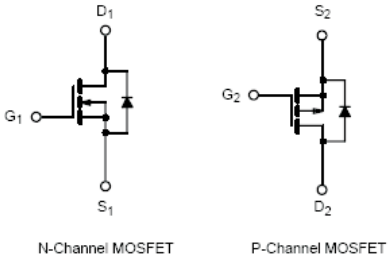
N- and P-Channel 12-V (D-S) MOSFET

KI7540DP

Features

- TrenchFET Power MOSFET
- PWM Optimized for High Efficiency





N-Channel MOSFET P-Channel MOSFET

Absolute Maximum Ratings T_A = 25℃

Parameter	Symbol	N-Channel		P-Channel		Unit
		10 secs	Steady State	10 secs	Steady State	
Drain-Source Voltage	V_{DS}	12		-12		V
Gate-Source Voltage	V_{GS}	±8		±8		V
Continuous Drain Current (T_J = 150℃)* T_A = 25℃	I_D	11.8	7.6	-8.9	-5.7	A
T_A = 70℃		9.5	6.1	-7.1	-4.6	A
Pulsed Drain Current	I_{DM}	20				A
Continuous Source Current (Diode Conduction)*	I_S	2.9	1.1	-2.9	-1.1	A
Maximum Power Dissipation* T_A = 25℃	P_D	3.5	1.4	3.5	1.4	W
T_A = 70℃		2.2	0.9	2.2	0.9	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150				℃

*Surface Mounted on 1" X 1" FR4 Board.

Thermal Resistance Ratings

Parameter		Symbol	N-Channel		P-Channel		Unit
			Typ	Max	Typ	Max	
Maximum Junction-to-Ambient*	t ≤10 sec	R_{thJA}	26	35	26	35	℃/W
	Steady State		60	85	60	85	
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	3.9	5.5	3.9	5.5	

*Surface Mounted on 1" X 1" FR4 Board.

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■ Electrical Characteristics T_J = 25℃

Parameter	Symbol	Testconditons		Min	Typ	Max	Unit
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	N-Ch	0.6		1.5	V
		V_{DS} = V_{GS}, I_D = -250 μA	P-Ch	-0.6		-1.5	
Gate Body Leakage	I_{GSS}	V_{DS} = 0 V V_{GS} = ±8 V	N-Ch			±100	nA
		V_{DS} = 0 V V_{GS} = ±8 V	P-Ch			±100	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 9.6V, V_{GS} = 0 V	N-Ch			1	
		V_{DS} = -9.6V, V_{GS} = 0 V	P-Ch			-1	
		V_{DS} = 20 V, V_{GS} = 0 V, T_J = 55℃	N-Ch			5	μA
		V_{DS} = -20V, V_{GS} = 0 V, T_J = 55℃	P-Ch			-5	
On State Drain Currenta	$I_{D(on)}$	V_{DS} ≥5 V, V_{GS} = 4.5 V	N-Ch	20			A
		V_{DS} ≤-5 V, V_{GS} = -4.5 V	P-Ch	-20			
Drain Source On State Resistance*	$r_{DS(on)}$	V_{GS} = 4.5 V, I_D = 11.8A	N-Ch		0.014	0.017	Ω
		V_{GS} = -4.5 V, I_D = -8.9A	P-Ch		0.026	0.032	
		V_{GS} = 2.5 V, I_D = 9.8A	N-Ch		0.020	0.025	
		V_{GS} = -2.5 V, I_D = -6.9A	P-Ch		0.043	0.053	
Forward Transconductance*	g_{fs}	V_{DS} = 5 V, I_D = 11.8A	N-Ch		32		S
		V_{DS} = -5 V, I_D = -8.9A	P-Ch		23		
Diode Forward Voltage*	V_{SD}	I_S = 2.9A, V_{GS} = 0 V	N-Ch		0.77	1.2	V
		I_S = -2.9A, V_{GS} = 0 V	P-Ch		-0.8	-1.2	
Total Gate Charge	Q_g	N-Channel	N-Ch		11.5	17	nC
		V_{DS} = 6 V, V_{GS} = 4.5V, I_D = 11.8A	P-Ch		13	20	
Gate Source Charge	Q_{gs}		N-Ch		3.2		
		P-Channel	P-Ch		4.1		
Gate Drain Charge	Q_{gd}	V_{DS} = -6 V, V_{GS} = -4.5 V, I_D = -8.9A	N-Ch		2.5		
			P-Ch		1.9		
Gate Resistance	R_G		N-Ch		1.7		Ω
			P-Ch		3.5		
Turn On Time	$t_{d(on)}$	N Channel	N-Ch		30	45	ns
		V_{DD} = 6 V, R_L = 6Ω	P-Ch		35	55	
Rise Time	t_r	I_D= 1A, V_{GEN} = 4.5V, R_g = 6 Ω	N-Ch		50	75	
			P-Ch		42	65	
Turn Off Delay Time	$t_{d(off)}$	P-Channel	N-Ch		60	90	
		V_{DD} = -6 V, R_L = 6Ω	P-Ch		54	85	
Fall Time	t_f	I_D= -1 A, V_{GEN} = -4.5 V, R_g = 6 Ω	N-Ch		25	40	
			P-Ch		17	30	
Source-Drain Reverse Recovery Time	t_{rr}	I_F =2.9 A, di/dt = 100 A/μs	N-Ch		40	80	
		I_F = -2.9 A, di/dt = 100 A/μs	P-Ch		40	80	

* Pulse test; pulse width ≤300 μs, duty cycle≤2%.