

N-Channel 30-V (D-S) Fast Switching MOSFET

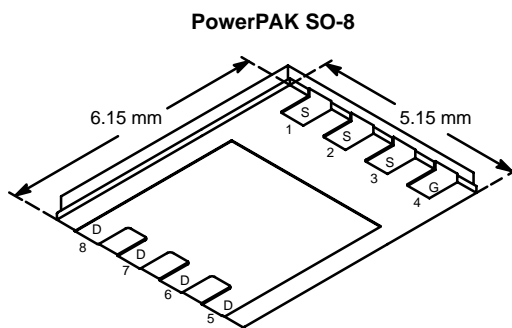
PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.0065 @ $V_{GS} = 10$ V	21
	0.008 @ $V_{GS} = 4.5$ V	19

FEATURES

- TrenchFET® Power MOSFET
- New Low Thermal Resistance PowerPAK® Package with Low 1.07-mm Profile
- 100% R_g Tested

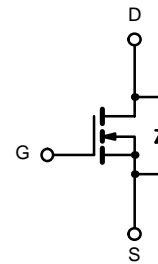
APPLICATIONS

- DC/DC Converters
- Optimized for “Low-Side” Synchronous Rectifier Operation



Bottom View

Ordering Information: Si7440DP-T1



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)					
Parameter	Symbol	10 secs	Steady State	Unit	
Drain-Source Voltage	V_{DS}	30		V	
Gate-Source Voltage	V_{GS}	± 20			
Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a	I_D	$T_A = 25^\circ\text{C}$	21	12	A
		$T_A = 70^\circ\text{C}$	17	9	
Pulsed Drain Current	I_{DM}	60			
Continuous Source Current (Diode Conduction) ^a	I_S	4.3	1.6		
Maximum Power Dissipation ^a	P_D	$T_A = 25^\circ\text{C}$	5.4	1.9	W
		$T_A = 70^\circ\text{C}$	3.4	1.2	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150		$^\circ\text{C}$	

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^a	R_{thJA}	$t \leq 10$ sec	18	23	$^\circ\text{C}/\text{W}$
		Steady State	52	65	
Maximum Junction-to-Case (Drain)	R_{thJC}	1.0	1.3		

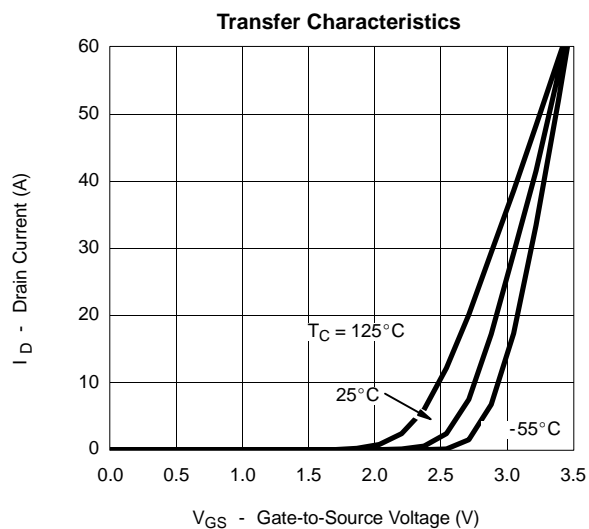
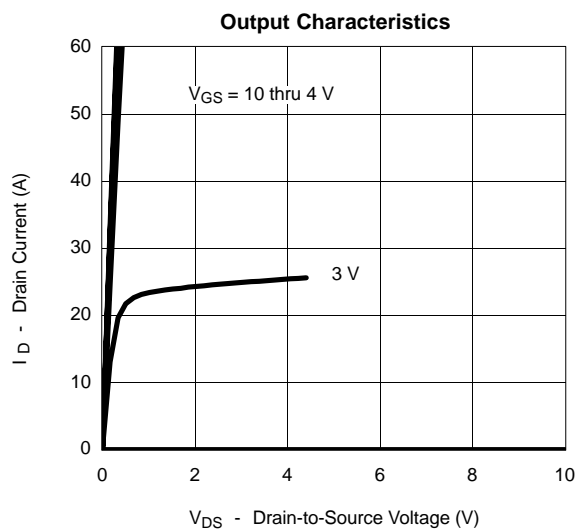
Notes

a. Surface Mounted on 1" x 1" FR4 Board.

MOSFET SPECIFICATIONS ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	1.0			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\ \text{V}, V_{GS} = \pm 20\ \text{V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 24\ \text{V}, V_{GS} = 0\ \text{V}$			1	μA
		$V_{DS} = 24\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 55^\circ\text{C}$			5	
On-State Drain Current ^{NO TAG}	$I_{D(on)}$	$V_{DS} \geq 5\ \text{V}, V_{GS} = 10\ \text{V}$	40			A
Drain-Source On-State Resistance ^{NO TAG}	$r_{DS(on)}$	$V_{GS} = 10\ \text{V}, I_D = 21\ \text{A}$		0.0053	0.0065	Ω
		$V_{GS} = 4.5\ \text{V}, I_D = 19\ \text{A}$		0.0065	0.008	
Forward Transconductance ^{NO TAG}	g_{fs}	$V_{DS} = 15\ \text{V}, I_D = 21\ \text{A}$		65		S
Diode Forward Voltage ^{NO TAG}	V_{SD}	$I_S = 4.3\ \text{A}, V_{GS} = 0\ \text{V}$		0.72	1.2	V
Dynamic^{NO TAG}						
Total Gate Charge	Q_g	$V_{DS} = 15\ \text{V}, V_{GS} = 4.5\ \text{V}, I_D = 21\ \text{A}$		29.0	35	nC
Gate-Source Charge	Q_{gs}			10.5		
Gate-Drain Charge	Q_{gd}			10.0		
Gate-Resistance	R_g		0.5	1.4	2.2	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\ \text{V}, R_L = 15\ \Omega$ $I_D \cong 1\ \text{A}, V_{GEN} = 10\ \text{V}, R_G = 6\ \Omega$		18	28	ns
Rise Time	t_r			16	25	
Turn-Off Delay Time	$t_{d(off)}$			75	180	
Fall Time	t_f			41	65	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 4.3\ \text{A}, di/dt = 100\ \text{A}/\mu\text{s}$		50	80	

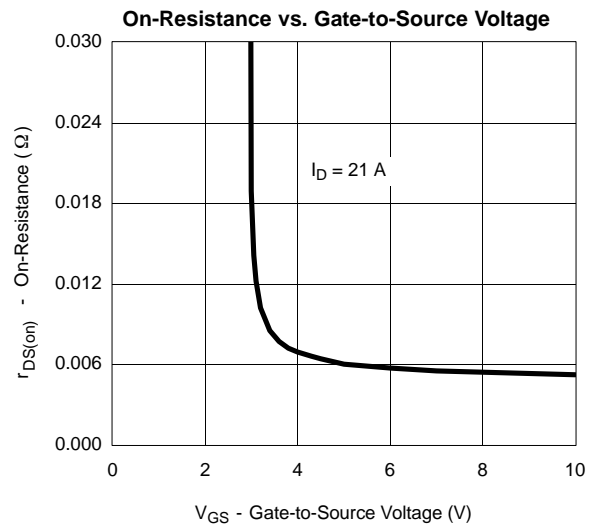
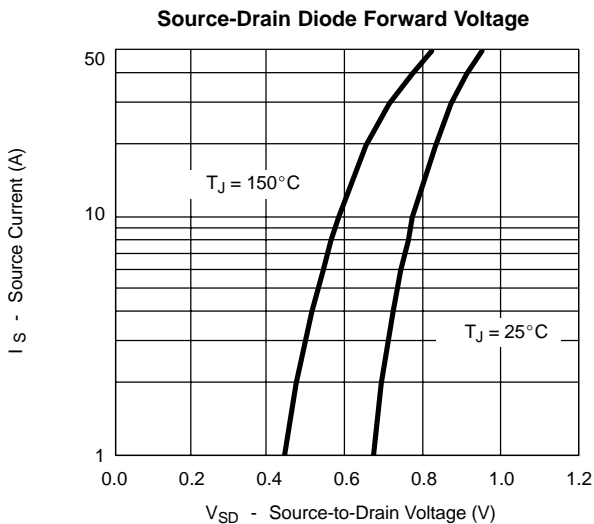
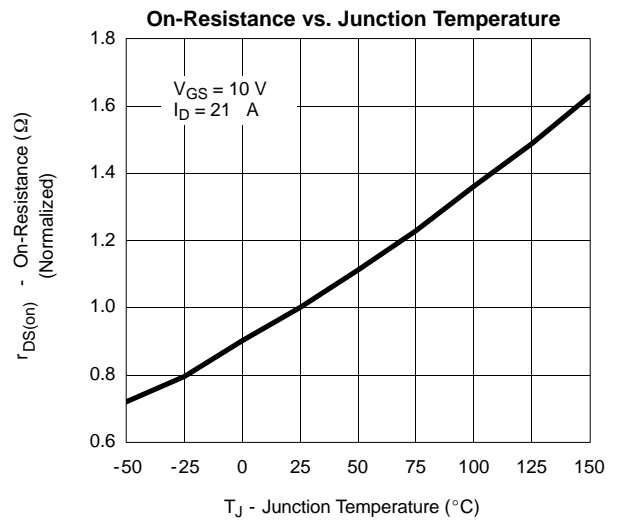
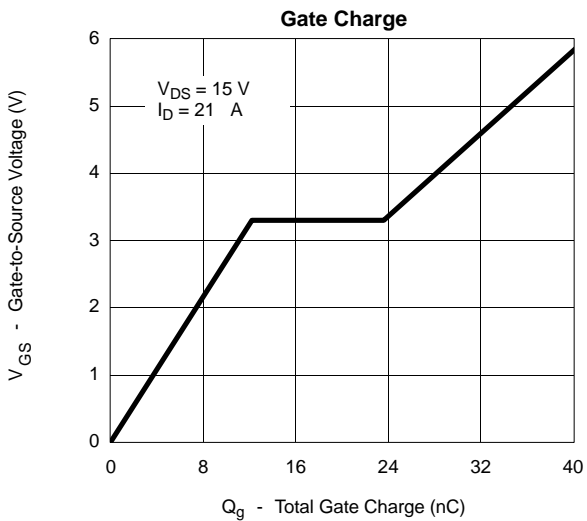
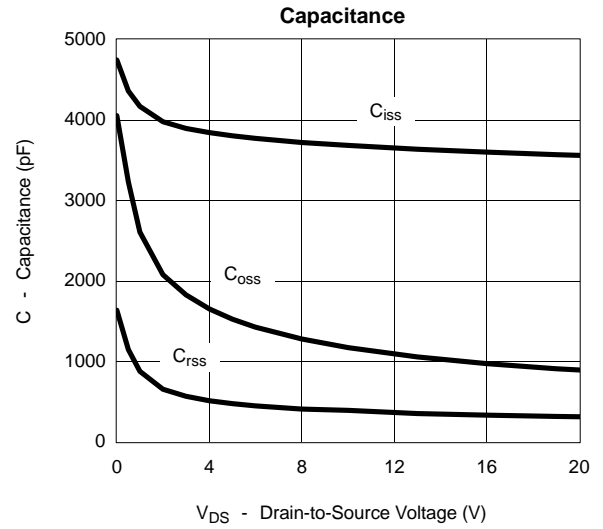
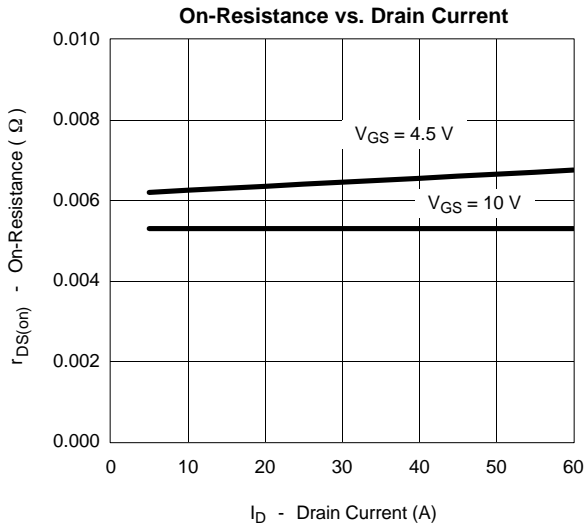
Notes

- Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)




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