

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

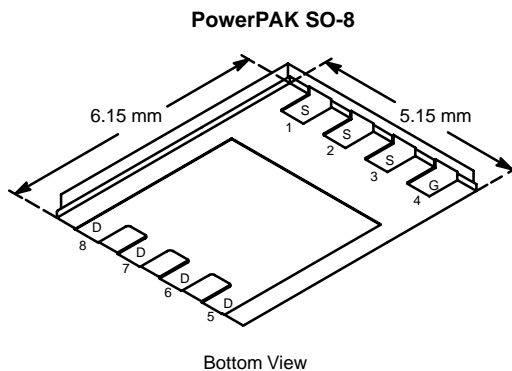
PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
30	0.0095 @ $V_{GS} = 10$ V	18
	0.014 @ $V_{GS} = 4.5$ V	15

### FEATURES

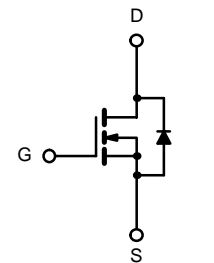
- TrenchFET® Power MOSFET
- New Low Thermal Resistance PowerPAK® Package with Low 1.07-mm Profile
- 100%  $R_g$  Tested

### APPLICATIONS

- DC/DC Converters
- Optimized for "High-Side" Synchronous Rectifier Operation



Ordering Information: Si7840DP-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	$V_{GS}$	$\pm 20$			
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>a</sup>	$I_D$	$T_A = 25^\circ\text{C}$	18	11	A
		$T_A = 70^\circ\text{C}$	14	8	
Pulsed Drain Current	$I_{DM}$	40			
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	4.1	1.6		
Avalanche Current	$I_{AS}$	L = 0.1 mH	40		
Avalanche Energy			$E_{AS}$	80	
Maximum Power Dissipation <sup>a</sup>	$P_D$	$T_A = 25^\circ\text{C}$	5.0	1.9	W
		$T_A = 70^\circ\text{C}$	3.2	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 <sup>a</sup>	$R_{thJA}$	$t \leq 10$ sec	20	25	$^\circ\text{C/W}$
		Steady State	52	65	
Maximum Junction-to-Case (Drain)	$R_{thJC}$	2.1	2.6		

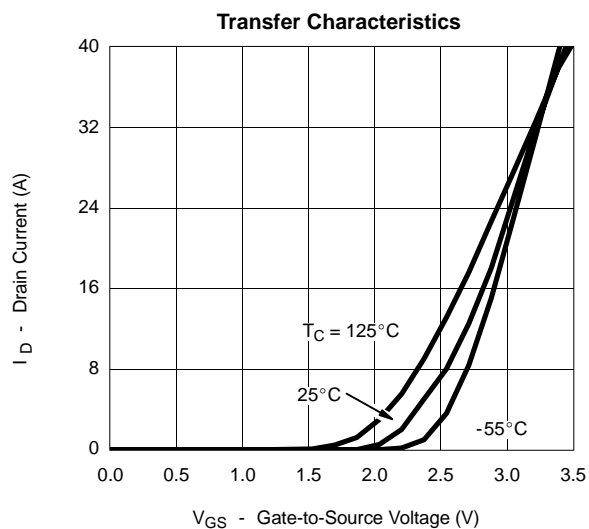
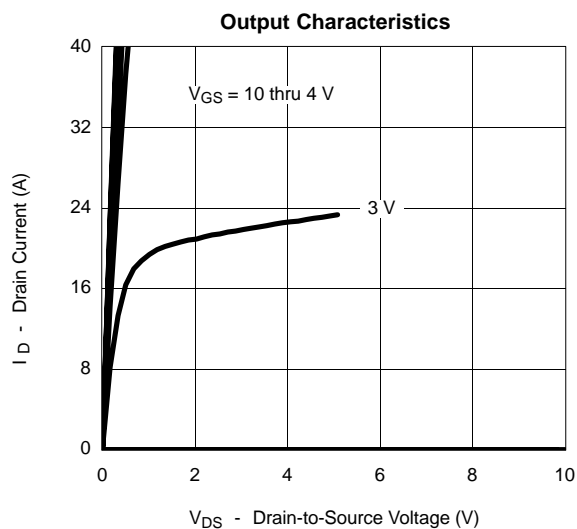
Notes

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

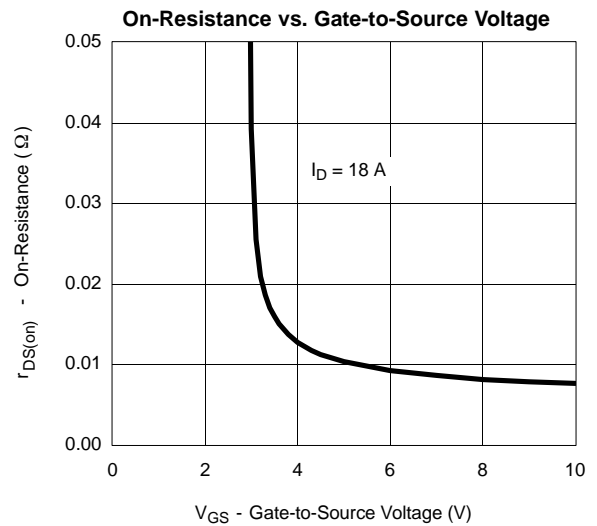
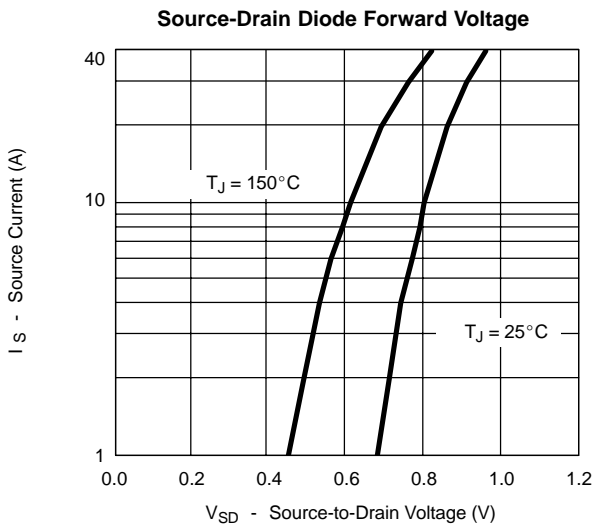
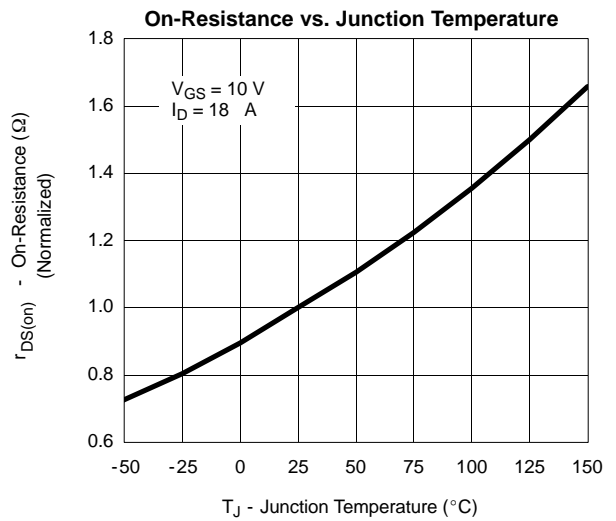
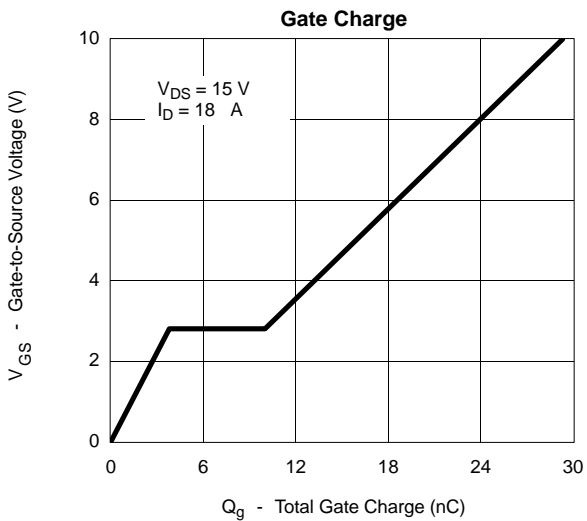
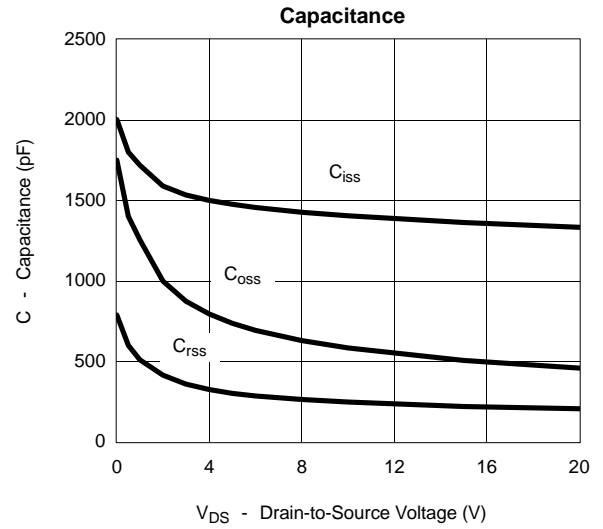
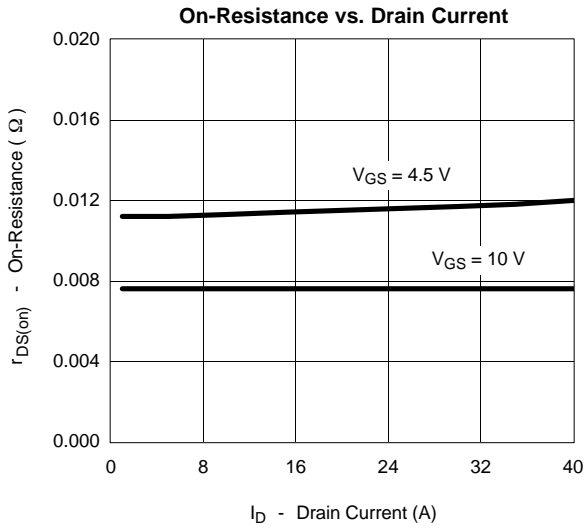
MOSFET SPECIFICATIONS ( $T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	1.0			V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\ \text{V}, V_{GS} = \pm 20\ \text{V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 24\ \text{V}, V_{GS} = 0\ \text{V}$			1	$\mu\text{A}$
		$V_{DS} = 24\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 55^\circ\text{C}$			5	
On-State Drain Current <sup>NO TAG</sup>	$I_{D(on)}$	$V_{DS} \geq 5\ \text{V}, V_{GS} = 10\ \text{V}$	30			A
Drain-Source On-State Resistance <sup>NO TAG</sup>	$r_{DS(on)}$	$V_{GS} = 10\ \text{V}, I_D = 18\ \text{A}$		0.0077	0.0095	$\Omega$
		$V_{GS} = 4.5\ \text{V}, I_D = 15\ \text{A}$		0.0115	0.014	
Forward Transconductance <sup>NO TAG</sup>	$g_{fs}$	$V_{DS} = 15\ \text{V}, I_D = 18\ \text{A}$		40		S
Diode Forward Voltage <sup>NO TAG</sup>	$V_{SD}$	$I_S = 4.1\ \text{A}, V_{GS} = 0\ \text{V}$		0.75	1.2	V
<b>Dynamic<sup>NO TAG</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = 15\ \text{V}, V_{GS} = 5.0\ \text{V}, I_D = 18\ \text{A}$		15.5	23	nC
Gate-Source Charge	$Q_{gs}$			3.8		
Gate-Drain Charge	$Q_{gd}$			6		
Gate-Resistance	$R_g$		0.2	0.8	1.2	$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\ \text{V}, R_L = 15\ \Omega$ $I_D \cong 1\ \text{A}, V_{GEN} = 10\ \text{V}, R_G = 6\ \Omega$		17	26	ns
Rise Time	$t_r$			14	21	
Turn-Off Delay Time	$t_{d(off)}$			39	60	
Fall Time	$t_f$			19	30	
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = 4.1\ \text{A}, di/dt = 100\ \text{A}/\mu\text{s}$		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 ( $25^\circ\text{C}$  UNLESS NOTED)**


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