

## N-Channel 40-V (D-S) MOSFET

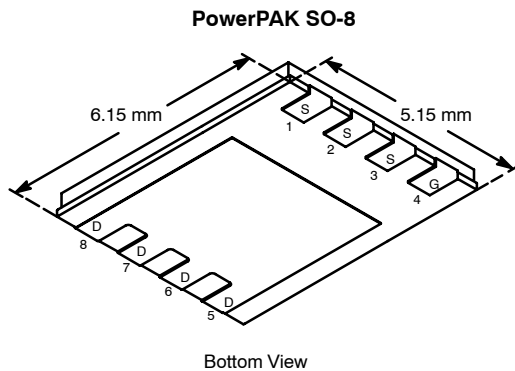
PRODUCT SUMMARY		
V <sub>DS</sub> (V)	r <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)
40	0.007 @ V <sub>GS</sub> = 10 V	20
	0.0095 @ V <sub>GS</sub> = 4.5 V	17

### FEATURES

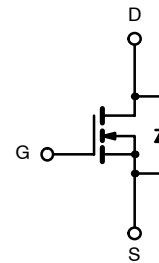
- TrenchFET® Power MOSFET
- New Low Thermal Resistance PowerPAK® Package with Low 1.07-mm Profile
- PWM Optimized for Fast Switching
- 100% R<sub>g</sub> Tested

### APPLICATIONS

- Synchronous Rectifier



Ordering Information: Si7884DP-T1



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)				
Parameter	Symbol	10 secs	Steady State	Unit
Drain-Source Voltage	V <sub>DS</sub>	40		V
Gate-Source Voltage	V <sub>GS</sub>	± 20		
Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a</sup>	T <sub>A</sub> = 25 °C	20	12	A
	T <sub>A</sub> = 70 °C	16	10	
Pulsed Drain Current	I <sub>DM</sub>	50		
Avalanche Current	L = 0.1 mH	30		
Continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	4.7	1.7	
Maximum Power Dissipation <sup>a</sup>	T <sub>A</sub> = 25 °C	5.2	1.9	W
	T <sub>A</sub> = 70 °C	3.3	1.2	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to 150		°C

THERMAL RESISTANCE RATINGS				
Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a</sup>	t ≤ 10 sec	19	24	°C/W
	Steady State	52	65	
Maximum Junction-to-Case (Drain)	Steady State	1.2	1.8	

**Notes**

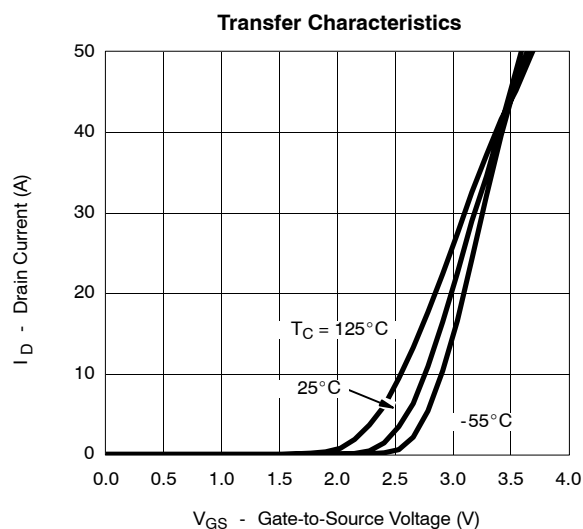
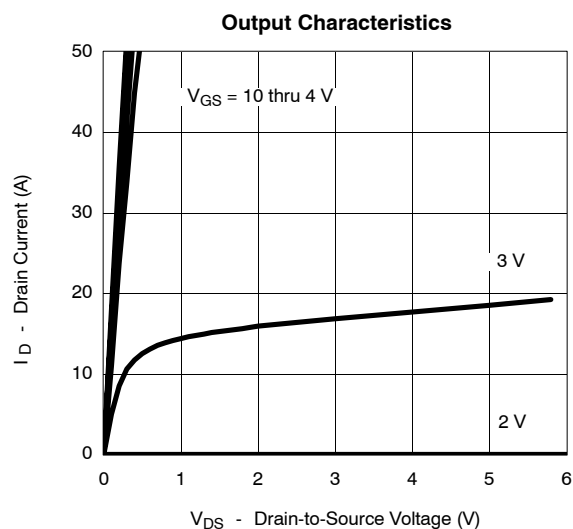
a. Surface Mounted on 1" x 1" FR4 Board.

**SPECIFICATIONS (T<sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)**

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	1.0		3.0	V
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 32 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 32 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 55 °C			5	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 5 V, V <sub>GS</sub> = 10 V	50			A
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 14 A		0.0055	0.007	Ω
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 12 A		0.0075	0.0095	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 14 A		50		S
Diode Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>S</sub> = 2.8 A, V <sub>GS</sub> = 0 V		0.75	1.1	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 20 V, V <sub>GS</sub> = 5 V, I <sub>D</sub> = 14 A		18.5	28	nC
Gate-Source Charge	Q <sub>gs</sub>		6			
Gate-Drain Charge	Q <sub>gd</sub>		7.5			
Gate Resistance	R <sub>g</sub>		0.2	0.8	1	Ω
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 20 V, R <sub>L</sub> = 20 Ω I <sub>D</sub> ≅ 1 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 6 Ω		15	30	ns
Rise Time	t <sub>r</sub>		10	20		
Turn-Off Delay Time	t <sub>d(off)</sub>		50	100		
Fall Time	t <sub>f</sub>		20	40		
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 2.8 A, di/dt = 100 A/μs		30	60	

## Notes

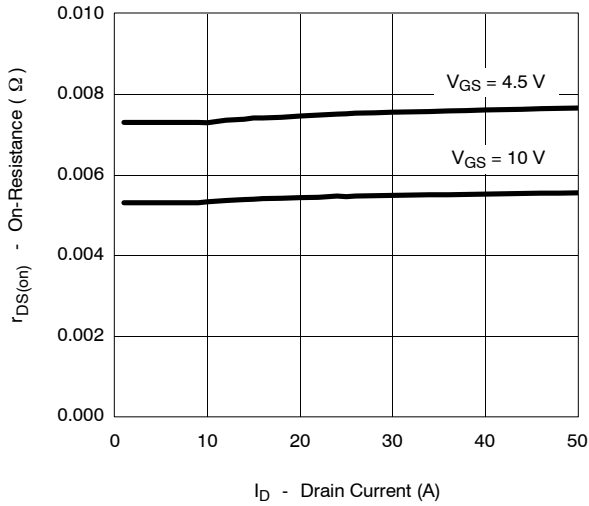
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.  
b. Guaranteed by design, not subject to production testing.

**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

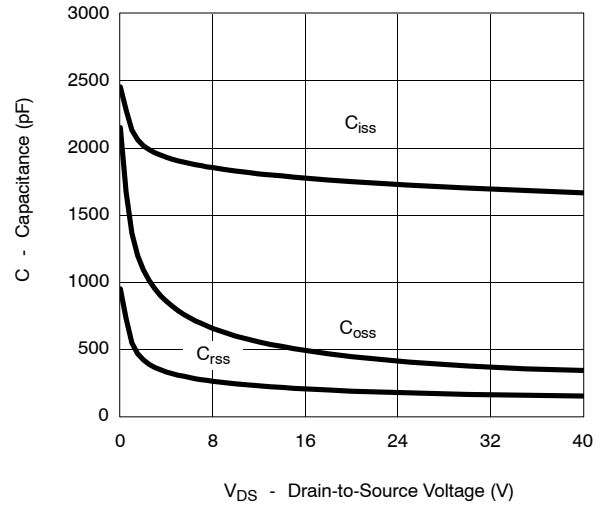


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

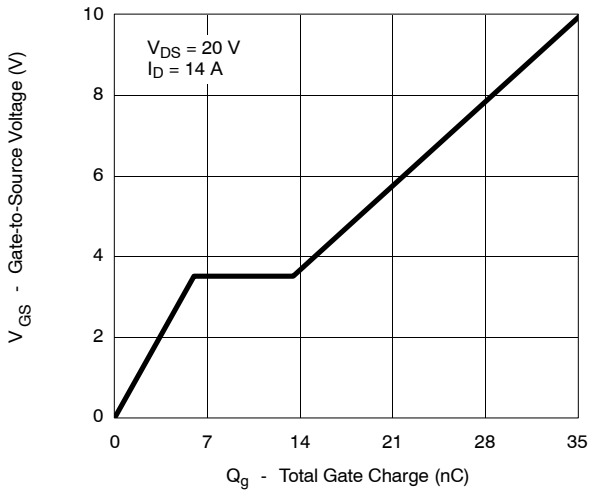
**On-Resistance vs. Drain Current**



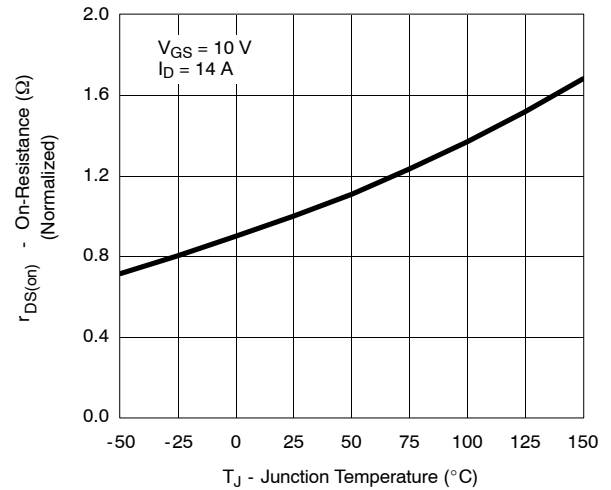
**Capacitance**



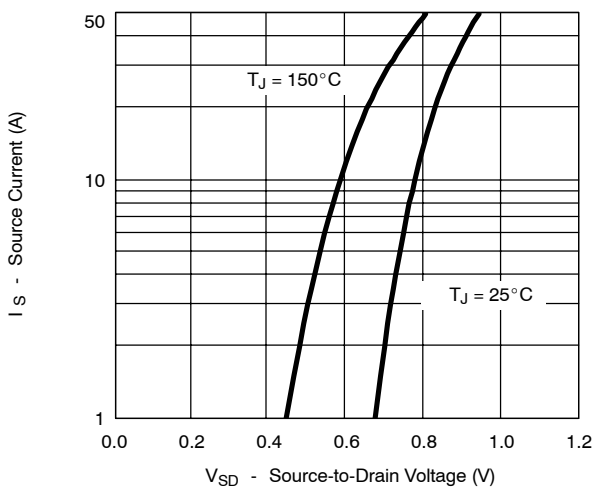
**Gate Charge**



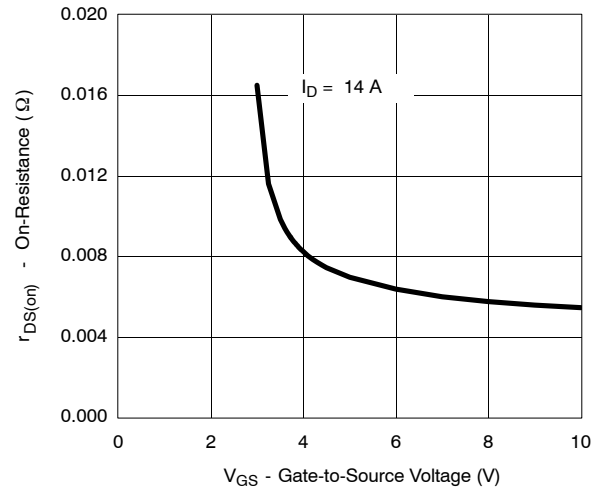
**On-Resistance vs. Junction Temperature**



**Source-Drain Diode Forward Voltage**



**On-Resistance vs. Gate-to-Source Voltage**



**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

