

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

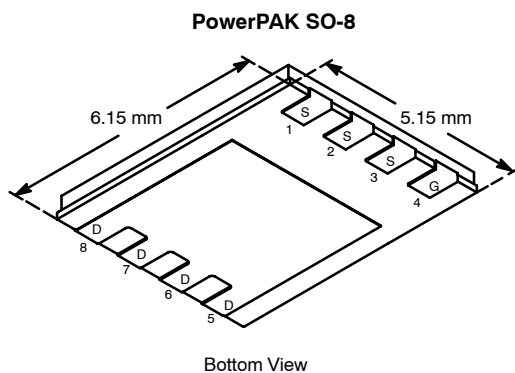
PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
40	0.009 @ $V_{GS} = 10$ V	17
	0.012 @ $V_{GS} = 4.5$ V	15

FEATURES

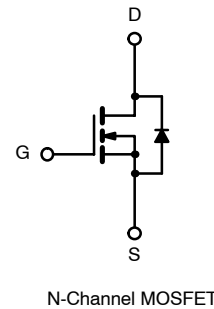
- TrenchFET® Power MOSFETS
- New Low Thermal Resistance PowerPAK® Package with Low 1.07-mm Profile
- PWM Optimized for Fast Switching
- 100% R_g Tested

APPLICATIONS

- DC/DC Converters
 - Synchronous Buck
 - Synchronous Rectifier



Ordering Information: Si7848DP-T1



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)					
Parameter	Symbol	10 secs	Steady State	Unit	
Drain-Source Voltage	V_{DS}	40		V	
Gate-Source Voltage	V_{GS}	± 20			
Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a	I_D	$T_A = 25^\circ\text{C}$	17	10.4	A
		$T_A = 70^\circ\text{C}$	13.7	8.3	
Pulsed Drain Current	I_{DM}	50			
Avalanche Current	I_{AS}	30			
Continuous Source Current (Diode Conduction) ^a	I_S	4.5	1.67		
Maximum Power Dissipation ^a	P_D	$T_A = 25^\circ\text{C}$	5	1.83	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 ^a	R_{thJA}	$t \leq 10$ sec	20	25	$^\circ\text{C/W}$
		Steady State	55	68	
Maximum Junction-to-Case (Drain)	R_{thJC}	1.8	2.2		

Notes

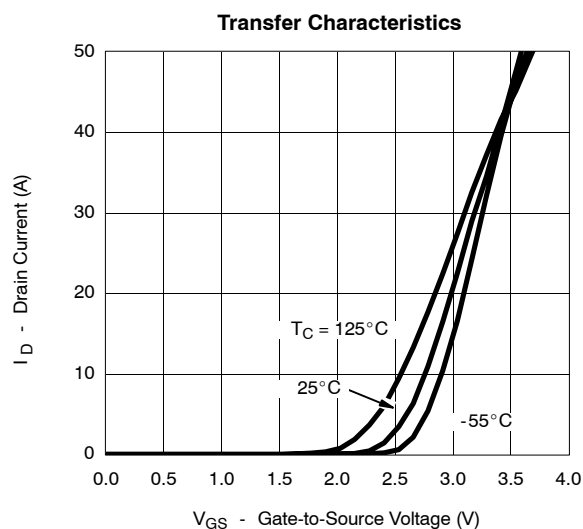
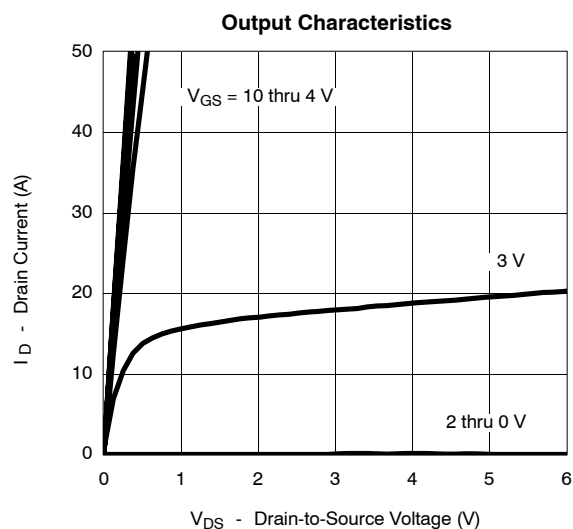
a. Surface Mounted on 1" x 1" FR4 Board.

SPECIFICATIONS (T_J = 25 °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 μA	1.0			V
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 32 V, V _{GS} = 0 V			1	μA
		V _{DS} = 32 V, V _{GS} = 0 V, T _J = 55 °C			5	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	50			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 14 A		0.0075	0.009	Ω
		V _{GS} = 4.5 V, I _D = 12 A		0.0095	0.012	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 14 A		50		S
Diode Forward Voltage ^a	V _{SD}	I _S = 2.8 A, V _{GS} = 0 V		0.75	1.1	V
Dynamic^b						
Total Gate Charge	Q _g	V _{DS} = 20 V, V _{GS} = 5 V, I _D = 14 A		18.5	28	nC
Gate-Source Charge	Q _{gs}		6			
Gate-Drain Charge	Q _{gd}		7.5			
Gate Resistance	R _g		0.1	0.8	1.1	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 20 V, R _L = 20 Ω I _D ≅ 1 A, V _{GEN} = 10 V, R _G = 6 Ω		15	30	ns
Rise Time	t _r		10	20		
Turn-Off Delay Time	t _{d(off)}		50	100		
Fall Time	t _f		20	40		
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 2.8 A, di/dt = 100 A/μs		30	60	

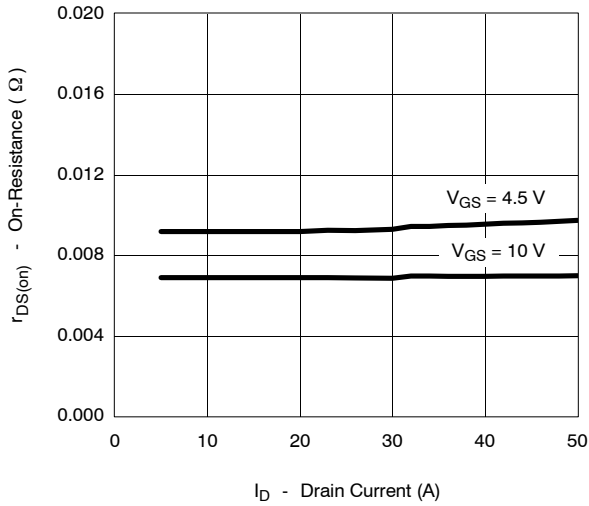
Notes

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

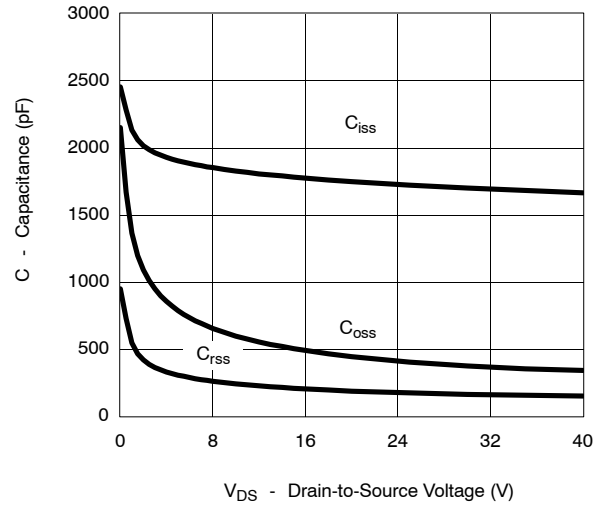
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

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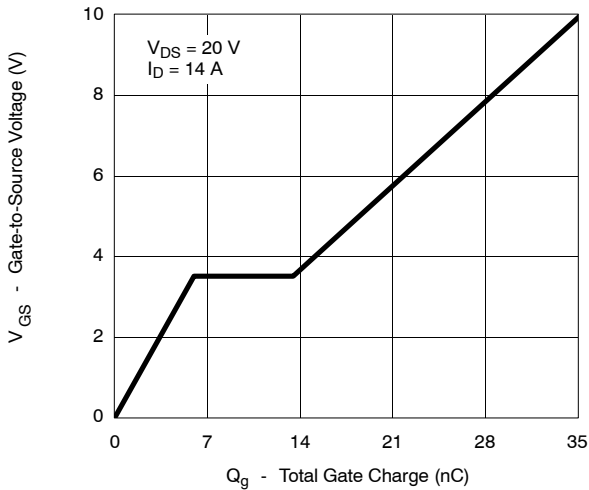
On-Resistance vs. Drain Current



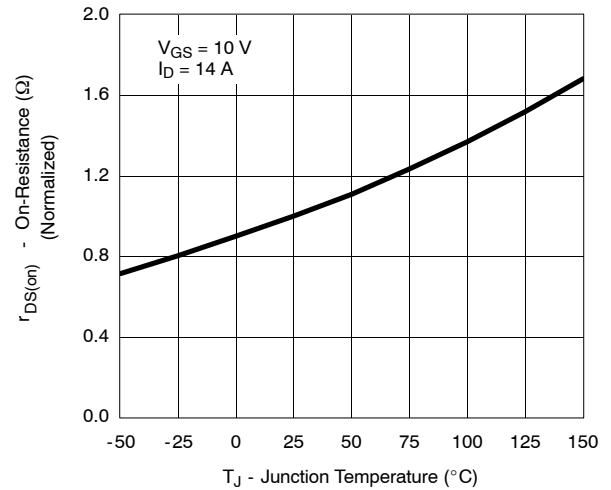
Capacitance



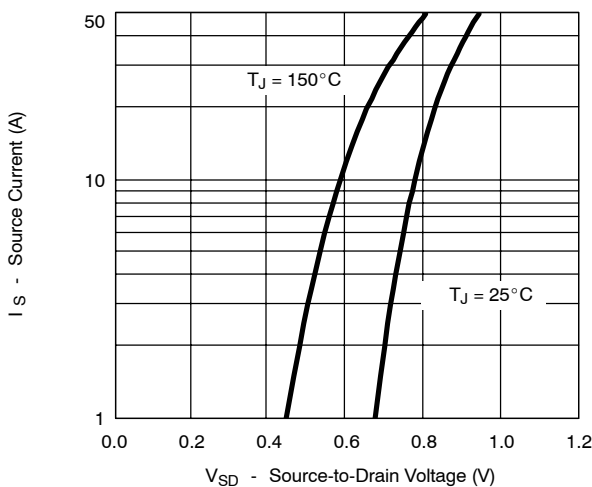
Gate Charge



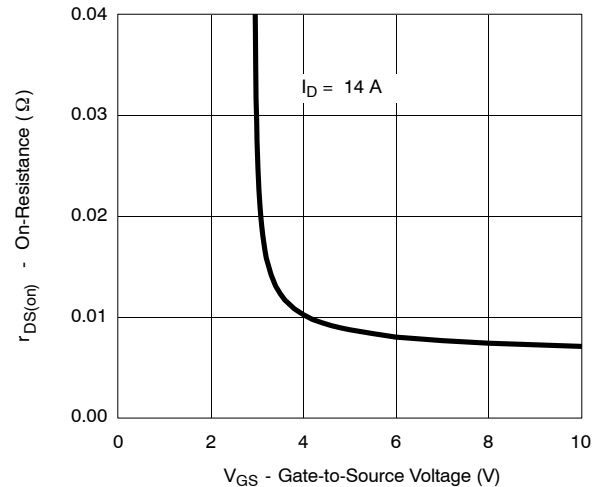
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

