



N-Channel 20-V (D-S) MOSFET

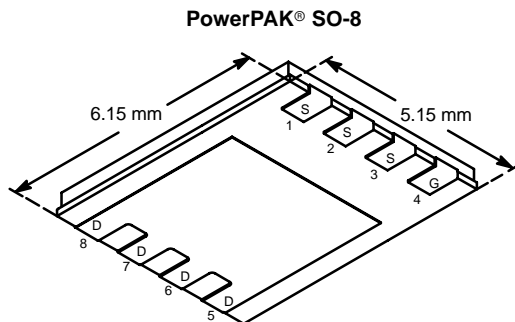
PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
20	0.0025 @ $V_{GS} = 10$ V	29
	0.00375 @ $V_{GS} = 4.5$ V	25

FEATURES

- TrenchFET® Power MOSFET
- Low $r_{DS(on)}$
- PWM (Q_{gd} and R_g) Optimized
- 100% R_g Tested

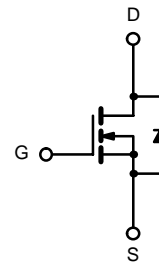
APPLICATIONS

- Low-Side MOSFET in Synchronous Buck DC/DC Converters in Desktops
- Low Output Voltage Synchronous Rectifier



Bottom View

Ordering Information: Si7866DP-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}	20		V	
Gate-Source Voltage	V_{GS}	± 20			
Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a	I_D	$T_A = 25^\circ\text{C}$	29	18	A
		$T_A = 70^\circ\text{C}$	25	14	
Pulsed Drain Current (10 μs Pulse Width)	I_{DM}	60			
Continuous Source Current (Diode Conduction) ^a	I_S	4.5	1.6	W	
Maximum Power Dissipation ^a	P_D	$T_A = 25^\circ\text{C}$	5.4		1.9
		$T_A = 70^\circ\text{C}$	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	$^\circ\text{C/W}$
		Steady State	50	65	
Maximum Junction-to-Case (Drain)	R_{thJC}	1.0	1.5		

Notes

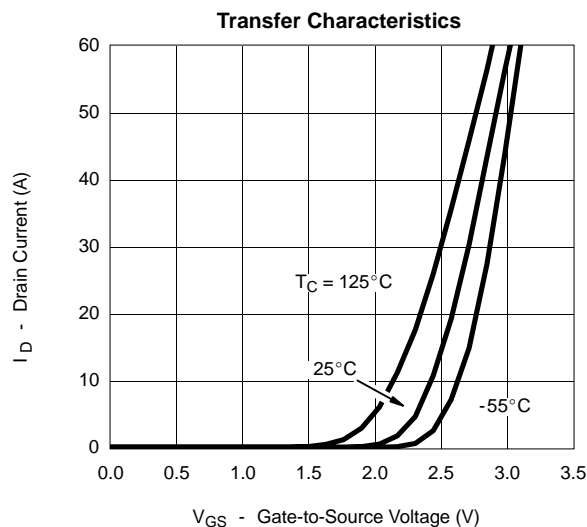
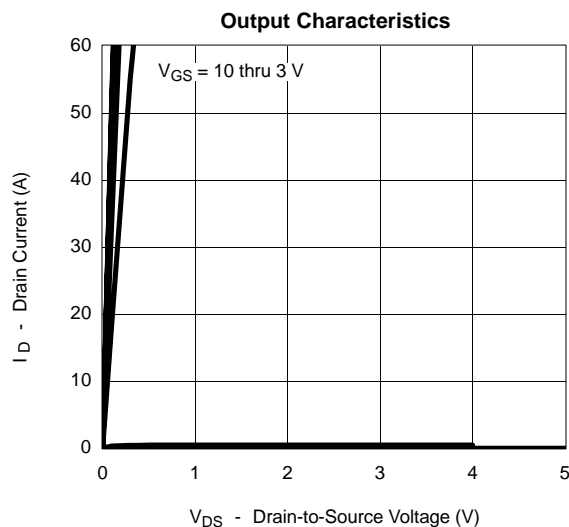
a. Surface Mounted on 1" x 1" FR4 Board.

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	0.8		2.1	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} = 16 V, V _{GS} = 0 V			1	μA
		V _{DS} = 16 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	30			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 29 A		0.0020	0.0025	Ω
		V _{GS} = 4.5 V, I _D = 25 A		0.0026	0.00375	
Forward Transconductance ^a	g _{fs}	V _{DS} = 6 V, I _D = 29 A		95		S
Diode Forward Voltage ^a	V _{SD}	I _S = 4.5 A, V _{GS} = 0 V		0.68	1.1	V
Dynamic^b						
Total Gate Charge	Q _g	V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 29 A		40	60	nC
Gate-Source Charge	Q _{gs}			15		
Gate-Drain Charge	Q _{gd}			11		
Gate Resistance	R _g		0.5	1.2	1.8	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 10 V, R _L = 10 Ω I _D ≅ 1 A, V _{GEN} = 4.5 V, R _G = 6 Ω		70	100	ns
Rise Time	t _r			60	90	
Turn-Off Delay Time	t _{d(off)}			105	160	
Fall Time	t _f			55	85	
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 2.9 A, di/dt = 100 A/μs		65	100	

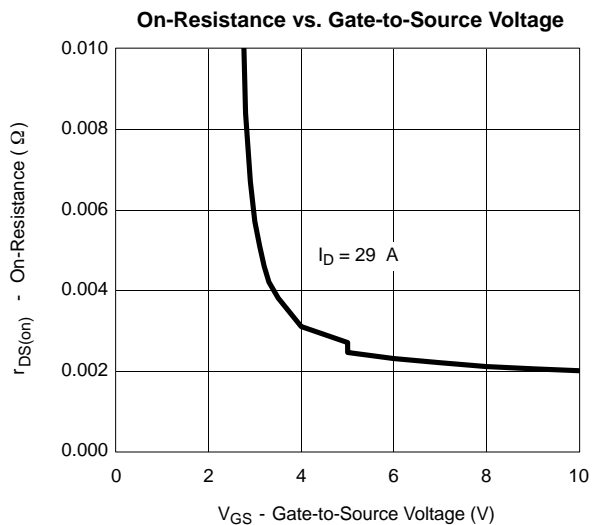
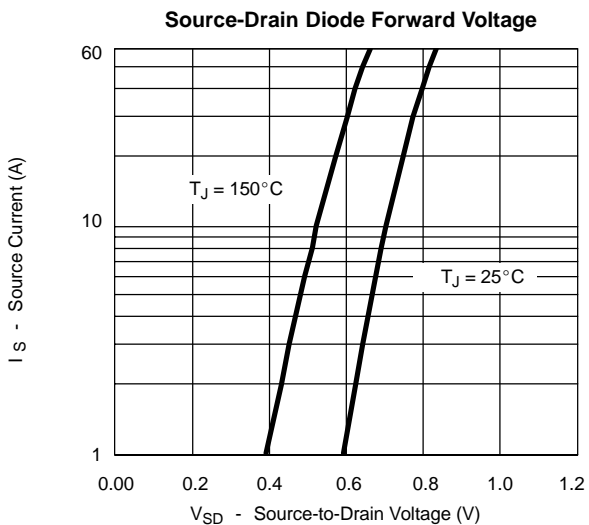
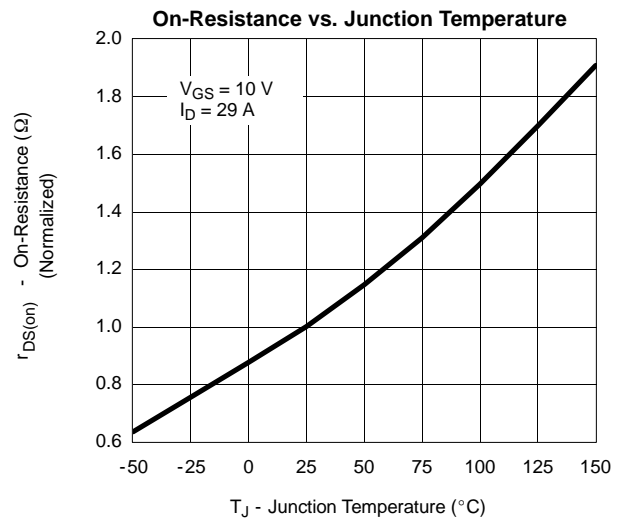
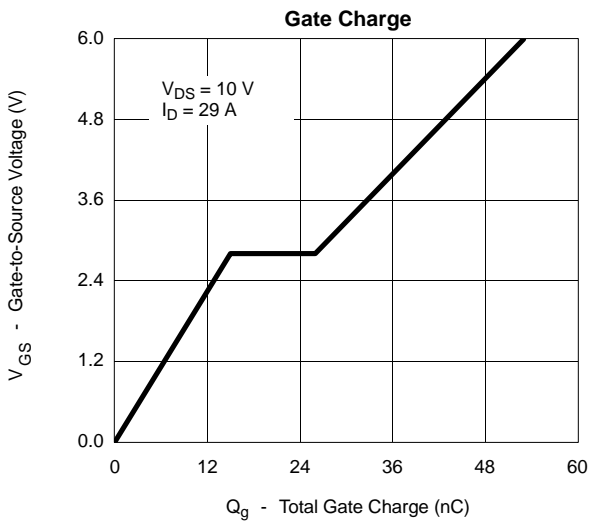
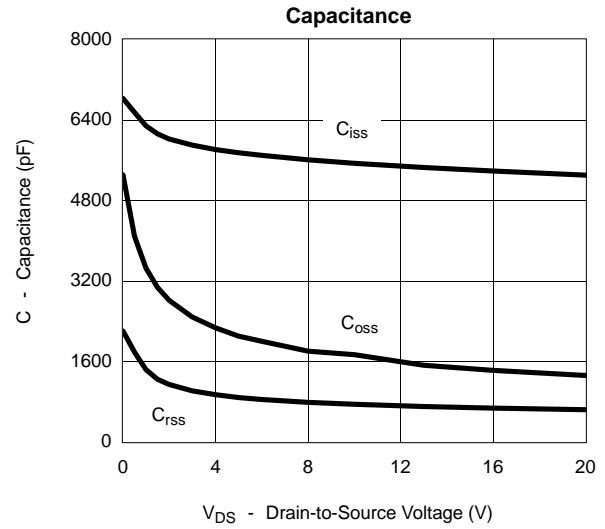
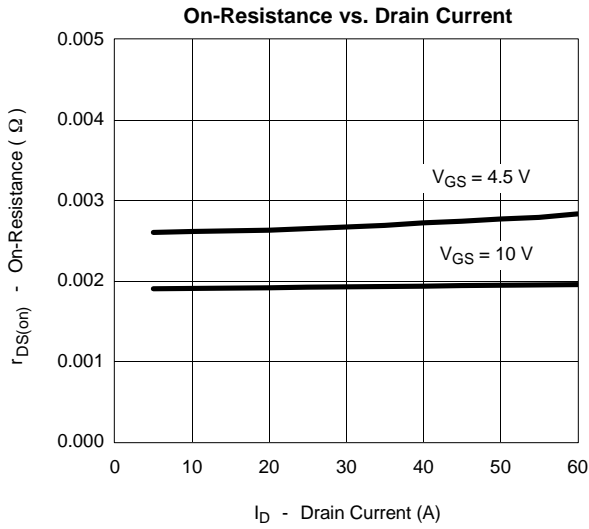
Notes

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

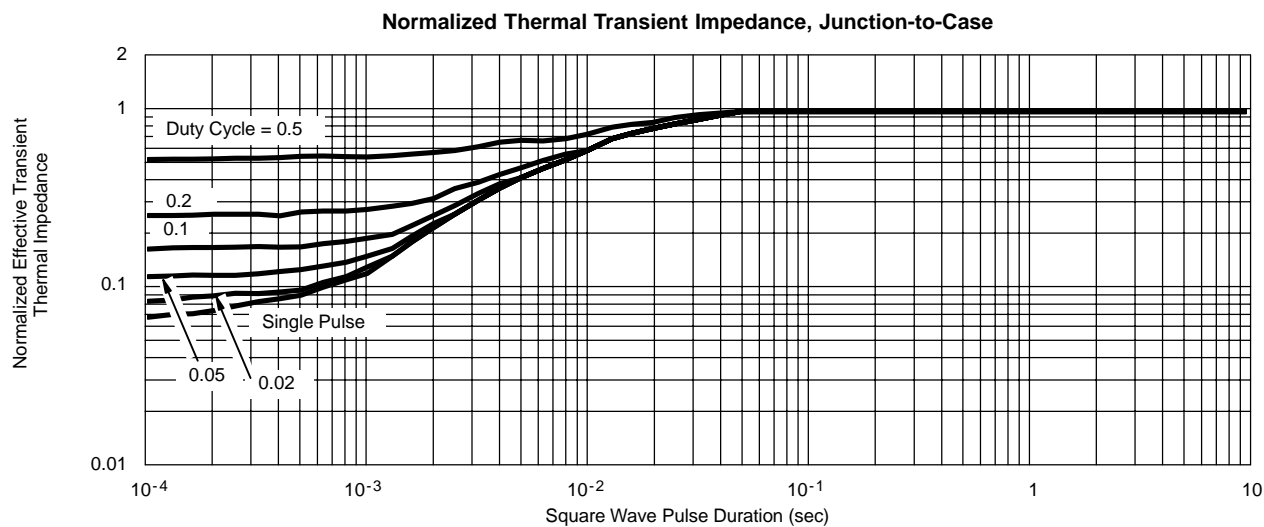
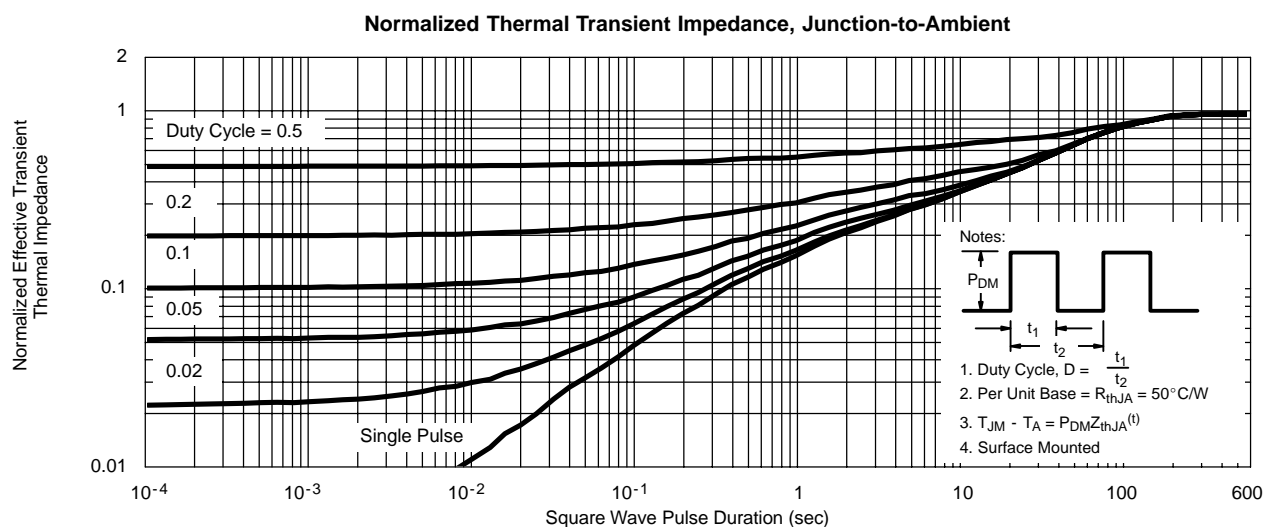
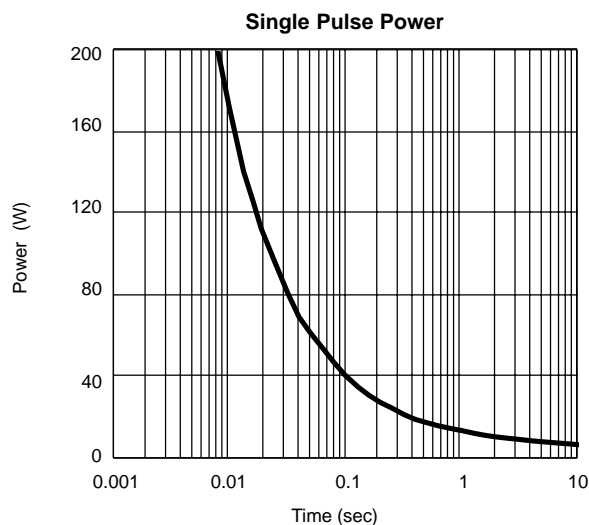
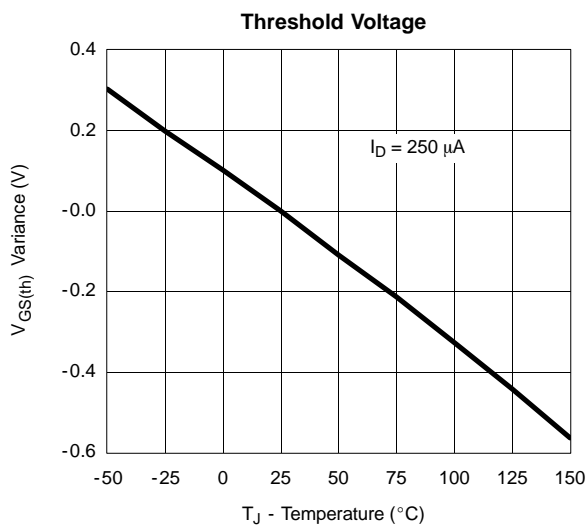
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



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