



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

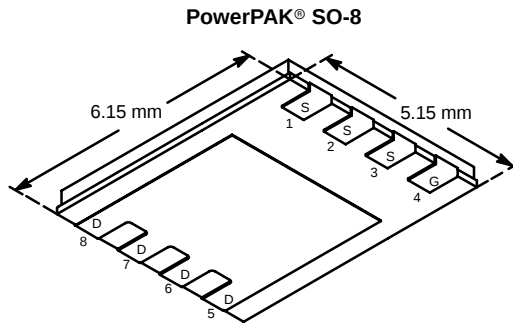
PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
20	0.0025 @ $V_{GS} = 10$ V	29
	0.00375 @ $V_{GS} = 4.5$ V	25

FEATURES

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

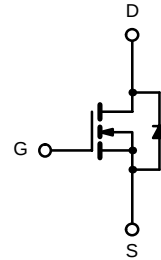
APPLICATIONS

- 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°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°C) ^a	T _A = 25°C	I _D	29	18	A
	T _A = 70°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	
Maximum Power Dissipation ^a	T _A = 25°C	P _D	5.4	1.9	W
	T _A = 70°C		3.4	1.2	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to 150		°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	$t \leq 10$ sec	R_{thJA}	18	23	$^\circ\text{C/W}$
	Steady State		50	65	
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	1.0	1.5	

Notes

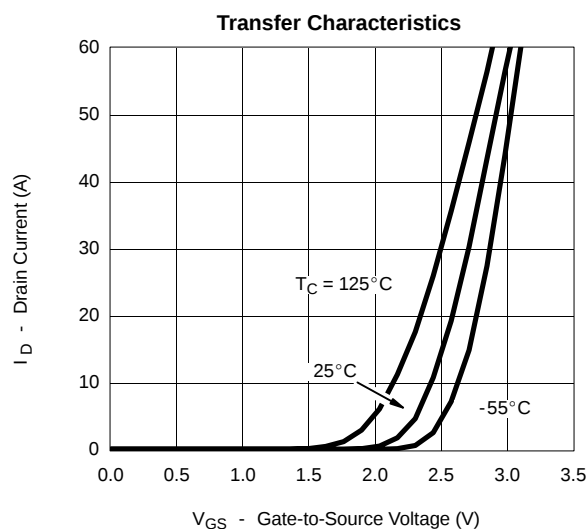
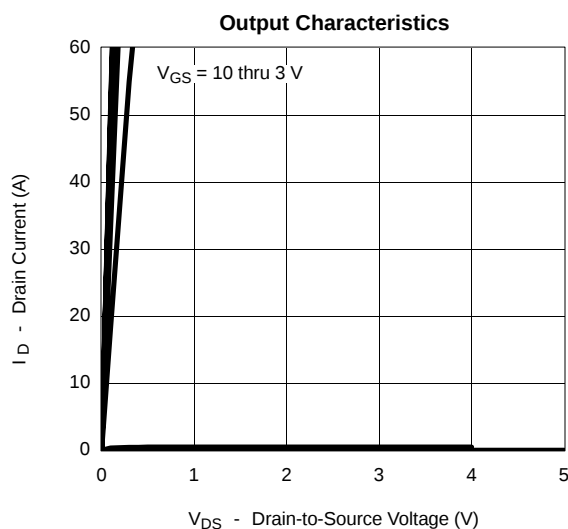
a. Surface Mounted on 1" x 1" FR4 Board.

SPECIFICATIONS ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	0.8		2.1	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}	$V_{DS} = 16\ \text{V}, V_{GS} = 0\ \text{V}$			1	μA
		$V_{DS} = 16\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 55^\circ\text{C}$			5	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\ \text{V}, V_{GS} = 10\ \text{V}$	30			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\ \text{V}, I_D = 29\ \text{A}$		0.0020	0.0025	Ω
		$V_{GS} = 4.5\ \text{V}, I_D = 25\ \text{A}$		0.0026	0.00375	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 6\ \text{V}, I_D = 29\ \text{A}$		95		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 4.5\ \text{A}, V_{GS} = 0\ \text{V}$		0.68	1.1	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = 10\ \text{V}, V_{GS} = 4.5\ \text{V}, I_D = 29\ \text{A}$		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	$t_{d(on)}$	$V_{DD} = 10\ \text{V}, R_L = 10\ \Omega$ $I_D \cong 1\ \text{A}, V_{GEN} = 4.5\ \text{V}, R_G = 6\ \Omega$		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}	$I_F = 2.9\ \text{A}, di/dt = 100\ \text{A}/\mu\text{s}$		65	100	

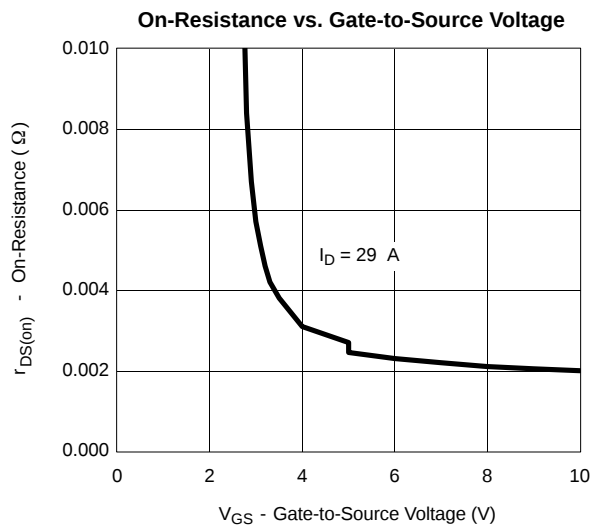
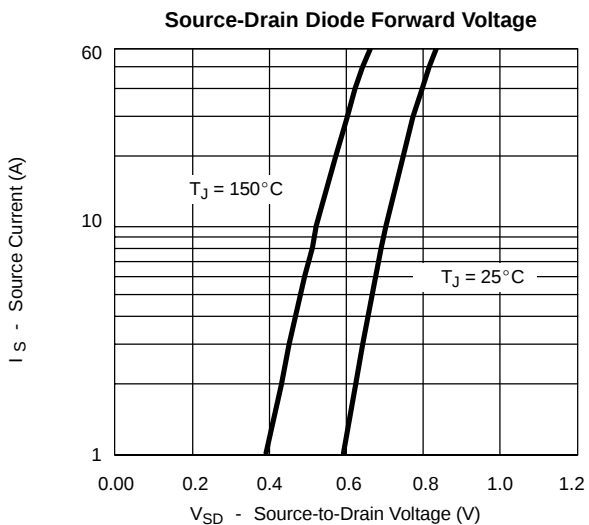
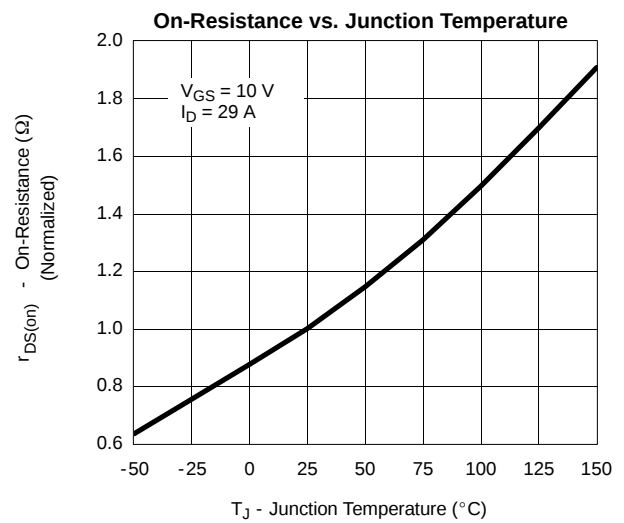
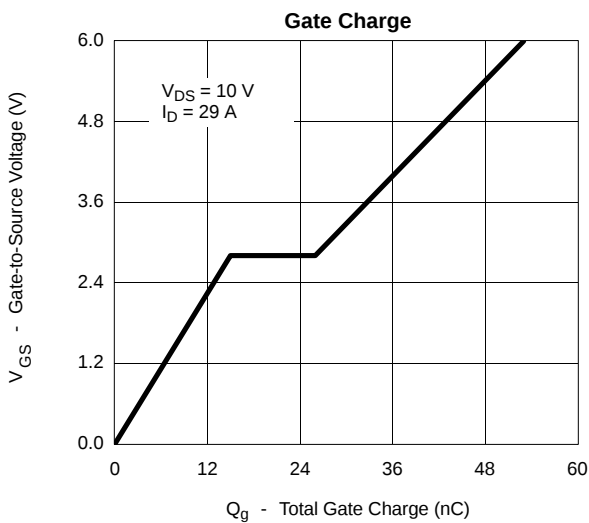
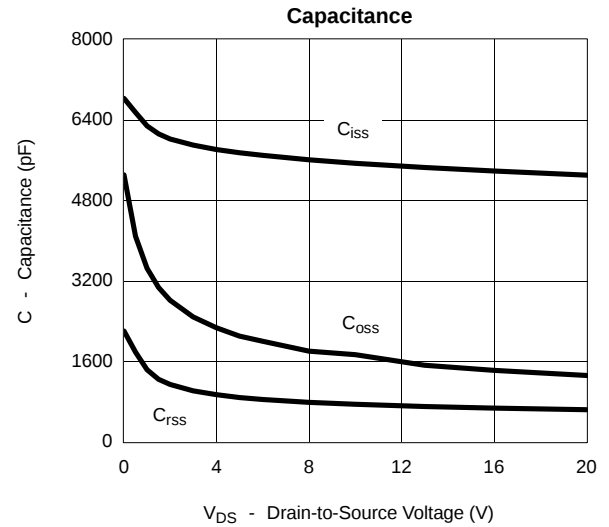
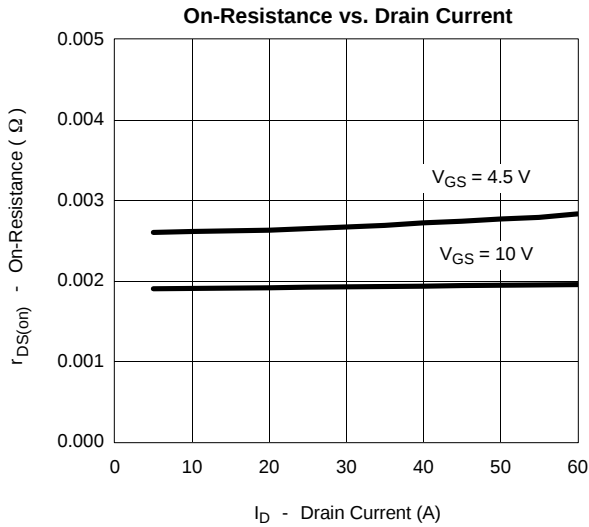
Notes

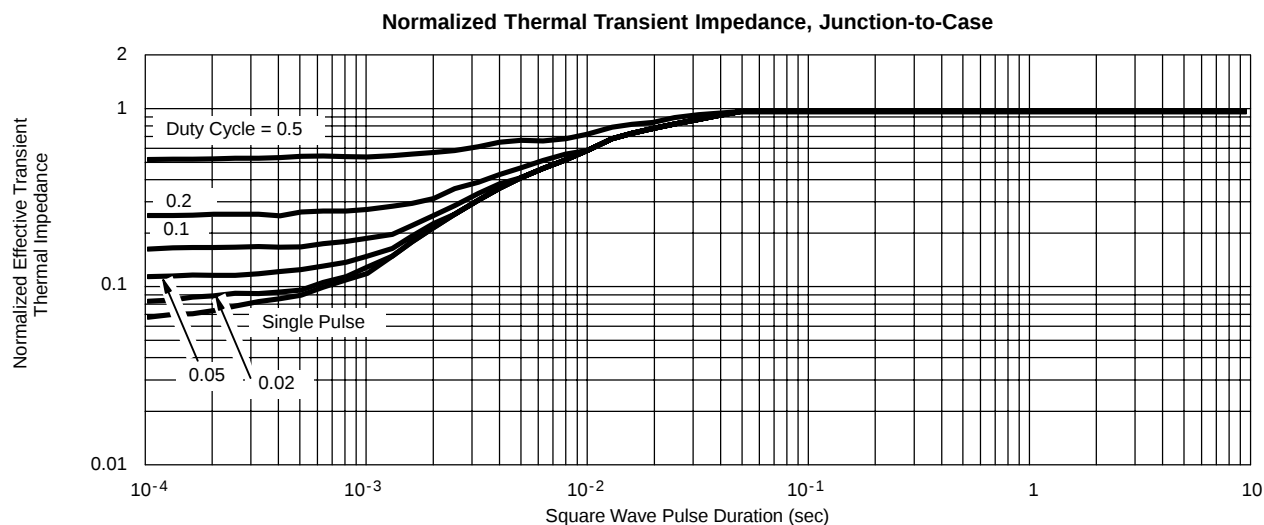
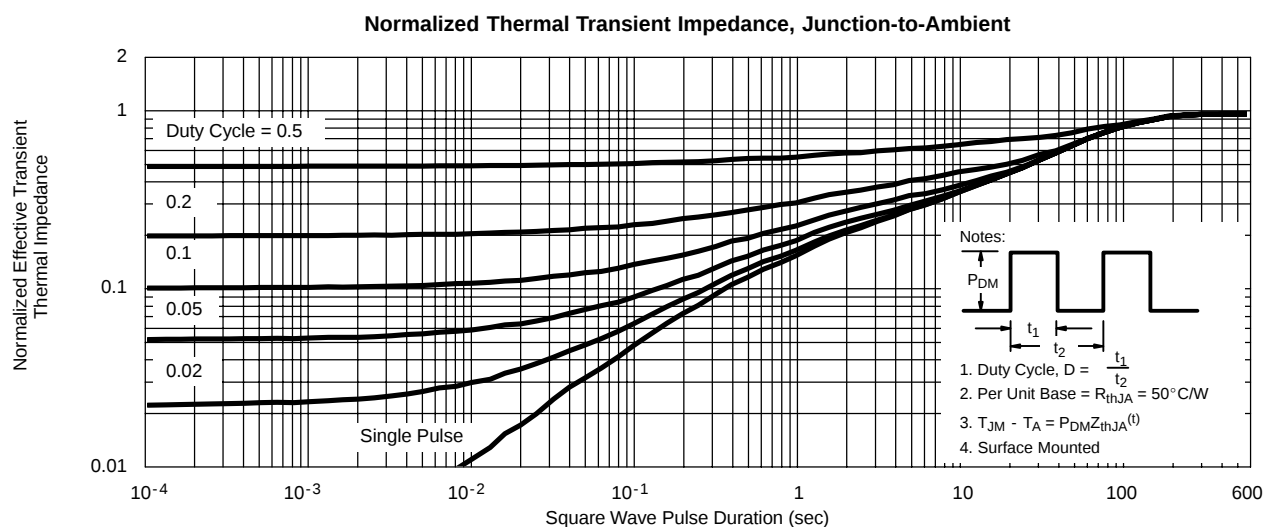
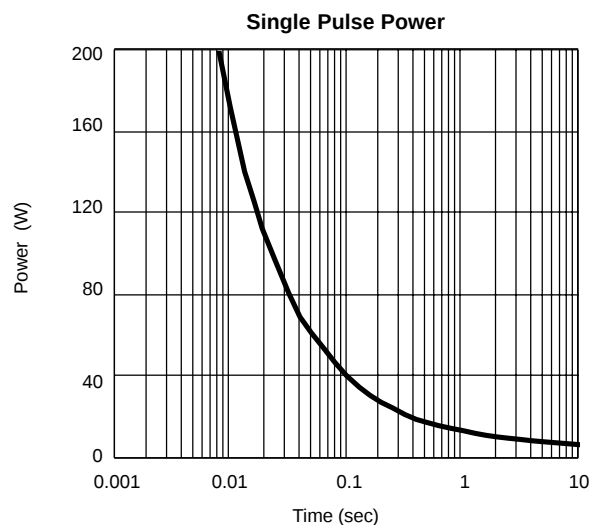
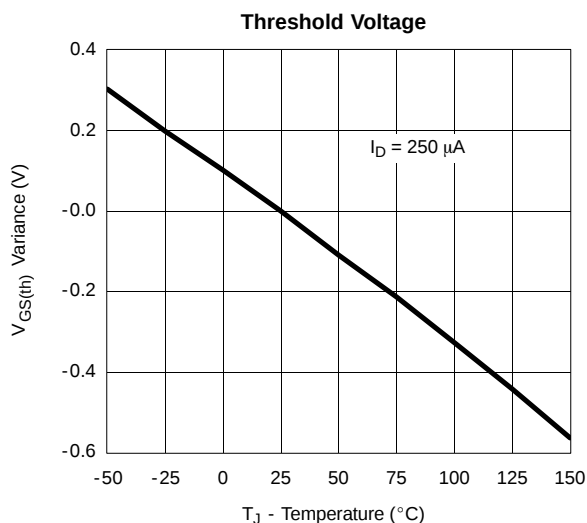
- a. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



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