



New Product

**Si7806DN**  
Vishay Siliconix

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

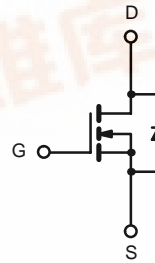
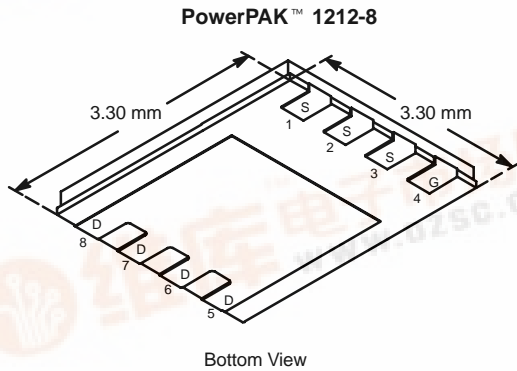
PRODUCT SUMMARY		
V <sub>DS</sub> (V)	r <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)
30	0.011 @ V <sub>GS</sub> = 10 V	14.4
	0.0175 @ V <sub>GS</sub> = 4.5 V	12.6

### FEATURES

- TrenchFET® Power MOSFET
- PWM Optimized
- New Low Thermal Resistance PowerPAK™ Package with Low 1.07-mm Profile

### APPLICATIONS

- DC/DC Converters
  - Secondary Synchronous Rectifier
  - High-Side MOSFET in Synchronous Buck



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>	30		V	
Gate-Source Voltage	V <sub>GS</sub>	± 20			
Continuous Drain Current (T <sub>J</sub> = 150°C) <sup>a</sup>	I <sub>D</sub>	T <sub>A</sub> = 25°C	14.4	9.2	A
		T <sub>A</sub> = 70°C	11.6	7.4	
Pulsed Drain Current	I <sub>DM</sub>	40		A	
Continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	3.2	1.3	A	
Maximum Power Dissipation <sup>a</sup>	P <sub>D</sub>	T <sub>A</sub> = 25°C	3.8	1.5	W
		T <sub>A</sub> = 70°C	2.0	0.8	
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>	R <sub>thJA</sub>	t ≤ 10 sec	24	33	°C/W
		Steady State	65	81	
Maximum Junction-to-Case (Drain)	R <sub>thJC</sub>	1.9	2.4		

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

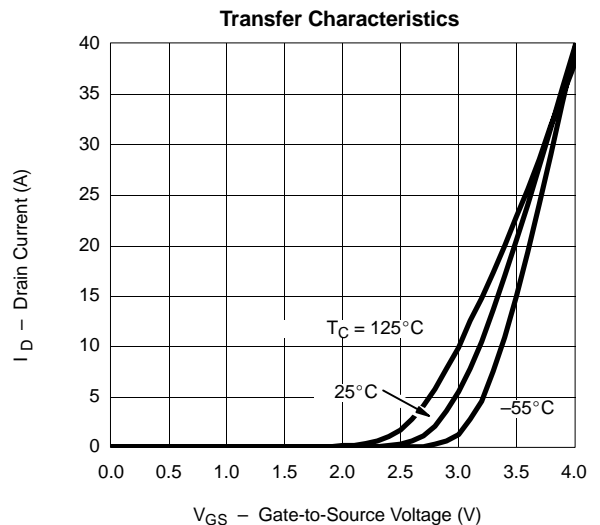
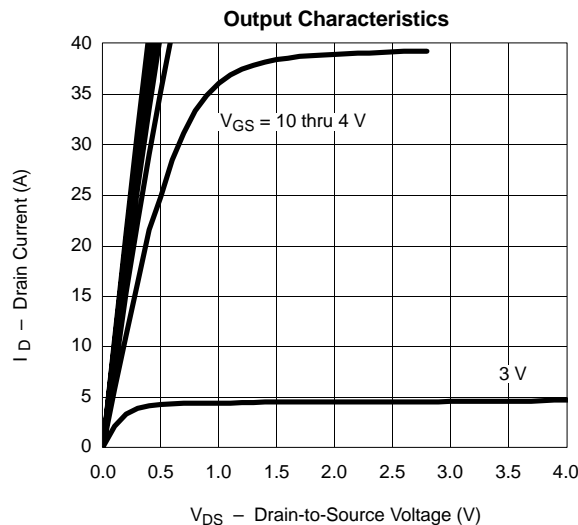


MOSFET SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	1.0		3	V
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 24 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	40			A
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 14.4 A		0.009	0.011	Ω
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 12.6 A		0.0145	0.0175	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 14.4 A		34		S
Diode Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>S</sub> = 3.2 A, V <sub>GS</sub> = 0 V		0.77	1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 14.4 A		8.5	11	nC
	Q <sub>gt</sub>			19	24	
Gate-Source Charge	Q <sub>gs</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 14.4 A		3.6		
Gate-Drain Charge	Q <sub>gd</sub>			3.0		
Gate-Resistance	R <sub>g</sub>			2		Ω
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 15 V, R <sub>L</sub> = 15 Ω I <sub>D</sub> ≅ 1 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 6 Ω		8	15	ns
Rise Time	t <sub>r</sub>			12	20	
Turn-Off Delay Time	t <sub>d(off)</sub>			25	40	
Fall Time	t <sub>f</sub>			10	20	
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 3.2 A, di/dt = 100 A/μs		35	70	

**Notes**

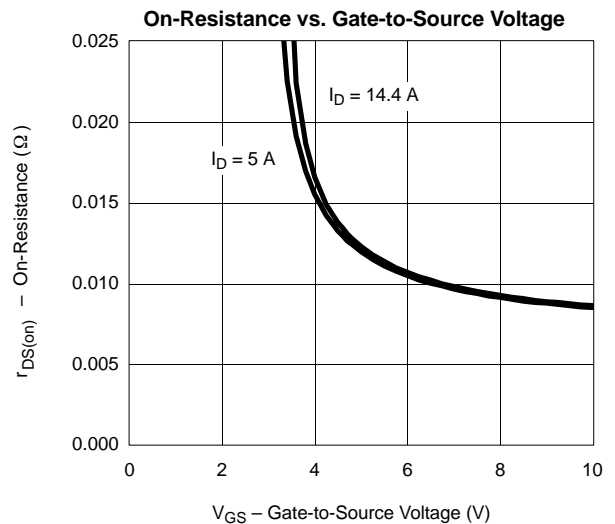
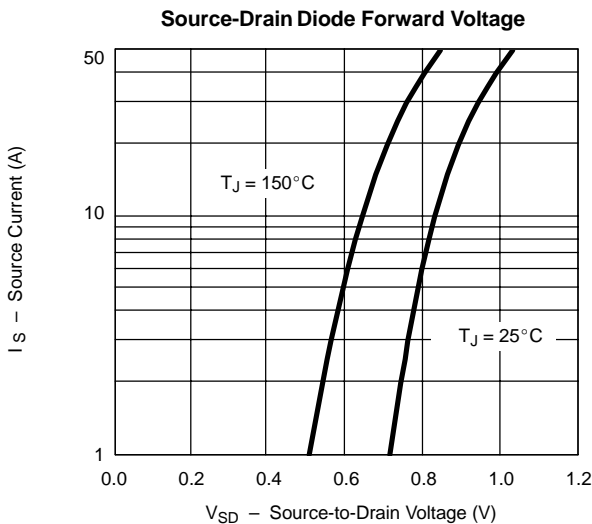
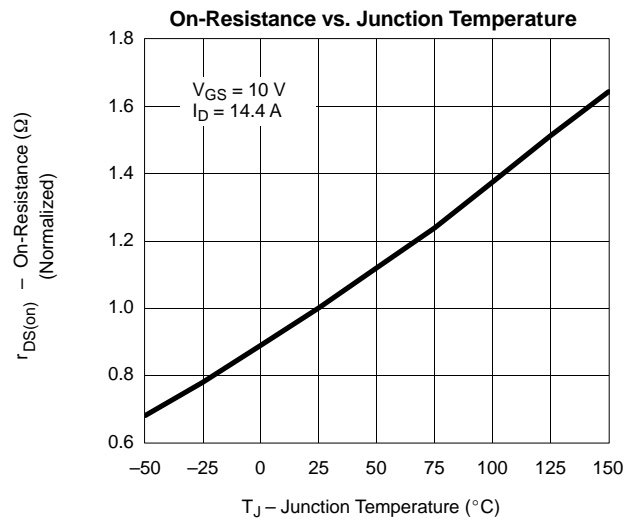
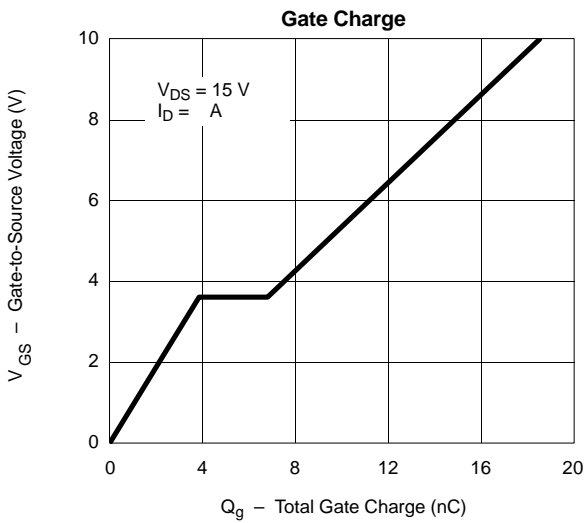
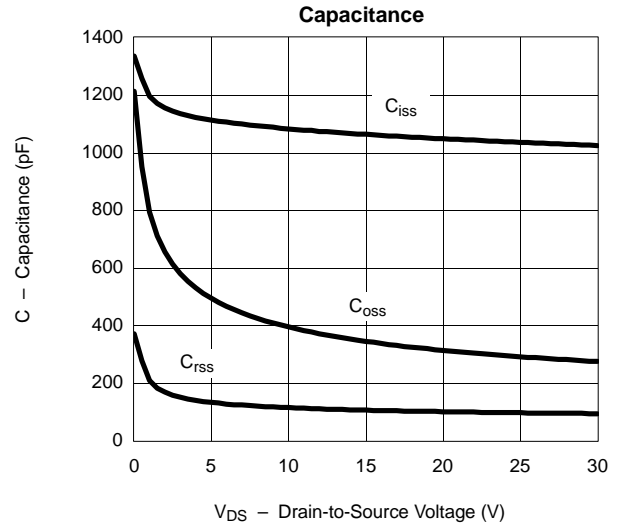
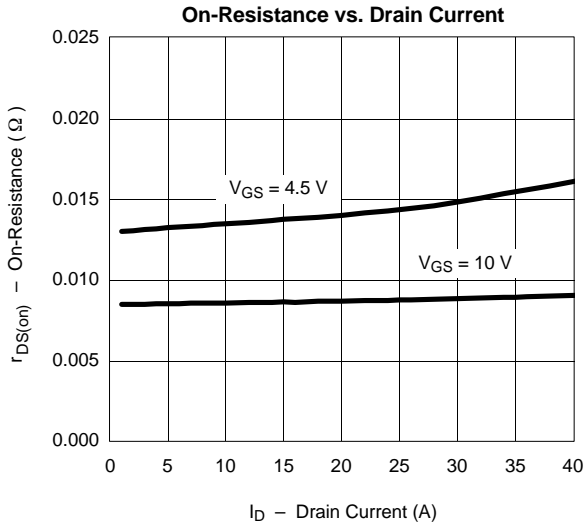
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

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



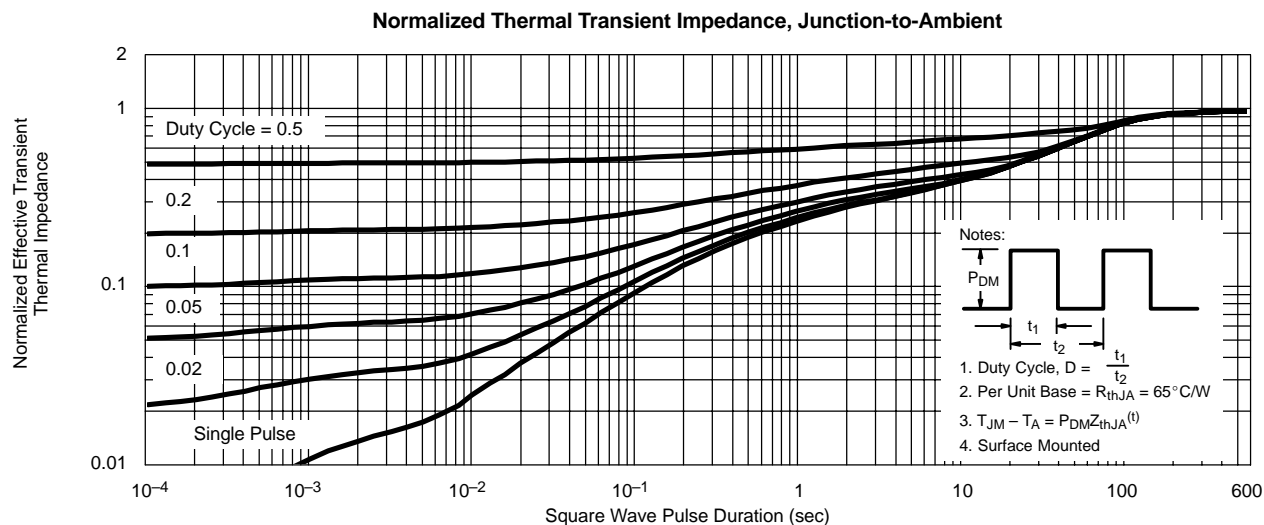
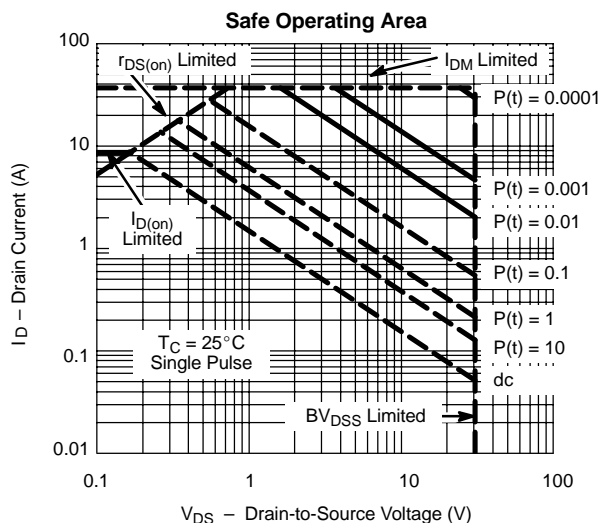
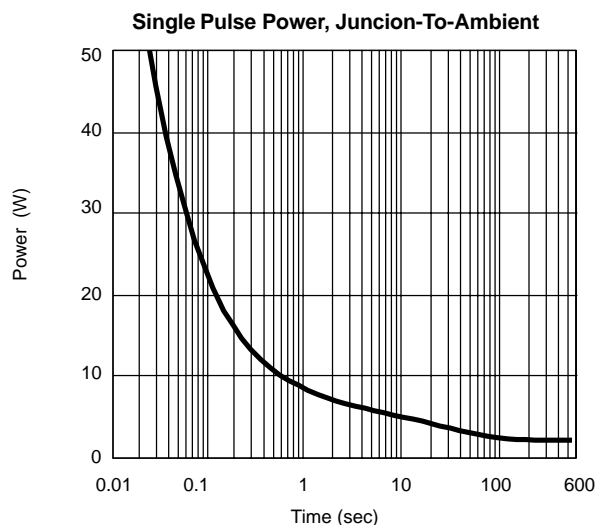
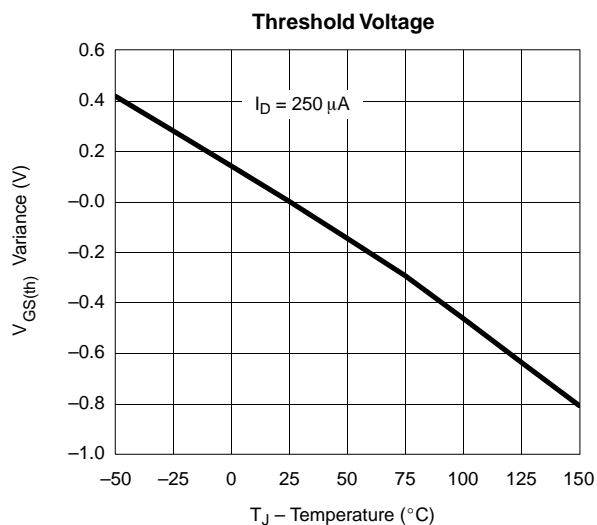


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