



New Product

**Si7458DP**  
Vishay Siliconix

## N-Channel 20-V (D-S) Fast Switching MOSFET

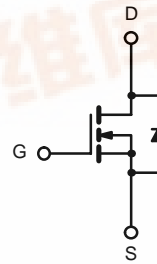
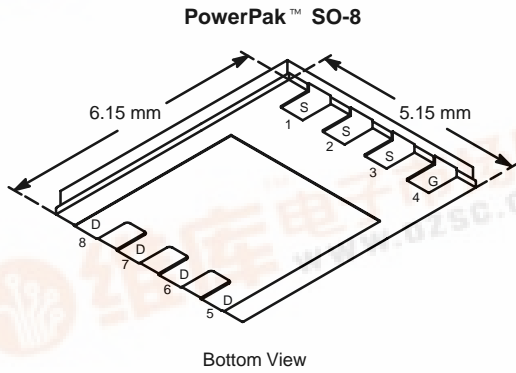
PRODUCT SUMMARY		
V <sub>DS</sub> (V)	r <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)
20	0.0045 @ V <sub>GS</sub> = 4.5 V	22
	0.0075 @ V <sub>GS</sub> = 2.5 V	19

### FEATURES

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

### APPLICATIONS

- Synchronous Rectifier–Low Output Voltage
- Portable Computer Battery Selection or Protection



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>	20		V
Gate-Source Voltage		V <sub>GS</sub>	± 12		
Continuous Drain Current (T <sub>J</sub> = 150°C) <sup>a</sup>	T <sub>A</sub> = 25°C	I <sub>D</sub>	22	13.4	A
	T <sub>A</sub> = 70°C		17.6	10.7	
Pulsed Drain Current		I <sub>DM</sub>	50		
Continuous Source Current (Diode Conduction) <sup>a</sup>		I <sub>S</sub>	4.3	1.6	
Maximum Power Dissipation <sup>a</sup>	T <sub>A</sub> = 25°C	P <sub>D</sub>	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	R <sub>thJA</sub>	18	23	°C/W
	Steady State		50	65	
Maximum Junction-to-Case (Drain)	Steady State	R <sub>thJC</sub>	1.0	1.5	

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



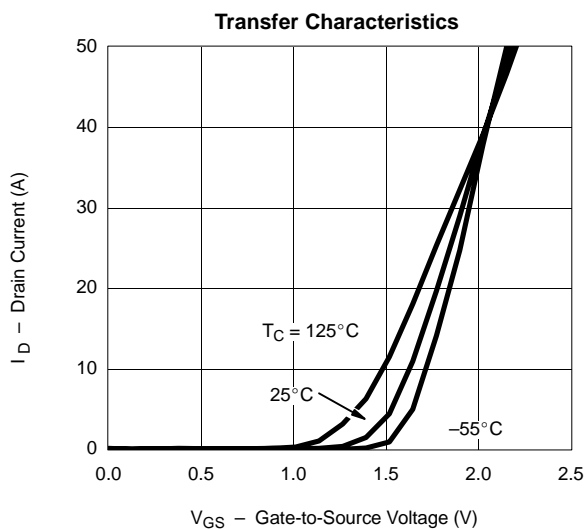
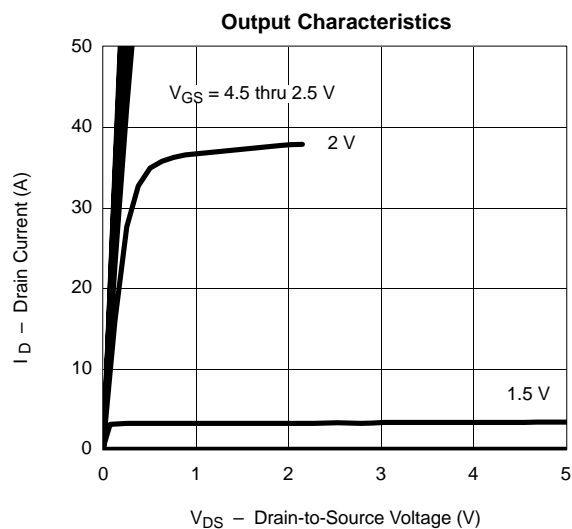
### MOSFET SPECIFICATIONS (T<sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)

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	0.6		1.4	V
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 12 V			± 100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 16 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 16 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 85 °C			20	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 5 V, V <sub>GS</sub> = 4.5 V	50			A
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 22 A		0.0035	0.0045	Ω
		V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 19 A		0.006	0.0075	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 22 A		90		S
Diode Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>S</sub> = 3 A, V <sub>GS</sub> = 0 V		0.8	1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 21 A		38	50	nC
Gate-Source Charge	Q <sub>gs</sub>			8		
Gate-Drain Charge	Q <sub>gd</sub>			8.5		
Gate-Resistance	R <sub>G</sub>			0.9		Ω
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 10 V, R <sub>L</sub> = 10 Ω I <sub>D</sub> ≅ 1 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 6 Ω		22	35	ns
Rise Time	t <sub>r</sub>			22	35	
Turn-Off Delay Time	t <sub>d(off)</sub>			125	190	
Fall Time	t <sub>f</sub>			60	90	
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 3 A, di/dt = 100 A/μs		60	90	

**Notes**

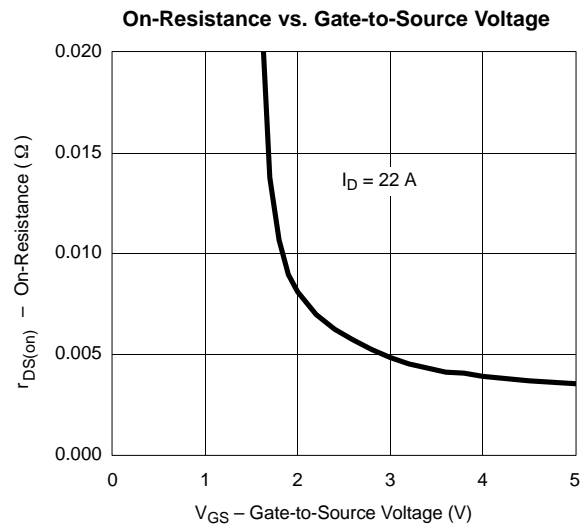
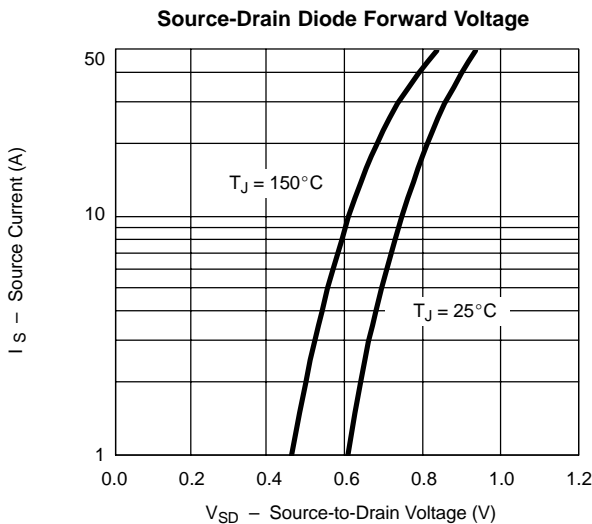
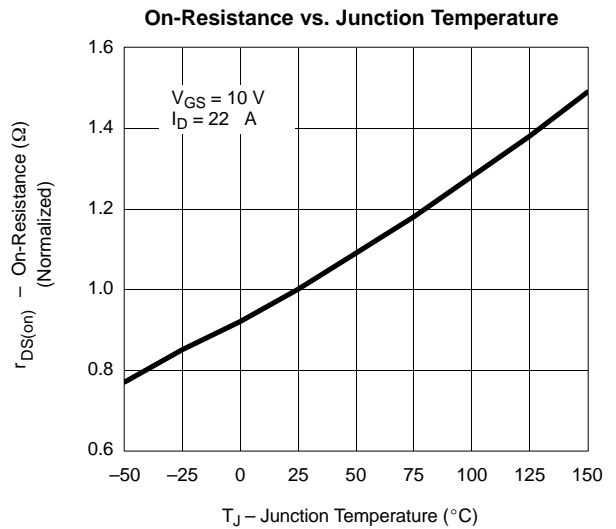
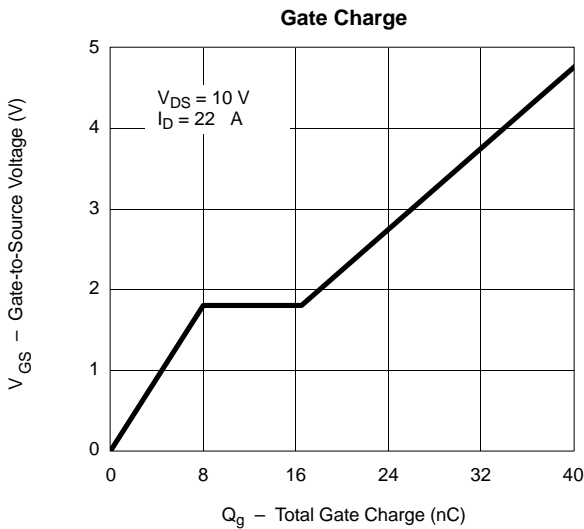
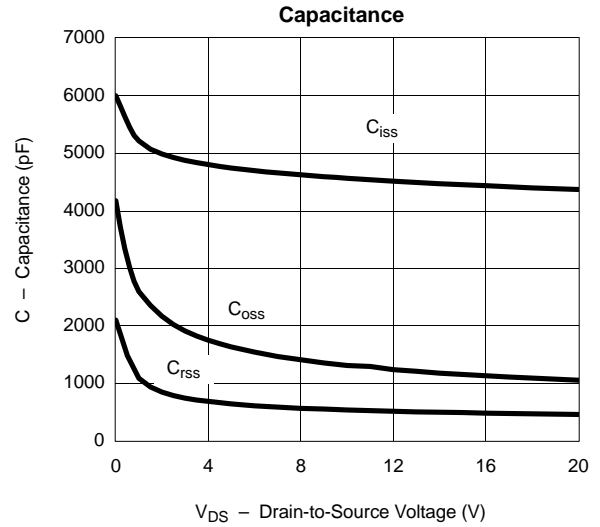
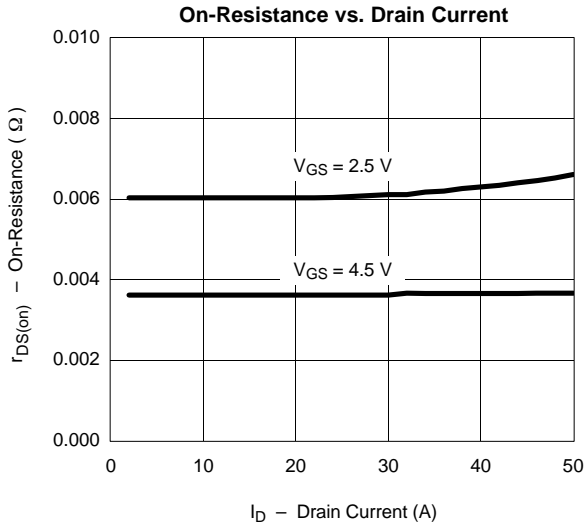
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

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





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