

N-Channel Reduced Q_g , Fast Switching WFET®

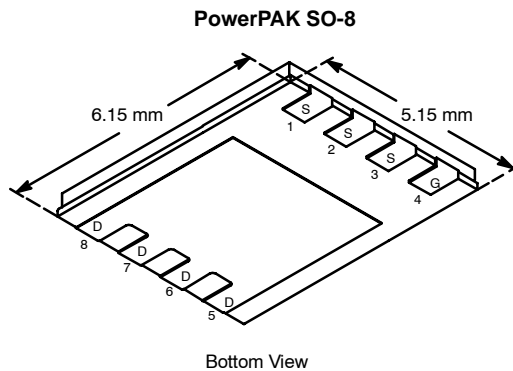
PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.0032 @ $V_{GS} = 10$ V	30
	0.0036 @ $V_{GS} = 4.5$ V	27

FEATURES

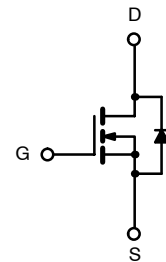
- Extremely Low Q_{gd} WFET Technology for Switching Losses Improvement
- Q_{sd}/Q_{gs} Ratio of 0.37 per Shoot-Through Limiting
- TrenchFET® Gen II Power MOSFET
- 100% R_g Tested

APPLICATIONS

- Low-Side DC/DC Conversion
 - Notebook, Server, VRM Module
- Fixed Telecom



Ordering Information: Si7668DP-T1—E3 (Lead Free)



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}	30		V	
Gate-Source Voltage	V_{GS}	± 12			
Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a	I_D	$T_A = 25^\circ\text{C}$	30	18	A
		$T_A = 70^\circ\text{C}$	25	15	
Pulsed Drain Current (10 μs Pulse Width)	I_{DM}	70			
Continuous Source Current (Diode Conduction) ^a	I_S	4.5	1.8		
Avalanche Current	I_{AS}	50			
Maximum Power Dissipation ^a	P_D	$T_A = 25^\circ\text{C}$	5.4	1.9	W
		$T_A = 70^\circ\text{C}$	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

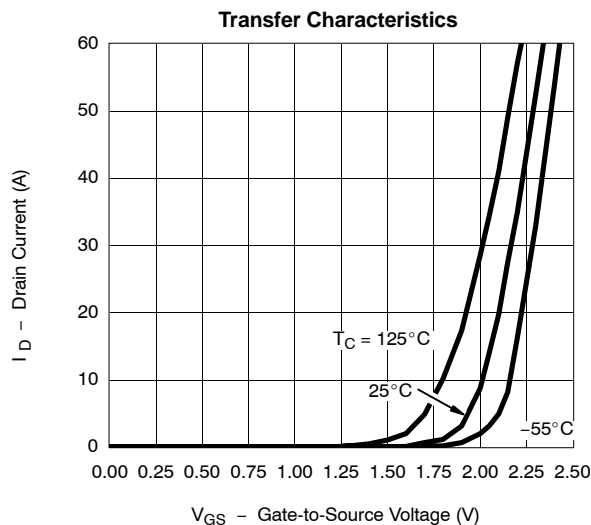
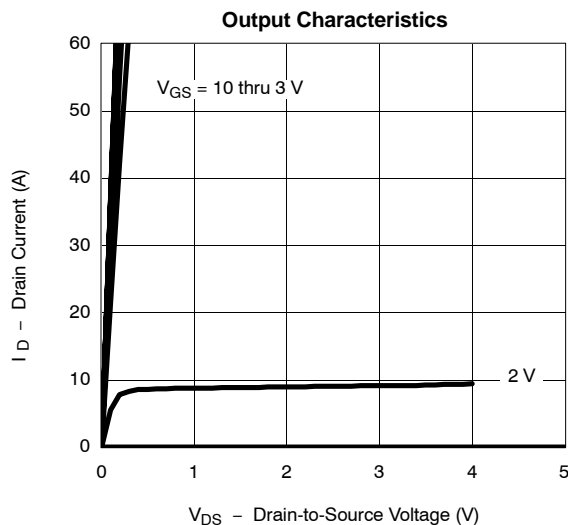
a. Surface Mounted on 1" x 1" FR4 Board.

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

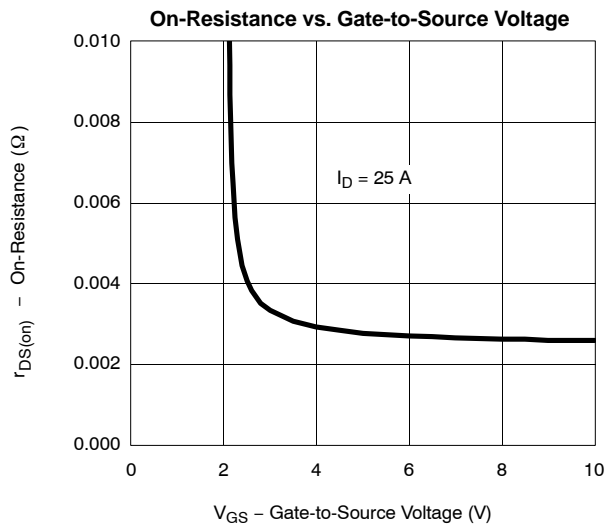
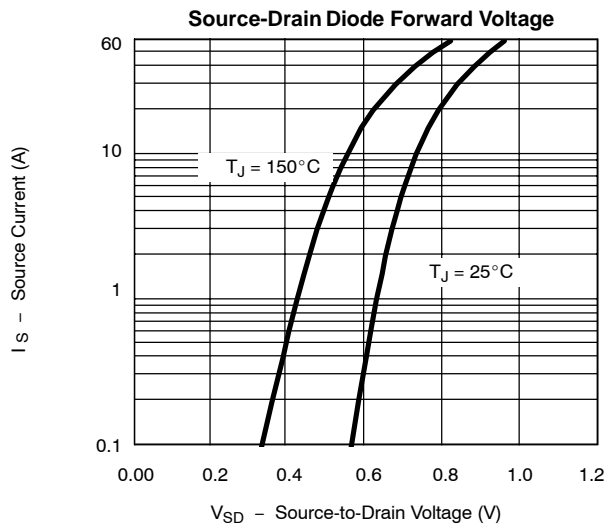
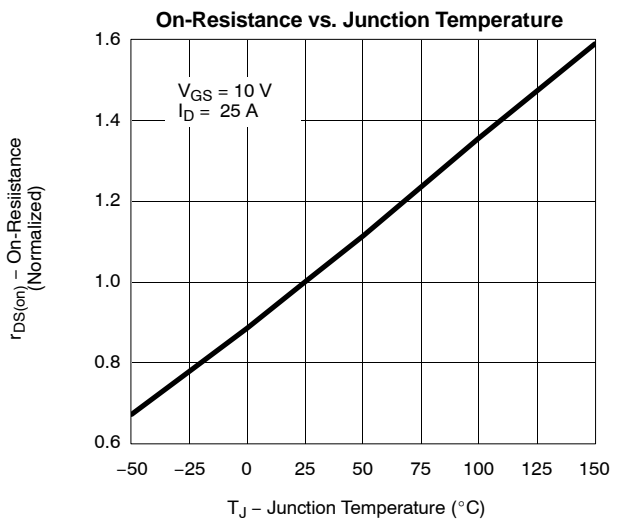
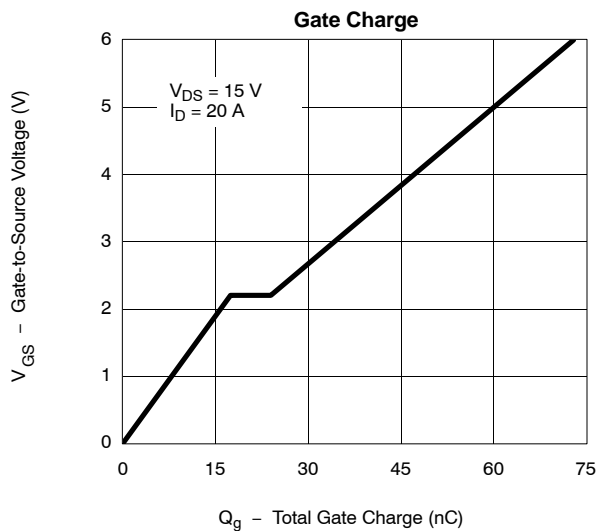
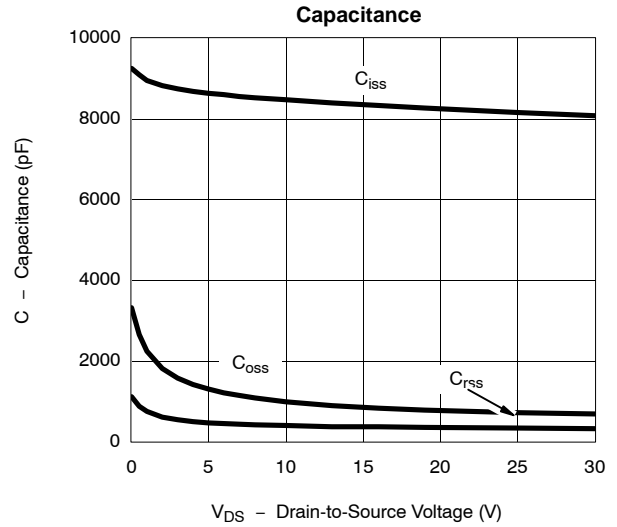
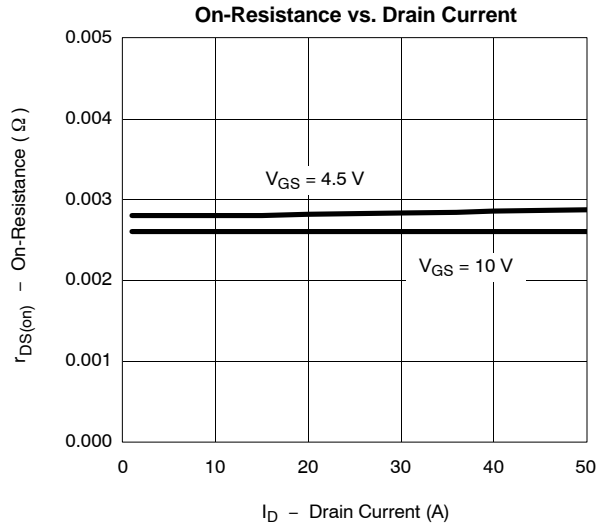
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	0.6		1.8	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 12 \text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}$			1	μA
		$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 55^\circ\text{C}$			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	$r_{DS(on)}$	$V_{GS} = 10 \text{ V}, I_D = 25 \text{ A}$		0.0026	0.0032	Ω
		$V_{GS} = 4.5 \text{ V}, I_D = 22 \text{ A}$		0.0029	0.0036	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15 \text{ V}, I_D = 25 \text{ A}$		150		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 2.9 \text{ A}, V_{GS} = 0 \text{ V}$		0.66	1.1	V
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		8340		pF
Output Capacitance	C_{oss}			850		
Reverse Transfer Capacitance	C_{rss}			355		
Total Gate Charge	Q_g	$V_{DS} = 15 \text{ V}, V_{GS} = 4.5 \text{ V}, I_D = 20 \text{ A}$		53	80	nC
Gate-Source Charge	Q_{gs}			17.5		
Gate-Drain Charge	Q_{gd}			6.5		
Gate Resistance	R_g		0.8	1.2	1.8	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15 \text{ V}, R_L = 15 \Omega$ $I_D \cong 1 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 6 \Omega$		25	38	ns
Rise Time	t_r			20	30	
Turn-Off Delay Time	$t_{d(off)}$			172	260	
Fall Time	t_f			41	62	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 2.9 \text{ A}, di/dt = 100 \text{ A}/\mu\text{s}$		42	60	

Notes

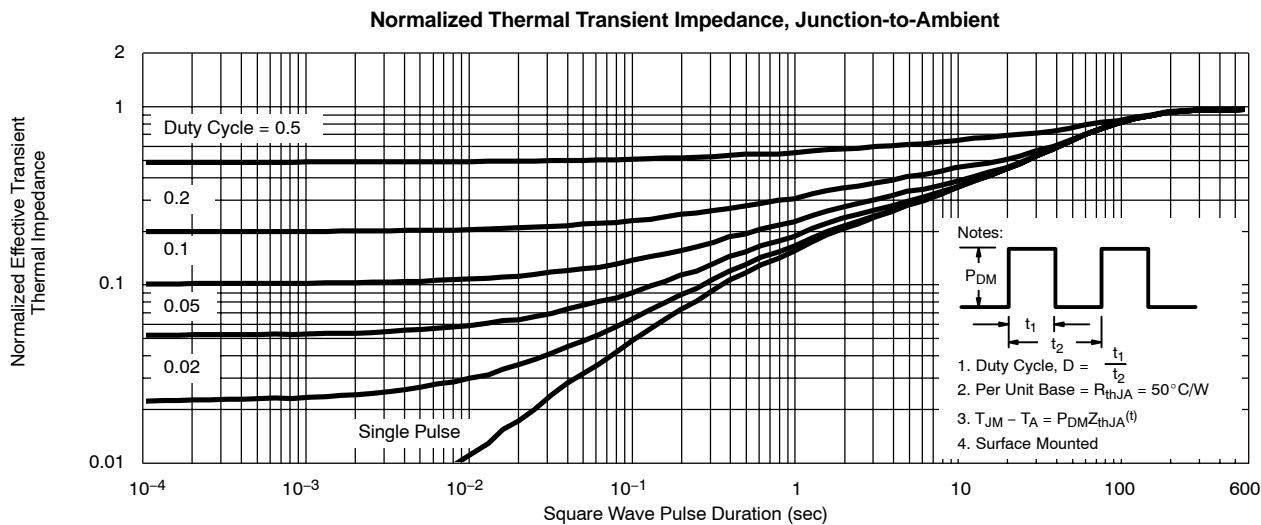
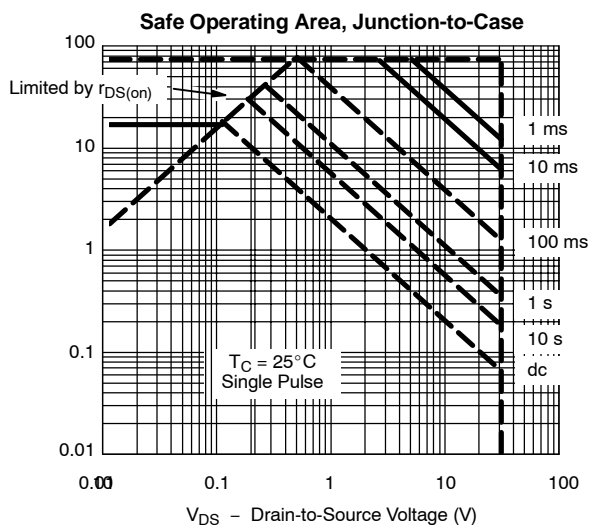
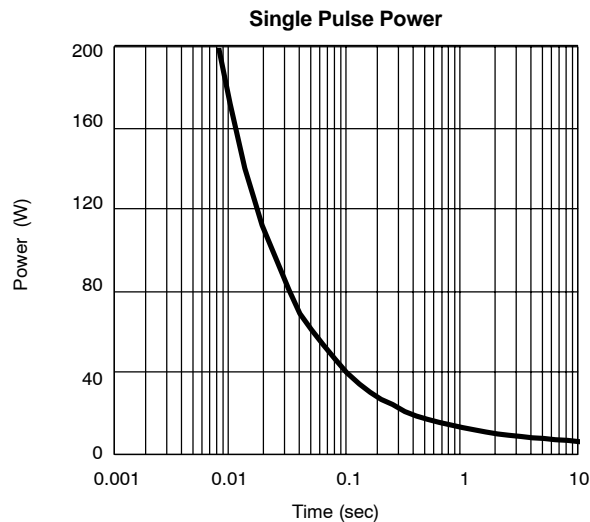
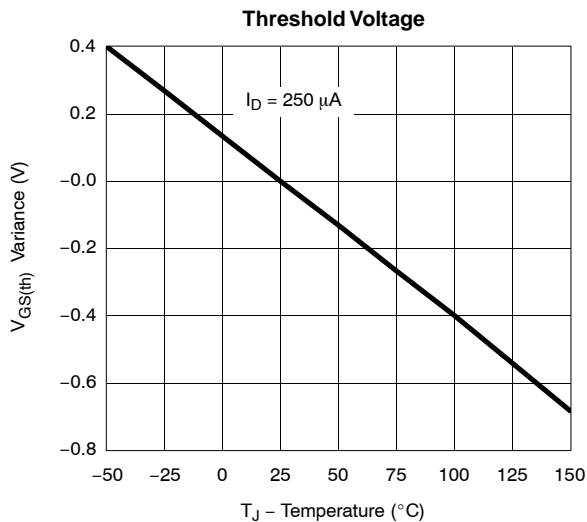
- a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

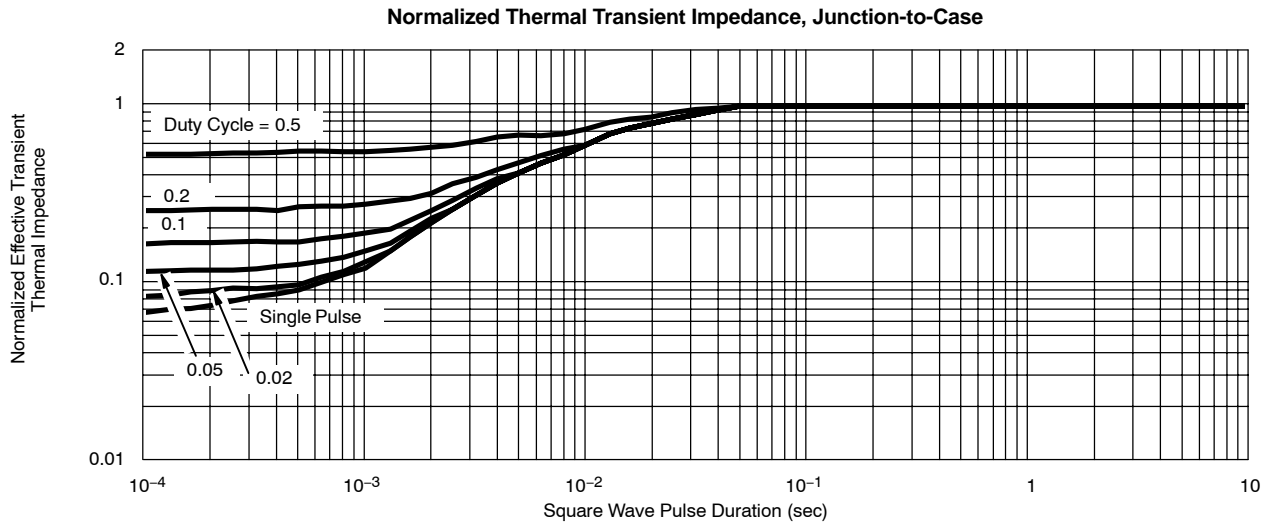
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