

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

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
20	0.0055 at $V_{GS} = 10$ V	20
	0.0085 at $V_{GS} = 4.5$ V	16

FEATURES

- Halogen-free available
- TrenchFET® Power MOSFET
- Low $R_{DS} \times Q_g$ Figure of Merit
- Optimized For High Frequency Conversion

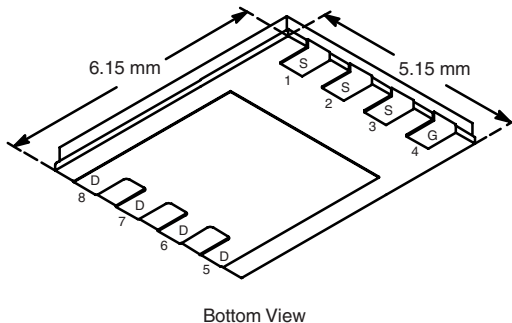


RoHS
COMPLIANT

APPLICATIONS

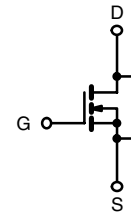
- Low-Side MOSFET in Synchronous Buck
- DC/DC Converters in Desktops
- Low Output Voltage Synchronous Rectifier

PowerPAK® SO-8



Bottom View

Ordering Information: Si7368DP-T1-E3 (Lead (Pb)-free)
Si7368DP-T1-GE3 (Lead (Pb)-free and Halogen-free)



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ\text{C}$, unless otherwise noted

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Parameter		Symbol	10 s	Steady State	Unit
Drain-Source Voltage		V_{DS}	20		V
Gate-Source Voltage		V_{GS}	± 16		
Continuous Drain Current ($T_J = 150\text{ }^{\circ}\text{C}$) ^a	$T_A = 25\text{ }^{\circ}\text{C}$	I_D	20	13	A
	$T_A = 70\text{ }^{\circ}\text{C}$		17	10	
Pulsed Drain Current (10 μs Pulse Width)		I_{DM}	50		
Continuous Source Current (Diode Conduction) ^a		I_S	4.1	1.4	W
Maximum Power Dissipation ^a	$T_A = 25\text{ }^{\circ}\text{C}$	P_D	5	1.7	
	$T_A = 70\text{ }^{\circ}\text{C}$		3.2	1.1	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150		$^{\circ}\text{C}$
Soldering Recommendations (Peak Temperature) ^{b,c}			260		

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	$t \leq 10$ s	R_{thJA}	20	25	$^\circ\text{C/W}$
	Steady State		53	70	
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	3.4	4.5	

Notes:

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

b. See Solder Profile (<http://www.vishay.com/ppg?73257>). The PowerPAK SO-8 is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.

c. Rework Conditions: manual soldering with a soldering iron is not recommended for leadless components.

SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	0.7		1.8	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\ \text{V}$, $V_{GS} = \pm 16\ \text{V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 20\ \text{V}$, $V_{GS} = 0\ \text{V}$			1	μA
		$V_{DS} = 20\ \text{V}$, $V_{GS} = 0\ \text{V}$, $T_J = 55^\circ\text{C}$			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	$R_{DS(on)}$	$V_{GS} = 10\ \text{V}$, $I_D = 20\ \text{A}$		0.0043	0.0055	Ω
		$V_{GS} = 4.5\ \text{V}$, $I_D = 16\ \text{A}$		0.0065	0.0085	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 6\ \text{V}$, $I_D = 20\ \text{A}$		48		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 4.5\ \text{A}$, $V_{GS} = 0\ \text{V}$		0.7	1.1	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = 10\ \text{V}$, $V_{GS} = 4.5\ \text{V}$, $I_D = 20\ \text{A}$		17	25	nC
Gate-Source Charge	Q_{gs}			4.5		
Gate-Drain Charge	Q_{gd}			4.5		
Gate Resistance	R_g			1.5		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 10\ \text{V}$, $R_L = 10\ \Omega$ $I_D \cong 1\ \text{A}$, $V_{GEN} = 10\ \text{V}$, $R_G = 6\ \Omega$		22	35	ns
Rise Time	t_r			20	30	
Turn-Off Delay Time	$t_{d(off)}$			65	100	
Fall Time	t_f			17	30	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 4.1\ \text{A}$, $di/dt = 100\ \text{A}/\mu\text{s}$		40	80	

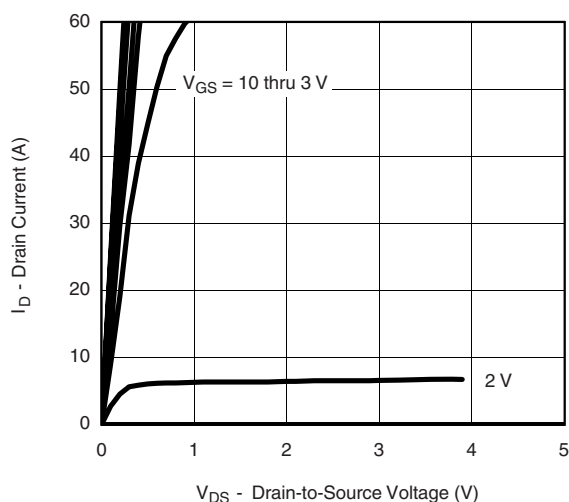
Notes:

a. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

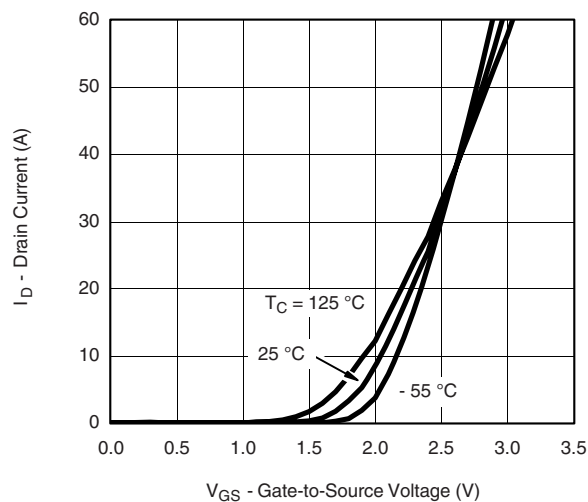
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS 25°C , unless otherwise noted

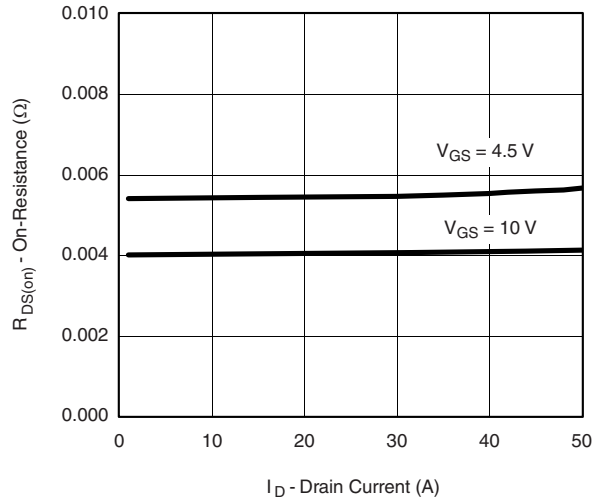


Output Characteristics

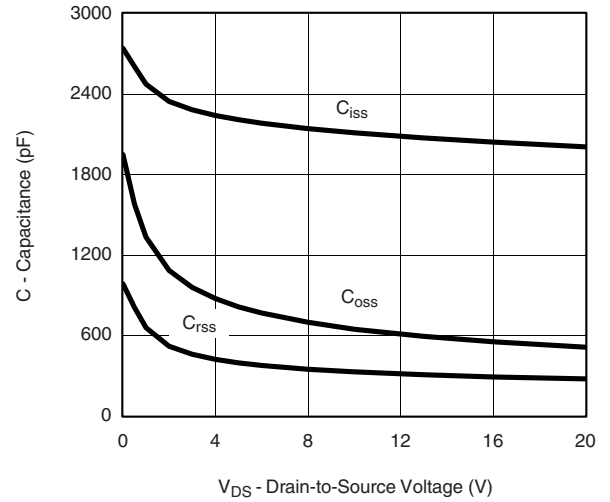


Transfer Characteristics

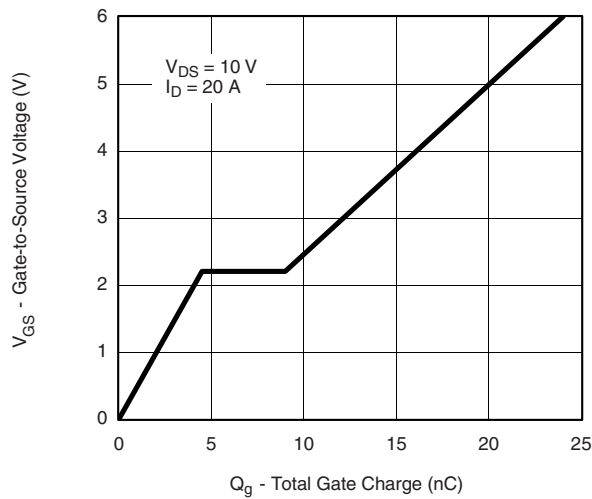
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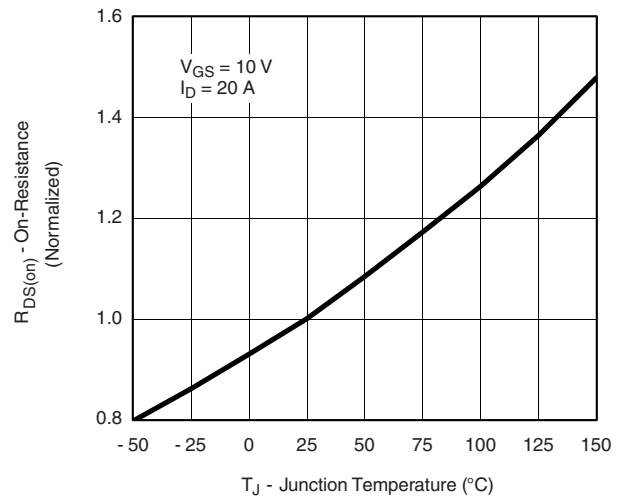
On-Resistance vs. Drain Current



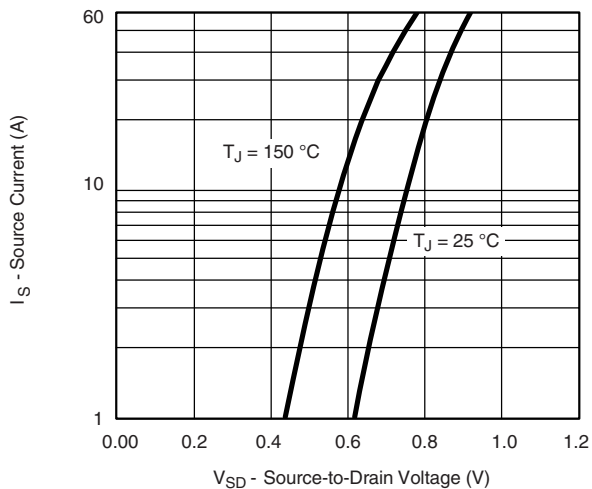
Capacitance



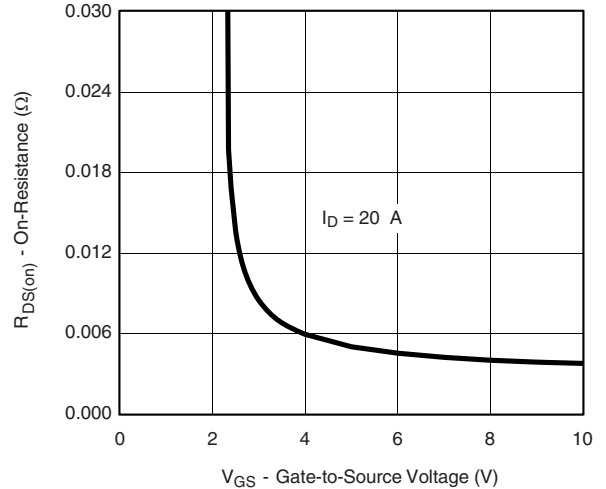
Gate Charge



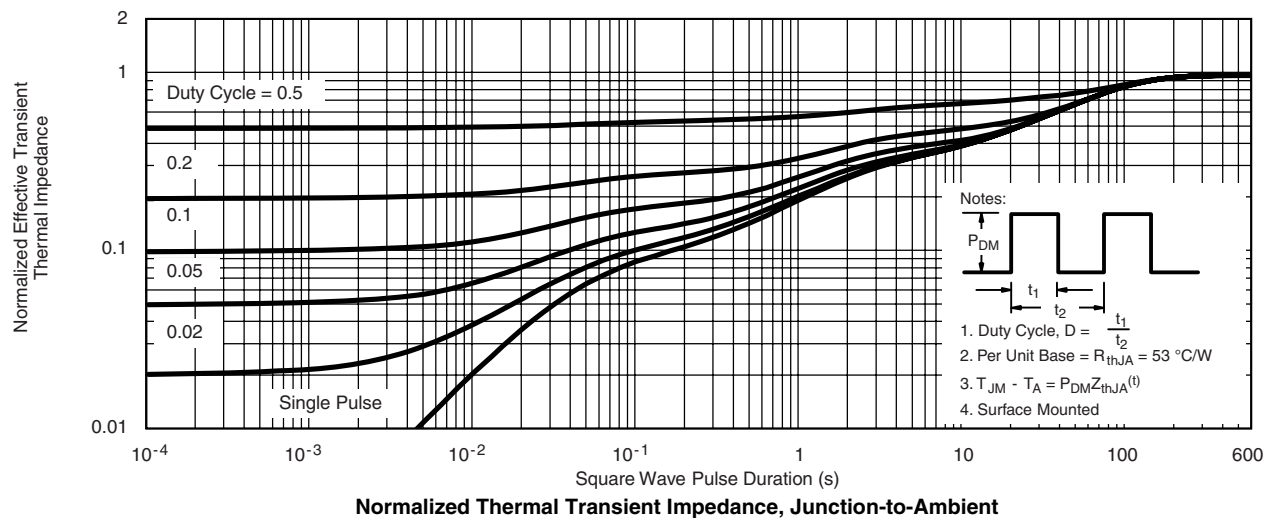
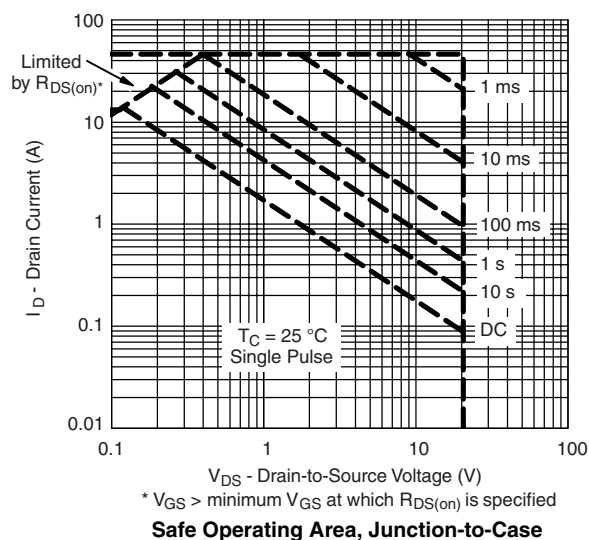
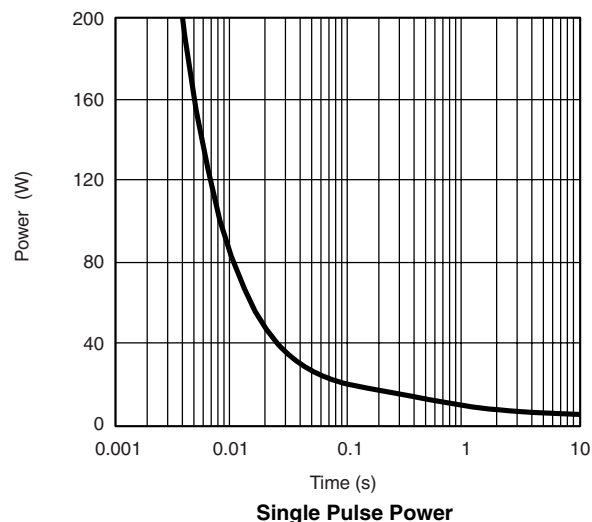
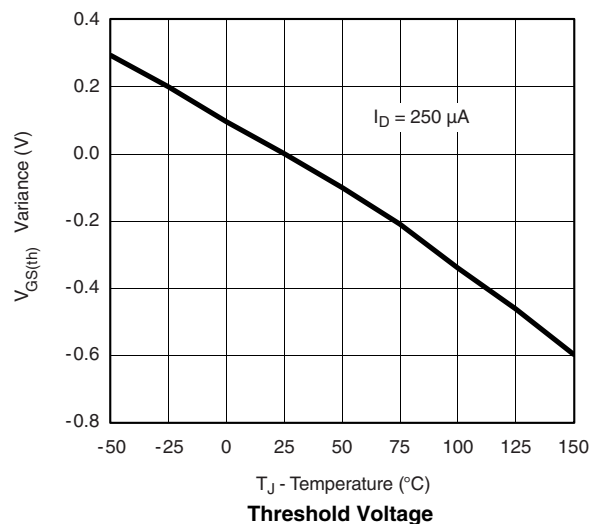
On-Resistance vs. Junction Temperature



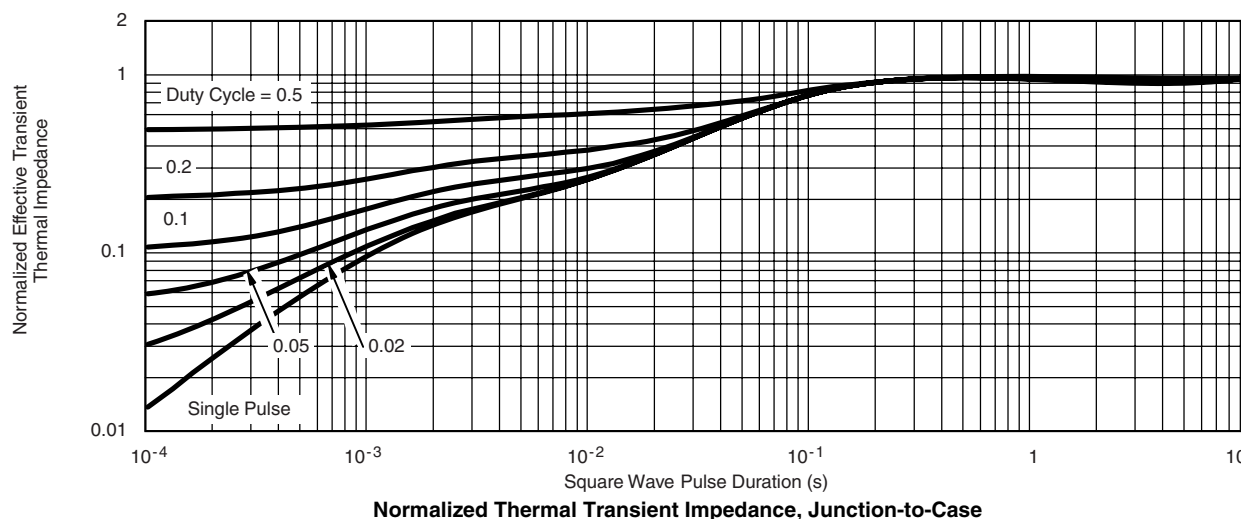
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

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