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Si7452DP

Vishay Siliconix

N-Channel 60-V (D-S) Fast Switching MOSFET

PRODUCT SUMMARY

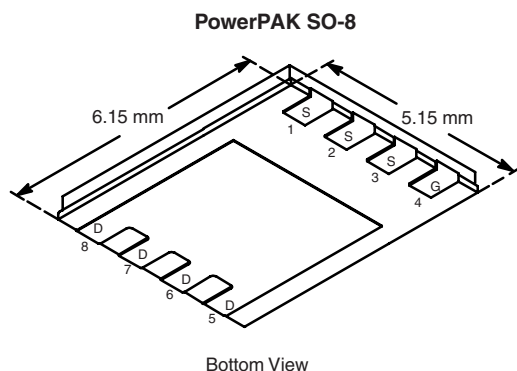
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ.)
60	0.0083 at $V_{GS} = 10$ V	19.3	105

FEATURES

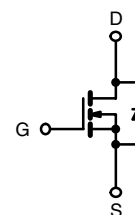
- Halogen-free According to IEC 61249-2-21 Available
- TrenchFET® Power MOSFET
- New Low Thermal Resistance PowerPAK® Package with Low 1.07 mm Profile
- 100 % R_g Tested
- High Threshold Voltage At High Temperature



RoHS
COMPLIANT
HALOGEN
FREE
Available



Bottom View



N-Channel MOSFET

Ordering Information: Si7452DP-T1-E3 (Lead (Pb)-free)
Si7452DP-T1-GE3 (Lead (Pb)-free and Halogen-free)

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

Parameter		Symbol	10 s	Steady State	Unit
Drain-Source Voltage		V _{DS}	60		V
Gate-Source Voltage		V _{GS}	± 20		
Continuous Drain Current (T _J = 150 °C) ^a	T _A = 25 °C	I _D	19.3	11.5	A
	T _A = 70 °C		15.5	9.2	
Pulsed Drain Current		I _{DM}	60		
Continuous Source Current (Diode Conduction) ^a		I _S	4.5	1.6	
Avalanche Current		I _{AS}	40		
Avalanche Energy		E _{AS}	80		
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
Soldering Recommendations (Peak Temperature) ^{b,c}			260		

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	R_{thJA}	18	23	$^\circ\text{C/W}$
		52	65	
Maximum Junction-to-Case (Drain)	R_{thJC}	1.0	1.3	

Notes:

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

b. See Solder Profile (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.

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MOSFET SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	3.4		4.5	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}	$V_{DS} = 60\ \text{V}, V_{GS} = 0\ \text{V}$			1	μA
		$V_{DS} = 60\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 55^\circ\text{C}$			5	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\ \text{V}, V_{GS} = 10\ \text{V}$	40			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\ \text{V}, I_D = 19.3\ \text{A}$		0.007	0.0083	Ω
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\ \text{V}, I_D = 19.3\ \text{A}$		51		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 4.5\ \text{A}, V_{GS} = 0\ \text{V}$		0.8	1.2	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = 30\ \text{V}, V_{GS} = 10\ \text{V}, I_D = 19.3\ \text{A}$		105	160	nC
Gate-Source Charge	Q_{gs}			40		
Gate-Drain Charge	Q_{gd}			21		
Gate Resistance	R_g	$f = 1\ \text{MHz}$	0.5	1.0	1.5	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 30\ \text{V}, R_L = 30\ \Omega$ $I_D \cong 1\ \text{A}, V_{GEN} = 10\ \text{V}, R_g = 6\ \Omega$		45	70	ns
Rise Time	t_r			15	25	
Turn-Off Delay Time	$t_{d(off)}$			90	135	
Fall Time	t_f			40	60	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 4.5\ \text{A}, dI/dt = 100\ \text{A}/\mu\text{s}$		46	70	

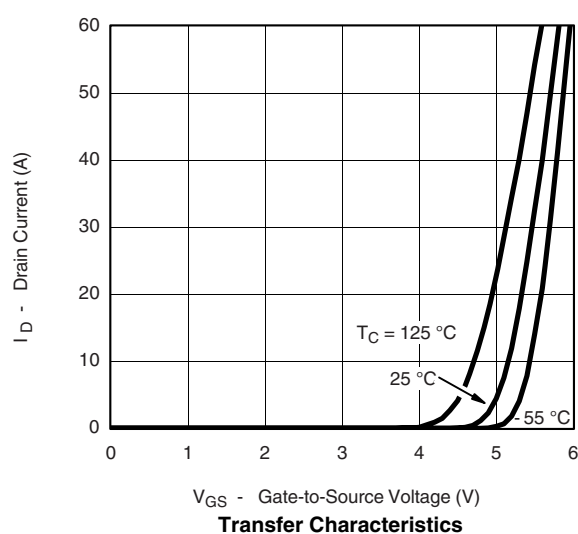
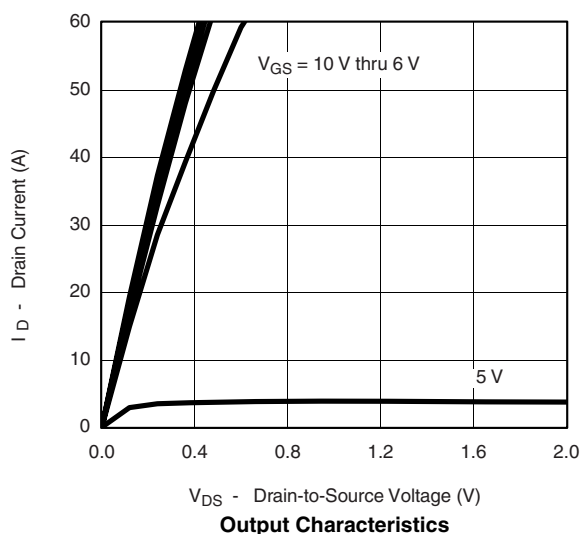
Notes:

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

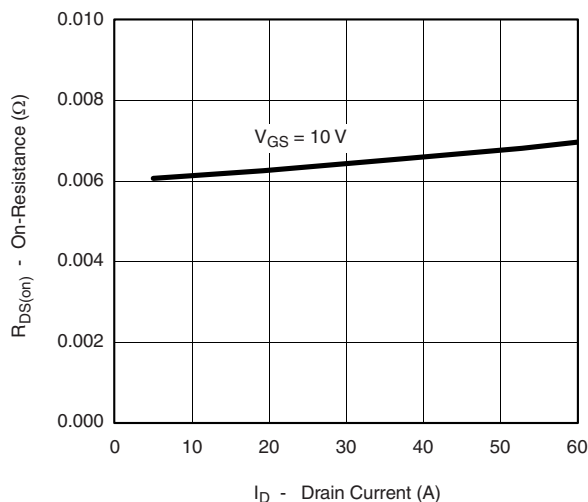




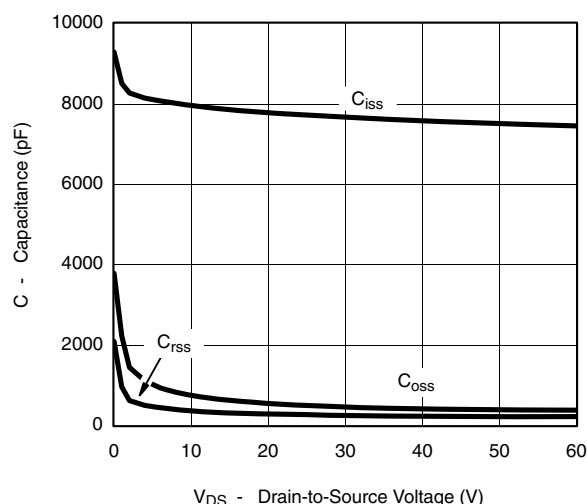
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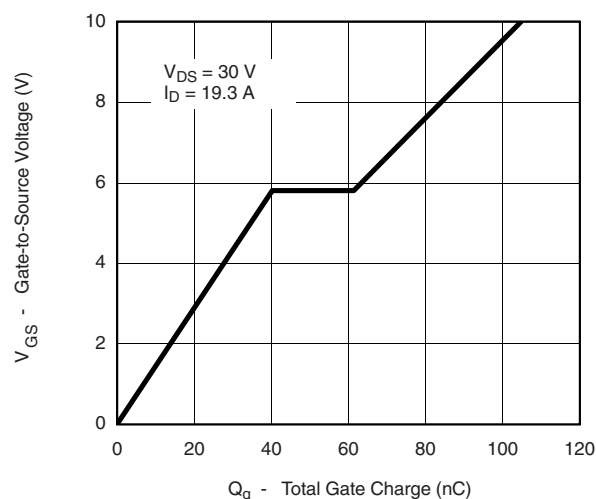
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



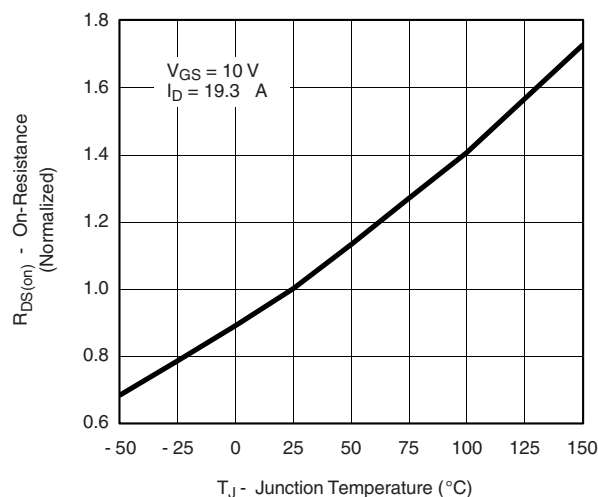
On-Resistance vs. Drain Current



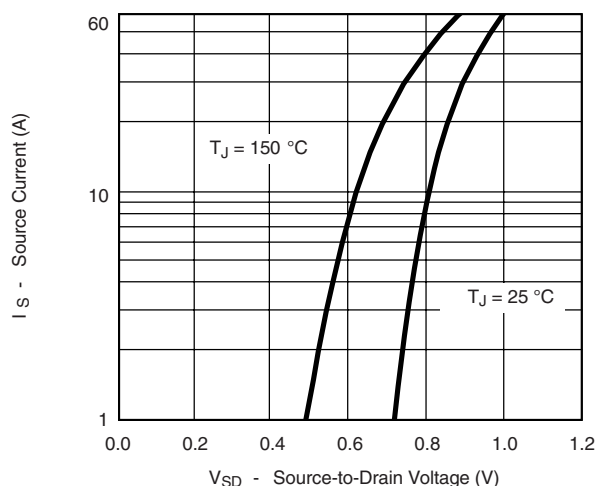
Capacitance



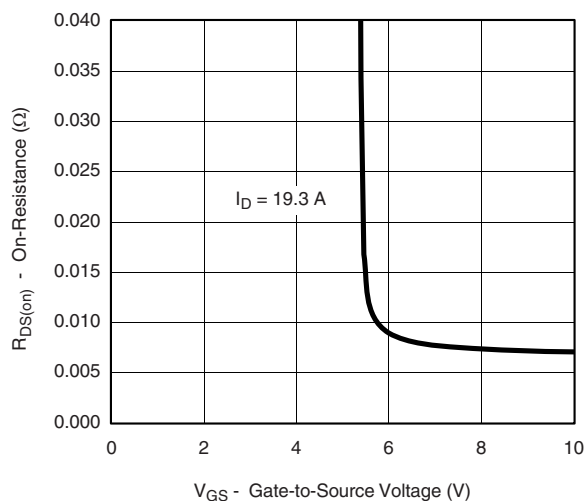
Gate Charge



On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



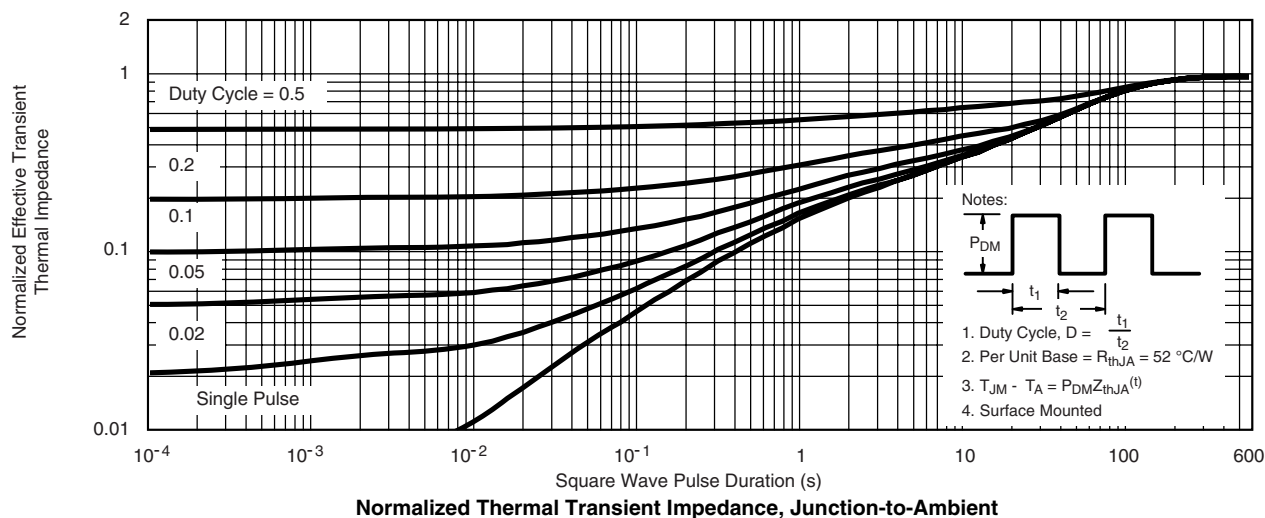
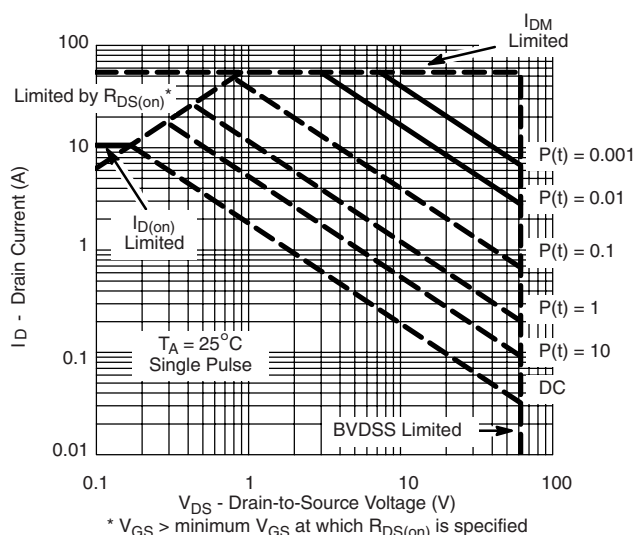
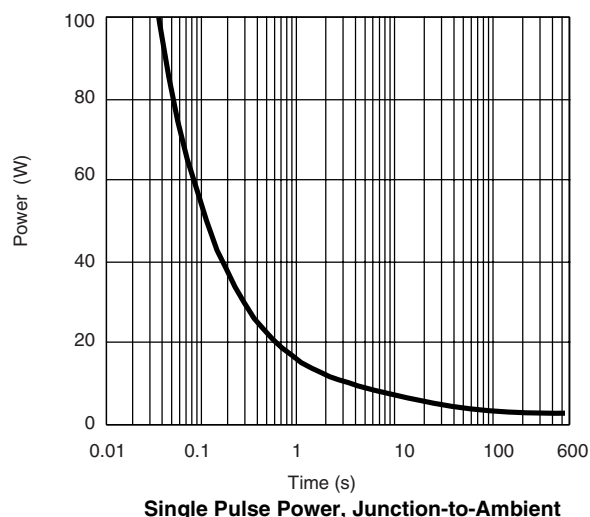
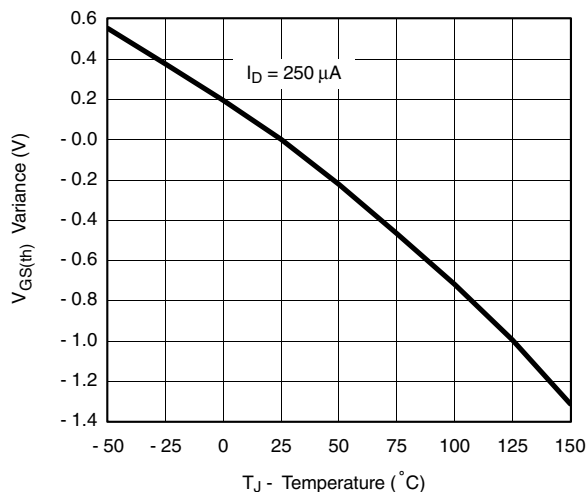
On-Resistance vs. Gate-to-Source Voltage

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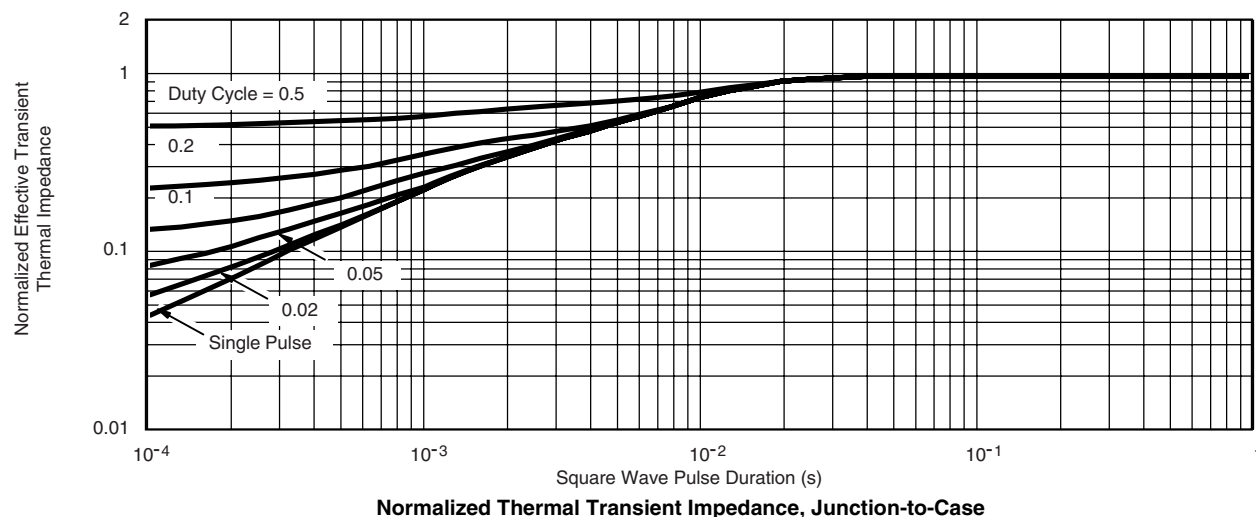




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Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg?72972.



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