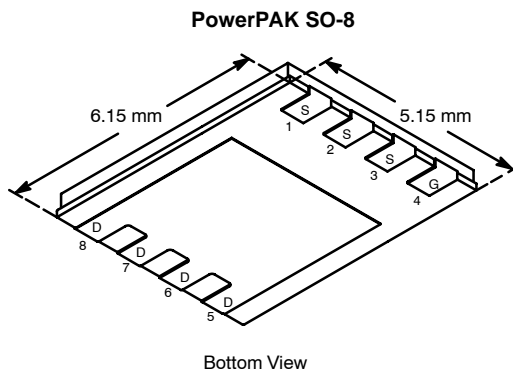


## N-Channel 40-V (D-S) Fast Switching MOSFET

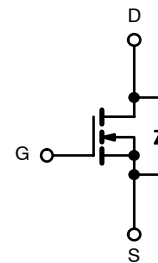
<b>PRODUCT SUMMARY</b>			
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)	$Q_g$ (Typ)
40	0.0061 @ $V_{GS} = 10$ V	23.6	105

### FEATURES

- 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



Ordering Information: Si7444DP-T1—E3



N-Channel MOSFET

<b>ABSOLUTE MAXIMUM RATINGS (<math>T_A = 25^\circ\text{C}</math> UNLESS OTHERWISE NOTED)</b>				
Parameter	Symbol	10 secs	Steady State	Unit
Drain-Source Voltage	$V_{DS}$	40		V
Gate-Source Voltage	$V_{GS}$	$\pm 20$		
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>a</sup>	$I_D$	$T_A = 25^\circ\text{C}$ 23.6	$T_A = 25^\circ\text{C}$ 14	A
		$T_A = 70^\circ\text{C}$ 18.9	$T_A = 70^\circ\text{C}$ 11.2	
Pulsed Drain Current	$I_{DM}$	60		
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	4.5	1.6	
Avalanche Current	$I_{AS}$	45		
Avalanche Energy	$E_{AS}$	100		mJ
Maximum Power Dissipation <sup>a</sup>	$P_D$	$T_A = 25^\circ\text{C}$ 5.4	$T_A = 25^\circ\text{C}$ 1.9	W
		$T_A = 70^\circ\text{C}$ 3.4	$T_A = 70^\circ\text{C}$ 1.2	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 150		$^\circ\text{C}$

<b>THERMAL RESISTANCE RATINGS</b>				
Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a</sup>	$R_{thJA}$	$t \leq 10$ sec 18	23	$^\circ\text{C}/\text{W}$
		Steady State 52	65	
Maximum Junction-to-Case (Drain)	$R_{thJC}$	1.0	1.3	

**Notes**

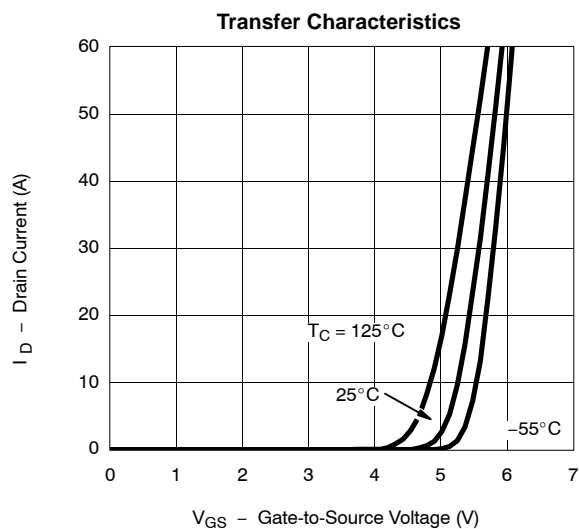
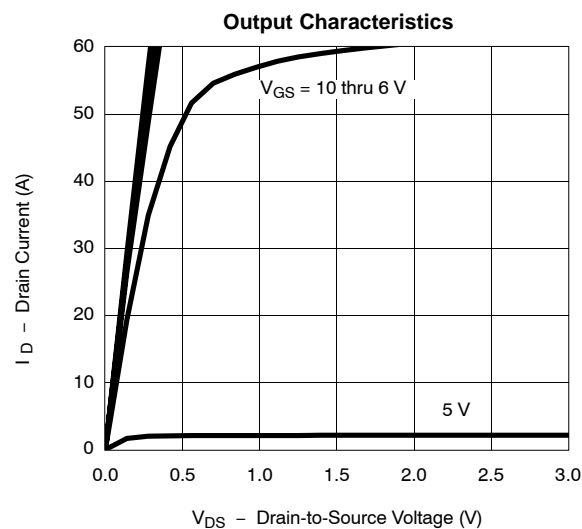
a. Surface Mounted on 1" x 1" FR4 Board.

MOSFET SPECIFICATIONS ( $T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	3.4		4.5	V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\ \text{V}, V_{GS} = \pm 20\ \text{V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 40\ \text{V}, V_{GS} = 0\ \text{V}$			1	$\mu\text{A}$
		$V_{DS} = 40\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 55^\circ\text{C}$			5	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 5\ \text{V}, V_{GS} = 10\ \text{V}$	40			A
Drain-Source On-State Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = 10\ \text{V}, I_D = 23.6\ \text{A}$		0.005	0.0061	$\Omega$
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15\ \text{V}, I_D = 23.6\ \text{A}$		56		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = 4.5\ \text{A}, V_{GS} = 0\ \text{V}$		0.76	1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = 20\ \text{V}, V_{GS} = 10\ \text{V}, I_D = 23.6\ \text{A}$		105	160	nC
Gate-Source Charge	$Q_{gs}$			39.4		
Gate-Drain Charge	$Q_{gd}$			21.7		
Gate Resistance	$R_g$	$f = 1\ \text{MHz}$	0.5	1.0	1.5	$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 20\ \text{V}, R_L = 20\ \Omega$ $I_D \cong 1\ \text{A}, V_{GEN} = 10\ \text{V}, R_g = 6\ \Omega$		45	70	ns
Rise Time	$t_r$			30	45	
Turn-Off Delay Time	$t_{d(off)}$			90	135	
Fall Time	$t_f$			45	70	
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = 4.5\ \text{A}, di/dt = 100\ \text{A}/\mu\text{s}$		45	70	

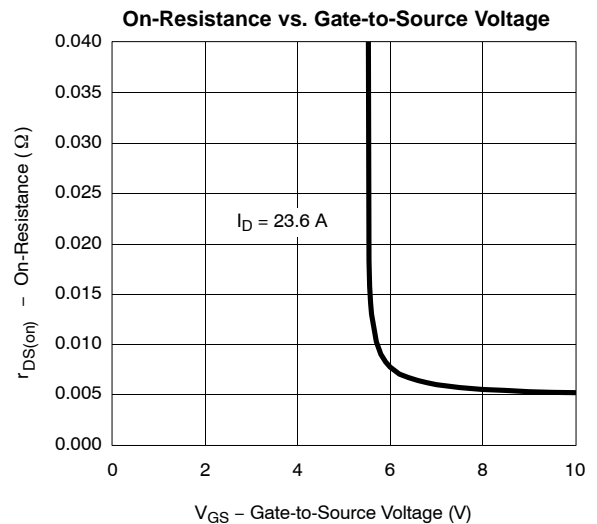
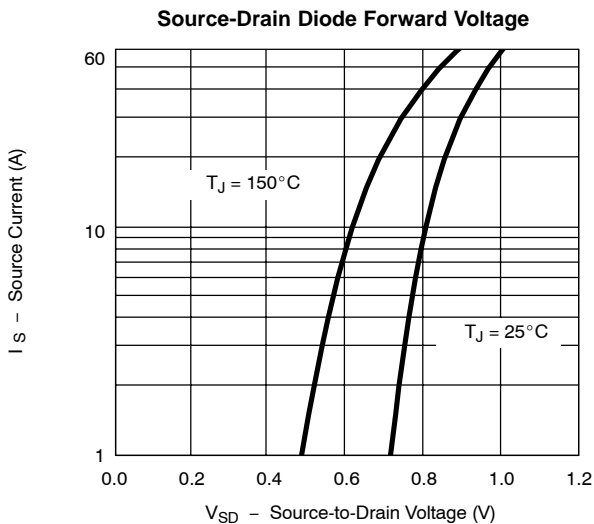
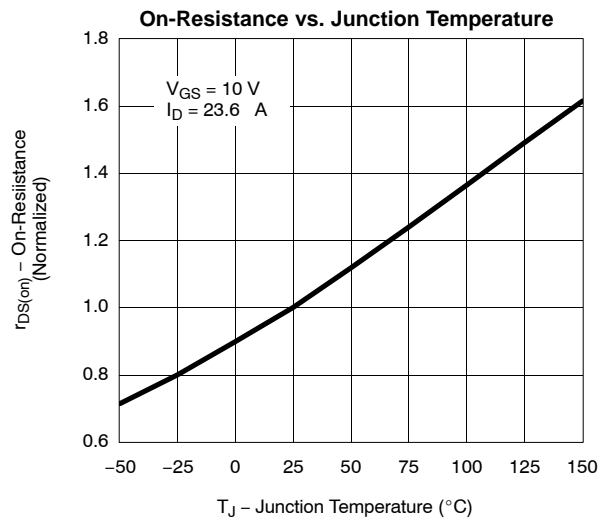
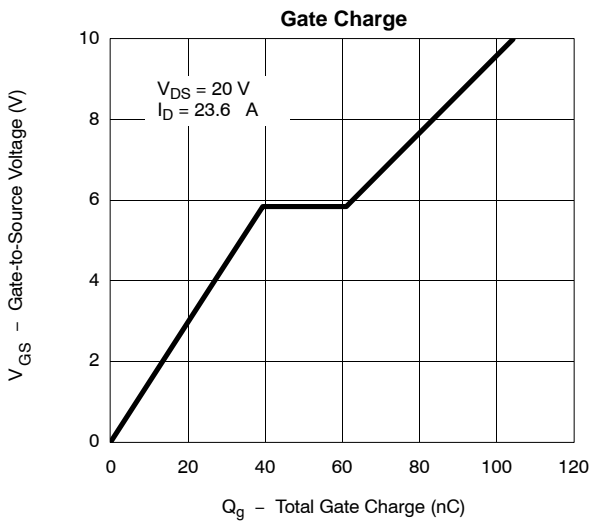
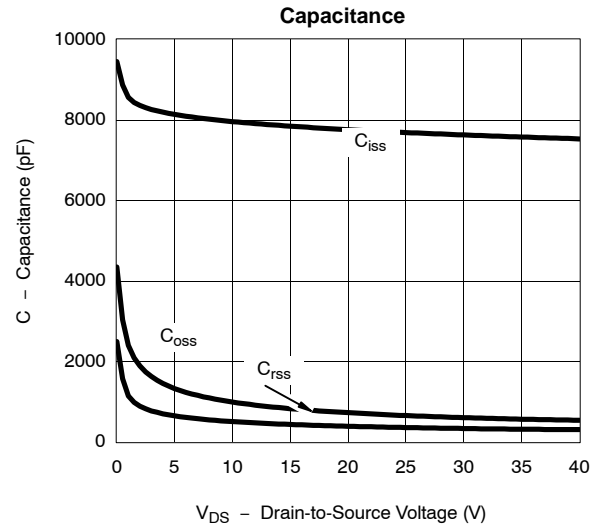
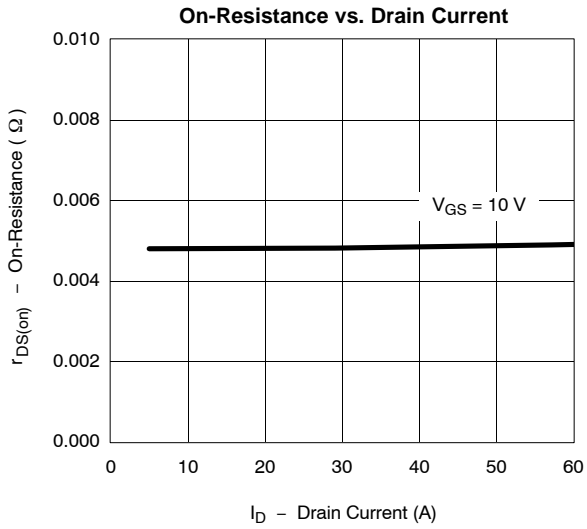
## Notes

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

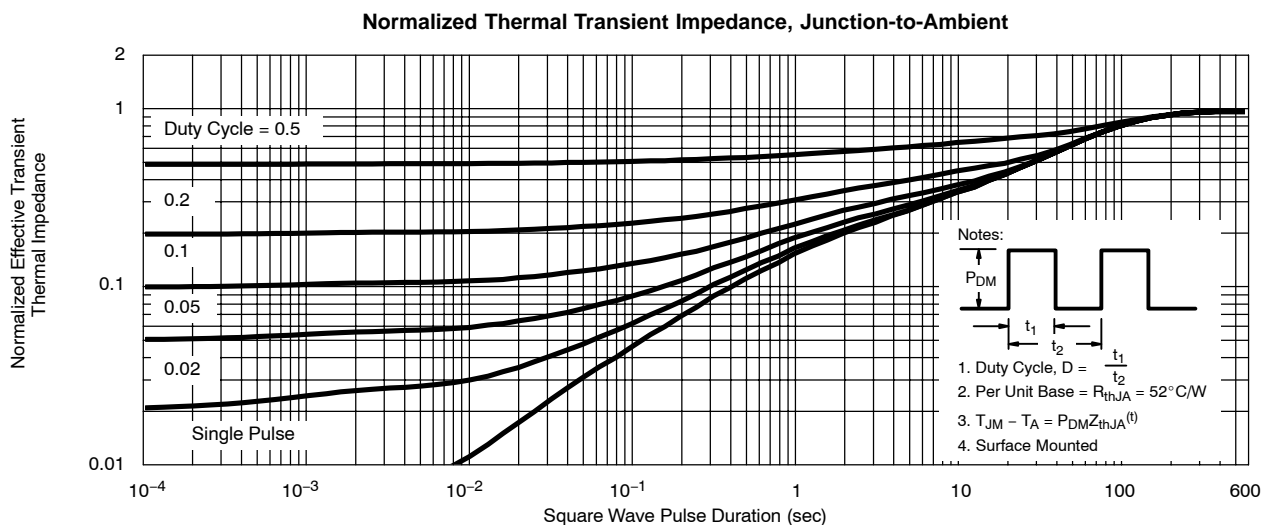
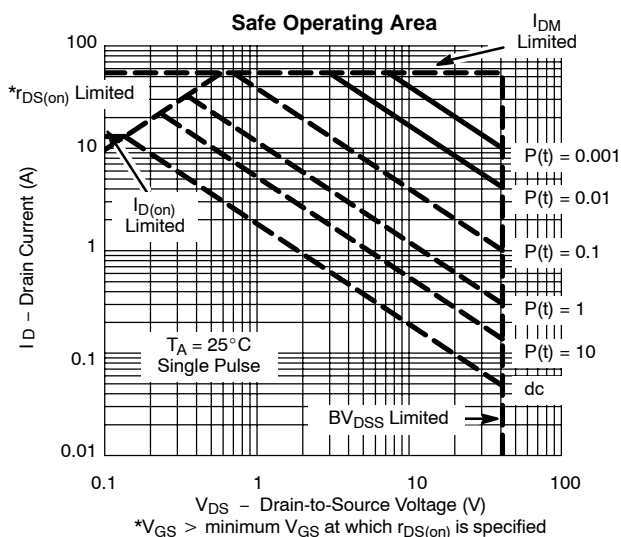
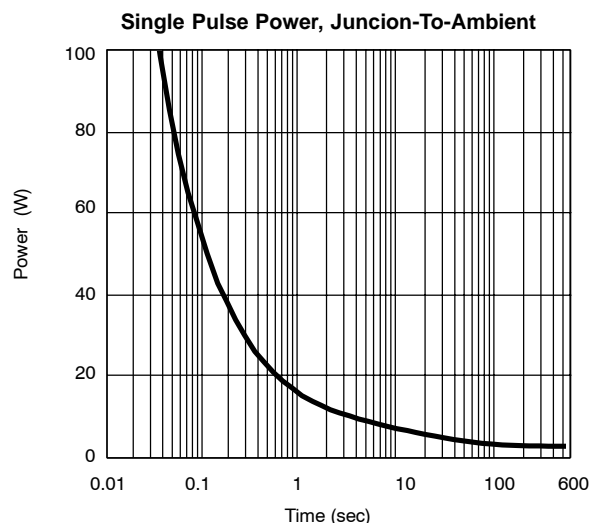
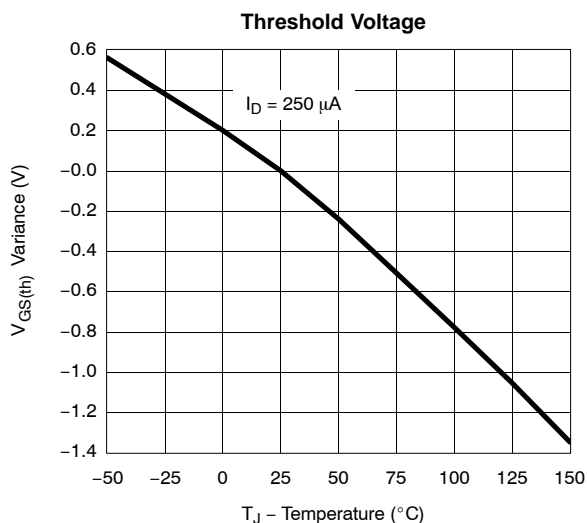
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

**TYPICAL CHARACTERISTICS ( $25^\circ\text{C}$  UNLESS NOTED)**


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

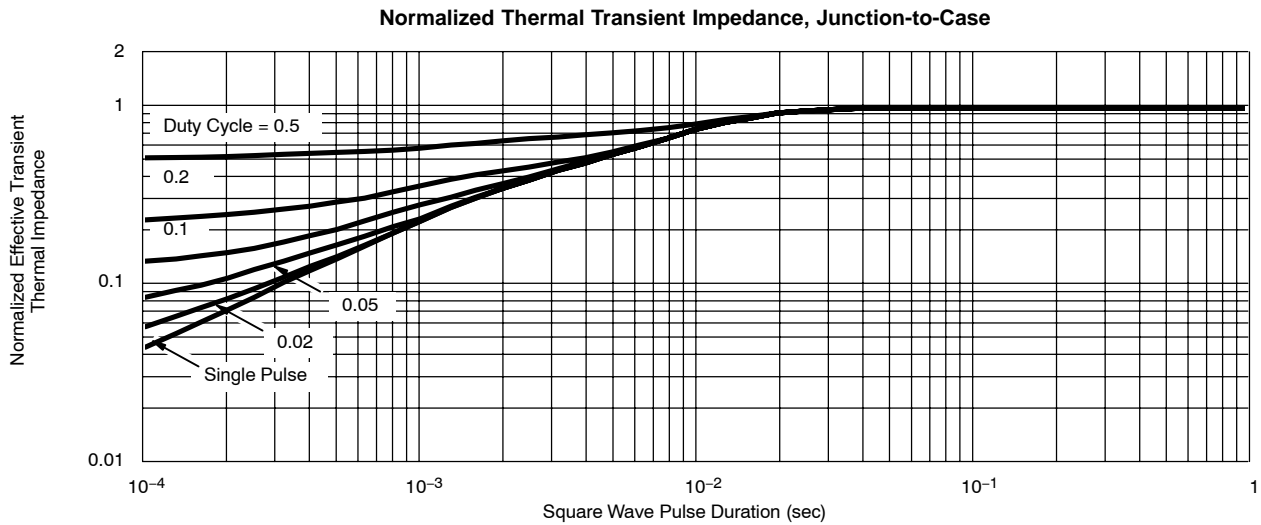


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**





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



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 <http://www.vishay.com/ppg?72920>.