

Dual N-Channel 30-V (D-S) MOSFET with Schottky Diode

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.022 at $V_{GS} = 10$ V	10
	0.030 at $V_{GS} = 4.5$ V	8.5

SCHOTTKY PRODUCT SUMMARY		
V_{DS} (V)	V_{SD} (V) Diode Forward Voltage	I_F (A)
30	0.50 V at 1.0 A	3.0

FEATURES

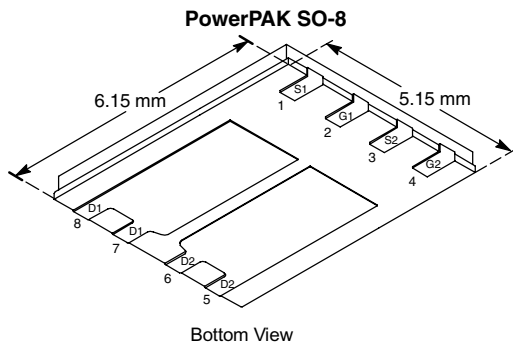
- LITTLE FOOT® Plus Schottky
- New Low Thermal Resistance PowerPAK® Package with Low 1.07-mm Profile
- 100 % R_g Tested



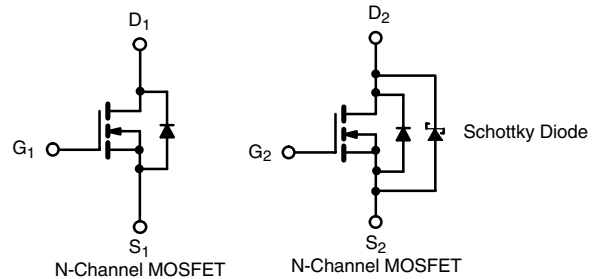
RoHS*
COMPLIANT

APPLICATIONS

- Bus and Logic DC-DC



Ordering Information: Si7842DP-T1
Si7842DP-T1—E3 (Lead (Pb)-Free)



ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted					
Parameter	Symbol	10 secs	Steady State	Unit	
Drain-Source Voltage	V_{DS}	30		V	
Gate-Source Voltage	V_{GS}	± 20			
Continuous Drain Current ($T_J = 150$ °C) ^a	I_D	$T_A = 25$ °C	10	6.3	A
		$T_A = 70$ °C	6.0	5.0	
Pulsed Drain Current	I_{DM}	30			
Continuous Source Current (Diode Conduction) ^a	I_S	2.9	1.1		
Maximum Power Dissipation ^a	P_D	$T_A = 25$ °C	3.5	1.4	W
		$T_A = 70$ °C	2.2	0.9	
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	MOSFET		Schottky		Unit	
		Typical	Maximum	Typical	Maximum		
Maximum Junction-to-Ambient ^a	R_{thJA}	$t \leq 10$ sec	26	35	26	35	°C/W
		Steady State	60	85	60	85	
Maximum Junction-to-Case (Drain)	R_{thJC}	Steady State	3.9	5.5	3.9	5.5	

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.

* Pb containing terminations are not RoHS compliant, exemptions may apply.

MOSFET SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Condition	Min	Typ ^b	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	0.8		2.4	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}	$V_{DS} = 30\ \text{V}, V_{GS} = 0\ \text{V}$	Ch-1		1	μA
			Ch-2		100	
		$V_{DS} = 30\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 85\text{ }^\circ\text{C}$	Ch-1		15	
			Ch-2		2000	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5\ \text{V}, V_{GS} = 10\ \text{V}$	20			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\ \text{V}, I_D = 7.5\ \text{A}$		0.018	0.022	Ω
		$V_{GS} = 4.5\ \text{V}, I_D = 6.5\ \text{A}$		0.024	0.030	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\ \text{V}, I_D = 7.5\ \text{A}$		22		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 1\ \text{A}, V_{GS} = 0\ \text{V}$	Ch-1	0.8	1.2	V
			Ch-2	0.47	0.5	
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = 15\ \text{V}, V_{GS} = 10\ \text{V}, I_D = 7.5\ \text{A}$		13	20	nC
Gate-Source Charge	Q_{gs}			2		
Gate-Drain Charge	Q_{gd}			2.7		
Gate Resistance	R_g		0.5	1.2	3.2	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\ \text{V}, R_L = 15\ \Omega$ $I_D \cong 1\ \text{A}, V_{GEN} = 10\ \text{V}, R_G = 6\ \Omega$		8	16	ns
Rise Time	t_r			10	20	
Turn-Off Delay Time	$t_{d(off)}$			21	40	
Fall Time	t_f			10	20	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 1.7\ \text{A}, di/dt = 100\ \text{A}/\mu\text{s}$	Ch-1	40	80	
			Ch-2	32	70	

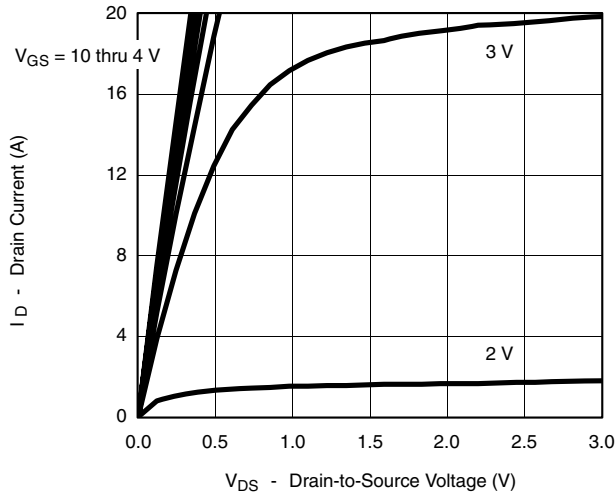
Notes

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

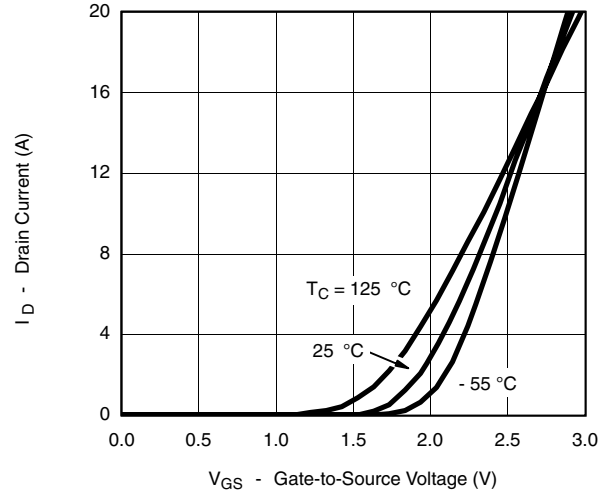
SCHOTTKY SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Forward Voltage Drop	V_F	$I_F = 1.0\ \text{A}$		0.47	0.50	V
		$I_F = 1.0\ \text{A}, T_J = 125\text{ }^\circ\text{C}$		0.36	0.42	
Maximum Reverse Leakage Current	I_{rm}	$V_r = 30\ \text{V}$		0.004	0.100	mA
		$V_r = 30\ \text{V}, T_J = 100\text{ }^\circ\text{C}$		0.7	10	
		$V_r = -30\ \text{V}, T_J = 125\text{ }^\circ\text{C}$		3.0	20	
Junction Capacitance	C_T	$V_r = 10\ \text{V}$		50		pF

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.

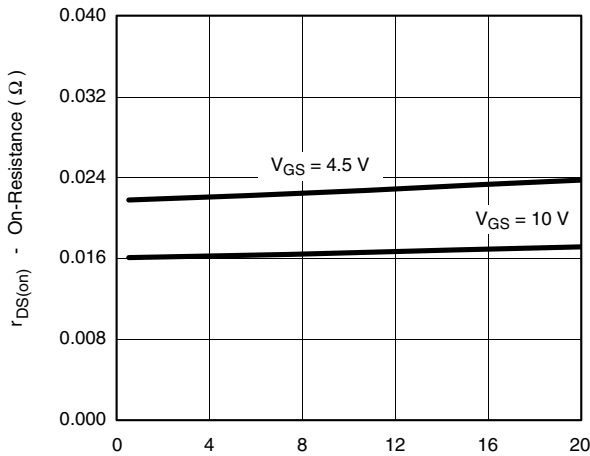
MOSFET TYPICAL CHARACTERISTICS 25 °C, unless noted



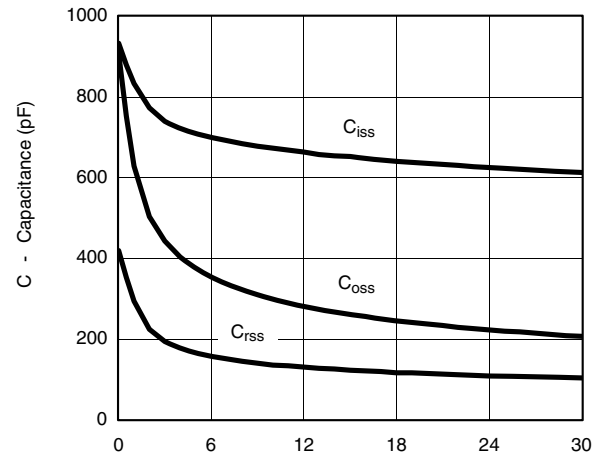
Output Characteristics



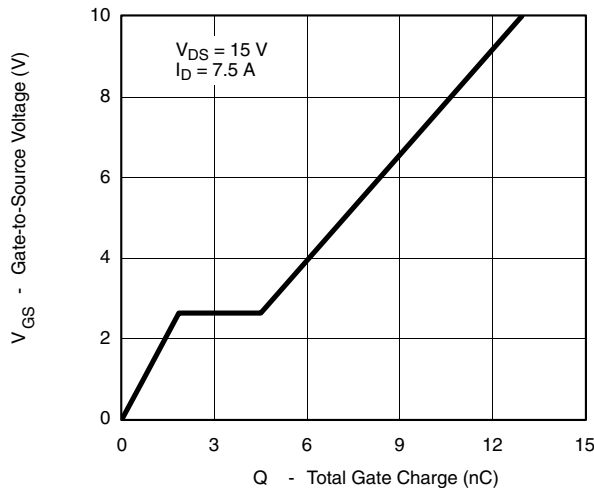
Transfer Characteristics



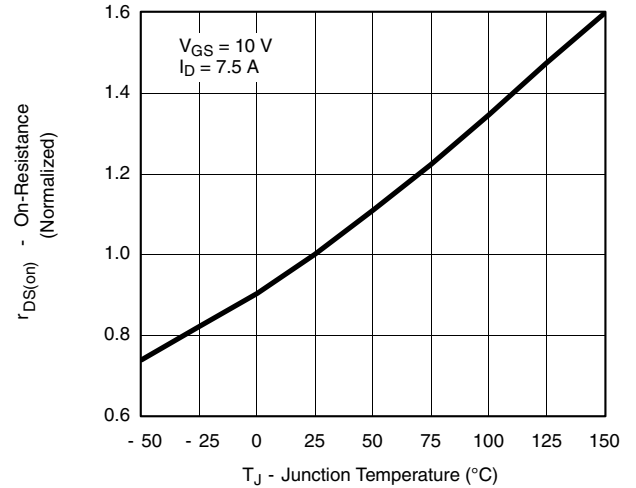
On-Resistance vs. Drain Current



Capacitance

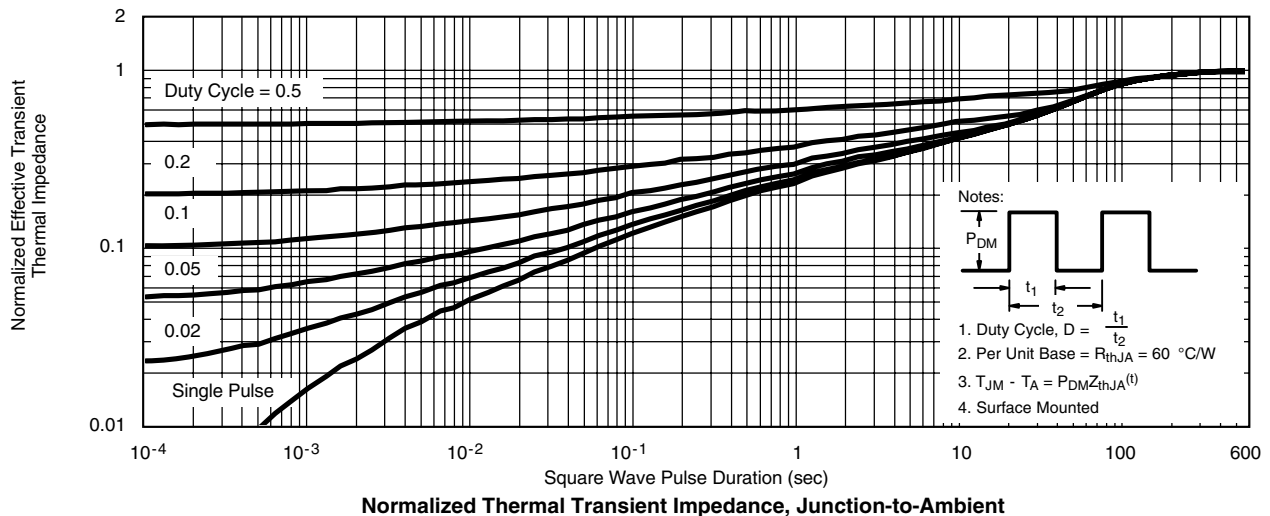
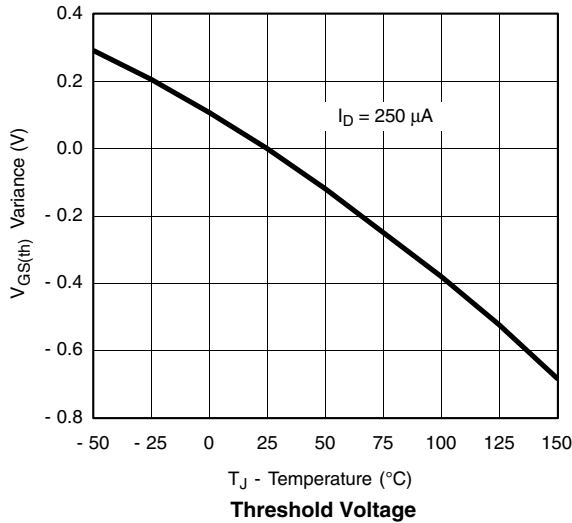
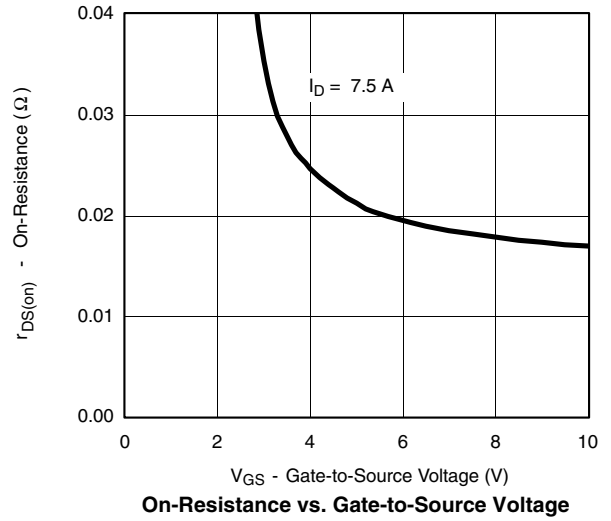
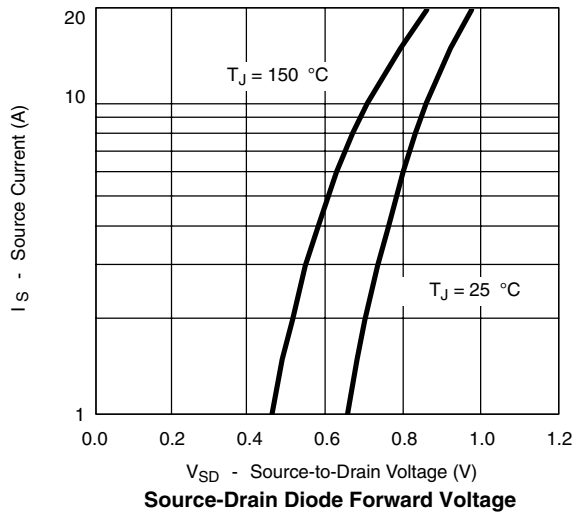


Gate Charge

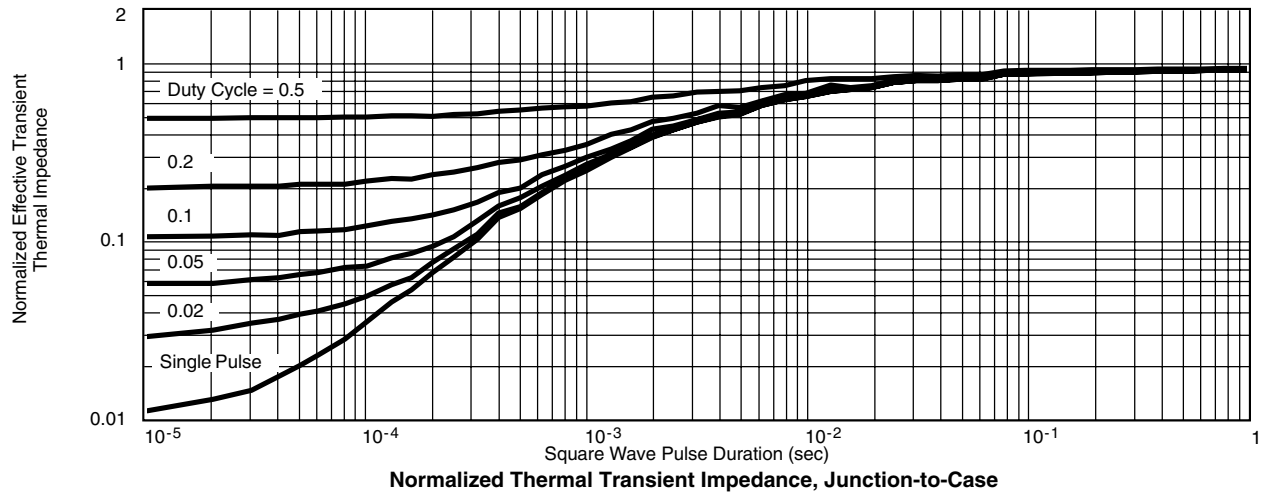


On-Resistance vs. Junction Temperature

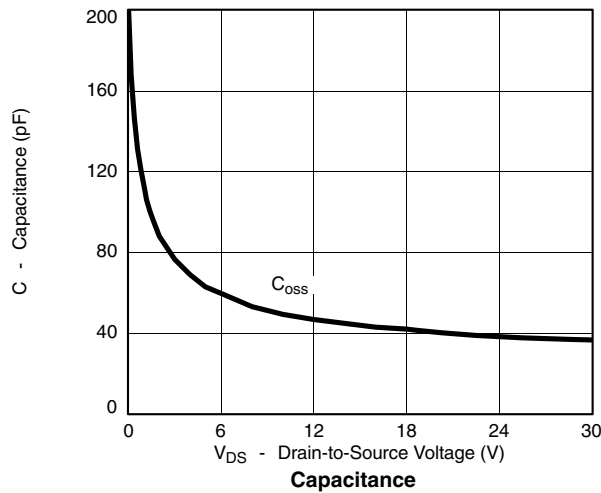
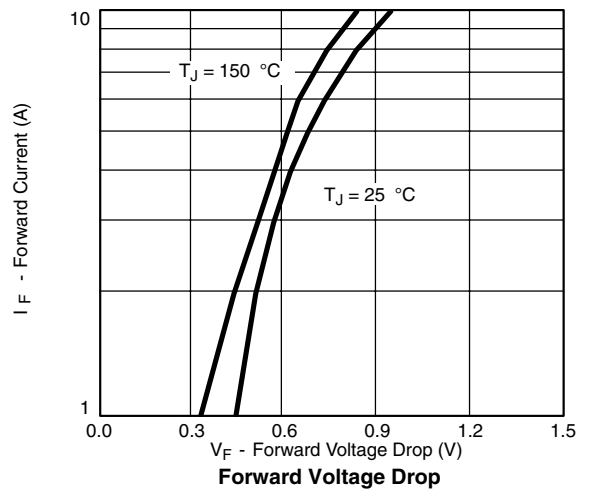
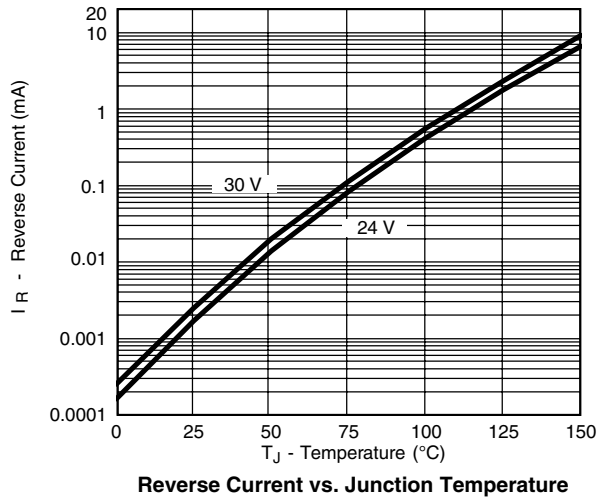
MOSFET TYPICAL CHARACTERISTICS 25 °C, unless noted



MOSFET TYPICAL CHARACTERISTICS 25 °C, unless noted



SCHOTTKY TYPICAL CHARACTERISTICS 25 °C, unless noted



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