

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

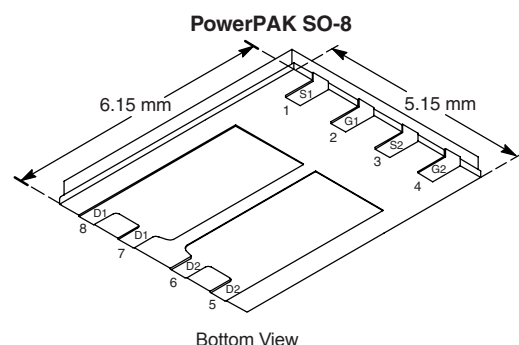
- Halogen-free According to IEC 61249-2-21 Available
- LITTLE FOOT® Plus Schottky
- New Low Thermal Resistance PowerPAK® Package with Low 1.07 mm Profile
- 100 % R_g Tested

APPLICATIONS

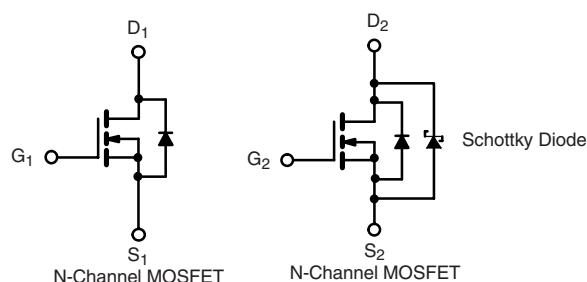
- Bus and Logic DC-DC



RoHS
COMPLIANT
HALOGEN
FREE
Available



Bottom View



Ordering Information: Si7842DP-T1-E3 (Lead (Pb)-free)
Si7842DP-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted					
Parameter		Symbol	10 s	Steady State	Unit
Drain-Source Voltage		V_{DS}	30		V
Gate-Source Voltage		V_{GS}	± 20		
Continuous Drain Current ($T_J = 150\text{ }^{\circ}\text{C}$) ^a	$T_A = 25\text{ }^{\circ}\text{C}$	I_D	10	6.3	A
	$T_A = 70\text{ }^{\circ}\text{C}$		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	$T_A = 25\text{ }^{\circ}\text{C}$	P_D	3.5	1.4	W
	$T_A = 70\text{ }^{\circ}\text{C}$		2.2	0.9	
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	MOSFET		Schottky		Unit
			Typical	Maximum	Typical	Maximum	
Maximum Junction-to-Ambient ^a	$t \leq 10$ s	R_{thJA}	26	35	26	35	$^\circ\text{C/W}$
	Steady State		60	85	60	85	
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	3.9	5.5	3.9	5.5	

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.

SPECIFICATIONS T _J = 25 °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 μA		0.8		2.4	V
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V				± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V	Ch-1			1	μA
			Ch-2			100	
		V _{DS} = 30 V, V _{GS} = 0 V, T _J = 85 °C	Ch-1			15	
			Ch-2			2000	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V		20			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 7.5 A			0.018	0.022	Ω
		V _{GS} = 4.5 V, I _D = 6.5 A			0.024	0.030	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 7.5 A			22		S
Diode Forward Voltage ^a	V _{SD}	I _S = 1 A, V _{GS} = 0 V	Ch-1		0.8	1.2	V
			Ch-2		0.47	0.5	
Dynamic ^b							
Total Gate Charge	Q _g	V _{DS} = 15 V, V _{GS} = 10 V, I _D = 7.5 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 V, R _L = 15 Ω I _D ≅ 1 A, V _{GEN} = 10 V, R _g = 6 Ω			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 A, dI/dt = 100 A/μs	Ch-1		
		Ch-2			32	70	

Notes:

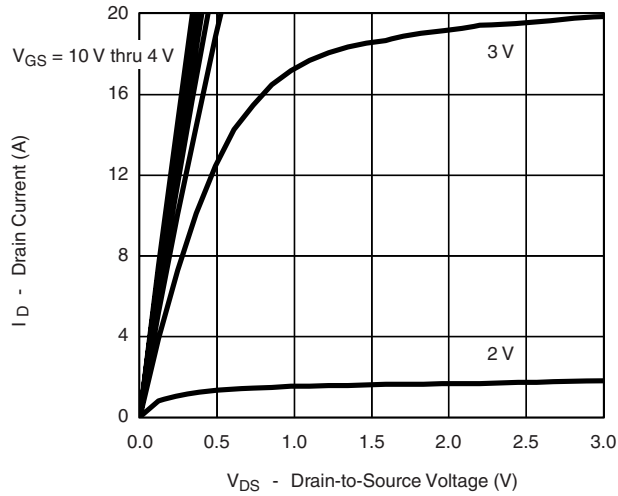
a. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

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

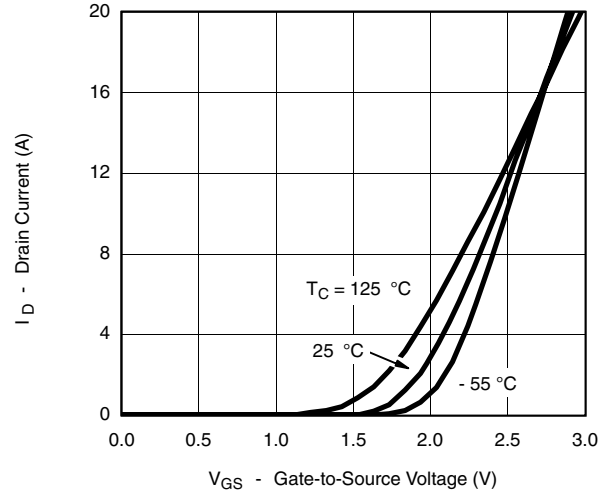
SCHOTTKY SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Forward Voltage Drop	V_F	$I_F = 1.0\ \text{A}$		0.47	0.50	V
		$I_F = 1.0\ \text{A}$, $T_J = 125^\circ\text{C}$		0.36	0.42	
Maximum Reverse Leakage Current	I_{rm}	$V_r = 30\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

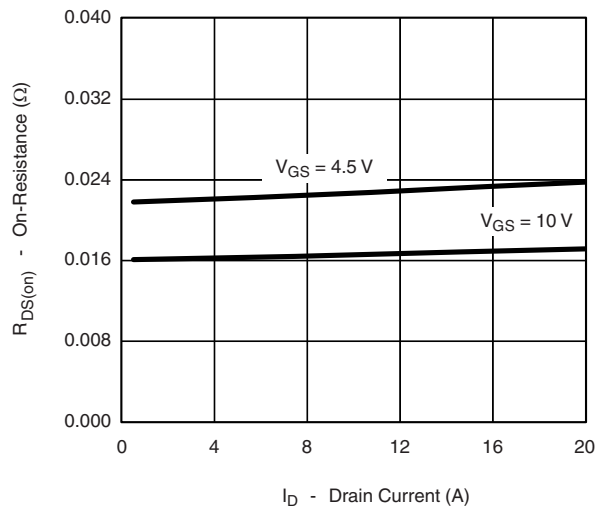
MOSFET TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



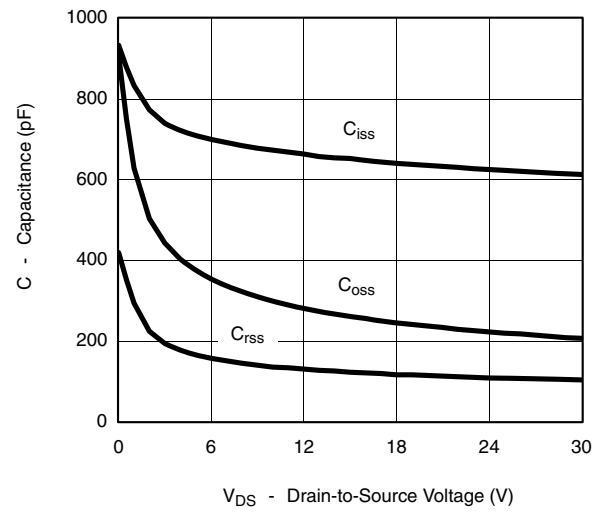
Output Characteristics



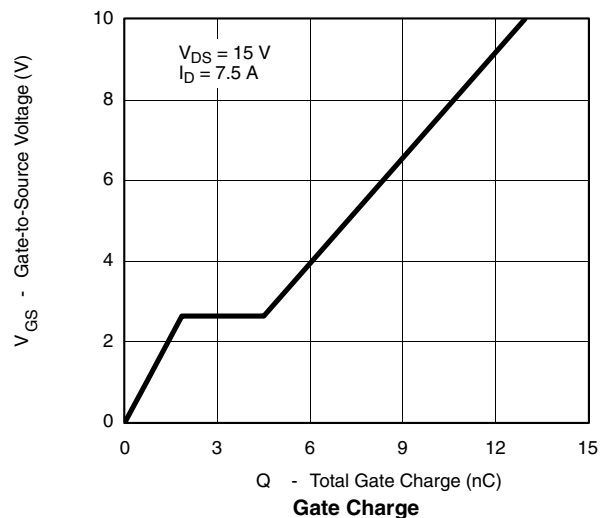
Transfer Characteristics



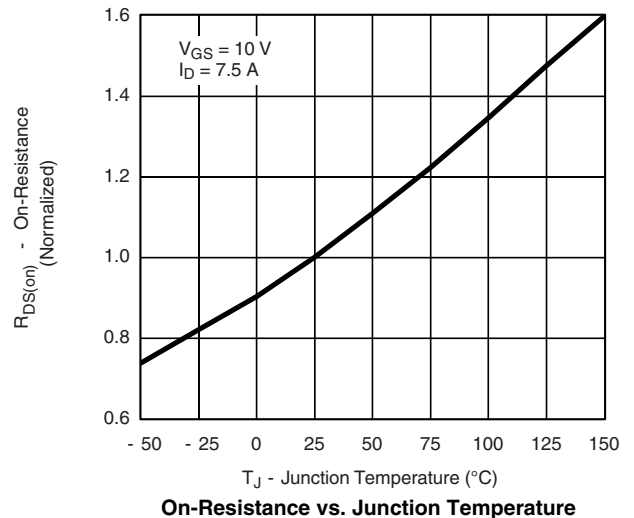
On-Resistance vs. Drain Current



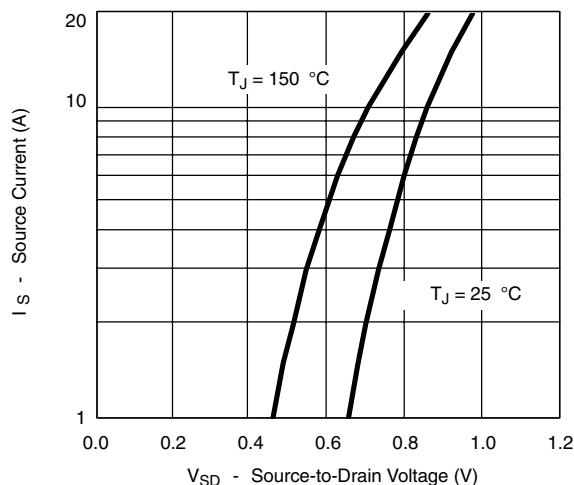
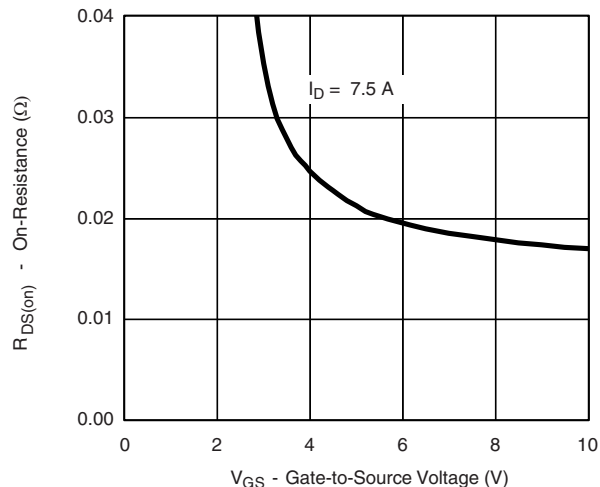
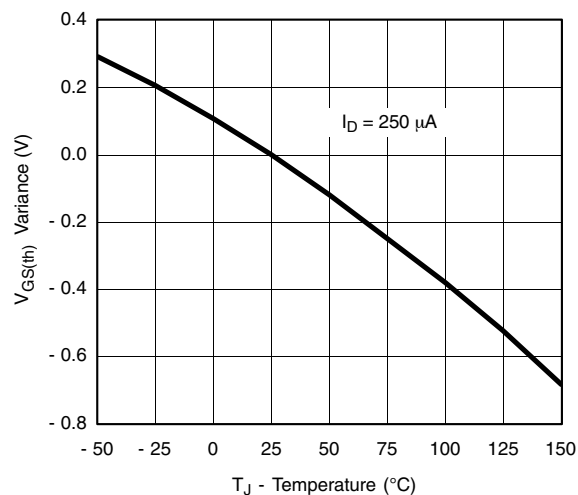
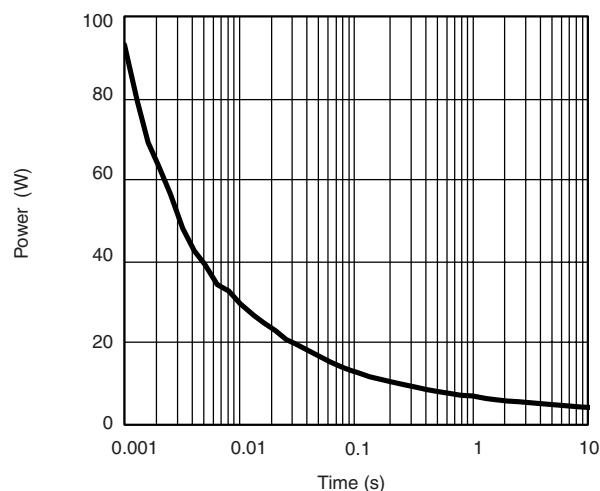
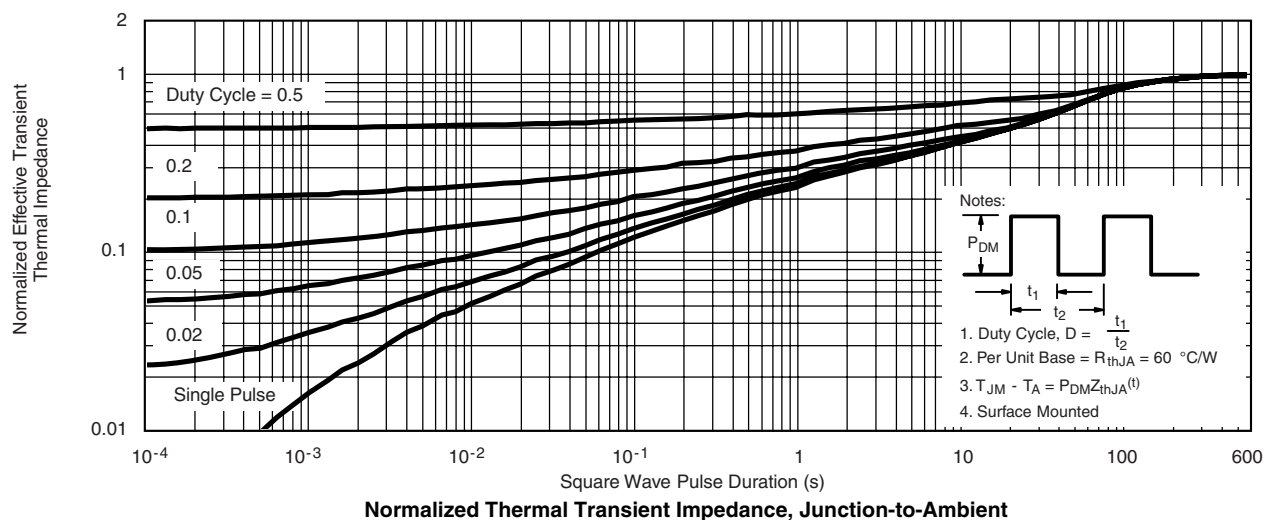
Capacitance



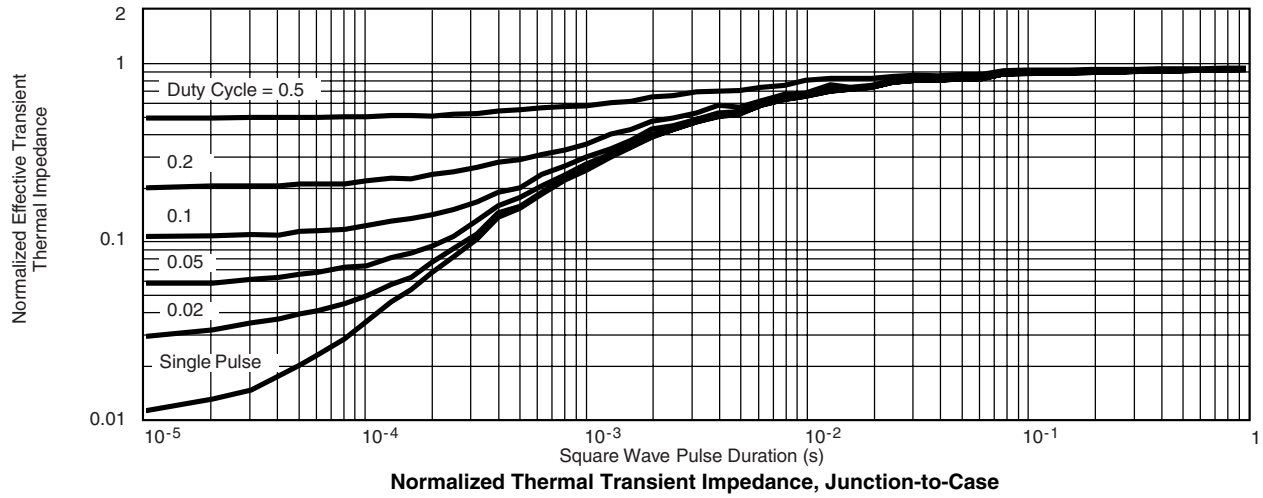
Gate Charge



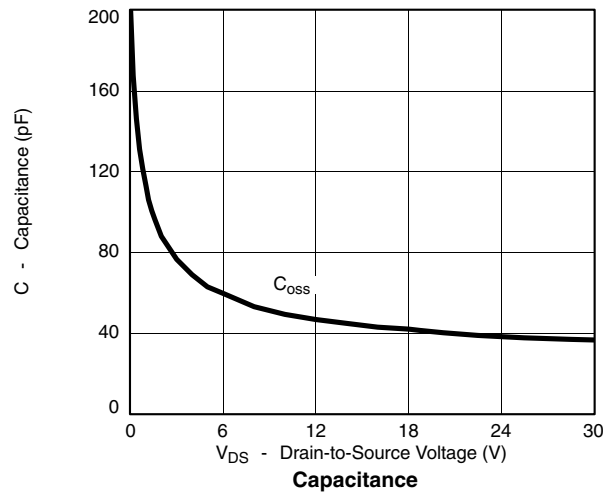
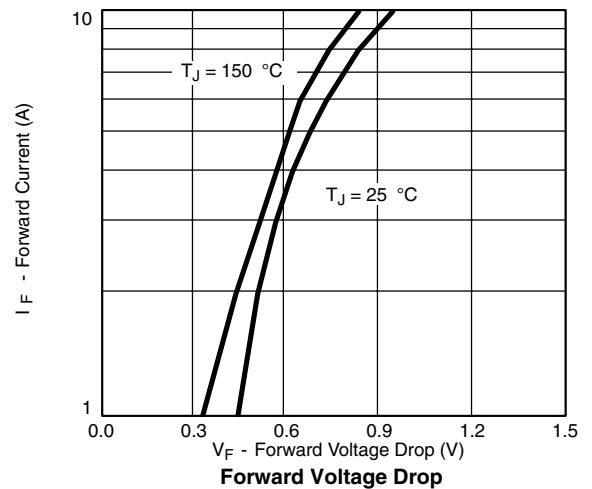
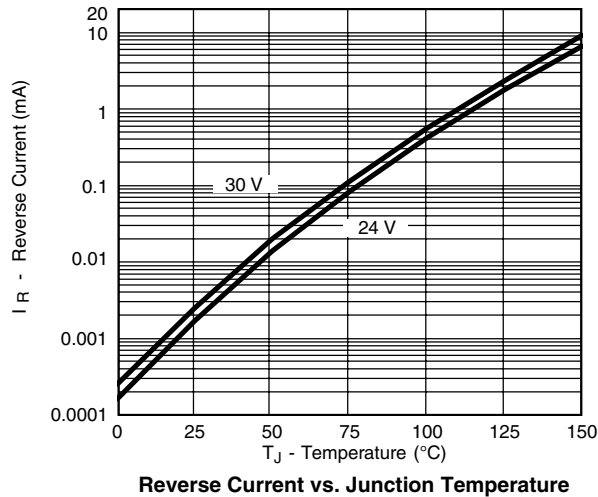
On-Resistance vs. Junction Temperature

MOSFET TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted**Source-Drain Diode Forward Voltage****On-Resistance vs. Gate-to-Source Voltage****Threshold Voltage****Single Pulse Power**

MOSFET TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



SCHOTTKY TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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