

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

PRODUCT SUMMARY		
$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (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

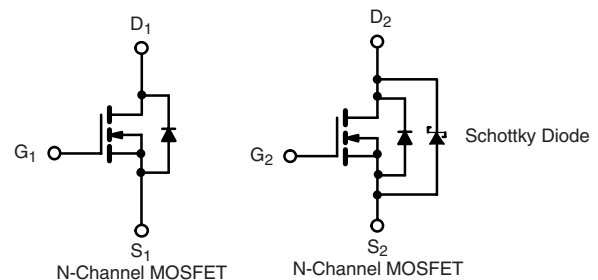
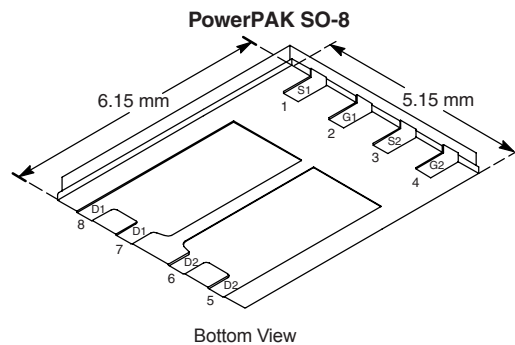
- Halogen-free According to IEC 61249-2-21 Available
- LITTLE FOOT® Plus Schottky
- New Low Thermal Resistance PowerPAK® Package with Low 1.07 mm Profile
- 100 %  $R_g$  Tested



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
Available

### APPLICATIONS

- Bus and Logic DC-DC



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

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted					
Parameter	Symbol	10 s	Steady State	Unit	
Drain-Source Voltage	$V_{DS}$	30		V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$			
Continuous Drain Current ( $T_J = 150$ °C) <sup>a</sup>	$I_D$	$T_A = 25$ °C	10	6.3	A
		$T_A = 70$ °C	6.0	5.0	
Pulsed Drain Current	$I_{DM}$	30			
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	2.9	1.1		
Maximum Power Dissipation <sup>a</sup>	$P_D$	$T_A = 25$ °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) <sup>b,c</sup>		260			

THERMAL RESISTANCE RATINGS							
Parameter	Symbol	MOSFET		Schottky		Unit	
		Typical	Maximum	Typical	Maximum		
Maximum Junction-to-Ambient <sup>a</sup>	$R_{thJA}$	$t \leq 10$ s	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:

- Surface Mounted on 1" x 1" FR4 board.
- See Solder Profile ([www.vishay.com/ppg?73257](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.
- Rework Conditions: manual soldering with a soldering iron is not recommended for leadless components.

SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Condition	Min.	Typ. <sup>b</sup>	Max.	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	0.8		2.4	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	$I_{DSS}$	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$	Ch-1		1	$\mu\text{A}$
			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 <sup>a</sup>	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	20			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 7.5\text{ A}$		0.018	0.022	$\Omega$
		$V_{GS} = 4.5\text{ V}, I_D = 6.5\text{ A}$		0.024	0.030	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}, I_D = 7.5\text{ A}$		22		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = 1\text{ A}, V_{GS} = 0\text{ V}$	Ch-1		0.8	1.2
			Ch-2		0.47	
<b>Dynamic<sup>b</sup></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	$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong 1\text{ A}, V_{GEN} = 10\text{ V}, R_g = 6\text{ }\Omega$		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		
		Ch-2			32	70

Notes:

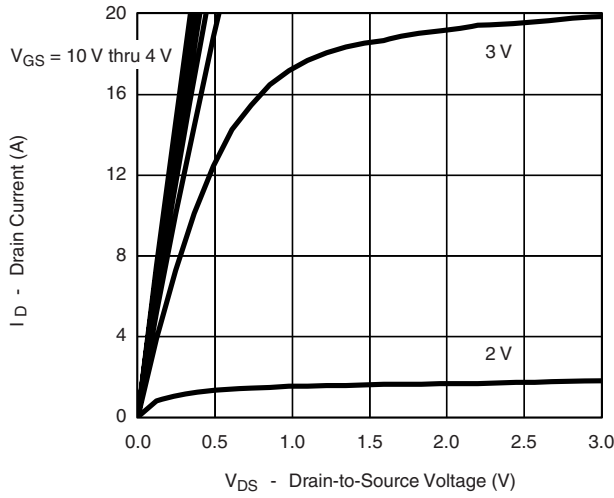
a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

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

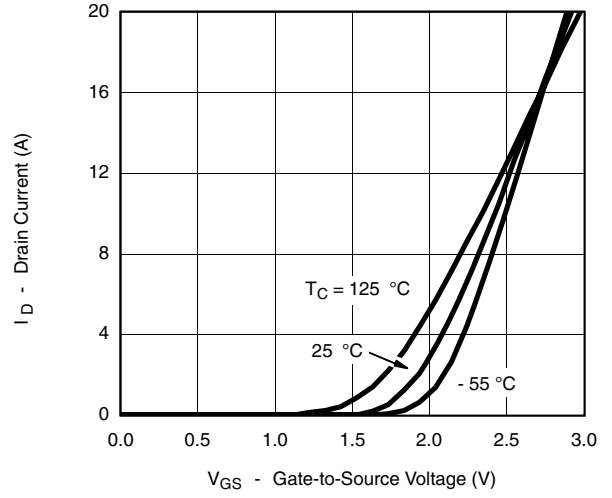
SCHOTTKY SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Forward Voltage Drop	$V_F$	$I_F = 1.0\text{ A}$		0.47	0.50	V
		$I_F = 1.0\text{ A}, T_J = 125\text{ }^\circ\text{C}$		0.36	0.42	
Maximum Reverse Leakage Current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

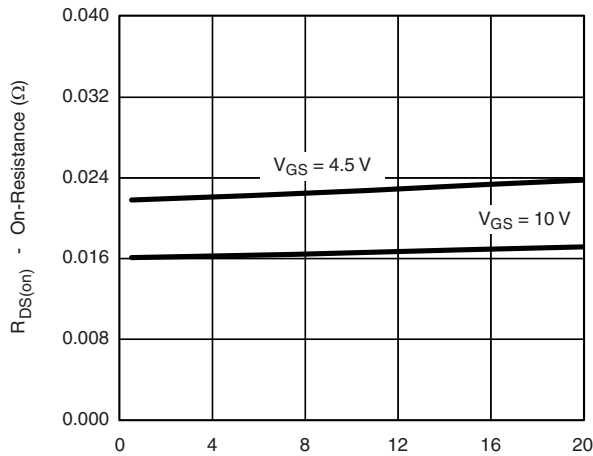
**MOSFET TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



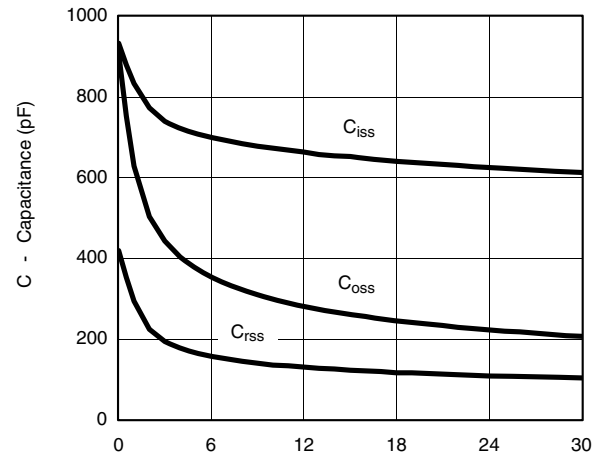
**Output Characteristics**



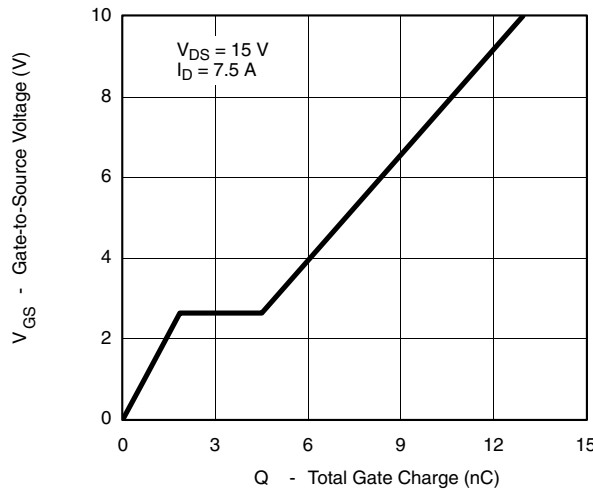
**Transfer Characteristics**



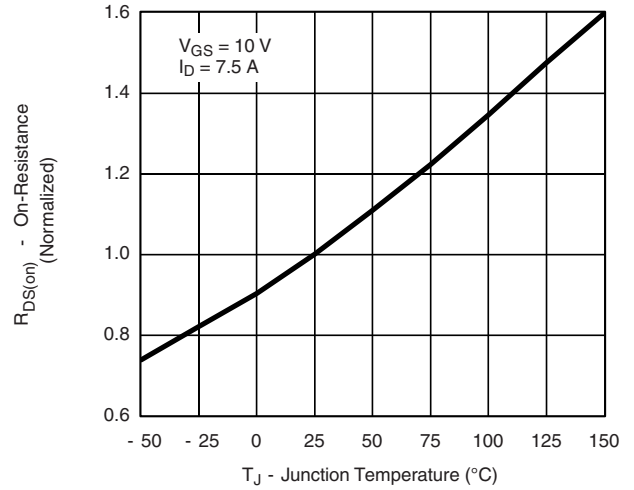
**On-Resistance vs. Drain Current**



**Capacitance**

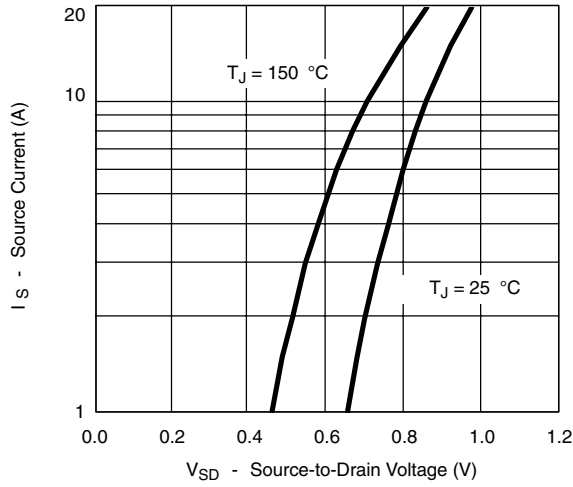


**Gate Charge**

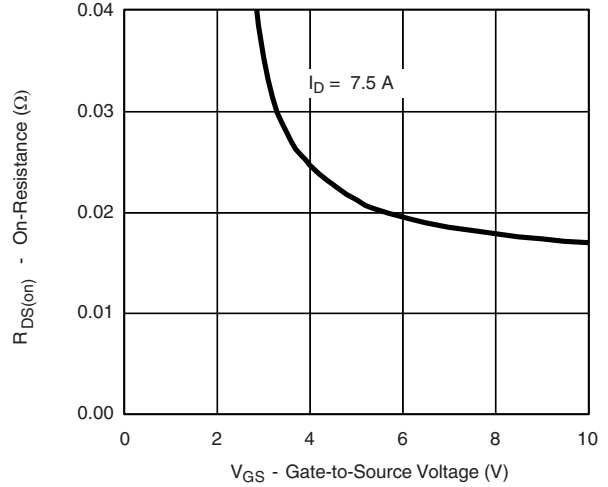


**On-Resistance vs. Junction Temperature**

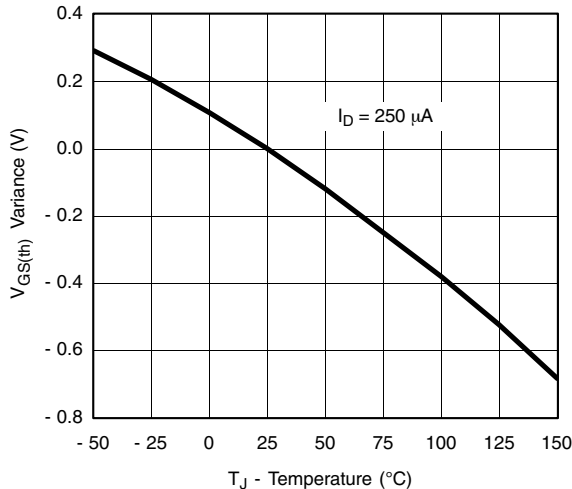
**MOSFET TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



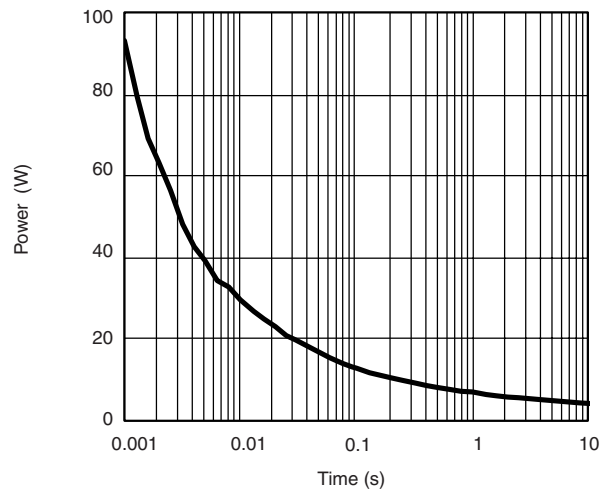
**Source-Drain Diode Forward Voltage**



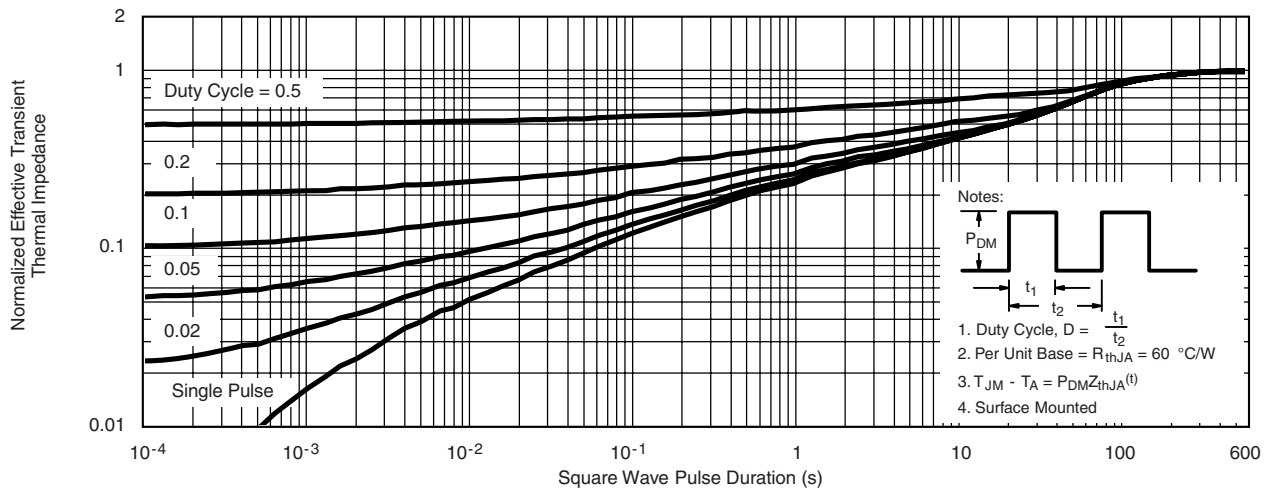
**On-Resistance vs. Gate-to-Source Voltage**



**Threshold Voltage**

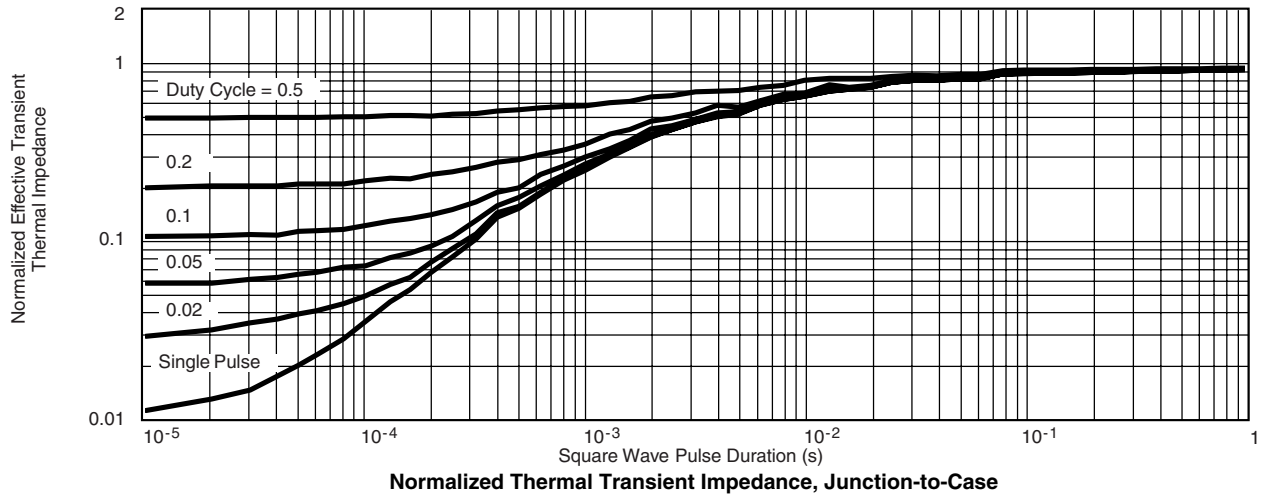


**Single Pulse Power**

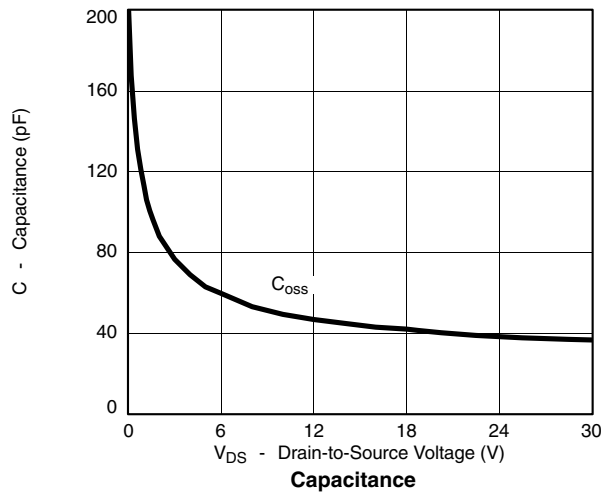
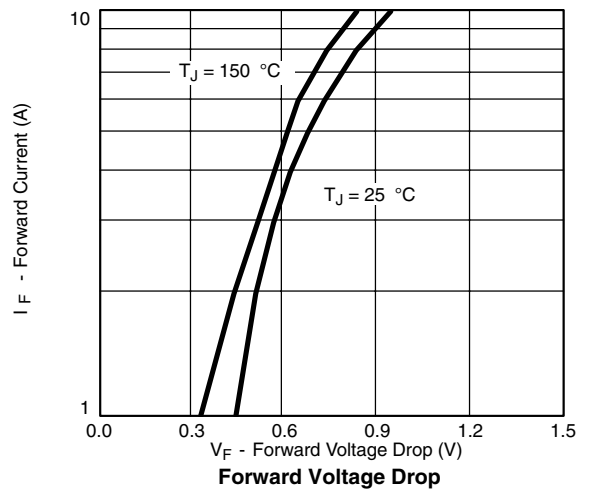
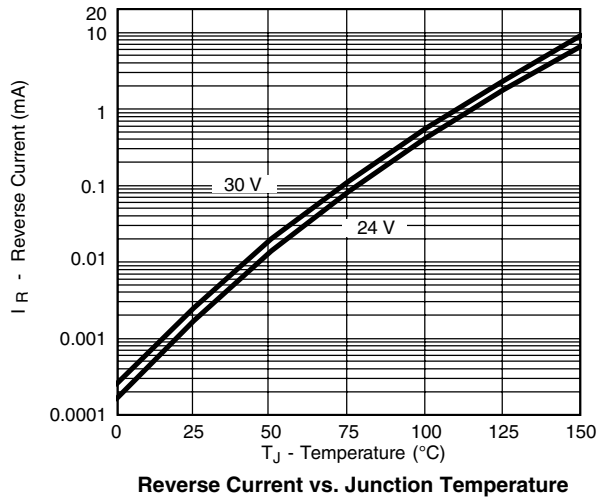


**Normalized Thermal Transient Impedance, Junction-to-Ambient**

**MOSFET TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



**SCHOTTKY TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



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