

## 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

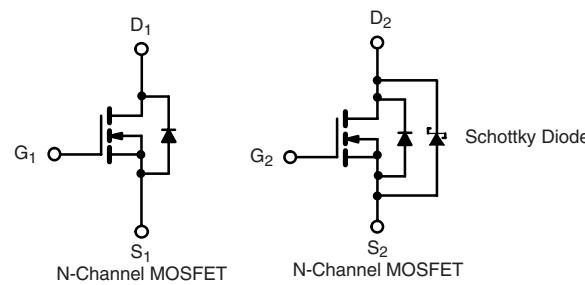
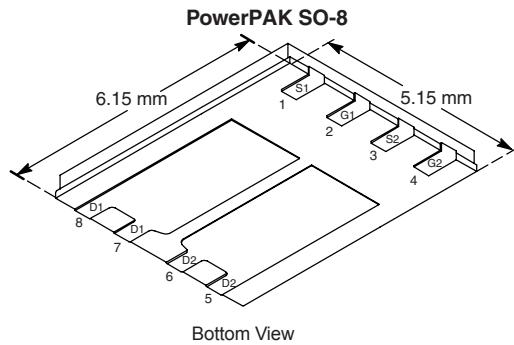
- Halogen-free According to IEC 61249-2-21 Available
- LITTLE FOOT® Plus Schottky
- New Low Thermal Resistance PowerPAK® Package with Low 1.07 mm Profile
- 100 %  $R_g$  Tested



**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>	$I_D$	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>	$P_D$	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>	$R_{thJA}$	26	35	26	35	°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:

- 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**  $T_J = 25^\circ\text{C}$ , unless otherwise noted

Parameter	Symbol	Test Condition		Min.	Typ. <sup>b</sup>	Max.	Unit
<b>Static</b>							
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$ , $I_D = 250 \mu\text{A}$		0.8		2.4	V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 \text{ V}$ , $V_{GS} = \pm 20 \text{ V}$				$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 30 \text{ V}$ , $V_{GS} = 0 \text{ V}$		Ch-1		1	$\mu\text{A}$
		$V_{DS} = 30 \text{ V}$ , $V_{GS} = 0 \text{ V}$ , $T_J = 85^\circ\text{C}$		Ch-2		100	
				Ch-1		15	
				Ch-2		2000	
On-State Drain Current <sup>a</sup>	$I_{D(\text{on})}$	$V_{DS} = 5 \text{ V}$ , $V_{GS} = 10 \text{ V}$		20			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$ , $I_D = 7.5 \text{ A}$			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	V
				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	$t_{d(\text{on})}$	$V_{DD} = 15 \text{ V}$ , $R_L = 15 \Omega$ $I_D \geq 1 \text{ A}$ , $V_{GEN} = 10 \text{ V}$ , $R_g = 6 \Omega$			8	16	ns
Rise Time	$t_r$				10	20	
Turn-Off Delay Time	$t_{d(\text{off})}$				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:

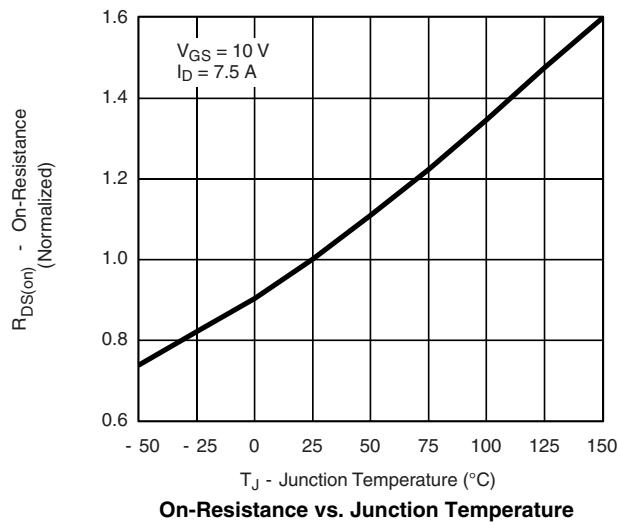
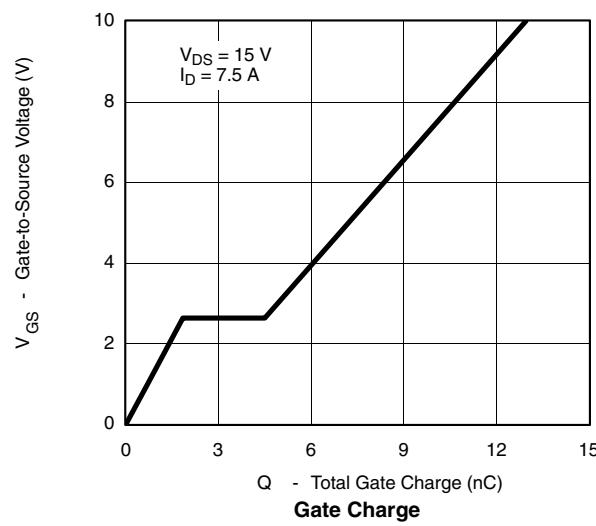
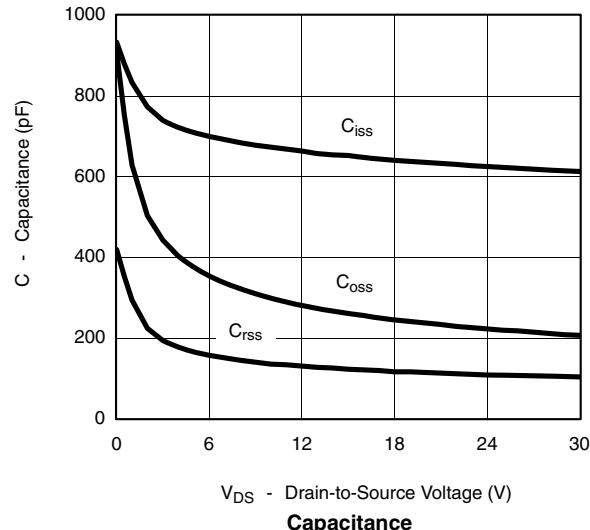
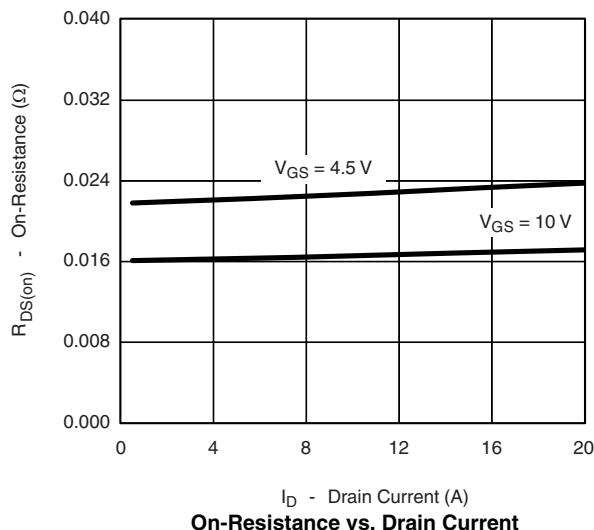
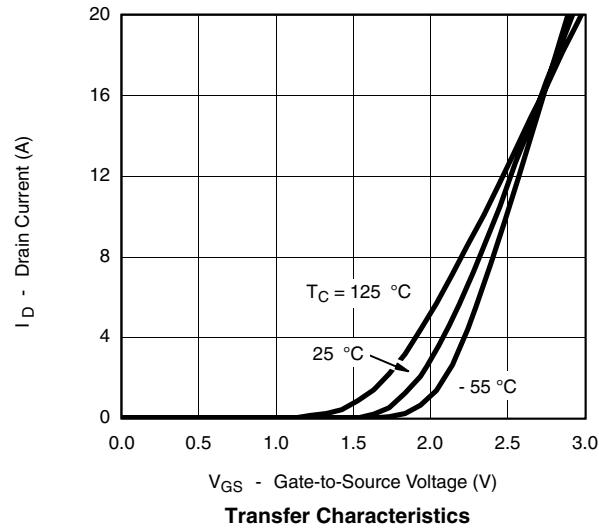
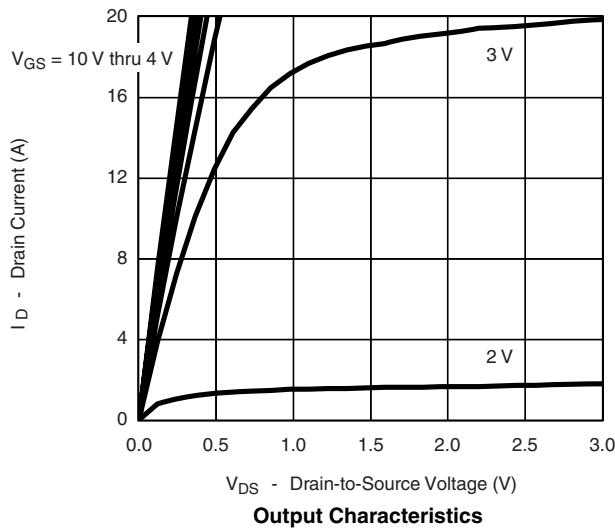
a. Pulse test; pulse width  $\leq 300 \mu\text{s}$ , duty cycle  $\leq 2 \%$ .

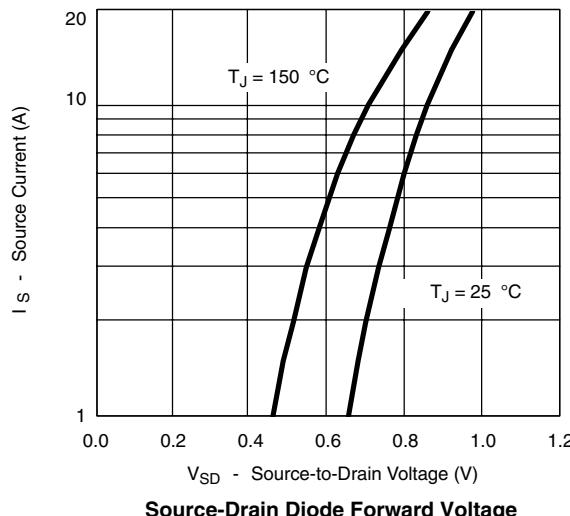
b. Guaranteed by design, not subject to production testing.

**SCHOTTKY SPECIFICATIONS**  $T_J = 25^\circ\text{C}$ , unless otherwise noted

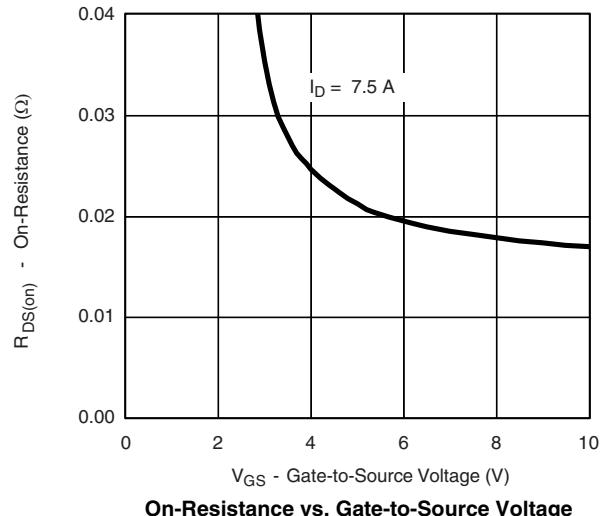
Parameter	Symbol	Test Condition		Min.	Typ.	Max.	Unit
Forward Voltage Drop	$V_F$	$I_F = 1.0 \text{ A}$			0.47	0.50	V
		$I_F = 1.0 \text{ A}$ , $T_J = 125^\circ\text{C}$			0.36	0.42	
Maximum Reverse Leakage Current	$I_{rm}$	$V_r = 30 \text{ V}$			0.004	0.100	mA
		$V_r = 30 \text{ V}$ , $T_J = 100^\circ\text{C}$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

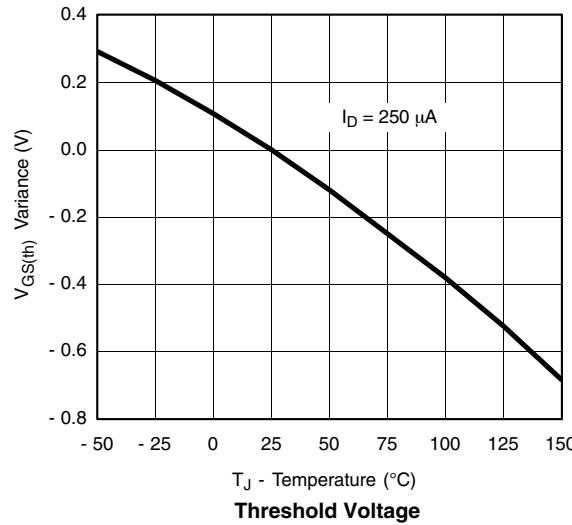
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Source-Drain Diode Forward Voltage



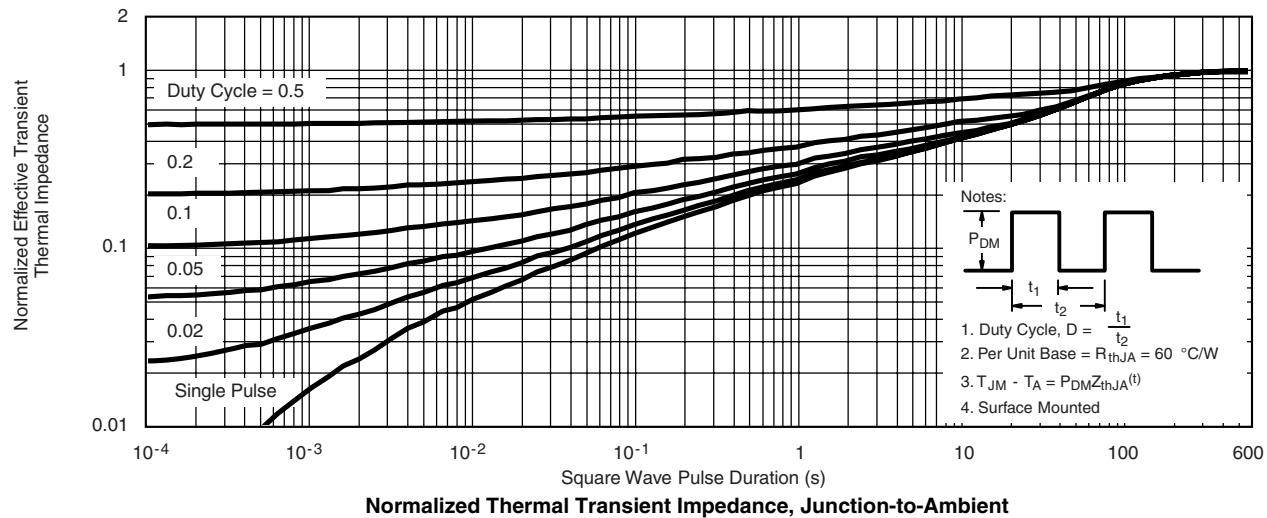
On-Resistance vs. Gate-to-Source Voltage

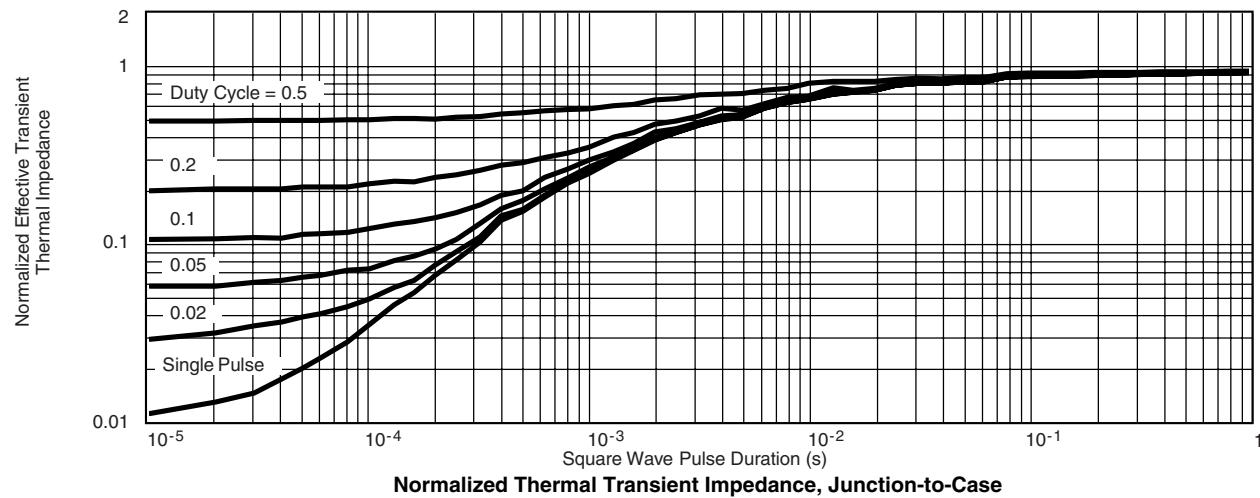
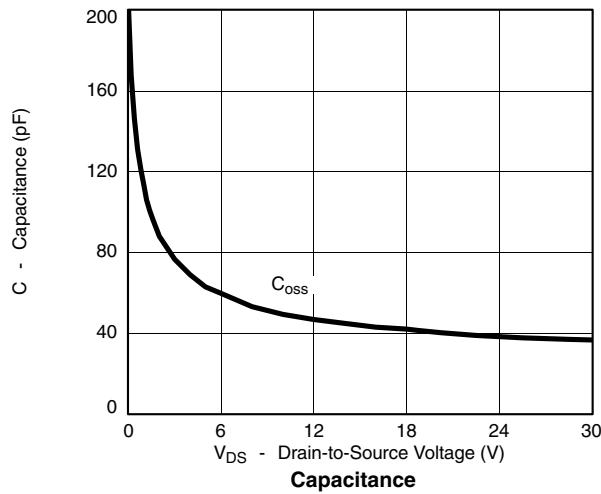
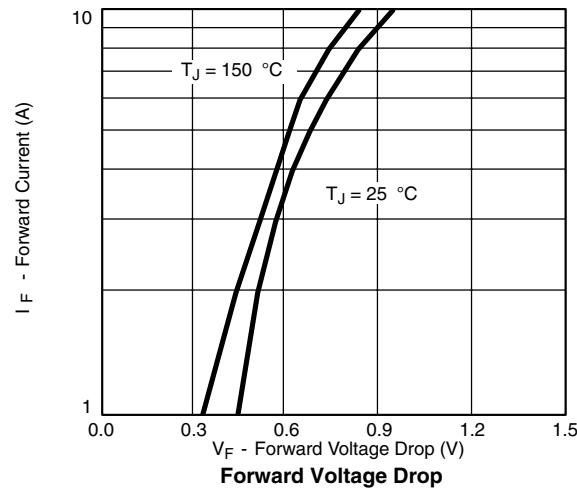
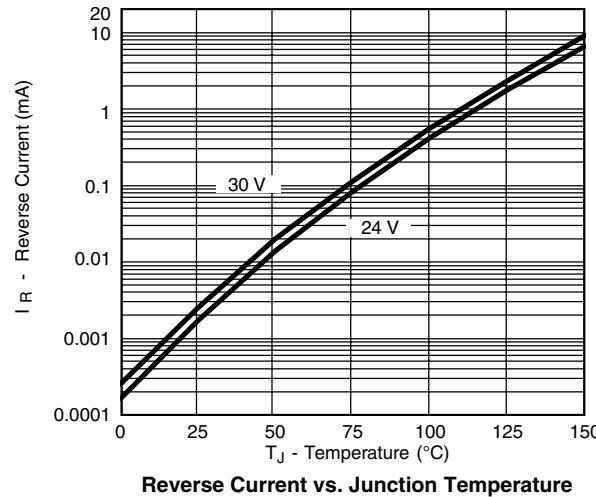


Threshold Voltage



Single Pulse Power



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

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


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