



## N-Channel 30-V (D-S), Reduced Qg Fast Switching MOSFET with Schottky Diode

PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
30	0.0185 @ $V_{GS} = 10$ V	9
	0.033 @ $V_{GS} = 4.5$ V	7

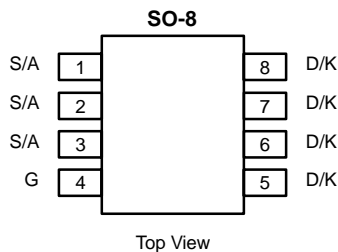
SCHOTTKY PRODUCT SUMMARY		
$V_{DS}$ (V)	$V_{SD}$ (V) Diode Forward Voltage	$I_F$ (A)
30	0.5 V @ 1 A	2.0

### FEATURES

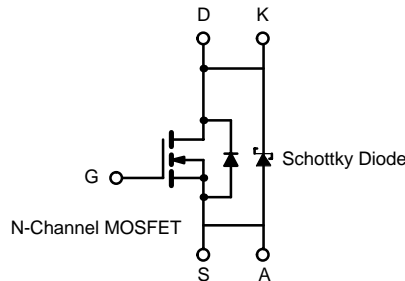
- TrenchFET® Power MOSFET
- LITTLE FOOT Plus™ Integrated Schottky
- PWM Optimized

### APPLICATIONS

- Low Power Synchronous Rectification



Ordering Information: Si4300DY  
Si4300DY-T1 (with Tape and Reel)



ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)					
Parameter		Symbol	10 secs	Steady State	Unit
Drain-Source Voltage (MOSFET)		$V_{DS}$	30		V
Reverse Voltage (Schottky)		$V_{DA}$	30		
Gate-Source Voltage		$V_{GS}$	$\pm 20$		
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) (MOSFET) <sup>a</sup>	$T_A = 25^\circ\text{C}$	$I_D$	9	6.4	A
	$T_A = 70^\circ\text{C}$		7	5.1	
Pulsed Drain Current (MOSFET)		$I_{DM}$	40		
Continuous Source Current (MOSFET Diode Conduction) <sup>a</sup>		$I_S$	2.3	1.25	
Average Forward Current (Schottky)		$I_F$	2.3	1.25	
Pulsed Forward Current (Schottky)		$I_{FM}$	20		
Maximum Power Dissipation (MOSFET) <sup>a</sup>	$T_A = 25^\circ\text{C}$	$P_D$	2.5	1.38	W
	$T_A = 70^\circ\text{C}$		1.6	0.88	
Maximum Power Dissipation (Schottky) <sup>a</sup>	$T_A = 25^\circ\text{C}$		2.2	1.25	
	$T_A = 70^\circ\text{C}$		1.4	0.80	
Operating Junction and Storage Temperature Range		$T_J, T_{stg}$	-55 to 150		$^\circ\text{C}$

THERMAL RESISTANCE RATINGS							
Parameter		Symbol	MOSFET		Schottky		Unit
			Typ	Max	Typ	Max	
Maximum Junction-to-Ambient <sup>a</sup>	$t \leq 10$ sec	$R_{thJA}$	40	50	45	55	$^\circ\text{C/W}$
	Steady-State		70	90	78	100	
Maximum Junction-to-Foot (Drain)	Steady-State	$R_{thJF}$	18	23	25	30	

Notes

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

<b>MOSFET SPECIFICATIONS (T<sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED).</b>						
Parameter	Symbol	Test Condition	Min	Typ <sup>a</sup>	Max	Unit
<b>Static</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	0.8			V
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V			100	μA
		V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 85 °C			2000	
On-State Drain Current <sup>b</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 5 V, V <sub>GS</sub> = 10 V	30			A
Drain-Source On-State Resistance <sup>b</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 9 A		0.0155	0.0185	Ω
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 7 A		0.0275	0.033	
Forward Transconductance <sup>b</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 9 A		16		S
Schottky Diode Forward Voltage <sup>b</sup>	V <sub>SD</sub>	I <sub>S</sub> = 1.0 A, V <sub>GS</sub> = 0 V		0.47	0.5	V
<b>Dynamic<sup>a</sup></b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 5 V, I <sub>D</sub> = 9 A		8.7	13	nC
Gate-Source Charge	Q <sub>gs</sub>			2.25		
Gate-Drain Charge	Q <sub>gd</sub>			4.2		
Gate Resistance	R <sub>g</sub>		0.5		2.7	Ω
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 15 V, R <sub>L</sub> = 15 Ω I <sub>D</sub> = 1 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 6 Ω		11	16	ns
Rise Time	t <sub>r</sub>			8	15	
Turn-Off Delay Time	t <sub>d(off)</sub>			22	30	
Fall Time	t <sub>f</sub>			9	15	
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 2.3 A, di/dt = 100 A/μs		32	60	

## Notes

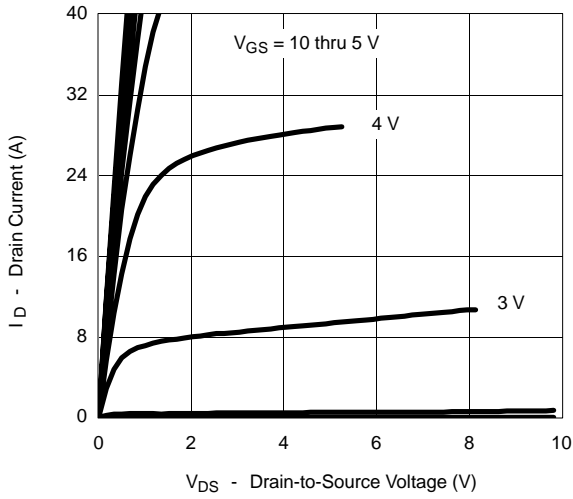
- a. Guaranteed by design, not subject to production testing.  
 b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.

<b>SCHOTTKY SPECIFICATIONS (T<sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)</b>						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Forward Voltage Drop	V <sub>F</sub>	I <sub>F</sub> = 1.0 A		0.47	0.5	V
		I <sub>F</sub> = 1.0 A, T <sub>J</sub> = 125 °C		0.36	0.42	
Maximum Reverse Leakage Current	I <sub>rm</sub>	V <sub>r</sub> = 24 V		0.004	0.100	mA
		V <sub>r</sub> = 24 V, T <sub>J</sub> = 100 °C		0.7	10	
		V <sub>r</sub> = -24 V, T <sub>J</sub> = 125 °C		3.0	20	
Junction Capacitance	C <sub>T</sub>	V <sub>r</sub> = 10 V		50		pF

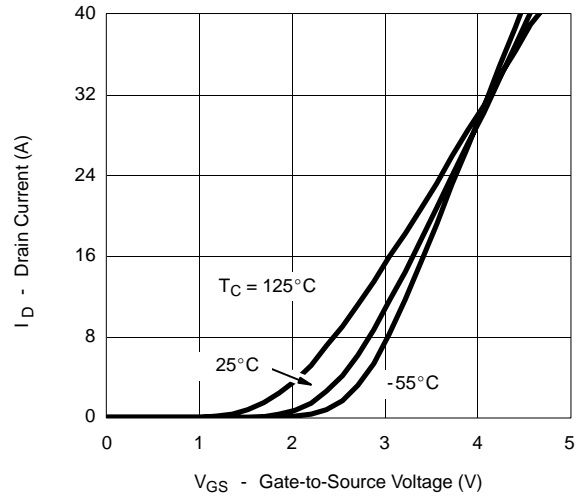


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) MOSFET**

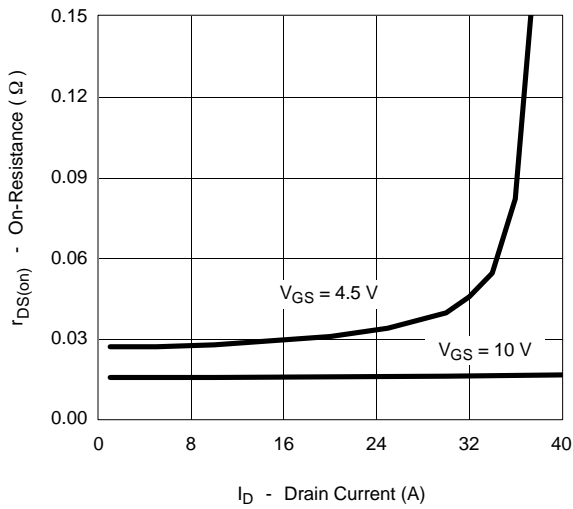
**Output Characteristics**



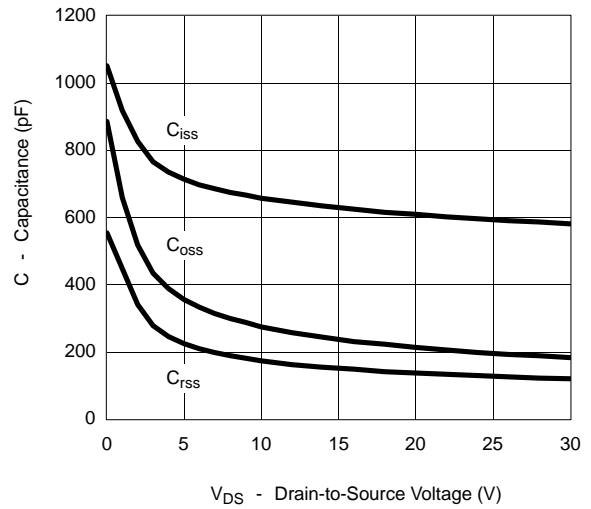
**Transfer Characteristics**



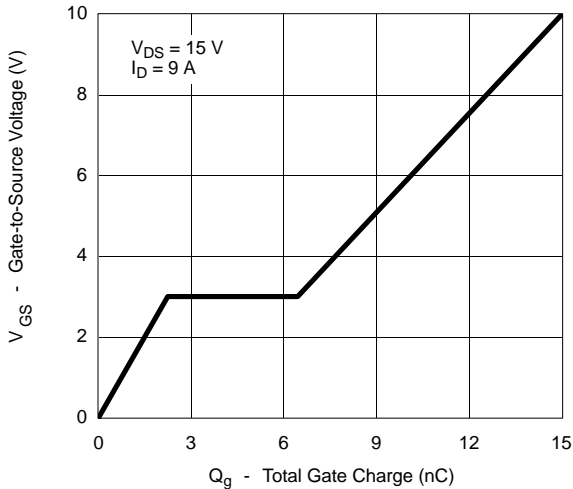
**On-Resistance vs. Drain Current**



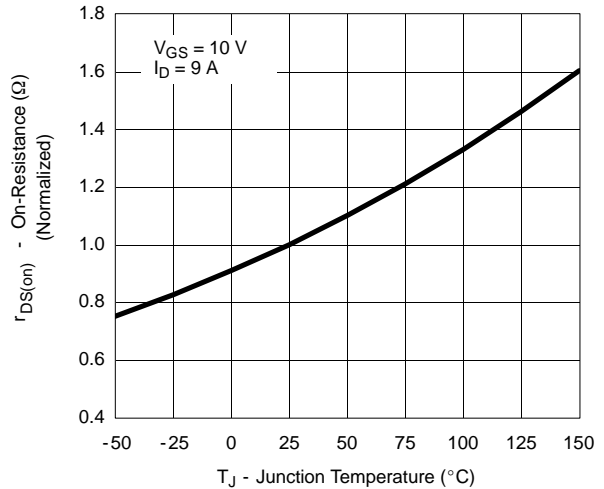
**Capacitance**



**Gate Charge**



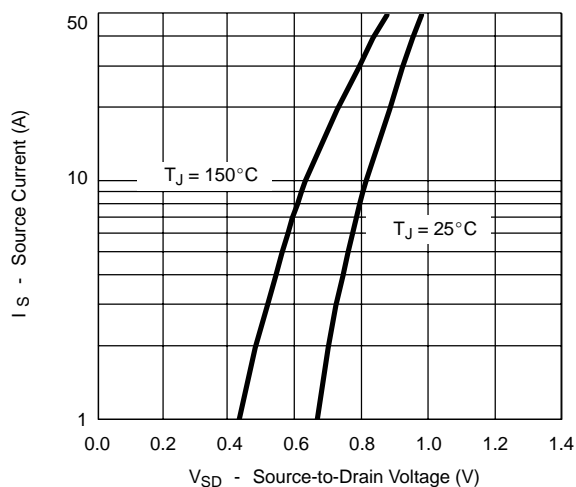
**On-Resistance vs. Junction Temperature**



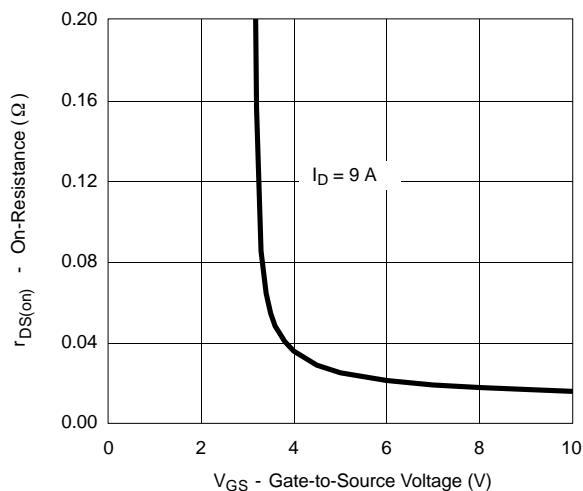
**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

**MOSFET**

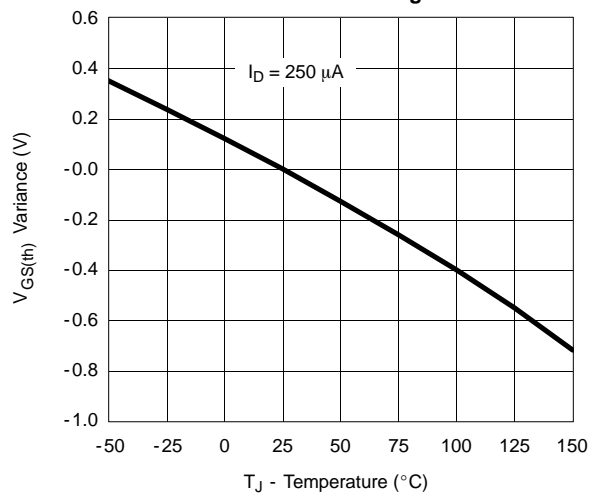
**Source-Drain Diode Forward Voltage**



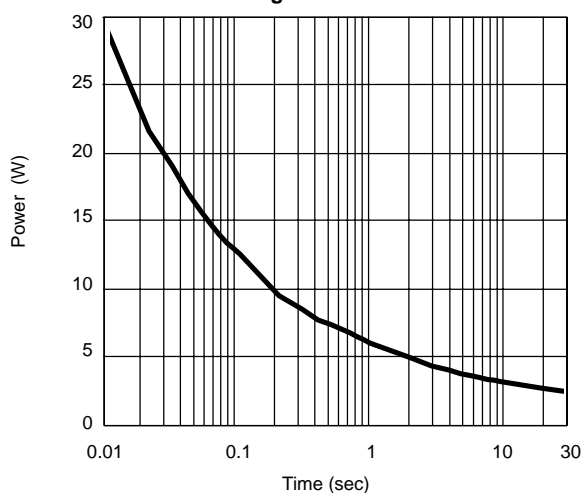
**On-Resistance vs. Gate-to-Source Voltage**



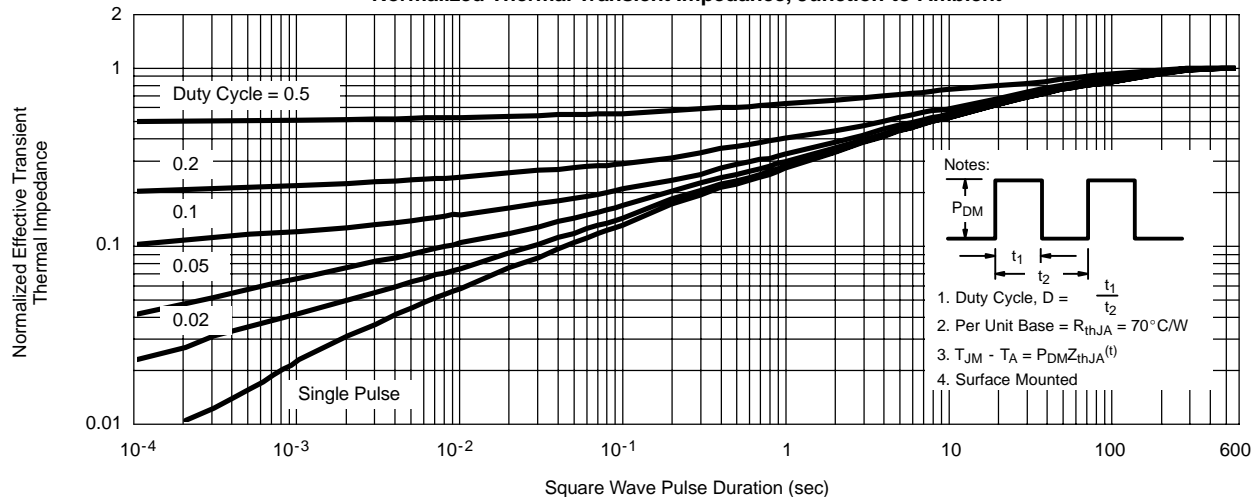
**Threshold Voltage**



**Single Pulse Power**

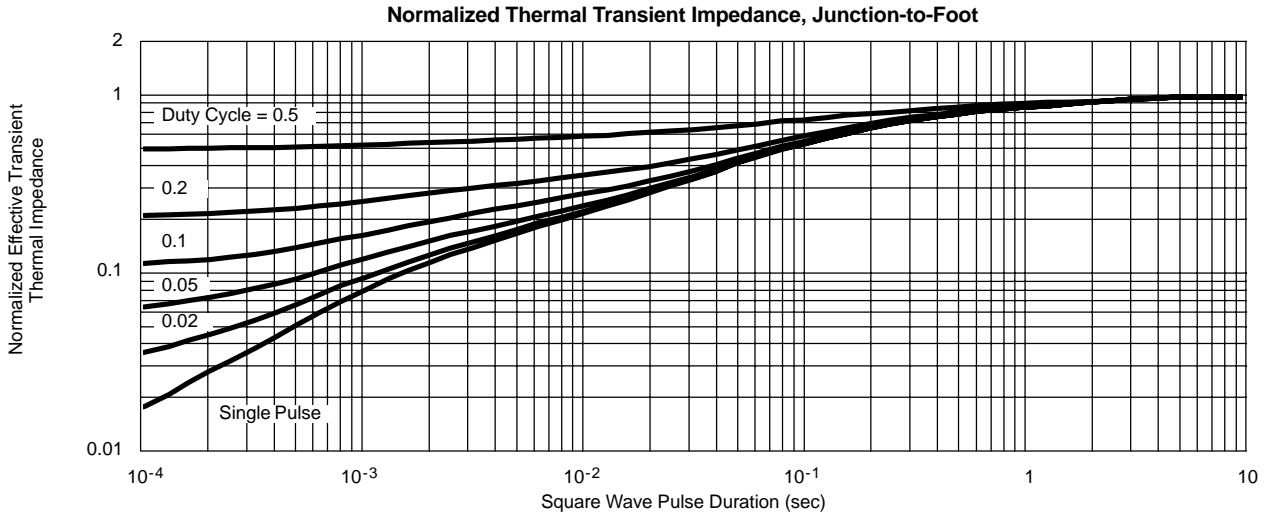


**Normalized Thermal Transient Impedance, Junction-to-Ambient**

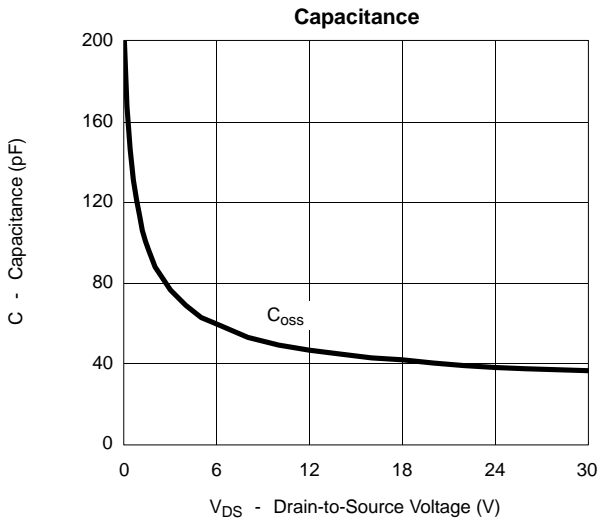
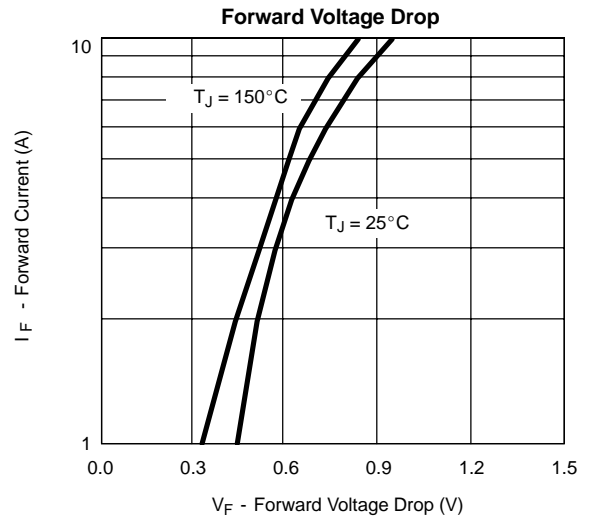
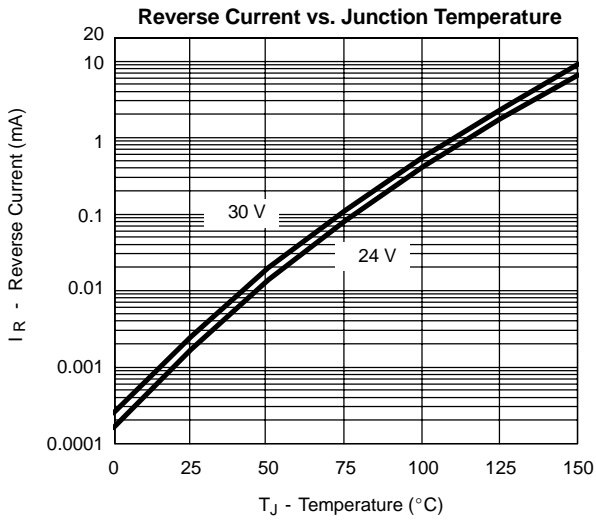




**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) MOSFET**



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





## Disclaimer

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