

Single P-Channel 20-V (D-S) MOSFET With Schottky Diode

MOSFET PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
-20	0.048 @ $V_{GS} = -4.5$ V	-6.3
	0.068 @ $V_{GS} = -2.5$ V	-5.3
	0.090 @ $V_{GS} = -1.8$ V	-4.6

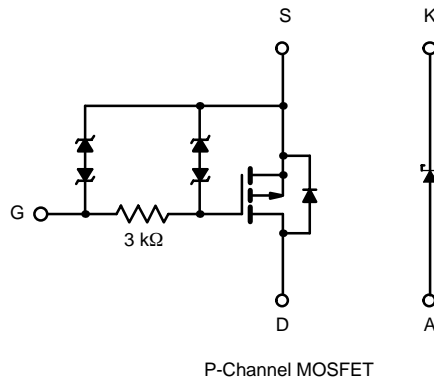
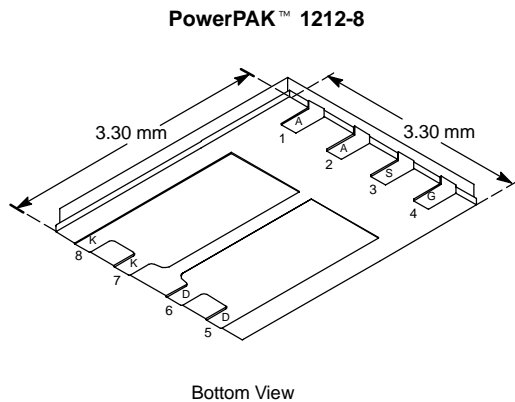
SCHOTTKY PRODUCT SUMMARY		
V_{KA} (V)	V_f (V) Diode Forward Voltage	I_F (A)
20	0.48 V @ 0.5 A	1.0

FEATURES

- TrenchFET® Power MOSFETS: 1.8-V Rated
- ESD Protected: 4500 V
- Ultra-Low Thermal Resistance, PowerPAK™ Package with Low 1.07-mm Profile

APPLICATIONS

- Charger Switching



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)					
Parameter	Symbol	10 sec	Steady State	Unit	
Drain-Source Voltage (MOSFET and Schottky)	V_{DS}	-20		V	
Reverse Voltage (Schottky)	V_{KA}	20			
Gate-Source Voltage (MOSFET)	V_{GS}	± 12	± 12		
Continuous Drain Current ($T_J = 150^\circ\text{C}$) (MOSFET) ^a	I_D	$T_A = 25^\circ\text{C}$	-6.3	-4.3	A
		$T_A = 85^\circ\text{C}$	-4.5	-3.1	
Pulsed Drain Current (MOSFET)	I_{DM}	-20			
Continuous Source Current (MOSFET Diode Conduction) ^a	I_S	-2.3	-1.1		
Average Forward Current (Schottky)	I_F	1.0			
Pulsed Forward Current (Schottky)	I_{FM}	7			
Maximum Power Dissipation (MOSFET) ^a	P_D	$T_A = 25^\circ\text{C}$	2.8	1.3	W
		$T_A = 85^\circ\text{C}$	1.5	0.7	
Maximum Power Dissipation (Schottky) ^a	P_D	$T_A = 25^\circ\text{C}$	2.0	1.1	
		$T_A = 85^\circ\text{C}$	1.0	0.6	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150		$^\circ\text{C}$	

Notes

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

THERMAL RESISTANCE RATINGS						
Parameter		Device	Symbol	Typical	Maximum	Unit
Junction-to-Ambient ^a	t ≤ 10 sec	MOSFET	R _{thJA}	35	44	°C/W
		Schottky		51	64	
	Steady State	MOSFET		75	94	
		Schottky		91	115	
Junction-to-Case (Drain)	Steady State	MOSFET	R _{thJC}	4	5	
		Schottky		10	12	

Notes

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

MOSFET SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -800 μA	-0.45			V
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±4.5 V			±1.5	μA
		V _{DS} = 0 V, V _{GS} = ±12 V			±100	mA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -16 V, V _{GS} = 0 V			-1	μA
		V _{DS} = -16 V, V _{GS} = 0 V, T _J = 85 °C			-5	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≤ -5 V, V _{GS} = -4.5 V	-20			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = -4.5 V, I _D = -6.3 A		0.041	0.048	Ω
		V _{GS} = -2.5 V, I _D = -5.3 A		0.057	0.068	
		V _{GS} = -1.8 V, I _D = -1 A		0.072	0.090	
Forward Transconductance ^a	g _{fs}	V _{DS} = -10 V, I _D = -6.3 A		14		S
Diode Forward Voltage ^a	V _{SD}	I _S = -2.3 A, V _{GS} = 0 V		-0.8	-1.2	V
Dynamic^b						
Total Gate Charge	Q _g	V _{DS} = -10 V, V _{GS} = -4.5 V, I _D = -6.3 A		12	18	nC
Gate-Source Charge	Q _{gs}		2.5			
Gate-Drain Charge	Q _{gd}		2.9			
Turn-On Delay Time	t _{d(on)}	V _{DD} = -10 V, R _L = 10 Ω I _D ≅ -1 A, V _{GEN} = -4.5 V, R _G = 6 Ω		2.5	4	vs
Rise Time	t _r			4	6	
Turn-Off Delay Time	t _{d(off)}			15	23	
Fall Time	t _f			12	18	

Notes

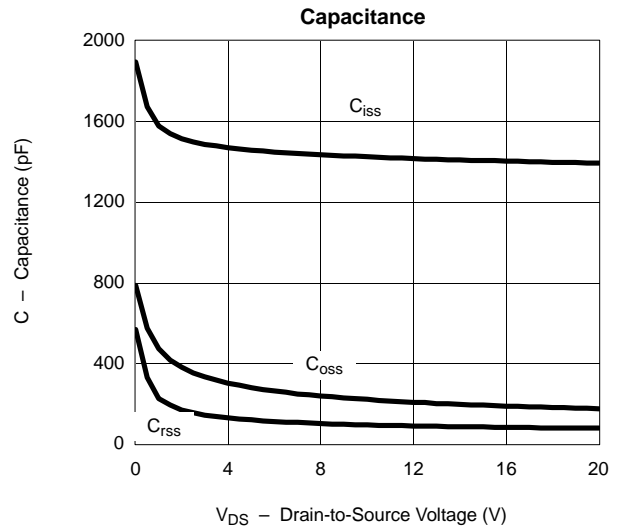
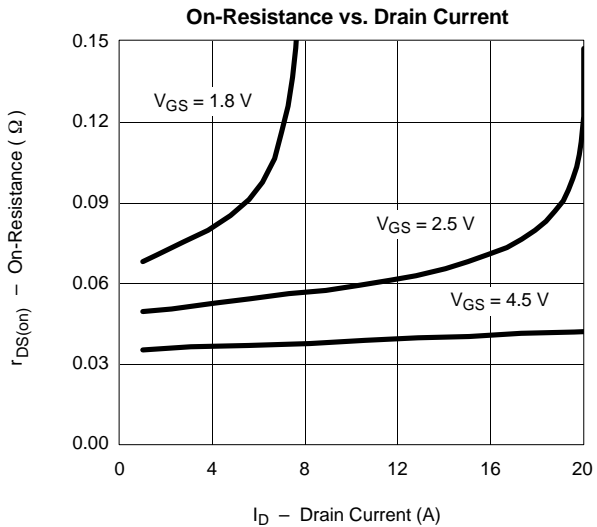
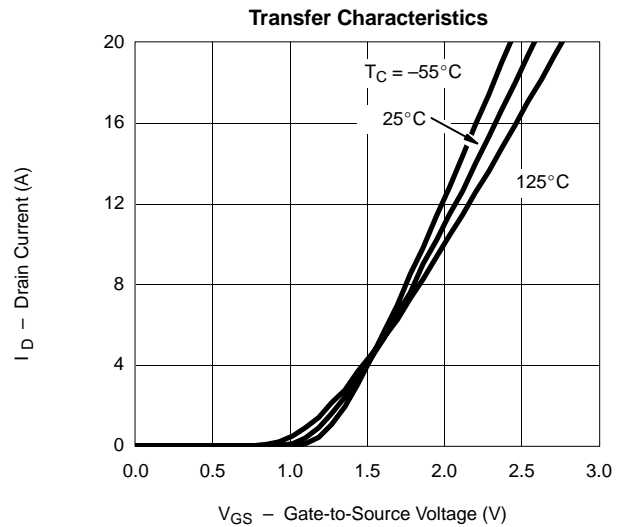
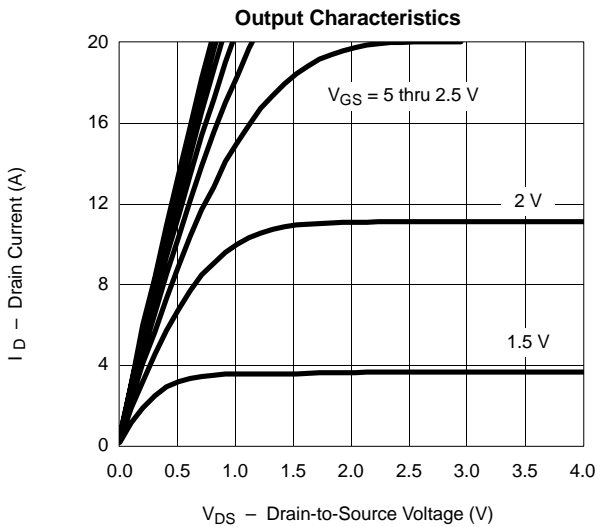
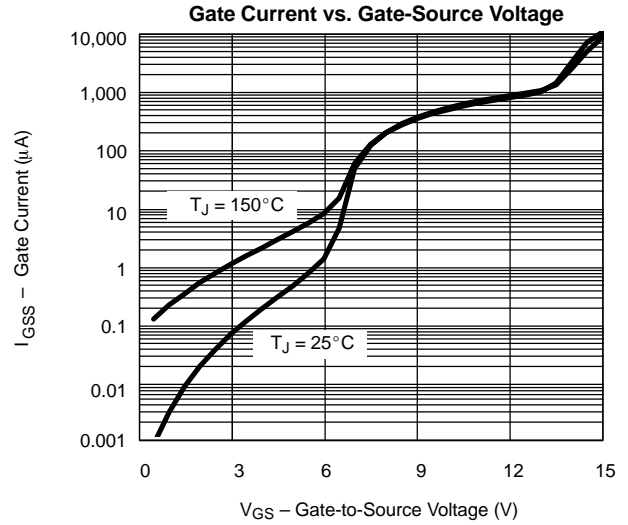
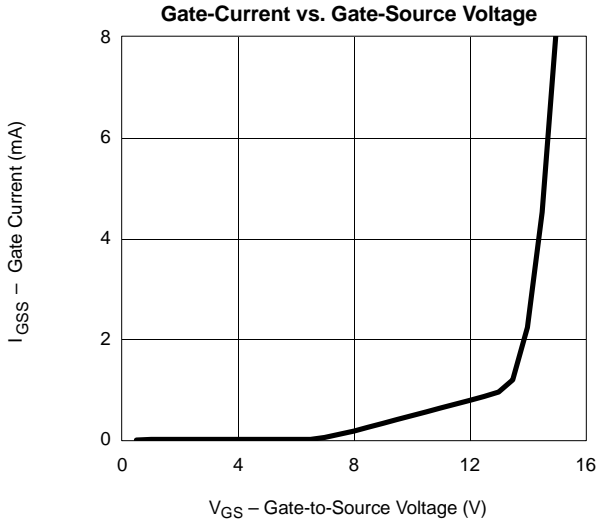
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.

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

SCHOTTKY SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Forward Voltage Drop	V _F	I _F = 0.5 A		0.42	0.48	V
		I _F = 0.5 A, T _J = 125 °C		0.33	0.4	
Maximum Reverse Leakage Current	I _{rm}	V _r = 20 V		0.002	0.100	mA
		V _r = 20 V, T _J = 85 °C		0.10	1	
		V _r = 20 V, T _J = 125 °C		1.5	10	
Junction Capacitance	C _T	V _r = 10 V		31		pF



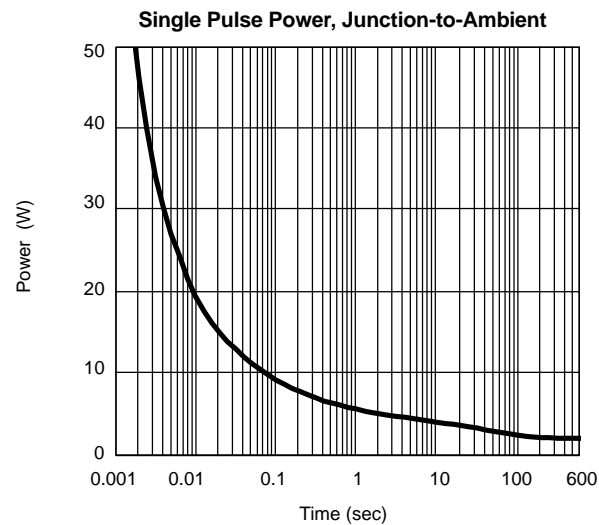
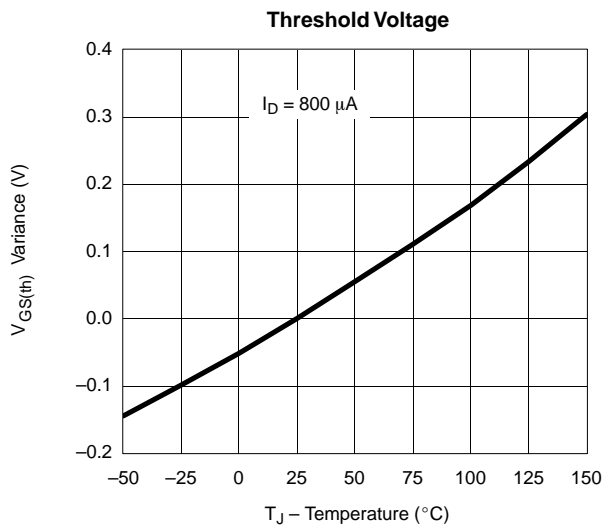
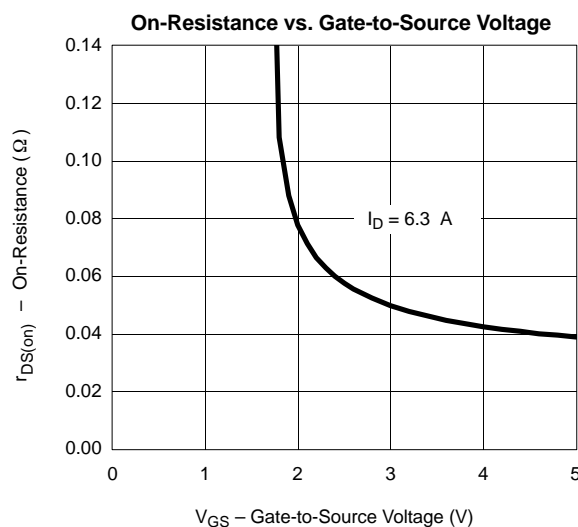
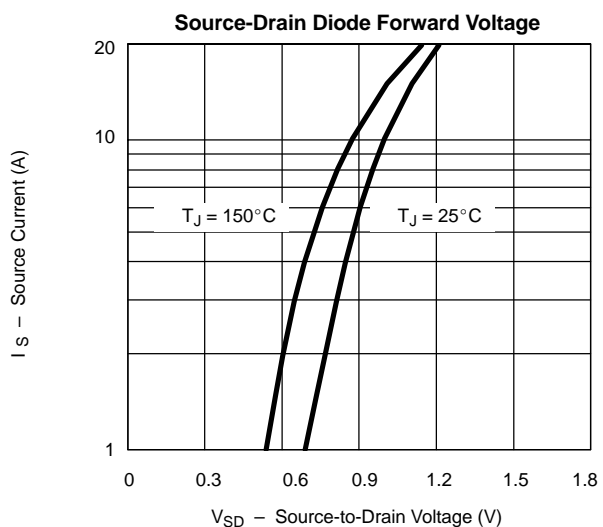
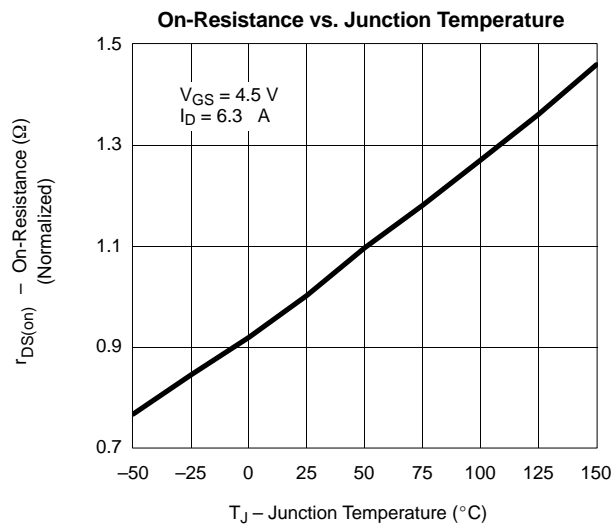
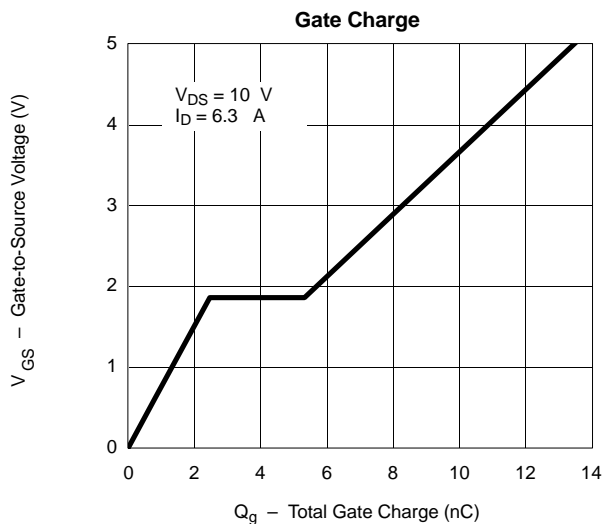
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) MOSFET





TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

MOSFET

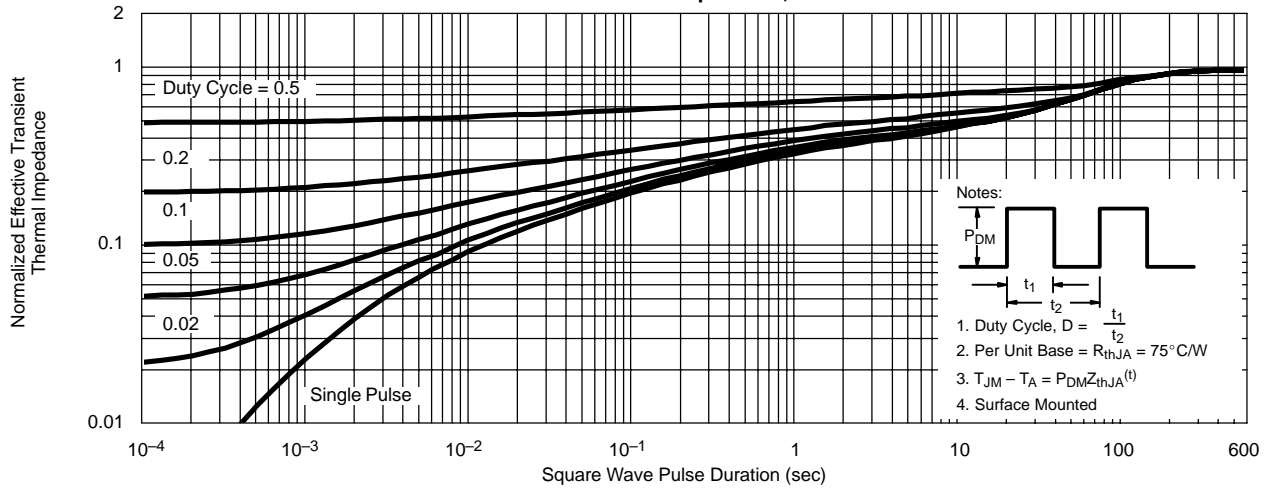




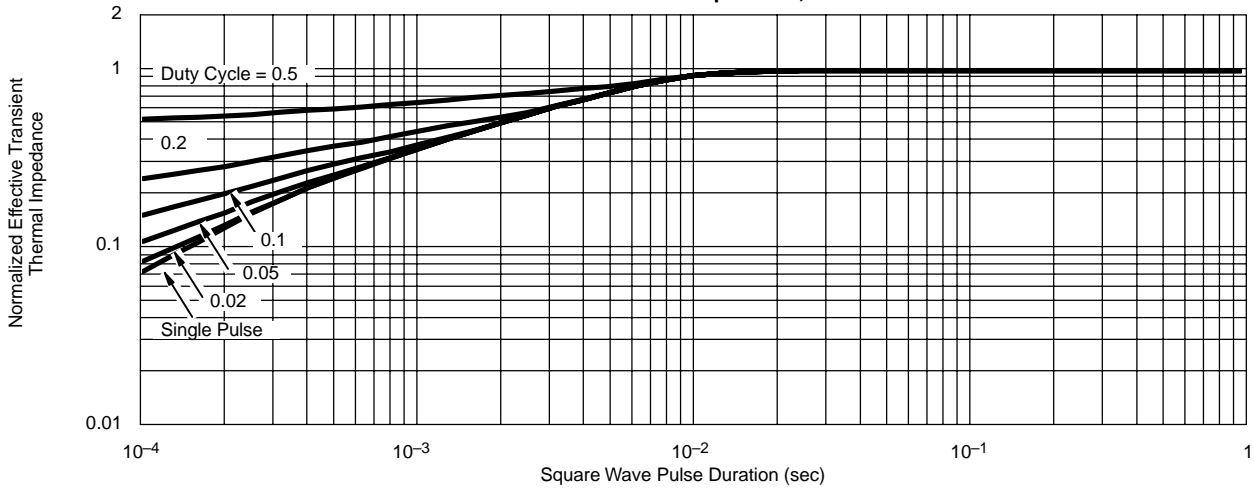
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

MOSFET

Normalized Thermal Transient Impedance, Junction-to-Ambient



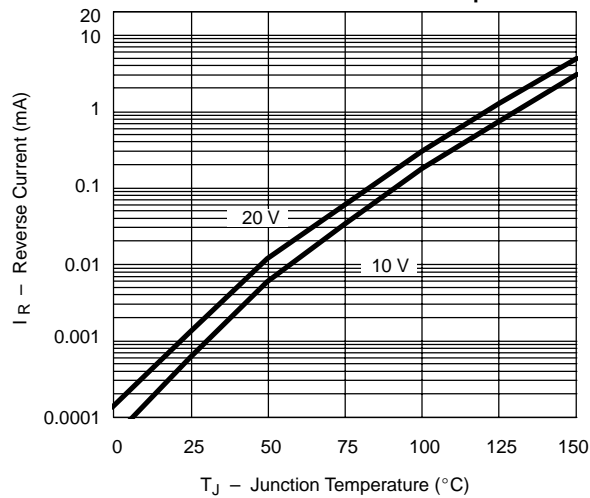
Normalized Thermal Transient Impedance, Junction-to-Case



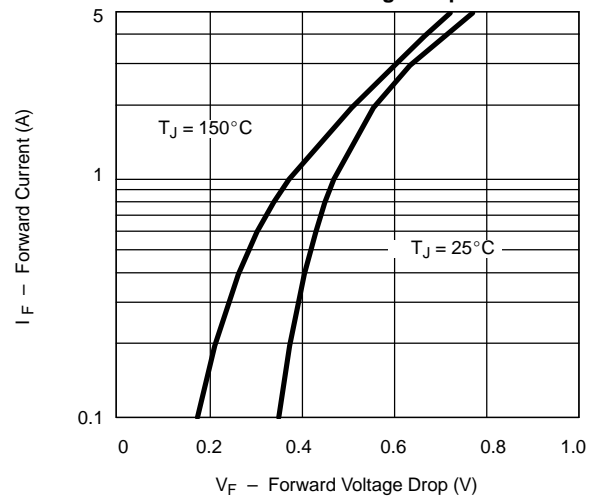
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

SCHOTTKY

Reverse Current vs. Junction Temperature



Forward Voltage Drop



TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

SCHOTTKY

