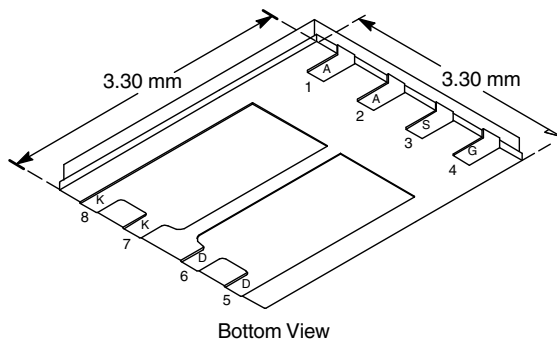


# Single P-Channel 20 V (D-S) MOSFET With Schottky Diode

PRODUCT SUMMARY		
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)
- 20	0.048 at V <sub>GS</sub> = - 4.5 V	- 6.3
	0.068 at V <sub>GS</sub> = - 2.5 V	- 5.3
	0.090 at V <sub>GS</sub> = - 1.8 V	- 4.6

SCHOTTKY PRODUCT SUMMARY		
V <sub>KA</sub> (V)	V <sub>f</sub> (V) Diode Forward Voltage	I <sub>F</sub> (A)
20	0.48 V at 0.5 A	1

PowerPAK 1212-8



## FEATURES

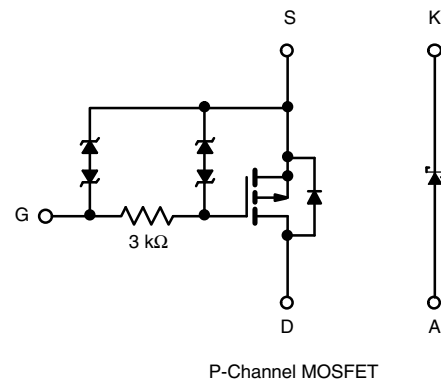
- TrenchFET® Power MOSFETS: 1.8 V Rated
- ESD Protected: 4500 V
- Ultra-Low Thermal Resistance, PowerPAK® Package with Low 1.07 mm Profile
- Material categorization:  
For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



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

## APPLICATIONS

- Charger Switching



## Ordering Information:

Si7703EDN-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25 °C, unless otherwise noted)				
Parameter	Symbol	10 s	Steady State	Unit
Drain-Source Voltage (MOSFET and Schottky)	V <sub>DS</sub>	- 20		V
Reverse Voltage (Schottky)	V <sub>KA</sub>	20		
Gate-Source Voltage (MOSFET)	V <sub>GS</sub>	± 12	± 12	
Continuous Drain Current (T <sub>J</sub> = 150 °C) (MOSFET) <sup>a</sup>	I <sub>D</sub>	T <sub>A</sub> = 25 °C	- 6.3	A
		T <sub>A</sub> = 85 °C	- 4.5	
Pulsed Drain Current (MOSFET)	I <sub>DM</sub>	- 20		A
Continuous Source Current (MOSFET Diode Conduction) <sup>a</sup>	I <sub>S</sub>	- 2.3	- 1.1	
Average Forward Current (Schottky)	I <sub>F</sub>	1		
Pulsed Forward Current (Schottky)	I <sub>FM</sub>	7		W
Maximum Power Dissipation (MOSFET) <sup>a</sup>	P <sub>D</sub>	T <sub>A</sub> = 25 °C	2.8	
		T <sub>A</sub> = 85 °C	1.5	
Maximum Power Dissipation (Schottky) <sup>a</sup>	P <sub>D</sub>	T <sub>A</sub> = 25 °C	2	
		T <sub>A</sub> = 85 °C	1	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150		°C
Soldering Recommendations <sup>b,c</sup>		260		

Notes:

- Surface mounted on 1" x 1" FR4 board.
- See solder profile ([www.vishay.com/doc?73257](http://www.vishay.com/doc?73257)). The PowerPAK 1212-8 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.

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

Notes

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

MOSFET SPECIFICATIONS (T <sub>J</sub> = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	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> = - 800 μA	- 0.45		- 1	V
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 4.5 V			± 1.5	μA
		V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 12 V			± 100	mA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = - 20 V, V <sub>GS</sub> = 0 V			- 1	μA
		V <sub>DS</sub> = - 20 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 85 °C			- 5	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≤ - 5 V, V <sub>GS</sub> = - 4.5 V	- 20			A
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = - 4.5 V, I <sub>D</sub> = - 6.3 A		0.041	0.048	Ω
		V <sub>GS</sub> = - 2.5 V, I <sub>D</sub> = - 5.3 A		0.057	0.068	
		V <sub>GS</sub> = - 1.8 V, I <sub>D</sub> = - 1 A		0.072	0.090	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = - 10 V, I <sub>D</sub> = - 6.3 A		14		S
Diode Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>S</sub> = - 2.3 A, V <sub>GS</sub> = 0 V		- 0.8	- 1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = - 10 V, V <sub>GS</sub> = - 4.5 V, I <sub>D</sub> = - 6.3 A		12	18	nC
Gate-Source Charge	Q <sub>gs</sub>			2.5		
Gate-Drain Charge	Q <sub>gd</sub>			2.9		
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = - 10 V, R <sub>L</sub> = 10 Ω I <sub>D</sub> ≅ - 1 A, V <sub>GEN</sub> = - 4.5 V, R <sub>G</sub> = 6 Ω		2.5	4	vs
Rise Time	t <sub>r</sub>			4	6	
Turn-Off Delay Time	t <sub>d(off)</sub>			15	23	
Fall Time	t <sub>f</sub>			12	18	

Notes

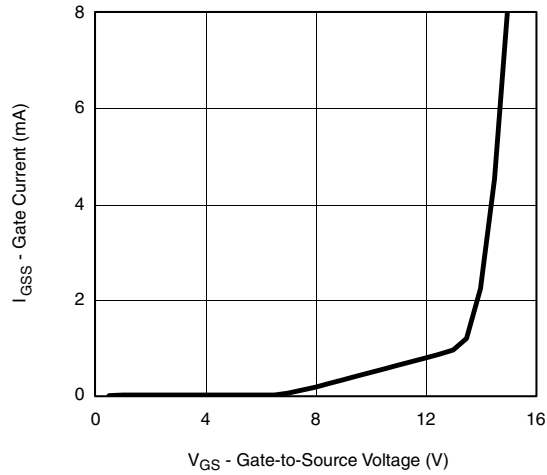
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.

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

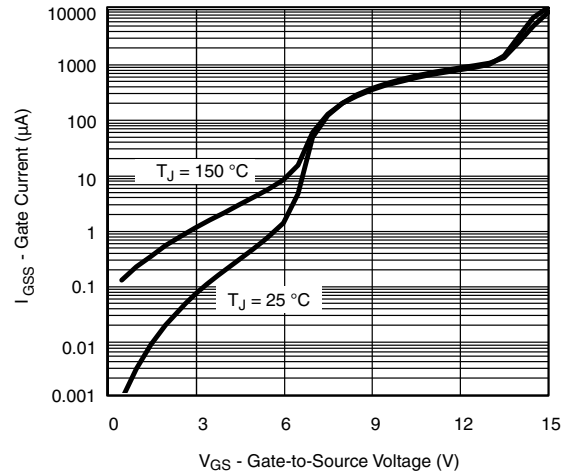
SCHOTTKY SPECIFICATIONS (T <sub>J</sub> = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Forward Voltage Drop	V <sub>F</sub>	I <sub>F</sub> = 0.5 A		0.42	0.48	V
		I <sub>F</sub> = 0.5 A, T <sub>J</sub> = 125 °C		0.33	0.4	
Maximum Reverse Leakage Current	I <sub>rm</sub>	V <sub>r</sub> = 20 V		0.002	0.100	mA
		V <sub>r</sub> = 20 V, T <sub>J</sub> = 85 °C		0.10	1	
		V <sub>r</sub> = 20 V, T <sub>J</sub> = 125 °C		1.5	10	
Junction Capacitance	C <sub>T</sub>	V <sub>r</sub> = 10 V		31		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.

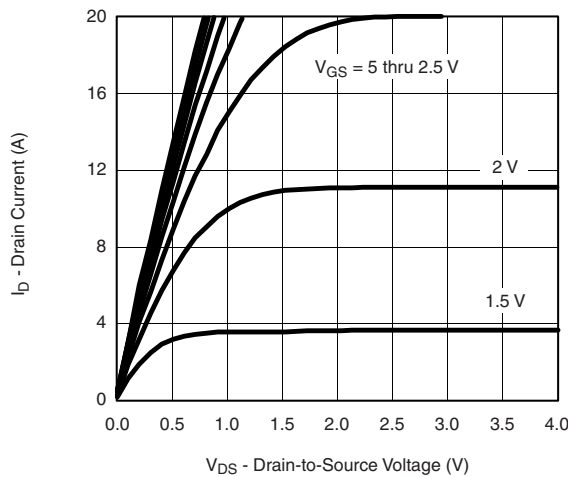
**MOSFET TYPICAL CHARACTERISTICS** ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)



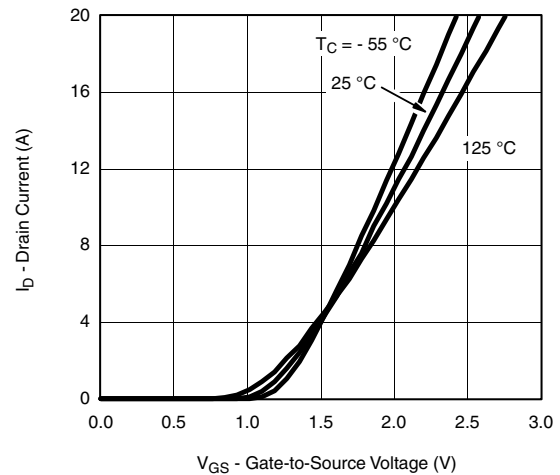
**Gate-Current vs. Gate-Source Voltage**



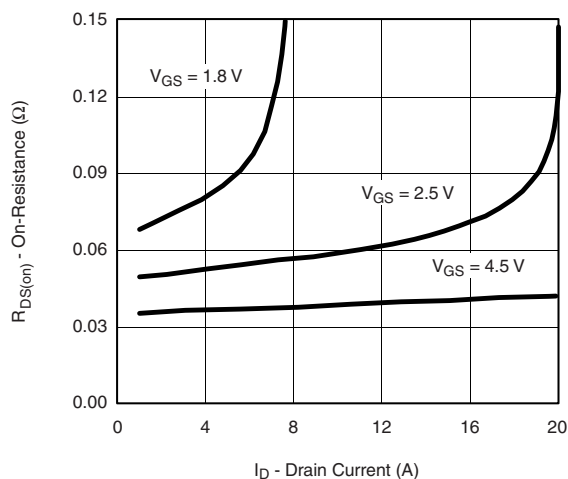
**Gate Current vs. Gate-Source Voltage**



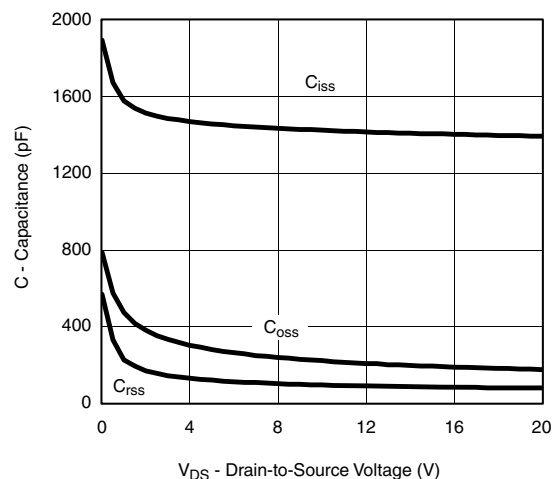
**Output Characteristics**



**Transfer Characteristics**

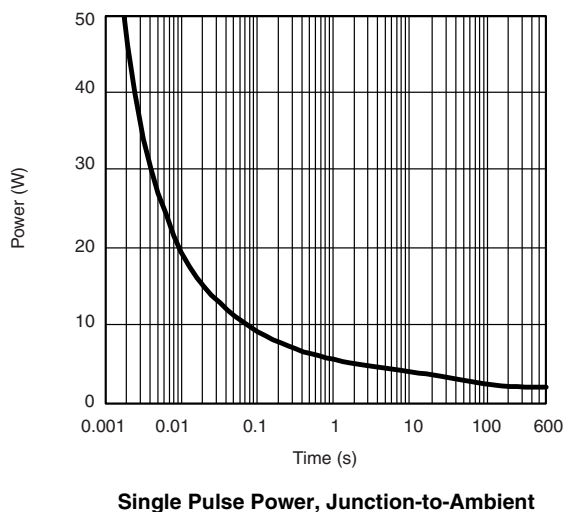
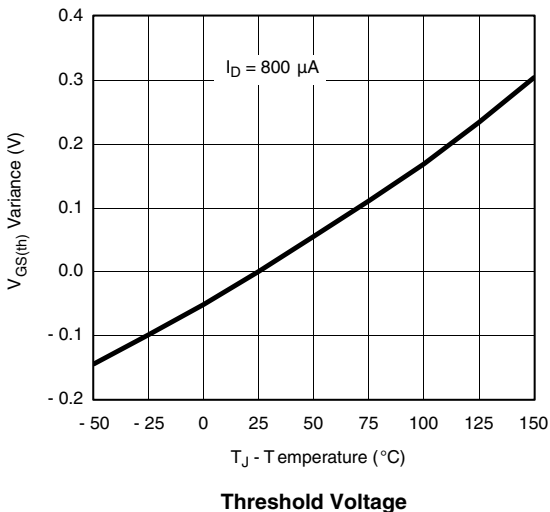
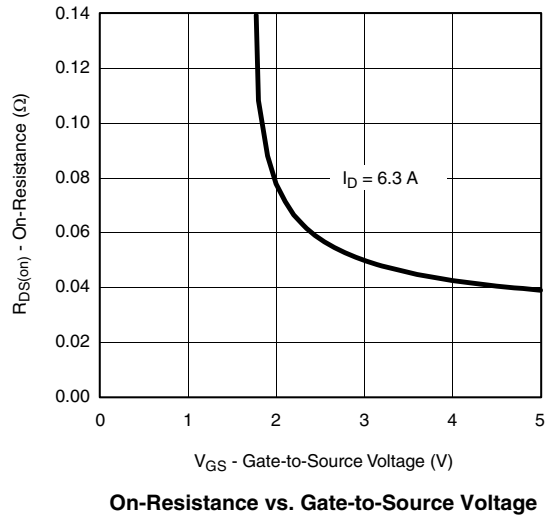
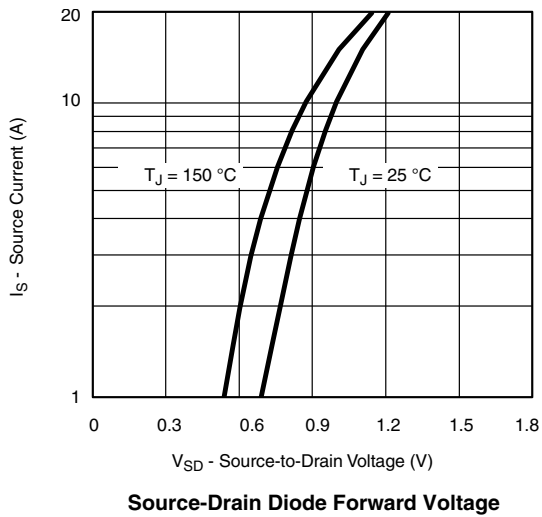
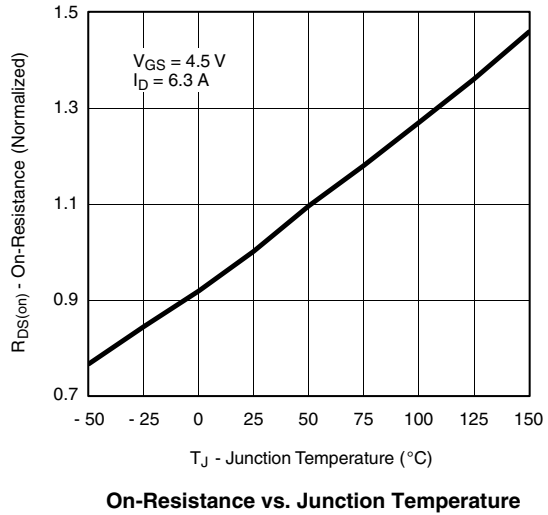
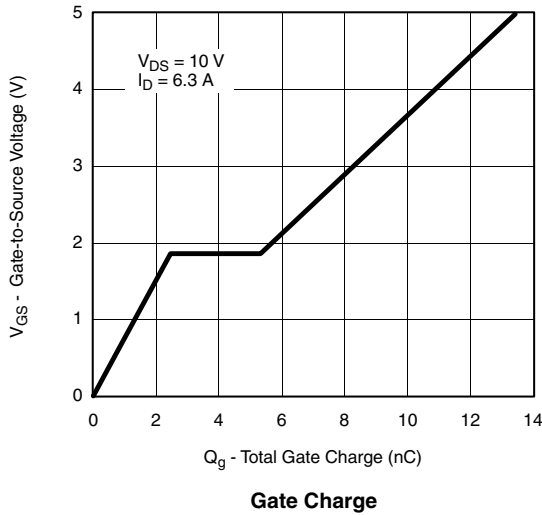


**On-Resistance vs. Drain Current**

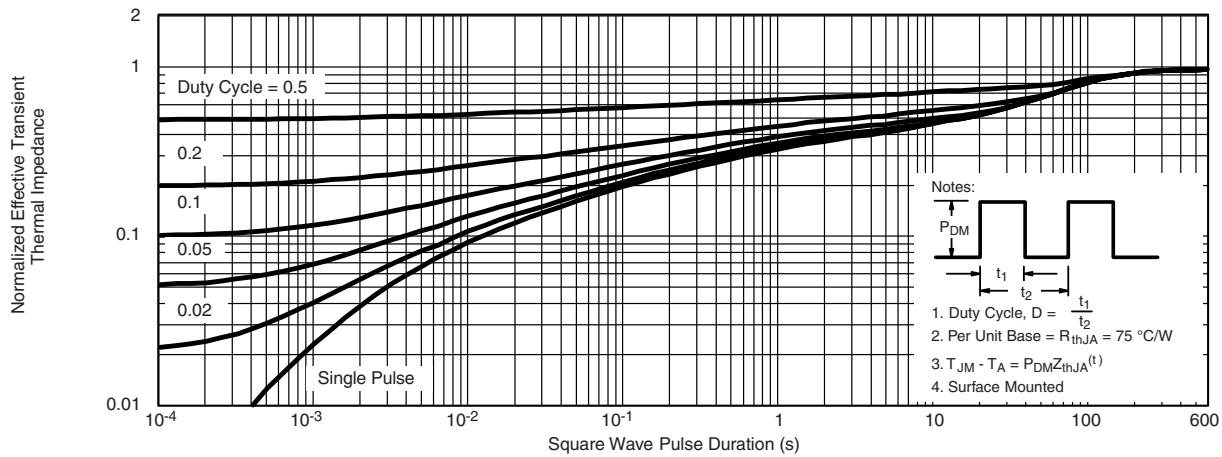


**Capacitance**

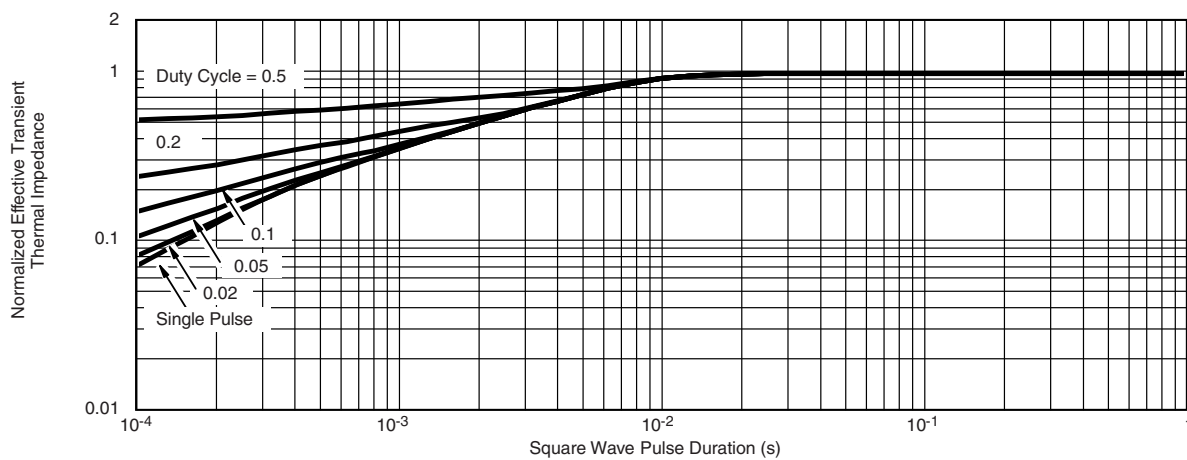
**MOSFET TYPICAL CHARACTERISTICS** ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)



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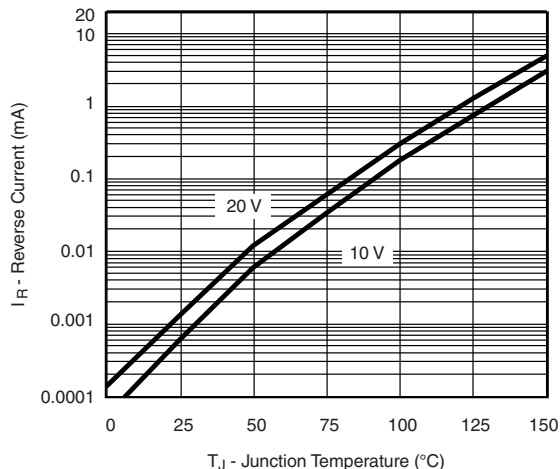


**Normalized Thermal Transient Impedance, Junction-to-Ambient**

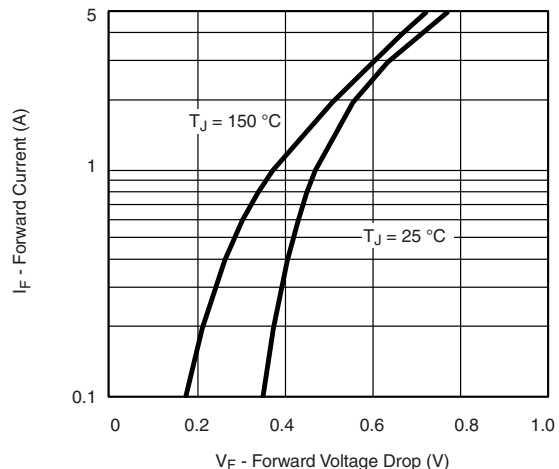


**Normalized Thermal Transient Impedance, Junction-to-Case**

**SCHOTTKY TYPICAL CHARACTERISTICS** ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)

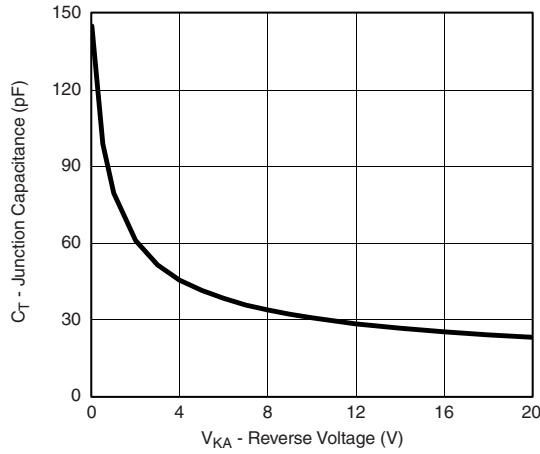


**Reverse Current vs. Junction Temperature**

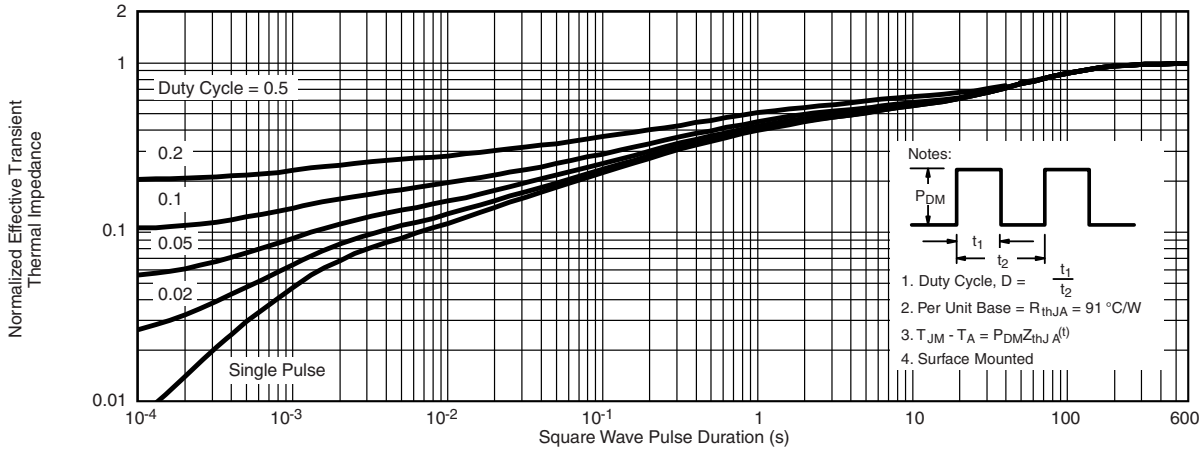


**Forward Voltage Drop**

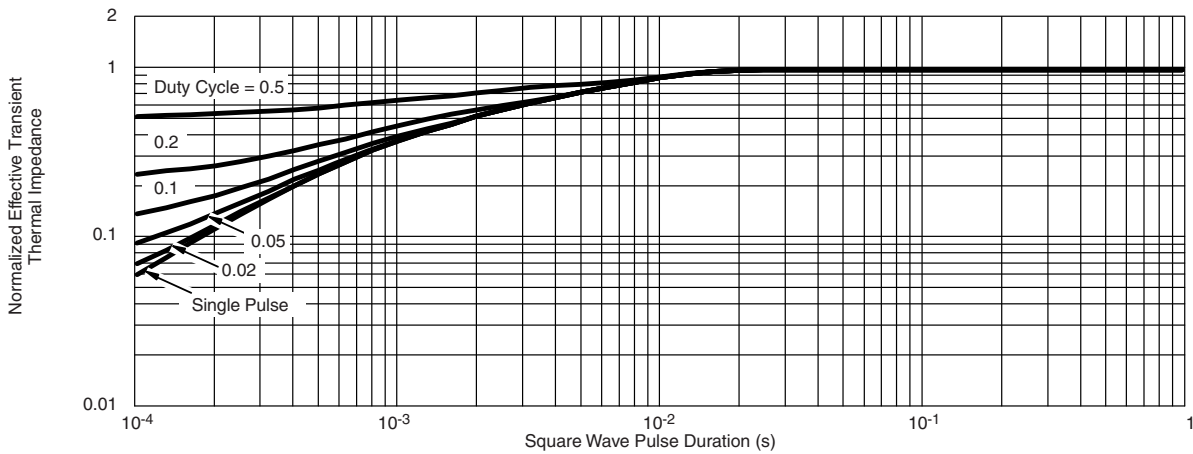
**SCHOTTKY TYPICAL CHARACTERISTICS** ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)



**Capacitance**



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



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

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