

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

PRODUCT SUMMARY		
$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
- 20	0.200 at $V_{GS} = - 4.5$ V	$\pm 1.8$
	0.340 at $V_{GS} = - 2.5$ V	$\pm 1.3$

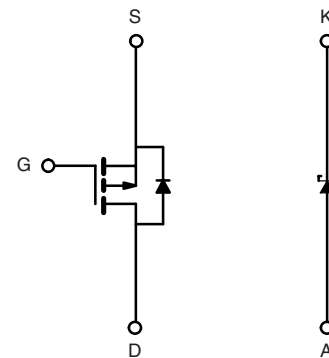
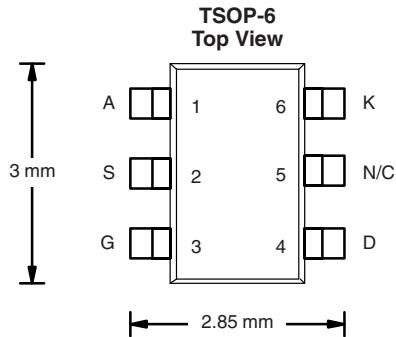
SCHOTTKY PRODUCT SUMMARY		
$V_{KA}$ (V)	$V_F$ (V) Diode Forward Voltage	$I_F$ (A)
20	0.48 V at 0.5 A	0.5

### FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- LITTLE FOOT® Plus
- Compliant to RoHS Directive 2002/95/EC



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



P-Channel MOSFET

Ordering Information: Si3853DV-T1-E3 (Lead (Pb)-free)  
Si3853DV-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted					
Parameter	Symbol	5 s	Steady State	Unit	
Drain-Source Voltage (MOSFET and Schottky)	$V_{DS}$	- 20		V	
Reverse Voltage (Schottky)	$V_{KA}$	20			
Gate-Source Voltage (MOSFET)	$V_{GS}$	$\pm 12$	$\pm 12$		
Continuous Drain Current ( $T_J = 150$ °C) (MOSFET) <sup>a</sup>	$I_D$	$T_A = 25$ °C	$\pm 1.8$	$\pm 1.6$	
		$T_A = 70$ °C	$\pm 1.5$	$\pm 1.2$	
Pulsed Drain Current (MOSFET)	$I_{DM}$	$\pm 7$		A	
Continuous Source Current (MOSFET Diode Conduction) <sup>a</sup>	$I_S$	- 1.05	- 0.75		
Average Forward Current (Schottky)	$I_F$	0.5			
Pulsed Forward Current (Schottky)	$I_{FM}$	7		W	
Maximum Power Dissipation (MOSFET) <sup>a</sup>	$P_D$	$T_A = 25$ °C	1.15		0.83
		$T_A = 70$ °C	0.73		0.53
Maximum Power Dissipation (Schottky) <sup>a</sup>	$P_D$	$T_A = 25$ °C	1.0		0.76
		$T_A = 70$ °C	0.64	0.48	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 150		°C	

Notes:

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

THERMAL RESISTANCE RATINGS						
Parameter		Device	Symbol	Typical	Maximum	Unit
Junction-to-Ambient <sup>a</sup>	t ≤ 5 s	MOSFET	R <sub>thJA</sub>	93	110	°C/W
		Schottky		103	125	
	Steady State	MOSFET		130	150	
		Schottky		140	165	
Junction-to-Foot	Steady State	MOSFET	R <sub>thJF</sub>	75	90	
		MOSFET		80	95	

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> = - 250 μA	- 0.5			V
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 12 V			± 100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = - 16 V, V <sub>GS</sub> = 0 V			- 1	μA
		V <sub>DS</sub> = - 16 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 75 °C			- 10	
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	- 5			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> = - 1.8 A		0.160	0.200	Ω
		V <sub>GS</sub> = - 2.5 V, I <sub>D</sub> = - 1.0 A		0.280	0.340	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = - 5 V, I <sub>D</sub> = - 1.8 A		3.6		S
Diode Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>S</sub> = - 1.05 V, V <sub>GS</sub> = 0 V		- 0.83	- 1.10	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> = - 1.8 A		2.7	4.0	nC
Gate-Source Charge	Q <sub>gs</sub>			0.4		
Gate-Drain Charge	Q <sub>gd</sub>			0.6		
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		11	17	ns
Rise Time	t <sub>r</sub>			34	50	
Turn-Off Delay Time	t <sub>d(off)</sub>			19	30	
Fall Time	t <sub>f</sub>			24	36	
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = - 1.05 A, dI/dt = 100 A/μs		20	40	

Notes:

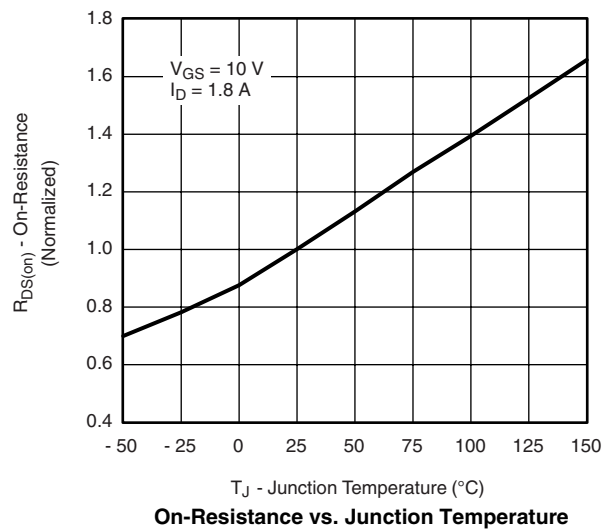
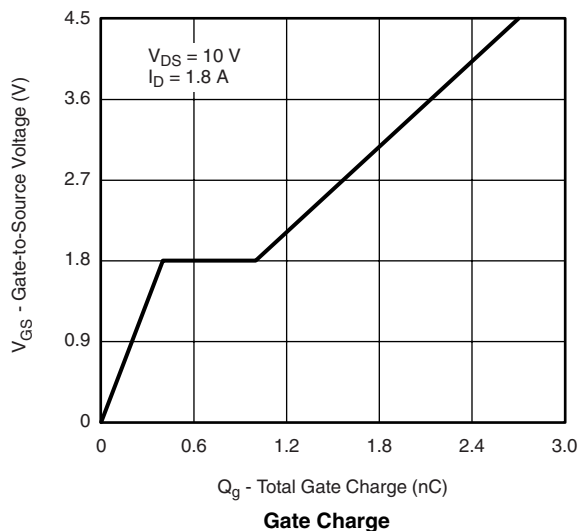
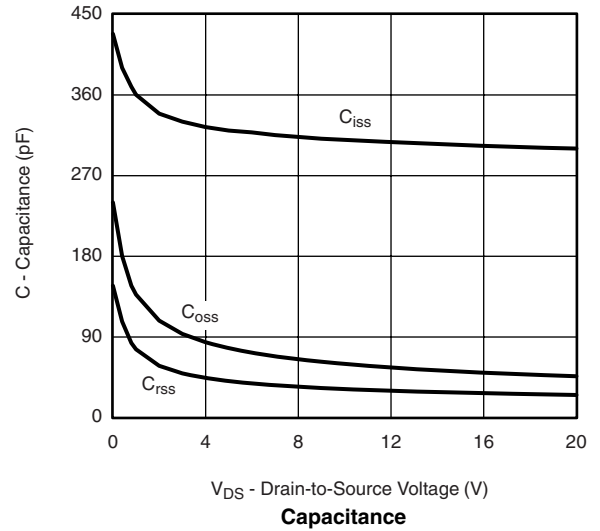
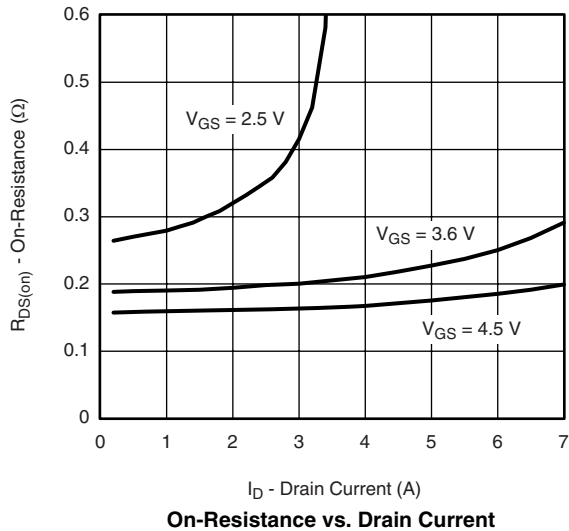
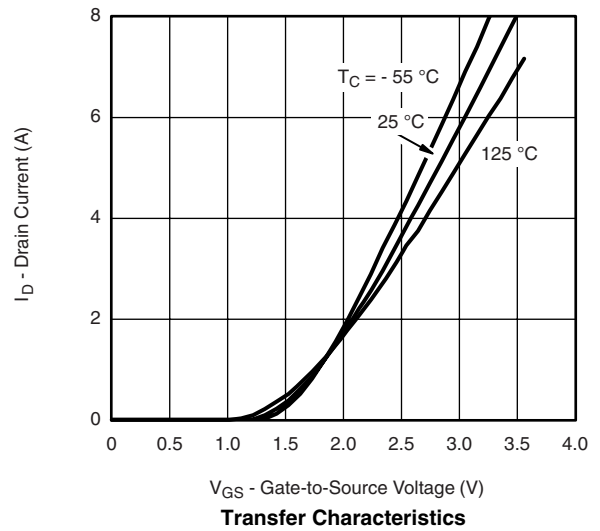
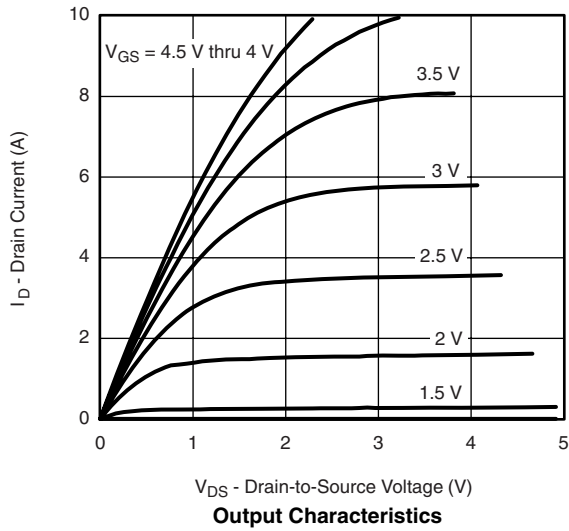
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.

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

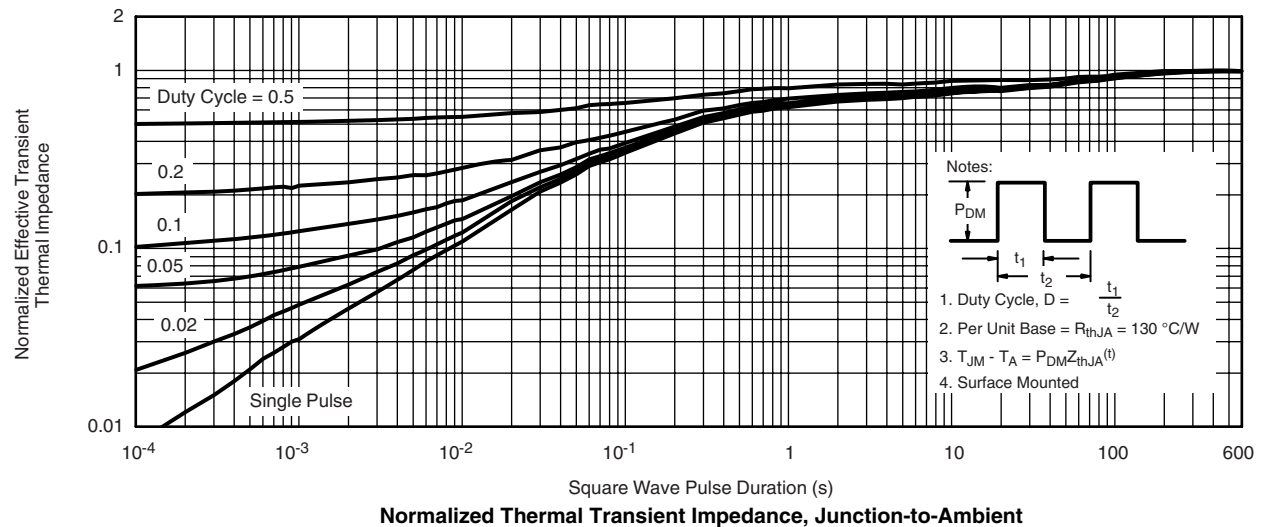
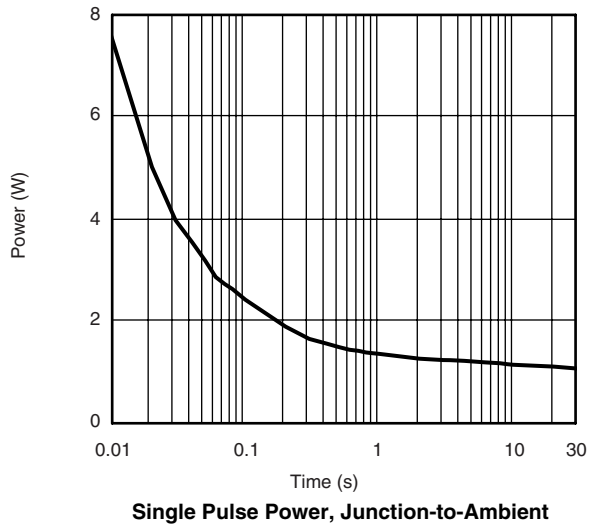
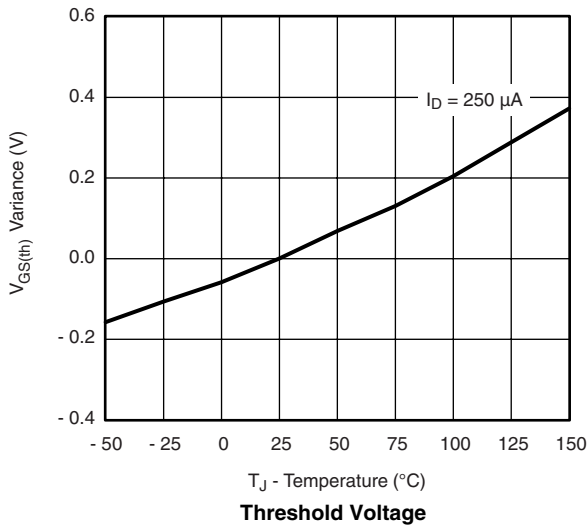
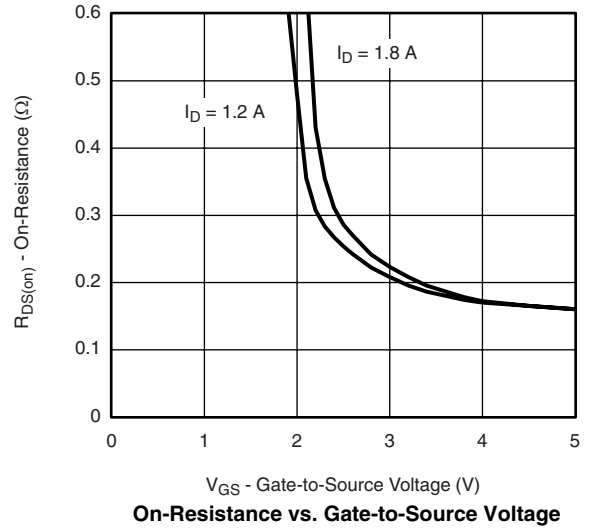
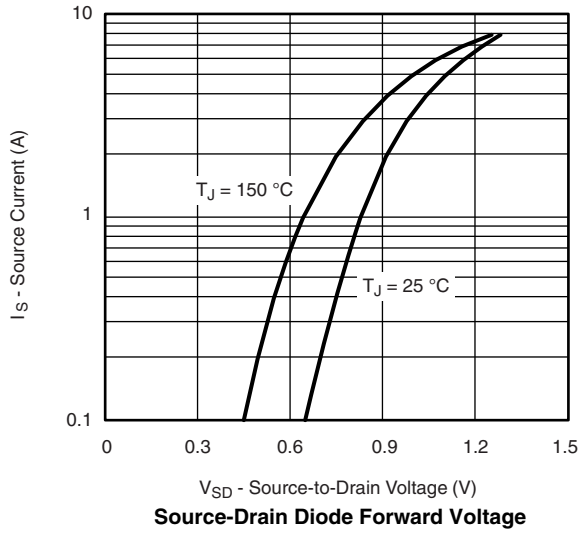
SCHOTTKY SPECIFICATIONS T <sub>J</sub> = 25 °C, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Forward Voltage Drop	V <sub>F</sub>	I <sub>F</sub> = 0.5 A		0.42	0.48	V
		I <sub>F</sub> = 0.5 A, T <sub>J</sub> = 125 °C		0.33	0.4	
Maximum Reverse Leakage Current	I <sub>rm</sub>	V <sub>R</sub> = 20 V		0.002	0.100	mA
		V <sub>R</sub> = 20 V, T <sub>J</sub> = 75 °C		0.06	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.

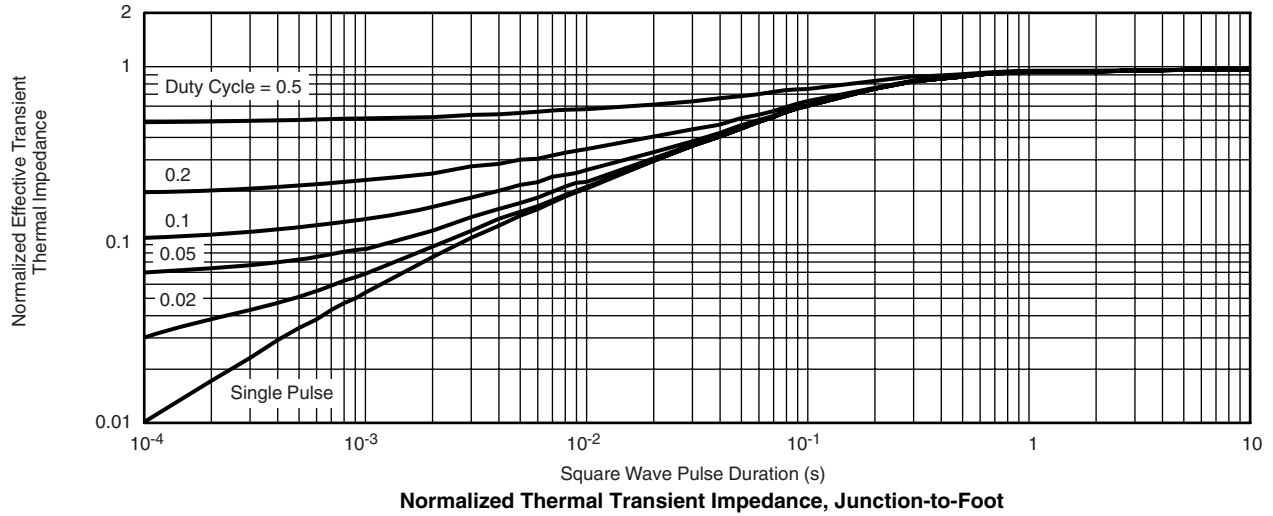
## MOSFET TYPICAL CHARACTERISTICS $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted



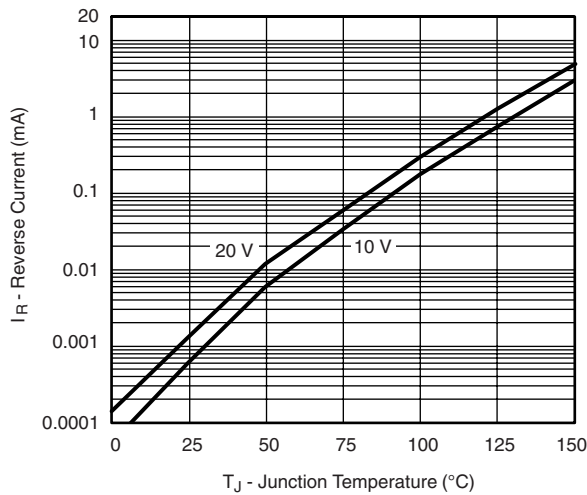
**MOSFET TYPICAL CHARACTERISTICS**  $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted



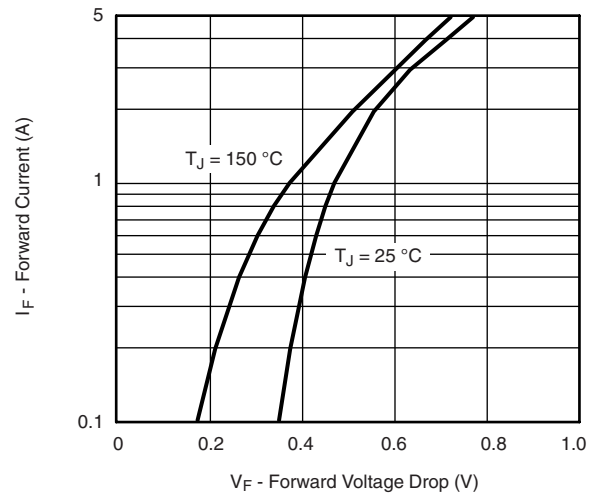
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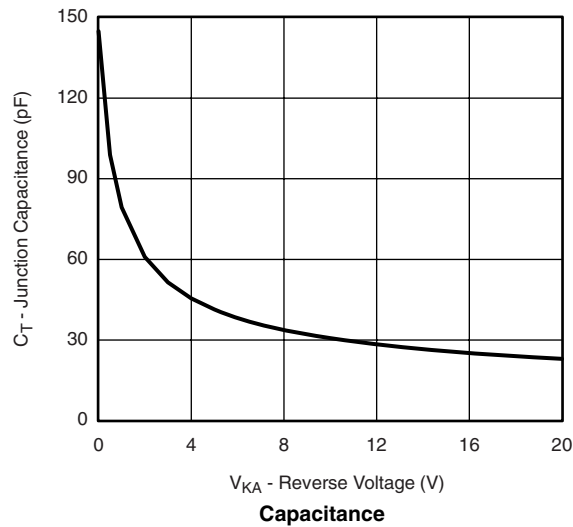
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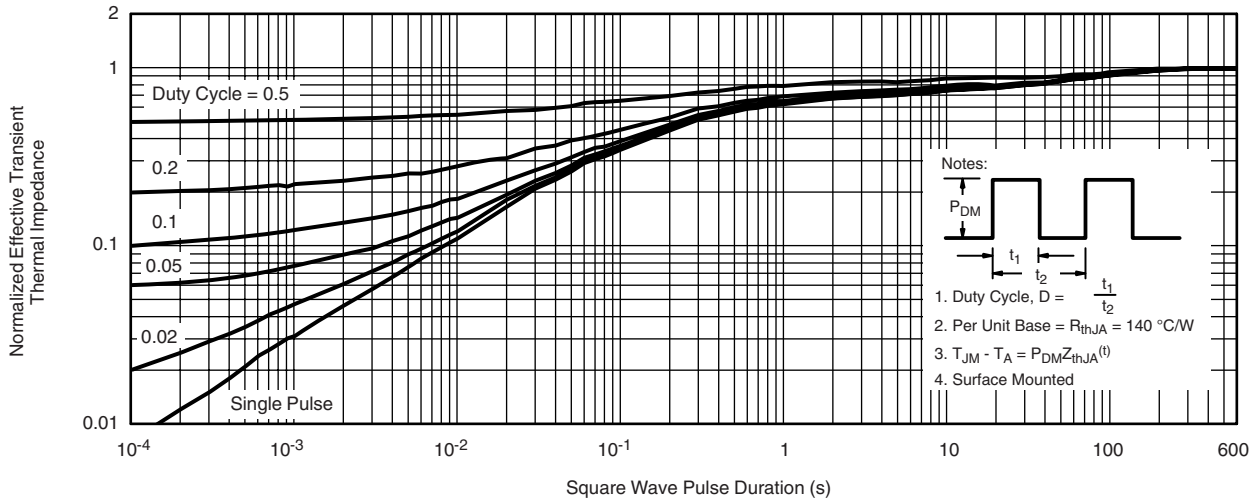
Reverse Current vs. Junction Temperature



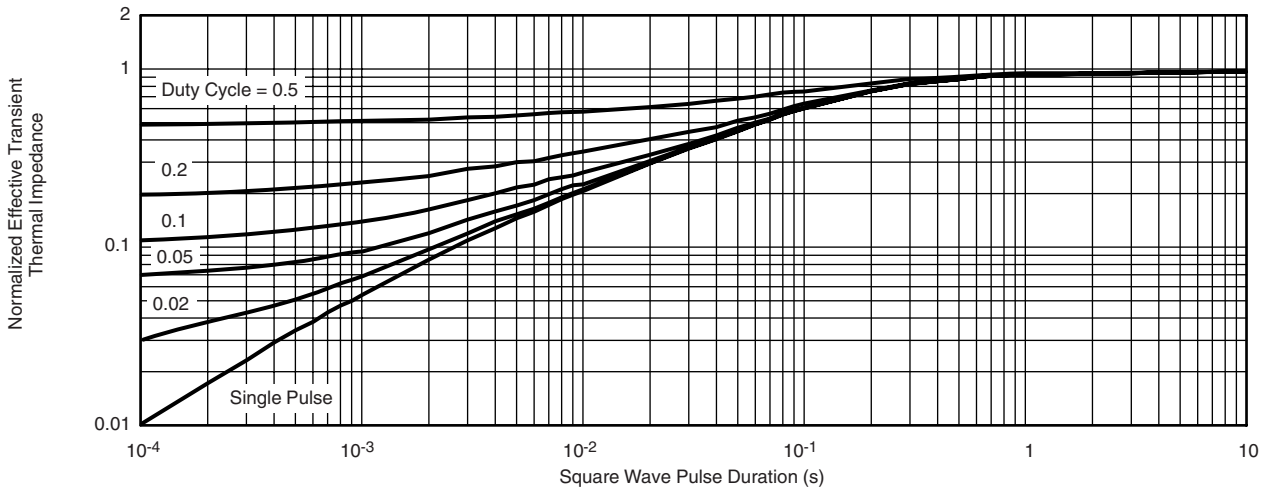
Forward Voltage Drop



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



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

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