



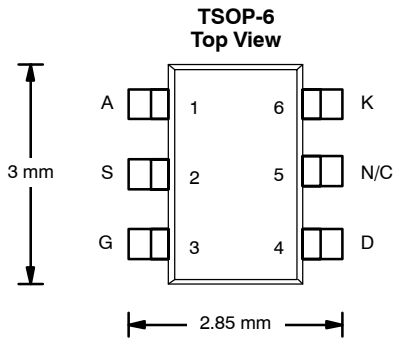
## N-Channel 20-V (D-S) MOSFET With Schottky Diode

<b>MOSFET PRODUCT SUMMARY</b>		
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
20	0.125 @ $V_{GS} = 4.5$ V	2.4
	0.200 @ $V_{GS} = 2.5$ V	1.8

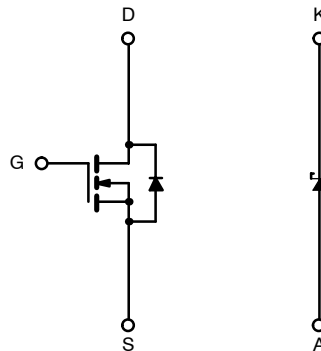
<b>SCHOTTKY PRODUCT SUMMARY</b>		
$V_{KA}$ (V)	$V_f$ (V) Diode Forward Voltage	$I_F$ (A)
20	0.48 V @ 0.5 A	0.5

**FEATURES**

- LITTLE FOOT *Plus*™
- 100%  $R_g$  Tested



Ordering Information: Si3812DV-T1



<b>ABSOLUTE MAXIMUM RATINGS (<math>T_A = 25^\circ\text{C}</math> UNLESS OTHERWISE NOTED)</b>					
Parameter	Symbol	5 sec	Steady State	Unit	
Drain-Source Voltage (MOSFET)	$V_{DS}$	20		V	
Reverse Voltage (Schottky)	$V_{KA}$	20			
Gate-Source Voltage (MOSFET)	$V_{GS}$	$\pm 12$			
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) (MOSFET) <sup>a</sup>	$T_A = 25^\circ\text{C}$	$I_D$	2.4	2.0	A
	$T_A = 85^\circ\text{C}$		1.7	1.4	
Pulsed Drain Current (MOSFET)		$I_{DM}$	8		
Continuous Source Current (MOSFET Diode Conduction) <sup>a</sup>		$I_S$	1.05	0.75	
Average Forward Current (Schottky)		$I_F$	0.5	0.5	
Pulsed Forward Current (Schottky)		$I_{FM}$	8	8	
Maximum Power Dissipation (MOSFET) <sup>a</sup>	$T_A = 25^\circ\text{C}$	$P_D$	1.15	0.83	W
	$T_A = 85^\circ\text{C}$		0.59	0.53	
Maximum Power Dissipation (Schottky) <sup>a</sup>	$T_A = 25^\circ\text{C}$		1.0	0.76	
	$T_A = 85^\circ\text{C}$		0.52	0.48	
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 <sup>a</sup>	$t \leq 5 \text{ sec}$	MOSFET	$R_{thJA}$	93	110	°C/W
		Schottky		103	125	
Junction-to-Ambient <sup>a</sup>	Steady State	MOSFET		130	150	
		Schottky		140	165	
Junction-to-Foot (MOSFET Drain, Schottky Kathode)	Steady State	MOSFET	$R_{thJF}$	75	90	
		Schottky		80	95	

## Notes

a. Surface Mounted on 1" x1" FR4 Board.

MOSFET + SCHOTTKY SPECIFICATIONS ( $T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	0.6			V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 12 \text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current (MOSFET + Schottky)	$I_{DSS}$	$V_{DS} = 16 \text{ V}, V_{GS} = 0 \text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 16 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 85^\circ\text{C}$			10	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 5 \text{ V}, V_{GS} = 4.5 \text{ V}$	5			A
Drain-Source On-State Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = 4.5 \text{ V}, I_D = 2.4 \text{ A}$		0.100	0.125	$\Omega$
		$V_{GS} = 2.5 \text{ V}, I_D = 1.0 \text{ A}$		0.160	0.200	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 5 \text{ V}, I_D = 2.4 \text{ A}$		5		S
Schottky Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = 1.5 \text{ A}, V_{GS} = 0 \text{ V}$		0.79	1.1	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = 10 \text{ V}, V_{GS} = 4.5 \text{ V}, I_D = 2.4 \text{ A}$		2.1	4.0	nC
Gate-Source Charge	$Q_{gs}$		0.3			
Gate-Drain Charge	$Q_{gd}$		0.4			
Gate Resistance	$R_g$		1		3.7	$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 10 \text{ V}, R_L = 10 \Omega$ $I_D \cong 1 \text{ A}, V_{GEN} = 4.5 \text{ V}, R_G = 6 \Omega$		10	17	ns
Rise Time	$t_r$		30	50		
Turn-Off Delay Time	$t_{d(off)}$		14	25		
Fall Time	$t_f$		6	12		
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = 3.0 \text{ A}, di/dt = 100 \text{ A}/\mu\text{s}$		30	50	

## Notes

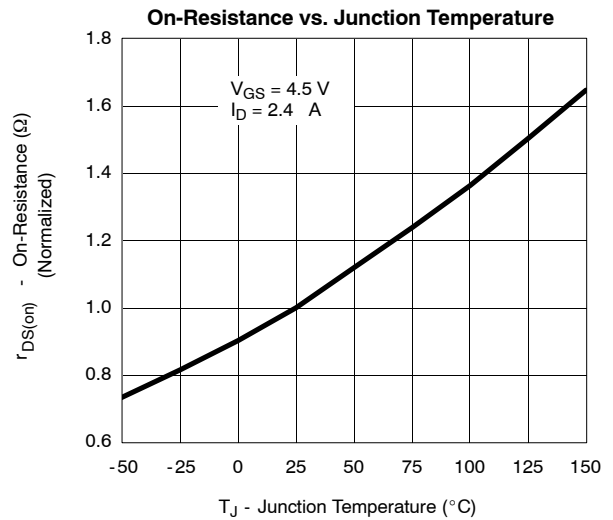
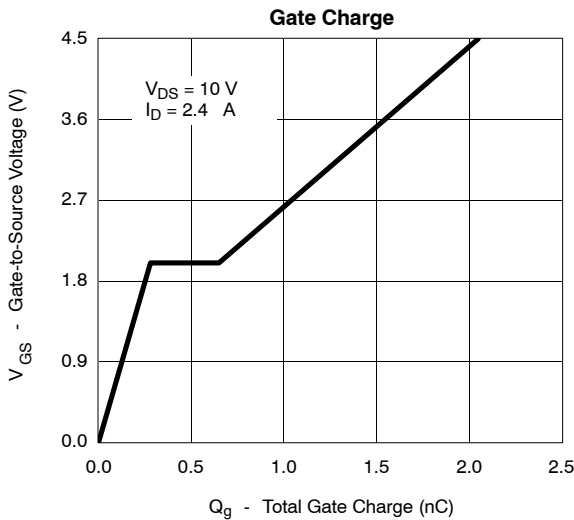
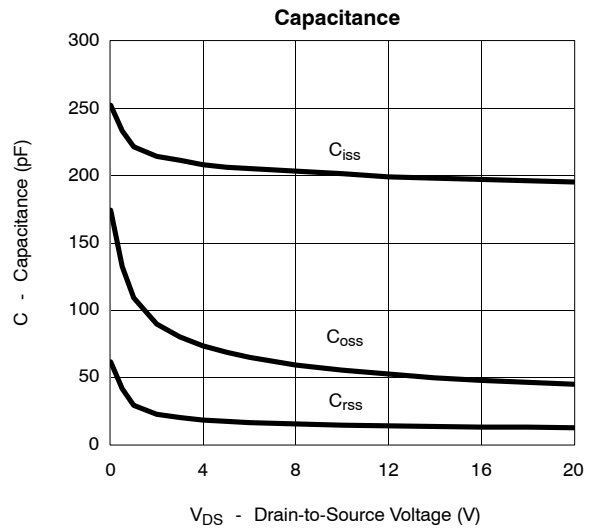
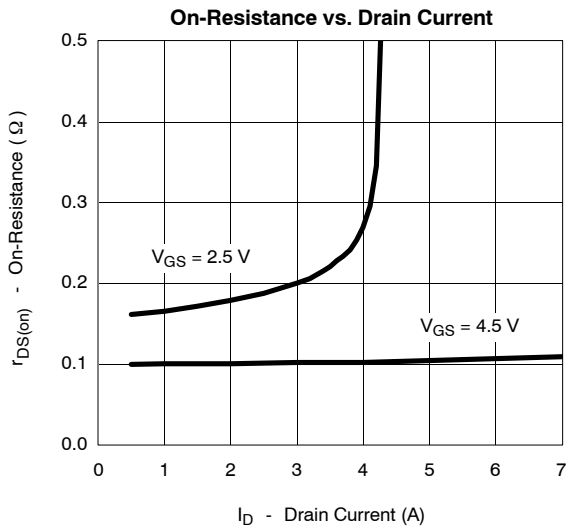
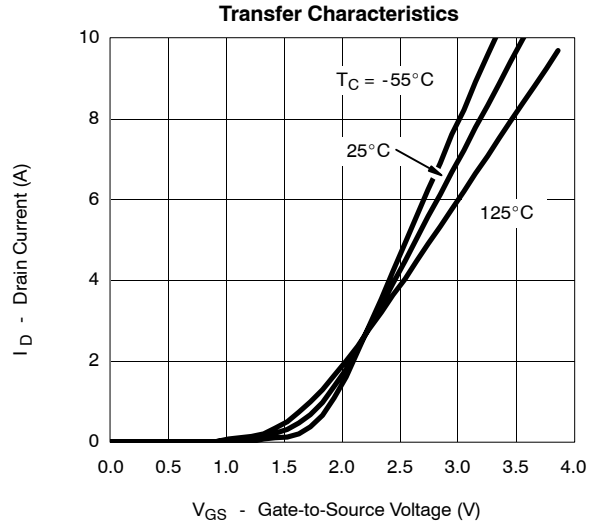
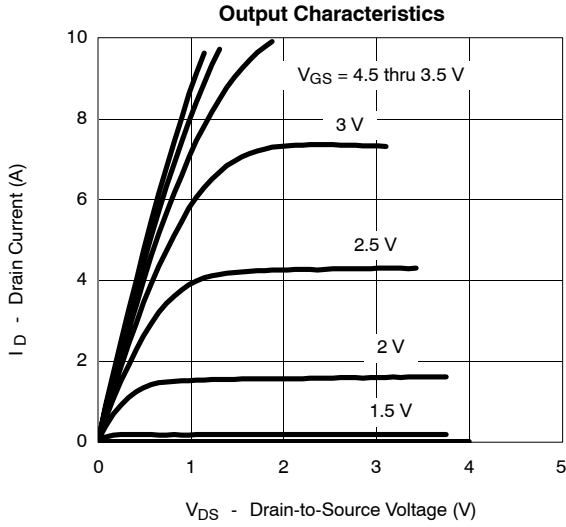
a. Pulse test; pulse width  $\leq 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .

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	$V_F$	$I_F = 0.5$		0.42	0.48	V
		$I_F = 0.5, T_J = 125^\circ\text{C}$		0.33	0.4	
Maximum Reverse Leakage Current	$I_{rm}$	$V_r = 20$		0.002	0.100	mA
		$V_r = 20, T_J = 75^\circ\text{C}$		0.06	1	
		$V_r = 20, T_J = 125^\circ\text{C}$		1.5	10	
Junction Capacitance	$C_T$	$V_r = 10 \text{ V}$		31		pF



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

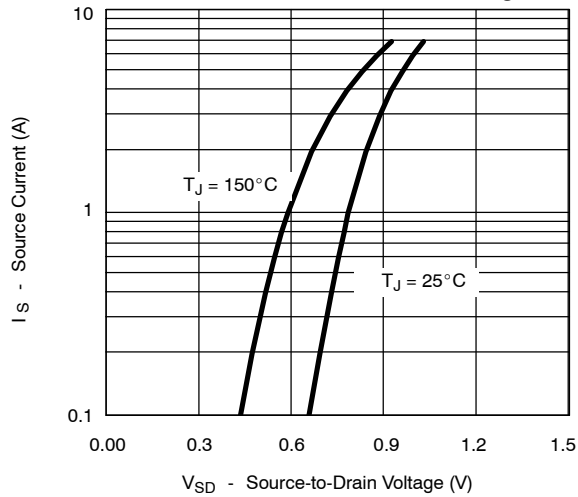




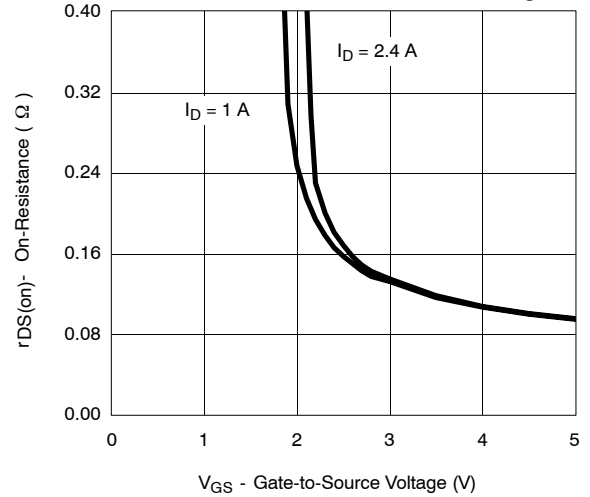
**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

**MOSFET**

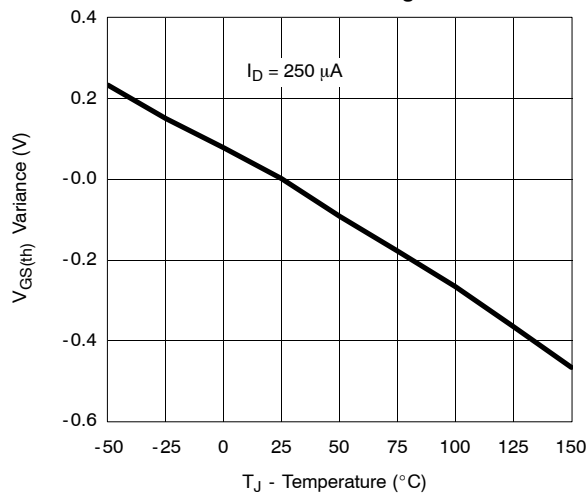
**Source-Drain Diode Forward Voltage**



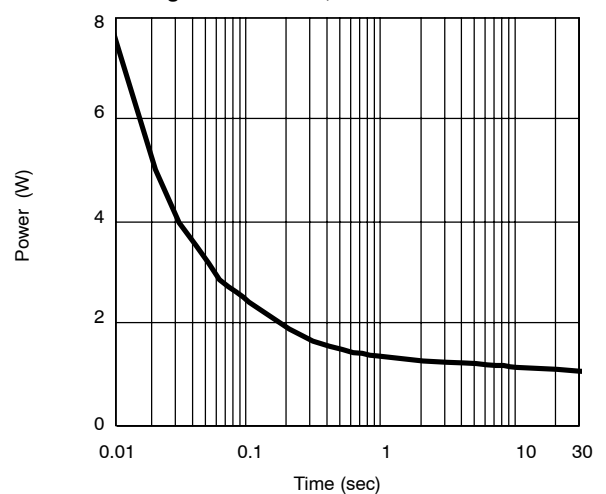
**On-Resistance vs. Gate-to-Source Voltage**



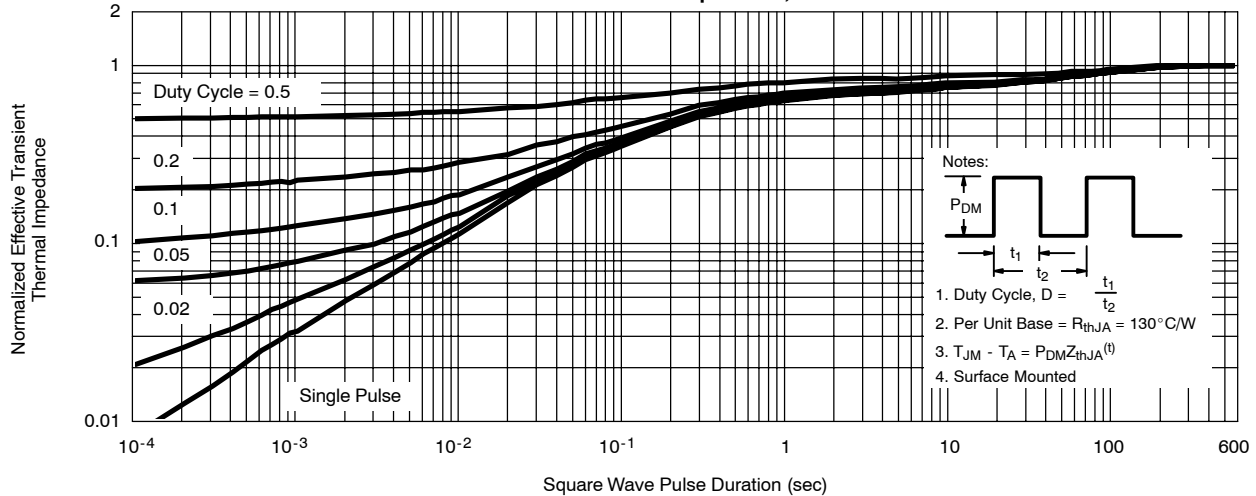
**Threshold Voltage**



**Single Pulse Power, Junction-to-Ambient**

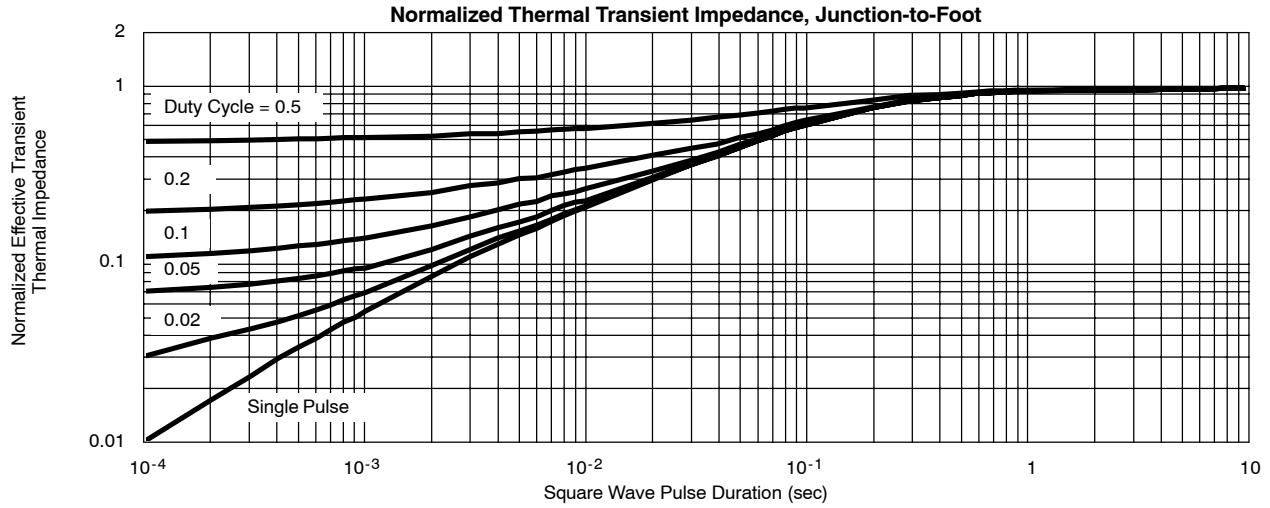


**Normalized Thermal Transient Impedance, Junction-to-Ambient**

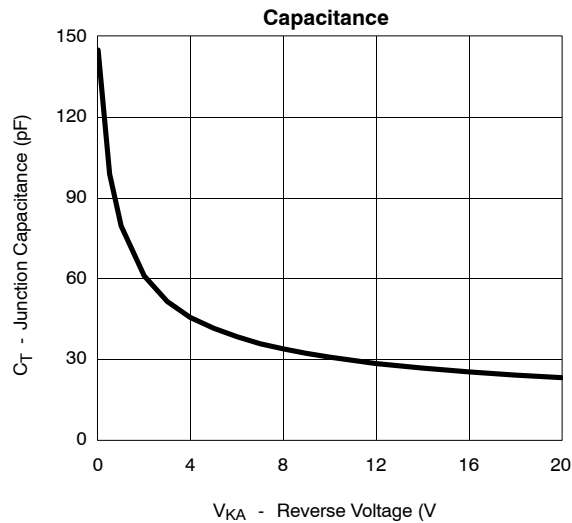
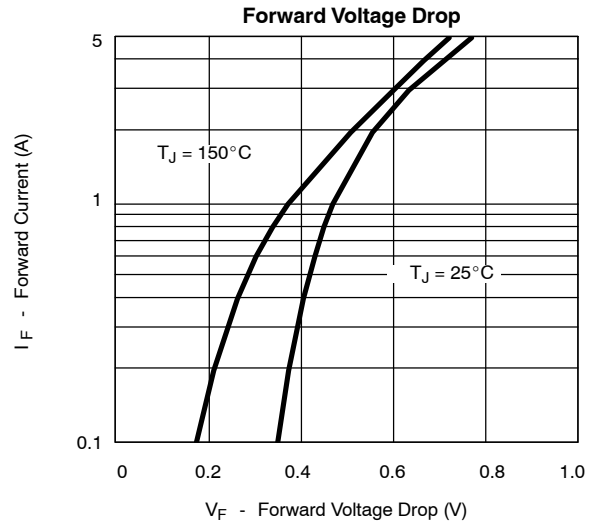
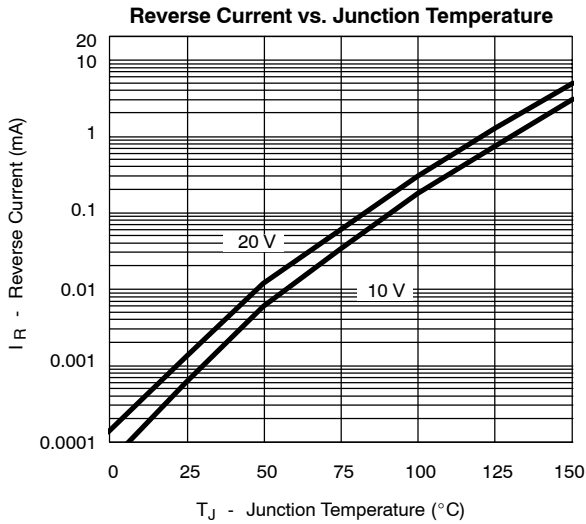




**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) MOSFET**

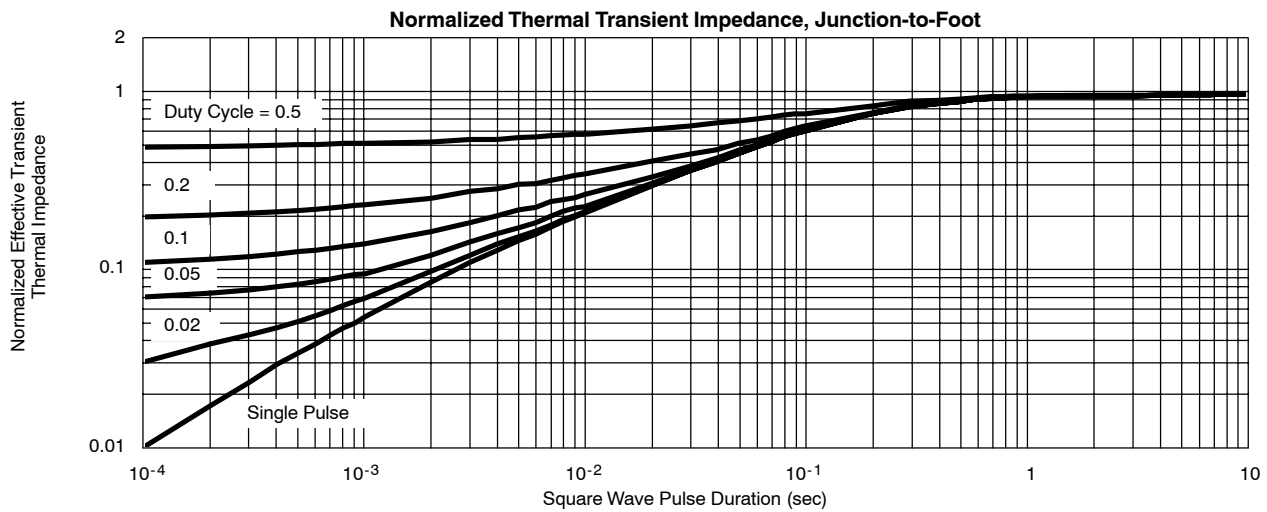
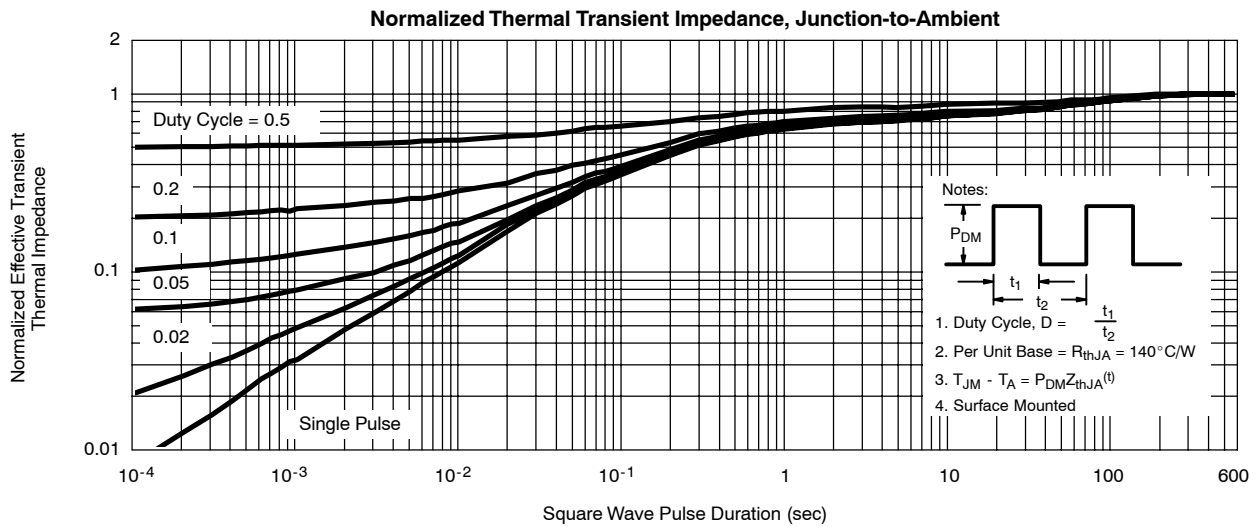


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) SCHOTTKY**



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

**SCHOTTKY**





## Disclaimer

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