



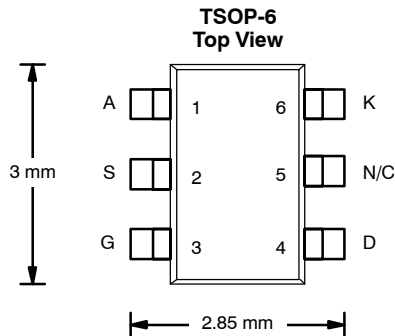
N-Channel 20-V (D-S) MOSFET With Schottky Diode

MOSFET PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
20	0.125 @ $V_{GS} = 4.5$ V	2.4
	0.200 @ $V_{GS} = 2.5$ V	1.8

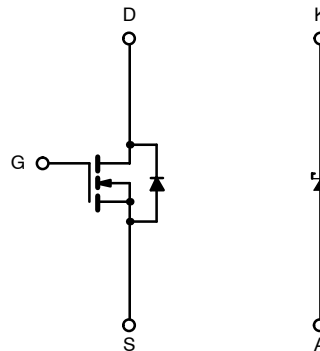
SCHOTTKY PRODUCT SUMMARY		
V_{KA} (V)	V_f (V) Diode Forward Voltage	I_F (A)
20	0.48 V @ 0.5 A	0.5

FEATURES

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



Ordering Information: Si3812DV-T1



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)				
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}	± 12		
Continuous Drain Current ($T_J = 150^\circ\text{C}$) (MOSFET) ^a	I_D	2.4	2.0	A
		1.7	1.4	
Pulsed Drain Current (MOSFET)	I_{DM}	8		
Continuous Source Current (MOSFET Diode Conduction) ^a	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) ^a	P_D	1.15	0.83	W
		0.59	0.53	
Maximum Power Dissipation (Schottky) ^a	P_D	1.0	0.76	
		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 ^a	$t \leq 5 \text{ sec}$	MOSFET	R_{thJA}	93	110	$^{\circ}\text{C/W}$
		Schottky		103	125	
Junction-to-Ambient ^a	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
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	0.6			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 12 \text{ V}$			± 100	nA
Zero Gate Voltage Drain Current (MOSFET + Schottky)	I_{DSS}	$V_{DS} = 16 \text{ V}, V_{GS} = 0 \text{ V}$			1	μA
		$V_{DS} = 16 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 85^{\circ}\text{C}$			10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5 \text{ V}, V_{GS} = 4.5 \text{ V}$	5			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 4.5 \text{ V}, I_D = 2.4 \text{ A}$		0.100	0.125	Ω
		$V_{GS} = 2.5 \text{ V}, I_D = 1.0 \text{ A}$		0.160	0.200	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 5 \text{ V}, I_D = 2.4 \text{ A}$		5		S
Schottky Diode Forward Voltage ^a	V_{SD}	$I_S = 1.5 \text{ A}, V_{GS} = 0 \text{ V}$		0.79	1.1	V
Dynamic^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	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 10 \text{ V}, R_L = 10 \Omega$ $I_D \equiv 1 \text{ A}, V_{GEN} = 4.5 \text{ V}, R_G = 6 \Omega$		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.

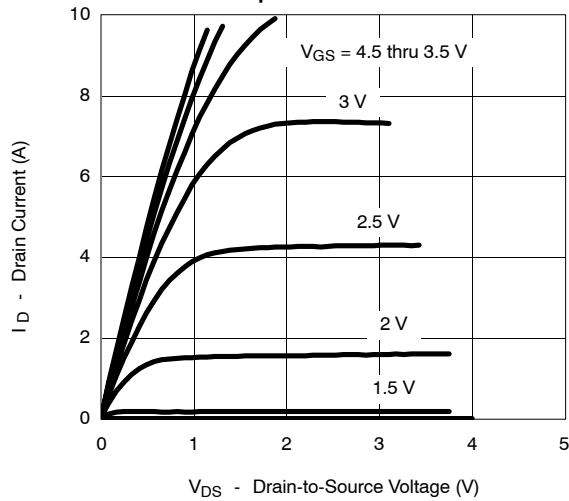
SCHOTTKY SPECIFICATIONS ($T_J = 25^{\circ}\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Forward Voltage Drop	V_F	$I_F = 0.5$		0.42	0.48	V
		$I_F = 0.5, T_J = 125^{\circ}\text{C}$		0.33	0.4	
Maximum Reverse Leakage Current	I_{rm}	$V_r = 20$		0.002	0.100	mA
		$V_r = 20, T_J = 75^{\circ}\text{C}$		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



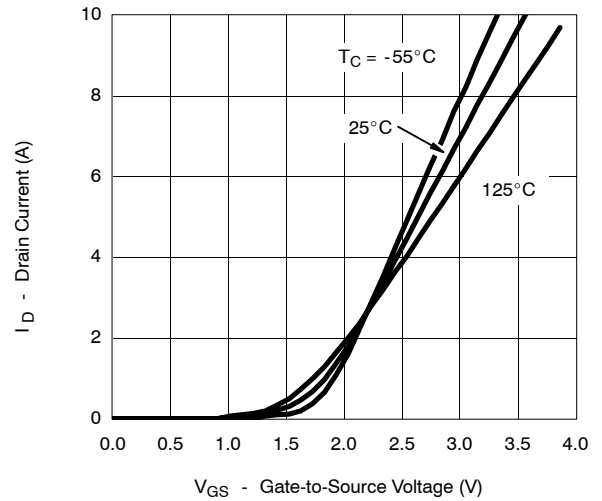
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

MOSFET

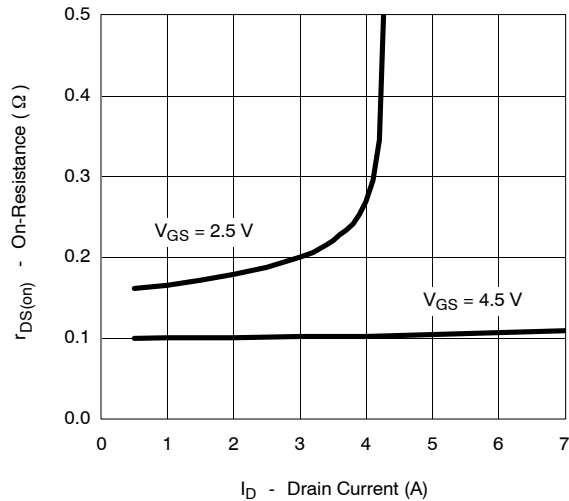
Output Characteristics



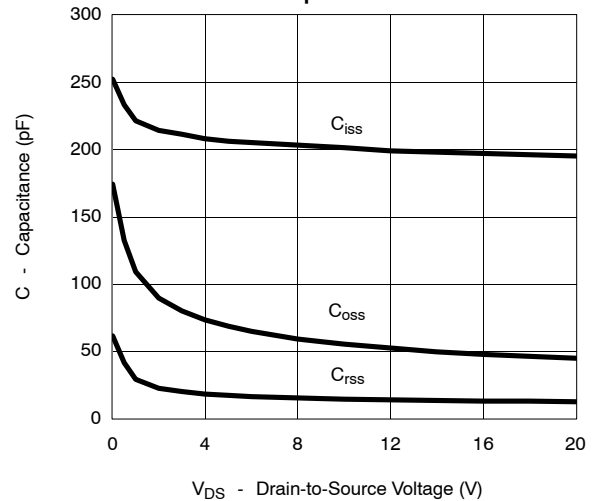
Transfer Characteristics



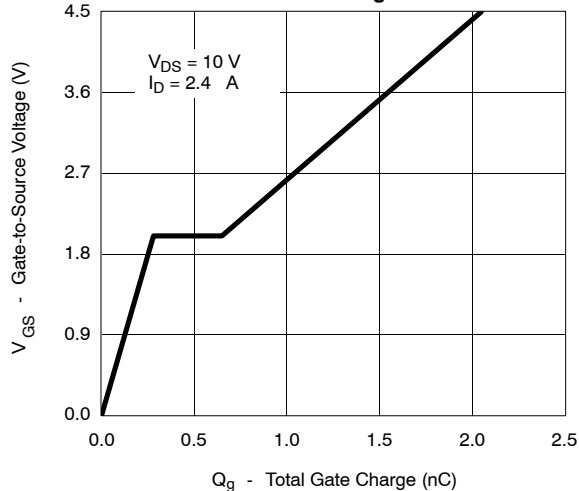
On-Resistance vs. Drain Current



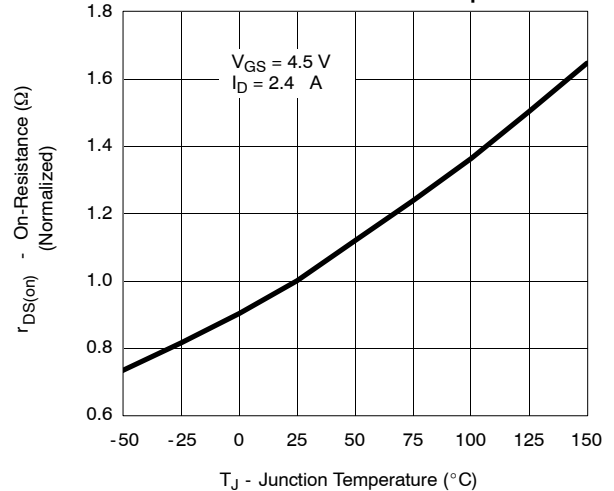
Capacitance



Gate Charge

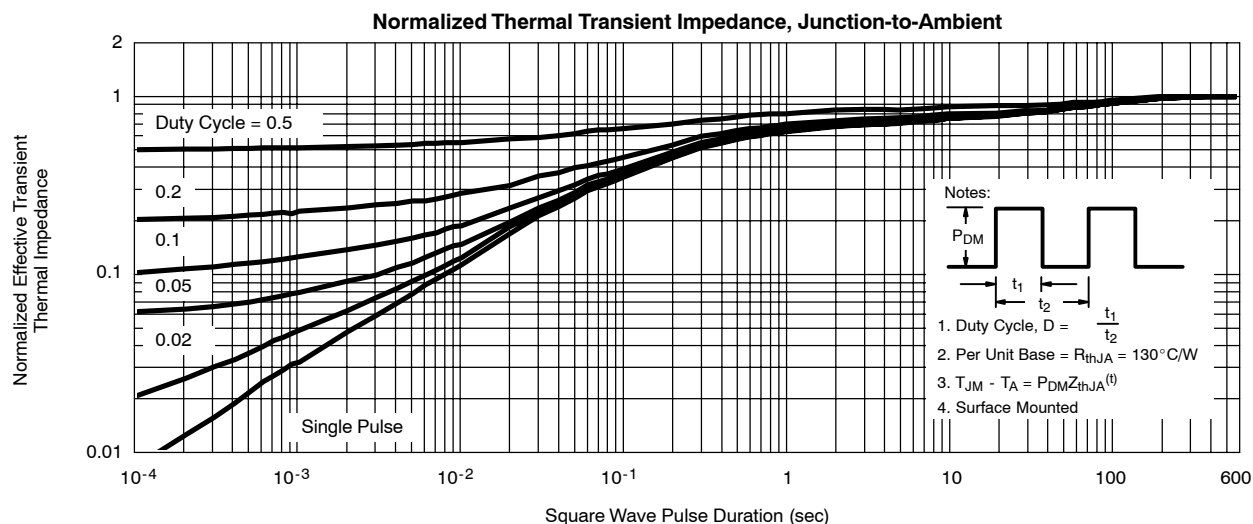
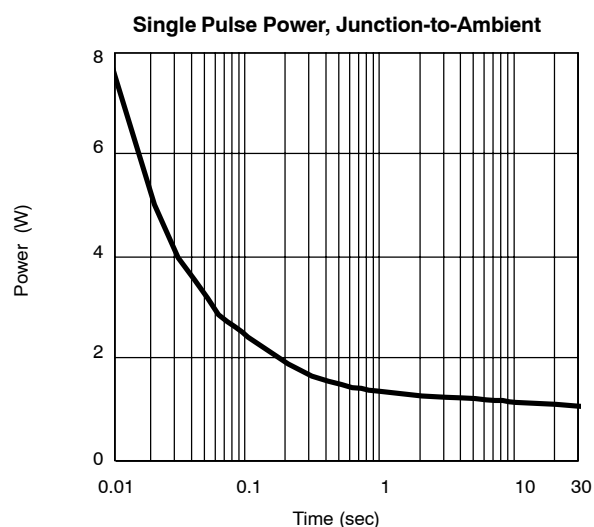
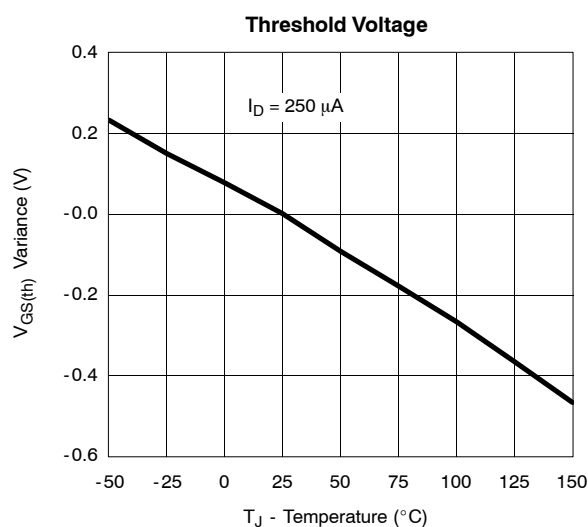
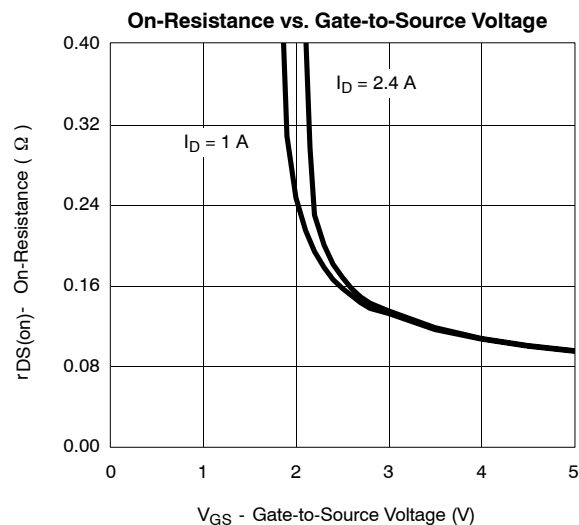
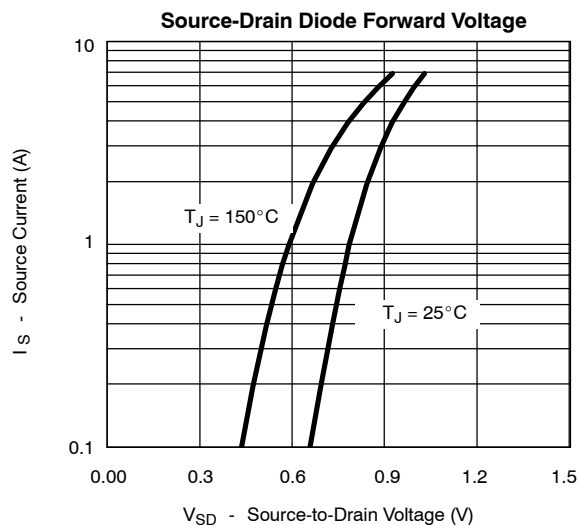


On-Resistance vs. Junction Temperature



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

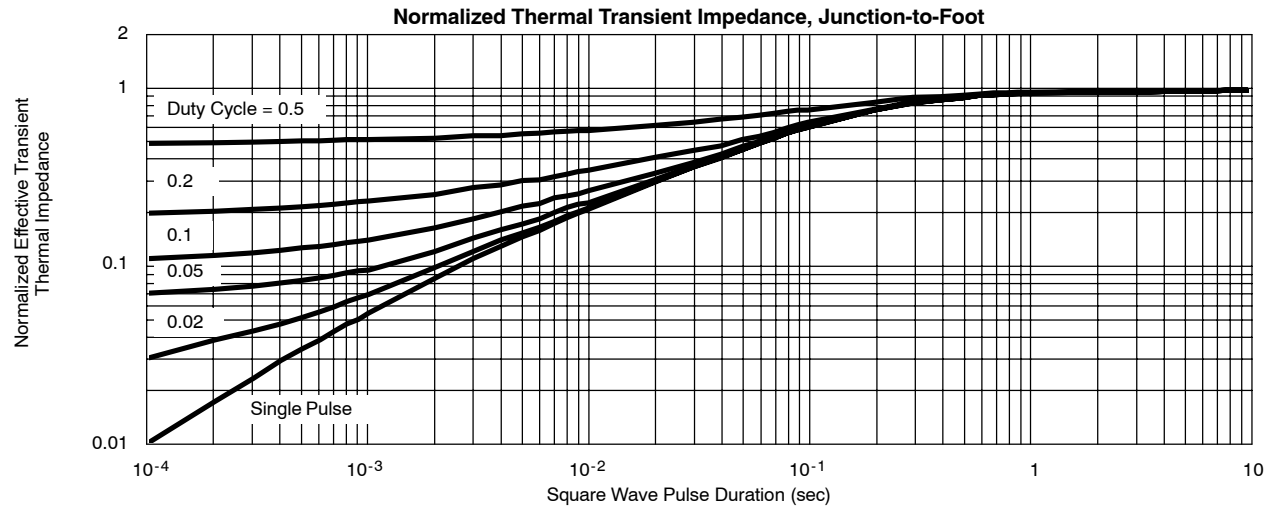
MOSFET





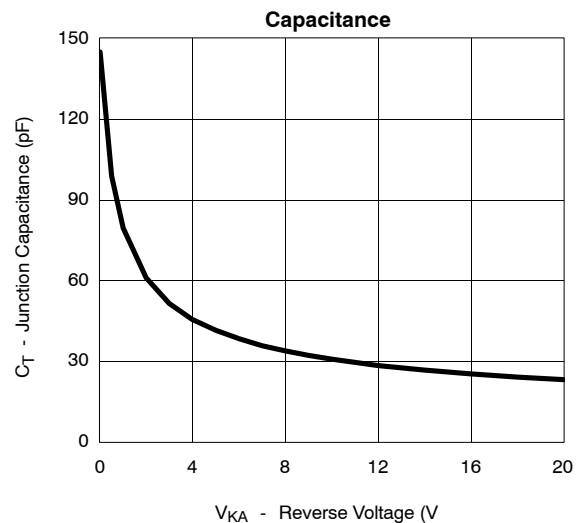
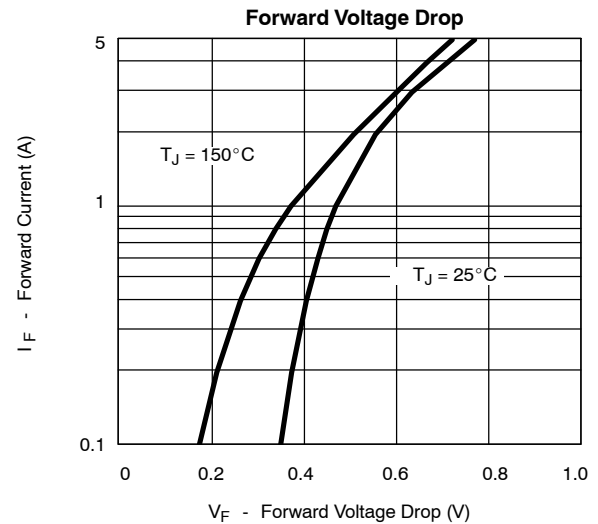
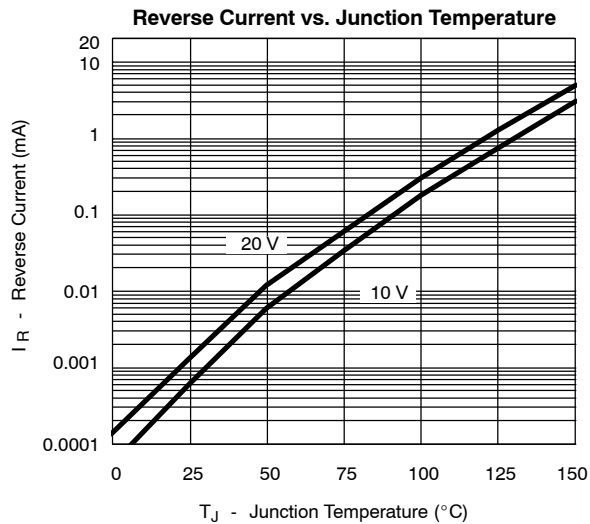
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

MOSFET



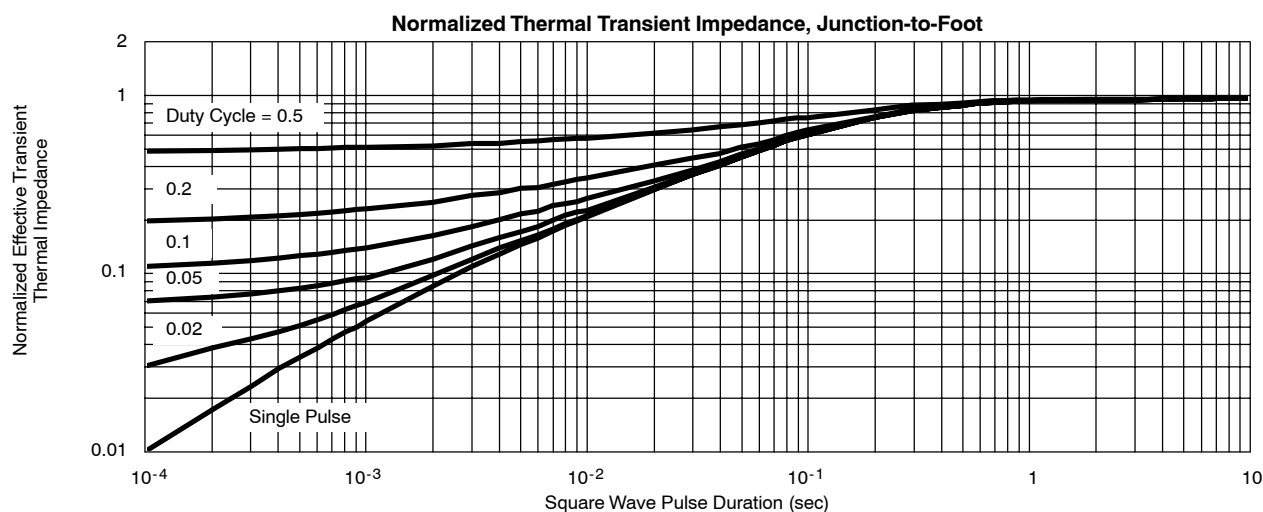
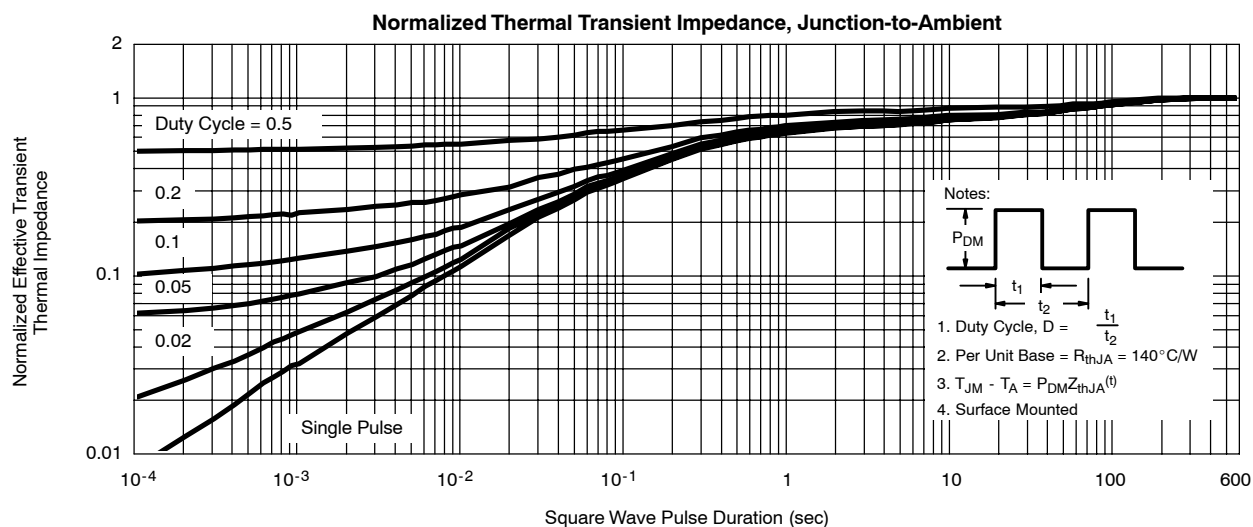
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

SCHOTTKY



TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

SCHOTTKY





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