

Dual N-Channel 30-V (D-S) MOSFET with Schottky Diode

PRODUCT SUMMARY			
	V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
Channel-1	30	0.012 @ $V_{GS} = 10$ V	9.6
		0.018 @ $V_{GS} = 4.5$ V	7.8
Channel-2		0.010 @ $V_{GS} = 10$ V	13.5
		0.0110 @ $V_{GS} = 4.5$ V	12.8

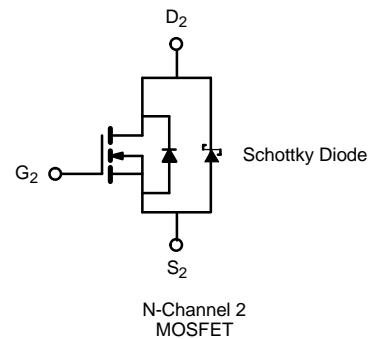
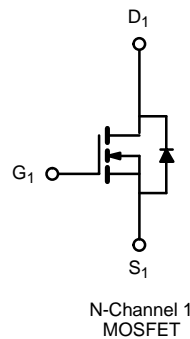
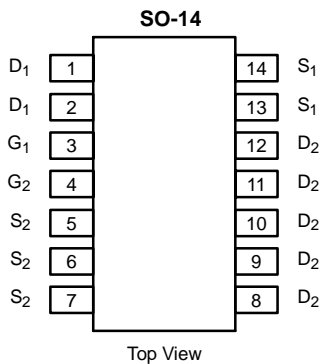
SCHOTTKY PRODUCT SUMMARY		
V_{DS} (V)	V_{SD} (V) Diode Forward Voltage	I_F (A)
30	0.53 V @ 3 A	2.0

FEATURES

- TrenchFET® Power MOSFET

APPLICATIONS

- DC-DC Converters
 - Game Stations
 - Video Graphics



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)							
Parameter	Symbol	Channel-1		Channel-2		Unit	
		10 secs	Steady State	10 secs	Steady State		
Drain-Source Voltage	V_{DS}	30				V	
Gate-Source Voltage	V_{GS}	± 20		± 12			
Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a	I_D	$T_A = 25^\circ\text{C}$	9.6	7.3	13.5	9.9	A
		$T_A = 70^\circ\text{C}$	7.7	5.8	10.8	7.6	
Pulsed Drain Current	I_{DM}	40		50		A	
Continuous Source Current (Diode Conduction) ^a	I_S	1.8	1.04	2.73	1.33		
Maximum Power Dissipation ^a	P_D	$T_A = 25^\circ\text{C}$	2	1.14	3.0	1.47	W
		$T_A = 70^\circ\text{C}$	1.28	0.73	1.9	0.94	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150				$^\circ\text{C}$	

THERMAL RESISTANCE RATINGS									
Parameter	Symbol	Channel-1		Channel-2		Schottky		Unit	
		Typ	Max	Typ	Max	Typ	Max		
Maximum Junction-to-Ambient ^a	R_{thJA}	$t \leq 10$ sec	50	62.5	34	42	40	48	$^\circ\text{C/W}$
		Steady-State	90	110	70	85	76	93	
Maximum Junction-to-Foot (Drain)	R_{thJC}	33	40	17	22	21	26		

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 ^a	Max	Unit	
Static							
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	Ch-1	0.8	1.40	2.00	V
			Ch-2	0.8	1.35	1.90	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V	Ch-1			100	nA
		V _{DS} = 0 V, V _{GS} = ±12 V	Ch-2			100	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 24 V, V _{GS} = 0 V	Ch-1			1	μA
			Ch-2			100	
		V _{DS} = 24 V, V _{GS} = 0 V, T _J = 85 °C	Ch-1			15	
			Ch-2			4000	
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	Ch-1	20			A
			Ch-2	30			
Drain-Source On-State Resistance ^b	r _{DS(on)}	V _{GS} = 10 V, I _D = 9.6 A	Ch-1		0.010	0.012	Ω
		V _{GS} = 10 V, I _D = 13.5 A	Ch-2		0.007	0.010	
		V _{GS} = 4.5 V, I _D = 7.8 A	Ch-1		0.015	0.018	
		V _{GS} = 4.5 V, I _D = 12.8 A	Ch-2		0.0085	0.0110	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 9.6 A	Ch-1		25		S
		V _{DS} = 15 V, I _D = 13.5 A	Ch-2		56		
Diode Forward Voltage ^b	V _{SD}	I _S = 1.8 A, V _{GS} = 0 V	Ch-1		0.7	1.1	V
		I _S = 2.73 A, V _{GS} = 0 V	Ch-2		0.485	0.53	
Dynamic^a							
Total Gate Charge	Q _g	Channel-1 V _{DS} = 15 V, V _{GS} = 5 V, I _D = 9.6 A	Ch-1		11.5	17	nC
			Ch-2		40	60	
Gate-Source Charge	Q _{gs}	Channel-2 V _{DS} = 15 V, V _{GS} = 5 V, I _D = -13.5 A	Ch-1		3		nC
			Ch-2		10		
Gate-Drain Charge	Q _{gd}	Channel-2 V _{DS} = 15 V, V _{GS} = 5 V, I _D = -13.5 A	Ch-1		4.5		nC
			Ch-2		8.8		
Gate Resistance	R _G		Ch-1		1.45		Ω
			Ch-2		0.8		
Turn-On Delay Time	t _{d(on)}	Channel-1 V _{DD} = 15 V, R _L = 15 Ω I _D ≅ 1 A, V _{GEN} = 10 V, R _G = 6 Ω Channel-2 V _{DD} = 15 V, R _L = 15 Ω I _D ≅ 1 A, V _{GEN} = 10 V, R _G = 6 Ω	Ch-1		10	20	ns
Rise Time	t _r		Ch-2		17	26	
			Ch-1		5	10	
Turn-Off Delay Time	t _{d(off)}		Ch-2		14	21	
			Ch-1		30	60	
Fall Time	t _f		Ch-2		102	155	
			Ch-1		10	20	
Source-Drain Reverse Recovery Time	t _{rr}		I _F = 1.8 A, di/dt = 100 A/μs	Ch-1		30	
		I _F = 2.73 A, di/dt = 100 μA/μs	Ch-2		40	65	

Notes

- a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.

SCHOTTKY SPECIFICATIONS (T_J = 25 °C UNLESS OTHERWISE NOTED)

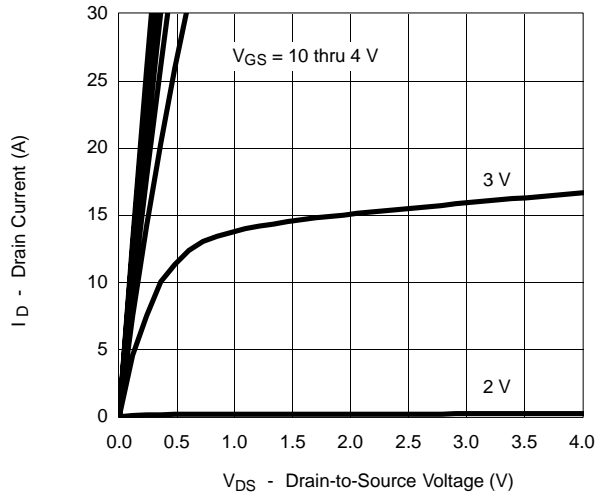
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Forward Voltage Drop	V _F	I _F = 3 A		0.485	0.53	V
		I _F = 3 A, T _J = 125 °C		0.42	0.42	
Maximum Reverse Leakage Current	I _{rm}	V _r = 30 V		0.008	0.100	mA
		V _r = 30 V, T _J = 75 °C		0.4	5	
		V _r = -30 V, T _J = 125 °C		6.5	20	
Junction Capacitance	C _T	V _r = 15 V		102		pF



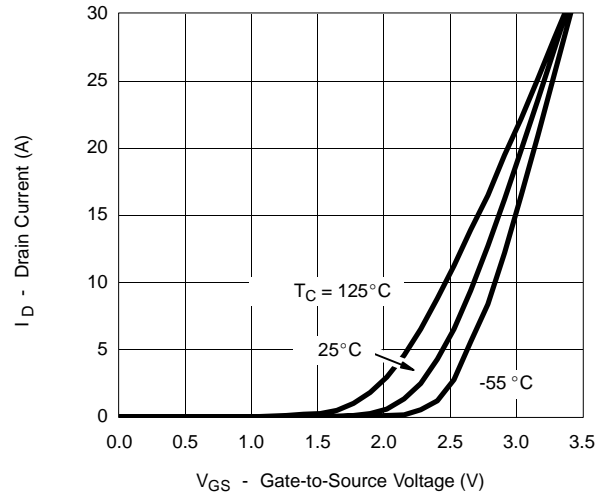
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

CHANNEL-1

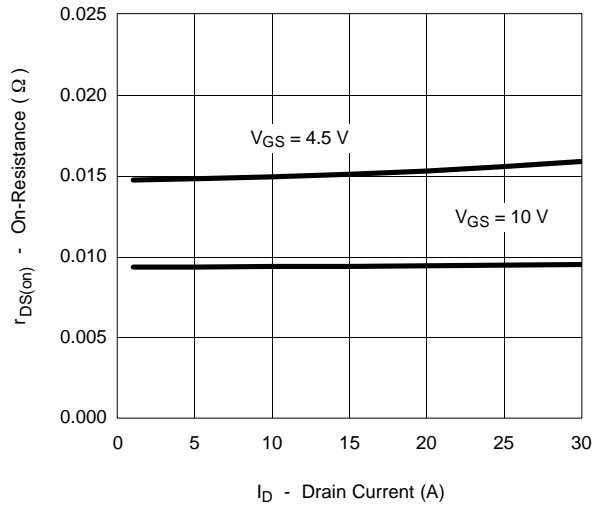
Output Characteristics



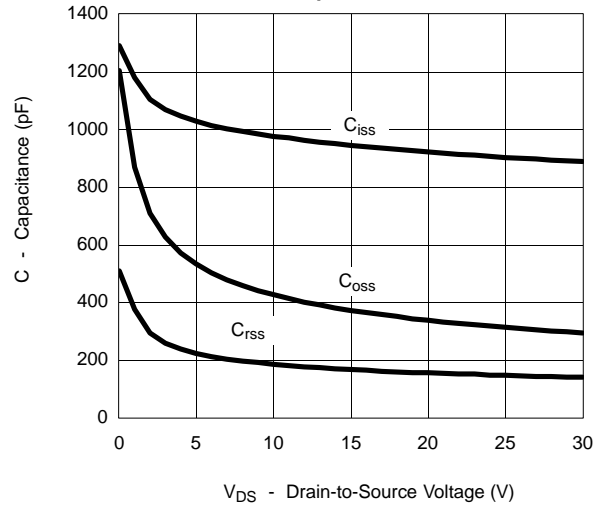
Transfer Characteristics



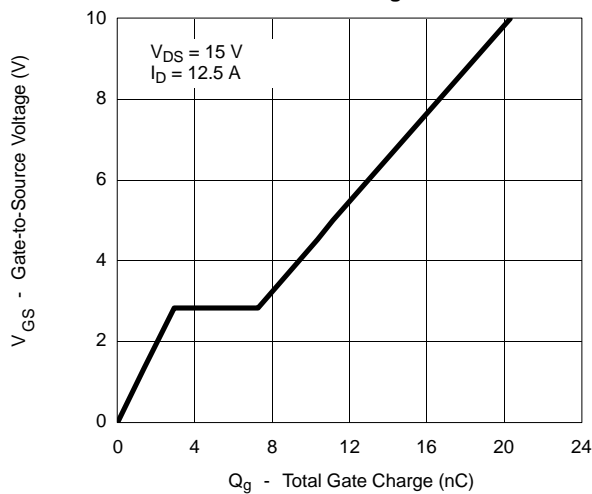
On-Resistance vs. Drain Current



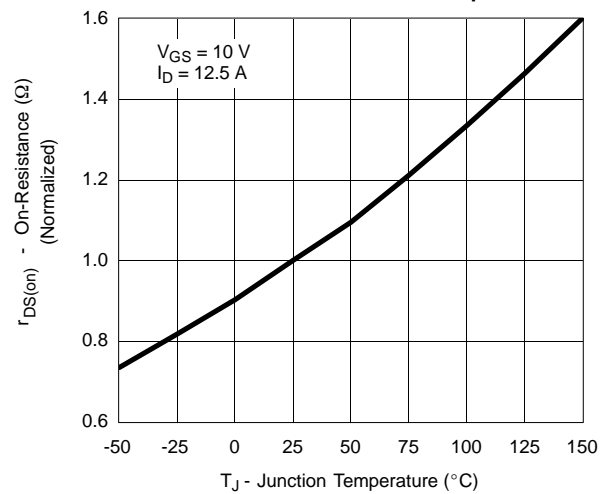
Capacitance



Gate Charge



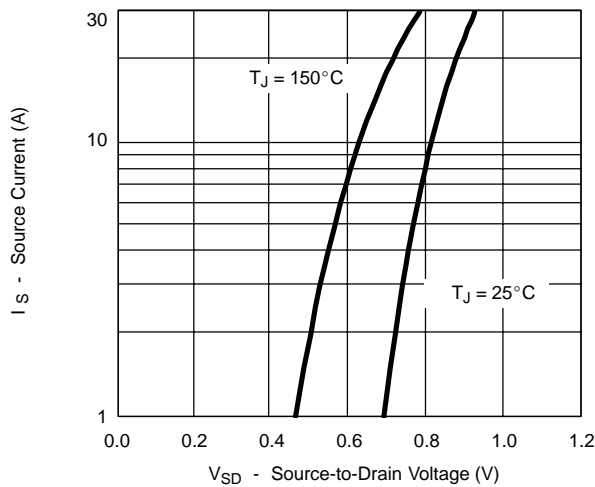
On-Resistance vs. Junction Temperature



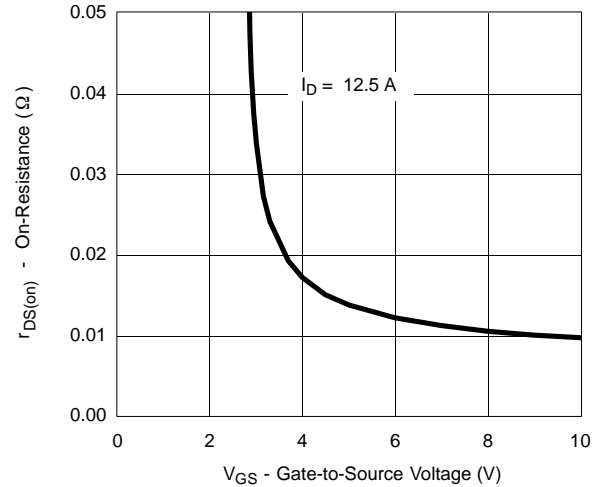
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

CHANNEL-1

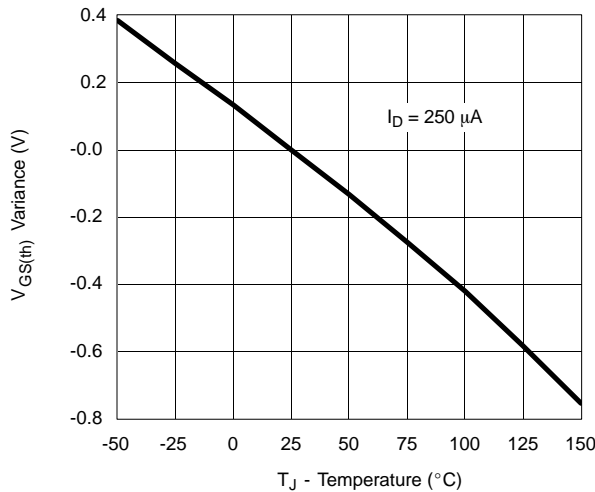
Source-Drain Diode Forward Voltage



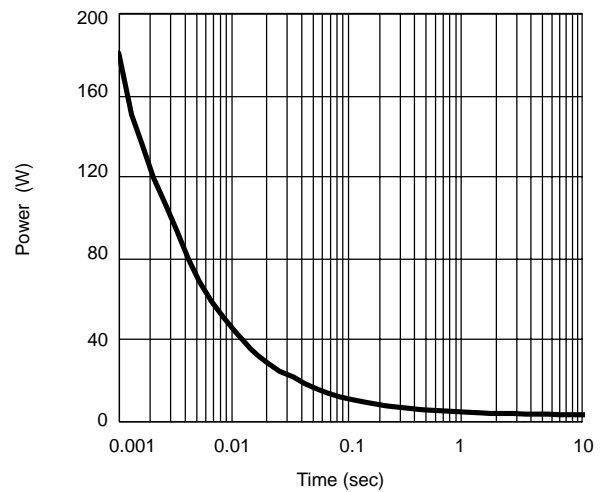
On-Resistance vs. Gate-to-Source Voltage



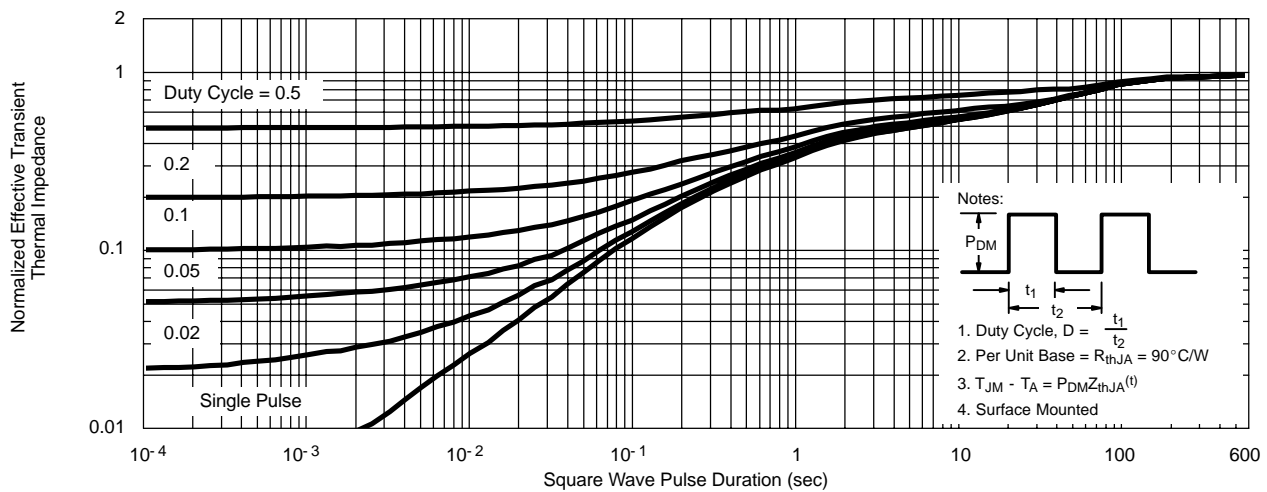
Threshold Voltage



Single Pulse Power



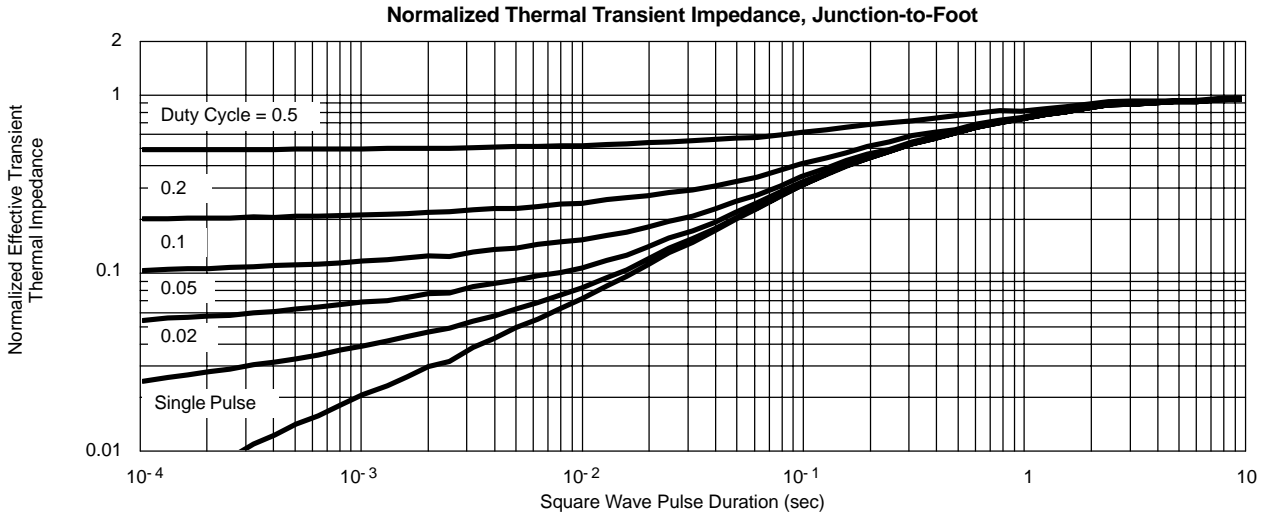
Normalized Thermal Transient Impedance, Junction-to-Ambient





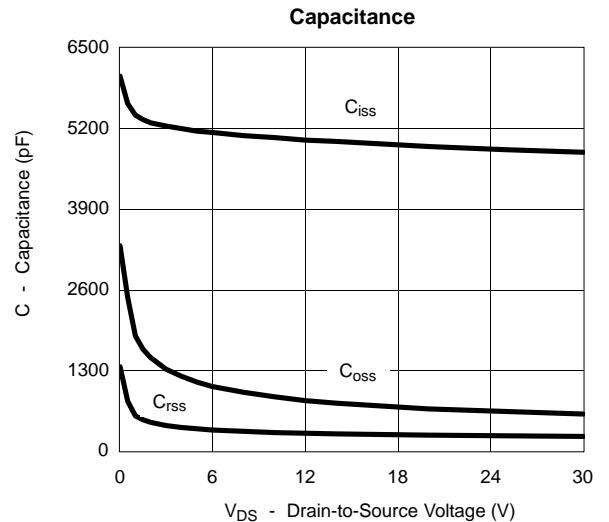
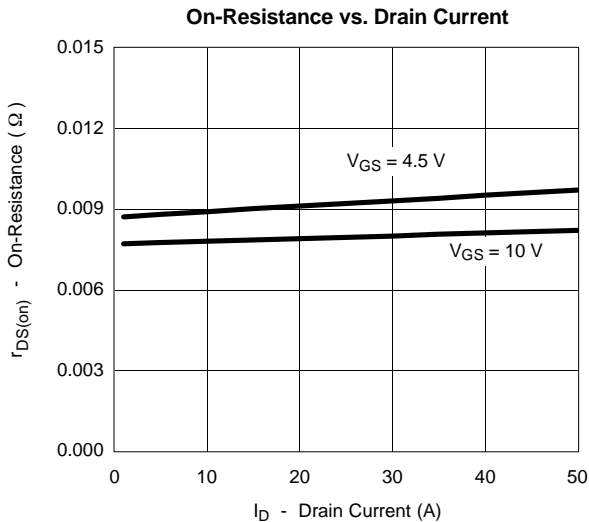
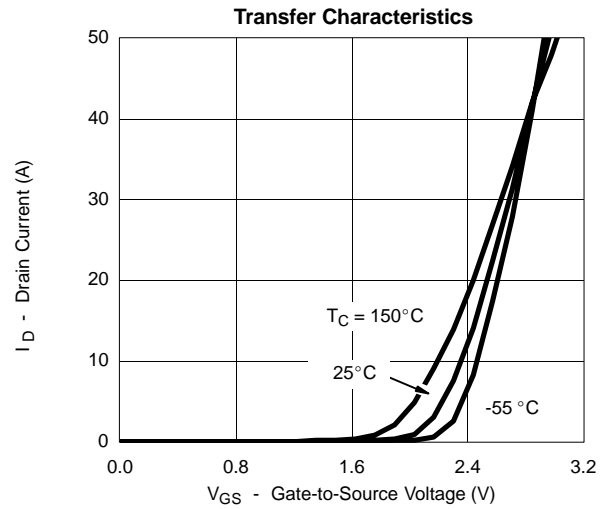
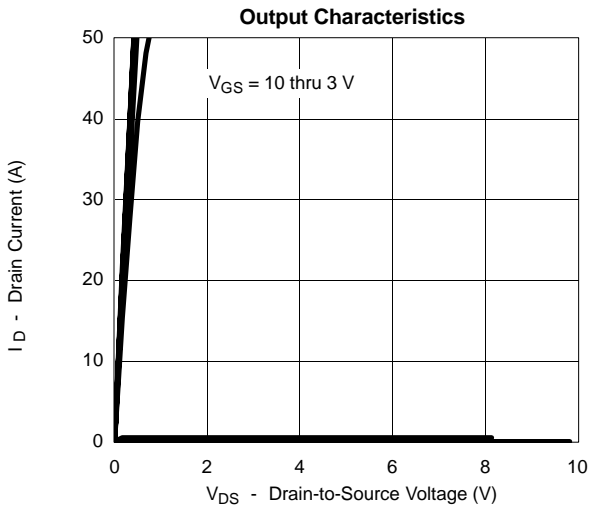
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

CHANNEL-1



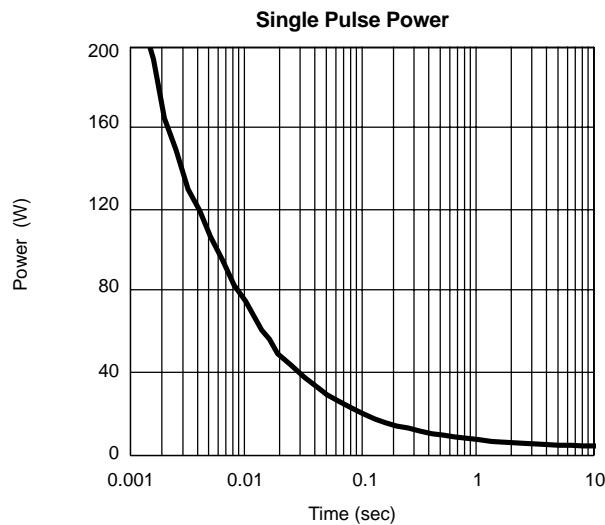
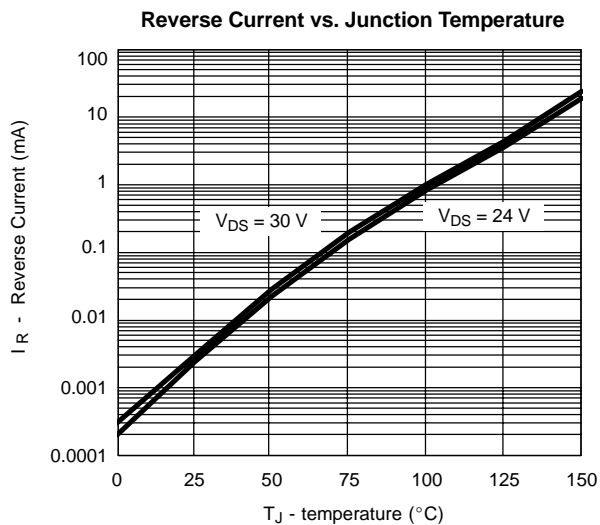
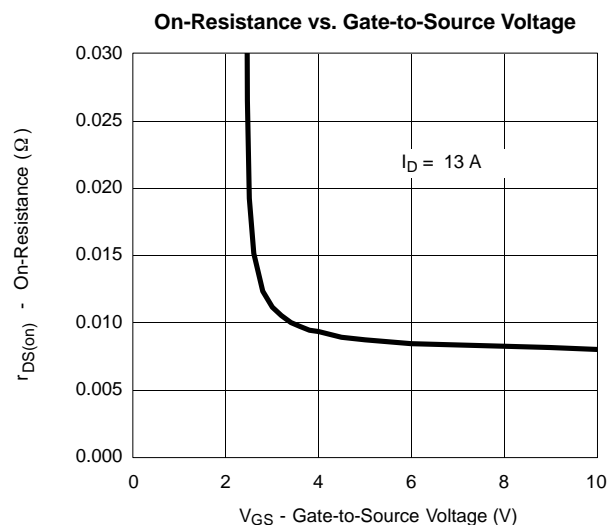
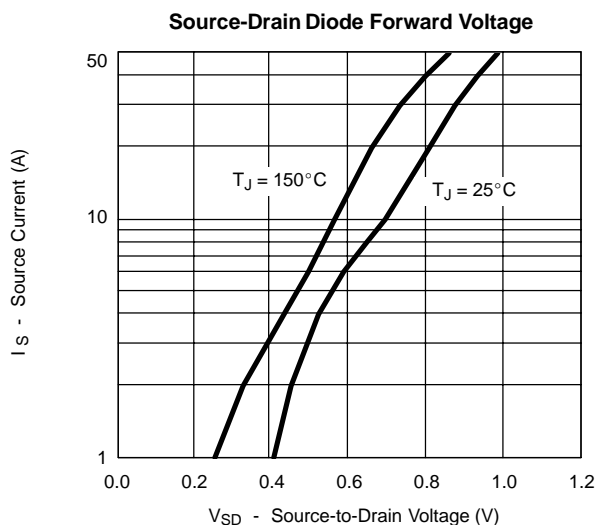
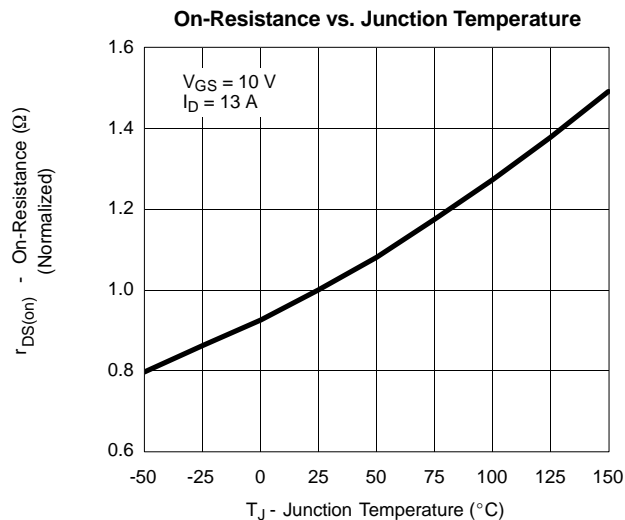
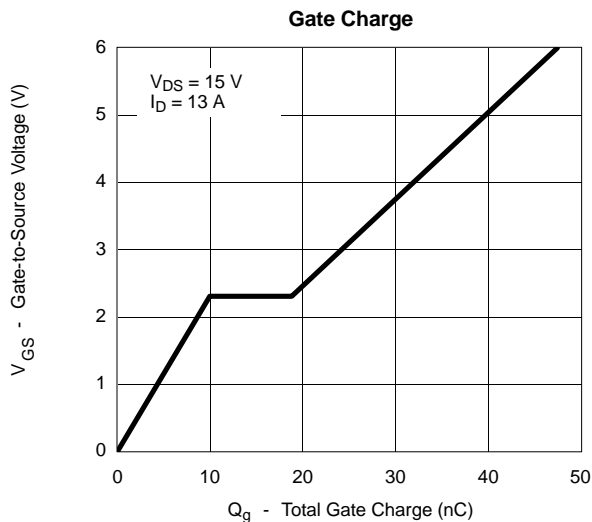
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

CHANNEL-2

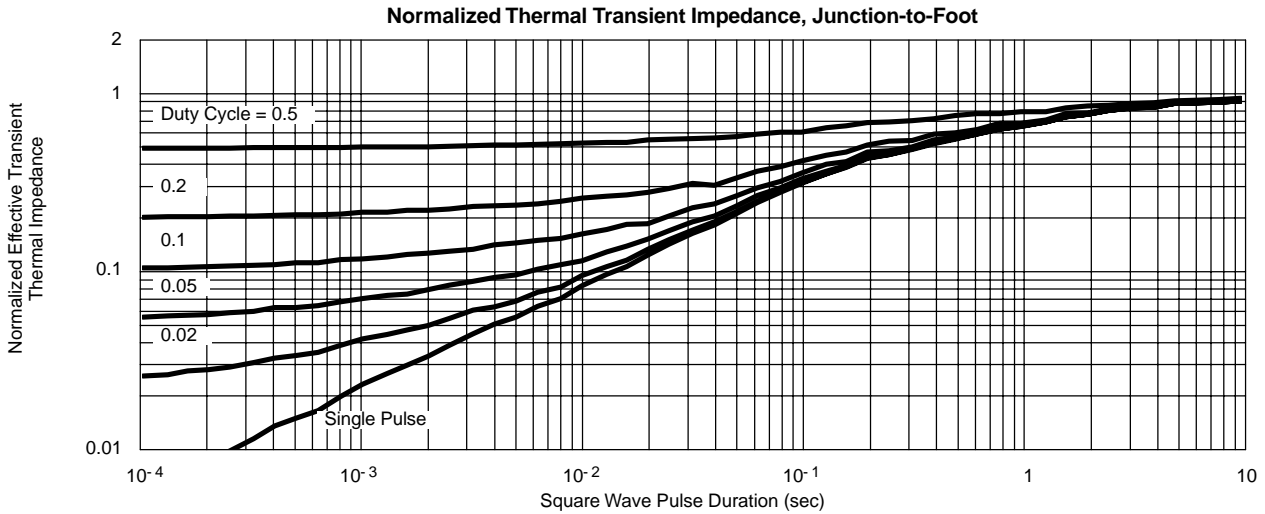
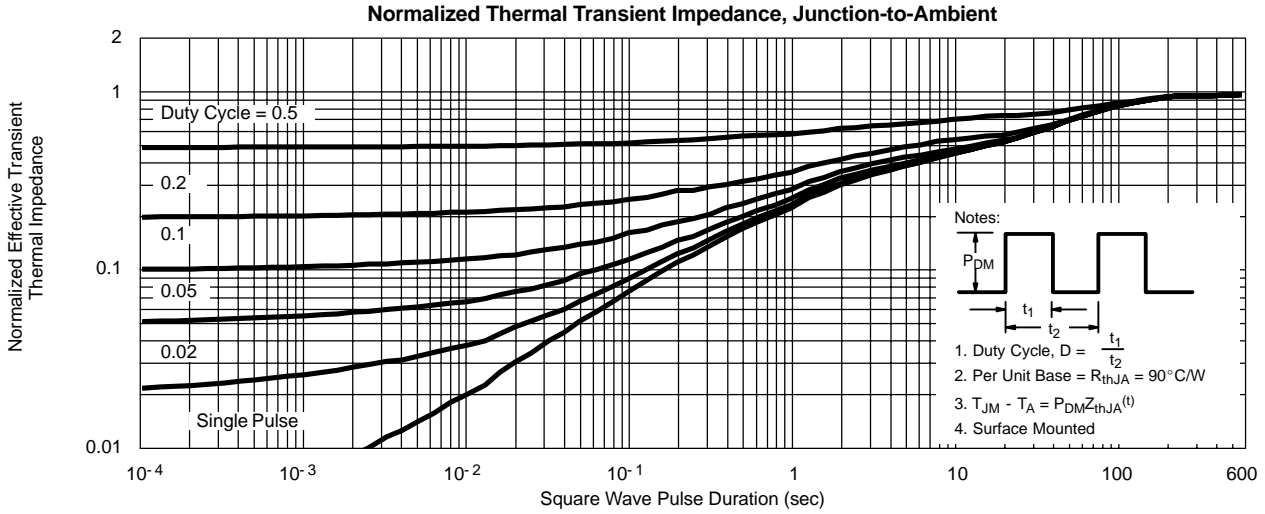


TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

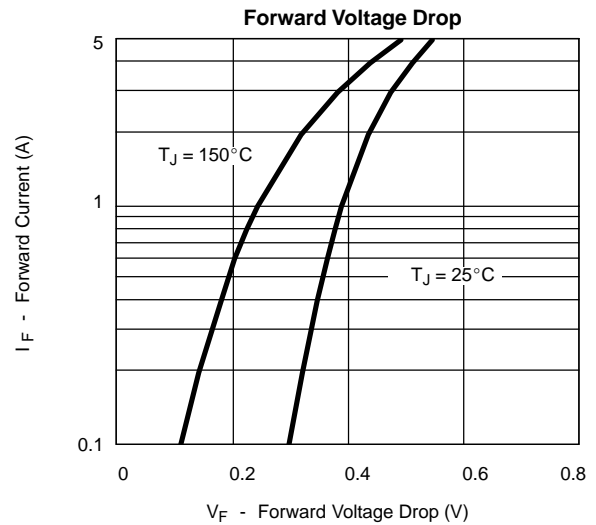
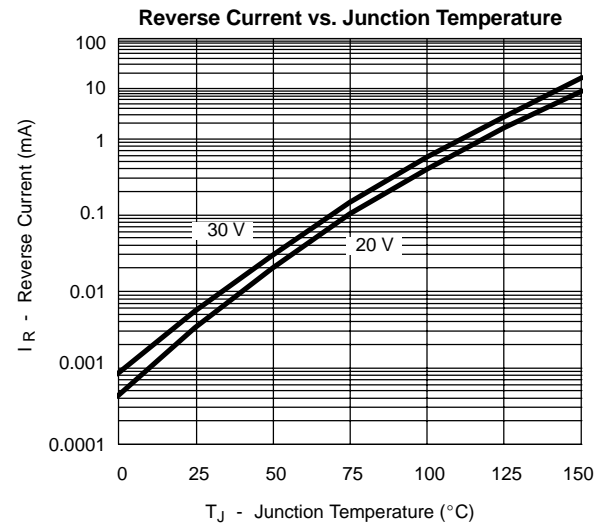
CHANNEL-2



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) CHANNEL-2



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) SCHOTTKY



TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

SCHOTTKY

