



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

PRODUCT SUMMARY

	V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
Channel-1	20	0.012 @ $V_{GS} = 10$ V	9.6
		0.0175 @ $V_{GS} = 4.5$ V	7.8
Channel-2		0.010 @ $V_{GS} = 10$ V	13.5
		0.0115 @ $V_{GS} = 4.5$ V	12.8

SCHOTTKY PRODUCT SUMMARY

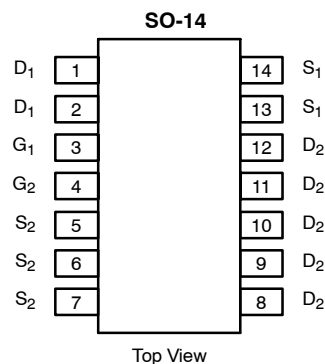
V_{DS} (V)	V_{SD} (V) Diode Forward Voltage	I_F (A)
20	0.53 V @ 3 A	2.0

FEATURES

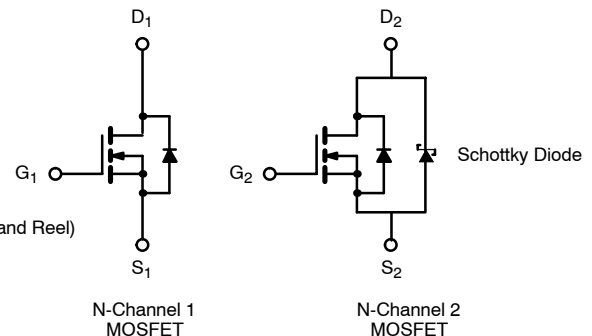
- TrenchFET® Power MOSFET
- 100% R_g Tested

APPLICATIONS

- DC/DC Converters
 - Game Stations
 - Notebook PC Logic



Ordering Information: Si4340DY
Si4340DY-T1 (with Tape and Reel)

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}	20				V
Gate-Source Voltage		V _{GS}	± 20		± 16		
Continuous Drain Current (T _J = 150°C) ^a	T _A = 25°C	I _D	9.6	7.3	13.5	9.5	A
	T _A = 70°C		7.7	5.8	10.8	7.5	
Pulsed Drain Current		I _{DM}	40		50		
Continuous Source Current (Diode Conduction) ^a		I _S	1.8	1.04	2.73	1.30	
Maximum Power Dissipation ^a	T _A = 25°C	P _D	2.0	1.14	3.0	1.43	W
	T _A = 70°C		1.28	0.73	1.9	0.91	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to 150				°C

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Channel-1		Channel-2		Schottky		Unit
			Typ	Max	Typ	Max	Typ	Max	
Maximum Junction-to-Ambient ^a	$t \leq 10$ sec	R_{thJA}	53	62.5	35	42	40	48	$^\circ\text{C/W}$
	Steady-State		92	110	72	87	76	93	
Maximum Junction-to-Foot (Drain)	Steady-State	R_{thJF}	35	42	18	23	21	25	

Notes

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

MOSFET SPECIFICATIONS ($T_J = 25^\circ\text{C}$ 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		2.00	V
			Ch-2	0.8		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} = 20 V, V _{GS} = 0 V	Ch-1			1	μA
			Ch-2			100	
		V _{DS} = 20 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		0.0095	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		0.0135	0.0175	
		V _{GS} = 4.5 V, I _D = 12.8 A	Ch-2		0.0085	0.0115	
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		38		
Diode Forward Voltage ^b	V _{SD}	I _S = 1.8 A, V _{GS} = 0 V	Ch-1		0.74	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} = 10 V, V _{GS} = 4.5 V, I _D = 9.6 A Channel-2 V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = -13.5 A	Ch-1		10	15	nC
			Ch-2		17	25	
Gate-Source Charge	Q _{gs}		Ch-1		3.3		
			Ch-2		4.5		
Gate-Drain Charge	Q _{gd}		Ch-1		3.1		
			Ch-2		4.5		
Gate Resistance	R _g	f = 1 MHz	Ch-1	0.45	0.9	1.35	Ω
			Ch-2	0.7	1.4	2.1	
Turn-On Delay Time	t _{d(on)}	Channel-1 V _{DD} = 01 V, R _L = 10 Ω I _D ≅ 1 A, V _{GEN} = 10 V, R _G = 6 Ω Channel-2 V _{DD} = 01 V, R _L = 15 Ω I _D ≅ 1 A, V _{GEN} = 10 V, R _G = 6 Ω	Ch-1		15	25	ns
Rise Time	t _r		Ch-2		24	35	
			Ch-1		16	25	
Turn-Off Delay Time	t _{d(off)}		Ch-2		22	35	
			Ch-1		42	65	
Fall Time	t _f		Ch-2		68	100	
			Ch-1		16	25	
Source-Drain Reverse Recovery Time	t _{rr}		I _F = 1.8 A, di/dt = 100 A/μs	Ch-1		35	
		I _F = 2.73 A, di/dt = 100 μA/μs	Ch-2		38	65	

Notes

- a. Guaranteed by design, not subject to production testing.
 b. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

SCHOTTKY SPECIFICATIONS ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

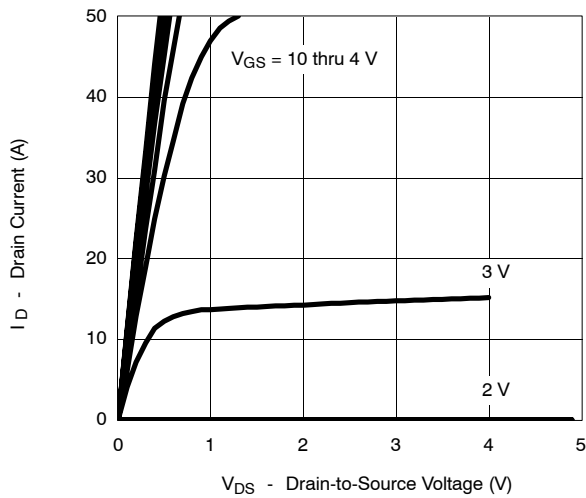
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Forward Voltage Drop	V_F	$I_F = 3\ \text{A}$		0.485	0.53	V
		$I_F = 3\ \text{A}, T_J = 125^\circ\text{C}$		0.42	0.42	
Maximum Reverse Leakage Current	I_{rm}	$V_r = 20\ \text{V}$		0.008	0.100	mA
		$V_r = 20\ \text{V}, T_J = 75^\circ\text{C}$		0.4	5	
		$V_r = -20\ \text{V}, T_J = 125^\circ\text{C}$		6.5	20	
Junction Capacitance	C_T	$V_r = 15\ \text{V}$		102		pF



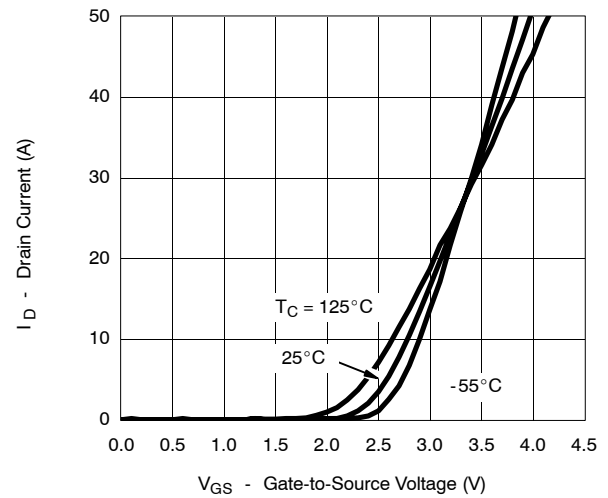
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

CHANNEL-1

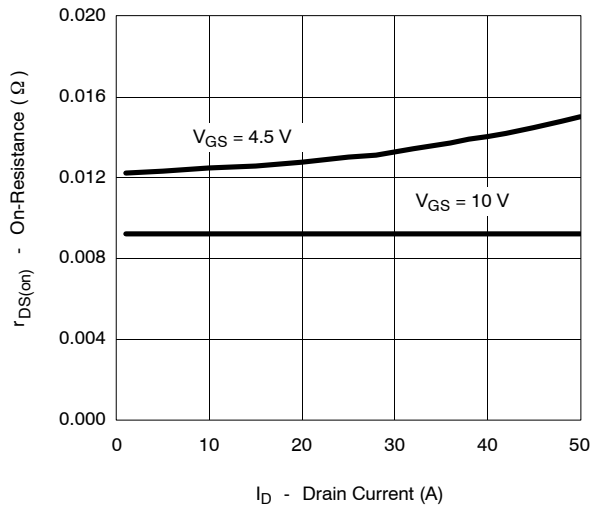
Output Characteristics



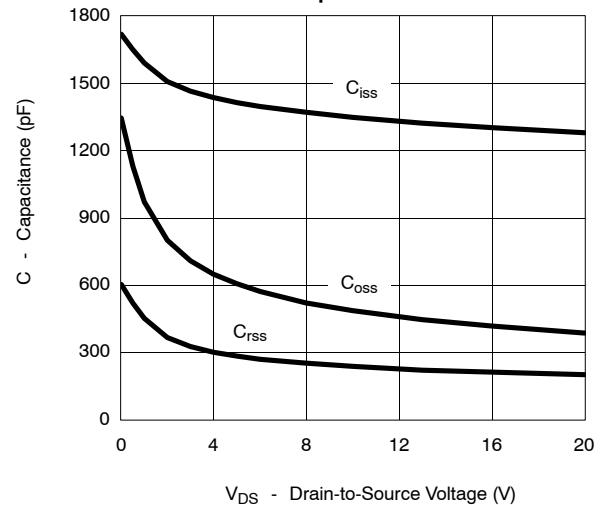
Transfer Characteristics



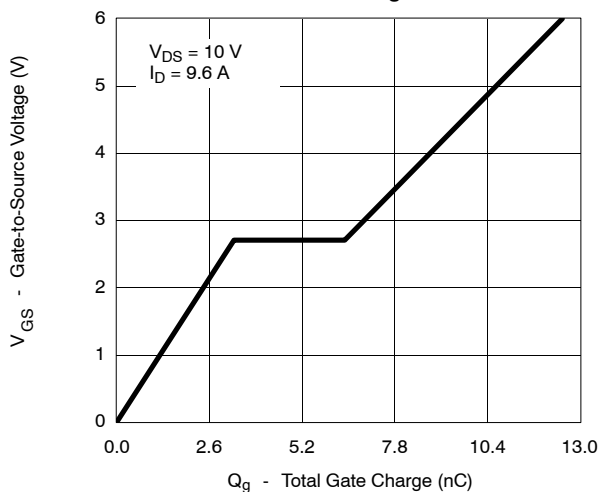
On-Resistance vs. Drain Current



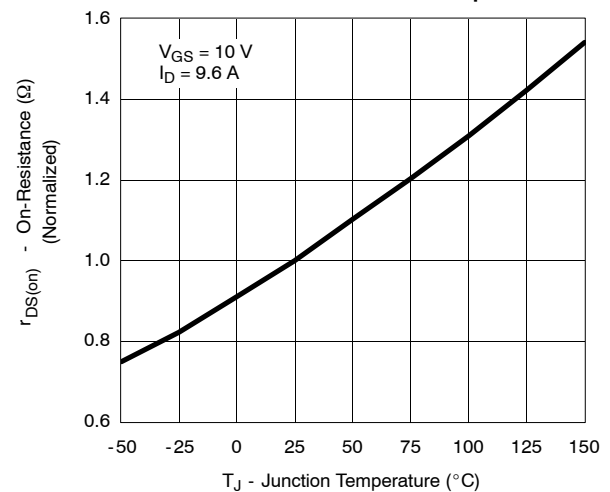
Capacitance



Gate Charge



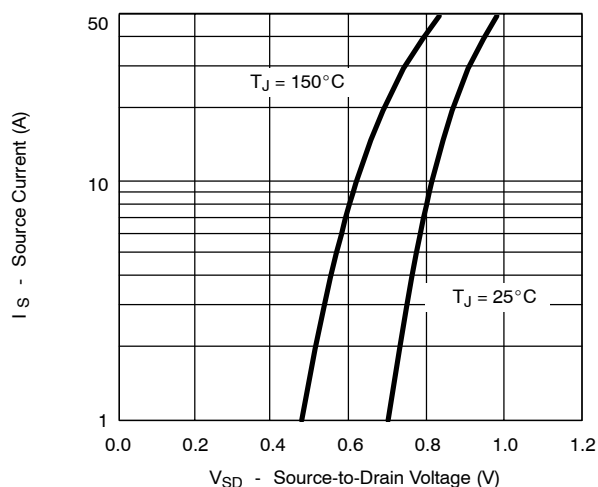
On-Resistance vs. Junction Temperature



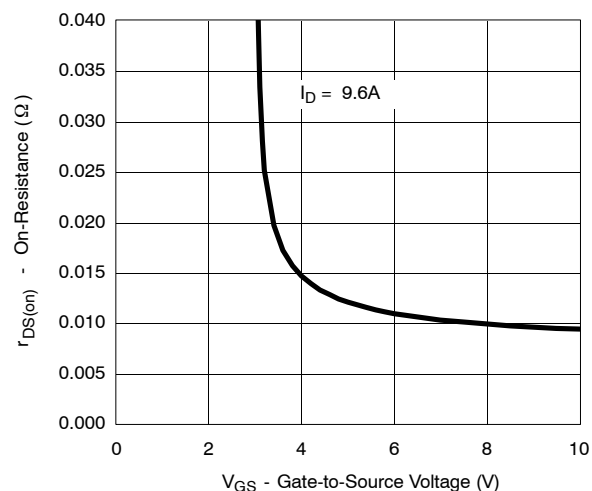
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

CHANNEL-1

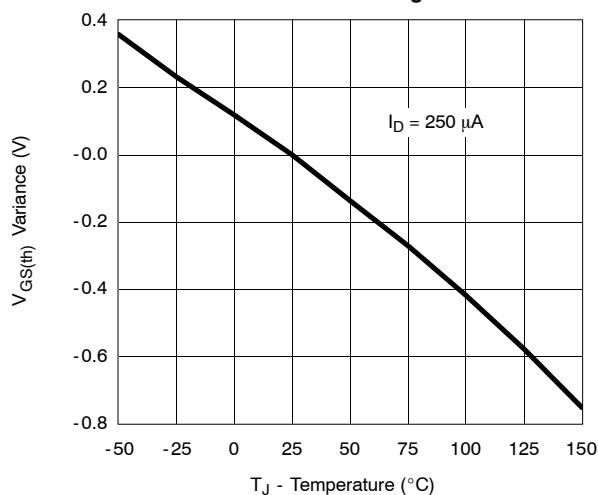
Source-Drain Diode Forward Voltage



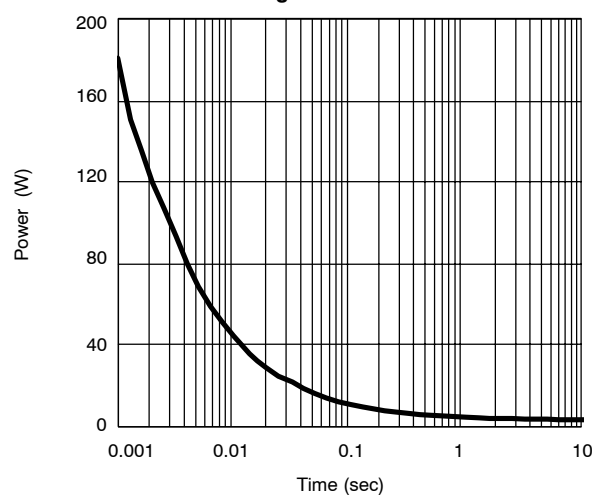
On-Resistance vs. Gate-to-Source Voltage



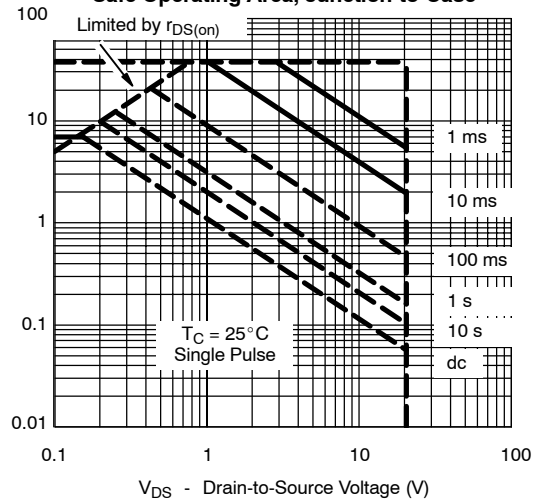
Threshold Voltage



Single Pulse Power



Safe Operating Area, Junction-to-Case

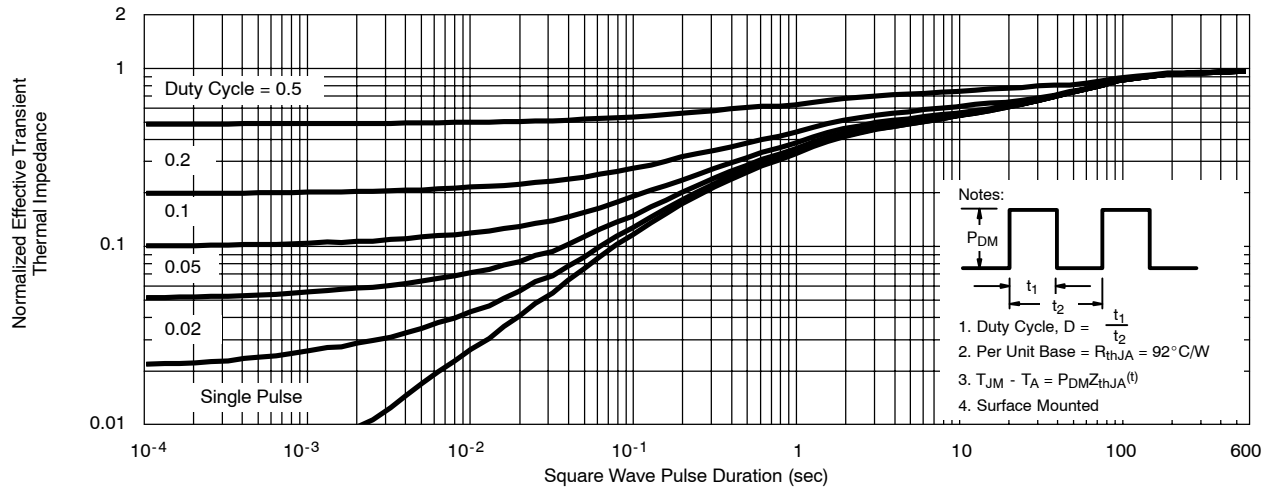




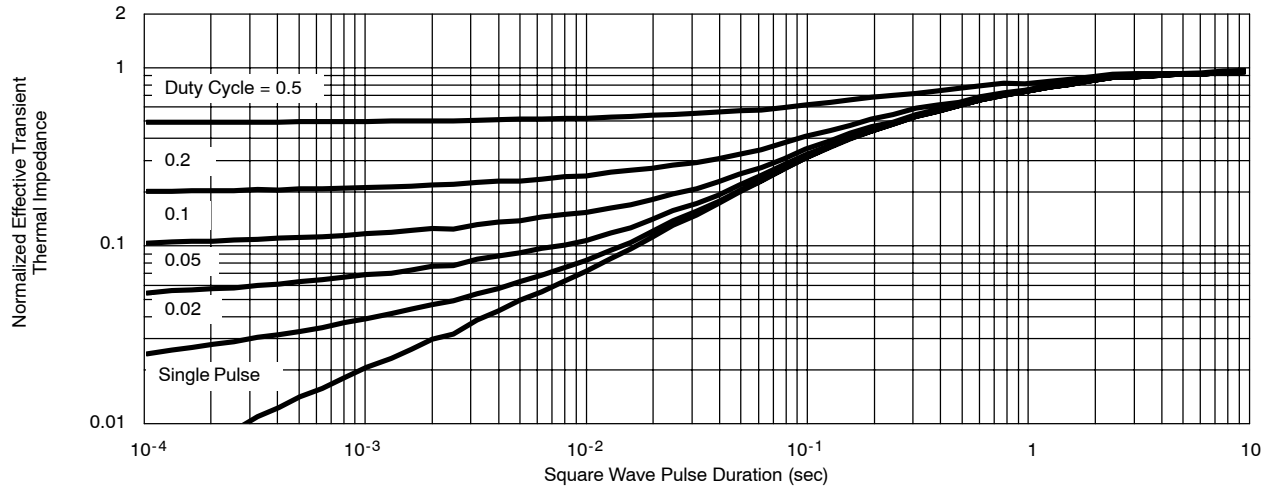
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

CHANNEL-1

Normalized Thermal Transient Impedance, Junction-to-Ambient



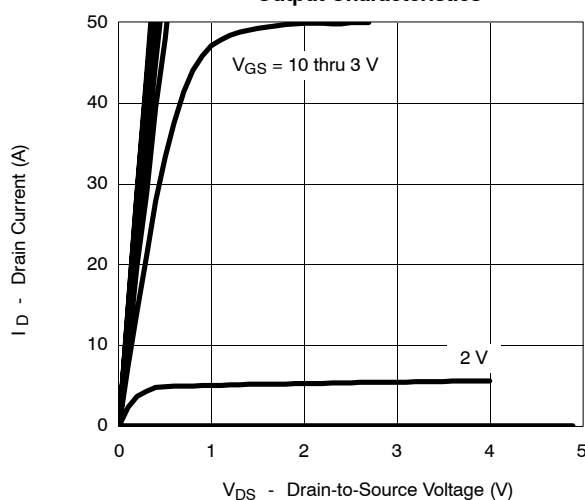
Normalized Thermal Transient Impedance, Junction-to-Foot



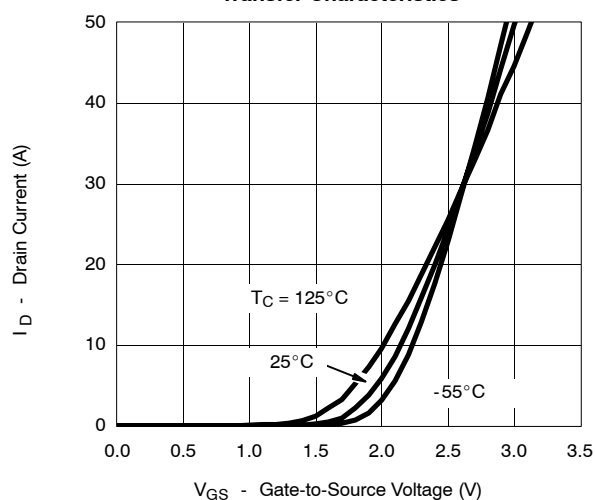
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

CHANNEL-2

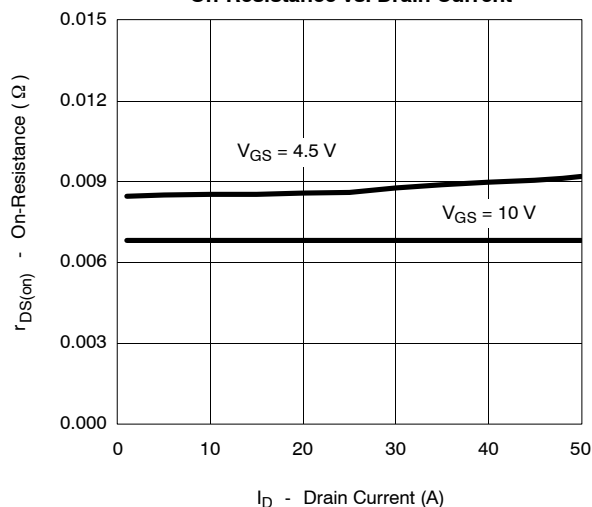
Output Characteristics



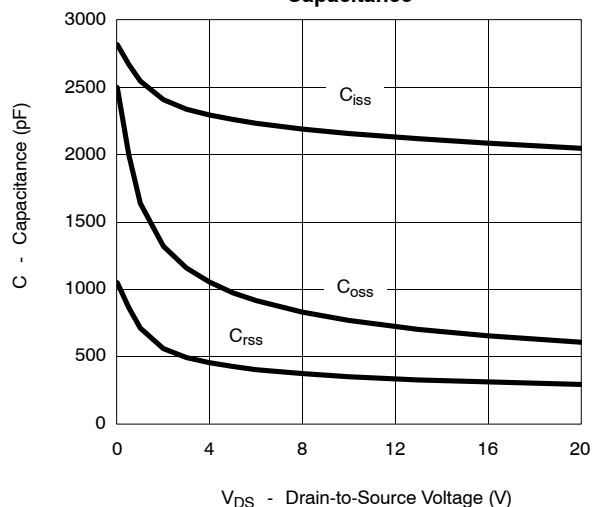
Transfer Characteristics



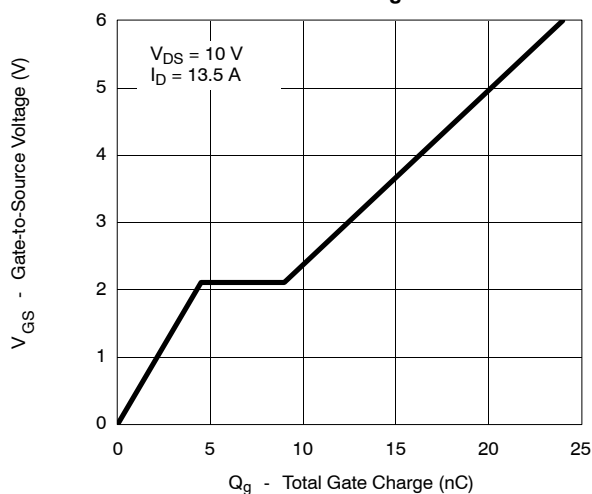
On-Resistance vs. Drain Current



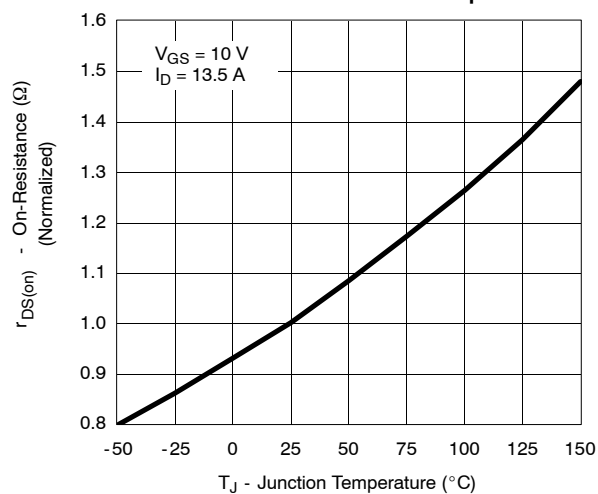
Capacitance



Gate Charge



On-Resistance vs. Junction Temperature

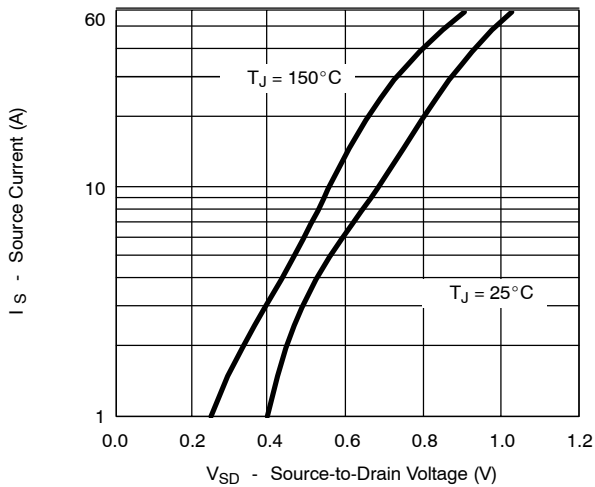




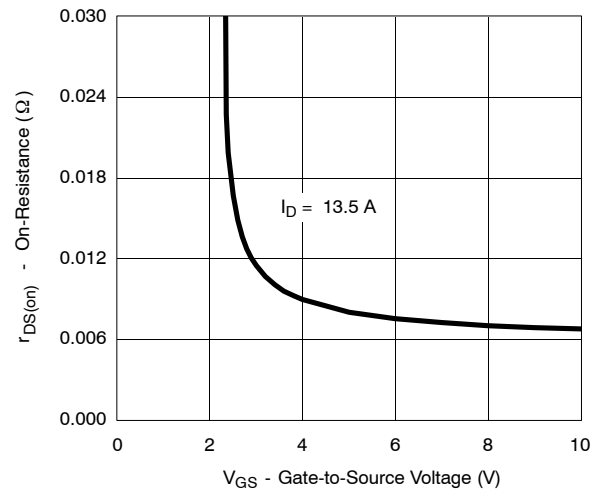
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

CHANNEL-2

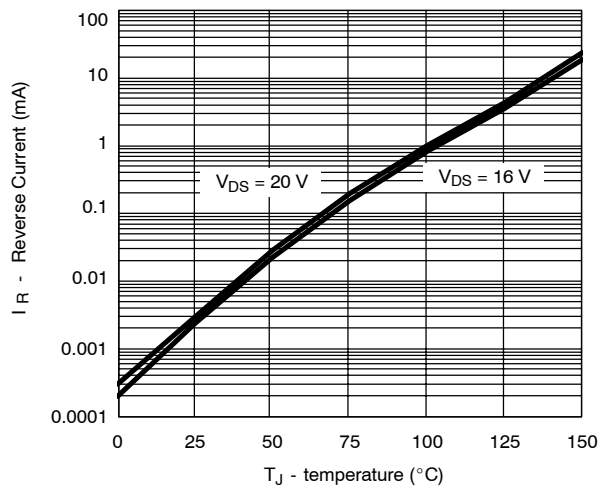
Source-Drain Diode Forward Voltage



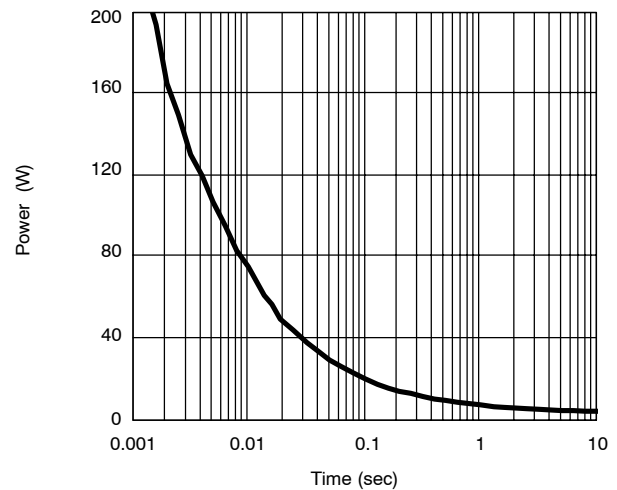
On-Resistance vs. Gate-to-Source Voltage



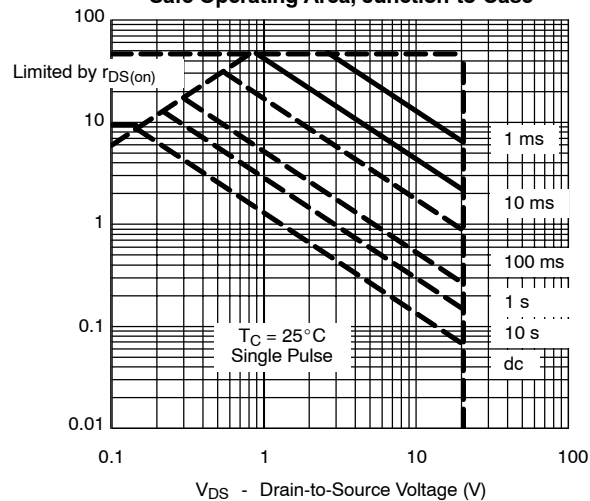
Reverse Current vs. Junction Temperature



Single Pulse Power



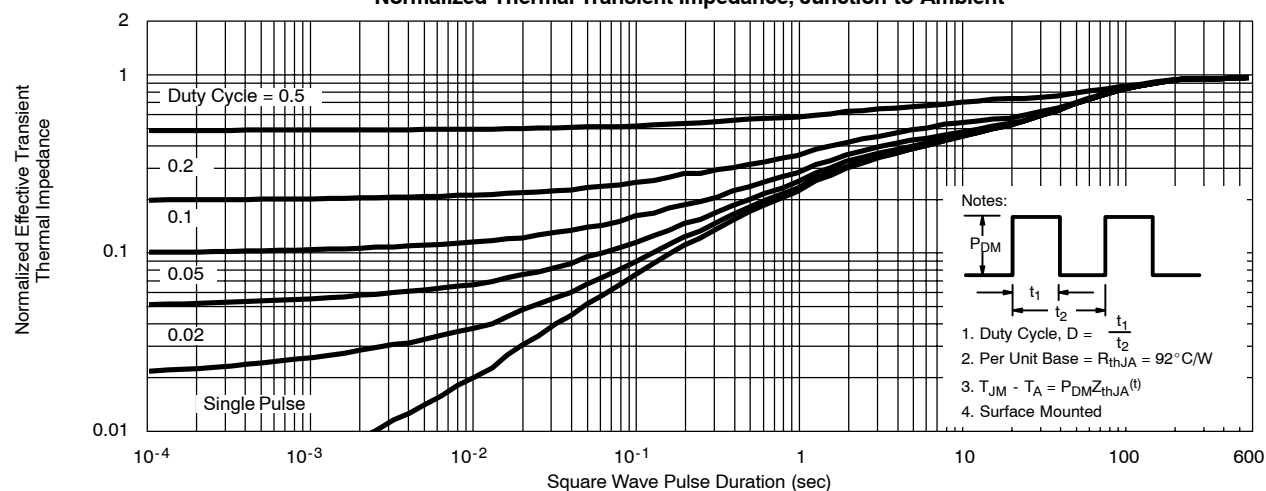
Safe Operating Area, Junction-to-Case



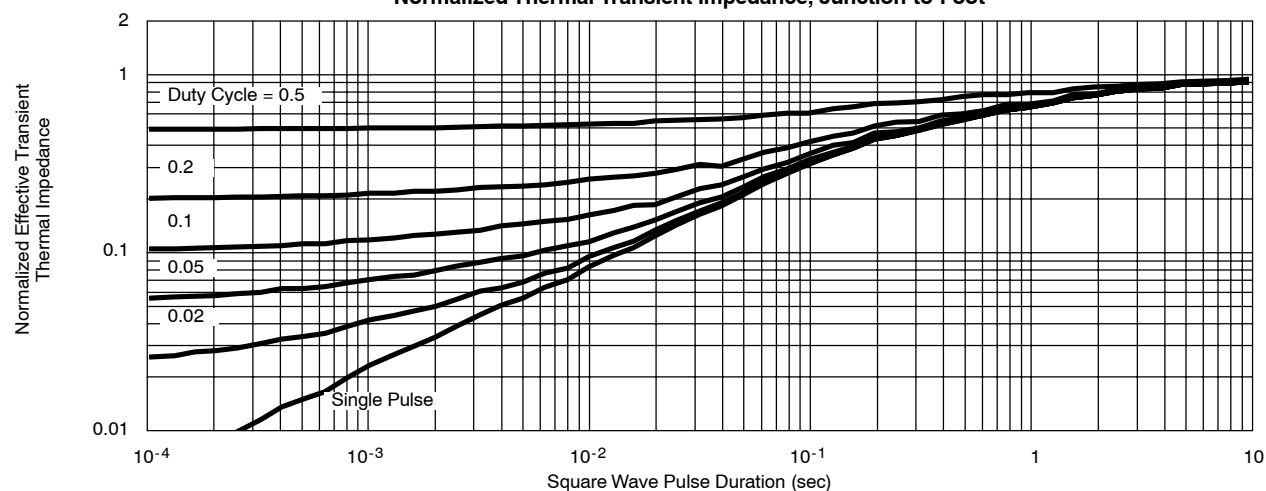
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

CHANNEL-2

Normalized Thermal Transient Impedance, Junction-to-Ambient



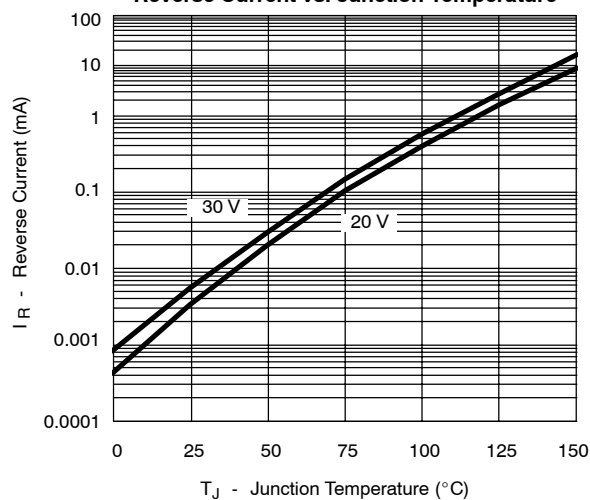
Normalized Thermal Transient Impedance, Junction-to-Foot



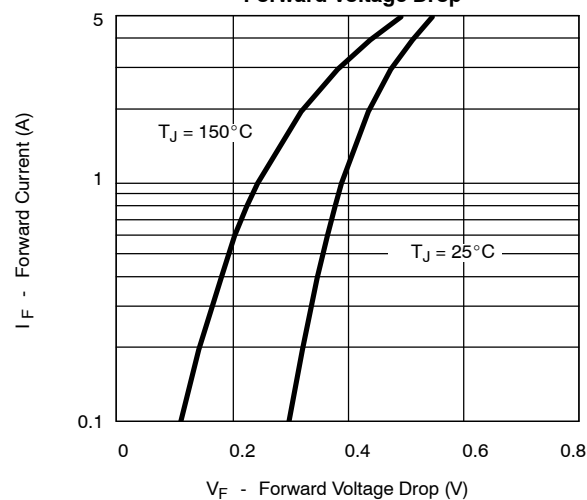
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

SCHOTTKY

Reverse Current vs. Junction Temperature



Forward Voltage Drop





TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

SCHOTTKY

