



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	0.011 @ V _{GS} = 10 V	10
		0.016 @ V _{GS} = 4.5 V	8.2
Channel-2		0.0085 @ V _{GS} = 10 V	14
		0.0095 @ V _{GS} = 4.5 V	13

SCHOTTKY PRODUCT SUMMARY

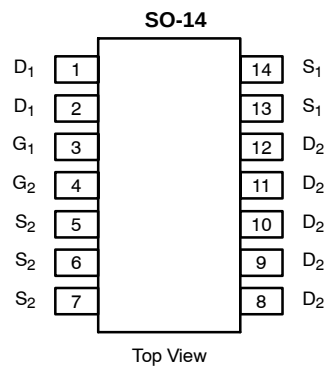
V_{DS} (V)	V_{SD} (V) Diode Forward Voltage	I_F (A)
30	0.53 V @ 3 A	2.0

FEATURES

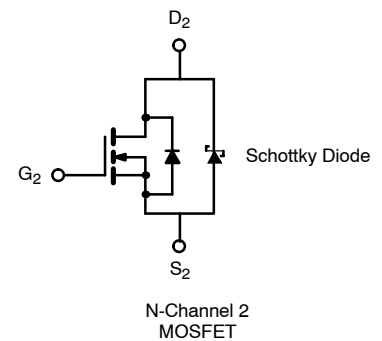
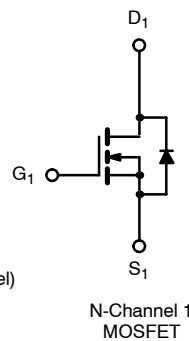
- TrenchFET® Power MOSFET
- 100% R_g Tested

APPLICATIONS

- DC/DC Converters
 - Game Stations
 - Video Equipment



Ordering Information:
Si4310BDY—E3
Si4310BDY-T1—E3 (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}	30				V
Gate-Source Voltage		V _{GS}	± 20		± 20		
Continuous Drain Current (T _J = 150°C) ^a	T _A = 25°C	I _D	10	7.5	14	9.8	A
	T _A = 70°C		8	6	11	7.8	
Pulsed Drain Current		I _{DM}	40		50		
Continuous Source Current (Diode Conduction) ^a		I _S	1.8	1.04	2.73	1.33	
Maximum Power Dissipation ^a	T _A = 25°C	P _D	2	1.14	3.0	1.47	W
	T _A = 70°C		1.28	0.73	1.9	0.94	
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	34	35	40	48	$^\circ\text{C/W}$
	Steady-State		92	110	70	72	76	93	
Maximum Junction-to-Foot (Drain)	Steady-State	R_{thJF}	35	42	17	24	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	1.0		3.0	V
			Ch-2	1.0		3.0	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V	Ch-1			100	nA
			Ch-2			100	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V	Ch-1			1	μA
			Ch-2			100	
		V _{DS} = 30 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 = 10 A	Ch-1		0.009	0.011	Ω
		V _{GS} = 10 V, I _D = 14 A	Ch-2		0.0065	0.0085	
		V _{GS} = 4.5 V, I _D = 8.2 A	Ch-1		0.013	0.016	
		V _{GS} = 4.5 V, I _D = 13 A	Ch-2		0.0075	0.0095	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 10 A	Ch-1		30		S
		V _{DS} = 15 V, I _D = 14 A	Ch-2		60		
Diode Forward Voltage ^b	V _{SD}	I _S = 1.8 A, V _{GS} = 0 V	Ch-1		0.76	1.1	V
		I _S = 2.73 A, V _{GS} = 0 V	Ch-2		0.485	0.53	
Dynamic ^a							
Input Capacitance	C _{iss}	V _{DS} = 15 V, V _{GS} = 0 V, f= 1 MHz	Ch-1	790	1580	2370	pF
Output Capacitance	C _{oss}		Ch-2	1530	3060	4590	
			Ch-1	145	290	435	
Reverse Transfer Capacitance	C _{rss}		Ch-2	300	600	900	
			Ch-1	70	140	210	
			Ch-2	115	225	340	
		Channel-1 V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 10 A Channel-2 V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 14 A	Ch-1		12	18	nC
Ch-2			19	30			
Gate-Source Charge	Q _{gs}		Ch-1		5.3		
			Ch-2		10		
Gate-Drain Charge	Q _{gd}		Ch-1		4.3		
			Ch-2		5		
Gate Resistance	R _g	f = 1 MHz	Ch-1	0.90	1.8	2,7	Ω
			Ch-2	0.3	0.95	1.4	
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		13	20	ns
	Ch-2			17	26		
	Rise Time		t _r	Ch-1		10	
Ch-2					12	20	
Turn-Off Delay Time	t _{d(off)}		Ch-1		33	50	
			Ch-2		53	80	
Fall Time	t _f		Ch-1		10	15	
			Ch-2		17	26	
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 1.8 A, di/dt = 100 A/μs	Ch-1		25	40	
		I _F = 2.73 A, di/dt = 100 μA/μs	Ch-2		31	50	

Notes

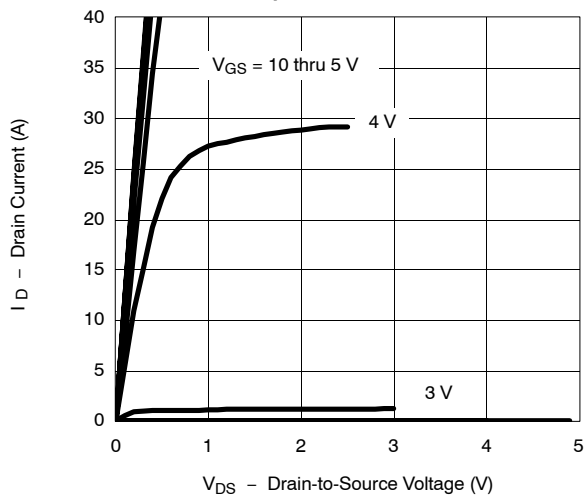
- a. Guaranteed by design, not subject to production testing.
 b. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

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

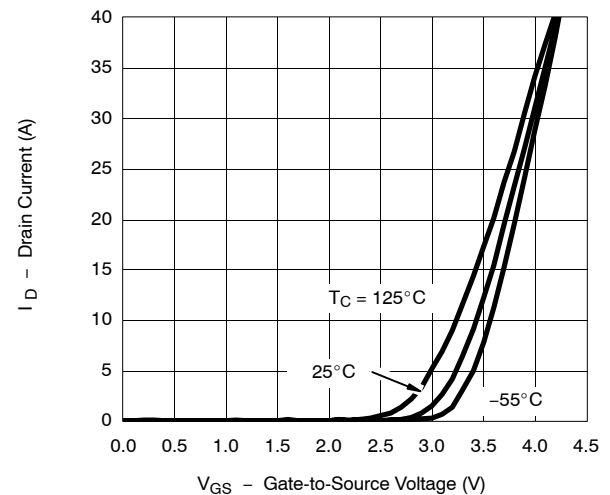
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Forward Voltage Drop	V_F	$I_F = 3\text{ A}$		0.485	0.53	V
		$I_F = 3\text{ A}, T_J = 125^\circ\text{C}$		0.42	0.42	
Maximum Reverse Leakage Current	I_{rm}	$V_r = 30\text{ V}$		0.008	0.100	mA
		$V_r = 30\text{ V}, T_J = 75^\circ\text{C}$		0.4	5	
		$V_r = -30\text{ V}, T_J = 125^\circ\text{C}$		6.5	20	
Junction Capacitance	C_T	$V_r = 15\text{ V}$		102		pF

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**CHANNEL-1**

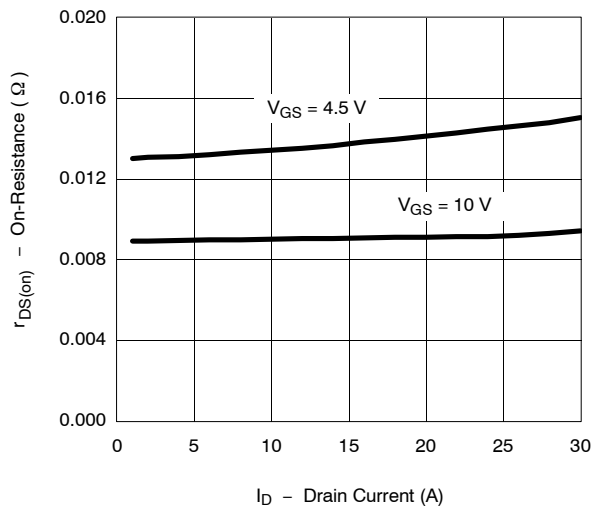
Output Characteristics



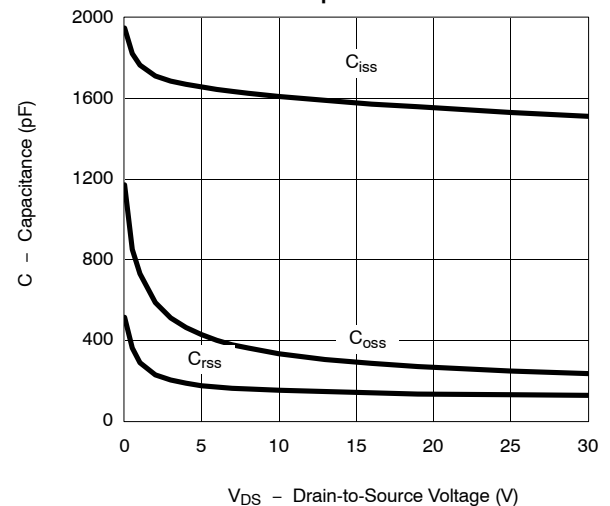
Transfer Characteristics



On-Resistance vs. Drain Current

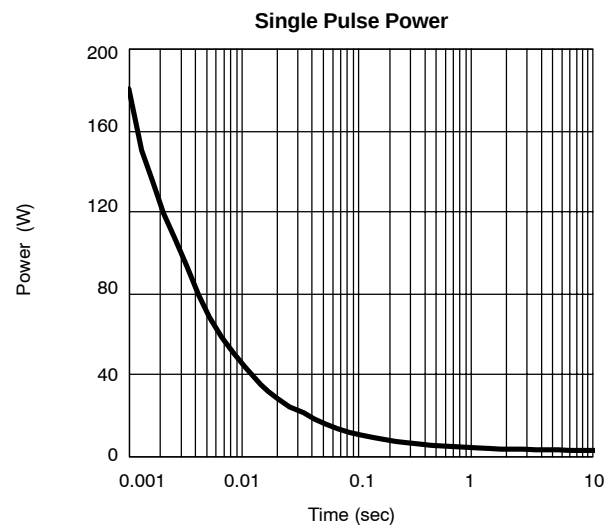
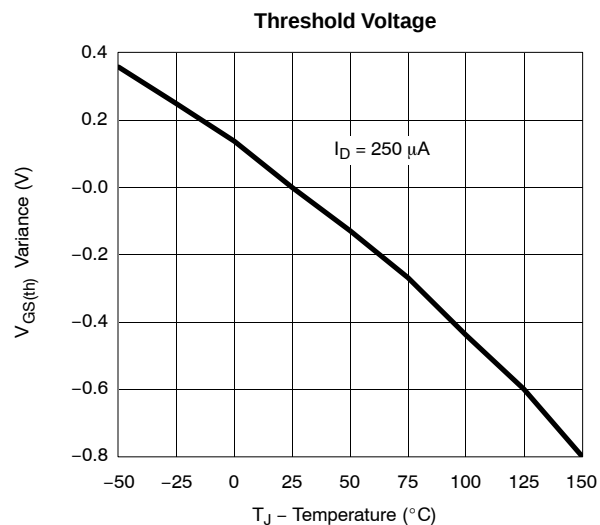
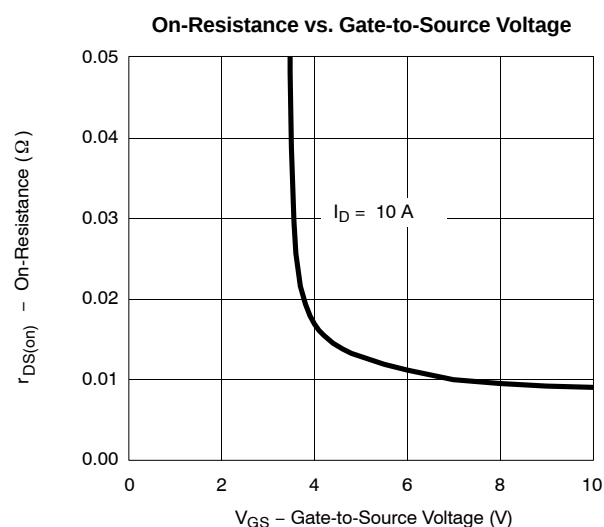
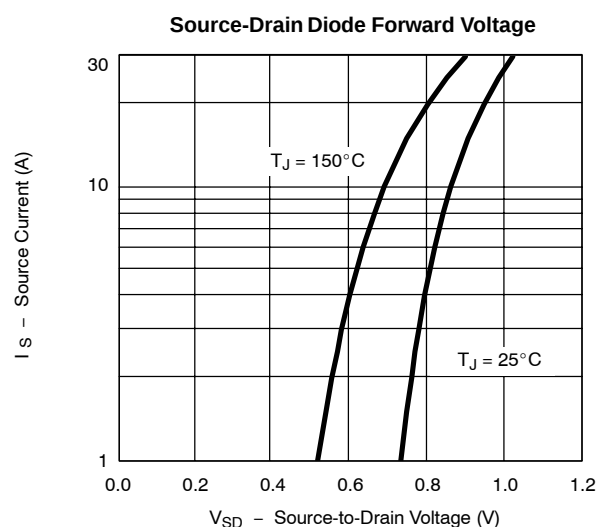
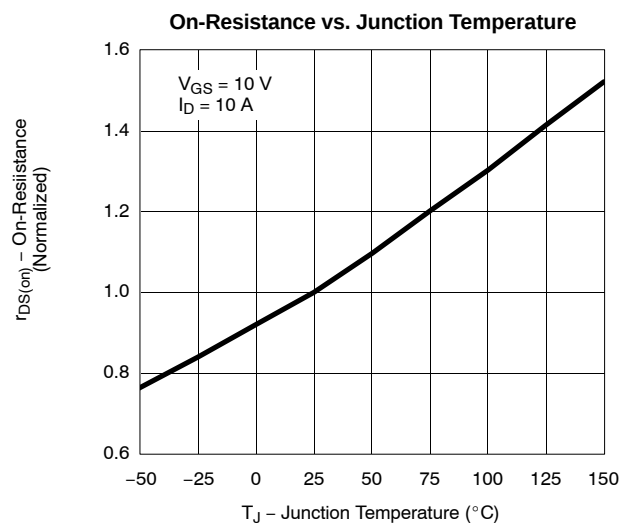
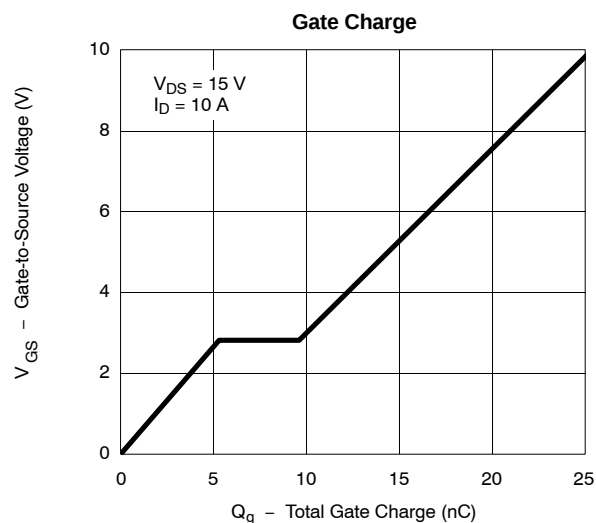


Capacitance



TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

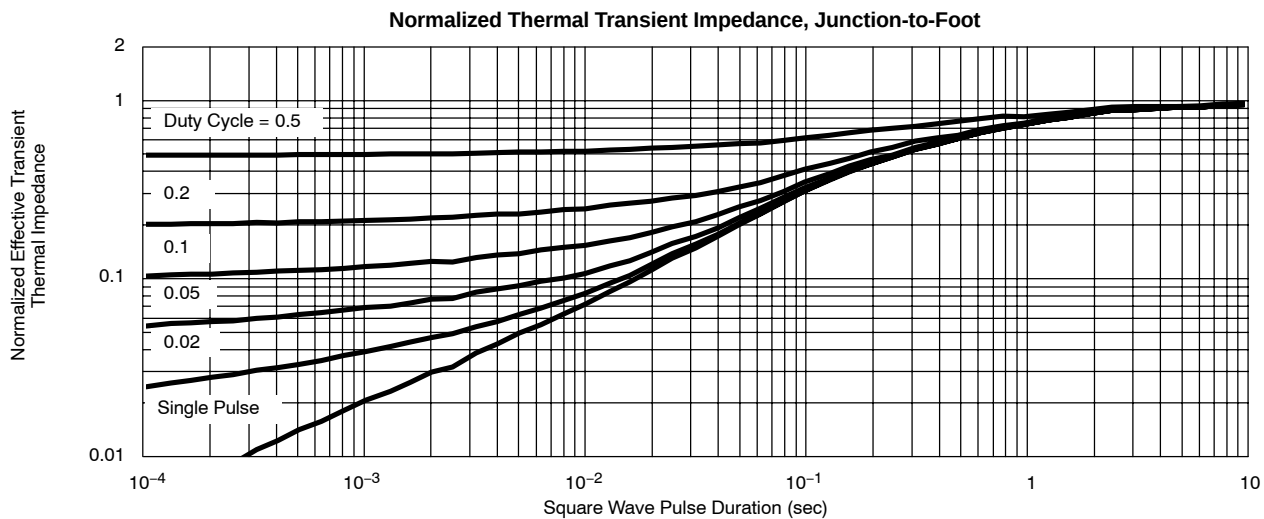
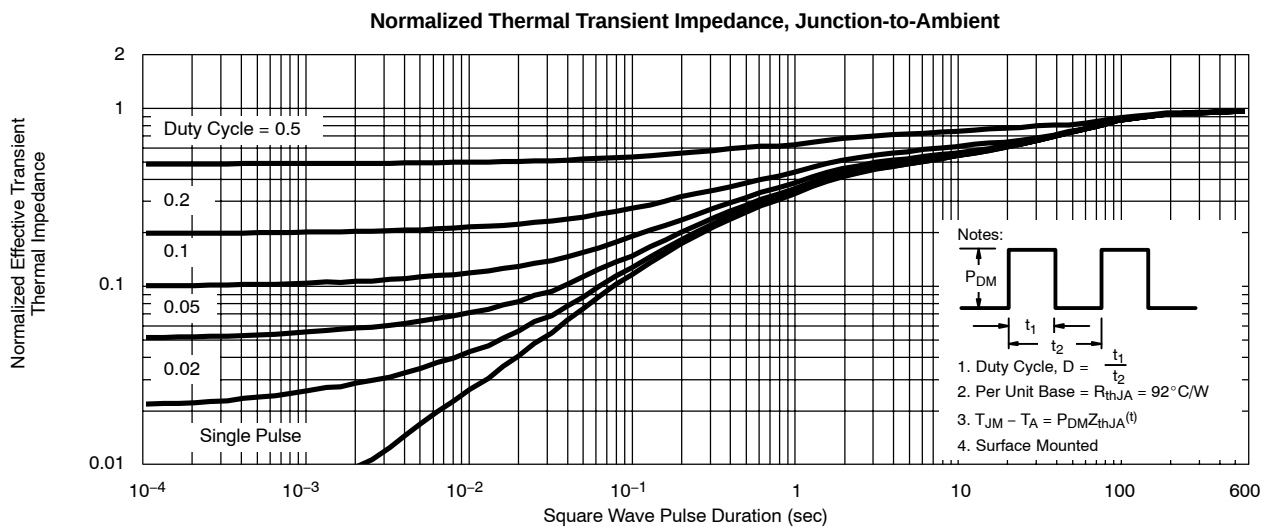
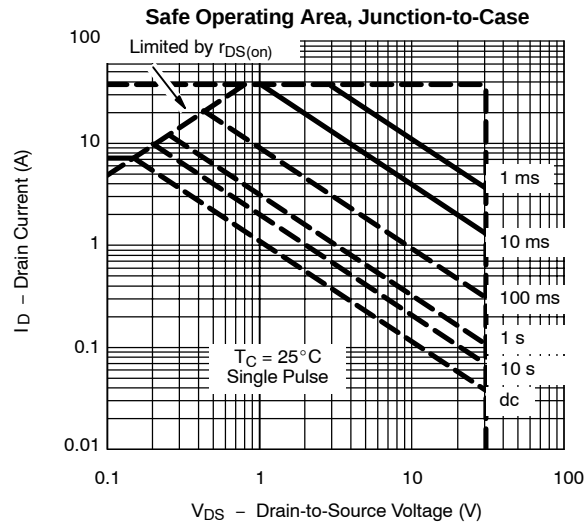
CHANNEL-1





TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

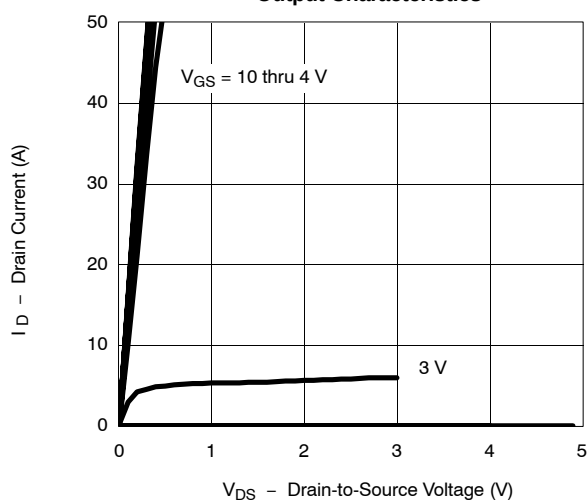
CHANNEL-1



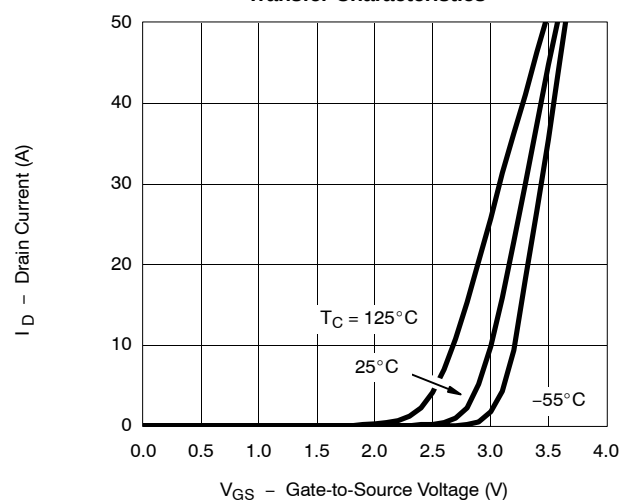
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

CHANNEL-2

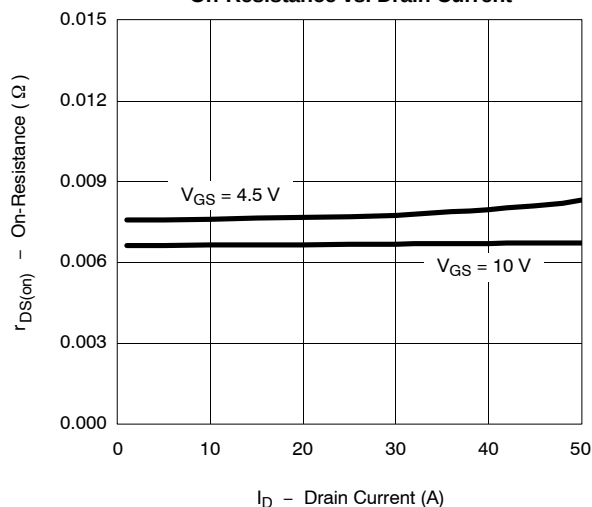
Output Characteristics



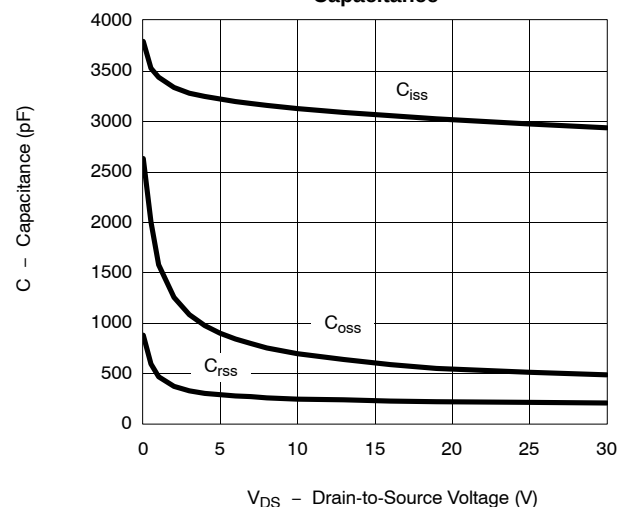
Transfer Characteristics



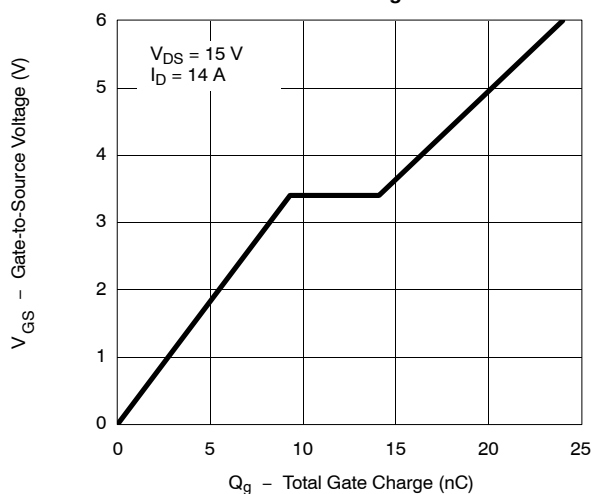
On-Resistance vs. Drain Current



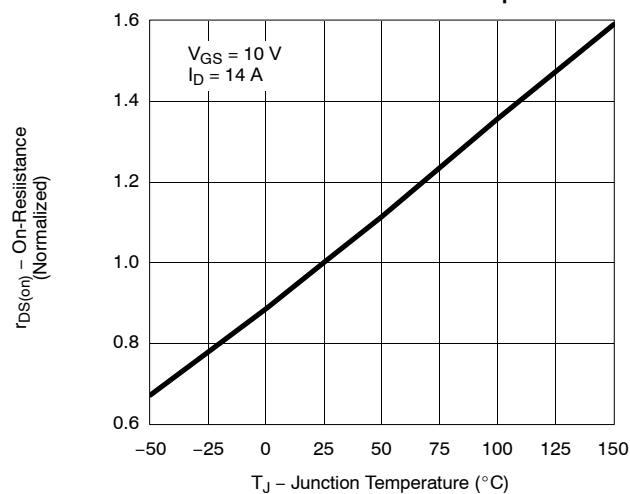
Capacitance



Gate Charge



On-Resistance vs. Junction Temperature

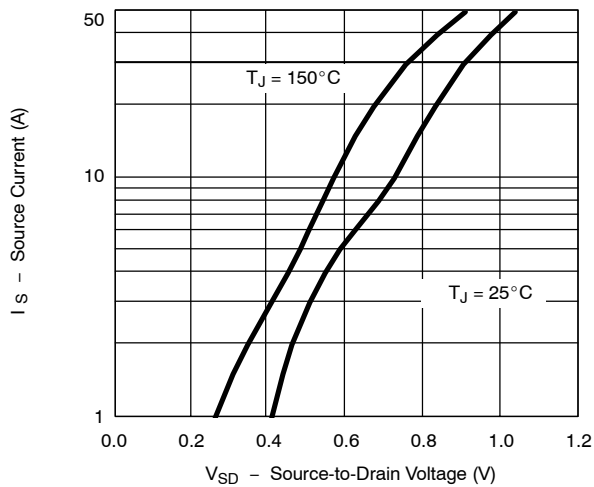




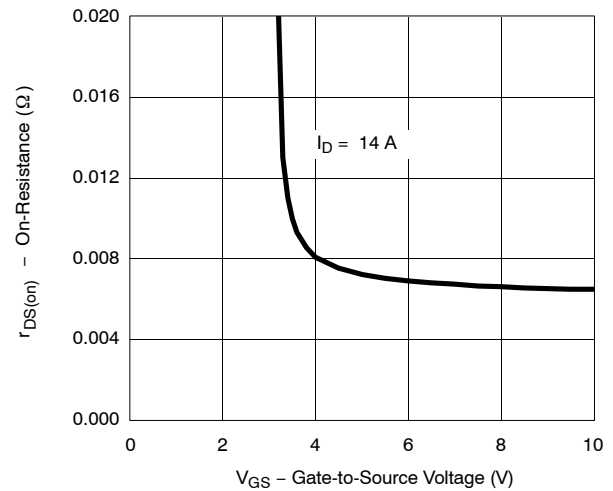
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

CHANNEL-2

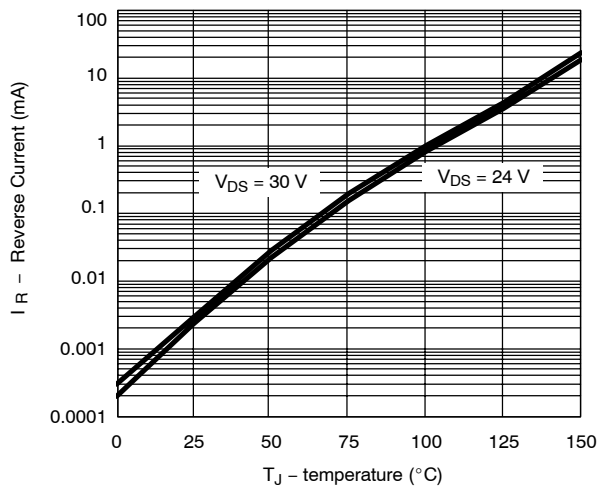
Source-Drain Diode Forward Voltage



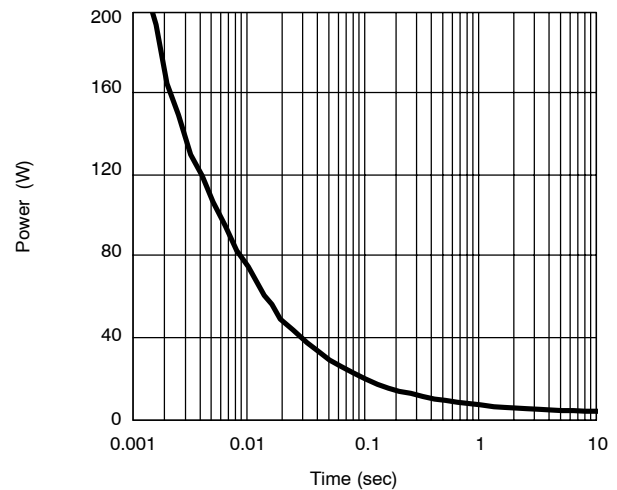
On-Resistance vs. Gate-to-Source Voltage



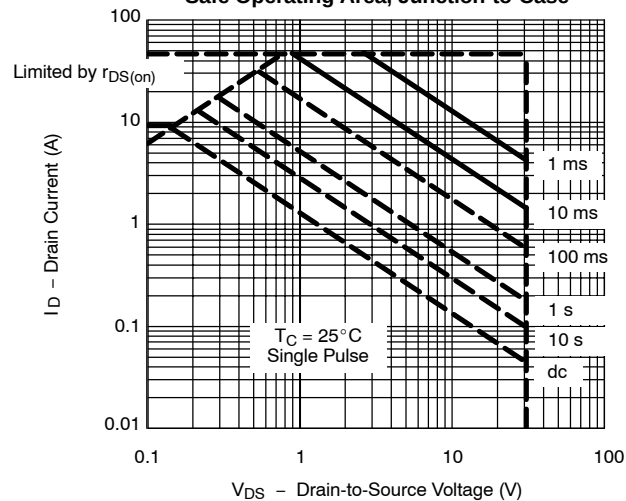
Reverse Current vs. Junction Temperature



Single Pulse Power

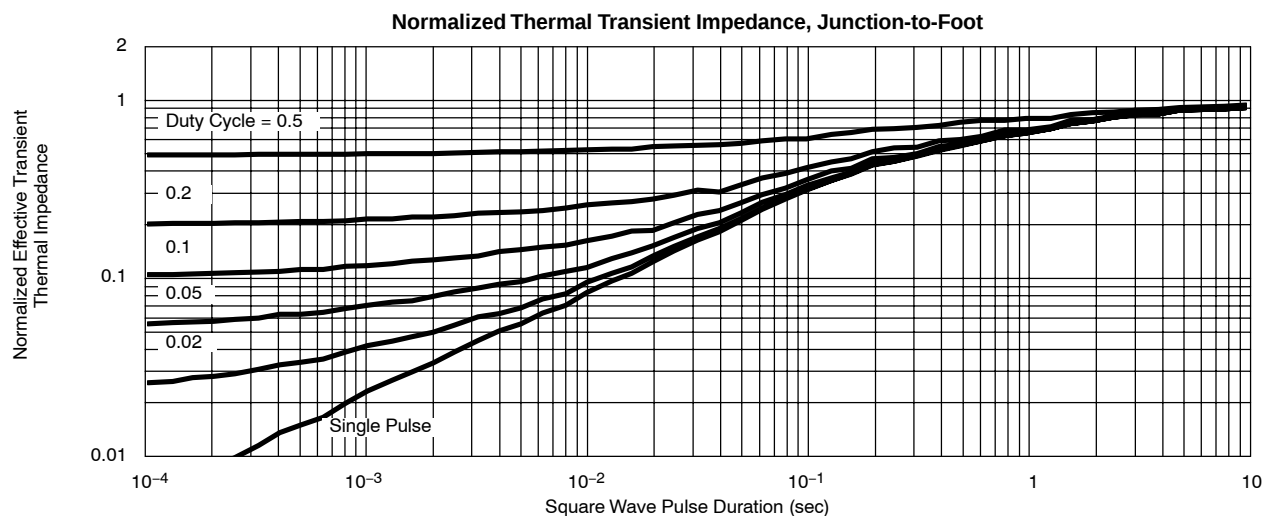
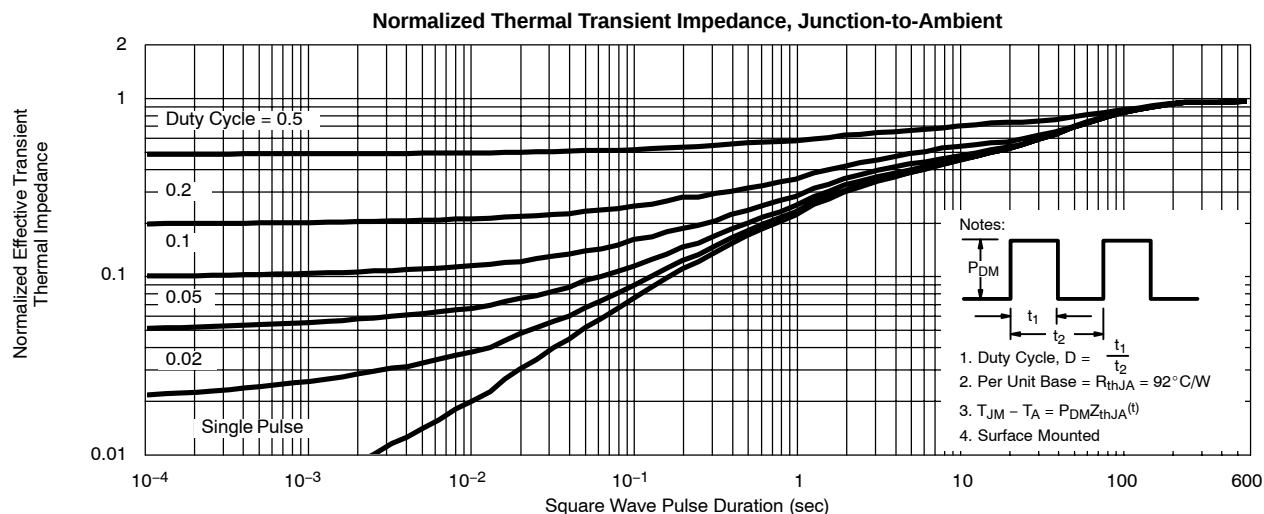


Safe Operating Area, Junction-to-Case



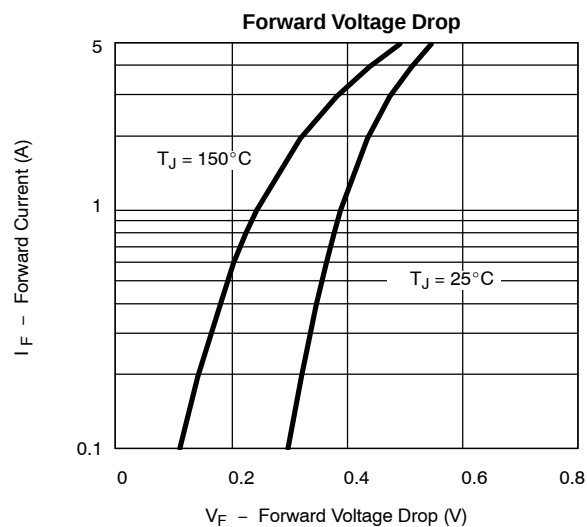
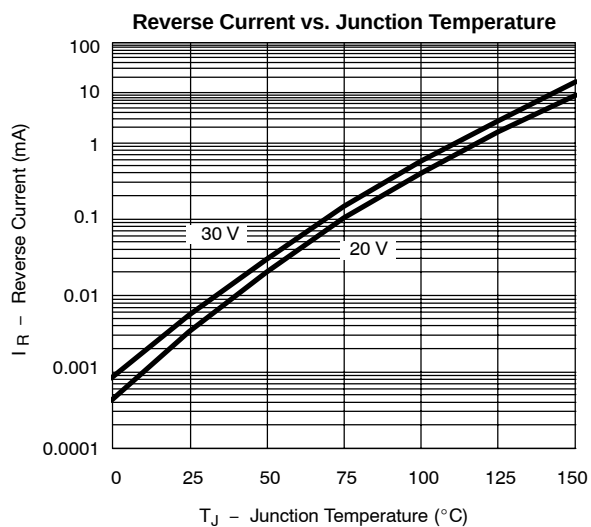
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

CHANNEL-2



TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

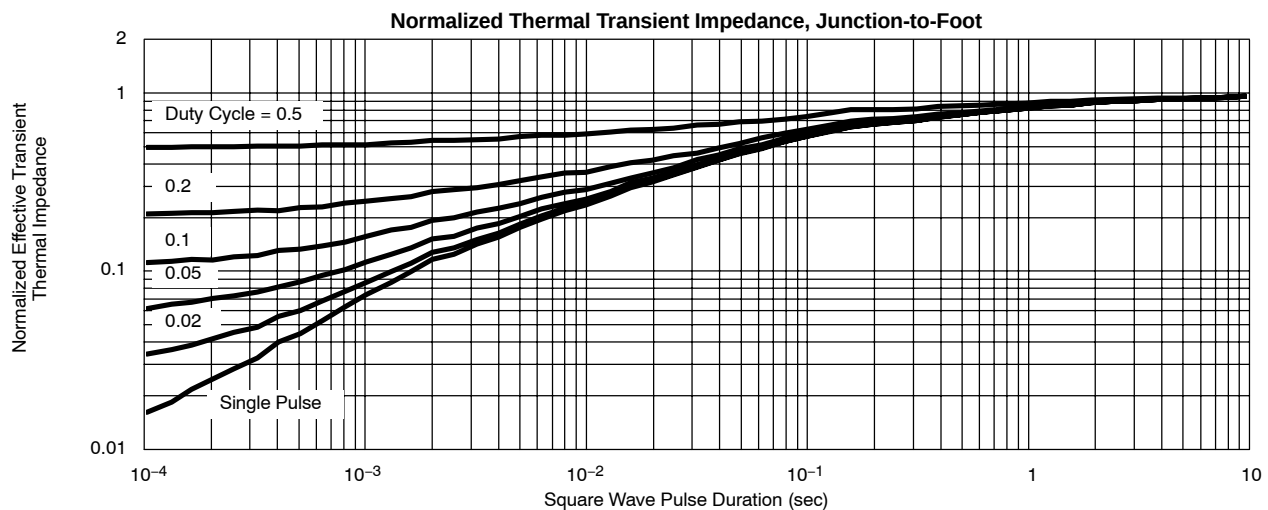
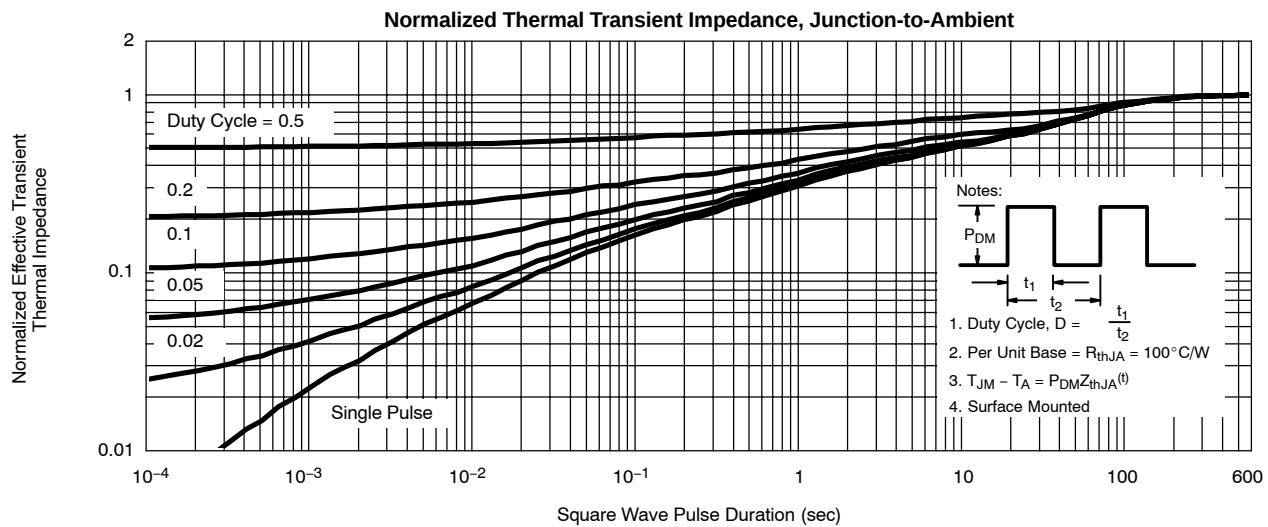
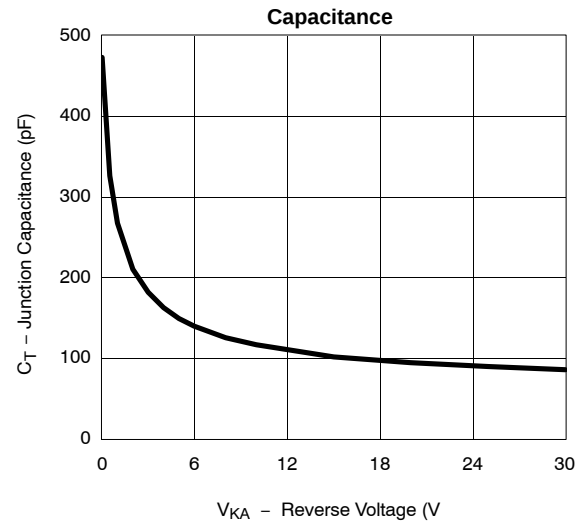
SCHOTTKY





TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

SCHOTTKY





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