

Complementary 20-V (D-S) MOSFET

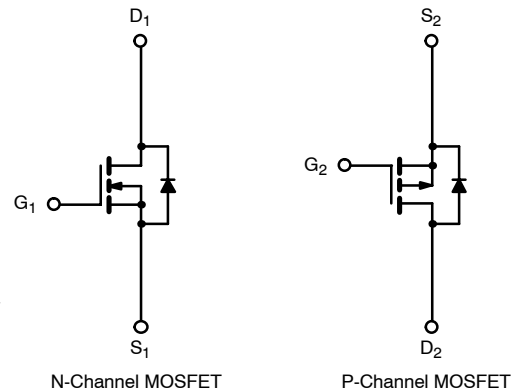
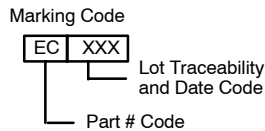
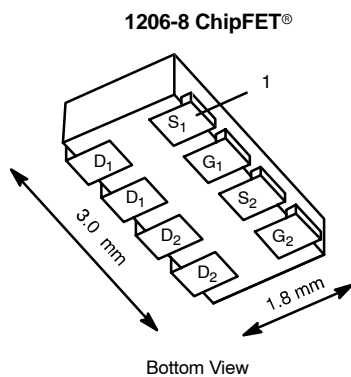
PRODUCT SUMMARY			
	V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A)
N-Channel	20	0.040 @ V _{GS} = 4.5 V	5.9
		0.045 @ V _{GS} = 2.5 V	5.6
		0.052 @ V _{GS} = 1.8 V	5.2
P-Channel	-20	0.086 @ V _{GS} = -4.5 V	-4.1
		0.121 @ V _{GS} = -2.5 V	-3.4
		0.171 @ V _{GS} = -1.8 V	-2.9

FEATURES

- TrenchFET® Power MOSFETS
- Ultra Low r_{DS(on)} and Excellent Power Handling In Compact Footprint

APPLICATIONS

- Load Switching for Portable Devices



Ordering Information: Si5515DC-T1—E3

ABSOLUTE MAXIMUM RATINGS (T _A = 25°C UNLESS OTHERWISE NOTED)							
Parameter	Symbol	N-Channel		P-Channel		Unit	
		5 secs	Steady State	5 secs	Steady State		
Drain-Source Voltage	V _{DS}	20		-20		V	
Gate-Source Voltage	V _{GS}	±8					
Continuous Drain Current (T _J = 150°C) ^a	I _D	T _A = 25°C	5.9	4.4	-4.1	-3	A
		T _A = 85°C	4.2	3.1	-2.9	-2.2	
Pulsed Drain Current	I _{DM}	20		-15			
Continuous Source Current (Diode Conduction) ^a	I _S	1.8	0.9	-1.8	-0.9		
Maximum Power Dissipation ^a	P _D	T _A = 25°C	2.1	1.1	2.1	1.1	W
		T _A = 85°C	1.1	0.6	1.1	0.6	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55 to 150					
Soldering Recommendations (Peak Temperature) ^{b, c}		260				°C	

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	t ≤ 5 sec	R _{thJA}	50	60	°C/W
	Steady State		90	110	
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	30	40	

Notes

- Surface Mounted on 1" x 1" FR4 Board.
- See Reliability Manual for profile. The ChipFET is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.
- Rework Conditions: manual soldering with a soldering iron is not recommended for leadless components.

SPECIFICATIONS (T _J = 25 °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 μA	N-Ch	0.4		1.0	V
		V _{DS} = V _{GS} , I _D = -250 μA	P-Ch	-0.4		-1.0	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±8 V	N-Ch			±100	nA
			P-Ch			±100	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V	N-Ch			1	μA
		V _{DS} = -20 V, V _{GS} = 0 V	P-Ch			-1	
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 85 °C	N-Ch			5	
		V _{DS} = -20 V, V _{GS} = 0 V, T _J = 85 °C	P-Ch			-5	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 4.5 V	N-Ch	20			A
		V _{DS} ≤ -5 V, V _{GS} = -4.5 V	P-Ch	-15			
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 4.5 V, I _D = 4.4 A	N-Ch		0.032	0.040	Ω
		V _{GS} = -4.5 V, I _D = -3.0 A	P-Ch		0.069	0.086	
		V _{GS} = 2.5 V, I _D = 4.1 A	N-Ch		0.036	0.045	
		V _{GS} = -2.5 V, I _D = -2.5 A	P-Ch		0.097	0.121	
		V _{GS} = 1.8 V, I _D = 1.9 A	N-Ch		0.042	0.052	
		V _{GS} = -1.8 V, I _D = -0.6 A	P-Ch		0.137	0.171	
Forward Transconductance ^a	g _{fs}	V _{DS} = 10 V, I _D = 4.4 A	N-Ch		22		S
		V _{DS} = -10 V, I _D = -3 A	P-Ch		8		
Diode Forward Voltage ^a	V _{SD}	I _S = 0.9 A, V _{GS} = 0 V	N-Ch		0.8	1.2	V
		I _S = -0.9 A, V _{GS} = 0 V	P-Ch		-0.8	-1.2	
Dynamic^b							
Total Gate Charge	Q _g	N-Channel V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 4.4 A P-Channel V _{DS} = -10 V, V _{GS} = -4.5 V, I _D = -3 A	N-Ch		5	7.5	nC
Gate-Source Charge	Q _{gs}		N-Ch		0.85		
Gate-Drain Charge	Q _{gd}		P-Ch		0.91		
Turn-On Delay Time	t _{d(on)}	N-Channel V _{DD} = 10 V, R _L = 10 Ω I _D ≅ 1 A, V _{GEN} = 4.5 V, R _G = 6 Ω P-Channel V _{DD} = -10 V, R _L = 10 Ω I _D ≅ -1 A, V _{GEN} = -4.5 V, R _G = 6 Ω	N-Ch		20	30	ns
			P-Ch		18	30	
Rise Time	t _r		N-Ch		36	55	
			P-Ch		32	50	
Turn-Off Delay Time	t _{d(off)}		N-Ch		30	45	
			P-Ch		42	65	
Fall Time	t _f	N-Ch		12	20		
		P-Ch		26	40		
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 0.9 A, di/dt = 100 A/μs	N-Ch		45	90	
		I _F = -0.9 A, di/dt = 100 A/μs	P-Ch		30	60	

Notes

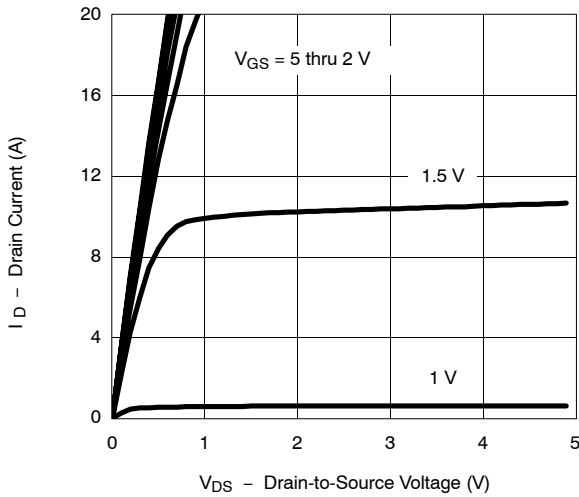
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%,
 b. Guaranteed by design, not subject to production testing.



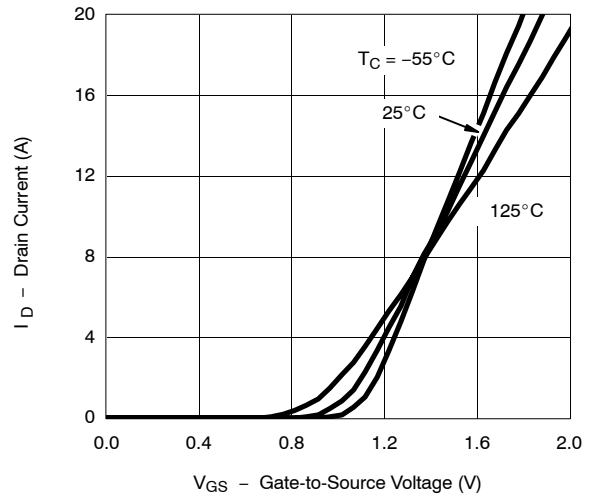
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

N-CHANNEL

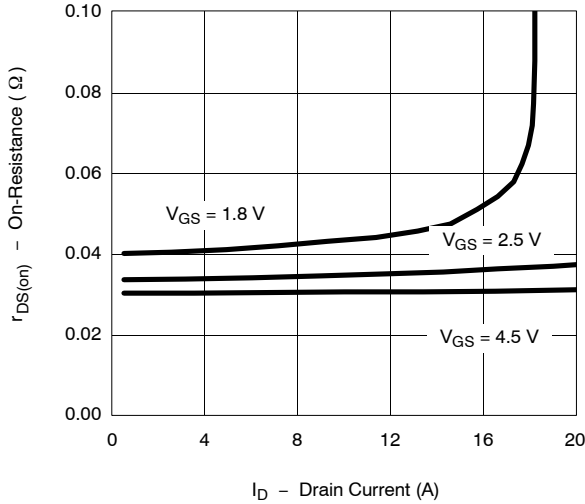
Output Characteristics



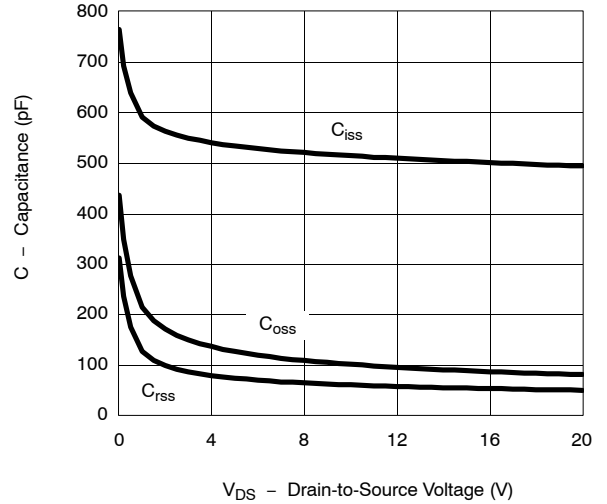
Transfer Characteristics



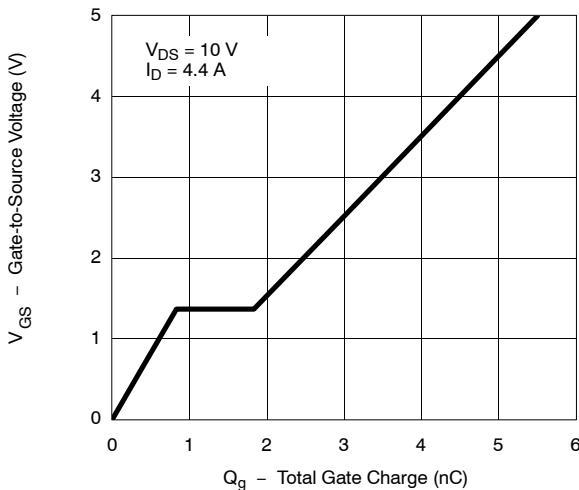
On-Resistance vs. Drain Current



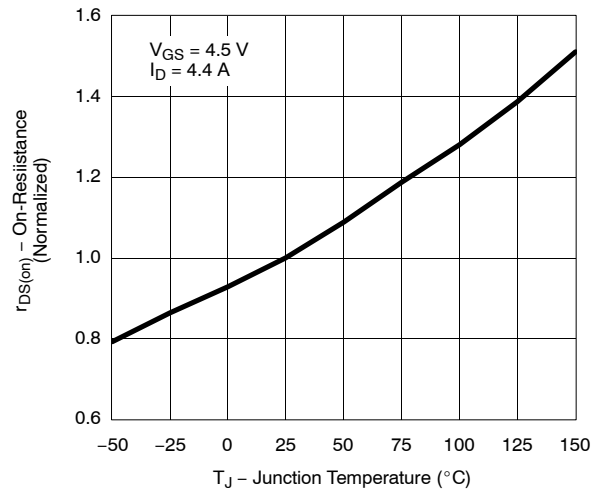
Capacitance



Gate Charge

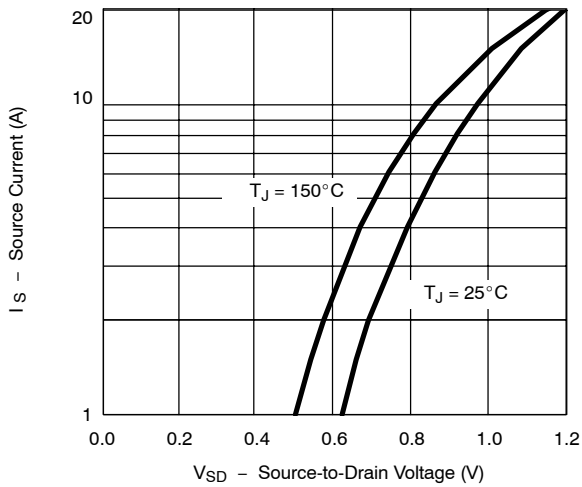


On-Resistance vs. Junction Temperature

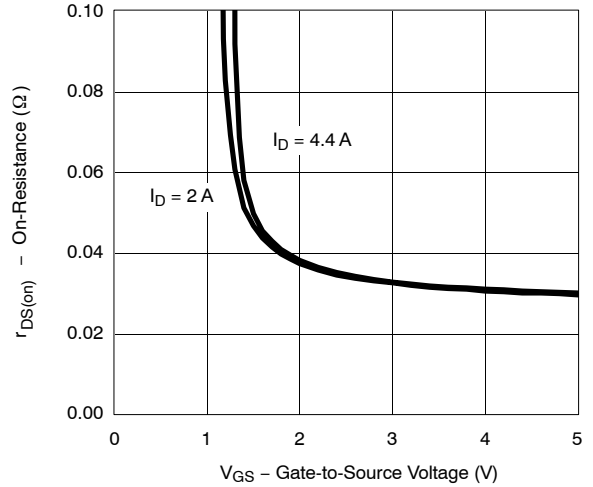


TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED) N-CHANNEL

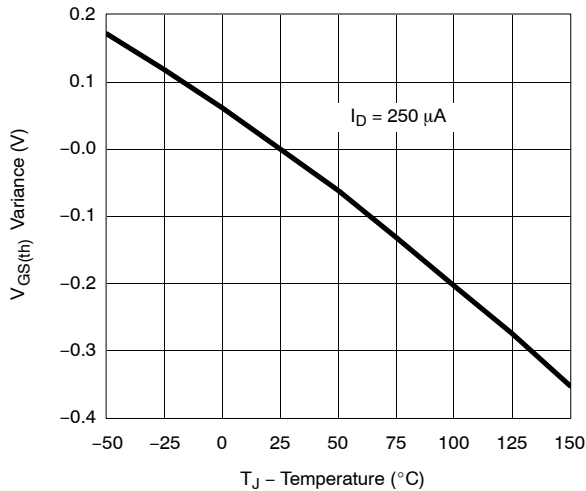
Source-Drain Diode Forward Voltage



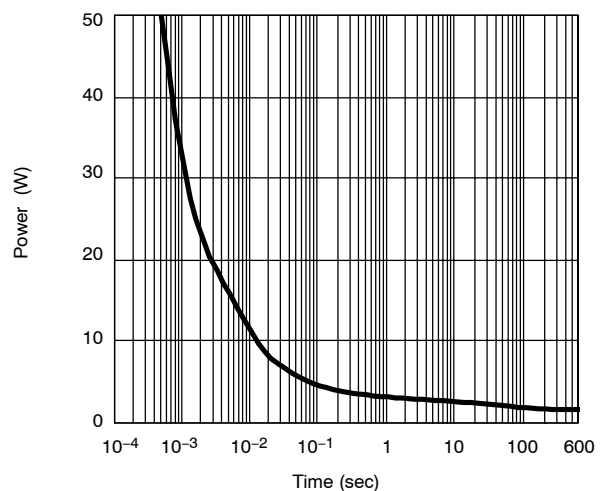
On-Resistance vs. Gate-to-Source Voltage



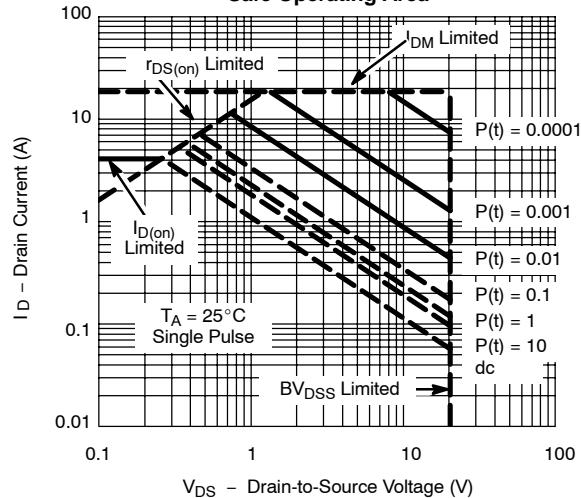
Threshold Voltage



Single Pulse Power



Safe Operating Area

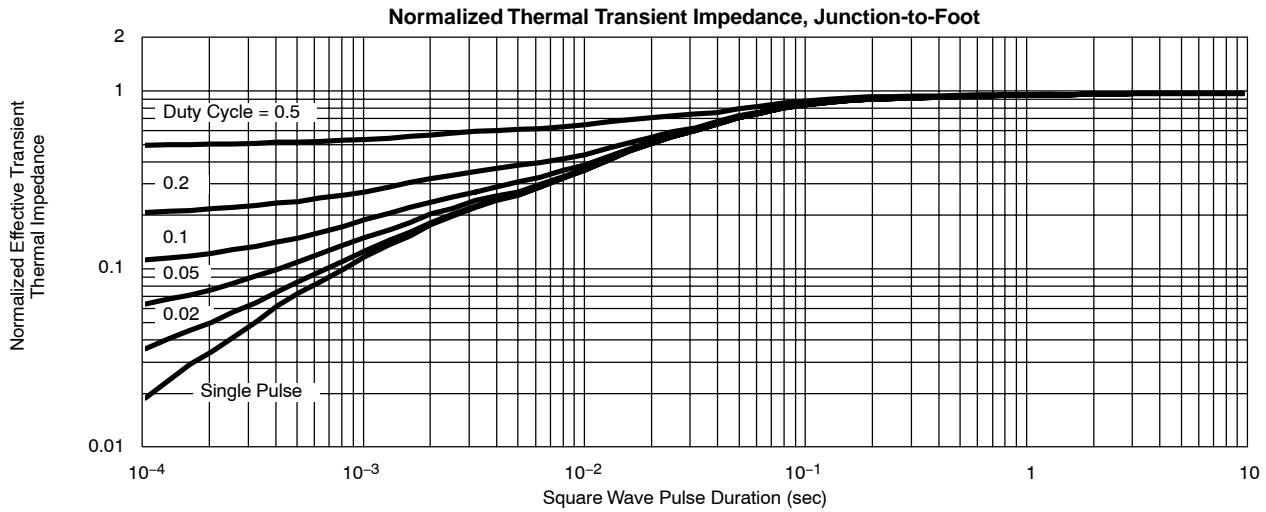
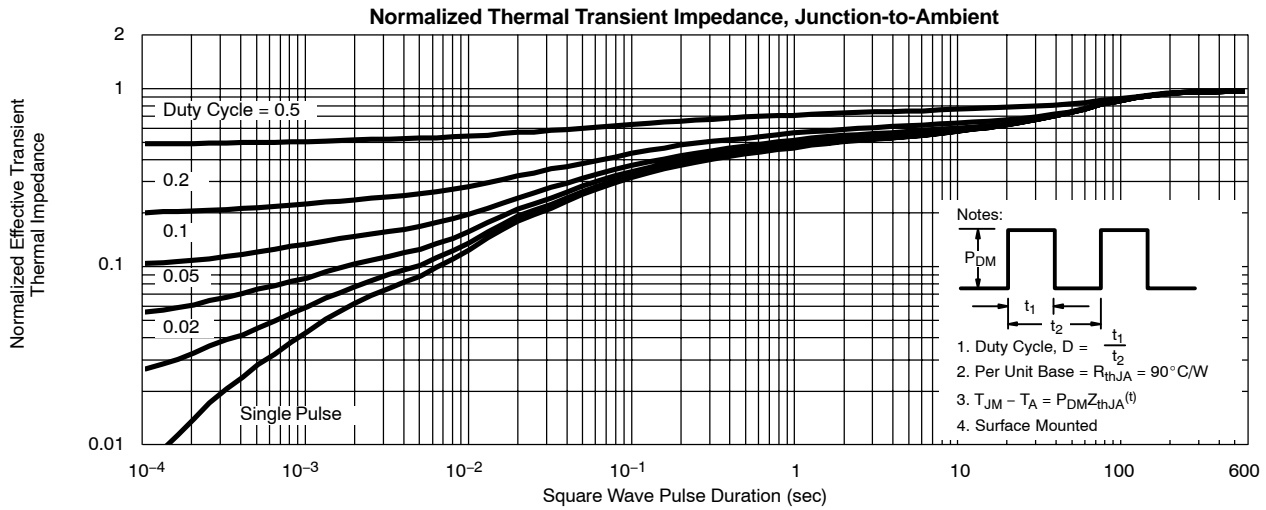


1000



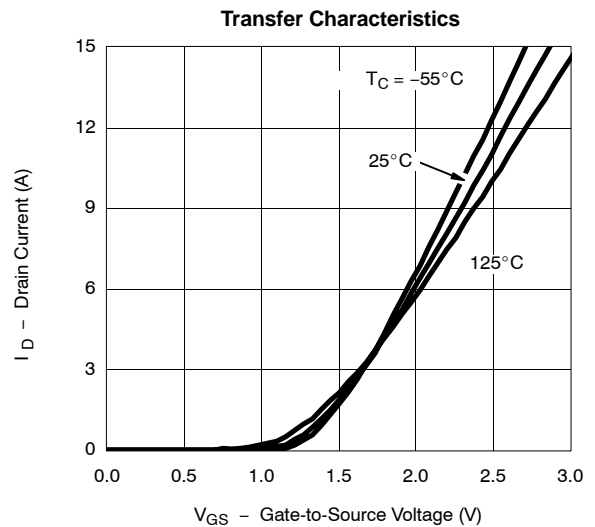
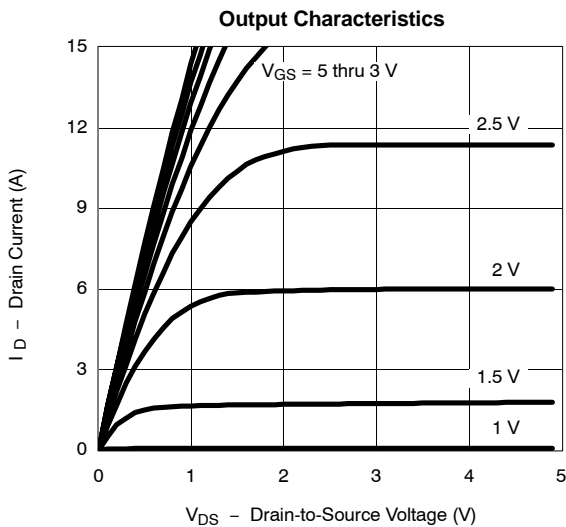
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

N-CHANNEL



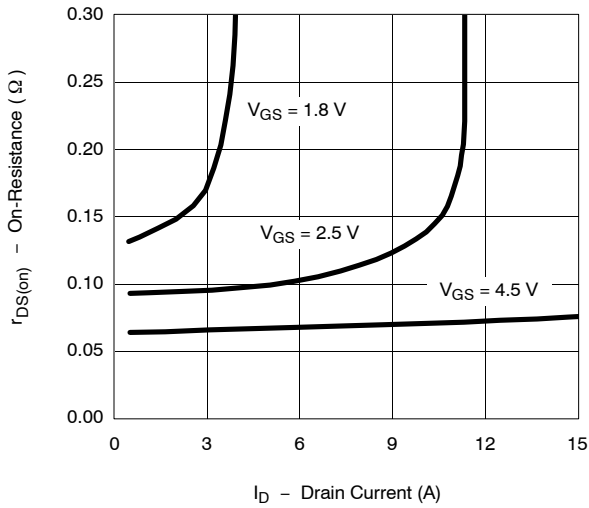
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

P-CHANNEL

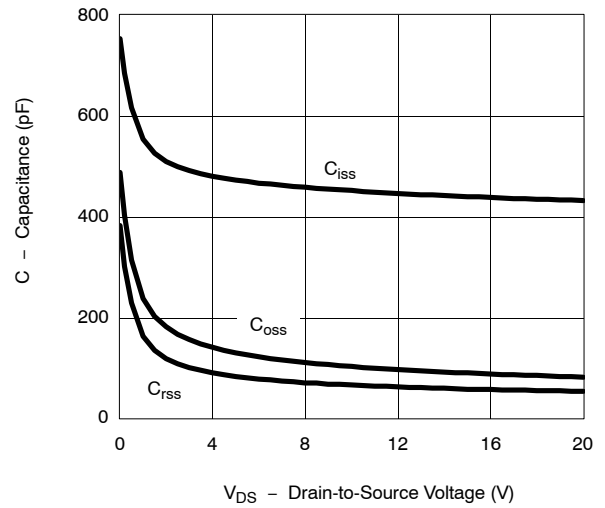


TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED) P-CHANNEL

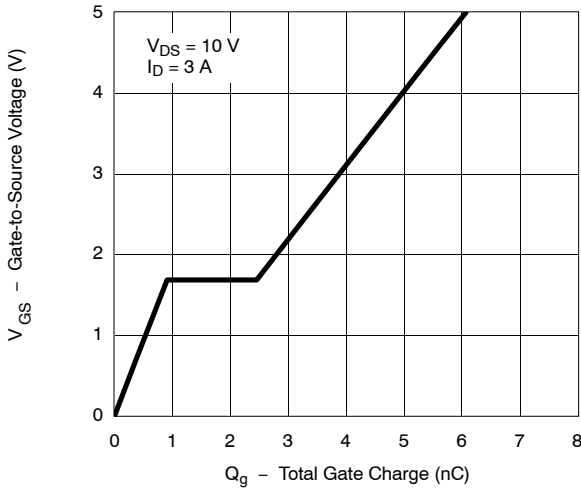
On-Resistance vs. Drain Current



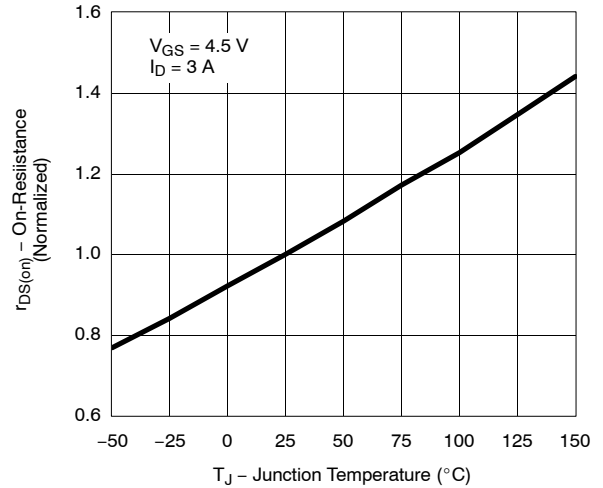
Capacitance



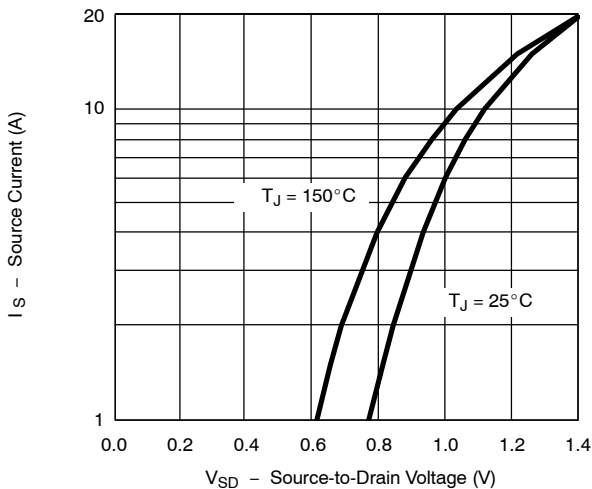
Gate Charge



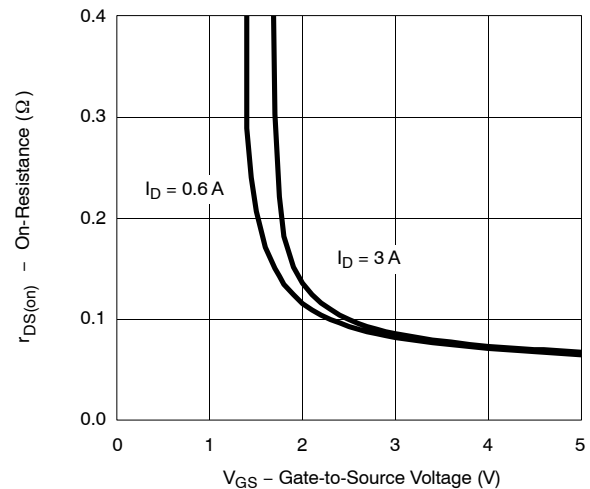
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

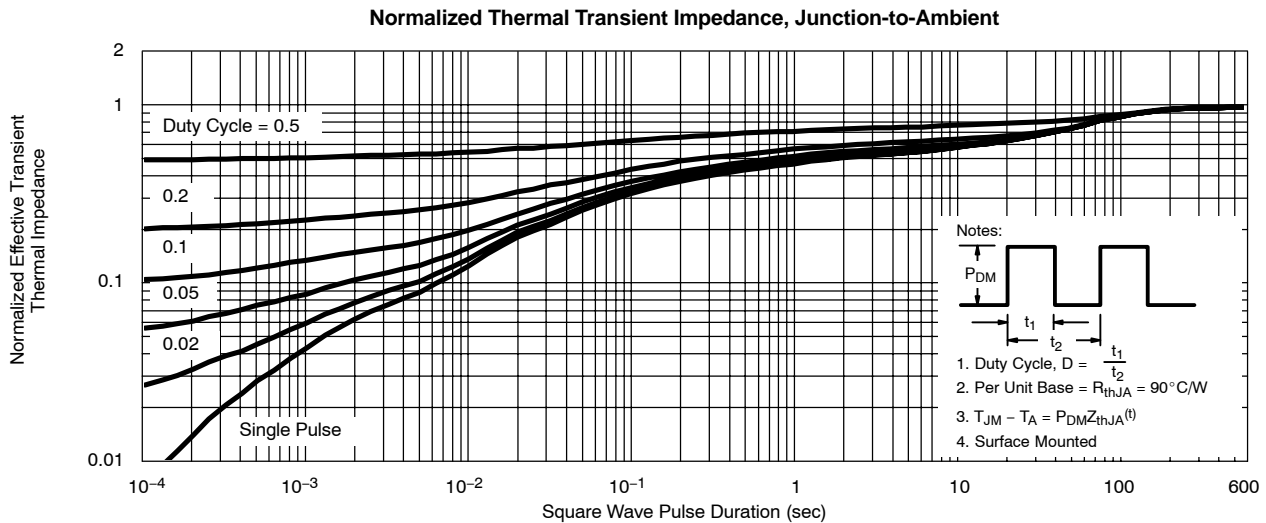
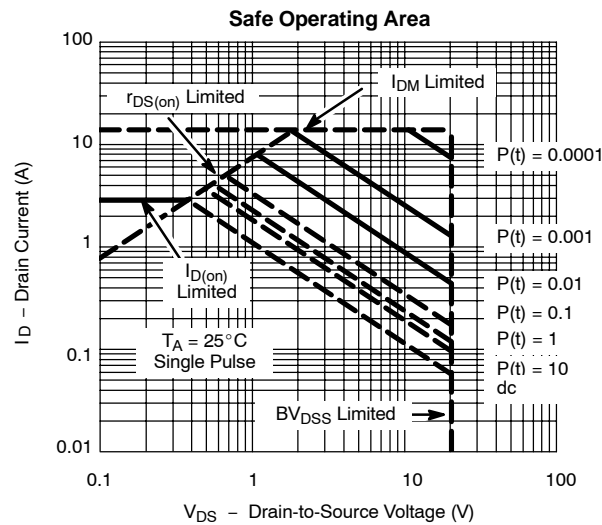
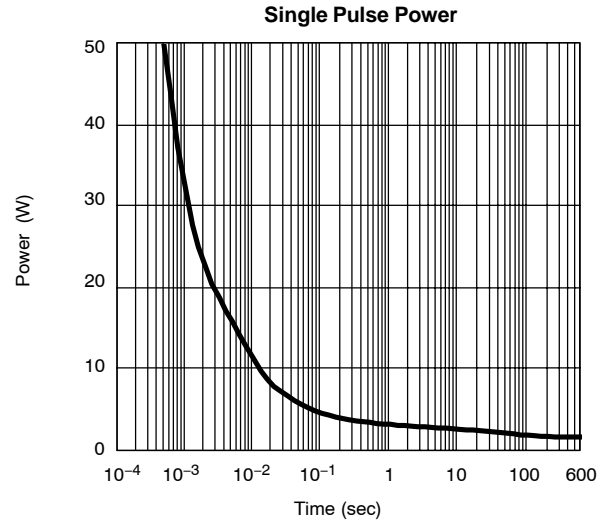
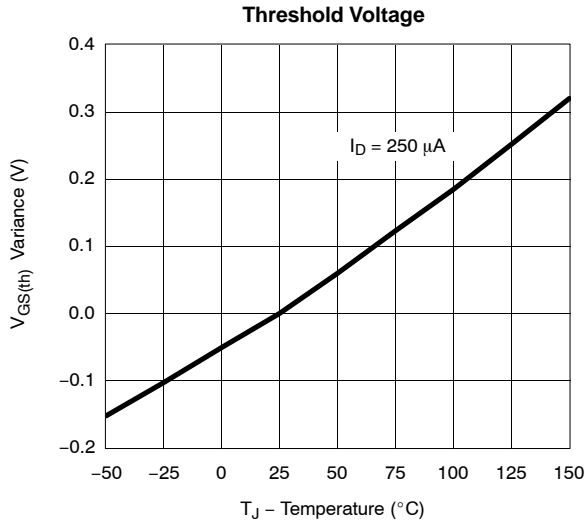


On-Resistance vs. Gate-to-Source Voltage



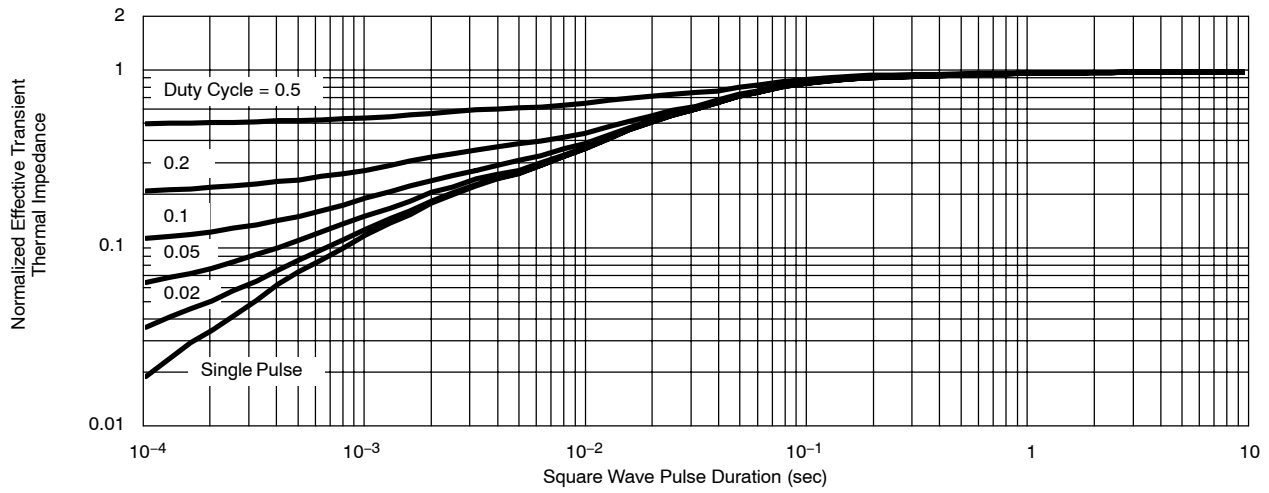
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

P-CHANNEL



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

Normalized Thermal Transient Impedance, Junction-to-Foot





Notice

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.