

## Complementary 2.5 V (G-S) MOSFET

### PRODUCT SUMMARY

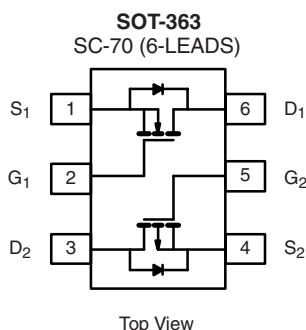
	V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)
N-Channel	20	0.385 at V <sub>GS</sub> = 4.5 V	± 0.70
		0.630 at V <sub>GS</sub> = 2.5 V	± 0.54
P-Channel	- 20	0.995 at V <sub>GS</sub> = - 4.5 V	± 0.44
		1.800 at V <sub>GS</sub> = - 2.5 V	± 0.32

### FEATURES

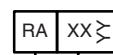
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- Compliant to RoHS Directive 2002/95/EC



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
Available



Marking Code



Lot Traceability  
and Date Code

Part # Code

**Ordering Information:** Si1553DL-T1-E3 (Lead (Pb)-free)  
Si1553DL-T1-GE3 (Lead (Pb)-free and Halogen-free)

### ABSOLUTE MAXIMUM RATINGS T<sub>A</sub> = 25 °C, unless otherwise noted

Parameter		Symbol	N-Channel		P-Channel		Unit
			5 s	Steady State	5 s	Steady State	
Drain-Source Voltage		V <sub>DS</sub>	20		- 20		V
Gate-Source Voltage		V <sub>GS</sub>	± 12				
Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a</sup>	T <sub>A</sub> = 25 °C	I <sub>D</sub>	± 0.70	± 0.66	± 0.44	± 0.41	A
	T <sub>A</sub> = 85 °C		± 0.50	± 0.48	± 0.31	± 0.30	
Pulsed Drain Current		I <sub>DM</sub>	± 1				
Continuous Source Current (Diode Conduction) <sup>a</sup>		I <sub>S</sub>	0.25	0.23	- 0.25	- 0.23	
Maximum Power Dissipation <sup>a</sup>	T <sub>A</sub> = 25 °C	P <sub>D</sub>	0.30	0.27	0.30	0.27	W
	T <sub>A</sub> = 85 °C		0.16	0.14	0.16	0.14	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150				°C

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a</sup>	R <sub>thJA</sub>	360	415	°C/W
		400	460	
Maximum Junction-to-Foot (Drain)	R <sub>thJF</sub>	300	350	

Notes:

a. Surface mounted on 1" x 1" FR4 board.

SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted							
Parameter	Symbol	Test Conditions		Min.	Typ.	Max.	Unit
Static							
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	N-Ch	0.6			V
		$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	P-Ch	- 0.6			
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 12\text{ V}$	N-Ch P-Ch			$\pm 100$ $\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 16\text{ V}, V_{GS} = 0\text{ V}$	N-Ch			1	$\mu\text{A}$
		$V_{DS} = -16\text{ V}, V_{GS} = 0\text{ V}$	P-Ch			- 1	
		$V_{DS} = 16\text{ V}, V_{GS} = 0\text{ V}, T_J = 85\text{ }^{\circ}\text{C}$	N-Ch			5	
		$V_{DS} = -16\text{ V}, V_{GS} = 0\text{ V}, T_J = 85\text{ }^{\circ}\text{C}$	P-Ch			- 5	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 4.5\text{ V}$	N-Ch	1			A
		$V_{DS} \leq -5\text{ V}, V_{GS} = -4.5\text{ V}$	P-Ch	- 1			
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}, I_D = 0.66\text{ A}$	N-Ch		0.320	0.385	$\Omega$
		$V_{GS} = -4.5\text{ V}, I_D = -0.41\text{ A}$	P-Ch		0.850	0.995	
		$V_{GS} = 2.5\text{ V}, I_D = 0.40\text{ A}$	N-Ch		0.560	0.630	
		$V_{GS} = -2.5\text{ V}, I_D = -0.25\text{ A}$	P-Ch		1.400	1.800	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 10\text{ V}, I_D = 0.66\text{ A}$	N-Ch		1.5		S
		$V_{DS} = -10\text{ V}, I_D = -0.41\text{ A}$	P-Ch		0.8		
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = 0.23\text{ A}, V_{GS} = 0\text{ V}$	N-Ch		0.8	1.2	V
		$I_S = -0.23\text{ A}, V_{GS} = 0\text{ V}$	P-Ch		- 0.8	- 1.2	
Dynamic <sup>b</sup>							
Total Gate Charge	$Q_g$	N-Channel $V_{DS} = 10\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 0.66\text{ A}$	N-Ch P-Ch		0.8 1.2	1.2 1.8	nC
Gate-Source Charge	$Q_{gs}$		N-Ch P-Ch		0.06 0.45		
Gate-Drain Charge	$Q_{gd}$	P-Channel $V_{DS} = -10\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -0.41\text{ A}$	N-Ch P-Ch		0.30 0.25		
Turn-On Delay Time	$t_{d(on)}$	N-Channel $V_{DD} = 10\text{ V}, R_L = 20\text{ }\Omega$ $I_D \cong 0.5\text{ A}, V_{GEN} = 4.5\text{ V}, R_g = 6\text{ }\Omega$	N-Ch P-Ch		10 7.5	20 15	ns
Rise Time	$t_r$		N-Ch P-Ch		16 20	30 40	
Turn-Off Delay Time	$t_{d(off)}$	P-Channel $V_{DD} = -10\text{ V}, R_L = 20\text{ }\Omega$ $I_D \cong -0.5\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 6\text{ }\Omega$	N-Ch P-Ch		10 8.5	20 17	
Fall Time	$t_f$		N-Ch P-Ch		10 12	20 24	
Source-Drain Reverse Recovery Time	$t_{rr}$		$I_F = 0.23\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}$	N-Ch		20	
		$I_F = -0.23\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}$	P-Ch		25	40	

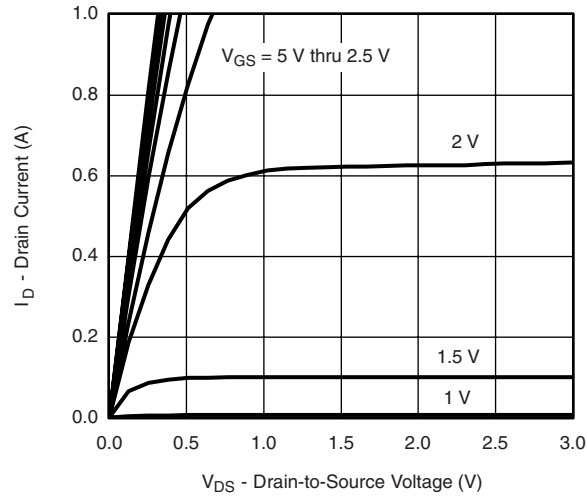
Notes:

a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

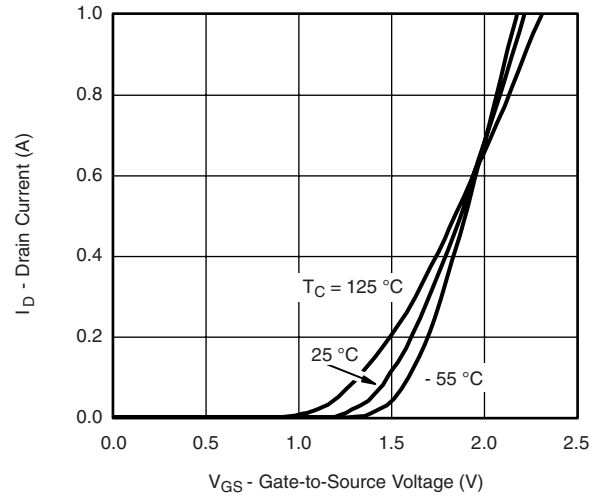
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

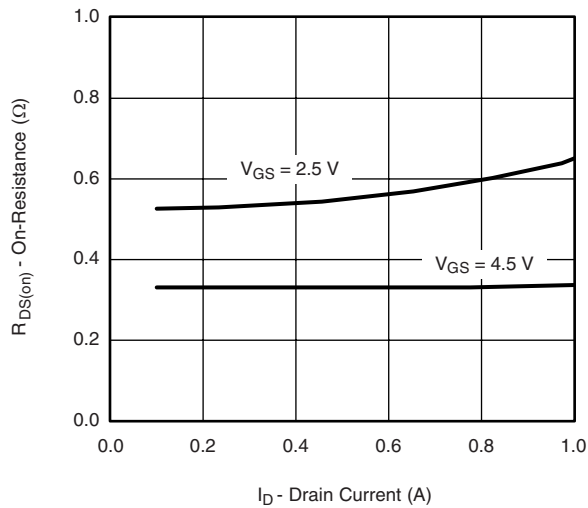
## N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



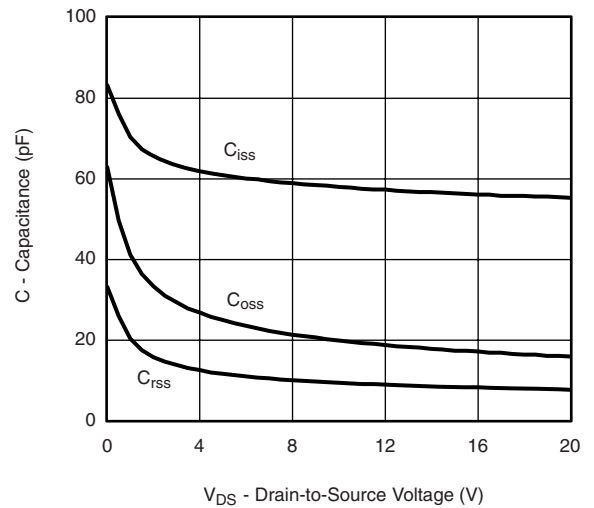
Output Characteristics



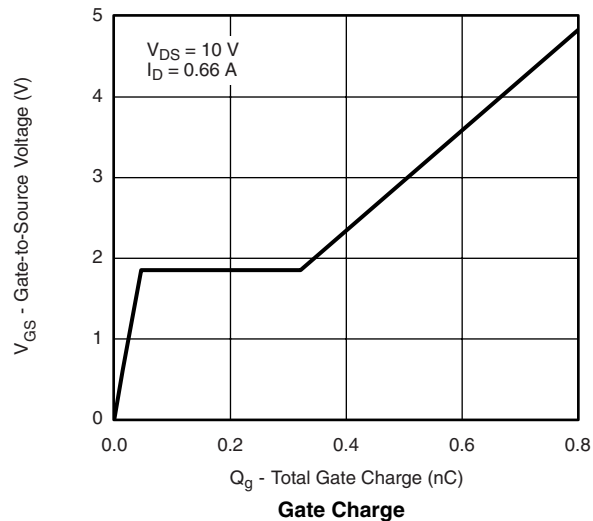
Transfer Characteristics



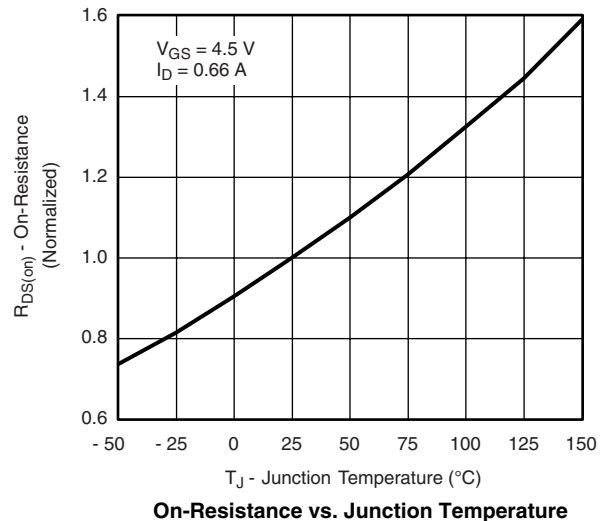
On-Resistance vs. Drain Current



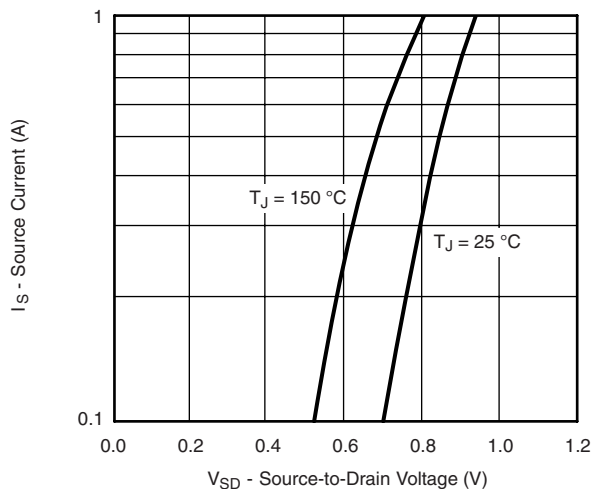
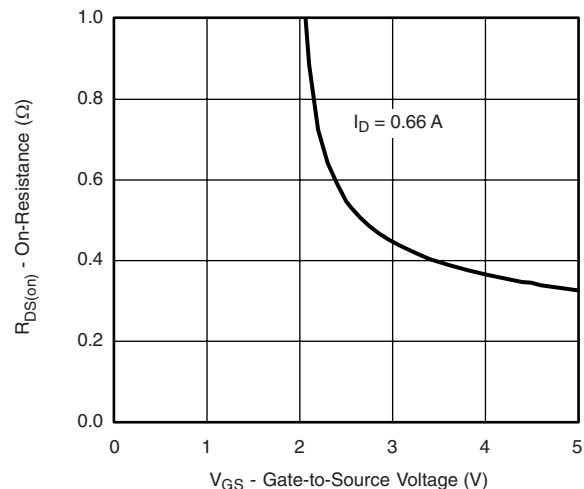
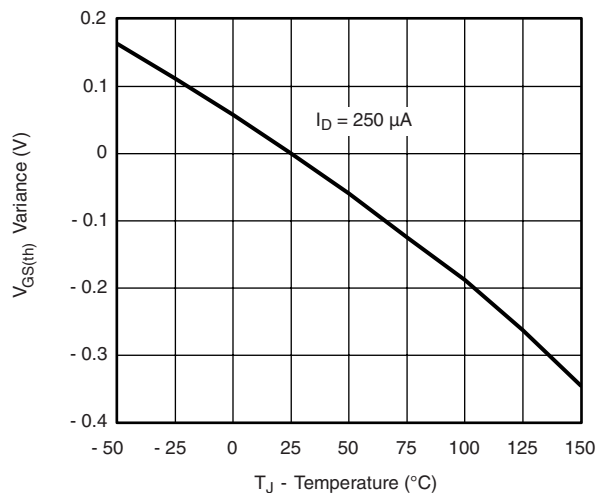
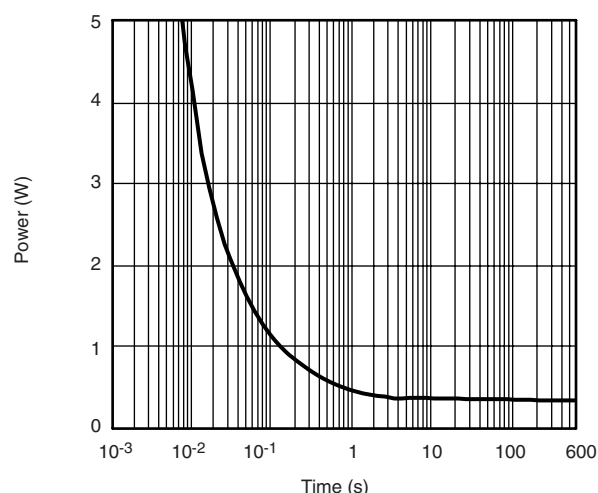
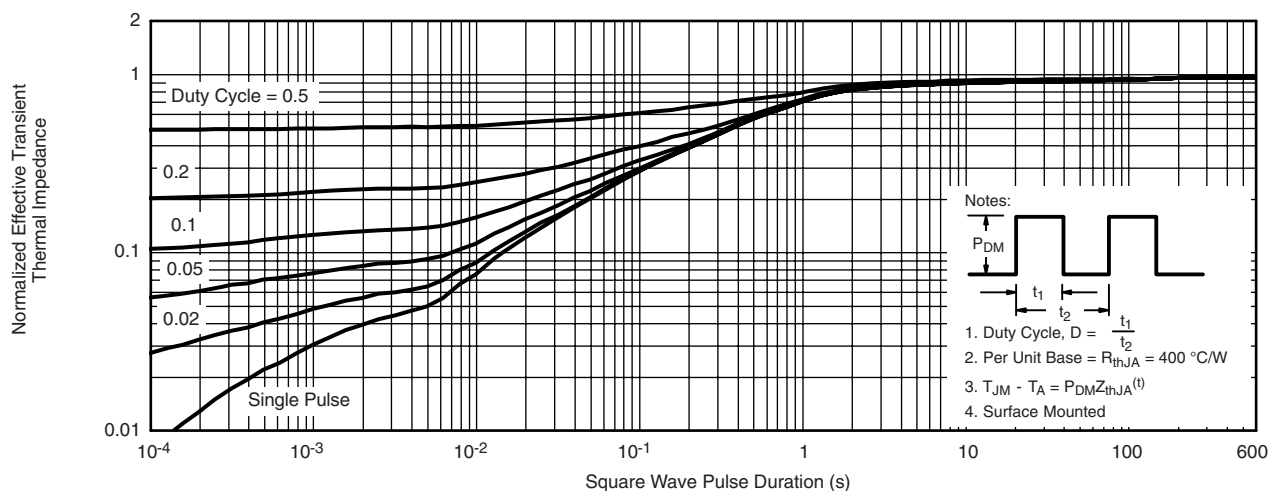
Capacitance



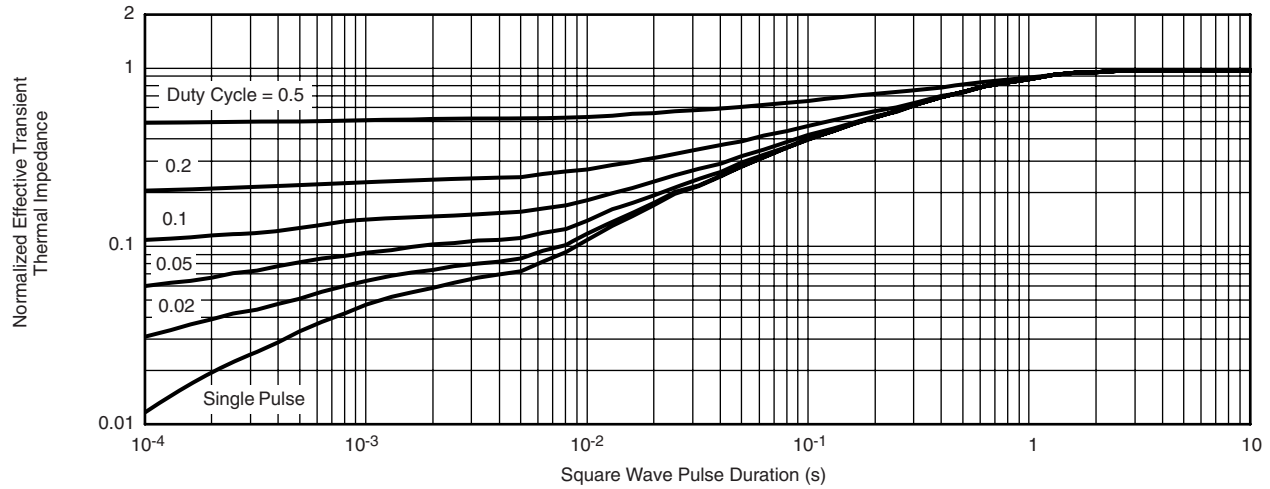
Gate Charge



On-Resistance vs. Junction Temperature

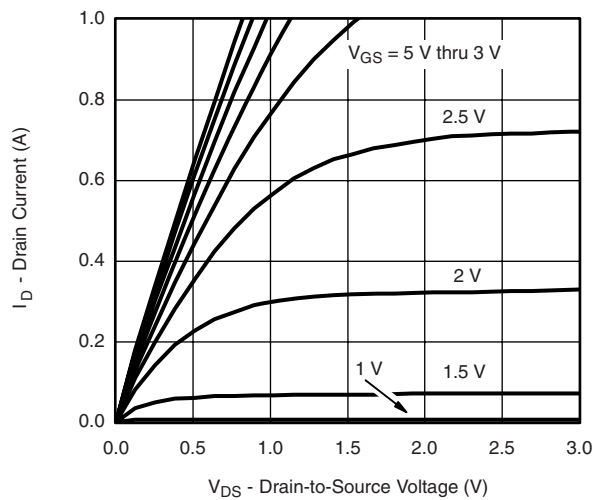
**N-CHANNEL TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted**Source-Drain Diode Forward Voltage****On-Resistance vs. Gate-to-Source Voltage****Threshold Voltage****Single Pulse Power****Normalized Thermal Transient Impedance, Junction-to-Ambient**

## N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

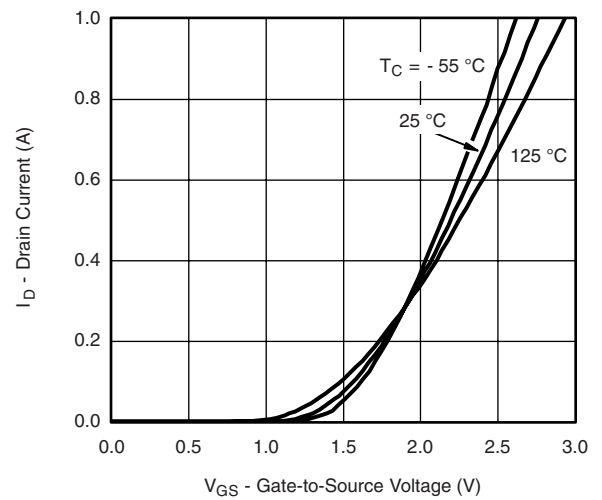


Normalized Thermal Transient Impedance, Junction-to-Foot

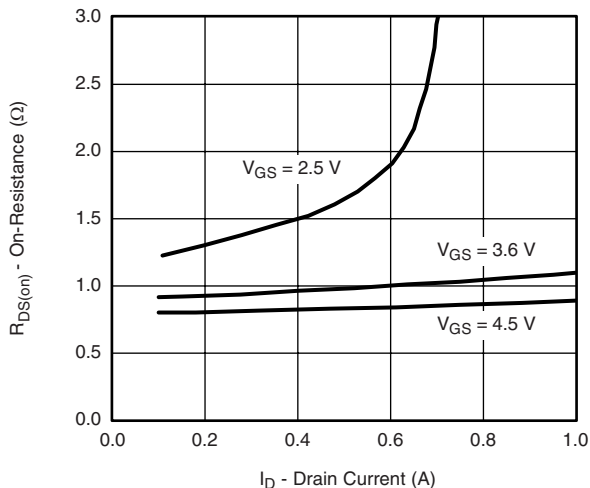
## P-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



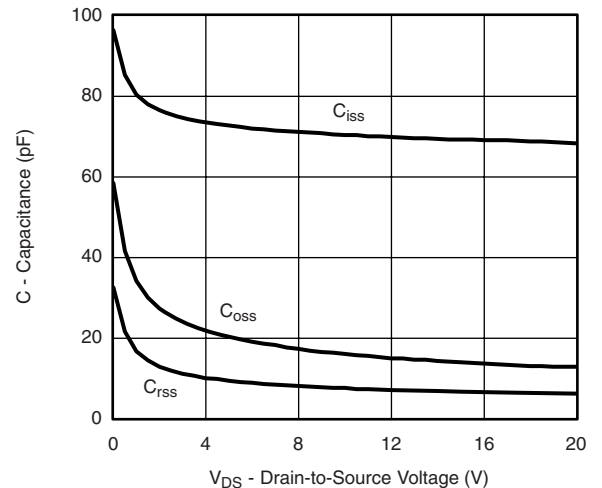
Output Characteristics



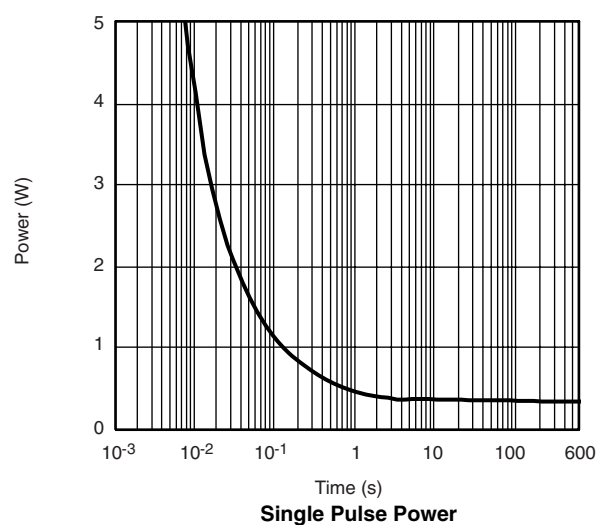
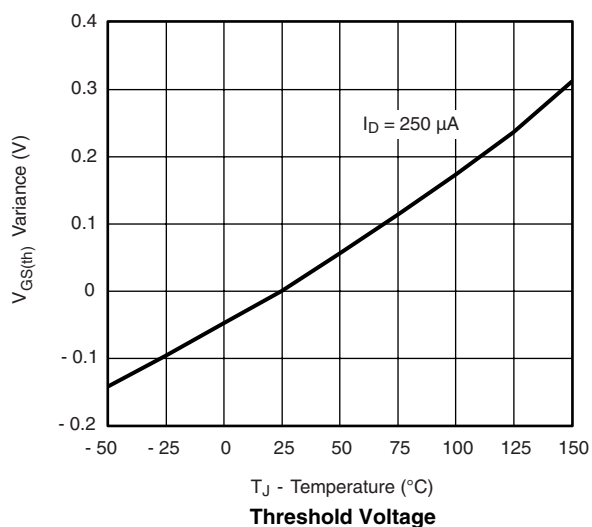
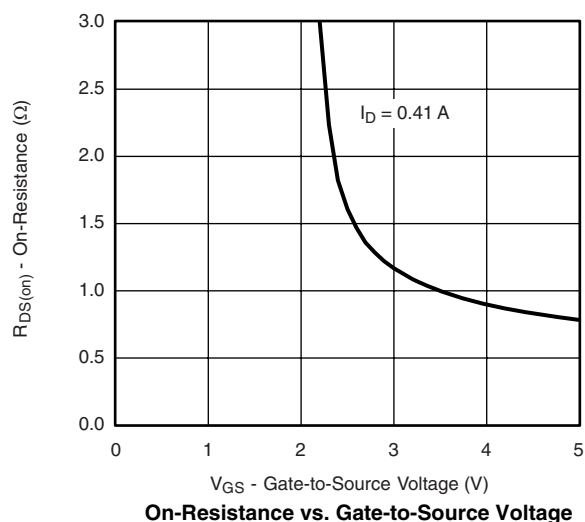
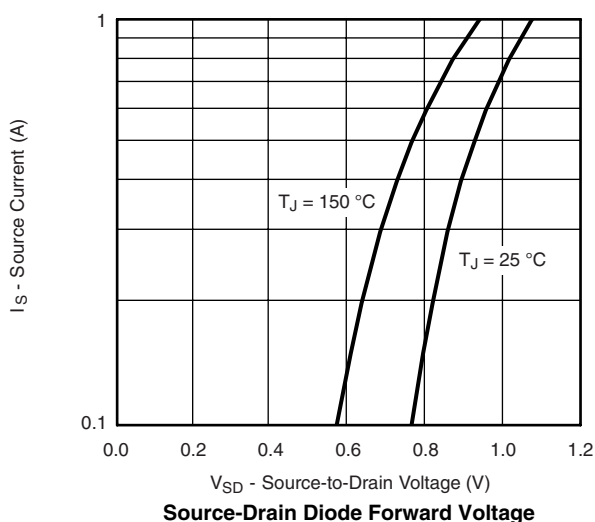
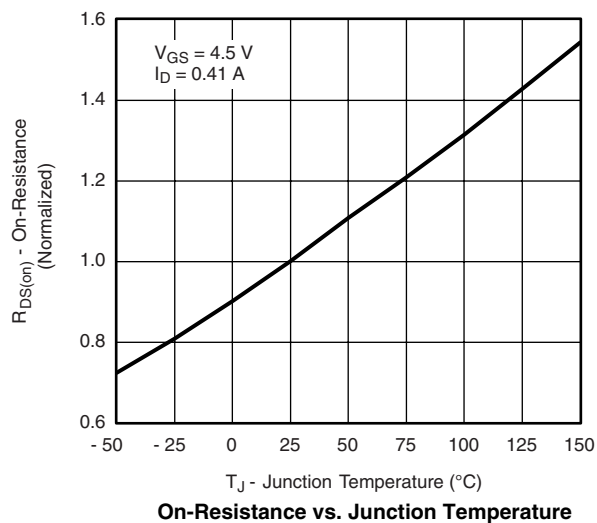
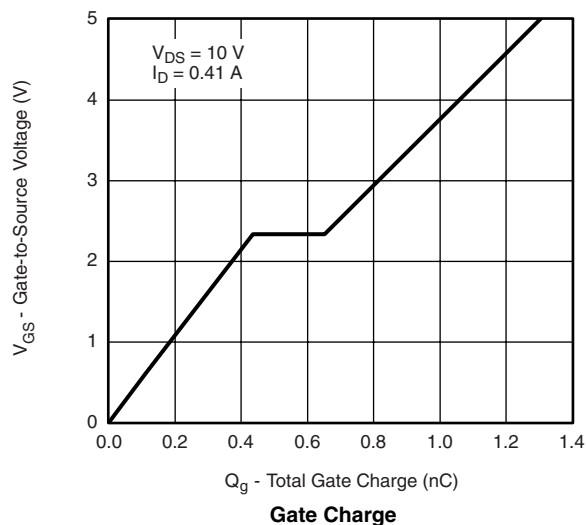
Transfer Characteristics



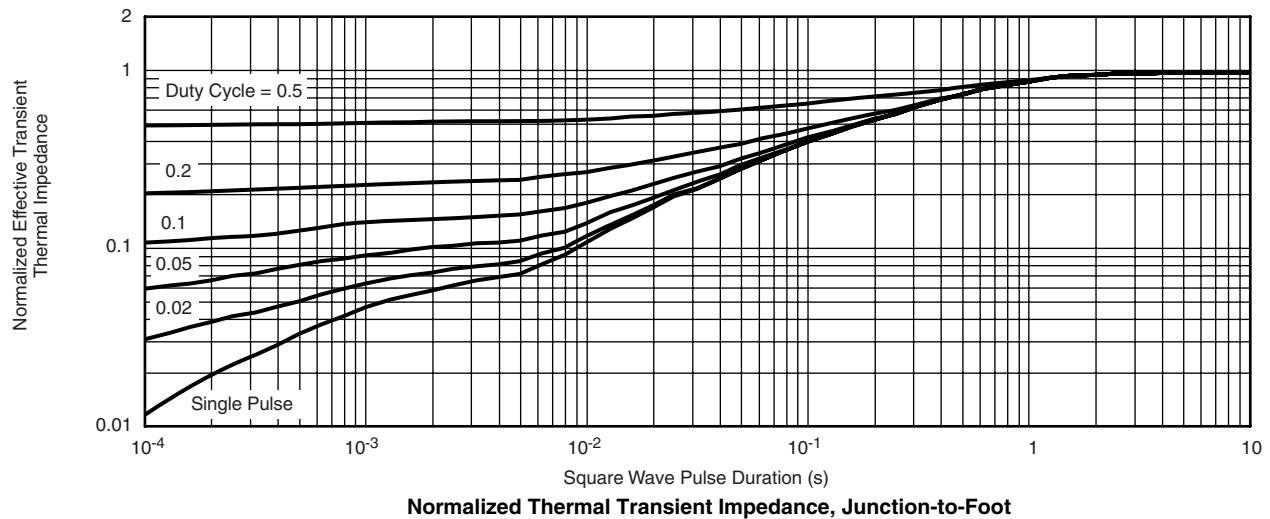
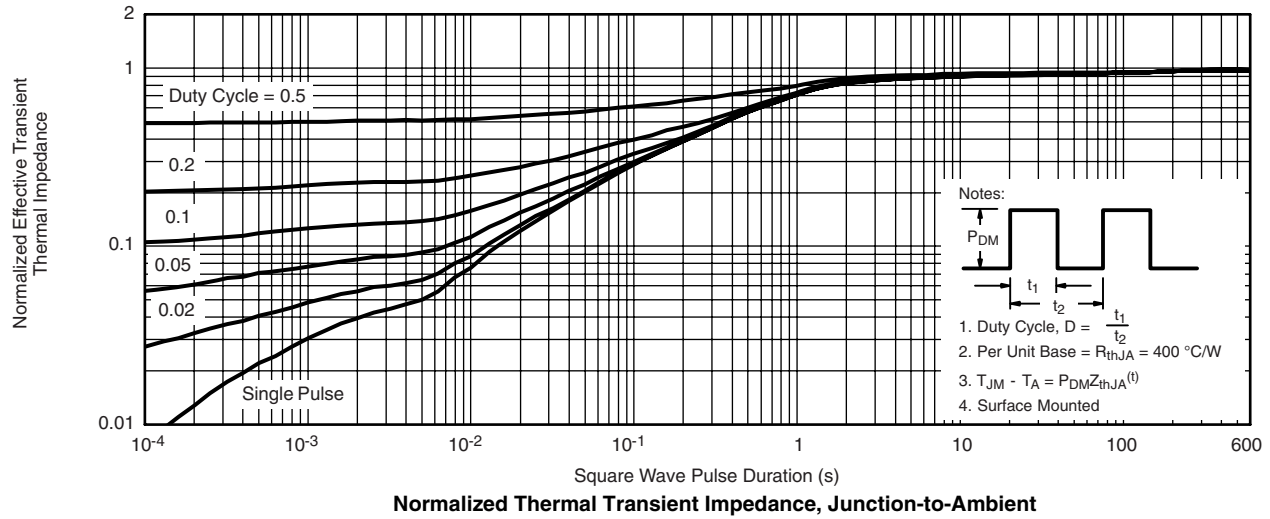
On-Resistance vs. Drain Current



Capacitance

**P-CHANNEL TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted

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