

Complementary MOSFET (N- and P-Channel)

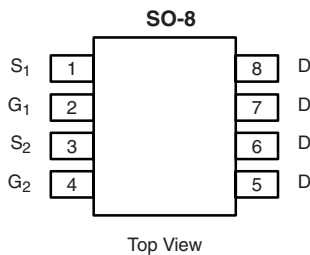
PRODUCT SUMMARY			
	V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)
N-Channel	30	0.018 at V _{GS} = 10 V	± 9
		0.027 at V _{GS} = 4.5 V	± 7.4
P-Channel	- 8	0.042 at V _{GS} = - 4.5 V	± 6.2
		0.060 at V _{GS} = - 2.5 V	± 5.2

FEATURES

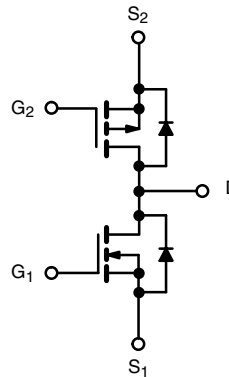
- Compliant to RoHS Directive 2002/95/EC



Available
RoHS*
COMPLIANT



Ordering Information: Si4501DY-T1
Si4501DY-T1-E3 (Lead (Pb)-free)



ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted				
Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V _{DS}	30	- 8	V
Gate-Source Voltage	V _{GS}	± 20	± 8	
Continuous Drain Current (T _J = 150 °C) ^{a, b}	T _A = 25 °C	± 9	± 6.2	A
	T _A = 70 °C	± 7.4	± 5.0	
Pulsed Drain Current	I _{DM}	± 30	± 20	
Continuous Source Current (Diode Conduction) ^{a, b}	I _S	1.7	- 1.7	
Maximum Power Dissipation ^{a, b}	T _A = 25 °C	2.5		W
	T _A = 70 °C	1.6		
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150		°C

THERMAL RESISTANCE RATINGS						
Parameter	Symbol	N-Channel		P-Channel		Unit
		Typ.	Max.	Typ.	Max.	
Maximum Junction-to-Ambient ^a	t ≤ 10 s	38	50	40	50	°C/W
	Steady State	73	95	73	95	
Maximum Junction-to-Foot	Steady State	17	22	20	26	

Notes:

a. Surface Mounted on FR4 board.

b. t ≤ 10 s.

* Pb containing terminations are not RoHS compliant, exemptions may apply.

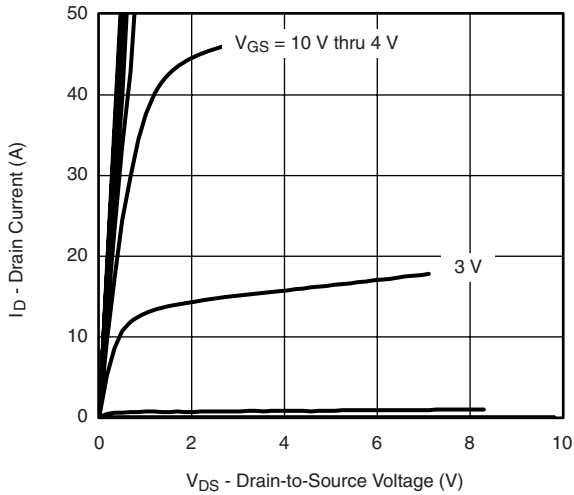
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted							
Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit	
Static							
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	N-Ch	0.8			V
		$V_{DS} = V_{GS}, I_D = -250\ \mu\text{A}$	P-Ch	-0.45			
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\ \text{V}, V_{GS} = \pm 20\ \text{V}$	N-Ch			± 100	nA
		$V_{DS} = 0\ \text{V}, V_{GS} = \pm 8\ \text{V}$	P-Ch			± 100	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 24\ \text{V}, V_{GS} = 0\ \text{V}$	N-Ch			1	μA
		$V_{DS} = -6.4\ \text{V}, V_{GS} = 0\ \text{V}$	P-Ch			-1	
		$V_{DS} = 24\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 55\text{ }^\circ\text{C}$	N-Ch			5	
		$V_{DS} = -6.4\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 55\text{ }^\circ\text{C}$	P-Ch			-5	
On-State Drain Current ^b	$I_{D(on)}$	$V_{DS} = 5\ \text{V}, V_{GS} = 10\ \text{V}$	N-Ch	30			A
		$V_{DS} = -5\ \text{V}, V_{GS} = -4.5\ \text{V}$	P-Ch	-20			
Drain-Source On-State Resistance ^b	$R_{DS(on)}$	$V_{GS} = 10\ \text{V}, I_D = 9\ \text{A}$	N-Ch		0.015	0.018	Ω
		$V_{GS} = -4.5\ \text{V}, I_D = -6.2\ \text{A}$	P-Ch		0.034	0.042	
		$V_{GS} = 4.5\ \text{V}, I_D = 7.4\ \text{A}$	N-Ch		0.022	0.027	
		$V_{GS} = -2.5\ \text{V}, I_D = -5.2\ \text{A}$	P-Ch		0.048	0.060	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15\ \text{V}, I_D = 9\ \text{A}$	N-Ch		20		S
		$V_{DS} = -15\ \text{V}, I_D = -6.2\ \text{A}$	P-Ch		14		
Diode Forward Voltage ^b	V_{SD}	$I_S = 1.7\ \text{A}, V_{GS} = 0\ \text{V}$	N-Ch		0.71	1.1	V
		$I_S = -1.7\ \text{A}, V_{GS} = 0\ \text{V}$	P-Ch		-0.70	-1.1	
Dynamic^a							
Total Gate Charge	Q_g	N-Channel $V_{DS} = 15\ \text{V}, V_{GS} = 5\ \text{V}, I_D = 9\ \text{A}$ P-Channel $V_{DS} = -4\ \text{V}, V_{GS} = -5\ \text{V}, I_D = -6.2\ \text{A}$	N-Ch		14.2	20	nC
			P-Ch		15	25	
Gate-Source Charge	Q_{gs}		N-Ch		3.3		
			P-Ch		3.0		
Gate-Drain Charge	Q_{gd}		N-Ch		6.6		
			P-Ch		2.0		
Turn-On Delay Time	$t_{d(on)}$	N-Channel $V_{DD} = 15\ \text{V}, R_L = 15\ \Omega$ $I_D \cong 1\ \text{A}, V_{GEN} = 10\ \text{V}, R_g = 6\ \Omega$ P-Channel $V_{DD} = -4\ \text{V}, R_L = 4\ \Omega$ $I_D \cong -1\ \text{A}, V_{GEN} = -4.5\ \text{V}, R_g = 6\ \Omega$	N-Ch		13	20	ns
			P-Ch		20	40	
Rise Time	t_r		N-Ch		9	18	
			P-Ch		50	100	
Turn-Off Delay Time	$t_{d(off)}$		N-Ch		35	50	
			P-Ch		110	220	
Fall Time	t_f		N-Ch		17	30	
			P-Ch		60	120	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 1.7\ \text{A}, dI/dt = 100\ \text{A}/\mu\text{s}$	N-Ch		35	70	
			P-Ch		60	100	

Notes:

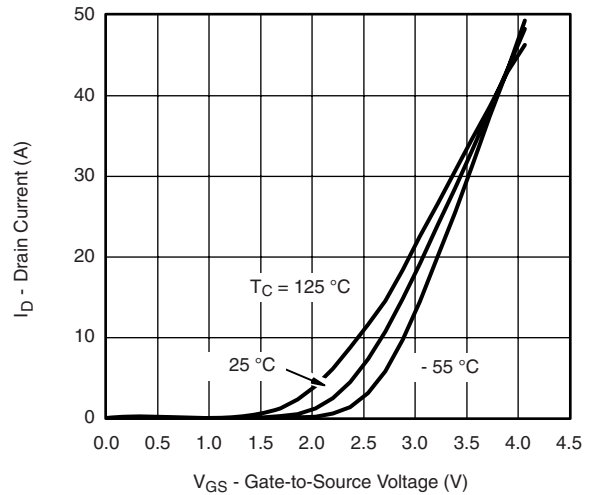
- a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

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.

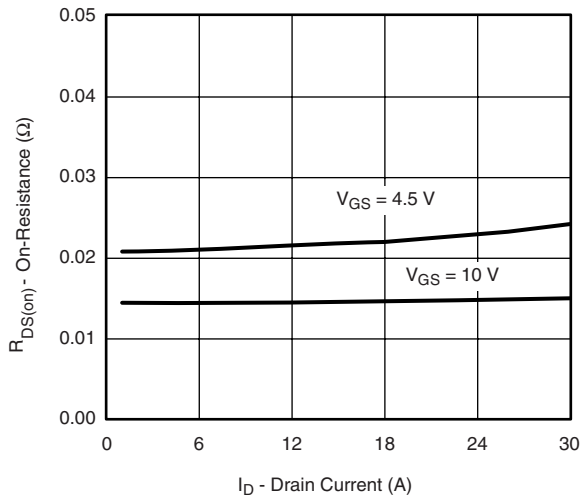
N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



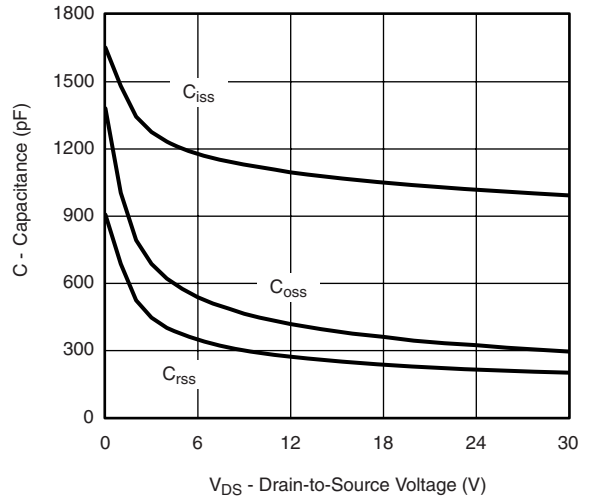
Output Characteristics



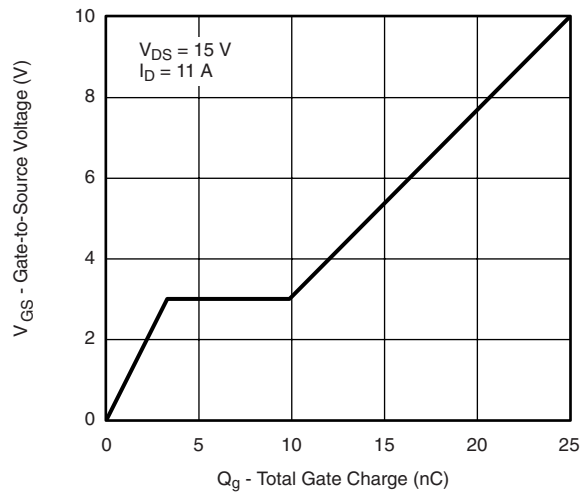
Transfer Characteristics



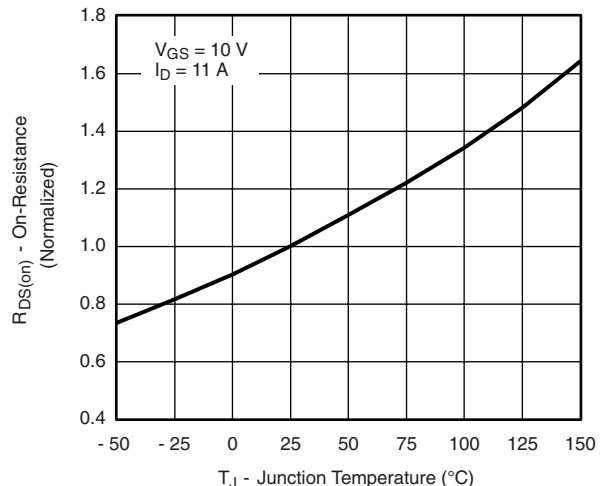
On-Resistance vs. Drain Current



Capacitance

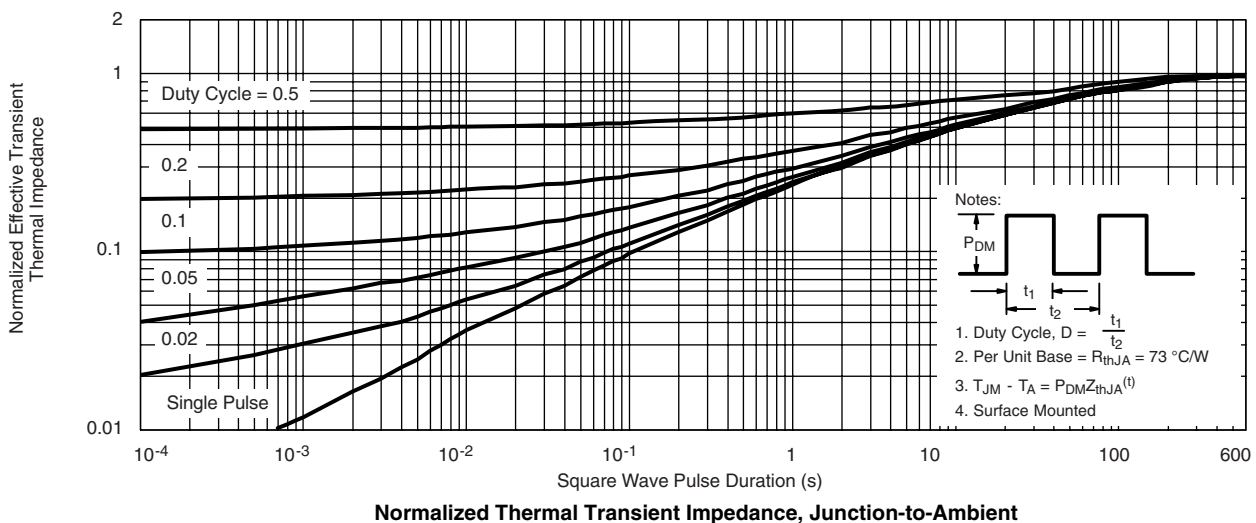
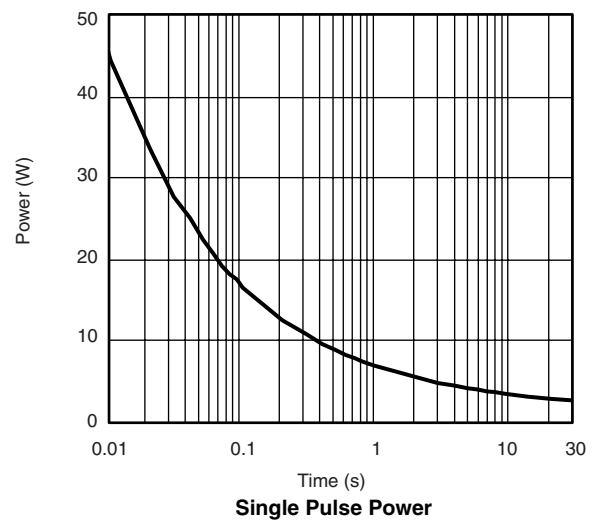
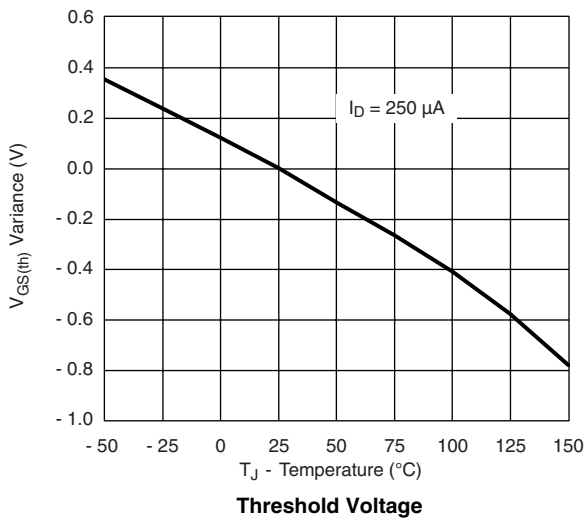
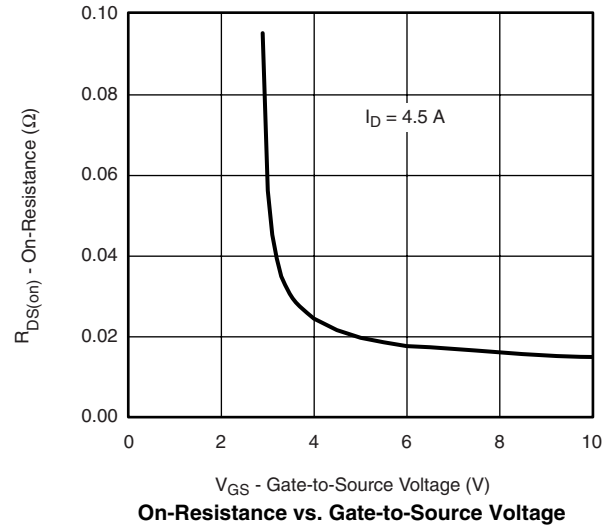
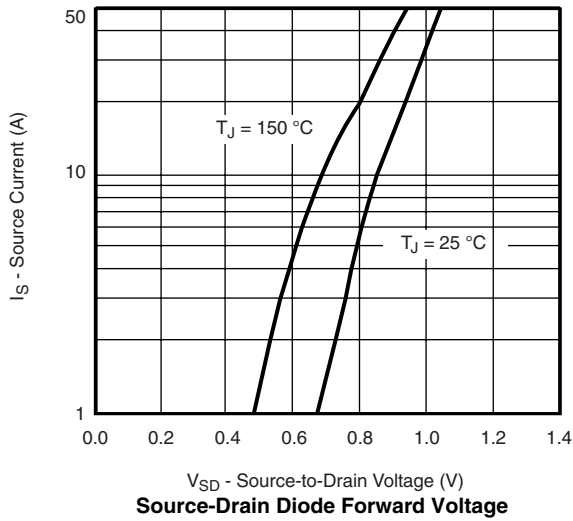


Gate Charge

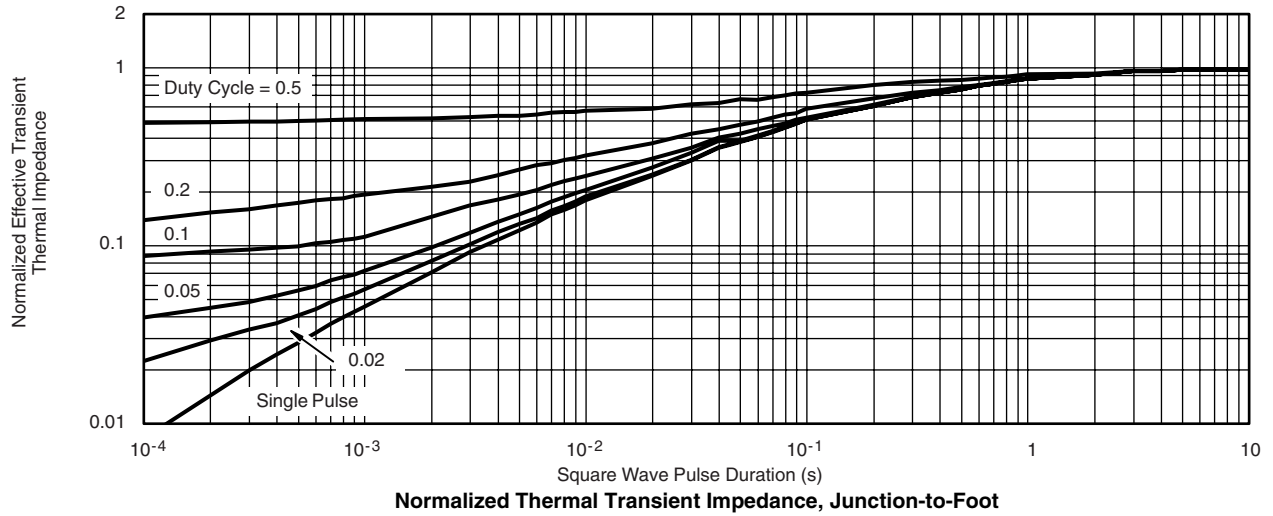


On-Resistance vs. Junction Temperature

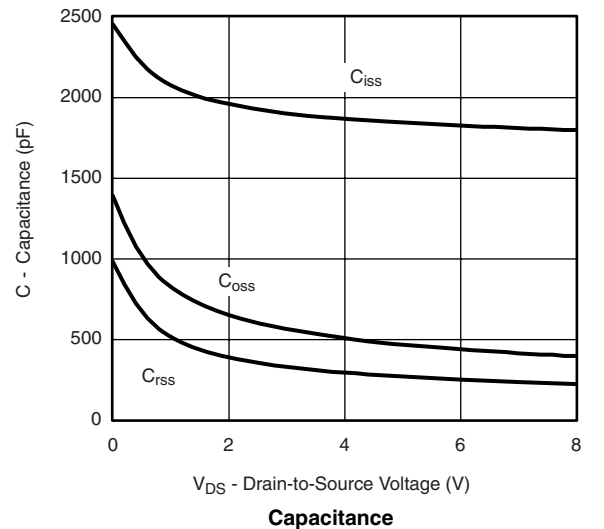
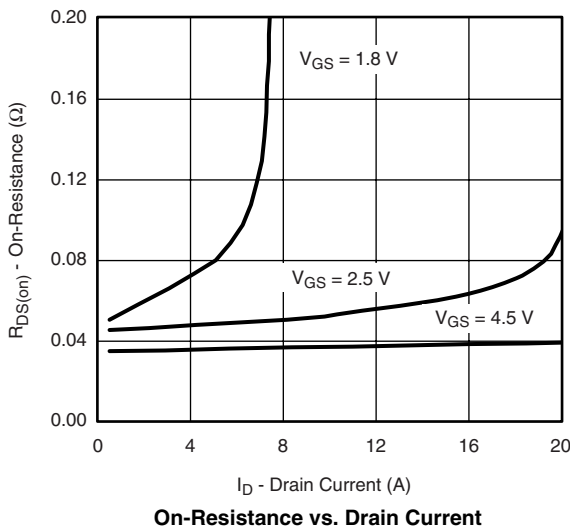
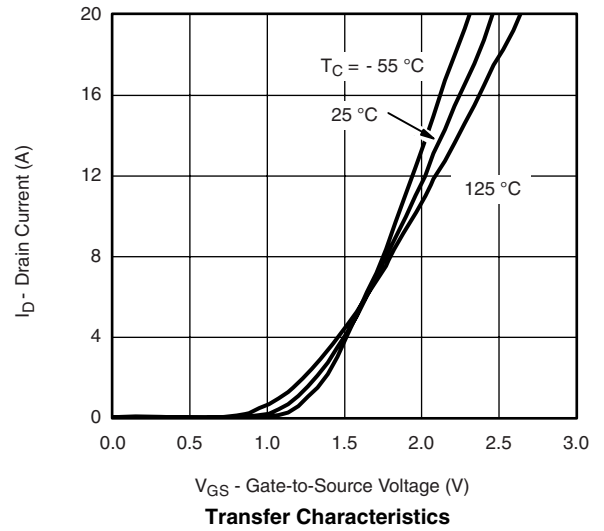
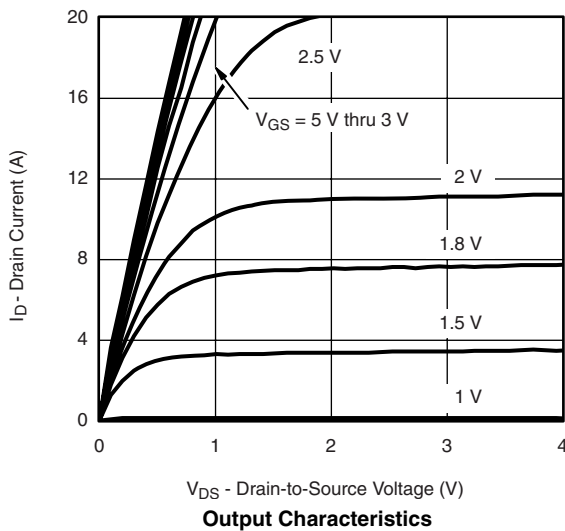
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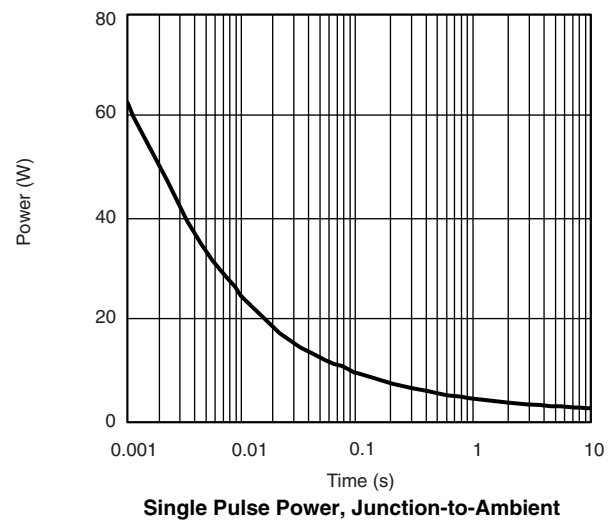
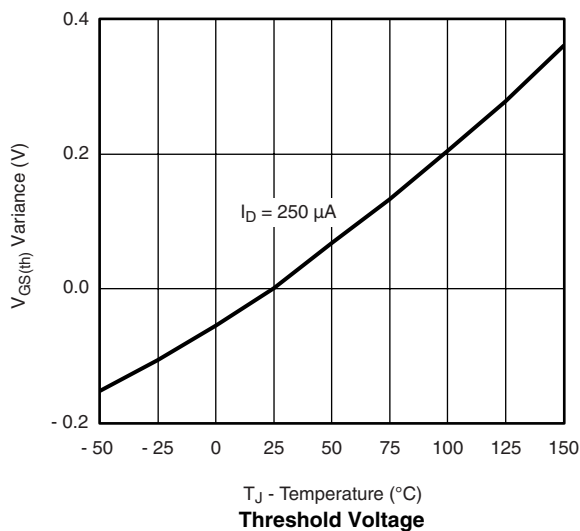
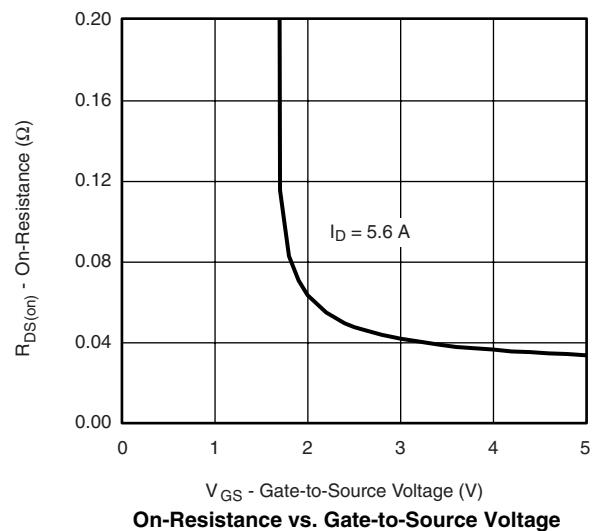
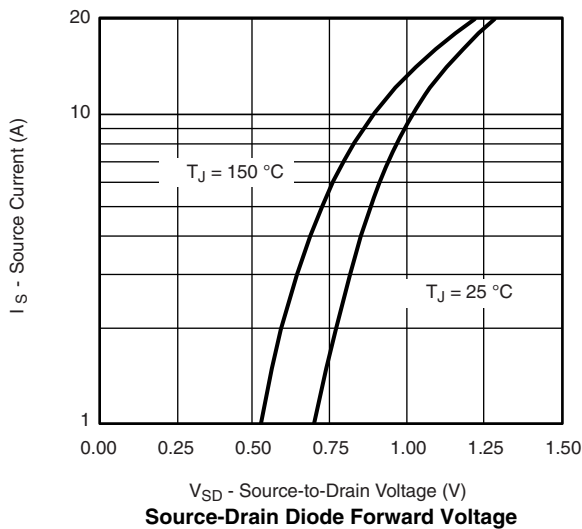
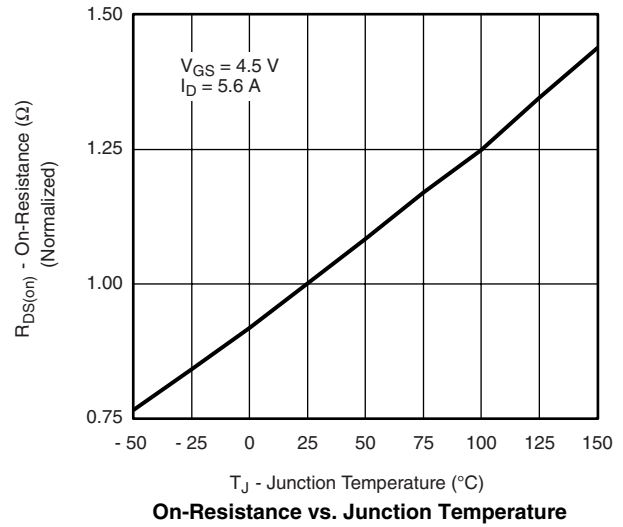
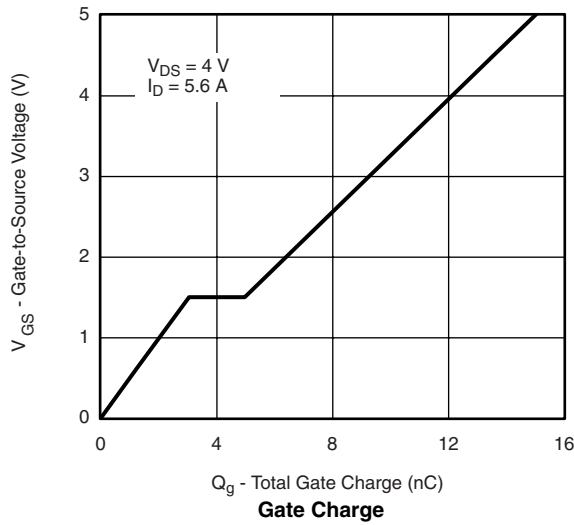
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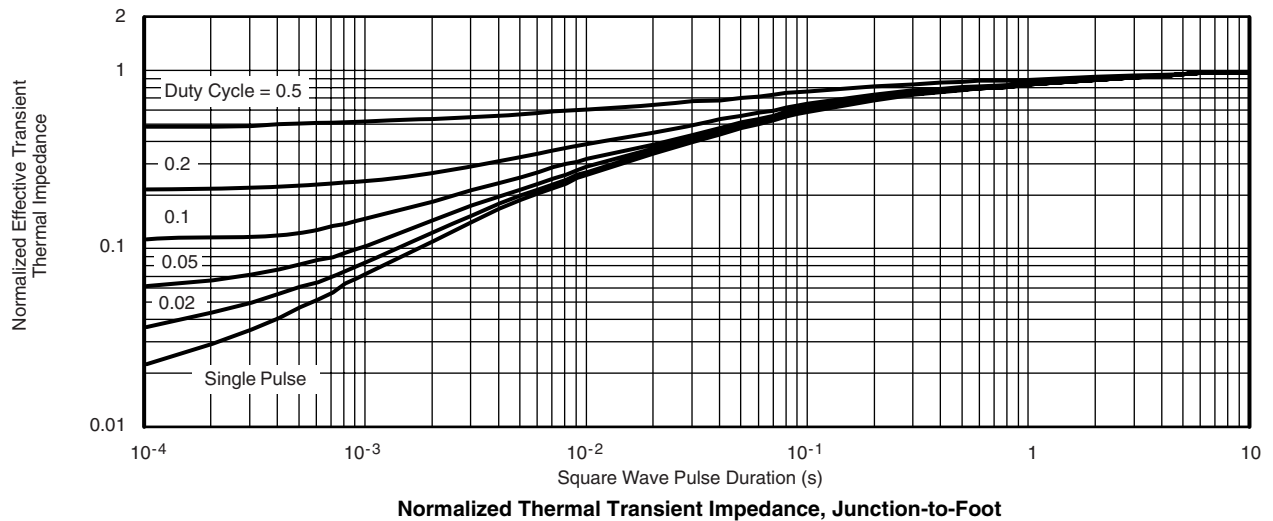
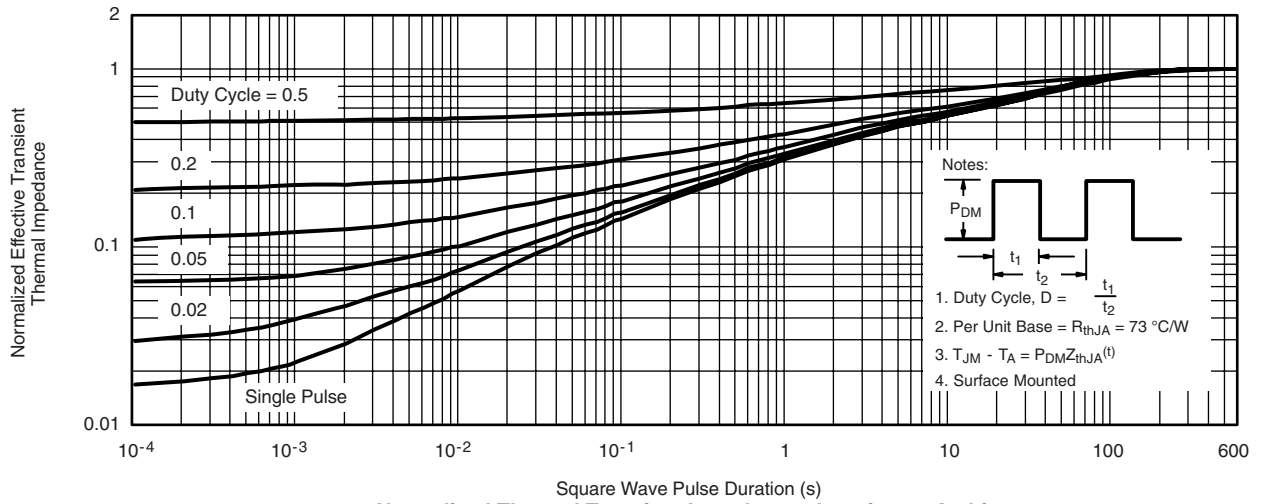
P-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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