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Si4539ADY
Vishay Siliconix

N- and P-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY

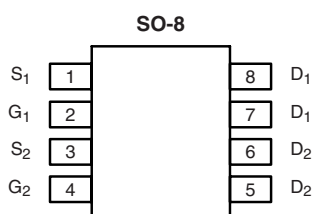
	V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)
N-Channel	30	0.036 at V _{GS} = 10 V	5.9
		0.053 at V _{GS} = 4.5 V	4.9
P-Channel	- 30	0.053 at V _{GS} = - 10 V	- 4.9
		0.090 at V _{GS} = - 4.5 V	- 3.7

FEATURES

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

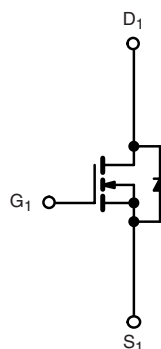


RoHS
COMPLIANT
HALOGEN
FREE
Available

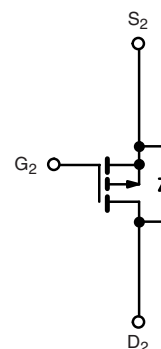


Top View

Ordering Information: SI4539ADY-T1-E3 (Lead (Pb)-free)
SI4539ADY-T1-GE3 (Lead (Pb)-free and Halogen-free)



N-Channel MOSFET



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted

Parameter	Symbol	N-Channel		P-Channel		Unit
		10 s	Steady State	10 s	Steady State	
Drain-Source Voltage	V _{DS}	30		- 30		V
Gate-Source Voltage	V _{GS}	± 20		± 20		V
Continuous Drain Current (T _J = 150 °C) ^a	I _D	5.9	4.4	- 4.9	- 3.7	A
		4.7	3.6	- 3.9	- 2.9	
Pulsed Drain Current	I _{DM}	30				A
Continuous Source Current (Diode Conduction) ^a	I _S	1.7	0.9	- 1.7	- 0.9	A
Maximum Power Dissipation ^a	P _D	2.0	1.1	2	1.1	W
		1.3	0.7	1.3	0.7	
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	R _{thJA}	50	62.5	52	62.5	°C/W
		90	110	90	110	
Maximum Junction-to-Foot (Drain)	R _{thJF}	32	40	32	40	°C/W

Notes:

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

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SPECIFICATIONS T _J = 25 °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 μA	N-Ch	1.0			V
		V _{DS} = V _{GS} , I _D = - 250 μA	P-Ch	- 1.0			
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	N-Ch			± 100	nA
		V _{DS} = 0 V, V _{GS} = ± 20 V	P-Ch			± 100	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 24 V, V _{GS} = 0 V	N-Ch			1	μA
		V _{DS} = - 24 V, V _{GS} = 0 V	P-Ch			- 1	
		V _{DS} = 24 V, V _{GS} = 0 V, T _J = 55 °C	N-Ch			5	
		V _{DS} = - 24 V, V _{GS} = 0 V, T _J = 55 °C	P-Ch			- 5	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	N-Ch	30			A
		V _{DS} ≤ - 5 V, V _{GS} = - 10 V	P-Ch	- 30			
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 5.9 A	N-Ch		0.032	0.036	Ω
		V _{GS} = - 10 V, I _D = - 4.9 A	P-Ch		0.043	0.053	
		V _{GS} = 4.5 V, I _D = 4.9 A	N-Ch		0.042	0.053	
		V _{GS} = - 4.5 V, I _D = - 3.7 A	P-Ch		0.075	0.090	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 5.9 A	N-Ch		15		S
		V _{DS} = - 15 V, I _D = - 4.9 A	P-Ch		9		
Diode Forward Voltage ^a	V _{SD}	I _S = 1.7 A, V _{GS} = 0 V	N-Ch		0.80	1.2	V
		I _S = - 1.7 A, V _{GS} = 0 V	P-Ch		- 0.80	- 1.2	
Dynamic ^b							
Total Gate Charge	Q _g	N-Channel V _{DS} = 15 V, V _{GS} = 10 V, I _D = 5.9 A	N-Ch		13	20	nC
Gate-Source Charge	Q _{gs}		P-Ch		15	25	
Gate-Drain Charge	Q _{gd}	P-Channel V _{DS} = - 15 V, V _{GS} = - 10 V, I _D = - 4.9 A	N-Ch		2.3		
			P-Ch		4		
Gate Resistance	R _g		N-Ch	0.5		2.2	Ω
			P-Ch	5		12.6	
Turn-On Delay Time	t _{d(on)}	N-Channel V _{DD} = 15 V, R _L = 15 Ω I _D ≅ 1 A, V _{GEN} = 10 V, R _g = 6 Ω	N-Ch		6	12	ns
Rise Time	t _r		P-Ch		7	15	
Turn-Off Delay Time	t _{d(off)}	P-Channel V _{DD} = - 15 V, R _L = 15 Ω I _D ≅ - 1 A, V _{GEN} = - 10 V, R _g = 6 Ω	N-Ch		14	25	
			P-Ch		10	20	
Fall Time	t _f		N-Ch		30	60	
			P-Ch		40	80	
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 1.7 A, dI/dt = 100 A/μs	N-Ch		5	10	
		I _F = - 1.7 A, dI/dt = 100 A/μs	P-Ch		20	40	
					30	60	
					30	60	

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.

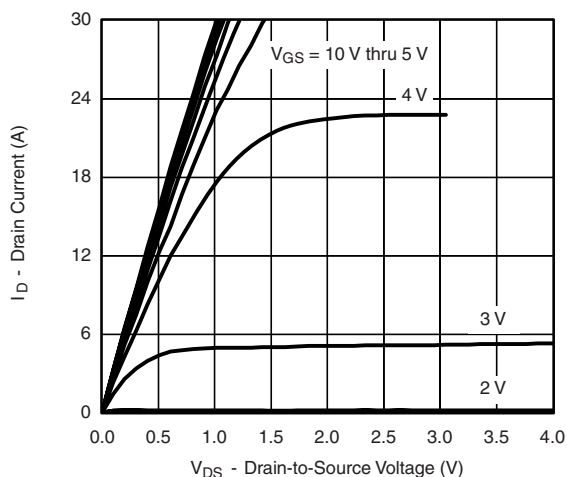
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



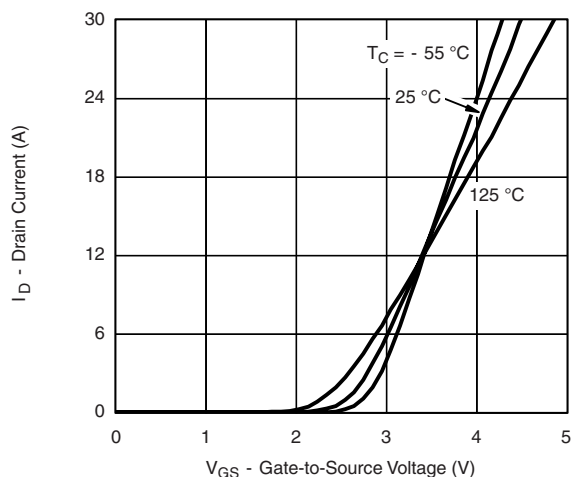
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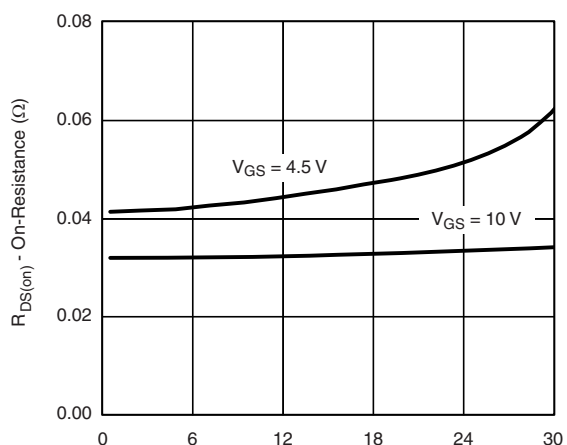
N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



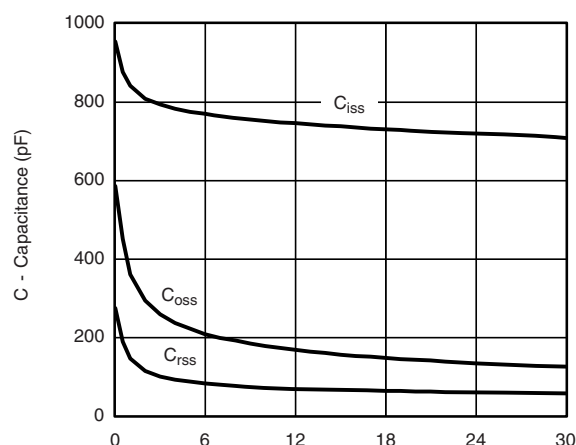
Output Characteristics



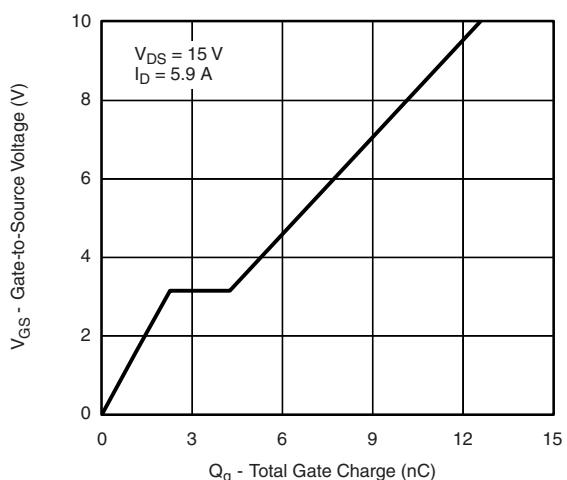
Transfer Characteristics



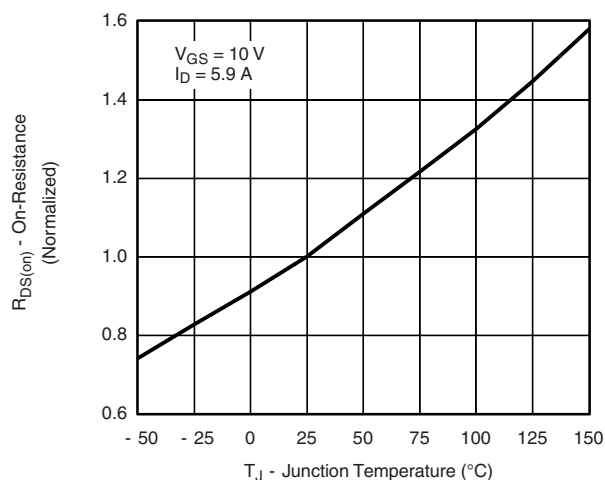
On-Resistance vs. Drain Current



Capacitance



Gate Charge



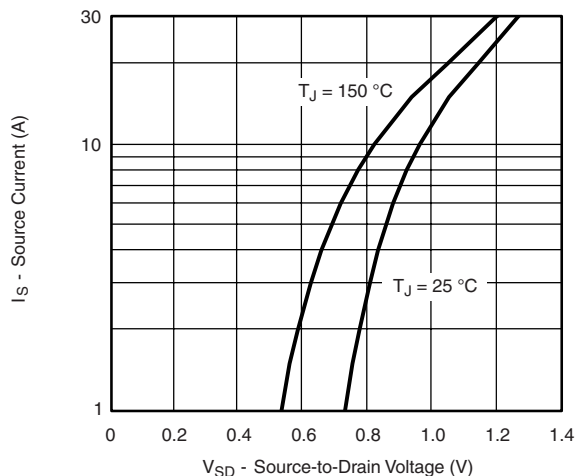
On-Resistance vs. Junction Temperature

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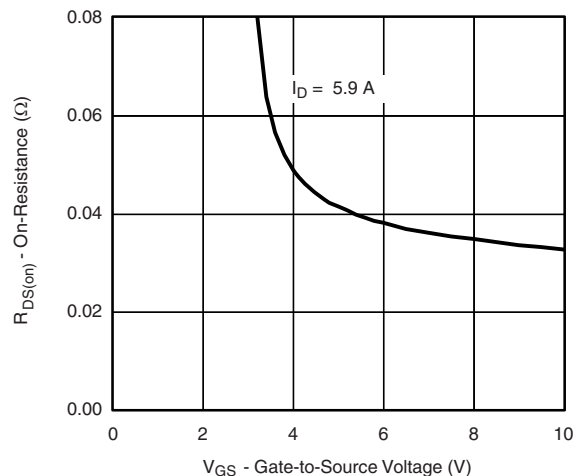
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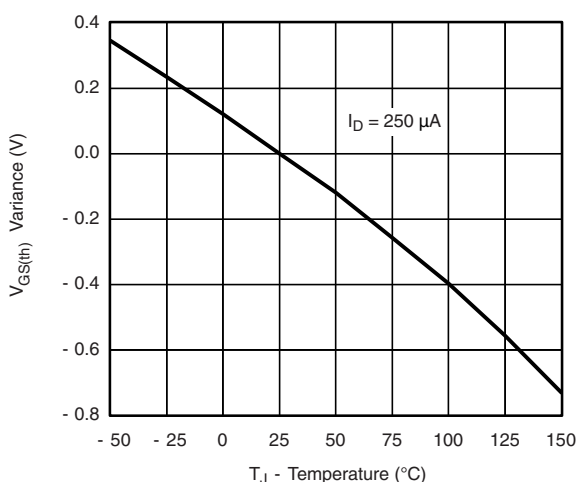
N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



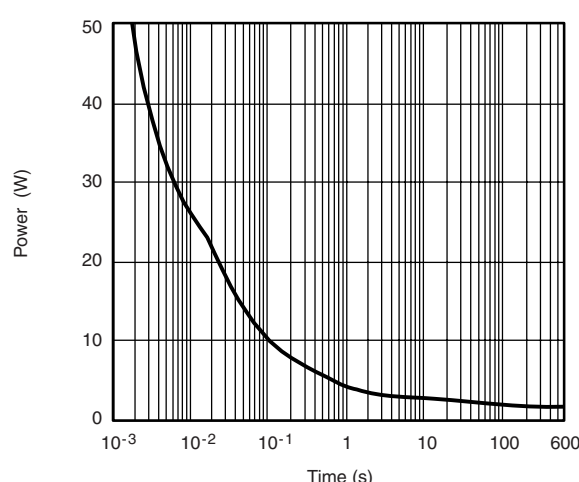
Source-Drain Diode Forward Voltage



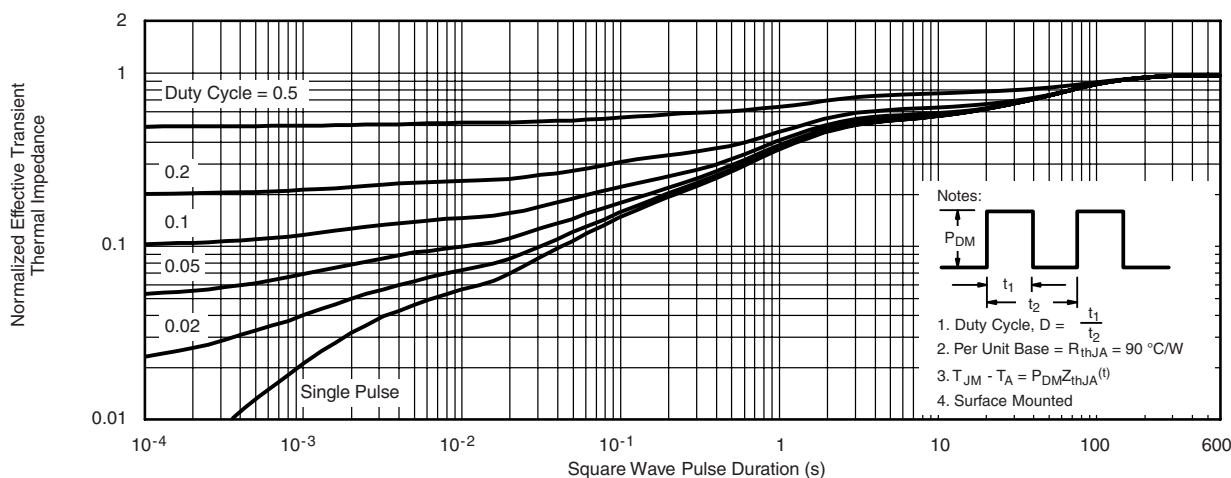
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power



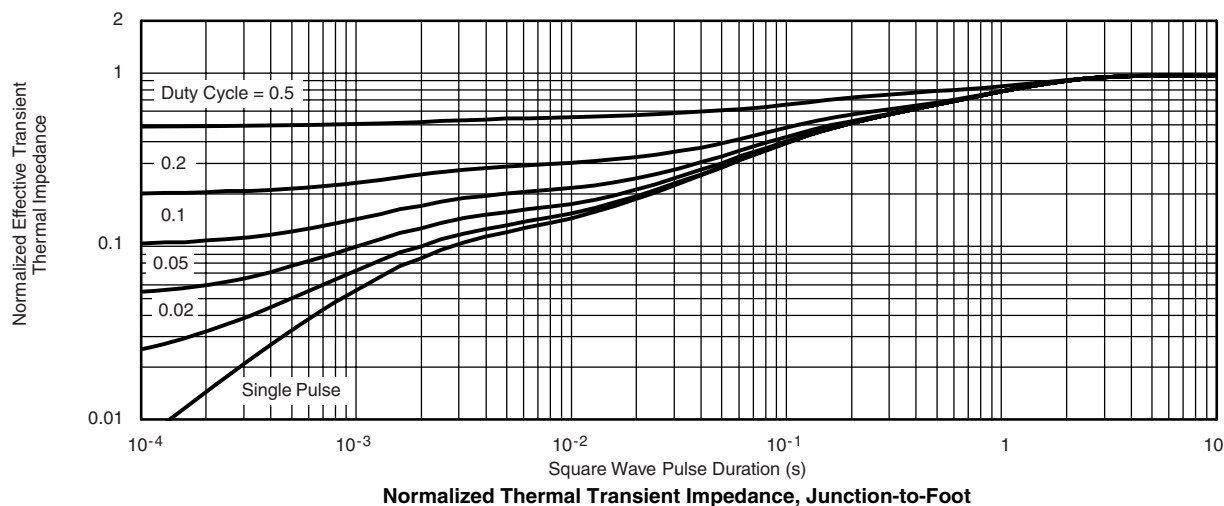
Normalized Thermal Transient Impedance, Junction-to-Ambient



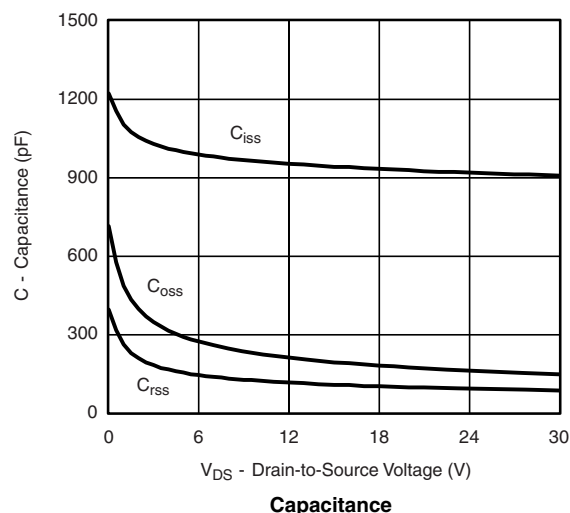
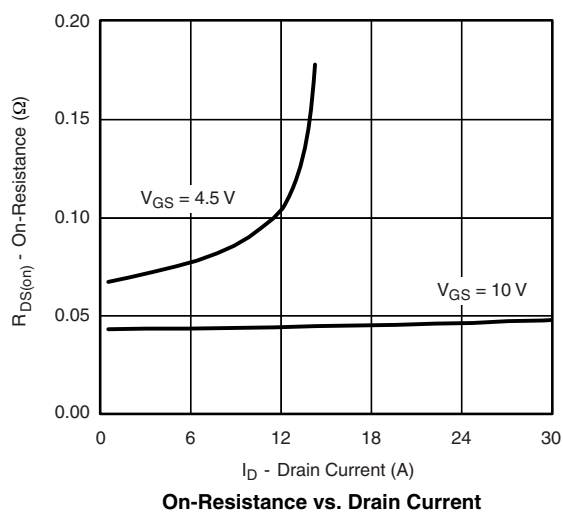
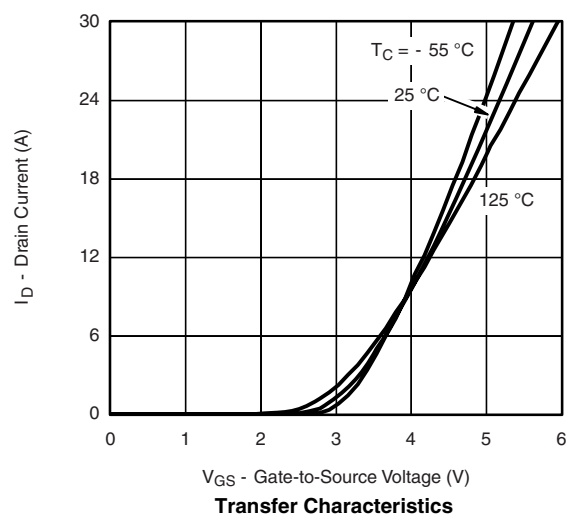
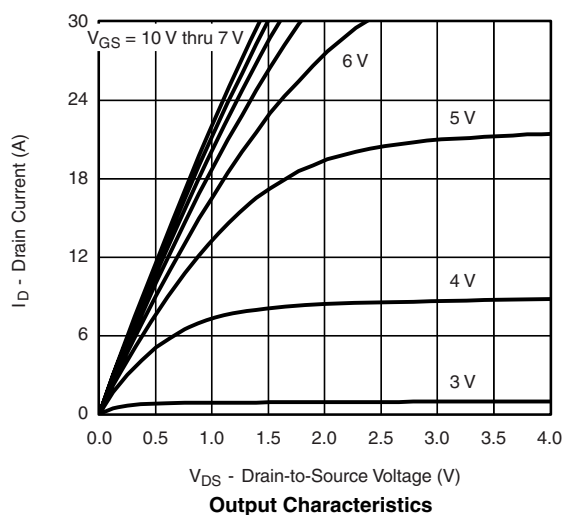
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N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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

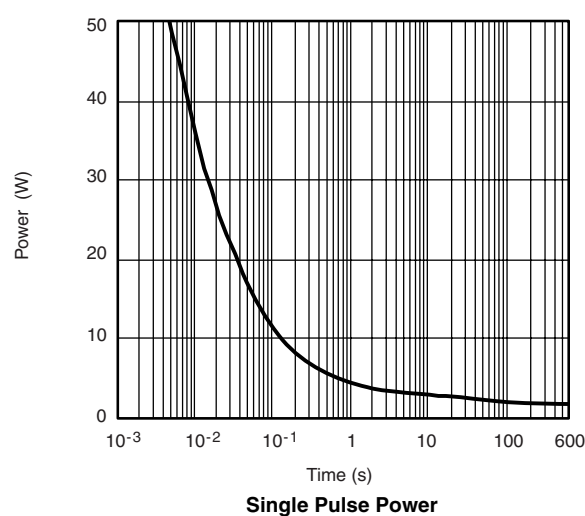
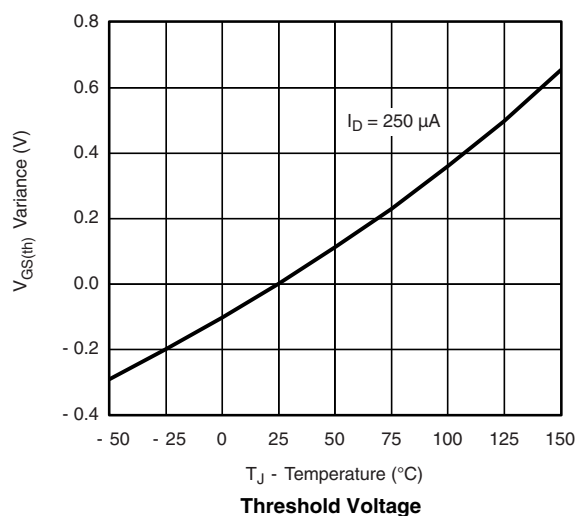
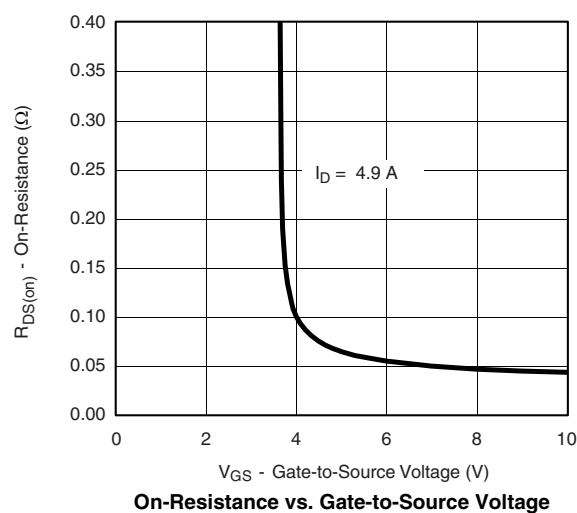
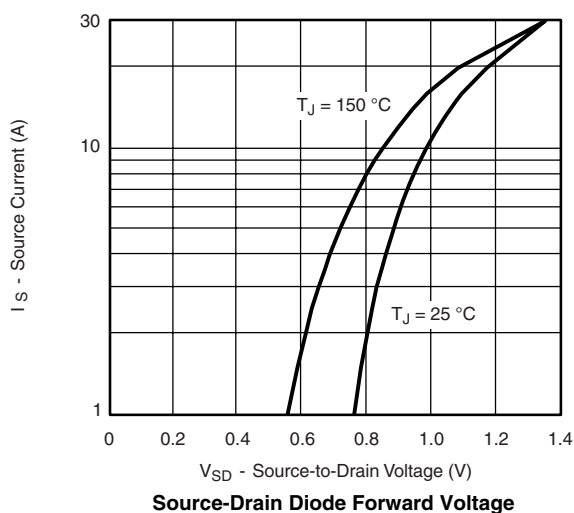
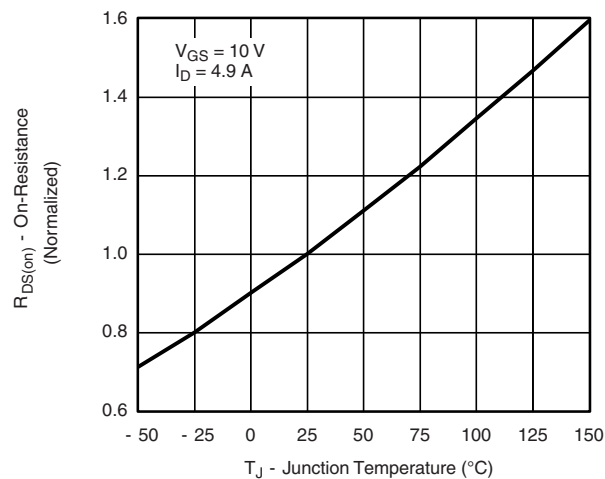
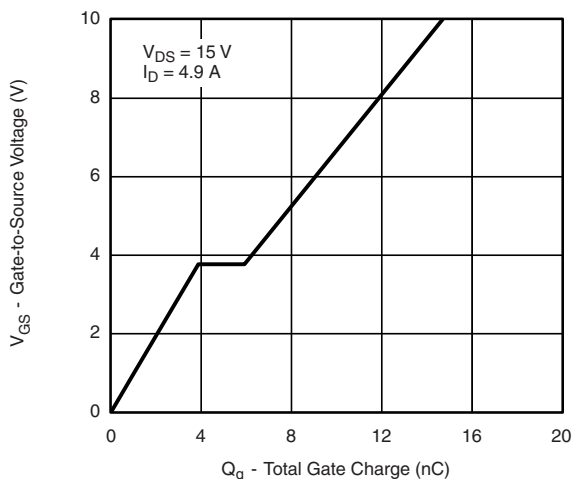


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P-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

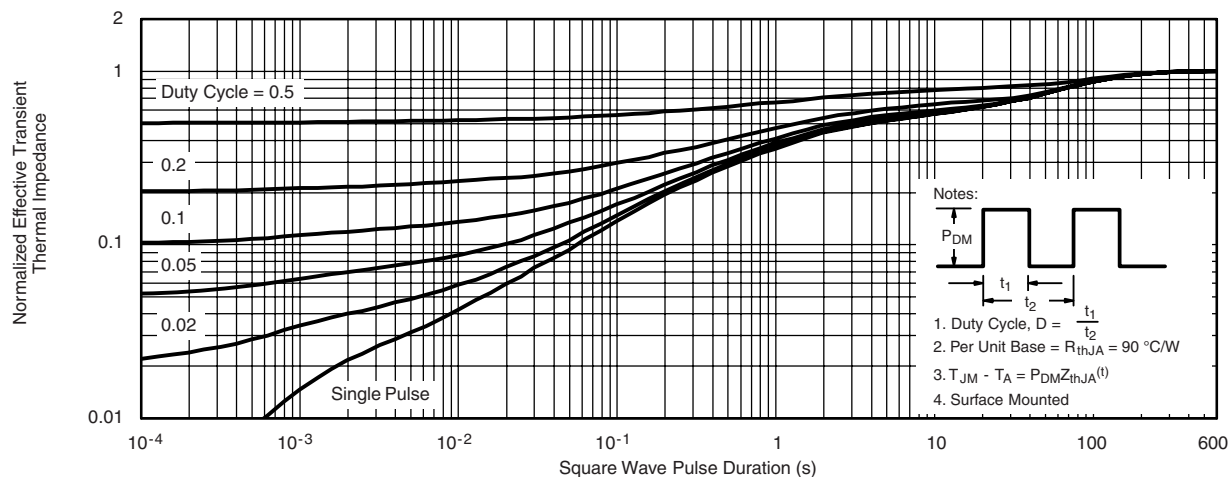




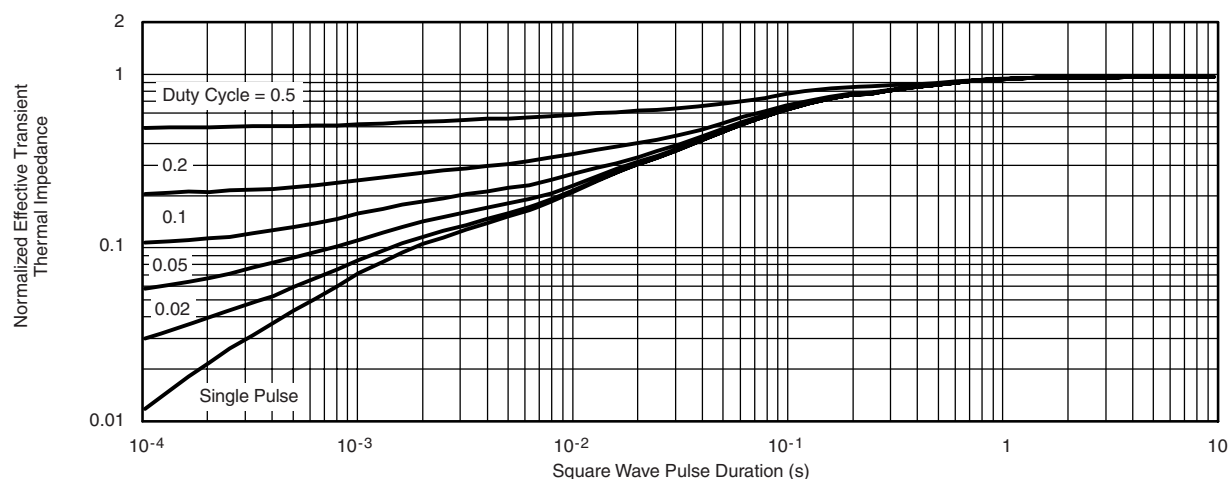
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P-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

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