

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

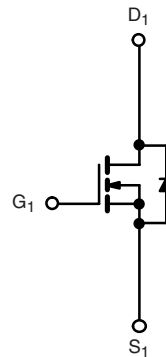
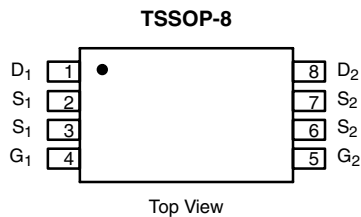
PRODUCT SUMMARY			
	V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)
N-Channel	30	0.032 at V _{GS} = 10 V	4.3
		0.046 at V _{GS} = 4.5 V	3.7
P-Channel	- 30	0.043 at V _{GS} = - 10 V	- 3.8
		0.073 at V _{GS} = - 4.5 V	- 2.8

FEATURES

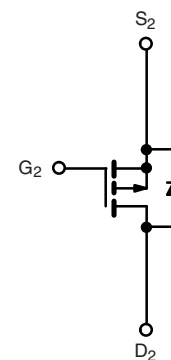
- Halogen-free
- TrenchFET[®] Power MOSFETS



RoHS
COMPLIANT



N-Channel MOSFET



P-Channel MOSFET

Ordering Information: Si6544BDQ-T1-GE3 (Lead (Pb)-free and Halogen-free)

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					
Continuous Drain Current (T _J = 150 °C) ^a	I _D	T _A = 25 °C	4.3	3.7	- 3.8	- 3.8	A
		T _A = 70 °C	3.5	3.0	- 3.0	- 2.6	
Pulsed Drain Current	I _{DM}	20		- 20			
Continuous Source Current (Diode Conduction) ^a	I _S	1.0	0.7	- 1.0	- 0.7		
Maximum Power Dissipation ^a	P _D	T _A = 25 °C	1.14	0.83	1.14	0.83	W
		T _A = 70 °C	0.73	0.53	0.73	0.53	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150				°C	

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^a	R _{thJA}	t ≤ 10 s	88	110	°C/W
		Steady State	120	150	
Maximum Junction-to-Foot (Drain)	R _{thJF}	65	80		

Notes:

a. Surface Mounted on FR4 board, t ≤ 10 s.

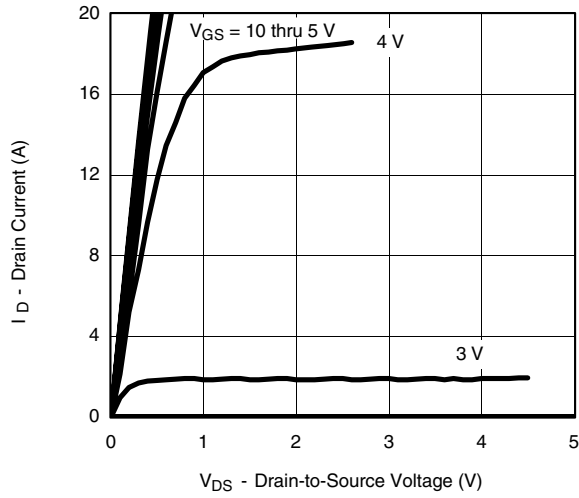
SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted							
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Static							
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	N-Ch	1.0		3.0	V
		$V_{DS} = V_{GS}, I_D = -250\ \mu\text{A}$	P-Ch	-1.0		-3.0	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\ \text{V}, V_{GS} = \pm 20\ \text{V}$	n-ch N-Ch			± 100 ± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\ \text{V}, V_{GS} = 0\ \text{V}$	P-Ch			1	μA
		$V_{DS} = -30\ \text{V}, V_{GS} = 0\ \text{V}$	N-Ch			-1	
		$V_{DS} = 30\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 55^\circ\text{C}$	P-Ch			5	
		$V_{DS} = -30\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 55^\circ\text{C}$	N-Ch			-5	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\ \text{V}, V_{GS} = 10\ \text{V}$	P-Ch	20			A
		$V_{DS} \geq -5\ \text{V}, V_{GS} = -10\ \text{V}$	N-Ch	-20			
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\ \text{V}, I_D = 4.3\ \text{A}$	P-Ch		0.025	0.032	Ω
		$V_{GS} = -10\ \text{V}, I_D = -3.8\ \text{A}$	N-Ch		0.034	0.043	
		$V_{GS} = 4.5\ \text{V}, I_D = 3.7\ \text{A}$	P-Ch		0.037	0.046	
		$V_{GS} = -4.5\ \text{V}, I_D = -2.8\ \text{A}$	N-Ch		0.058	0.073	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\ \text{V}, I_D = 4.3\ \text{A}$	P-Ch		11		S
		$V_{DS} = -15\ \text{V}, I_D = -3.8\ \text{A}$	N-Ch		11		
Diode Forward Voltage ^a	V_{SD}	$I_S = 1.25\ \text{A}, V_{GS} = 0\ \text{V}$	P-Ch		0.77	1.1	V
		$I_S = -1.25\ \text{A}, V_{GS} = 0\ \text{V}$	N-Ch		-0.77	-1.1	
Dynamic^b							
Total Gate Charge	Q_g	N-Channel $V_{DS} = 15\ \text{V}, V_{GS} = 10\ \text{V}, I_D = 4.3\ \text{A}$	N-Ch		9.5	15	nC
Gate-Source Charge	Q_{gs}		P-Ch		16	25	
Gate-Drain Charge	Q_{gd}	P-Channel $V_{DS} = -15\ \text{V}, V_{GS} = -10\ \text{V}, I_D = -3.8\ \text{A}$	N-Ch		1.8		
			P-Ch		2.3		
Gate Resistance	R_g		N-Ch		0.45		Ω
			P-Ch		8.8		
Turn-On Delay Time	$t_{d(on)}$	N-Channel $V_{DD} = 15\ \text{V}, R_L = 15\ \Omega$ $I_D \cong 1\ \text{A}, V_{GEN} = 10\ \text{V}, R_G = 6\ \Omega$	N-Ch		13	25	ns
Rise Time	t_r		P-Ch		14	25	
		Turn-Off Delay Time	$t_{d(off)}$	N-Ch		14	
Fall Time	t_f			P-Channel $V_{DD} = -15\ \text{V}, R_L = 15\ \Omega$ $I_D \cong -1\ \text{A}, V_{GEN} = -10\ \text{V}, R_G = 6\ \Omega$	N-Ch		
		Source-Drain Reverse Recovery Time	t_{rr}		P-Ch		
N-Ch					10	20	
			P-Ch		30	50	
			N-Ch		30	60	
			P-Ch		30		

Notes:

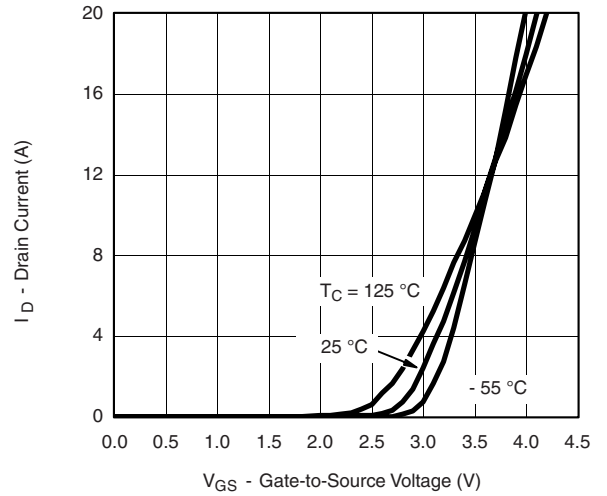
- a. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.

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.

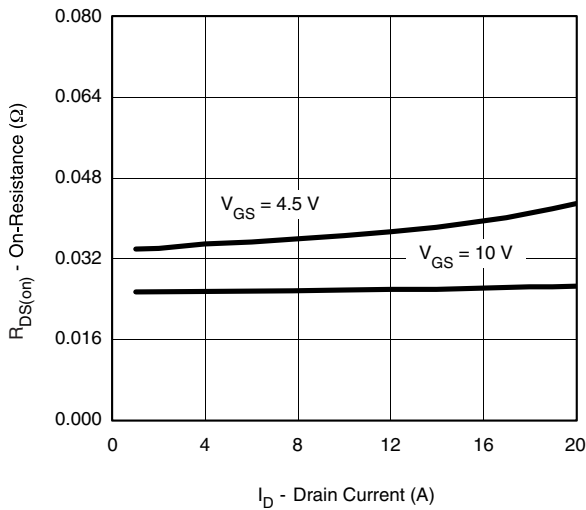
N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



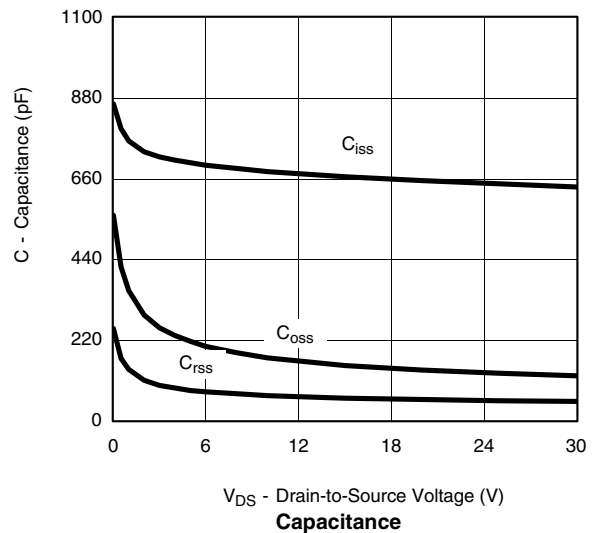
Output Characteristics



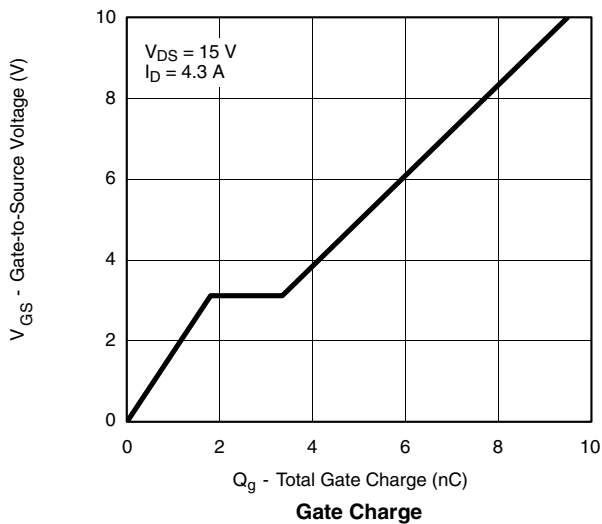
Transfer Characteristics



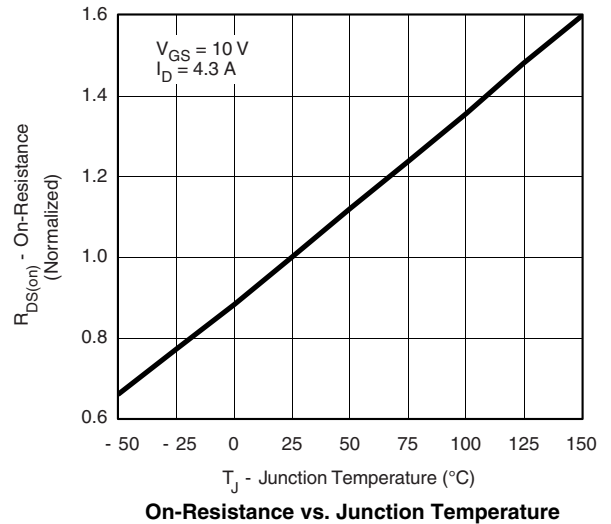
On-Resistance vs. Drain Current



Capacitance

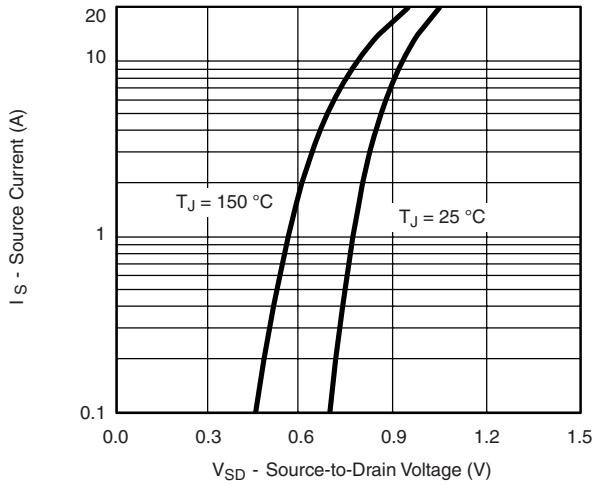


Gate Charge

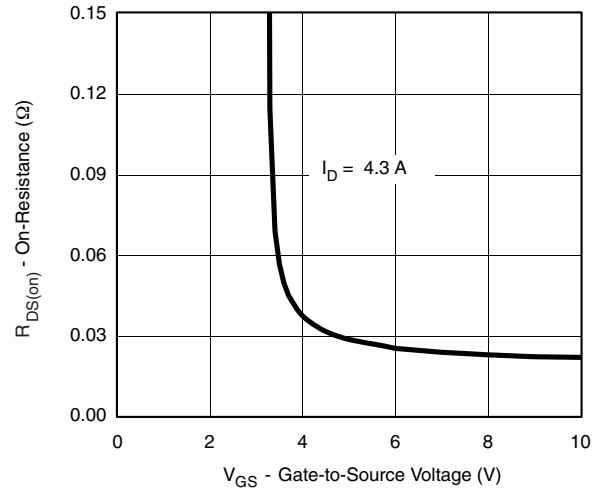


On-Resistance vs. Junction Temperature

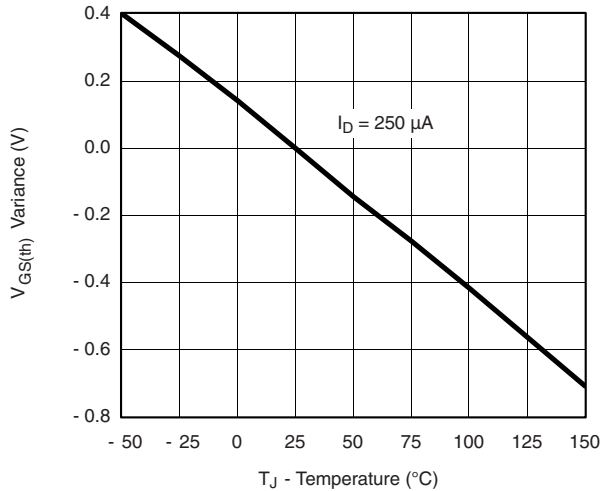
N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



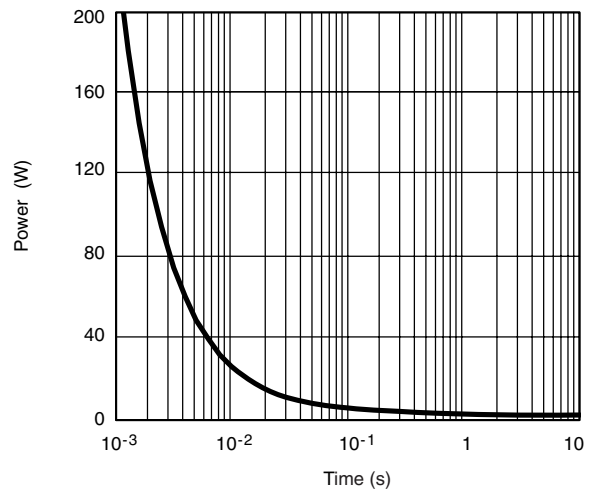
Source-Drain Diode Forward Voltage



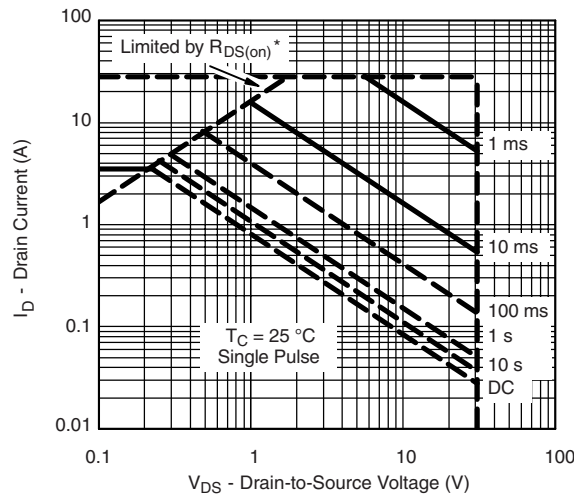
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



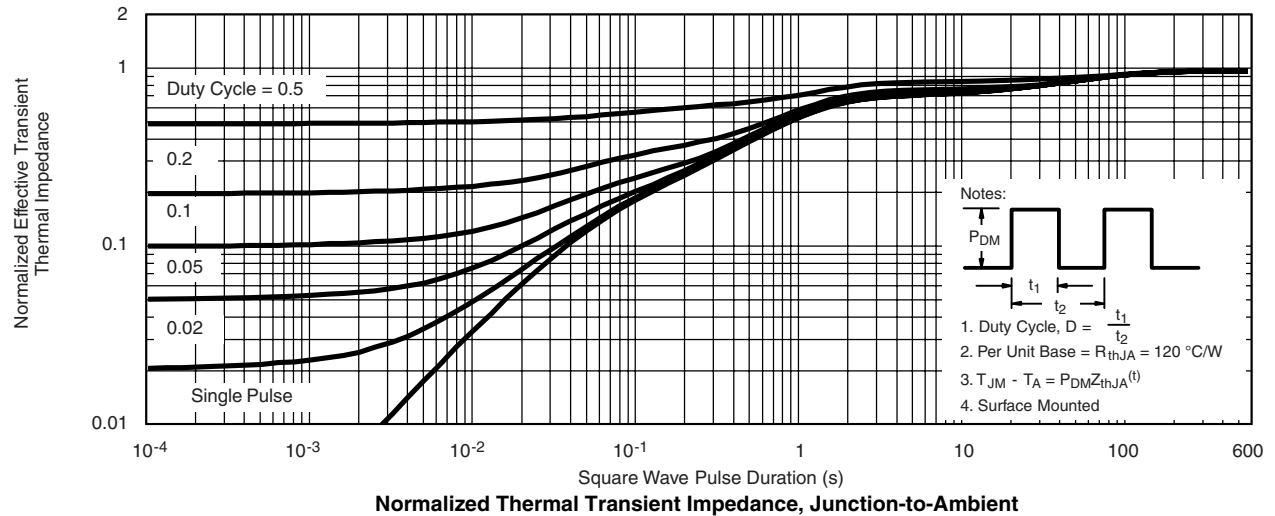
Single Pulse Power, Junction-to-Ambient



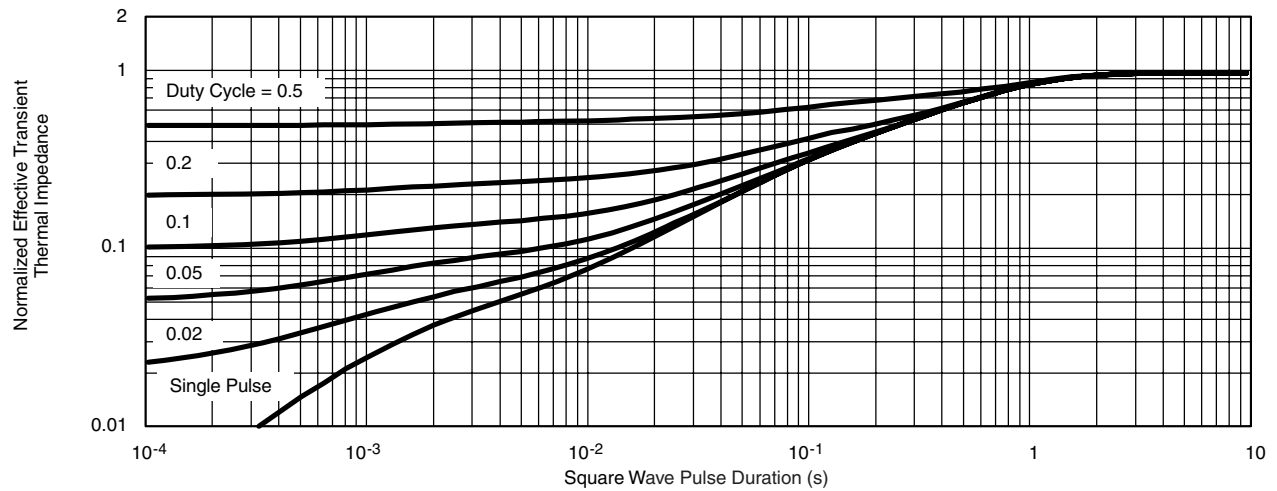
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Case

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

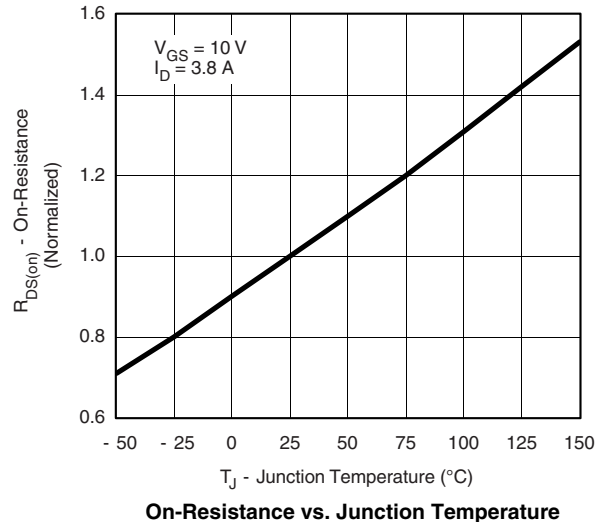
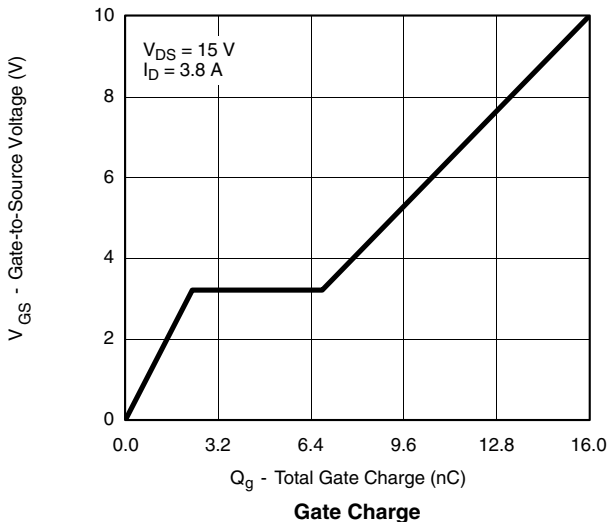
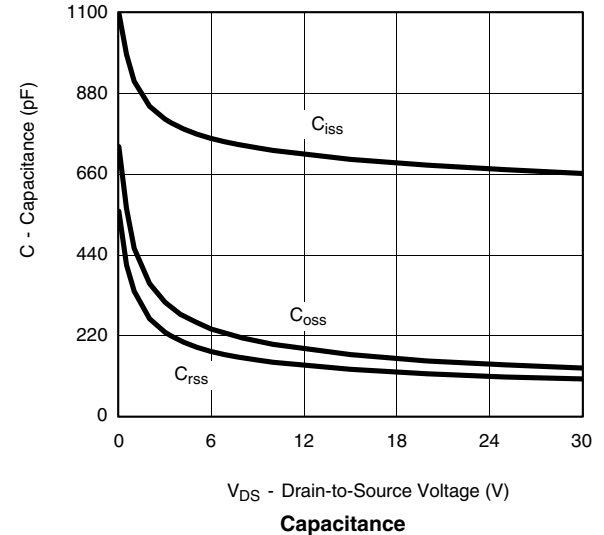
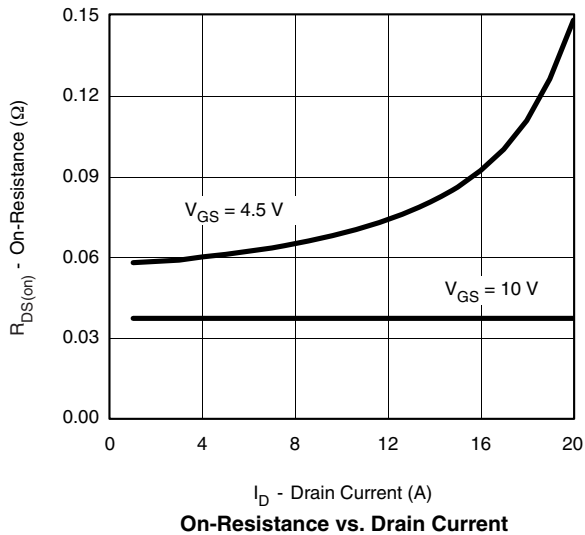
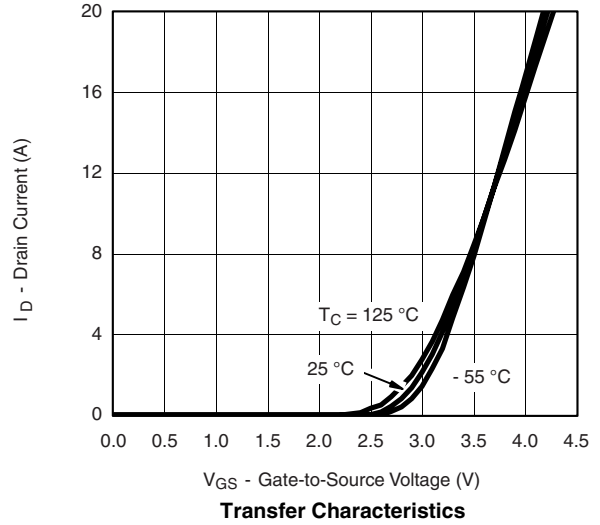
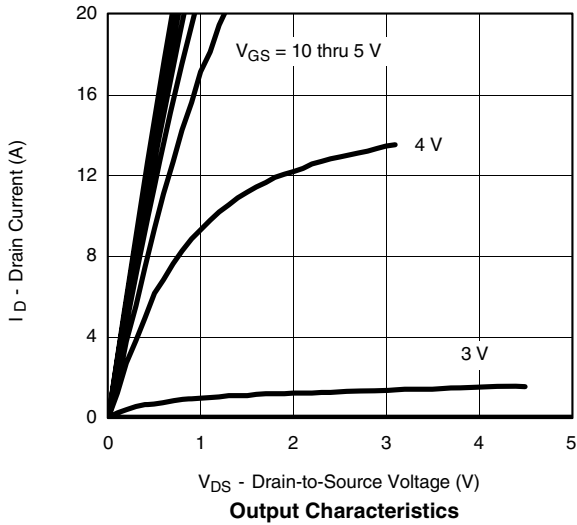


Normalized Thermal Transient Impedance, Junction-to-Ambient

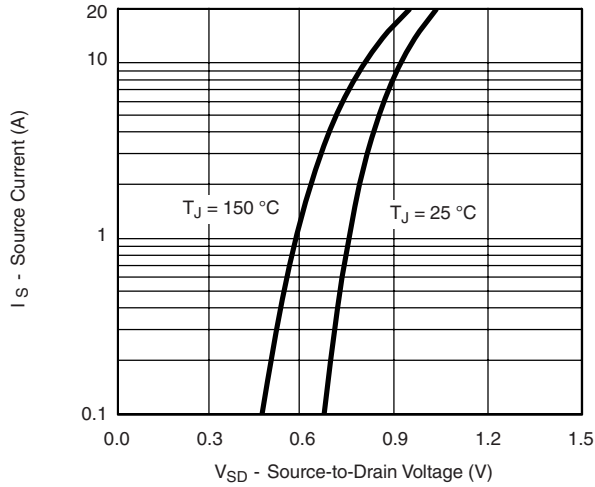


Normalized Thermal Transient Impedance, Junction-to-Foot

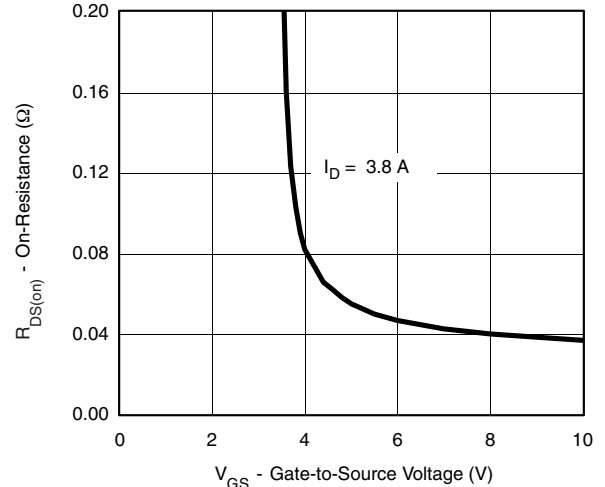
P-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



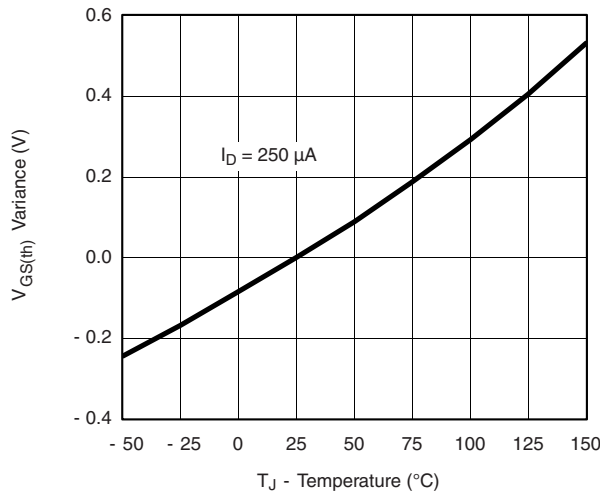
P-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



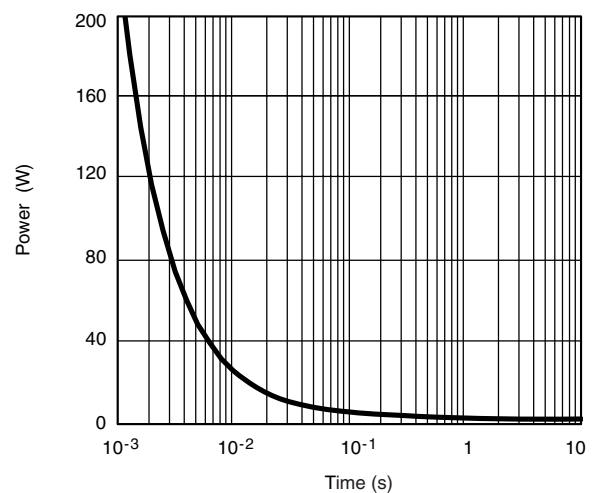
Source-Drain Diode Forward Voltage



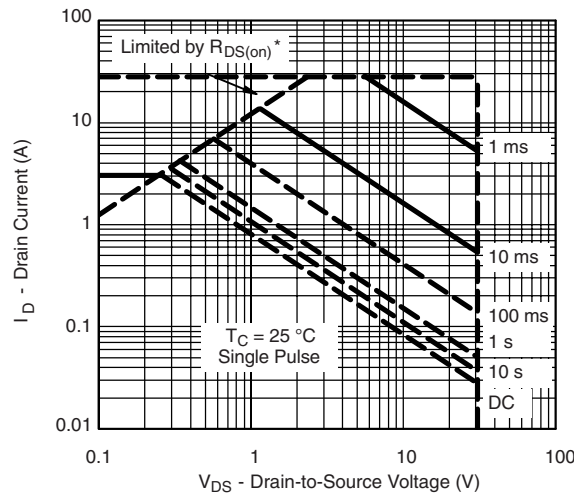
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



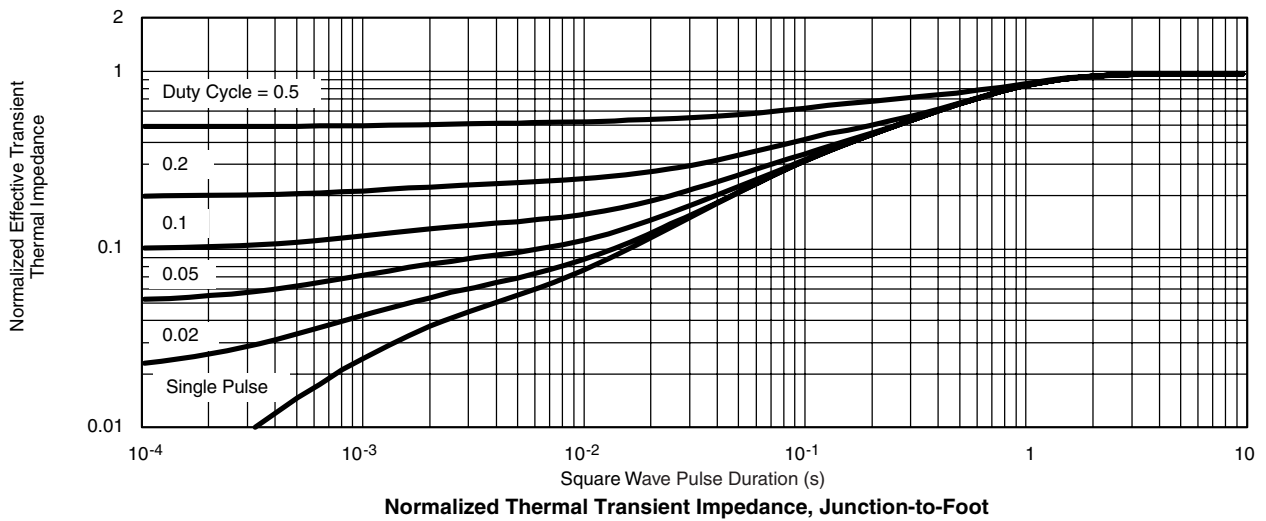
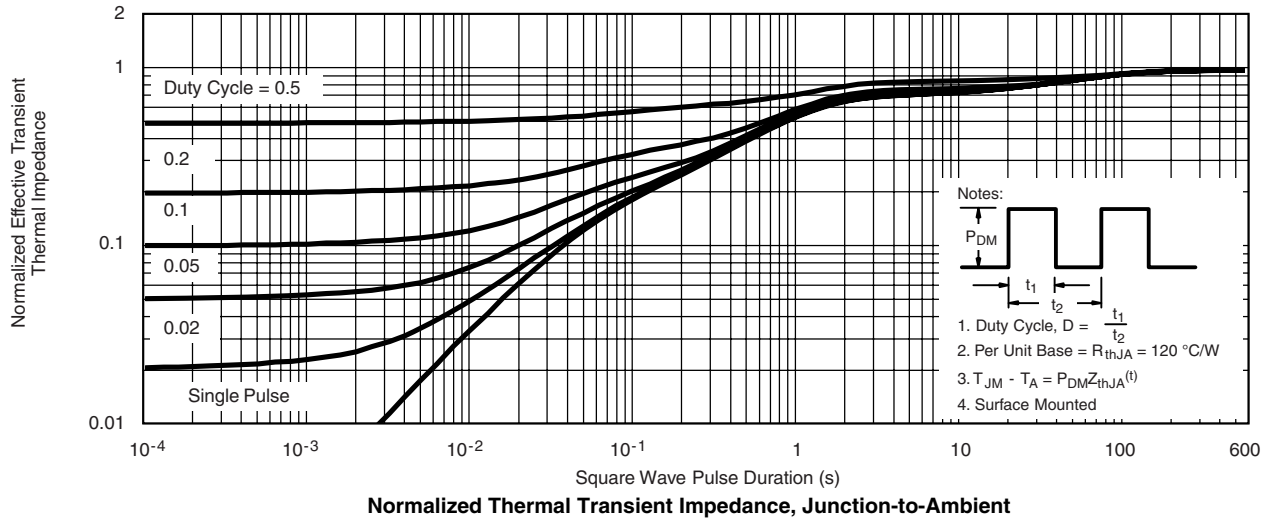
Single Pulse Power, Junction-to-Ambient



* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Case

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



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